

SEMICONDUCTOR GENERAL CATALOG

Microcomputers

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4-Bit Microcontrollers

TLCS-47 Family: TLCS-47E Series

□Mask ROM Versions

Part Number	ROM (kbytes)	RAM (Nibbles)	Minimum Instruction Execution Time (μs) (Note 2)	LED Driver (Ch)	LCD Driver (Ch)	SIO (Ch)	AD Converter (Ch)	Pulse Generator (Ch)	Watchdog Timer	Dual Clocks (Low-Speed Mode (Note 4))	Standby Mode	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP Version	Package				
TMP47C101MG	1	64	(1) 1.3 (2) 1.9	4							Yes	11	(Note1) (1) 4.5 to 5.5 (2) 2.7 to 5.5	-30 to 70	—	SOP16				
TMP47C101PG				4								Yes			11	TMP47P201VPG	DIP16			
TMP47C102MG				4					Yes			Yes			15	TMP47P202VPG	SOP20			
TMP47C102PG				4					Yes			Yes			15	TMP47P202VPG	DIP20			
TMP47C103MG				8	1			Yes				Yes			23	TMP47P403VMG	SOP28			
TMP47C103NG				8	1			Yes				Yes			23	TMP47P403VNG	SDIP28			
TMP47C201MG	2	128	(1) 1 (2) 1.9	4							Yes	11	(1) 4.0 to 5.7 (2) 4.0 to 5.7	-40 to 85	—	SOP16				
TMP47C201PG				4								Yes			11	TMP47P201VPG	DIP16			
TMP47C202MG				4					Yes			Yes			15	TMP47P202VMG	SOP20			
TMP47C202PG				4					Yes			Yes			15	TMP47P202VPG	DIP20			
TMP47C203MG				8	1			Yes				Yes			23	TMP47P403VMG	SOP28			
TMP47C203NG				8	1			Yes				Yes			23	TMP47P403VNG	SDIP28			
TMP47C206MG				(1) 1	5				1	Yes		Yes			15	(1) 4.0 to 5.7	-40 to 85	TMP47P206VMG	SOP20	
TMP47C206PG				(2) 1.9	5				1	Yes		Yes			15	(2) 4.0 to 5.7		TMP47P206VPG	DIP20	
TMP47C241MG				(1) 1.3	5	1	4			Yes					Yes	21	(1) 4.5 to 6.0	-30 to 70	TMP47P241VMG	SOP28
TMP47C241NG				(2) 1.9	5	1	4			Yes					Yes	21	(2) 2.7 to 6.0		TMP47P241VNG	SDIP28
TMP47C243DMG (Note3)				(1) 1 (2) 1.9	8	1	8	1	Yes			Yes			23	(1) 2.7 to 5.5 (2) 2.2 to 5.5	TMP47P443VDMG		SSOP30	
TMP47C243MG (Note3)					8	1	8	1	Yes			Yes			23		TMP47P443VMG		SOP28	
TMP47C243NG (Note3)					8	1	8	1	Yes			Yes			23		TMP47P443VNG		SDIP28	
TMP47C222FG (Note3)				192		20	1	4	1	Yes	Yes	Yes			22	(1) 2.7 to 5.5 (2) 2.2 to 5.5	TMP47P422VFG		QFP44 (14×14 mm)	
TMP47C222NG (Note3)		20	1		4	1	Yes	Yes	Yes	20	TMP47P422VNG	SDIP42								
TMP47C222UG (Note3)		20	1		4	1	Yes	Yes	Yes	22	TMP47P422VUG	LQFP44 (10×10 mm)								
TMP47C422FG (Note3)		20	1		4	1	Yes	Yes	Yes	22	TMP47P422VFG	QFP44 (14×14 mm)								
TMP47C422NG (Note3)	4	256	(1) 1 (2) 1.9		20	1	4	1	Yes	Yes	Yes	20	(1) 2.7 to 5.5 (2) 2.2 to 5.5	TMP47P422VNG	SDIP42					
TMP47C422UG (Note3)					20	1	4	1	Yes	Yes	Yes	22		TMP47P422VUG	LQFP44 (10×10 mm)					
TMP47C443DMG (Note3)				8	1	8	1	Yes			Yes	23		TMP47P443VDMG	SSOP30					
TMP47C443MG (Note3)				8	1	8	1	Yes			Yes	23		TMP47P443VMG	SOP28					
TMP47C443NG (Note3)				8	1	8	1	Yes			Yes	23		TMP47P443VNG	SDIP28					

Note 1) When CR oscillation is used (2.2 V to 5.5 V at 2.5 MHz)

Note 2) Minimum instruction execution times (1) and (2) correspond to power supply voltages (1) and (2).

Note 3) Contains the CPU core for the 470 Series.

Note 4) The minimum instruction execution time in Low-Speed mode is 244 μs (at 32.768 kHz).

- Not recommended for automotive applications.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

8-Bit Microcontrollers

TLCS-870 Family: TLCS-870/C Series

□Flash Versions

Part Number	ROM (kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs) (Note 2)	LED Driver (Ch)	LCD Driver (Ch)	VFT Driver (Ch)	SEI (Ch)	SIO (Ch)	UART (Ch)	UART/SIO (Ch) (Note 1)	UART/I ² C (Ch) (Note 4)	I ² C (Ch)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	8-Bit DA Converter (Ch)	18-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Multiply-Accumulate (MAC)	Program Patch Logic	Watchdog Timer	Dual Clocks (Low-Speed Mode) (Note 5)	Clock Gear	Power-On Reset	Undervoltage Detection	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	Mask ROM Version (See the datasheet for operating conditions.)	Package			
TMP86F409NG	4	512	(1) 0.25 (2) 0.5 (3) 0.5	8			1		1				6			1	2				Yes	Yes				26	(1) 4.5 to 5.5 (2) 3.0 to 5.5 (3) 2.7 to 5.5	(1) -40 to 85 (2) -40 to 85 (3) -20 to 85	—	SDIP32			
TMP86F807MG	8	256	(1) 0.25 (2) 0.5	8			1		1				6			1	2				Yes	Yes				22	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-40 to 85	TMP86C407MG	SOP28			
TMP86F807NG				8			1		1					6			1	2				Yes	Yes						22	TMP86C407NG	SDIP28		
TMP86F808DMG				8			1		1					6			1	2				Yes	Yes						24	TMP86C408DMG	SSOP30		
TMP86F808NG				8			1		1					5			1	2				Yes	Yes						24	TMP86C808DMG	SSOP30		
TMP86F809NG				8			1		1					6			1	2				Yes	Yes						26	TMP86C808NG	SDIP30		
TMP86FH09ANG	16	512	(1) 0.25 (2) 0.5 (3) 0.5	8			1		1				6			1	2				Yes	Yes				26	(1) 4.5 to 5.5 (2) 3.0 to 5.5 (3) 2.7 to 5.5	(1) -40 to 85 (2) -40 to 85 (3) -20 to 85	TMP86C809NG	SDIP32			
TMP86FH12MG				8			1	1					8			1	1	2				Yes	Yes						24	TMP86CH09NG	SSOP30		
TMP86FH46ANG				19			1	1					8			1	2					Yes	Yes						33	TMP86C846NG	SDIP42		
TMP86FH47ADUG				19			1	1					8			1	2					Yes	Yes						35	—	LQFP48 (7×7 mm)		
TMP86FH47AUG				19			1	1					8			1	2					Yes	Yes						35	TMP86C845UG	LQFP44 (10×10 mm)		
TMP86FH92DMG				8			1	1	1				6			1	2					Yes	Yes	Yes	Yes				24	(1) 4.0 to 5.5 (2) 2.7 to 5.5	-20 to 85	—	SSOP30
TMP86FH93NG				8			1	1	1	1			6			1	2					Yes	Yes	Yes	Yes				26			—	SDIP32
TMP86FM29FG	32	1536	(1) 0.25 (2) 0.5	4	32				1				8		1	4					Yes	Yes				39	(1) 2.7 to 3.6 (2) 1.8 to 3.6	-40 to 85	—	QFP64 (14×14 mm)			
TMP86FM29UG				4	32			1			8		1	4			Yes	Yes				Yes	Yes						39	TMP86CM29LUG	LQFP64 (10×10 mm)		
TMP86FM25FG				4	(Note 3) 60		1	1			8		1	4			Yes	Yes				Yes	Yes						42	TMP86CM25AFG	QFP100 (14×20 mm)		
TMP86FM48FG				11			1	1	1	16		2	2				Yes	Yes				Yes	Yes						54	—	QFP64 (14×14 mm)		
TMP86FM48UG				11			1	1	1	16		2	2				Yes	Yes				Yes	Yes						54	—	LQFP64 (10×10 mm)		
TMP86FP24FG				48			12	24		1	1		8		2	2	Yes	Yes	Yes				Yes	Yes	Yes					54	—	LQFP80 (12×12 mm)	
TMP86FS27FG	60	1024	(1) 0.25 (2) 0.5 (3) 0.5	8	40		1	1				8			1	2					Yes	Yes				55	(1) 4.5 to 5.5 (2) 2.7 to 5.5 (3) 2.7 to 5.5	(1) -40 to 85 (2) -40 to 85 (3) -20 to 85	TMP86CM27FG	QFP80 (14×20 mm)			
TMP86FS23UG				5	32		1	1		8	1	4	Yes		Yes	Yes						Yes	Yes						51	TMP86CM23AUG	LQFP64 (10×10 mm)		
TMP86FS28DFG				40			1	1		8	2	4			Yes	Yes						Yes	Yes						62	TMP86CP27AFG	LQFP80 (12×12 mm)		
TMP86FS28FG				40			1	1		8	2	4			Yes	Yes						Yes	Yes						62	TMP86CS28DFG	QFP80 (14×20 mm)		
TMP86FS49BFG				13			2	2		1	16	2	4			Yes	Yes						Yes	Yes						56	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-40 to 85	TMP86CH49FG
TMP86FS49BUG	13			2	2		1	16	2	4			Yes	Yes					Yes	Yes				56	TMP86CM49FG	LQFP64 (10×10 mm)							

Note 1) Configurable as UART or SIO.

Note 2) Minimum instruction execution times (1) and (3) correspond to power supply voltages (1) and (3).

Note 3) Up to 960 LCD segments (60 seg. x 16 com.)

Note 4) Configurable as I²C or UART.

Note 5) The minimum instruction execution time in Low-Speed mode is 122 μs (at 32.768 kHz).

• Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TLCS-870 Family: TLCS-870/X Series

Flash Versions

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs)	LED Driver (Ch)	VFT Driver (Ch)	SIO (Ch)	UART (Ch)	I ² C (Ch)	PWM Generator (Ch)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	16-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Motor Controller (Ch)	Remote Control Preprocessor	Program Patch Logic	Watchdog Timer	Dual Clocks (Low-Speed Mode)	Internal Oscillator	Oscillation Frequency Detector	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	Mask ROM Version (See the datasheet for operating conditions.)	Package	
TMP88F846UG	8	512	0.2	16	(Note1) 1	(Note1) 1						8	2	2	1		Yes		Yes		33	4.5 to 5.5	-40 to 85	—	LQFP44 (10×10 mm)	
TMP88FH41UG	16			16	(Note1) 1	(Note1) 1							8	2	2	1		Yes						33		TMP88CH41UG
TMP88FW45AFG	120			4096	24	1	2		2				16	2	4	2			Yes		Yes					71

Note 1) Cannot be used at the same time because their I/O pins are multiplexed.

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TLCS-870 Family: TLCS-870/C1 Series

□Flash Versions

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs) (Note 3)	LED Driver (Ch)	LCD Driver (Ch)	SEL (Ch)	SIO (Ch)	UART (Ch)	UART/SIO (Ch) (Note 1)	IC/SIO (Ch) (Note 1)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	8-Bit DA Converter (Ch)	18-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	10-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Multiply-Accumulate (MAC)	Program Patch Logic	Watchdog Timer	Dual Clocks (Low-Speed Mode (Note 4))	Clock Gear	Power-On Reset	Undervoltage Detection	On-Chip Debug Unit (Note 2)	Internal Oscillator	I/O Port (Pins) (Note 6)	Power Supply Voltage (V)	Operating Temperature (°C)	Mask ROM Version (See the datasheet for operating conditions.)	Package
TMP89FH40NG	16		(1) 0.1 (2) 0.238 (3) 0.5	6				1	1	1		8			2		4			Yes	Yes	Yes	Yes	Yes	Yes	Yes	36	(1) 4.3 to 5.5 (2) 2.7 to 5.5 (3) 2.2 to 5.5	—	SDIP42	
TMP89FH42LUG			(1) 0.238 (2) 0.5	8					1	1	1		8			2		4			Yes	Yes	Yes	Yes	Yes	Yes	40	(Note5) (1) 2.7 to 3.6 (2) 2.2 to 3.6		LOFP44 (10x10 mm)	
TMP89FH42UG			(1) 0.1 (2) 0.238 (3) 0.5	8					1	1	1		8			2		4			Yes	Yes	Yes	Yes	Yes	Yes	40	(1) 4.3 to 5.5 (2) 2.7 to 5.5 (3) 2.2 to 5.5		TMP89CH42UG (Note 7)	
TMP89FH46DUG			(1) 0.1 (2) 0.238 (3) 0.5	8					1	1	1		8			2		4			Yes	Yes	Yes	Yes	Yes	Yes	42	(2) 2.7 to 5.5 (3) 2.2 to 5.5		TMP89CH46DUG	
TMP89FH46LDUG			(1) 0.238 (2) 0.5	8					1	1	1		8			2		4			Yes	Yes	Yes	Yes	Yes	Yes	42	(Note5) (1) 2.7 to 3.6 (2) 2.2 to 3.6		LOFP48 (7x7 mm)	
TMP89FM40NG	2048		(1) 0.1 (2) 0.238 (3) 0.5	6				1	1	1		8			2		4			Yes	Yes	Yes	Yes	Yes	Yes	Yes	36	(1) 4.3 to 5.5 (2) 2.7 to 5.5 (3) 2.2 to 5.5	—	SDIP42	
TMP89FM42AUG			(1) 0.1 (2) 0.19 (3) 0.5	8					1	1	1		8			2		4			Yes	Yes	Yes	Yes	Yes	Yes	40	(1) 2.7 to 3.6 (2) 2.2 to 3.6		LOFP44 (10x10 mm)	
TMP89FM42KUG			(1) 0.19 (2) 0.5	8					1	1	1		8			2		4			Yes	Yes	Yes	Yes	Yes	Yes	40	(1) 2.7 to 3.6 (2) 2.2 to 3.6			
TMP89FM42LUG			(1) 0.238 (2) 0.5	8					1	1	1		8			2		4			Yes	Yes	Yes	Yes	Yes	Yes	40	(1) 4.3 to 5.5 (2) 2.7 to 5.5 (3) 2.2 to 5.5		TMP89CM42UG (Note 7)	
TMP89FM42UG			(1) 0.1 (2) 0.238 (3) 0.5	8					1	1	1		8			2		4			Yes	Yes	Yes	Yes	Yes	Yes	40	(Note5) (1) 2.7 to 3.6 (2) 2.2 to 3.6			
TMP89FM43LQG	32		(1) 0.238 (2) 0.5	8				1	1	1		8			2		4			Yes	Yes	Yes	Yes	Yes	Yes	38	(1) 2.7 to 3.6 (2) 2.2 to 3.6	—	VQON44 (5.3x5.3 mm)		
TMP89FM46ADUG			(1) 0.1 (2) 0.19 (3) 0.5	8					1	1	1		8			2		4			Yes	Yes	Yes	Yes	Yes	Yes	42		(1) 4.3 to 5.5 (2) 2.7 to 5.5 (3) 2.2 to 5.5		
TMP89FM46DUG			(1) 0.1 (2) 0.238 (3) 0.5	8					1	1	1		8			2		4			Yes	Yes	Yes	Yes	Yes	Yes	42		(3) 2.2 to 5.5	TMP89CM46DUG	LOFP48 (7x7 mm)
TMP89FM46KDUG			(1) 0.19 (2) 0.5	8					1	1	1		8			2		4			Yes	Yes	Yes	Yes	Yes	Yes	42		(Note5) (1) 2.7 to 3.6 (2) 2.2 to 3.6		
TMP89FM82DUG			0.125	16					1				8			2		4		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		39	4.5 to 5.5	
TMP89FS60FG	60		(1) 0.125 (2) 0.238	8				1	2	1		16			2		4			Yes	Yes	Yes	Yes	Yes	Yes	Yes	58	(1) 4.3 to 5.5 (2) 3.0 to 5.5	—	QFP64 (14x14 mm)	
TMP89FS60UG			(3) 0.238	8					1	2	1		16			2		4			Yes	Yes	Yes	Yes	Yes	Yes	58	(3) 2.7 to 3.0		LOFP64 (10x10 mm)	
TMP89FW20UG	124	3072	(1) 0.0625 (2) 0.125	8	32			1	3	1		8			2	1	4			Yes	Yes	Yes	Yes	Yes	Yes	Yes	52	(1) 2.7 to 5.5 (2) 1.8 to 5.5	-40 to 85	QFP80 (14x20 mm)	
TMP89FW24DFG				12	40					1	3	1		8			2	1	4			Yes	Yes	Yes	Yes	Yes	Yes			68	LOFP80 (12x12 mm)
TMP89FW24FG				12	40					1	3	1		8			2	1	4			Yes	Yes	Yes	Yes	Yes	Yes			68	

Note 1) Configurable as UART or SIO. Also, selectable from IC and SIO.

One SIO channel can be used simultaneously. As for the TMP89FS60, up to two SIO channels can be used simultaneously.

Note 2) The on-chip debug unit is available with the flash versions, but not with the mask ROM versions.

Note 3) Minimum instruction execution times (1) and (3) correspond to power supply voltages (1) and (3).

Note 4) The minimum instruction execution time in Low-Speed mode is 122 μs (at 32.768 kHz).

Note 5) The erase/program power supply voltage is 3.0 to 3.6 V.

Note 6) Two ports are reserved for high-speed oscillator pins and cannot be used as I/O ports.

Note 7) The AD conversion accuracy differs between the flash and mask ROM versions. For details, see the datasheet.

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TLCS-870 Family: TLCS-870/C Series

□Mask ROM Versions

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs) (Note 3)	LED Driver (Ch)	LCD Driver (Ch)	VFT Driver (Ch)	SEI (Ch)	SIO (Ch)	UART (Ch)	UART/SIO (Ch) (Note 1)	UART/I ² C (Ch) (Note 4)	I ² C (Ch)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	8-Bit DA Converter (Ch)	18-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	10-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Multiply-Accumulate (MAC)	Program Patch Logic	Watchdog Timer	Dual Clocks (Low-Speed Mode (Note 5))	Clock Gear	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP/Flash Version (See the datasheet for operating conditions.)	Package		
TMP86P202MG (Note2)	2	128	0.5	2									4					2			Yes			14	3.3 to 5.5	-40 to 85	—	SOP20			
TMP86P202PG (Note2)				2										4					2			Yes						14	DIP20		
TMP86P203MG (Note2)			1.6	2										4					2			Yes			14			4.5 to 5.5	SOP20		
TMP86P203PG (Note2)				2										4					2			Yes			14			DIP20			
TMP86C407MG	4	256	(1) 0.25 (2) 0.5	8			1	1					6			1	2				Yes	Yes		22	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-40 to 85	—	TMP86P807MG TMP86F807MG	SOP28		
TMP86C407NG				8			1	1						6				1	2				Yes	Yes					22	TMP86P807NG TMP86F807NG	SDIP28
TMP86C408DMG			8			1	1						6				1	2				Yes	Yes		24			TMP86P808DMG TMP86F808DMG	SSOP30		
TMP86C408NG			8			1	1						6				1	2				Yes	Yes		24			TMP86P808NG TMP86F808NG	SDIP30		
TMP86C420FG			(1) 0.25 (2) 0.5	4	32				1					8			1	2					Yes	Yes				39	(1) 4.5 to 5.5 (2) 2.7 to 5.5	TMP86P820FG	QFP64 (14×14 mm)
TMP86C420UG			(3) 0.95	4	32				1					8			1	2					Yes	Yes				39	(3) 1.8 to 5.5	TMP86P820UG	LQFP64 (10×10 mm)
TMP86C807MG	8	512	(1) 0.25 (2) 0.5	8			1	1					6			1	2					Yes	Yes		22	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-40 to 85	—	TMP86P807MG TMP86F807MG	SOP28	
TMP86C807NG				8			1	1						6				1	2				Yes	Yes					22	TMP86P807NG TMP86F807NG	SDIP28
TMP86C808DMG			8			1	1						6				1	2				Yes	Yes		24	TMP86P808DMG TMP86F808DMG			SSOP30		
TMP86C808NG			8			1	1						6				1	2				Yes	Yes		24	TMP86P808NG TMP86F808NG			SDIP30		
TMP86C820FG			(1) 0.25 (2) 0.5	4	32				1					8			1	2					Yes	Yes		39			(1) 4.5 to 5.5 (2) 2.7 to 5.5	TMP86P820FG	QFP64 (14×14 mm)
TMP86C820UG			(3) 0.95	4	32				1					8			1	2					Yes	Yes		39			(3) 1.8 to 5.5	TMP86P820UG	LQFP64 (10×10 mm)
TMP86C845UG	0.5	19					1						8			2					Yes	Yes		35	2.7 to 5.5	TMP86PM47AUG TMP86PH47UG TMP86FH47AUG	LQFP44 (10×10 mm)				
TMP86C809NG	8	512	(1) 0.25 (2) 0.5	8			1	1					6			1	2				Yes	Yes		26	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-40 to 85	—	TMP86P809NG TMP86FH09ANG	SDIP32		
TMP86C822UG			(1) 0.25 (2) 0.5 (3) 0.95 (4) 0.95	3	23				1	1				4			1	2					Yes	Yes				33	(1) 4.5 to 5.5 (2) 2.7 to 5.5 (3) 2.0 to 5.5 (4) 1.8 to 5.5	TMP86PH22UG	LQFP44 (10×10 mm)
TMP86C829BFG			(1) 0.25 (2) 0.5 (3) 0.95	4	32					1				8			1	4					Yes	Yes				39	(1) 4.5 to 5.5 (2) 2.7 to 5.5 (3) 1.8 to 5.5	TMP86PM29BFG	QFP64 (14×14 mm)
TMP86C829BUG				4	32					1				8			1	4					Yes	Yes				39	LQFP64 (10×10 mm)		
TMP86C846NG			19						1	1				8			1	2					Yes	Yes				33	TMP86PH46NG TMP86PM46NG TMP86FH46ANG	SDIP42	
TMP86C847UG			19						1	1				8			1	2					Yes	Yes				35	TMP86PM47AUG TMP86PH47UG TMP86FH47AUG	LQFP44 (10×10 mm)	
TMP86CH06AUG	16	256	(1) 0.25 (2) 0.5 (3) 0.95 (4) 0.95	8				1	1							1	2				Yes	Yes		35	(1) 4.5 to 5.5 (2) 2.7 to 5.5 (3) 2.0 to 5.5 (4) 1.8 to 5.5	-40 to 85	—	TMP86PH06UG	LQFP44 (10×10 mm)		
TMP86CH06NG			(1) 0.25 (2) 0.5 (3) 0.95	8				1	1								1	2				Yes	Yes	Yes	35			(1) 4.5 to 5.5 (2) 2.7 to 5.5 (3) 1.8 to 5.5	TMP86PH06NG	SDIP42	
TMP86CH09NG			(1) 0.25	8				1	1					6			1	2				Yes	Yes		26			(1) 4.5 to 5.5	TMP86FH09ANG	SDIP32	
TMP86CH12MG			(2) 0.5	8				1	1					8			1	1	2			Yes	Yes		24			(2) 2.7 to 5.5	TMP86FH12MG	SSOP30	

Note 1) Configurable as UART or SIO.

Note 2) Contains an OTP memory.

Note 3) Minimum instruction execution times (1) to (4) correspond to power supply voltages (1) to (4).

Note 4) Configurable as I²C or UART.

Note 5) The minimum instruction execution time in Low-Speed mode is 122 μs (at 32.768 kHz).

• Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TLCS-870 Family: TLCS-870/C Series

□Mask ROM Versions (Continued)

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs) (Note 3)	LED Driver (Ch)	LCD Driver (Ch)	VFT Driver (Ch)	SEI (Ch)	SIO (Ch)	UART (Ch)	UART/SIO (Ch) (Note 1)	UART/I ² C (Ch) (Note 4)	I ² C (Ch)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	8-Bit DA Converter (Ch)	18-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	10-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Multiply-Accumulate (MAC)	Program Patch Logic	Watchdog Timer	Dual Clocks (Low-Speed Mode (Note 5))	Clock Gear	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP/Flash Version (See the datasheet for operating conditions.)	Package			
TMP86CH21AUG	16	512	(1) 0.25 (2) 0.5 (3) 0.95 (4) 0.95	4	32					1			8			1			4			Yes	Yes		39	(1) 4.5 to 5.5 (2) 2.7 to 5.5 (3) 2.0 to 5.5 (4) 1.8 to 5.5	(1) -40 to 85 (2) -40 to 85 (3) -40 to 85 (4) -20 to 85	TMP86PM29BUG	LQFP64 (10×10 mm)			
TMP86CH21FG			(1) 0.25 (2) 0.5 (3) 0.95	4	32						1			8			1			4			Yes	Yes		39	(1) 4.5 to 5.5 (2) 2.7 to 5.5 (3) 1.8 to 5.5	-40 to 85	TMP86PM29BFG	QFP64 (14×14 mm)		
TMP86CH22UG			(1) 0.25 (2) 0.5 (3) 0.95 (4) 0.95	3	23					1	1				4			1			2			Yes	Yes		33	(1) 4.5 to 5.5 (2) 2.7 to 5.5 (3) 2.0 to 5.5 (4) 1.8 to 5.5	(1) -40 to 85 (2) -40 to 85 (3) -40 to 85 (4) -20 to 85	TMP86PH22UG	LQFP44 (10×10 mm)	
TMP86CH46ANG			(1) 0.25 (2) 0.5 (3) 0.95 (4) 0.95	19						1	1				8			1			2			Yes	Yes		33	(1) 4.5 to 5.5 (2) 2.7 to 5.5 (3) 2.0 to 5.5 (4) 1.8 to 5.5	(1) -40 to 85 (2) -40 to 85 (3) -40 to 85 (4) -20 to 85	TMP86PH46NG TMP86PM46NG TMP86FH46ANG	SDIP42	
TMP86CH47AUG			(1) 0.25 (2) 0.5 (3) 0.95	19						1	1				8			1			2			Yes	Yes		35	(1) 4.5 to 5.5 (2) 2.7 to 5.5 (3) 1.8 to 5.5	(1) -40 to 85 (2) -40 to 85 (3) -40 to 85 (4) -20 to 85	TMP86PM47AUG TMP86PH47UG TMP86FH47AUG	LQFP44 (10×10 mm)	
TMP86CH49FG			(1) 0.25 (2) 0.5 (3) 0.95	13						2	2			1	16			2			4			Yes	Yes		56	(1) 4.5 to 5.5 (2) 2.7 to 5.5 (3) 1.8 to 5.5	-40 to 85	TMP86PM49FG TMP86FS49BFG	QFP64 (14×14 mm)	
TMP86CH72FG			(1) 0.25 (2) 0.5	1024	(1) 0.25 (2) 0.5		16			1	1		1	6				1			2		Yes	Yes	Yes		54	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-30 to 70	TMP86PM72FG	QFP64 (14×14 mm)	
TMP86CH29BFG			(1) 0.25 (2) 0.5 (3) 0.95	4	32						1				8			1			4			Yes	Yes		39	(1) 4.5 to 5.5 (2) 2.7 to 5.5 (3) 1.8 to 5.5	-40 to 85	TMP86PM29BFG	LQFP64 (10×10 mm)	
TMP86CH29BUG			(1) 0.25 (2) 0.5 (3) 0.95	4	32						1				8			1			4			Yes	Yes		39	(1) 4.5 to 5.5 (2) 2.7 to 5.5 (3) 1.8 to 5.5	-40 to 85	TMP86PM29BUG	LQFP64 (10×10 mm)	
TMP86CK74AFG			24	1024	(1) 0.25 (2) 0.5	2		16							8			2			2			Yes	Yes		70	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-30 to 70	TMP86PM74AFG	QFP80 (14×20 mm)	
TMP86CM27FG			(1) 0.25 (2) 0.5		8	40					1	1				8			1			2			Yes	Yes		55	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-40 to 85	TMP86PS27FG TMP86FS27FG	QFP80 (14×20 mm)
TMP86CM46ANG			(1) 0.25 (2) 0.5 (3) 0.95		19						1	1				8			1			2			Yes	Yes		33	(1) 4.5 to 5.5 (2) 2.7 to 5.5 (3) 1.8 to 5.5	-40 to 85	TMP86PM46NG	SDIP42
TMP86CM47AUG			(1) 0.25 (2) 0.5 (3) 0.95		19						1	1				8			1			2			Yes	Yes		35	(1) 4.5 to 5.5 (2) 2.7 to 5.5 (3) 1.8 to 5.5	-40 to 85	TMP86PM47AUG	LQFP44 (10×10 mm)
TMP86CM49FG			(1) 0.25 (2) 0.5 (3) 0.95		13						2	2		1	16			2				4			Yes	Yes		56	(1) 4.5 to 5.5 (2) 2.7 to 5.5 (3) 1.8 to 5.5	-40 to 85	TMP86PM49FG TMP86FS49BFG	QFP64 (14×14 mm)
TMP86CM49UG			(1) 0.25 (2) 0.5 (3) 0.95		13						2	2		1	16			2				4			Yes	Yes		56	(1) 4.5 to 5.5 (2) 2.7 to 5.5 (3) 1.8 to 5.5	-40 to 85	TMP86PM49UG TMP86FS49BUG	LQFP64 (10×10 mm)
TMP86CM72FG			(1) 0.25 (2) 0.5				16				1	1		1	6				1			2		Yes	Yes	Yes		54	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-30 to 70	TMP86PM72FG	QFP64 (14×14 mm)
TMP86CM23AUG	(1) 0.25 (2) 0.5 (3) 0.95 (4) 0.95	5	32						1	1				8			1			4	Yes		Yes	Yes		51	(1) 3.5 to 5.5 (2) 2.7 to 5.5 (3) 2.0 to 5.5 (4) 1.8 to 5.5	(1) -40 to 85 (2) -40 to 85 (3) -40 to 85 (4) -20 to 85	TMP86PM23UG TMP86FS23UG	LQFP64 (10×10 mm)		
TMP86CM29BFG	(1) 0.25 (2) 0.5 (3) 0.95	4	32							1				8			1			4			Yes	Yes		39	(1) 4.5 to 5.5 (2) 2.7 to 5.5 (3) 1.8 to 5.5	-40 to 85	TMP86PM29BFG	QFP64 (14×14 mm)		
TMP86CM29BUG	(1) 0.25 (2) 0.5 (3) 0.95	4	32							1				8			1			4			Yes	Yes		39	(1) 4.5 to 5.5 (2) 2.7 to 5.5 (3) 1.8 to 5.5	-40 to 85	TMP86PM29BUG	LQFP64 (10×10 mm)		
TMP86CM29LUG	(1) 0.25 (2) 0.5 (3) 0.95	4	32							1				8			1			4			Yes	Yes		39	(1) 2.7 to 3.6 (2) 1.8 to 3.6	-40 to 85	TMP86FM29UG	QFP100 (14×20 mm)		
TMP86CM25AFG	(1) 0.25 (2) 0.5	4	(Note2) 60						1	1				8			1			4			Yes	Yes		42	(1) 2.7 to 3.6 (2) 1.8 to 3.6	-40 to 85	TMP86FM25FG	QFP100 (14×20 mm)		
TMP86CM25FG	(1) 0.25 (2) 0.5 (3) 0.95	4	(Note2) 60						1	1				8			1			4			Yes	Yes		42	(1) 4.5 to 5.5 (2) 2.7 to 5.5 (3) 1.8 to 5.5	-40 to 85	TMP86PS25FG	QFP100 (14×20 mm)		
TMP86CM74AFG	(1) 0.25 (2) 0.5	2			16				1					8			2			2			Yes	Yes		70	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-30 to 70	TMP86PM74AFG	QFP80 (14×20 mm)		

Note 1) Configurable as UART or SIO.

Note 2) Up to 960 LCD segments (60 seg. x 16 com.)

Note 3) Minimum instruction execution times (1) to (4) correspond to power supply voltages (1) to (4).

Note 4) Configurable as I²C or UART.

Note 5) The minimum instruction execution time in Low-Speed mode is 122 μs (at 32.768 kHz).

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs) (Note 3)	LED Driver (Ch)	LCD Driver (Ch)	SEI (Ch)	SIO (Ch)	UART (Ch)	UART/SIO (Ch) (Note 1)	UART/I ² C (Ch) (Note 4)	I ² C (Ch)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	8-Bit DA Converter (Ch)	18-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	10-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Multiply-Accumulate (MAC)	Program Patch Logic	Watchdog Timer	Dual Clocks (Low-Speed Mode (Note 5))	Clock Gear	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP/Flash Version (See the datasheet for operating conditions.)	Package
TMP86CP27AFG		1024	(1) 0.25 (2) 0.5	8	40	1	1					8					1	2			Yes	Yes		55	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-40 to 85	TMP86PS27FG TMP86FS27FG	QFP80 (14×20 mm)
TMP86CP23AUG	48	2048	(1) 0.25 (2) 0.5 (3) 0.95 (4) 0.95	5	32	1	1					8		1				4	Yes		Yes	Yes		51	(1) 3.5 to 5.5 (2) 2.7 to 5.5 (3) 2.0 to 5.5 (4) 1.8 to 5.5	(1) -40 to 85 (2) -40 to 85 (3) -40 to 85 (4) -20 to 85	TMP86PS23UG TMP86FS23UG	LQFP64 (10×10 mm)
TMP86CS44UG		1024	(1) 0.25 (2) 0.5	19		1	1					8	1		2		2				Yes	Yes		35	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-40 to 85	TMP86PS44UG	LQFP44 (10×10 mm)
TMP86CS25ADFG			(1) 0.25 (2) 0.5	4	(Note2) 60	1	1					8		1				4			Yes	Yes		42	(1) 4.5 to 5.5 (2) 2.7 to 5.5	(1) -40 to 85 (2) -40 to 85	—	QFP100 (14×14 mm)
TMP86CS25AFG			(3) 0.95 (4) 0.95	4	(Note2) 60	1	1					8		1				4			Yes	Yes		42	(3) 2.0 to 5.5 (4) 1.8 to 5.5	(3) -40 to 85 (4) -20 to 85	TMP86PS25FG	QFP100 (14×20 mm)
TMP86CS28DFG			(1) 0.25		40		1	1				8			2		4				Yes	Yes		62	(1) 4.0 to 5.5	-40 to 85	TMP86FS28DFG	LQFP80 (12×12 mm)
TMP86CS28FG	60	2048	(2) 0.5		40		1	1				8			2		4				Yes	Yes		62	(2) 2.7 to 5.5		TMP86FS28FG	QFP80 (14×20 mm)
TMP86CS49FG			(1) 0.25 (2) 0.5	13		2	2			1		16			2		4				Yes	Yes		56	(1) 4.5 to 5.5 (2) 2.7 to 5.5	(1) -40 to 85 (2) -40 to 85	TMP86FS49BFG	QFP64 (14×14 mm)
TMP86CS49UG			(3) 0.95 (4) 0.95	13		2	2			1		16			2		4				Yes	Yes		56	(3) 2.0 to 5.5 (4) 1.8 to 5.5	(3) -40 to 85 (4) -20 to 85	TMP86FS49BUG	LQFP64 (10×10 mm)
TMP86CS64AFG			(1) 0.25 (2) 0.5	16		2	1					16			2		4				Yes	Yes		91	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-40 to 85	TMP86PS64FG	QFP100 (14×20 mm)

Note 1) Configurable as UART or SIO.

Note 2) Up to 960 LCD segments (60 seg. x 16 com.)

Note 3) Minimum instruction execution times (1) to (4) correspond to power supply voltages (1) to (4).

Note 4) Configurable as I²C or UART.

Note 5) The minimum instruction execution time in Low-Speed mode is 122 μs (at 32.768 kHz).

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TLCS-870 Family: TLCS-870 Series

□Mask ROM Versions

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs) (Note 3)	LED Driver (Ch)	LCD Driver (Ch)	VFT Driver (Ch)	SIO (Ch)	UART (Ch)	I ² C (Ch) (Note 1)	High-Speed Serial Output (Ch)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	6-Bit Comparator (Ch)	18-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Watchdog Timer	Dual Clocks (Low-Speed Mode (Note 4))	Clock Gear	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP Version (See the datasheet for operating conditions.)	Package					
TMP87C405AMG	4	256	(1) 0.5	6										2	2	Yes	Yes	Yes	22	(1) 4.5 to 5.5	-30 to 70	TMP87P808MG	SOP28						
TMP87C408DMG (Note2)			(2) 0.95	6		1					6				2	2	Yes	Yes	Yes	22		(2) 2.7 to 5.5	—	SSOP30					
TMP87C408LMG			0.95	6		1					6				2	2	Yes	Yes	Yes	22		1.8 to 4.0	TMP87P808LMG	SOP28					
TMP87C408LNG				6		1					6				2	2	Yes	Yes	Yes	22			TMP87P808LNG	SDIP28					
TMP87C408MG			0.95	256	(1) 0.5	6		1				6				2	2	Yes	Yes	Yes		22	(1) 4.5 to 5.5	TMP87P808MG	SOP28				
TMP87C408NG						6		1					6				2	2	Yes	Yes		Yes	22	(2) 2.7 to 5.5	TMP87P808NG	SDIP28			
TMP87C409BMG			0.95	512	(2) 0.95	6				1			8			1	2	Yes				22	(1) 4.5 to 5.5	TMP87P809MG	SOP28				
TMP87C409BNG						6				1			8				1	2	Yes				22	(2) 2.2 to 5.5	TMP87P809NG	SDIP28			
TMP87C446NG		0.95	512	(2) 0.95	8		1			1	8				2	2	Yes	Yes	Yes	35		(1) 4.5 to 5.5	TMP87PH46NG	SDIP42					
TMP87C447UG					8		1			1	8					2	2	Yes	Yes	Yes		37	(2) 2.7 to 5.5	TMP87PH47UG	LQFP44 (10×10 mm)				
TMP87C807UG		8	256	0.95	8		1			1					2	2	Yes	Yes	Yes	37		1.8 to 4.0	-40 to 85	TMP87P807UG	LQFP44 (10×10 mm)				
TMP87C808LMG					6		1					6					2	2	Yes	Yes				Yes	22	TMP87P808LMG	SOP28		
TMP87C808LNG					6		1					6					2	2	Yes	Yes				Yes	22	TMP87P808LNG	SDIP28		
TMP87C808MG					0.95	256	(1) 0.5	6		1				6				2	2	Yes				Yes	Yes	22	(1) 4.5 to 5.5	TMP87P808MG	SOP28
TMP87C808NG								6		1					6				2	2				Yes	Yes	Yes	22	(2) 2.7 to 5.5	TMP87P808NG
TMP87C809BMG					0.95	512	(2) 0.95	6				1			8			1	2	Yes						22	(1) 4.5 to 5.5	TMP87P809MG	SOP28
TMP87C809BNG	6										1			8				1	2	Yes					22	(2) 2.2 to 5.5	TMP87P809NG	SDIP28	
TMP87C840FG	0.95				512	(2) 0.95	8		2				8				2	2	Yes	Yes	Yes			56	(1) 4.5 to 6.0	TMP87PH40AFG	QFP64 (14×20 mm)		
TMP87C840NG			8				2					8				2	2	Yes	Yes	Yes	56	(2) 2.7 to 6.0		TMP87PH40ANG	SDIP64				
TMP87C841FG	0.95		512	(2) 0.95	8		2				16				2	2	Yes	Yes	Yes	56	(1) 4.5 to 5.5 (2) 2.7 to 5.5	TMP87PM41FG		QFP64 (14×20 mm)					
TMP87C841NG					8		2					16				2	2	Yes	Yes	Yes		56		TMP87PM41NG	SDIP64				
TMP87C841UG	8			2					16					2	2	Yes	Yes	Yes	56	TMP87PM41UG	LQFP64 (10×10 mm)								
TMP87C814FG	0.5		512	(1) 0.5		16	1				8				2	2	Yes	Yes	Yes	55	4.5 to 5.5	-30 to 70		TMP87PM14FG	QFP64 (14×20 mm)				
TMP87C814NG						16	1					8				2	2	Yes	Yes	Yes				55	TMP87PM14NG	SDIP64			
TMP87C846NG					(2) 0.95	8		1			1	8					2	2	Yes	Yes				Yes	35	(1) 4.5 to 5.5 (2) 2.7 to 5.5	TMP87PH46NG	SDIP42	
TMP87C847LUG					0.95	8		1			1	8					2	2	Yes	Yes				Yes	37	1.8 to 4.0	TMP87PH47LUG	LQFP44 (10×10 mm)	
TMP87C847UG		0.95			8		1			1	8					2	2	Yes	Yes	Yes			37	(1) 4.5 to 5.5 (2) 2.7 to 5.5	TMP87PH47UG	LQFP44 (10×10 mm)			
TMP87CC40FG		0.95			512	(2) 0.95	8		2				8				2	2	Yes	Yes			Yes	56	(1) 4.5 to 6.0 (2) 2.7 to 6.0	TMP87PH40AFG	QFP64 (14×20 mm)		
TMP87CC40NG							8		2					8				2	2	Yes			Yes	Yes	56	(2) 2.7 to 6.0	TMP87PH40ANG	SDIP64	
TMP87CC41FG		0.95			512	(2) 0.95	8		2				16				2	2	Yes	Yes			Yes	56	(1) 4.5 to 5.5 (2) 2.7 to 5.5	TMP87PM41FG	QFP64 (14×20 mm)		
TMP87CC41NG	8			2							16				2	2	Yes	Yes	Yes	56	TMP87PM41NG	SDIP64							
TMP87CC41UG	8		2					16					2	2	Yes	Yes	Yes	56	TMP87PM41UG	LQFP64 (10×10 mm)									
TMP87CH14FG	0.5	16	(1) 0.5		16	1				8				2	2	Yes	Yes	Yes	55	4.5 to 5.5	-30 to 70	TMP87PM14FG	QFP64 (14×20 mm)						
TMP87CH14NG					16	1					8				2	2	Yes	Yes	Yes			55	TMP87PM14NG	SDIP64					
TMP87CH40FG				(2) 0.95	8		2				8					2	2	Yes	Yes			Yes	56	(1) 4.5 to 6.0 (2) 2.7 to 6.0	TMP87PH40AFG	QFP64 (14×20 mm)			
TMP87CH40NG				8		2					8					2	2	Yes	Yes			Yes	56	(2) 2.7 to 6.0	TMP87PH40ANG	SDIP64			

Note 1) Either I²C bus or SIO module can be selected via software.

Note 2) A 125°C version is available for the TMP87C408DM. For further information, please contact your nearest Toshiba sales representative.

Note 3) Minimum instruction execution times (1) and (2) correspond to power supply voltages (1) and (2).

Note 4) The minimum instruction execution time in Low-Speed mode is 122 μs (at 32.768 kHz).

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs) (Note 2)	LED Driver (Ch)	LCD Driver (Ch)	VFT Driver (Ch)	SIO (Ch)	UART (Ch)	I ² C (Ch) (Note 1)	High-Speed Serial Output (Ch)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	6-Bit Comparator (Ch)	18-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Watchdog Timer	Dual Clocks (Low-Speed Mode (Note 3))	Clock Gear	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP Version (See the datasheet for operating conditions.)	Package		
TMP87CH41FG	16	512	(1) 0.5 (2) 0.95	8			2					16		2	2	Yes	Yes			56	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-40 to 85	TMP87PM41FG	QFP64 (14×20 mm)		
TMP87CH41NG				8			2						16		2	2	Yes	Yes					56	TMP87PM41NG	SDIP64	
TMP87CH41UG				8			2						16		2	2	Yes	Yes					56	TMP87PM41UG	LQFP64 (10×10 mm)	
TMP87CH46NG					0.95	8			1			1	8			2	2	Yes	Yes			35	1.8 to 4.0	-30 to 70	TMP87PH46NG	SDIP42
TMP87CH47LUG			8				1			1	8			2	2	Yes	Yes			37	TMP87PH47LUG	LQFP44 (10×10 mm)				
TMP87CH47UG			8				1			1	8			2	2	Yes	Yes			37	TMP87PH47UG					
TMP87CH48DFG					(1) 0.5 (2) 0.95	8			1	1				16		2	2	Yes	Yes			56	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-40 to 85	TMP87PH48DFG	QFP64 (14×14 mm)
TMP87CH48UG			8				1	1					16		2	2	Yes	Yes			56	TMP87PH48UG			LQFP64 (10×10 mm)	
TMP87CH74AFG					0.5	16	16	1		1			12			2	2	Yes	Yes			71	4.5 to 5.5		TMP87PM74FG	QFP80 (14×20 mm)
TMP87CH75FG			16	16		1	1			16					2	2	Yes	Yes			89	TMP87PM75FG			QFP100 (14×20 mm)	
TMP87CH21CDFG					(1) 0.5 (2) 0.95	1	32						8			2	2	Yes	Yes			52	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-30 to 70	TMP87PP21DFG	LQFP80 (12×12 mm)
TMP87CH21CFG			1	32						8				2	2	Yes	Yes			52	TMP87PP21FG	QFP80 (14×20 mm)				
TMP87CH29NG	3	24				1		5			1		4	Yes	Yes			43	TMP87PM29NG	SDIP64						
TMP87CH29UG	3	24				1		5			1		4	Yes	Yes			43	TMP87PM29UG	LQFP64 (10×10 mm)						
TMP87CK14FG	24	1024	0.5		16	1					8			2	2	Yes	Yes			55	4.5 to 5.5		TMP87PM14FG	QFP64 (14×20 mm)		
TMP87CK14NG					16	1				8			2	2	Yes	Yes			55	TMP87PM14NG			SDIP64			
TMP87CK29NG			3	24			1		5			1		4	Yes	Yes			43	TMP87PM29NG						
TMP87CK29UG			3	24			1		5			1		4	Yes	Yes			43	TMP87PM29UG	LQFP64 (10×10 mm)					
TMP87CK40AFG					(1) 0.5 (2) 0.95	8			2				8			2	2	Yes	Yes			56	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-40 to 85	TMP87PM40AFG	QFP64 (14×20 mm)
TMP87CK40ANG			8				2			8				2	2	Yes	Yes			56	TMP87PM40ANG	SDIP64				
TMP87CK41FG			8				2			16				2	2	Yes	Yes			56	TMP87PM41FG	QFP64 (14×20 mm)				
TMP87CK41NG			8				2			16				2	2	Yes	Yes			56	TMP87PM41NG	SDIP64				
TMP87CK41UG			8				2			16				2	2	Yes	Yes			56	TMP87PM41UG	LQFP64 (10×10 mm)				
TMP87CM70BFG				512				16	1			1			6		2	2	Yes	Yes					73	
TMP87CM14FG			32	1024	0.5		16	1					8			2	2	Yes	Yes			55	4.5 to 5.5	-30 to 70	TMP87PM14FG	QFP64 (14×20 mm)
TMP87CM14NG							16	1				8			2	2	Yes	Yes			55	TMP87PM14NG			SDIP64	
TMP87CM21CDFG	1	32					2						8			2	2	Yes	Yes			52			TMP87PP21DFG	LQFP80 (12×12 mm)
TMP87CM21CFG	1	32					2						8			2	2	Yes	Yes			52			TMP87PP21FG	QFP80 (14×20 mm)
TMP87CM23AFG	1	40					2						8			2	2	Yes	Yes			70			TMP87PP23FG	QFP100 (14×20 mm)
TMP87CM29NG	3	24					1						5			1	4	Yes	Yes			43			TMP87PM29NG	SDIP64
TMP87CM29UG	3	24					1						5			1	4	Yes	Yes			43			TMP87PM29UG	LQFP64 (10×10 mm)

Note 1) Either I²C bus or SIO module can be selected via software.

Note 2) Minimum instruction execution times (1) and (2) correspond to power supply voltages (1) and (2).

Note 3) The minimum instruction execution time in Low-Speed mode is 122 μs (at 32.768 kHz).

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TLCS-870 Family: TLCS-870 Series

□Mask ROM Versions (Continued)

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs) (Note 2)	LED Driver (Ch)	LCD Driver (Ch)	VFT Driver (Ch)	SIO (Ch)	UART (Ch)	I ² C (Ch) (Note 1)	High-Speed Serial Output (Ch)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	6-Bit Comparator (Ch)	18-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Watchdog Timer	Dual Clocks (Low-Speed Mode (Note 3))	Clock Gear	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP Version (See the datasheet for operating conditions.)	Package				
TMP87CM40AFG	32	1024	(1) 0.5 (2) 0.95	8			2				8			2	2	Yes	Yes			56	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-30 to 70	TMP87PM40AFG	QFP64 (14×20 mm)				
TMP87CM40ANG				8			2					8			2	2	Yes	Yes					56	TMP87PM40ANG	SDIP64			
TMP87CM41FG				8			2					16			2	2	Yes	Yes					56	TMP87PM41FG	QFP64 (14×20 mm)			
TMP87CM41NG				8			2					16			2	2	Yes	Yes					56	TMP87PM41NG	SDIP64			
TMP87CM41UG				8			2					16			2	2	Yes	Yes					56	TMP87PM41UG	LQFP64 (10×10 mm)			
TMP87CM48DFG				8						1	1		16			2	2	Yes	Yes					56	TMP87PM48DFG	QFP64 (14×14 mm)		
TMP87CM48UG				8						1	1		16			2	2	Yes	Yes					56	TMP87PM48UG	LQFP64 (10×10 mm)		
TMP87CM53FG				7			1	1				8			2	2	Yes	Yes	Yes					72	(1) 4.5 to 5.5 (2) 2.2 to 5.5	-30 to 60	TMP87PM53FG	QFP80 (14×20 mm)
TMP87CM74AFG				16	16	1		1			12			2	2	Yes	Yes							71			TMP87PM74FG	
TMP87CM75FG				16	16	1	1				16			2	2	Yes	Yes							89	4.5 to 5.5	-30 to 70	TMP87PM75FG	QFP100 (14×20 mm)
TMP87CP21CDFG	48	2048	(1) 0.5 (2) 0.95	1	32		2			8			2	2	Yes	Yes				52	(1) 4.5 to 5.5 (2) 2.7 to 5.5	TMP87PP21DFG	LQFP80 (12×12 mm)					
TMP87CP21CFG				1	32		2			8			2	2	Yes	Yes						52	TMP87PP21FG	QFP80 (14×20 mm)				
TMP87CP23FG				1	40		2			8			2	2	Yes	Yes						70	TMP87PP23FG	QFP100 (14×20 mm)				
TMP87CS68DFG				7			1	1			8			2	2	Yes	Yes	Yes					72	TMP87PS68DFG	LQFP80 (12×12 mm)			
TMP87CS71BFG					16	1			1		6		2	2	Yes	Yes							73	TMP87PS71AFG	QFP80 (14×20 mm)			

Note 1) Either I²C bus or SIO module can be selected via software.

Note 2) Minimum instruction execution times (1) and (2) correspond to power supply voltages (1) and (2).

Note 3) The minimum instruction execution time in Low-Speed mode is 122 μs (at 32.768 kHz).

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TLCS-870 Family: TLCS-870/X Series

□Mask ROM Versions

Part Number	ROM (kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs) (Note 3)	LED Driver (Ch)	VFT Driver (Ch)	SIO (Ch)	UART (Ch)	I ² C (Ch) (Note 1)	PWM Generator (Ch)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	16-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Motor Controller (Ch)	Remote Control Preprocessor	Program Patch Logic	Watchdog Timer	Dual Clocks (Low-Speed Mode (Note 4))	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP/Flash Version (See the datasheet for operating conditions.)	Package	
TMP88CH40MG	16	512	0.2	14	(Note2) 1	(Note2) 1					4	1	2	1			Yes		19	4.5 to 5.5	-40 to 85	TMP88PH40MG	SOP28	
TMP88CH40NG				14	(Note2) 1	(Note2) 1						4	1	2	1			Yes				19	TMP88PH40NG	SDIP28
TMP88CH41NG				16	(Note2) 1	(Note2) 1						8	2	2	1			Yes				33	TMP88PH41NG	SDIP42
TMP88CH41UG				16	(Note2) 1	(Note2) 1						8	2	2	1			Yes				33	TMP88PH41UG TMP88FH41UG	LQFP44 (10x10 mm)
TMP88CS42FG	64	2048	(1) 0.32 (2) 122	24	1	1		2		16	2	4	2			Yes		55	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-30 to 70	TMP88PS42FG	QFP64 (14x20 mm)		
TMP88CS42NG				24	1	1		2		16	2	4	2			Yes		55			TMP88PS42NG	SDIP64		
TMP88CS43FG				24	1	1		2		16	2	4	2			Yes		71			TMP88PS43FG	QFP80 (14x20 mm)		
TMP88CS77FG				18	2		1		12		3	1				Yes	Yes	88			TMP88PU77FG	QFP100 (14x20 mm)		
TMP88CU74FG	96	3072	(1) 0.32 (2) 122	16	1		1		12		2	2				Yes	Yes	71	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-30 to 70	TMP88PU74FG	QFP80 (14x20 mm)		
TMP88CU77FG				18	2		1		12		3	1				Yes	Yes	88			TMP88PU77FG	QFP100 (14x20 mm)		

Note 1) Either I²C bus or SIO module can be selected via software.

Note 2) Cannot be used at the same time because their I/O pins are multiplexed.

Note 3) Minimum instruction execution times (1) and (2) correspond to power supply voltages (1) and (2).

Note 4) The minimum instruction execution time in Low-Speed mode is 122 μs (at 32.768 kHz).

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TLCS-870 Family: TLCS-870/C1 Series

□Mask ROM Versions

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs) (Note 2)	LED Driver (Ch)	LCD Driver (Ch)	VFT Driver (Ch)	SEI (Ch)	SIO (Ch)	UART (Ch)	UART/SIO (Ch) (Note 1)	I ² C/SIO (Ch) (Note 1)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	8-Bit DA Converter (Ch)	18-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	10-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Multiply-Accumulate (MAC)	Program Patch Logic	Watchdog Timer	Dual Clocks (Low-Speed Mode (Note 3))	Clock Gear	Power-On Reset	Undervoltage Detection	I/O Port (Pins) (Note 4)	Power Supply Voltage (V)	Operating Temperature (°C)	Flash Version (See the datasheet for operating conditions.)	Package
TMP89CH42UG	16	2048	(1) 0.1 (2) 0.238 (3) 0.5	8					1	1	1	8			2	4				Yes	Yes	Yes	Yes	Yes	40	(1) 4.3 to 5.5 (2) 2.7 to 5.5 (3) 2.2 to 5.5	-40 to 85	TMP89FH42UG	LQFP44 (10×10 mm)	
TMP89CH46DUG				8						1	1	1	8			2	4				Yes	Yes	Yes	Yes	Yes			42	TMP89FH46DUG	LQFP48 (7×7 mm)
TMP89CM42UG	32	8							1	1	1	8			2	4				Yes	Yes	Yes	Yes	Yes	40			TMP89FM42UG	LQFP44 (10×10 mm)	
TMP89CM46DUG		8							1	1	1	8			2	4				Yes	Yes	Yes	Yes	Yes	42			TMP89FM46DUG	LQFP48 (7×7 mm)	

Note 1) Configurable as UART or SIO. Also, selectable from I²C and SIO.

One SIO channel can be used simultaneously.

Note 2) Minimum instruction execution times (1) and (3) correspond to power supply voltages (1) and (3).

Note 3) The minimum instruction execution time in Low-Speed mode is 122 μs (at 32.768 kHz).

Note 4) Two ports are reserved for high-speed oscillator pins and cannot be used as I/O ports.

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

16-Bit Microcontrollers

TLCS-900 Family: TLCS-900/L1 Series

□Flash Versions

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs) (Note 1)	LED Driver (Ch)	UART/SIO (Ch)	SIO (Ch)	I ² C/SIO (Ch)	I ² C (Ch)	DRAM Controller (Ch)	Memory Bank Controller	10-Bit AD Converter (Ch)	LCD Controller	LCD Driver (Ch)	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	Motor Controller (Ch)	32-kHz Timer (for S/W RTC)	RTC (Ch)	8-Bit PWM Generator (Ch)	CS/WAIT Controller (Ch)	Watchdog Timer	Dual Clocks	Clock Gear	Program Patch Logic(Bank)	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	Mask ROM Version (See the datasheet for operating conditions.)	Package		
TMP91FU62DFG	96	4096	0.2	8	3		1				16			4	4	Yes				Yes	Yes	Yes	Yes	6	69	4.5 to 5.5	-	QFP80 (14×20 mm)			
TMP91FU62FG				8	3		1						16			4	4	Yes				Yes	Yes	Yes	Yes			6	69	LQFP80 (12×12 mm)	
TMP91FW40FG	128	8192	(1) 0.148 (2) 0.25	4							4	(Note2) 40		4	3		1			Yes	Yes	Yes	Yes	6	61	(1) 2.7 to 3.6 (2) 2.2 to 3.6	-40 to 85	TMP91CW40FG	LQFP100 (14×14 mm)		
TMP91FW64DFG			(1) 0.16 (2) 0.25	3			2					16			6	5	Yes			4	Yes	Yes	Yes	Yes	6	83		(1) 4.5 to 5.5 (2) 2.7 to 5.5	-	QFP100 (14×20 mm)	
TMP91FW64FG			(1) 0.148 (2) 0.25	3			2					16			6	5	Yes			4	Yes	Yes	Yes	Yes	6	83		(1) 4.5 to 5.5 (2) 2.7 to 5.5	-	LQFP100 (14×14 mm)	
TMP91FW27FG			(1) 0.148 (2) 0.25	2	1							4			6	1	Yes			3	Yes	Yes	Yes	Yes		53		(1) 2.7 to 3.6 (2) 2.2 to 3.6	TMP91CU27FG	QFP64 (14×14 mm)	
TMP91FW27UG			(1) 0.148 (2) 0.25	2	1							4			6	1	Yes			3	Yes	Yes	Yes	Yes		53		(1) 2.7 to 3.6 (2) 2.2 to 3.6	TMP91CK27UG TMP91CP27UG TMP91CU27UG	LQFP64 (10×10 mm)	
TMP91FY42FG			256	16384	0.148	2			1				8			8	2	Yes			4	Yes	Yes	Yes	Yes			81	2.7 to 3.6	TMP91CY22FG TMP91CW12AFG	LQFP100 (14×14 mm)

Note 1) Minimum instruction execution times (1) and (2) correspond to power supply voltages (1) and (2).

Note 2) For the 4-common and 40-segment LCD driver specification, see the technical datasheet.

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TLCS-900 Family: TLCS-900/L1 Series

□Mask ROM Versions

Part Number	ROM (kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs) (Note 2)	LED Driver (Ch)	UART/SIO (Ch)	UART (Ch)	SIO (Ch)	I ² C/SIO (Ch)	I ² C (Ch)	DRAM Controller (Ch)	Memory Bank Controller	10-Bit AD Converter (Ch)	LCD Controller	LCD Driver (Ch)	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	32-kHz Timer (for SW RTC)	RTC (Ch)	8-Bit PWM Generator (Ch)	CS/WAIT Controller (Ch)	Watchdog Timer	Dual Clocks	Clock Gear	Program Patch Logic (Bank)	Touch Screen Interface	Melody/Alarm Generator (MLD)	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP/Flash Version (See the datasheet for operating conditions.)	Package		
TMP91C016FG	NA	NA	(1) 0.148 (2) 0.4	1	1					1	Yes	Yes		4			1	4	Yes	Yes	Yes					31	(1) 2.7 to 3.6 (2) 1.8 to 3.6	-10 to 70	—	LQFP100 (14×14 mm)			
TMP91C025FG			(1) 0.111 (2) 0.148 (3) 0.25	2								Yes	4	Yes		4		1	4	Yes	Yes	Yes		Yes	Yes	Yes	38	(1) 3.0 to 3.6 (2) 2.7 to 3.6 (3) 2.4 to 3.6			-40 to 85		
TMP91C219FG		2048	0.111	1											6	1			4	Yes		Yes					45	(Note1) (1) 4.75 to 5.25 (2) 3.0 to 3.6			-20 to 70		
TMP91C630FG		6144		2											6	1			4	Yes		Yes					53	2.7 to 3.6					
TMP91C815FG		8192	(1) 0.148 (2) 0.4	2		1					Yes	8	Yes		4			1	4	Yes	Yes	Yes			Yes	Yes	61	(1) 2.7 to 3.6 (2) 1.8 to 3.6			-40 to 85		TQFP128 (14×14 mm)
TMP91C824FG			(1) 0.122 (2) 0.4	2		1					Yes	8			4			1	4	Yes	Yes	Yes			Yes	Yes	35	(1) 2.7 to 3.6 (2) 1.8 to 3.6					
TMP91C829FG			0.111	2									8			6	1			4	Yes		Yes				45	(Note1) (1) 4.75 to 5.25 (2) 3.0 to 3.6			-20 to 70		LQFP100 (14×14 mm)
TMP91C820AFG	8	(1) 0.111 (2) 0.148	2	1	1				1	Yes	8	Yes		4	1		1	4	Yes	Yes	Yes			Yes	Yes	77	(1) 3.0 to 3.6 (2) 2.7 to 3.6			LQFP144 (16×16 mm)			
TMP91CK27UG	24	1024	(1) 0.148	2		1								6	1	Yes		3	Yes	Yes	Yes					53	(1) 2.7 to 3.6						
TMP91CP27UG	48	4096	(2) 0.4	2		1								6	1	Yes		3	Yes	Yes	Yes					53	(2) 1.8 to 3.6			TMP91FW27UG	LQFP64 (10×10 mm)		
TMP91CU10FG	96	3072	(1) 0.296 (2) 0.4	3										8	2			3	Yes	Yes	Yes					80	(1) 2.7 to 3.6 (2) 2.0 to 3.6			TMP91PW10FG	LQFP100 (14×14 mm)		
TMP91CU27FG			(1) 0.148	2		1									4				3	Yes	Yes	Yes					53	(1) 2.7 to 3.6			TMP91FW27FG	QFP64 (14×14 mm)	
TMP91CU27UG		10240	(2) 0.4	2		1								4				3	Yes	Yes	Yes					53	(2) 1.8 to 3.6			TMP91FW27UG	LQFP64 (10×10 mm)		
TMP91CW11FG		128	4096	(1) 0.16 (2) 0.32	6	2	1	2	1						8				2	3	Yes	Yes	Yes					79	(1) 4.5 to 5.5 (2) 2.7 to 5.5			TMP91PW11FG	LQFP100 (14×14 mm)
TMP91CW12AFG	(1) 0.148 (2) 0.4			2		1									8				4	Yes	Yes	Yes					81	(1) 2.7 to 3.6 (2) 1.8 to 3.6	-40 to 85		TMP91FY42FG		
TMP91CW12FG	(1) 0.16 (2) 0.25			2		1									8				4	Yes	Yes	Yes					81	(1) 4.5 to 5.5 (2) 2.7 to 5.5			TMP91PW12FG		
TMP91CW40FG	(1) 0.148 (2) 0.25 (3) 0.4		4									4	(Note3) 40		4	3		1		Yes	Yes		6			61	(1) 2.7 to 3.6 (2) 2.2 to 3.6 (3) 1.8 to 3.6			TMP91FW40FG			
TMP91CW60DFG	8192		0.2		3							16			6	5	Yes		4	Yes	Yes	Yes	6				83	4.5 to 5.5			TMP91FW64DFG	QFP100 (14×20 mm)	
TMP91CW60FG				3									16			6	5	Yes		4	Yes	Yes	Yes	6			83				TMP91FW64FG	LQFP100 (14×14 mm)	
TMP91CY22FG	256		16384	(1) 0.148 (2) 0.4	2		1								8				4	Yes	Yes	Yes					81	(1) 2.7 to 3.6 (2) 1.8 to 3.6			TMP91FY42FG		

Note 1) 3.0 V to 3.6 V internally; 4.75 V to 5.25 V for input/output interface

Note 2) Minimum instruction execution times (1) and (3) correspond to power supply voltages (1) and (3).

Note 3) For the 4-common and 40-segment LCD driver specification, see the technical datasheet.

• Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TLCS-900 Family: TLCS-900/L Series

□Mask ROM Versions

Part Number	ROM (kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs) (Note 2)	UART/SIO (Ch)	I ² C/SIO (Ch)	10-Bit AD Converter (Ch)	LCD Driver (Ch)	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	32-kHz Timer (for SW RTC)	Motor Pattern Generator (Ch)	8-Bit PWM Generator (Ch)	CS/WAIT Controller (Ch)	Watchdog Timer	Dual Clocks	Clock Gear	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP Version (See the datasheet for operating conditions.)	Package			
TMP93CS41DFG	NA	2048	(1) 0.2 (2) 0.32	2	8		2	2		2	2	3	Yes	Yes	Yes	Yes	61	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-40 to 85	—	LQFP100 (14×14 mm)			
TMP93CS45FG				2	1	8		4	2						Yes	Yes	Yes				Yes	44	LQFP80 (12×12 mm)	
TMP93CW41DFG		2		8		2	2		2	2	3	Yes	Yes	Yes	Yes	Yes	61				LQFP100 (14×14 mm)			
TMP93CS20FG	64	2048		2	1	8	(Note3) 40	4	4	Yes				Yes	Yes	Yes	Yes			88			TMP93PW20AFG	LQFP144 (16×16 mm)
TMP93CS32FG				2	6		4	2					Yes	Yes	Yes	49	TMP93PW32FG			QFP64 (14×14 mm)				
TMP93CS36UG				2	4		4	2					Yes	Yes	Yes	33	—			LQFP44 (10×10 mm)				
TMP93CS40DFG				2	8		2	2		2	2	3	Yes	Yes	Yes	Yes	79			TMP93PS40DFG			LQFP100 (14×14 mm)	
TMP93CS44FG				2	1	8		4	2				Yes	Yes	Yes	62	TMP93PS44FG			LQFP80 (12×12 mm)				
TMP93CU44DFG (Note1)				96	3072	2	1	8		4	2				Yes	Yes	Yes			62			TMP93PW44DFG (Note1)	QFP80 (14×20 mm)
TMP93CW40DFG	128	4096		2	8		2	2		2	2	3	Yes	Yes	Yes	Yes	79					TMP93PW40DFG	LQFP100 (14×14 mm)	
TMP93CW44DFG (Note1)			2	1	8		4	2			Yes	Yes	Yes	62	TMP93PW44DFG (Note1)	QFP80 (14×20 mm)								
TMP93CW46AFG			5	8		2	2		2	3	Yes	Yes	Yes	79	TMP93PW46AFG	LQFP100 (14×14 mm)								

Note 1) Operating voltage of OTP-version TMP93PW44DFG is 4.5 V to 5.5 V.

Note 2) Minimum instruction execution times (1) and (2) correspond to power supply voltages (1) and (2).

Note 3) For the 4-common and 40-segment LCD driver specification, see the technical datasheet.

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TLCS-900 Family: TLCS-900/H Series

□Mask ROM Versions

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs) (Note 1)	UART/SIO (Ch)	DRAM Controller (Ch)	10-Bit AD Converter (Ch)	8-Bit DA Converter (Ch)	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	Motor Pattern Generator (Ch)	CS/WAIT Controller (Ch)	Watchdog Timer	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP Version (See the datasheet for operating conditions.)	Package
TMP95C001FG	NA	NA	(1) 0.16 (2) 0.32								4			(1) 4.5 to 5.5 (2) 2.7 to 5.5	-20 to 70	—	QFP64 (14×14 mm)
TMP95C061BDFG			0.16	2	1	4		4	2	2	4	Yes	56	4.5 to 5.5			LQFP100 (14×14 mm)
TMP95C063DFG			2	2	8	2	8	2	2	4	Yes	91	LQFP144 (20×20 mm)				
TMP95C265FG		2048	(1) 0.16 (2) 0.4	3		8	2	8	2		4	Yes	55	(1) 4.5 to 5.5 (2) 2.7 to 5.5			TMP95PW64FG
TMP95CW65FG		4096	3		8	2	8	2		4	Yes	55	4.5 to 5.5				
TMP95CS64FG		64	2048	3		8	2	8	2		4	Yes		81	4.5 to 5.5		
TMP95CS66FG			0.16	1				8	2		4	Yes	81				
TMP95CW64FG	128	4096	(1) 0.16 (2) 0.4	3		8	2	8	2		4	Yes	81	(1) 4.5 to 5.5 (2) 2.7 to 5.5			

Note 1) Minimum instruction execution times (1) and (2) correspond to power supply voltages (1) and (2).

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TLCS-900 Family: TLCS-900 Series

□Mask ROM Versions

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs) (Note 1)	UART/SIO (Ch)	DRAM Controller (Ch)	6-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	Motor Pattern Generator (Ch)	8-Bit PWM Generator (Ch)	CS/WAIT Controller (Ch)	Watchdog Timer	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP Version (See the datasheet for operating conditions.)	Package
TMP96C031ZFG	NA	NA	0.2	2	1	4		4	1	2		4	Yes	37	4.5 to 5.5	-20 to 70	—	QFP64 (14×20 mm)
TMP96C041BFG			(1) 0.2	2			4	2	2	2	2	3	Yes	47		(1) -20 to 70 (2) -40 to 85		TMP96PM40FG
TMP96C141BFG		1024	(2) 0.25	2			4	2	2	2	3	Yes	47	4.5 to 5.5				
TMP96CM40FG		32	2			4	2	2	2	2	3	Yes	65					

Note 1) Minimum instruction execution times (1) and (2) correspond to power supply voltages (1) and (2).

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

32-Bit Microcontrollers

TLCS-900 Family: TLCS-900/H1 Series

□Flash Versions

Part Number	ROM (kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs)	USB Host (Full Speed) (Ch)	USB Device (Full Speed) (Ch)	SPI (SD Card)	High-Speed SIO (Ch)	UART/SIO (Ch)	UART/SIO/HSIO (Ch)	I ² C/SIO (Ch)	DMA Controller (Ch)	DRAM Controller (Ch)	NAND Flash Controller (Ch)	Memory Bank Controller	10-Bit AD Converter (Ch)	8-Bit DA Converter (Ch)	LCD Controller	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	32-kHz Timer (for S/W RTC)	RTC (Ch)	Motor Pattern Generator (Ch)	Multiply-Accumulate (MAC)	CS/WAIT Controller (Ch)	Watchdog Timer	Dual Clocks	Clock Gear	Program Patch Logic (Bank)	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	Mask ROM Version (See the datasheet for operating conditions.)	Package	
TMP92FD23ADFG	512	32768	0.05				2	1	2						12			6	2	Yes			4	Yes	Yes	Yes	8	84	3.0 to 3.6	-40 to 85	TMP92CY23DFG	QFP100 (14x20 mm)		
TMP92FD23AFG									2	1	2						12			6	2	Yes			4	Yes	Yes	Yes			8	84	TMP92CY23FG	LQFP100 (14x14 mm)
TMP92FD28ADFG				1	Yes	1	2	(Note1) 2												6	2		1		3	Yes	Yes	Yes			8	70	—	QFP100 (14x20 mm)
TMP92FD28AFG				1	Yes	1	2	(Note1) 2													6	2		1		3	Yes	Yes			Yes	8	70	TMP92CD28AFG

Note 1) Only one channel can be configured as SIO.

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TLCS-900 Family: TLCS-900/H1 Series

Mask ROM Versions

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs) (Note 2)	USB Host (Full Speed) (Ch)	USB Device (Full Speed) (Ch)	SPI (SD Card)	High-Speed SIO (Ch)	UART/SIO (Ch)	UART (Ch)	UART/SIO/HSIO (Ch)	I ² C/SIO (Ch)	I ² C (Ch)	DMA Controller (Ch)	DRAM Controller (Ch)	NAND Flash Controller (Ch)	Memory Bank Controller	10-Bit AD Converter (Ch)	8-Bit DA Converter (Ch)	LCD Controller	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	32-kHz Timer (for SW RTC)	RTC (Ch)	Motor Pattern Generator (Ch)	Multiply-Accumulate (MAC)	CS/WAIT Controller (Ch)	Watchdog Timer	Dual Clocks	Clock Gear	Program Patch Logic (Bank)	Touch Screen Interface	Melody/Alarm Generator (MLD)	I ² S (Inter-IC Sound) Interface (Ch)	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	Flash Version (See the datasheet for operating conditions.)	Package	
TMP94C241CFG	2048		0.05			2								2			8	2		4	4					6	Yes						64	4.5 to 5.5	-20 to 70	—	QFP160 (28x28 mm)		
TMP94C251ADFG						2									2				8	2		4	4				6	Yes					64				LQFP144 (20x20 mm)		
TMP92C820FG				8192				2	1		1			1		1	Yes	5	Yes	4	1	1				4	Yes	Yes	Yes	Yes	Yes	Yes	83				3.0 to 3.6	LQFP144 (16x16 mm)	
TMP92CA25FG				10240	(1) 0.05		Yes	1			1			1	2	Yes	4	Yes	4	1	1					4	Yes	Yes	Yes	Yes	Yes	Yes	84				(1) 3.0 to 3.6	LQFP144 (16x16 mm)	
TMP92CH21FG				16384	(2) 0.074	1		2						1	2	Yes	4	Yes	4	1	1					4	Yes	Yes	Yes	Yes	Yes	Yes	82				(2) 2.7 to 3.6	LQFP100 (14x14 mm)	
TMP92CM22FG	NA	32768	0.05			2			1								8			4	2				4	Yes	Yes					58	3.0 to 3.6	-40 to 85	LQFP100 (14x14 mm)				
TMP92CM27FG						2	4			2		1				12	2		8	6			2		6	Yes	Yes					83			LQFP144 (16x16 mm)				
TMP92CF26AXBG	147456		(1) 0.0125 (2) 0.0167	1	Yes	1				1	6	1	2	Yes	6	Yes	8	2	1	Yes	4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2	136	(Note1) 3.0 to 3.6 1.4 to 1.6	(1) 0 to 50 (2) 0 to 70	FBGA228 (15x15 mm)			
TMP92CF29AFG			0.0125	1	Yes	2				1	6	1	2	Yes	6	Yes	8	2	1	Yes	4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1	98	0 to 70		LQFP176 (20x20 mm)				
TMP92CF30FG			0.0125	1	Yes	2					1	6	1	2	Yes	6	Yes	8	2	1	Yes	4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1	98	(1) 0 to 50 (2) 0 to 70		FBGA228 (15x15 mm)				
TMP92CZ26AXBG	294912		(1) 0.0125 (2) 0.0167	1	Yes	1				1	6	1	2	Yes	6	Yes	8	2	1	Yes	4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	2	136							
TMP92CY23DFG	256	16384	0.05			3			2								12			6	2	Yes			4	Yes	Yes	Yes	8				84	3.0 to 3.6	-40 to 85	TMP92FD23ADFG	QFP100 (14x20 mm)		
TMP92CY23FG						3		2											12			6	2	Yes			4	Yes	Yes	Yes	8						84	TMP92FD23AFG	LQFP100 (14x14 mm)
TMP92CD23ADFG	512	32768	0.05			2		1	2								12			6	2	Yes			4	Yes	Yes	Yes	8				84	3.0 to 3.6	-40 to 85	TMP92FD23ADFG	QFP100 (14x20 mm)		
TMP92CD23AFG						2		1	2										12			6	2	Yes			4	Yes	Yes	Yes	8						84	TMP92FD23AFG	LQFP100 (14x20 mm)
TMP92CD28AFG						1	Yes	1	2		(Note3) 2											6	2	1		3	Yes	Yes	Yes	8						70			

: Contains a 900/H2 core that is functionally fully compatible with 900/H1 core.

Note 1) 1.4 V to 1.6 V internally; 3.0 V to 3.6 V for input/output interface.

Note 2) Minimum instruction execution times (1) and (2) correspond to power supply voltages (1) and (2).

Note 3) Only one channel can be configured as SIO.

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

8-Bit Microcontrollers for Automotive

TLCS-870 Family: TLCS-870/C Series

□Flash Versions

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs) (Note 1)	LED Driver (Ch)	CAN (Ch)	SEI (Ch)	SIO (Ch)	UART (Ch)	UART/I ² C (Ch) (Note 3)	I ² C (Ch)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	18-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Watchdog Timer	Dual Clocks (Low-Speed Mode (Note 2))	Power-On Reset	Undervoltage Detection	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	Mask ROM Version (See the datasheet for operating conditions.)	Package
TMP86FH92IDMG (Note4)	16	512	(1) 0.25 (2) 0.4	8		1		1	1			6		1	2	Yes	Yes	Yes	Yes	24	(1) 4.0 to 5.5 (2) 3.0 to 5.5	-40 to 85	TMP86CH92IDMG (Note4) TMP86CH92SDMG (Note4)	SSOP30

Note 1) Minimum instruction execution times (1) and (2) correspond to power supply voltages (1) and (2).

Note 2) The minimum instruction execution time in Low-Speed mode is 122 μs (at 32.768 kHz).

Note 3) Configurable as I²C or UART.

Note 4) Reliability testing includes AEC-Q100-Rev-F (July 18, 2003) in addition to Toshiba's standard tests (automotive grade).

- For further information about the I/R/S/T grade levels, please contact your nearest Toshiba sales representative.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TLCS-870 Family: TLCS-870/C1 Series

□Flash Versions

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs)	LED Driver (Ch)	LCD Driver (Ch)	VFT Driver (Ch)	SEI (Ch)	SIO (Ch)	UART (Ch)	UART/SIO (Ch) (Note 1)	SEI/UART (Ch) (Note 3)	I ² C/SIO (Ch) (Note 2)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	8-Bit DA Converter (Ch)	18-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	10-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Multiply-Accumulate (MAC)	Motor Controller (Ch) (Note 5)	Program Patch Logic	Watchdog Timer	Dual Clocks (Low-Speed Mode (Note 4))	Clock Gear	Power-On Reset	Undervoltage Detection	On-Chip Debug Unit	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	Mask ROM Version (See the datasheet for operating conditions.)	Package	
TMP89FM82TDUG **	32	2048	0.125	16						1	1		8			2		4		1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	39	4.5 to 5.5	-40 to 125	—	LQFP48 (7×7 mm)

Note 1) Configurable as SIO or UART.

Note 2) Configurable as I²C or SIO. Up to two SIO channels can be used simultaneously.

Note 3) Configurable as SEI or UART.

Note 4) The minimum instruction execution time in Low-Speed mode is 122 μs (at 32.768 kHz).

Note 5) The motor controller can only be used when an 8-MHz oscillator is used with the clock gear set to 1x.

- For further information about the I/R/S/T grade levels, please contact your nearest Toshiba sales representative.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

** : Under development

TLCS-870 Family: TLCS-870/C Series

□Mask ROM Versions

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs) (Note 1)	LED Driver (Ch)	CAN (Ch) (Note 2)	SEI (Ch)	SIO (Ch)	UART (Ch)	UART/I ² C (Ch) (Note 5)	I ² C (Ch)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	16-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Watchdog Timer	Dual Clocks (Low-Speed Mode (Note 4))	Power-On Reset	Undervoltage Detection	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP/Flash Version (See the datasheet for operating conditions.)	Package	
TMP86C408IDMG	4	256	(1) 0.25 (2) 0.5	8	1			1			6	1	2	Yes	Yes				24	(1) 4.5 to 5.5 (2) 2.7 to 5.5	-40 to 85	TMP86P808DMG	SSOP30	
TMP86C408SDMG				8	1	1			6	1	2	Yes	Yes								24			-40 to 125
TMP86C808IDMG				8	1	1			6	1	2	Yes	Yes								24			-40 to 85
TMP86C808SDMG				8	1	1			6	1	2	Yes	Yes								24			-40 to 125
TMP86C847IUG	8	512	(1) 0.25 (2) 0.4	19		1	1				8	1	2	Yes	Yes				35	(1) 4.0 to 5.5 (2) 2.7 to 5.5	-40 to 85	TMP86PM47AUG TMP86PH47UG TMP86FH47AUG	LQFP44 (10×10 mm)	
TMP86C847SUG				19		1	1			8	1	2	Yes	Yes					35		-40 to 125			
TMP86CH47IUG				19		1	1			8	1	2	Yes	Yes					35		-40 to 85			
TMP86CH47SUG	16	1024	(1) 0.25 (2) 0.4	19		1	1				8	1	2	Yes	Yes				35	(1) 4.0 to 5.5 (2) 2.7 to 5.5	-40 to 125	TMP86FH92IDMG (Note6)	SSOP30	
TMP86CH92IDMG (Note6)				8	1	1	1			6	1	2	Yes	Yes	Yes	Yes	Yes	Yes	Yes		24			-40 to 85
TMP86CH92SDMG (Note6)				8	1	1	1				6	1	2	Yes	Yes				24	-40 to 125				
TMP86CH87RUG	32	1024	0.25	8	^(Note3) 1	1	1				14	1	2	Yes	Yes				35	4.5 to 5.5	-40 to 85	TMP86PM87RUG	LQFP44 (10×10 mm)	
TMP86CM87RUG				8	^(Note3) 1	1	1			14	1	2	Yes	Yes										35

Note 1) Minimum instruction execution times (1) and (2) correspond to power supply voltages (1) and (2).

Note 2) There are four channels of mailboxes.

Note 3) Either the SEI or UART module should be selected via software.

Note 4) The minimum instruction execution time in Low-Speed mode is 122 μs (at 32.768 kHz).

Note 5) Configurable as I²C or UART.

Note 6) Reliability testing includes AEC-Q100-Rev-F (July 18, 2003) in addition to Toshiba's standard tests (automotive grade).

- For further information about the I/R/S/T grade levels, please contact your nearest Toshiba sales representative.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TLCS-870 Family: TLCS-870/X Series

□Mask ROM Versions

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs)	LED Driver (Ch)	SIO (Ch)	UART (Ch)	10-Bit AD Converter (Ch)	16-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Motor Controller (Ch)	Watchdog Timer	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP Version (See the datasheet for operating conditions.)	Package
TMP88CH40IMG	16	512	0.2	14	^(Note1) 1	^(Note1) 1	4	1	2	1	Yes	19	4.5 to 5.5	-40 to 85	TMP88PH40MG	SOP28

Note 1) Cannot be used at the same time because their I/O pins are multiplexed.

- For further information about the I/R/S/T grade levels, please contact your nearest Toshiba sales representative.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

16-Bit Microcontrollers for Automotive

TLCS-900 Family: TLCS-900/L1 Series

□Mask ROM Versions

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs) (Note 1)	CAN (16 Mailboxes) (Ch)	SEI (Ch)	UART/SIO (Ch)	I ² C/SIO (Ch)	10-Bit AD Converter (Ch)	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	32-kHz Timer (for S/W RTC)	16-Bit PWM Generator (Ch)	CS/WAIT Controller (Ch)	PDC (Ch)	Watchdog Timer	Dual Clocks	Clock Gear	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	Flash Version (See the datasheet for operating conditions.)	Package
TMP91CU27RUG **	96	10240	0.148			2	1	4	6	1	Yes		3		Yes	Yes	Yes	53	2.7 to 3.6	-40 to 85	TMP91FW27UG	LQFP64 (10×10 mm)
TMP91CY22IFG	256	16384	(1) 0.148 (2) 0.4			2	1	8	8	2	Yes		4		Yes	Yes	Yes	81	(1) 2.7 to 3.6 (2) 1.8 to 3.6		TMP91FY42FG	LQFP100 (14×14 mm)

Note 1) Minimum instruction execution times (1) and (2) correspond to power supply voltages (1) and (2).

** : Under development

- For further information about the I/R/S/T grade levels, please contact your nearest Toshiba sales representative.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

32-Bit Microcontrollers for Automotive

TLCS-900 Family: TLCS-900/H1 Series

□Flash Versions

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs)	CAN (16 Mailboxes) (Ch)	SEI (Ch)	UART/SIO (Ch)	I ² C/SIO (Ch)	10-Bit AD Converter (Ch)	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	H/W RTC (Ch)	CS/WAIT Controller (Ch)	Watchdog Timer	Dual Clocks	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	Mask ROM Version (See the datasheet for operating conditions.)	Package
TMP92FD54AIFG (Note1) **	512	32768	0.05	1	1	2	3	12	8	2	1	1	Yes		68	4.5 to 5.25	-40 to 85	TMP92CD54IFG **	LQFP100 (14×14 mm)

Note 1) Contains voltage regulator.

** : Under development

- For further information about the I/R/S/T grade levels, please contact your nearest Toshiba sales representative.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TLCS-900 Family: TLCS-900/H1 Series

□Mask ROM Versions

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Time (μs)	CAN (16 Mailboxes) (Ch)	SEI (Ch)	UART/SIO (Ch)	I ² C/SIO (Ch)	10-Bit AD Converter (Ch)	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	H/W RTC (Ch)	CS/WAIT Controller (Ch)	Watchdog Timer	Dual Clocks	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	Flash Version (See the datasheet for operating conditions.)	Package
TMP92CD54IFG (Note1)**	512	32768	0.05	1	1	2	3	12	8	2	1	1	Yes		68	4.5 to 5.25	-40 to 85	TMP92FD54AIFG **	LQFP100 (14×14 mm)

Note 1) Contains voltage regulator.

** : Under development

- For further information about the I/R/S/T grade levels, please contact your nearest Toshiba sales representative.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

32-Bit Microcontrollers

TX03 Family: TX03 Series

Flash Versions

Part Number	ROM (Kbytes)	SRAM (Kbytes)	Maximum Operating Frequency (MHz)	DMA Controller (Ch)	SSP(Ch)	UART/SIO (Ch)	UART/HsIO (Ch)	I ² C (Ch)	I ² C/SIO(Ch)	10-Bit AD Converter (Ch)	12-Bit AD Converter (Ch)	10-Bit DA Converter (Ch)	16-Bit Timer/Counter (Ch)	USB Host (Full Speed) (Ch)	CEC (Ch)	Remote Control Preprocessor (Ch)	Motor Controller (Ch)	Multi-Purpose Timer (MPT) (Ch)	Incremental Encoder Input (Ch)	Op.Amp (Ch)	Comparator (Ch)	External Interrupt Pins (Pins)	CS/WAIT Controller (Ch)	Watchdog Timer	Clock Gear	RTC (Ch)	Dual Clocks	On-Chip Debug Unit	Trace Function	Oscillation Frequency Detector	Power-On Reset	Undervoltage Detection	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	Package		
TMPM382FSFG **	64	8	40	2	1	3		1	10			8			1	(Note3) 1	1				8	Yes	Yes	1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	48	4.0 to 5.5	-40 to 85	QFP64 (14x14 mm)			
TMPM330FWFG	40			3			3	12		10			1	2								8	Yes	Yes	1	Yes	Yes	Yes				78	2.7 to 3.6	-20 to 85	LQFP100 (14x14 mm)			
TMPM332FWUG	40			2			2	8		10			1	1								5	Yes	Yes	1	Yes	Yes	Yes				44			LQFP64 (10x10 mm)			
TMPM333FWFG	40			3			3	12		10												8	Yes	Yes	1	Yes	Yes	Yes				78			LQFP100 (14x14 mm)			
TMPM390FWFG **	20		1	3		1	1	12		10				1	1							7	Yes	Yes	1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	76	1.7 to 3.6		LQFP100 (14x14 mm)		
TMPM395FWXBG	20		4	3		1	1	12		10				1	1							11	Yes	Yes	1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	91			FBGA120 (6x6 mm)		
TMPM380FDFG **	40		2	2	5		2	18		8				1	(Note3) 2	3	2					16	Yes	Yes	1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	84	4.0 to 5.5	-40 to 85	QFP100 (14x20 mm)		
TMPM380FWFG **	40		2	2	5		2	18		8				1	(Note3) 2	3	2					16	Yes	Yes	1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	84			LQFP100 (14x14 mm)		
TMPM382FWFG **	40	2	1	3		1	10		8				1	(Note3) 1	1						8	Yes	Yes	1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	48	QFP64 (14x14 mm)					
TMPM370FYDFG	10	10	80		4				22			8				2	(Note3) 2	2	4	4	16	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	76	4.5 to 5.5		QFP100 (14x20 mm)		
TMPM370FYFG			80		4			22		8					2	(Note3) 2	2	4	4	16	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	76			QFP100 (14x20 mm)		
TMPM330FYFG			256	16	40		3		3	12		10		1	2								8	Yes	Yes	1	Yes	Yes	Yes					78	2.7 to 3.6	-20 to 85	LQFP100 (14x14 mm)	
TMPM330FYWFG**					40		3		3	12		10		1	2									8	Yes	Yes	1	Yes	Yes	Yes								78
TMPM333FYFG					40		3		3	12		10													8	Yes	Yes	1	Yes	Yes	Yes					78	-20 to 85	
TMPM380FYDFG **					40	2	2	5		2	18		8				1	(Note3) 2	3	2					16	Yes	Yes	1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	84	4.0 to 5.5
TMPM380FYFG **	40	2	2	5		2	18		8				1	(Note3) 2	3	2					16	Yes	Yes	1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	84						
TMPM330FDFG	512	32	40		3		3	12		10		1	2									8	Yes	Yes	1	Yes	Yes	Yes					78	2.7 to 3.6	-20 to 85	LQFP100 (14x14 mm)		
TMPM330FDWFG			40		3		3	12		10		1	2									8	Yes	Yes	1	Yes	Yes	Yes					78				-40 to 85	
TMPM333FDFG			40		3		3	12		10													8	Yes	Yes	1	Yes	Yes	Yes					78	-20 to 85			
TMPM341FDXBG **			54	4	1	5		2	16	2	12												12	2	Yes	Yes			Yes	Yes	Yes			87	-40 to 85	FBGA113 (6x6 mm)		
TMPM361F10FG	1024	64	64	2	1	5		1	3	8		16		1	1							10	4	Yes	Yes	1	Yes	Yes	Yes				76	2.7 to 3.6	-40 to 85	LQFP100 (14x14 mm)		
TMPM362F10FG			64	2	1	12		5	16		16		1	2									16	4	Yes	Yes	1	Yes	Yes	Yes						120	LQFP144 (20x20 mm)	
TMPM363F10FG			(Note1) 64	2	1	5		1	3	8		16		1	1	1							8	4	Yes	Yes	1	Yes	Yes	Yes				74	(Note2)		LQFP100 (14x14 mm)	
TMPM364F10FG **			(Note1) 64	2	1	12		5	16		16		1	1	2									14	4	Yes	Yes	1	Yes	Yes	Yes				118	2.7 to 3.6		LQFP144 (20x20 mm)
TMPM360F20FG **	2048	128	64		1	12		5	16				16		1	2						17	4	Yes	Yes	1	Yes	Yes	Yes				120	2.7 to 3.6				

Note 1) 48 MHz when USB is used.

Note 2) 3.0 to 3.6 V when USB is used.

Note 3) The motor controller channel is multiplexed with the multi-purpose timer (MPT).

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

** : Under development

TX03 Family: TX03 Series

□Mask ROM Versions

Part Number	ROM (Kbytes)	SRAM (Kbytes)	eDRAM (Kbytes)	Maximum Operating Frequency (MHz)	DMA Controller (Ch)	USB Host (High Speed) (Ch)	SD Host Controller (Ch)	SSP(SPI/MicroWire) (Ch)	UART (Ch)	f _c (Ch)	10-Bit AD Converter (Ch)	16-Bit Timer/Counter (Ch)	External Interrupt Pins (Pins)	Watchdog Timer	Static Memory Controller (Ch)	On-Chip Debug Unit	Trace Function	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	Package
TMPM320C1DFG	NA	320	1024	144	8	1	1	4	4	2	4	8	4	Yes	2	Yes	Yes	55	(Note1) 1.1 to 1.3	-40 to 85	LQFP144 (20x20 mm)

Note 1) The following three power supplies are available:

- (1) For external circuitry in general, USB, external AD converter, internal eDRAM: 3.0 V to 3.6 V
- (2) For external USB device : 3.15 V to 3.45 V
- (3) For internal circuitry: 1.1 V to 1.3 V

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TX09 Family: TX09 Series

□Mask ROM Versions

Part Number	ROM (Kbytes)	RAM (Kbytes)	Minimum Instruction Execution Time (μs)	USB Device (High Speed) (Ch)	USB Host (Full Speed) (Ch)	SD Host Controller (Ch)	UART (Ch)	I ² C (Ch)	SSP (Ch)	DMA Controller (Ch)	Static Memory Controller (Ch)	DRAM Controller (SDR SDRAM / LVC MOS DDR SDRAM) (Ch)	NANDFC (Ch)	10-Bit AD Converter (Ch)	LCD Controller	LCD Data Process Accelerator	16-Bit Timer/Counter (Ch)	32-kHz Timer (for SW RTC)	Watchdog Timer	I ² S (Inter-IC Sound) Interface (Ch)	Touch Screen Interface	CMOS Image Sensor Interface (Ch)	JTAG (Debug)	JTAG (PC Trace)	JTAG (Boundary-Scan)	Clock Gear	Oscillation Frequency Detector	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	Package
TMPA913CHXBG	NA	16	(1) 0.005 (2) 0.0067	1			2	2	2	8	4	1	2	6			6	Yes	Yes	2	Yes		Yes	Yes	Yes	Yes	98	(Note1) 1.4 to 1.6	(1) 0 to 70 (2) -20 to 85	FBGA361 (16x16 mm)	
TMPA900CMXBG				1	1	1	3	2	2	8	2	1	2	8	Yes	Yes	6	Yes	Yes	2	Yes	1	Yes	Yes	Yes	Yes	Yes			91	FBGA289 (15x15 mm)
TMPA901CMXBG				1	1		2	1	1	8	2	1	2	4	Yes	Yes	6	Yes	Yes	1	Yes		Yes	Yes	Yes	Yes	Yes			43	FBGA177 (13x13 mm)
TMPA912CMXBG				1		2	2	2	8	4	1	2	6	Yes	Yes	6	Yes	Yes	2	Yes	1	Yes	1	Yes	Yes	Yes	Yes			114	FBGA361 (16x16 mm)
TMPA910CRAXBG		0.005	1		2	2	2	8	4	1	2	6	Yes	Yes	6	Yes	Yes	2	Yes	1	Yes	Yes	Yes	Yes	Yes	114	0 to 70				
TMPA910CRBxBG		0.0067	1		2	2	2	8	4	1	2	6	Yes	Yes	6	Yes	Yes	2	Yes	1	Yes	Yes	Yes	Yes	Yes	114	-20 to 85				
TMPA911CRXBG		56	(1) 0.005 (2) 0.0067	1			2	2	2	8	4	1	2	6	Yes	Yes	6	Yes	Yes	2	Yes	1	Yes	Yes	Yes	Yes	98		(1) 0 to 70 (2) -20 to 85		

Note 1) The following five power supplies are available:

- (1) For external circuitry in general, external AD converter, external USB host (Full-Speed): 3.0 V to 3.6 V
- (2) For external USB device (High-Speed): 3.15 V to 3.45 V
- (3) For external memory: 1.7 V to 1.9 V/3.0 V to 3.6 V
- (4) For external CMOS image sensor, external I²S, external LCD: 1.8 V to 3.6 V
- (5) For internal circuitry: 1.4 V to 1.6 V

Note 2) The external data bus width is as follows:

- TMPA910CRAXBG, TMPA910CRBxBG, TMPA911CRXBG, TMPA900CMXBG: Up to 32 bits
- TMPA912CMXBG, TMPA913CHXBG, TMPA901CMXBG: Up to 16 bits
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

32-Bit Microcontrollers

TX19 Family: TX19 Series

□Flash Versions

Part Number	ROM (Kbytes)	RAM (Kbytes)	Maximum Operating Frequency (MHz)	DMA Controller (Ch)	UART/SIO (Ch)	UART/HSIO (Ch)	UART (Ch)	I ² C/SIO (Ch)	10-Bit AD Converter (Ch)	8-Bit DA Converter (Ch)	10-Bit DA Converter (Ch)	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	32-Bit Timer Output Compare (Ch)	32-Bit Timer Input Capture (Ch)	Motor Controller (Ch)	External Interrupt Pins (Pins)	Dual Clocks	Debug Support Unit	I/O Ports (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	Mask ROM Version (See the datasheet for operating conditions.)	Package
TMP1940FDBFG	512	16	32	4	2		2	1	8			4	4				11	Yes	Yes	77	2.7 to 3.6	-40 to 85	TMP1940CYAFG	LQFP100 (14×14 mm)
TMP1942FDU		20	32	4	5			1	16		3	12	14				29	Yes	Yes	108			TMP1942CYUE	LQFP144 (16×16 mm)
TMP1942FDXBG **		32	4	5			1	16		3	12	14					29	Yes	Yes	108			TMP1942CZUE	FBGA177 (13×13 mm)
TMP1962F10AXBG	1024	40	40.5	8	7			1	24			12	4	8	8		25		Yes	202	(Note1) 2.2 to 2.7	-20 to 85	TMP1962C10BDBG	FBGA281 (13×13 mm)

Note 1) A separate I/O power supply is required.

** : Under development

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TX19 Family: TX19A Series

□Flash Versions

Part Number	ROM (Kbytes)	RAM (Kbytes)	Maximum Operating Frequency (MHz)	DMA Controller (Ch)	UART/SIO (Ch)	UART/HSIO (Ch)	UART (Ch)	I ² C/SIO (Ch)	10-Bit AD Converter (Ch)	8-Bit DA Converter (Ch)	10-Bit DA Converter (Ch)	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	32-Bit Timer Output Compare (Ch)	32-Bit Timer Input Capture (Ch)	Motor Controller (Ch)	External Interrupt Pins (Pins)	Dual Clocks	Debug Support Unit	I/O Ports (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	Mask ROM Version (See the datasheet for operating conditions.)	Package
TMP19A71FYFG	256	10	56	8	2		2		19				4			2	10		Yes	75	(Note1) 2.25 to 2.75	-40 to 85	TMP19A71CYFG	QFP100 (14×20 mm)
TMP19A71FYUG			56	8	2		2		19				4			2	10		Yes	75			TMP19A71CYUG	LQFP100 (14×14 mm)
TMP19A23FYFG		24	54	4	3	1		2	12					12			16		Yes	111	3.0 to 3.6			LQFP144 (20×20 mm)
TMP19A23FYXBG	40	4	3	1		2	12					12			15		Yes	103					FBGA141 (9×9 mm)	
TMP19A43FZXBG	384	20	40	8	3	3		1	16	2			16	8	4		48	Yes	Yes	143	(Note1) 1.35 to 1.65	-20 to 85		FBGA193 (12×12 mm)
TMP19A43FDXBG	512	24	40	8	3	3		1	16	2			16	8	4		48	Yes	Yes	143				
TMP19A61F10XBG	1024	48	54	8	9	2		2	32				36	4	4		16		Yes	212				FBGA289 (11×11 mm)
TMP19A64F20XBG	2048	64	54	8	7			1	24				11	10	4		20	Yes	Yes	209				FBGA281 (13×13 mm)

Note 1) A separate I/O power supply is required.

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TX19 Family: TX19A/H1 Series

□Flash Versions

Part Number	ROM (Kbytes)	RAM (Kbytes)	Maximum Operating Frequency (MHz)	DMA Controller (Ch)	UART/SIO (Ch)	UART/HSIO (Ch)	UART (Ch)	I ² C/SIO (Ch)	10-Bit AD Converter (Ch)	16-Bit Timer/Counter (Ch)	32-Bit Timer Output Compare (Ch)	32-Bit Timer Input Capture (Ch)	Motor Controller (Ch)	External Interrupt Pins (Pins)	RTC (Ch)	Dual Clocks	Debug Support Unit	I/O Ports (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	Mask ROM Version (See the datasheet for operating conditions.)	Package
TMP19A44FDXBG	512	32	80	8	3	3	1	16	18	8	4	64	1	Yes	Yes	Yes	160	2.7 to 3.6	-20 to 85	—	FBGA241 (12x12 mm)	
TMP19A44FEXBG	768	64	80	8	3	3	1	16	18	8	4	64	1	Yes	Yes	160						
TMP19A44F10XBG	1024		80	8	3	3	1	16	18	8	4	64	1	Yes	Yes	160						
TMP19A33F20NG	2048	10	64	8	5	3	3	2				11		Yes	Yes	49	SDIP64					
TMP19A33F20NG-OTP(Note1)			64	8	5	3	3	2				11		Yes	Yes	49						

Note 1) The on-chip ROM can be programmed only once and can not be reprogrammed.

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TX19 Family: TX19 Series

□Mask ROM Versions

Part Number	ROM (Kbytes)	RAM (Kbytes)	Maximum Operating Frequency (MHz)	DMA Controller (Ch)	UART/SIO (Ch)	UART/HSIO (Ch)	UART (Ch)	I ² C/SIO (Ch)	10-Bit AD Converter (Ch)	8-Bit DA Converter (Ch)	10-Bit DA Converter (Ch)	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	32-Bit Timer Output Compare (Ch)	32-Bit Timer Input Capture (Ch)	Motor Controller (Ch)	External Interrupt Pins (Pins)	Dual Clocks	Debug Support Unit	I/O Ports (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	Flash Version (See the datasheet for operating conditions.)	Package
TMP1941AFG	NA	10	40	4	2	2	1	8				4	4				11	Yes	Yes	46	2.7 to 3.6	-40 to 85	—	LQFP100 (14×14 mm)
TMP1940CYAFG	256		32	4	2	2	1	8				4	4				11	Yes	Yes	77			TMP1940FDBFG	
TMP1942CYUE		384	16	32	4	5		1	16		3	12	14					29	Yes	Yes	108	(Note1) 1.35 to 1.65	-20 to 85	TMP1942FDU
TMP1942CZUE	32			4	5		1	16		3	12	14					29	Yes	Yes	108	TMP1942FDXBG **			FBGA177 (13×13 mm)
TMP1942CZXBG	32			4	5		1	16		3	12	14					29	Yes	Yes	108	TMP1962F10AXBG			FBGA281 (13×13 mm)
TMP1962C10BxBG	1024	40	40.5	8	7		1	24				12	4	8	8		25		Yes	202				

Note 1) A separate I/O power supply is required.

** : Under development

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TX19 Family: TX19A Series

□Mask ROM Versions

Part Number	ROM (Kbytes)	RAM (Kbytes)	Maximum Operating Frequency (MHz)	DMA Controller (Ch)	UART/SIO (Ch)	UART/HSIO (Ch)	UART (Ch)	I ² C/SIO (Ch)	10-Bit AD Converter (Ch)	8-Bit DA Converter (Ch)	10-Bit DA Converter (Ch)	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	32-Bit Timer Output Compare (Ch)	32-Bit Timer Input Capture (Ch)	Motor Controller (Ch)	External Interrupt Pins (Pins)	Dual Clocks	Debug Support Unit	I/O Ports (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	Flash Version (See the datasheet for operating conditions.)	Package
TMP19A71CYFG	256	10	56	8	2	2		19					4			2	10		Yes	75	(Note1) 1.35 to 1.65	-40 to 85	TMP19A71FYFG	QFP100 (14×20 mm)
TMP19A71CYUG			56	8	2	2		19					4			2	10		Yes	75			TMP19A71FYUG	LQFP100 (14×14 mm)
TMP19A43CZXBG	384	20	40	8	3	3	1	16	2				16	8	4		48	Yes	Yes	143		-20 to 85	TMP19A43FZXBG	FBGA193 (12×12 mm)
TMP19A43CDXBG			40	8	3	3	1	16	2				16	8	4		48	Yes	Yes	143			TMP19A43FDXBG	
TMP19A61CDXBG	512	40	54	8	9	2	2	32					36	4	4		16		Yes	212		-20 to 85	TMP19A61F10XBG	FBGA289 (11×11 mm)
TMP19A61C10XBG			54	8	9	2	2	32					36	4	4		16		Yes	212			TMP19A64F20BxBG	FBGA281 (13×13 mm)
TMP19A64C1DXBG	1536	56	54	8	7		1	24				11	10	4		20	Yes	Yes	209					

Note 1) A separate I/O power supply is required.

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

TX19 Family: TX19A/H1 Series

□Mask ROM Versions

Part Number	ROM (Kbytes)	RAM (Kbytes)	Maximum Operating Frequency (MHz)	External SRAM Interface	DMA Controller (Ch)	Remote Memory Interface	UART/SIO (Ch)	UART/HSIO (Ch)	I ² C/SIO (Ch)	10-Bit AD Converter (Ch)	16-Bit Timer/Counter (Ch)	16-Bit PWM Generator (Ch)	CS/WAIT Controller (Ch)	Multiply-Accumulate (MAC)	External Interrupt Pins (Pins)	Watchdog Timer	Clock Gear	32-kHz Timer (for S/W RTC)	RTC (Ch)	Dual Clocks	On-chip Debug Function	Debug Support Unit	I/O Ports (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	Mask ROM Version (See the datasheet for operating conditions.)	Package
TMP19A31CYFG	NA	256	80	Yes	8	Yes	5	5	2	12	16	16	6	Yes	16	Yes	Yes		1	Yes	Yes	Yes	96	2.7 to 3.6	-20 to 85	—	LQFP176 (24×24 mm)

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

32-Bit Microprocessors

TX39 Family

Part Number	Maximum Operating Frequency (MHz)	Internal Bus Width (Bits)	External Bus Width (Bits)	Instruction Cache (Kbytes)	Data Cache (Kbytes)	DMAC Channels (Ch)	I/O Ports (Pins)	Serial Interface (Ch)	Timer Channels (Ch)	External Interrupt Pins (Pins)	PCI Controller (MHz)	Debug Support Unit	Memory Controller	Others	Package
TMPR3912AUG-92	92	32	32	4	1		39	3	2	39			SDRAM, ROM, SRAM, Flash	LCD interface, PCMCIA, RTC	LQFP208
TMPR3912XB-92	92	32	32	4	1		39	3	2	39					FBGA217
TMPR3927CFE	133	32	32	8	4	4	16	2	3	6	33	●	SDRAM, SRAM, ROM, Flash		QFP240

● Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

64-Bit Microprocessors

TX49 Family

Part Number	Maximum Operating Frequency (MHz)	Internal Bus Width (Bits)	External Bus Width (Bits)	Instruction Cache (Kbytes)	Data Cache (Kbytes)	DMAC Channels (Ch)	I/O Ports (Pins)	Serial Interface (Ch)	Timer Channels (Ch)	External Interrupt Pins (Pins)	PCI Controller (MHz)	Debug Support Unit	Memory Controller	Others	Package
TMPR4951BFG-200	200	64	32	16	8				1	4		●			LQFP100
TMPR4955BFG-200/300	200 /300	64	32	32	32				1	6		●		FPU	QFP160
TMPR4955CFG-400	400	64	32	32	32				1	6		●			QFP160
TMPR4956CXBG-400	400	64	64	32	32				1	6		●			PBGA217
TMPR4925XBG-200	200	64	32	16	16	4	32	2	3	8	33	●	NAND Flash, SDRAM, SRAM, ROM, NOR Flash	FPU, SPI, AC-Link, PCMCIA, RTC	PBGA256
TMPR4937XBG-300/333	300 /333	64	64	32	32	8	16	2	3	6	33/66	●	SDRAM, SRAM, ROM, NOR Flash	FPU, AC-Link	PBGA484
TMPR4938XBG-300/333	300 /333	64	64	32	32	8	16	2	3	6	33/66	●	NAND Flash, SDRAM, SRAM, ROM, NOR Flash	FPU, Ether MAC, SPI, AC-Link	PBGA484
TX4939XBG-400	400	64	32	32	32	8	101	4	6	7	33/66	●	NAND Flash, DDR-SDRAM, SRAM, ROM, NOR Flash	FPU, Ether MAC, ATA100, SPI, AC-Link/I ² S, I ² C, Video port, RTC, Crypt engine (AES, SHA1, etc.)	PBGA456
TX4961XBG-240	240	64	32	16	16	8	※	6	12	5		●	NAND Flash, DDR-SDRAM, SRAM, ROM, NOR Flash	Graphics controller, frame grabber, CAN controller, Media-LB interface, ADC, AC-Link controller	PBGA456
TX4964FG-120	120	64	16	8	8	4	※	4	6	7		●	SRAM, ROM, NOR Flash	Graphics controller, frame grabber, CAN controller, I ² S controller	LQFP176
TX4966XBG-280	**	280	64	32	16	16	8	※	7	22	10	●	SDRAM, SRAM, ROM, NOR Flash	Graphics controller × 2, frame grabber × 2, APIX, RSDS, CAN controller, I ² S controller	PBGA456

※: All I/O pins are configurable as general-purpose I/Os.

** : Under development

● Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

64-Bit Microprocessor Peripherals (PCI companion chip)

Part Number	Functions	Package
TC86C001FG (GOKU-S)	PCI interface (32 bit, 33 MHz) ATA/ATAPI host controller, Ultra DMA transfer (mode 4), maximum transfer rate = 66 MB/s USB1.1 host controller: 2 ports (OpenHCI 1.0a compatible) USB device controller: 1 port I ² C/SIO Power supply voltage (I/O = 3.3 V, internal = 1.5 V)	LQFP144

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

Development System Tools

TLCS-47 Family

□Software Products

Language Tool		Debugger
Assembler	C-Like Compiler	
SW471E0-ZZJ: Japanese edition SW471E0-ZZE: English edition	SW476E0-ZZJ: Japanese edition SW476E0-ZZE: English edition	SW477E0-ZZJ ## : Controller: BM1020A (for the RTE emulation system), Japanese edition SW477E0-ZZE ## : Controller: BM1020A (for the RTE emulation system), English edition SW477E1-ZZJ : Controller: BM1022R0B (for the model 10 emulation system), Japanese edition SW477E1-ZZE: Controller: BM1022R0B (for the model 10 emulation system), English edition

□Hardware Products

Target MCU		In-Circuit Emulation System				
Part Number	Package	Emulator		Accessory		
		Controller *5	Emulation Pod	MCU Probe	Package Converter	MCU Mount Adapter /IC Socket
TMP47C101PG	DIP16	BM1020A ##	BM4721A ##	PN100002 + PN200001 *4	BM1160 ##	—
TMP47C201PG					BM1160 + AS-DIP.3-016-SO03-1 ## *3	
TMP47P201VPG						
TMP47C101MG	SOP16	BM1020A ##	BM4721A ##	PN100004 *4	AS-DIP.3-020-SO03-1 *3	—
TMP47C201MG						
TMP47C102PG						
TMP47C202PG	DIP20	BM1020A ##	BM47C203N0A ##	PN100003 *4	AS-DIP.6-028-SO08-1 *3	—
TMP47P202VPG						
TMP47C102MG						
TMP47C202MG	SOP20	BM1020A ##	BM47C203N0A ##	PN100004 *4	AS-DIP.3-020-SO03-1 *3, *4	—
TMP47P202VMG						
TMP47C103NG						
TMP47C203NG	SDIP28	BM1022R0B ##	BM47C206M0A ##	PN100004 *4	AS-DIP.3-020-SO03-1 *3, *4	—
TMP47P403VNG						
TMP47C103MG						
TMP47C203MG	SOP28	BM1022R0B ##	BM47C206M0A ##	PN100004 *4	AS-DIP.3-020-SO03-1 *3, *4	—
TMP47P403VMG						
TMP47C206PG						
TMP47P206VPG	DIP20	BM1022R0B ##	BM47C206M0A ##	PN100004 *4	AS-DIP.3-020-SO03-1 *3, *4	—
TMP47C206MG						
TMP47P206VMG						
TMP47C222UG	LOFP44 (10 x 10)	BM1020A ##	BM47214A ##	PN110003 ##	BM1152 ##	—
TMP47C422UG					BM1152 + AS-SDP.4-028-SO05-2 ## *3	
TMP47P422VUG						
TMP47C222FG	QFP44 (14 x 14)	BM1022R0B ##	BM47C422N0B ##	PN120019	AS-DIP.6-028-SO08-1 *3	—
TMP47C422FG						
TMP47P422VFG						
TMP47C222NG	SDIP42	BM1020A ##	BM47214A ##	PN100002 *4	PN200001 *4	—
TMP47C422NG						
TMP47P422VNG						
TMP47C241NG	SDIP28	BM1020A ##	BM47214A ##	PN110003 ##	BM1152 ##	—
TMP47P241VNG					BM1152 + AS-SDP.4-028-SO05-2 ## *3	
TMP47C241MG						
TMP47P241VMG	SOP28	BM1022R0B ##	BM47C443N0B ##	PN100003 *4	AS-DIP.6-028-SO08-1 *3	—
TMP47C243NG						
TMP47C443NG						
TMP47P443VNG	SDIP28	BM1022R0B ##	BM47C443N0B ##	PN100003 *4	AS-DIP.6-028-SO08-1 *3	—
TMP47C243MG						
TMP47C443MG						
TMP47P443VMG	SOP28	BM1022R0B ##	BM47C443N0B ##	PN100003 *4	AS-DIP.6-028-SO08-1 *3	—
TMP47C243DMG						
TMP47C443DMG						
TMP47P443VDMG	SSOP30	BM1022R0B ##	BM47C443N0B ##	PN100003 *4	AS-DIP.6-028-SO08-1 *3	—
TMP47C243DMG						
TMP47C443DMG						
TMP47P443VDMG	SSOP30	BM1022R0B ##	BM47C443N0B ##	PN100003 *4	AS-DIP.6-028-SO08-1 *3	—
TMP47C243DMG						
TMP47C443DMG						

● The TLCS-47 Family software products run on the Japanese or English Microsoft® Windows® 95, Microsoft® Windows NT®4.0, DOS-compatible box and Microsoft® MS-DOS®.

Microsoft, Windows, Windows NT and MS-DOS are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

● One QFP adaptor and one pin protector are supplied with an MCU probe or a package converter whose name begins with "PN12."

When you purchase additional QFP adaptors or pin protectors, check their part numbers in the section "Spare Parts from Toshiba."

● For the supported Programming tools, see the section "Programming Tools".

● Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

##: Contact your local Toshiba sales representative before ordering products.

*1: One IC socket is supplied with each MCU probe. IC sockets are Yamaichi Electronics' products.

*2: One IC socket is supplied with each package converter. IC sockets are Yamaichi Electronics' products.

*3: The package converters whose part numbers begin with AS are Emulation Technology's products.

AS-DIP.3-016-SO03-1: DIP16 → SOP16

AS-DIP.6-028-SO08-1: DIP28 → SOP28

AS-DIP.3-020-SO03-1: DIP20 → SOP20

AS-SDP.4-028-SO05-2: SDIP28 → SOP28

*4: These are spare parts. One spare part is supplied with each emulator or emulation pod.

*5: BM1020A: RTE controller, BM1022R0B: model 10 controller

TLCS-870/C Series (1/4)

□ Software Products

Toshiba Integrated Development Environment	
C Compiler	Integrated Development Environment *1
SW89CN0-ZCC: 1 license SW89CN3-ZCC: 10 licenses	SW00MN0-ZCC: 1 license SW00MN3-ZCC: 10 licenses

□ Hardware Products

- Choose either the RTE870/C model 15 In-Circuit Emulation system or the RTE870/C Light In-Circuit Emulation system.
- The TLCS-870/C Series software products run on the Japanese or English Microsoft® Windows® 2000, Microsoft® Windows® XP and Microsoft® Windows Vista®. Microsoft, Windows and Windows Vista are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
- For the supported Programming tools, see the section "Programming Tools".
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

*1: The controller and Light In-Circuit Emulator comes with a single-seat download license for the Integrated Development Environment.

*2: The emulation chip is specifically designed for each target MCU. For availability status, contact your local Toshiba sales representative.

*3: One QFP adaptor and one pin protector are supplied with each QFP packaged product.

When you purchase additional QFP adaptors or pin protectors, check their part numbers in the section "Spare Parts from Toshiba."

*4: These are ADLINKS's products.

*5: One IC socket is supplied with each target connection board. IC sockets are Yamaichi Electronics' products.

Target MCU		Emulation Chip *2	RTE870/C model 15 In-Circuit Emulation System				RTE870/C Light In-Circuit Emulation System						
			model 15 In-Circuit Emulator			Accessory	Light In-Circuit Emulator	Accessory					
Part Number	Part Number		Controller	Interface Module	Emulation Module	Target Connection Board *3		MCU Mount Adapter /IC Socket	Probe Set *4	Bump Socket *4 (MCU Mount Adapter)			
TMP86P202PG	DIP20	TMP86C908XBG	BM1040R0B-G	BMP86A100010B	BMP86A200010B	BMP86D020NA0A	—	BMP86A300010A	AP20D3W-2	—			
TMP86P202MG	SOP20					BMP86D020MC0A	IC253-020-0004-B *5		AP20S3T-2	BM-20S3T			
TMP86P203PG	DIP20					BMP86D020NA0A	—		AP20D3W-2	—			
TMP86P203MG	SOP20					BMP86D020MC0A	IC253-020-0004-B *5		AP20S3T-2	BM-20S3T			
TMP86CH06AUG	LQFP44 (10 x 10)	TMP86C906XBG				BMP86D044DE0A	PN210020A		AP44QP	BM-44Q10P			
TMP86PH06UG						BMP86D042NB0A	—		AP42D0U-2	—			
TMP86CH06NG	SDIP42	TMP86C906XBG				BMP86D028NB0A	—		AP28D4U	—			
TMP86PH06NG						BMP86A200010B	BMP86D028MC0A		IC253-028-0003-B *5	AP28S9T	BM-28S9T		
TMP86C407NG						SDIP28	TMP86C908XBG		BMP86D030MF1A	IC253-030-0002-B *5	AP30S3N-2	BM-30S3N	
TMP86C807NG									BMP86D030NB0A	—	AP30D4U-2	—	
TMP86F807NG	SOP28	TMP86C908XBG							BMP86A200020A	BMP86D032NB0A	—	AP32D4U	—
TMP86P807NG									BMP86D030MF0A	IC253-030-0002-B *5	AP30S3N	BM-30S3N	
TMP86C407MG						SSOP30	TMP86C908XBG		BMP86A200020A	BMP86D032NB0A	—	AP32D4U	—
TMP86C807MG									BMP86D030MF0A	IC253-030-0002-B *5	AP30S3N	BM-30S3N	
TMP86F807MG	SDIP30	TMP86C909XBG							BMP86A200020A	BMP86D032NB0A	—	AP32D4U	—
TMP86P807MG									BMP86D030MF0A	IC253-030-0002-B *5	AP30S3N	BM-30S3N	
TMP86C408DMG			SSOP30	TMP86C908XBG	BMP86A200020A	BMP86D032NB0A	—	AP32D4U	—				
TMP86C408IDMG					BMP86D030MF0A	IC253-030-0002-B *5	AP30S3N	BM-30S3N					
TMP86C408SDMG	SDIP32	TMP86C909XBG			BMP86A200020A	BMP86D032NB0A	—	AP32D4U	—				
TMP86C808DMG					BMP86D030MF0A	IC253-030-0002-B *5	AP30S3N	BM-30S3N					
TMP86C808IDMG			SSOP30	TMP86C912XBG	BMP86A200020A	BMP86D032NB0A	—	AP32D4U	—				
TMP86C808SDMG					BMP86D030MF0A	IC253-030-0002-B *5	AP30S3N	BM-30S3N					
TMP86F808DMG	SDIP32	TMP86C909XBG			BMP86A200020A	BMP86D032NB0A	—	AP32D4U	—				
TMP86P808DMG					BMP86D030MF0A	IC253-030-0002-B *5	AP30S3N	BM-30S3N					
TMP86C408NG			SSOP30	TMP86C912XBG	BMP86A200020A	BMP86D032NB0A	—	AP32D4U	—				
TMP86C808NG					BMP86D030MF0A	IC253-030-0002-B *5	AP30S3N	BM-30S3N					
TMP86F808NG	SSOP30	TMP86C912XBG			BMP86A200020A	BMP86D032NB0A	—	AP32D4U	—				
TMP86P808NG					BMP86D030MF0A	IC253-030-0002-B *5	AP30S3N	BM-30S3N					
TMP86C809NG			SSOP30	TMP86C912XBG	BMP86A200020A	BMP86D032NB0A	—	AP32D4U	—				
TMP86CH09NG					BMP86D030MF0A	IC253-030-0002-B *5	AP30S3N	BM-30S3N					
TMP86FH09ANG	SSOP30	TMP86C912XBG			BMP86A200020A	BMP86D032NB0A	—	AP32D4U	—				
TMP86F409NG					BMP86D030MF0A	IC253-030-0002-B *5	AP30S3N	BM-30S3N					
TMP86F809NG			SSOP30	TMP86C912XBG	BMP86A200020A	BMP86D032NB0A	—	AP32D4U	—				
TMP86CH12MG					BMP86D030MF0A	IC253-030-0002-B *5	AP30S3N	BM-30S3N					
TMP86FH12MG	SSOP30	TMP86C912XBG			BMP86A200020A	BMP86D032NB0A	—	AP32D4U	—				
TMP86FH12MG					BMP86D030MF0A	IC253-030-0002-B *5	AP30S3N	BM-30S3N					

TLCS-870/C Series (2/4)

□ Software Products

Toshiba Integrated Development Environment	
C Compiler	Integrated Development Environment *1
SW89CN0-ZCC: 1 license SW89CN3-ZCC: 10 licenses	SW00MN0-ZCC: 1 license SW00MN3-ZCC: 10 licenses

□ Hardware Products

- Choose either the RTE870/C model 15 In-Circuit Emulation system or the RTE870/C Light In-Circuit Emulation system.
 - The TLCS-870/C Series software products run on the Japanese or English Microsoft® Windows® 2000, Microsoft® Windows® XP and Microsoft® Windows Vista®. Microsoft, Windows and Windows Vista are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
 - For the supported Programming tools, see the section "Programming Tools".
 - Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.
- *1: The controller and Light In-Circuit Emulator comes with a single-seat download license for the Integrated Development Environment.
 *2: The emulation chip is specifically designed for each target MCU. For availability status, contact your local Toshiba sales representative.
 *3: One QFP adaptor and one pin protector are supplied with each QFP packaged product.
 When you purchase additional QFP adaptors or pin protectors, check their part numbers in the section "Spare Parts from Toshiba."
 *4: These are ADLINKS's products.

Target MCU		Emulation Chip *2	RTE870/C model 15 In-Circuit Emulation System				RTE870/C Light In-Circuit Emulation System										
			model 15 In-Circuit Emulator			Accessory	Light In-Circuit Emulator	Accessory									
Part Number	Package		Controller	Interface Module	Emulation Module	Target Connection Board *3		MCU Mount Adaptor /IC Socket	Probe Set *4	Bump Socket *4 (MCU Mount Adaptor)							
TMP86C420UG	LQFP64 (10 x 10)	TMP86C929AXBG	BM1040R0B-G	BMP86A100010B	BMP86A200010B	BMP86D064DG0A	PN210033	BMP86A300010A	AP64QM	BM-64Q10M							
TMP86C820UG																	
TMP86P820UG																	
TMP86C420FG	QFP64 (14 x 14)					BMP86D064DE0A	PN210026		AP64QP	BM-64Q14P							
TMP86C820FG																	
TMP86P820FG																	
TMP86CH21AUG	LQFP64 (10 x 10)	TMP86C923XBG			BMP86A100010B	BMP86A100010B	BMP86A200010B	BMP86D064DG0A	PN210033	BMP86A300010A	AP64QM	BM-64Q10M					
TMP86CH21FG	QFP64 (14 x 14)												BMP86D064DE0A	PN210026	AP64QP	BM-64Q14P	
TMP86C822UG	LQFP44 (10 x 10)																BMP86D044DE1A
TMP86CH22UG																	
TMP86PH22UG																	
TMP86CM23AUG	LQFP64 (10 x 10)							TMP86C925XBG	BMP86A100010B		BMP86A100010B	BMP86A200010B	BMP86D064DG0A	PN210033	BMP86A300010A	AP64QM	BM-64Q10M
TMP86CP23AUG																	
TMP86FS23UG																	
TMP86PM23UG																	
TMP86PS23UG																	
TMP86FP24FG	LQFP80 (12 x 12)	TMP86C948XBG	BMP86A200030A	BMP86A200020A			BMP86D080DG1A			PN210008			BMP86A300020A	—		—	—
TMP86CS25ADFG	LQFP100 (14 x 14)	TMP86C925XBG						BMP86D100DG0A				PN210023			AP100QM-2		
TMP86CM25AFG	QFP100 (14 x 20)				BMP86A200020A	BMP86D100FF0A											
TMP86CM25FG																	
TMP86CS25AFG																	
TMP86FM25FG																	
TMP86PS25FG																	
TMP86CM27FG	QFP80 (14 x 20)	TMP86C927XBG				BMP86A200010B	BMP86A200010B	BMP86D080FE0A	PN210002	BMP86A300010A	AP80QP	BM-80Q142P					
TMP86CP27AFG																	
TMP86FS27FG																	
TMP86PS27FG	QFP80 (14 x 20)	TMP86C989XBG			BMP86D080DG0A			PN210008	AP80QM		BM-80Q12M						
TMP86CS28DFG	LQFP80 (12 x 12)											BMP86A200010B	BMP86D080FE0A	PN210002	AP80QP	BM-80Q142P	
TMP86FS28DFG																	
TMP86CS28FG	QFP80 (14 x 20)	TMP86C989XBG	BMP86D080FE0A	PN210002	AP80QP			BM-80Q142P									
TMP86FS28FG																	

TLCS-870/C Series (3/4)

□ Software Products

Toshiba Integrated Development Environment	
C Compiler	Integrated Development Environment *1
SW89CN0-ZCC: 1 license SW89CN3-ZCC: 10 licenses	SW00MN0-ZCC: 1 license SW00MN3-ZCC: 10 licenses

□ Hardware Products

- Choose either the RTE870/C model 15 In-Circuit Emulation system or the RTE870/C Light In-Circuit Emulation system.
 - The TLCS-870/C Series software products run on the Japanese or English Microsoft® Windows® 2000, Microsoft® Windows® XP and Microsoft® Windows Vista®. Microsoft, Windows and Windows Vista are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
 - For the supported Programming tools, see the section "Programming Tools".
 - Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.
- *1: The controller and Light In-Circuit Emulator comes with a single-seat download license for the Integrated Development Environment.
 *2: The emulation chip is specifically designed for each target MCU. For availability status, contact your local Toshiba sales representative.
 *3: One QFP adaptor and one pin protector are supplied with each QFP packaged product.
 When you purchase additional QFP adaptors or pin protectors, check their part numbers in the section "Spare Parts from Toshiba."
 *4: These are ADLINKS's products.
 *5: These are top covers for IC packages. These are Tokyo Eletech's products.

Target MCU		Emulation Chip *2	RTE870/C model 15 In-Circuit Emulation System				RTE870/C Light In-Circuit Emulation System			
			model 15 In-Circuit Emulator		Target Connection Board *3	Accessory MCU Mount Adapter /IC Socket	Light In-Circuit Emulator	Accessory		
Part Number	Package	Controller	Interface Module	Emulation Module				MCU Mount Adapter /IC Socket	Probe Set *4	Bump Socket *4 (MCU Mount Adapter)
TMP86C829BUG	LQFP64 (10 x 10)	TMP86C929AXBG	BM1040R0B-G	BMP86A100010B	BMP86A200010B	BMP86D064DG0A	PN210033	BMP86A300010A	AP64QM	BM-64Q10M
TMP86CH29BUG										
TMP86CM29BUG										
TMP86CM29LUG										
TMP86FM29UG										
TMP86PM29BUG										
TMP86C829BFG	QFP64 (14 x 14)	TMP86C944XBG	BM1040R0B-G	BMP86A100010B	BMP86A200010B	BMP86D064DE0A	PN210026	BMP86A300010A	AP64QP	BM-64Q14P
TMP86CH29BFG										
TMP86CM29BFG										
TMP86FM29FG										
TMP86PM29BFG										
TMP86CS44UG	LQFP44 (10 x 10)	TMP86C944XBG	BM1040R0B-G	BMP86A100010B	BMP86A200010B	BMP86D044DE0A	PN210020A	BMP86A300010A	AP44QP	BM-44Q10P
TMP86PS44UG										
TMP86C845UG										
TMP86C846NG	SDIP42	TMP86C947XBG	BM1040R0B-G	BMP86A100010B	BMP86A200010B	BMP86D042NB1A	—	BMP86A300010A	AP42D0U-3	—
TMP86CH46ANG										
TMP86CM46ANG										
TMP86FH46ANG										
TMP86PH46NG										
TMP86PM46NG										
TMP86C847IUG	LQFP44 (10 x 10)	TMP86C947XBG	BM1040R0B-G	BMP86A100010B	BMP86A200010B	BMP86D044DE0A	PN210020A	BMP86A300010A	AP44QP	BM-44Q10P
TMP86C847SUG										
TMP86C847UG										
TMP86CH47AUG										
TMP86CH47IUG										
TMP86CH47SUG										
TMP86CM47AUG										
TMP86FH47AUG										
TMP86PH47UG										
TMP86PM47AUG										
TMP86FH47ADUG	LQFP48 (7 x 7)	TMP86C948XBG	BM1040R0B-G	BMP86A100010B	BMP86A200030A	BMP86D048DG0A	HQPACK048SD *5	BMP86A300030A	AP48QM-2	BM-48Q7M
TMP86FM48UG	LQFP64 (10 x 10)									
TMP86FM48FG	QFP64 (14 x 14)									
					BMP86A200030A	BMP86D064DG0A	PN210033	BMP86A300030A	AP64QM	BM-64Q10M
					BMP86A200030A	BMP86D064DE0A	PN210026	BMP86A300030A	AP64QP	BM-64Q14P

TLCS-870/C Series (4/4)

□ Software Products

Toshiba Integrated Development Environment	
C Compiler	Integrated Development Environment *1
SW89CN0-ZCC: 1 license SW89CN3-ZCC: 10 licenses	SW00MN0-ZCC: 1 license SW00MN3-ZCC: 10 licenses

□ Hardware Products

- Choose either the RTE870/C model 15 In-Circuit Emulation system or the RTE870/C Light In-Circuit Emulation system.
- The TLCS-870/C Series software products run on the Japanese or English Microsoft® Windows® 2000, Microsoft® Windows® XP and Microsoft® Windows Vista®. Microsoft, Windows and Windows Vista are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
- For the supported Programming tools, see the section "Programming Tools".
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

*1: The controller and Light In-Circuit Emulator comes with a single-seat download license for the Integrated Development Environment.

*2: The emulation chip is specifically designed for each target MCU. For availability status, contact your local Toshiba sales representative.

*3: One QFP adaptor and one pin protector are supplied with each QFP packaged product.

When you purchase additional QFP adaptors or pin protectors, check their part numbers in the section "Spare Parts from Toshiba."

*4: These are ADLINKS's products.

*5: One IC socket is supplied with each target connection board. IC sockets are Yamaichi Electronics' products.

Target MCU		Emulation Chip *2	RTE870/C model 15 In-Circuit Emulation System				RTE870/C Light In-Circuit Emulation System			
			model 15 In-Circuit Emulator			Accessory	Light In-Circuit Emulator	Accessory		
Part Number	Package		Controller	Interface Module	Emulation Module	Target Connection Board *3		MCU Mount Adapter /IC Socket	Probe Set *4	Bump Socket *4 (MCU Mount Adapter)
TMP86CM49UG	LQFP64 (10 x 10)	TMP86C949XBG	BM1040R0B-G	BMP86A100010B	BMP86A200010B	BMP86D064DG0A	PN210033	AP64QM	BM-64Q10M	
TMP86CS49UG										
TMP86FS49BUG										
TMP86PM49UG										
TMP86CH49FG	QFP64 (14 x 14)					BMP86A200010B	BMP86D064DE0A	PN210026	AP64QP	BM-64Q14P
TMP86CM49FG										
TMP86CS49FG										
TMP86FS49BFG										
TMP86PM49FG										
TMP86CS64AFG	QFP100 (14 x 20)	TMP86C964XBG	BMP86A200020A	BMP86D100FF0A	PN210005A	BMP86A300020A	AP100QN	BM-100Q142N		
TMP86PS64FG										
TMP86CH72FG	QFP64 (14 x 14)	TMP86C972XBG	BMP86A200010B	BMP86D064DE0A	PN210026	BMP86A300010A	AP64QP	BM-64Q14P		
TMP86CM72FG										
TMP86PM72FG										
TMP86CK74AFG		QFP80 (14 x 20)							TMP86C974XBG	BMP86D080FE0A
TMP86CM74AFG										
TMP86PM74AFG										
TMP86CH87RUG	LQFP44 (10 x 10)	TMP86C987XBG	BMP86A200020A	BMP86D044DE0A	PN210020A	BMP86A300020A	AP44QP	BM-44Q10P		
TMP86CM87RUG										
TMP86PM87RUG										
TMP86CH92IDMG		SSOP30							TMP86C993XBG	BMP86D030MF3A
TMP86CH92SDMG										
TMP86FH92IDMG										
TMP86FH92DMG										
TMP86FH93NG	SDIP32			BMP86D032NB1A	—		AP32D4U-2	—		

TLCS-870 Series (1/3)

☐ Software Products

Language Tool	Debugger
C/C-Like Compiler & Assembler Set	
SW87YN0-ZCJ: 1 license (Japanese edition) SW87YN0-ZCE: 1 license (English edition) SW87YN3-ZCJ: 10 licenses (Japanese edition) SW87YN3-ZCE: 10 licenses (English edition)	SW87DN9-ZCK: 1 license (Japanese edition) SW87DN9-ZCF: 1 license (English edition) SW87DN3-ZCK: 10 licenses (Japanese edition) SW87DN3-ZCF: 10 licenses (English edition)

☐ Hardware Products

Target MCU		RTE870 model 10 In-Circuit Emulation System						
		In-Circuit Emulator		Accessory				
Part Number	Package	Controller	Emulation Pod	MCU Probe	Package Converter	MCU Mount Adapter /IC Socket		
TMP87C405AMG	SOP28	BM87C408M0A ##	BM87C408M0A ##	PN100003 *1	AS-DIP.6-028-SO08-1 *1, *2	—		
TMP87C807UG	QFP44 (10 x 10)		BM87CH47U0B ##	PN120011 *1	—	PN210020A		
TMP87C408LNG	SDIP28		BM87C408M0A ##	PN100003 *1	AS-DIP.6-028-SO08-1 *1, *2	—		
TMP87C408NG								
TMP87C808LNG								
TMP87C808NG								
TMP87P808LNG								
TMP87P808NG								
TMP87C408LMG							SOP28	BM87C408M0A ##
TMP87C408MG								
TMP87C808LMG								
TMP87C808MG								
TMP87P808LMG								
TMP87P808MG								
TMP87C408DMG	SSOP30		BM1022R0B ##	—	PN100003 *1	PN200007	IC253-030-0002-B *3	
TMP87C409BNG	SDIP28	BM87C809N0A ##				PN100003 *1	AS-DIP.6-028-SO08-1 *2	—
TMP87C809BNG								
TMP87P809NG								
TMP87C409BMG	SOP28	BM87C809N0A ##				PN100003 *1	AS-DIP.6-028-SO08-1 *2	—
TMP87C809BMG								
TMP87P809MG								
TMP87C814FG	QFP64 (14 x 20)	BM87C814NG				PN110008 *1	—	—
TMP87CH14FG								
TMP87CK14FG								
TMP87CM14FG								
TMP87PM14FG								
TMP87C814NG	SDIP64	BM87CM14N0A ##				PN110008 *1	—	—
TMP87CH14NG								
TMP87CK14NG								
TMP87CM14NG								
TMP87PM14NG								
TMP87CH21CDFG	LQFP80 (12 x 12)	BM87CP23F0B ##	PN120006A	—	—			
TMP87CM21CDFG								
TMP87CP21CDFG								
TMP87PP21DFG								
TMP87CH21CFG	QFP80 (14 x 20)	BM87CP23F0B ##	PN120004	—	—			
TMP87CM21CFG								
TMP87CP21CFG								
TMP87PP21FG								
TMP87CM23AFG	QFP100 (14 x 20)	BM87CM29U0B ##	PN120005 *1	—	—			
TMP87CP23FG								
TMP87PP23FG								
TMP87CH29UG	LQFP64 (10 x 10)	BM87CM29U0B ##	PN120022 *1	—	—			
TMP87CK29UG								
TMP87CM29UG								

● The TLCS-870 Series software products run in the following environments:

C/C-Like Compiler & Assembler Set: Japanese or English Microsoft® Windows® 98 and Microsoft® Windows NT®4.0.

Debugger: Japanese or English Microsoft® Windows® 2000 and Microsoft® Windows® XP.

Microsoft, Windows and Windows NT are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

● One QFP adapter and one pin protector are supplied with an MCU probe or a package converter whose name begins with "PN12".

When you purchase additional QFP adaptors or pin protectors, check their part numbers in the section "Spare Parts from Toshiba."

● For the supported Programming tools, see the section "Programming Tools".

● Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

#: Contact your local Toshiba sales representative before ordering products.

*1: These are spare parts. One spare part is supplied with each emulation pod.

*2: The package converters (DIP28 → SOP28) whose part numbers begin with AS are Emulation Technology's products.

*3: One IC socket is supplied with the package converter. The IC socket is Yamaichi Electronics' product.

TLCS-870 Series (2/3)

☐ Software Products

Language Tool	Debugger
C/C-Like Compiler & Assembler Set	
SW87YN0-ZCJ: 1 license (Japanese edition) SW87YN0-ZCE: 1 license (English edition) SW87YN3-ZCJ: 10 licenses (Japanese edition) SW87YN3-ZCE: 10 licenses (English edition)	SW87DN9-ZCK: 1 license (Japanese edition) SW87DN9-ZCF: 1 license (English edition) SW87DN3-ZCK: 10 licenses (Japanese edition) SW87DN3-ZCF: 10 licenses (English edition)

☐ Hardware Products

Target MCU		RTE870 model 10 In-Circuit Emulation System												
		In-Circuit Emulator		Accessory										
Part Number	Package	Controller	Emulation Pod	MCU Probe	Package Converter	MCU Mount Adapter								
TMP87PM29UG	LQFP64 (10 x 10)	BM1022R0B ##	BM87CM29U0B ##	PN120022 *1	—	PN210033								
TMP87CH29NG	SDIP64			PN110005		—	—							
TMP87CK29NG			PN120014		PN210011A									
TMP87CM29NG				—		—								
TMP87PM29NG			QFP64 (14 x 20)		PN120014		—	PN210011A						
TMP87C840FG	—			—										
TMP87CC40FG					—	—								
TMP87CH40FG	—			—										
TMP87CK40AFG					—	—								
TMP87CM40AFG	—			—										
TMP87PH40AFG			—		—									
TMP87PM40AFG	—			—										
TMP87C840NG			SDIP64		PN110005 *1	—	—							
TMP87CC40NG	—			—										
TMP87CH40NG		—			—									
TMP87CK40ANG	—			—										
TMP87CM40ANG		—			—									
TMP87PH40ANG	—			—										
TMP87PM40ANG		—	—											
TMP87C841UG	LQFP64 (10 x 10)			BM1022R0B ##	BM87CM41N0A ##	PN110005 *1	PN120035	PN210033						
TMP87CC41UG		QFP64 (14 x 20)	PN120014			—	PN210011A							
TMP87CH41UG								—	—					
TMP87CK41UG										—	—			
TMP87CM41UG												—	—	
TMP87PM41UG														—
TMP87C841FG	—			—										
TMP87CC41FG		—	—											
TMP87CH41FG					—	—								
TMP87CK41FG							—	—						
TMP87CM41FG									—	—				
TMP87PM41FG											—	—		
TMP87C841NG	SDIP64			PN110005 *1									—	—
TMP87CC41NG		—	—											
TMP87CH41NG					—	—								
TMP87CK41NG							—	—						
TMP87CM41NG									—	—				
TMP87PM41NG											—	—		
TMP87C446NG	SDIP42			PN100002 *1									PN200001 *1	—
TMP87C846NG		—	—											
TMP87CH46NG					—	—								
TMP87PH46NG							—	—						
TMP87C447UG									LQFP44 (10 x 10)	PN120011 *1				
TMP87C847LUG											—	—		
TMP87C847UG	—			—										
TMP87CH47LUG		—	—											

● The TLCS-870 Series software products run in the following environments:

C/C-Like Compiler & Assembler Set: Japanese or English Microsoft® Windows® 98 and Microsoft® Windows NT®4.0.

Debugger: Japanese or English Microsoft® Windows® 2000 and Microsoft® Windows® XP.

Microsoft, Windows and Windows NT are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

● One QFP adapter and one pin protector are supplied with an MCU probe or a package converter whose name begins with "PN12".

When you purchase additional QFP adaptors or pin protectors, check their part numbers in the section "Spare Parts from Toshiba."

● For the supported Programming tools, see the section "Programming Tools".

● Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

##: Contact your local Toshiba sales representative before ordering products.

*1: These are spare parts. One spare part is supplied with each emulation pod.

TLCS-870 Series (3/3)

☐ Software Products

Language Tool	Debugger
C/C-Like Compiler & Assembler Set	
SW87YN0-ZCJ: 1 license (Japanese edition)	SW87DN9-ZCK: 1 license (Japanese edition)
SW87YN0-ZCE: 1 license (English edition)	SW87DN9-ZCF: 1 license (English edition)
SW87YN3-ZCJ: 10 licenses (Japanese edition)	SW87DN3-ZCK: 10 licenses (Japanese edition)
SW87YN3-ZCE: 10 licenses (English edition)	SW87DN3-ZCF: 10 licenses (English edition)

☐ Hardware Products

Target MCU		RTE870 model 10 In-Circuit Emulation System				
		In-Circuit Emulator		Accessory		
Part Number	Package	Controller	Emulation Pod	MCU Probe	Package Converter	MCU Mount Adapter
TMP87CH47UG	LQFP44 (10 x 10)	BM1022R0B ##	BM87CH47U0B ##	PN120011 *1	—	PN210020A
TMP87PH47LUG						
TMP87PH47UG						
TMP87CH48UG	LQFP64 (10 x 10)		BM87CH48U0A ##	PN120022 *1		PN210033
TMP87CM48UG						
TMP87PH48UG						
TMP87PM48UG	QFP64 (14 x 14)			PN120052		PN210026
TMP87CH48DFG						
TMP87CM48DFG						
TMP87PH48DFG						
TMP87PM48DFG	QFP80 (14 x 20)			PN120004 *1		PN210002
TMP87CM53FG						
TMP87PM53FG	LQFP80 (12 x 12)			PN120006A *1		PN210008
TMP87CS68DFG						
TMP87PS68DFG						
TMP87CM70BFG	QFP80 (14 x 20)		PN120004	PN210002		
TMP87PM70FG						
TMP87CS71BFG	QFP80 (14 x 20)		PN120004	PN210002		
TMP87PS71AFG						
TMP87CH74AFG						
TMP87CM74AFG	QFP80 (14 x 20)		PN120004	PN210002		
TMP87PM74FG						
TMP87CH75FG						
TMP87CM75FG	QFP100 (14 x 20)		PN120005 *1	PN210005A		
TMP87PM75FG						

- The TLCS-870 Series software products run in the following environments:

C/C-Like Compiler & Assembler Set: Japanese or English Microsoft® Windows® 98 and Microsoft® Windows NT®4.0.

Debugger: Japanese or English Microsoft® Windows® 2000 and Microsoft® Windows® XP.

Microsoft, Windows and Windows NT are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

- One QFP adaptor and one pin protector are supplied with an MCU probe or a package converter whose name begins with "PN12".

When you purchase additional QFP adaptors or pin protectors, check their part numbers in the section "Spare Parts from Toshiba."

- For the supported Programming tools, see the section "Programming Tools".

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

##: Contact your local Toshiba sales representative before ordering products.

*1: These are spare parts. One spare part is supplied with each emulation pod.

TLCS-870/X Series

□Software Products

Language Tool	Debugger
C Compiler & Assembler Set	
SW88YN0-ZCK: 1 license (Japanese edition) SW88YN0-ZCF: 1 license (English edition)	SW88DN9-ZCK: 1 license (Japanese edition) SW88DN9-ZCF: 1 license (English edition)
SW88YN3-ZCK: 10 licenses (Japanese edition) SW88YN3-ZCF: 10 licenses (English edition)	SW88DN3-ZCK: 10 licenses (Japanese edition) SW88DN3-ZCF: 10 licenses (English edition)

□Hardware Products

Target MCU		RTE870/X model 10 In-Circuit Emulation System					
		In-Circuit Emulator		Accessory			
Part Number	Package	Controller *2	Emulation Pod	MCU Probe	Package Converter	MCU Mount Adapter /IC Socket	
TMP88CH40NG	SDIP28	BM1040R0B-G /BM1055R0C	BM88CS43F0A-M15	PN100003	PN200004	—	
TMP88PH40NG					PN200008	IC253-028-0003-B *4	
TMP88CH40IMG	SOP28						PN120011
TMP88CH40MG					LQFP44 (10 x 10)	PN100002	
TMP88PH40MG	SDIP42						PN120014
TMP88CH41UG				QFP64 (14 x 20)	PN110005	—	
TMP88PH41UG	SDIP64						PN120004 *1
TMP88FH41UG				QFP80 (14 x 20)	BM88FW44F0A-M15	PN120004 *1	
TMP88CH41NG	QFP80 (14 x 20)						BM88CS43F0A-M15
TMP88PH41NG				LQFP44 (10 x 10)	BM88CU74F0A	PN120004 *1	
TMP88CS42FG	QFP80 (14 x 20)						BM88CP77F0A
TMP88PS42FG				QFP100 (14 x 20)	—	—	
TMP88CS42NG	SDIP64						—
TMP88PS42NG				QFP80 (14 x 20)	—	—	
TMP88CS43FG	QFP80 (14 x 20)						—
TMP88PS43FG		LQFP44 (10 x 10)	—	—	—	—	
TMP88FW45AFG	QFP80 (14 x 20)						—
TMP88F846UG		QFP80 (14 x 20)	—	—	—	—	
TMP88CU74FG	QFP100 (14 x 20)						—
TMP88PU74FG		QFP100 (14 x 20)	—	—	—	—	
TMP88CS77FG	QFP100 (14 x 20)						—
TMP88CU77FG		QFP100 (14 x 20)	—	—	—	—	
TMP88PU77FG	QFP100 (14 x 20)						—

● The TLCS-870/X Series software products run on the Japanese or English Microsoft® Windows® 2000 and Microsoft® Windows® XP. Microsoft and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

● One QFP adapter and one pin protector are supplied with an MCU probe or a package converter whose name begins with "PN12". When you purchase additional QFP adaptors or pin protectors, check their part numbers in the section "Spare Parts from Toshiba."

● For the supported Programming tools, see the section "Programming Tools".

● Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

*1: These are spare parts. One spare part is supplied with each emulation pod.

*2: BM1040R0B-G: model 15 controller, BM1055R0C: model 25 controller

- For connection with the host system via RS-232C:

- the BM1055R0C requires a 9-pin cross cable;

- the BM1055R0B and BM1055R0A (old version) require a 25-pin straight cable;

- the BM1040R0B-G requires a 25-pin straight cable.

- For connection with the emulation pod, the BM1055R0A, the old version of the controller, requires the PN300001.

*3: One IC socket is supplied with each MCU probe. IC sockets are Yamaichi Electronics' product.

*4: One IC socket is supplied with the package converter. The IC socket is Yamaichi Electronics' product.

TLCS-870/C1 Series

☐ Software Products

Toshiba Integrated Development Environment	
C Compiler	Integrated Development Environment *1
SW89CN0-ZCC: 1 license SW89CN3-ZCC: 10 licenses	SW00MN0-ZCC: 1 license SW00MN3-ZCC: 10 licenses

☐ Hardware Products

Target MCU		RTE870/C1 On-Chip Debug Emulation System		RTE870/C1 In-Circuit Emulation System									
		On-Chip Debug Emulator	Accessory	In-Circuit Emulator	Emulation Chip *3	Accessory *4							
Part Number	Package		Connector *2			Probe Set	Bump Socket (MCU Mount Adapter)						
TMP89FH00DUG	LQFP48(7 x 7)	BMP89A400010A-G	FTSH-110-01-L-DV-K	—	—	—	—						
TMP89FH00WBG	WCSP39 (3.8 x 3.8)												
TMP89FW20UG	LQFP64 (10 x 10)												
TMP89FW24DFG	QFP80 (14 x 20)												
TMP89FW24FG	LQFP80 (12 x 12)												
TMP89FM40NG	SDIP42	BMP89A400010A-G	FTSH-110-01-L-DV-K	BMP89A300010A-G	TMP89C900XBG **	AP42D0U-4	—						
TMP89FH40NG													
TMP89FM42UG	LQFP44 (10 x 10)					—	—	—	AP44QP-3	BM-44Q10P			
TMP89FM42LUG													
TMP89FM42AUG													
TMP89FM42KUG													
TMP89FH42UG													
TMP89FH42LUG													
TMP89CM42UG													
TMP89CH42UG													
TMP89FM43LQG	VQON44 (5.3 x 5.3)	BMP89A400010A-G	FTSH-110-01-L-DV-K	BMP89A300010A-G	TMP89C900XBG **	AP48QM-3	BM-48Q7M						
TMP89FM46DUG	LQFP48 (7 x 7)							—	—	—	—	—	
TMP89FM46ADUG													
TMP89FM46KDUG													
TMP89FH46DUG													
TMP89FH46LDUG													
TMP89CM46DUG													
TMP89CH46DUG													
TMP89FS60UG													LQFP64 (10 x 10)
TMP89FS60FG	QFP64 (14 x 14)							AP64QP-2	BM-64Q14P				
TMP89FM82DUG	LQFP48 (7 x 7)	—	—	—	—	—							
TMP89FM82TDUG **	LQFP48 (7 x 7)												

- Choose either the On-Chip Debug Emulator or the In-Circuit Emulator.
 - The TLCS-870/C1 Series software products run on the Japanese or English Microsoft® Windows® 2000, Microsoft® Windows® XP and Microsoft® Windows Vista®. Microsoft, Windows and Windows Vista are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
 - For the supported Programming tools, see the section "Programming Tools".
 - Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.
- *1: The emulator comes with a single-seat download license for the Integrated Development Environment.
- *2: One spare part is supplied with each On-Chip Debug Emulator. These are Samtec's products. The part number shown here denotes surface mount type with keying shroud (recommended). Other mount types, such as through-hole, and other mating options are also available.
For the specifications and purchase inquiries about this product, please contact the supplier Samtec, Inc. The recommended connector can also be purchased from it-sim corporation, Sophia Systems Co., Ltd. and UNIDUX INC.
- *3: The emulation chip is specifically designed for each target MCU. For availability status, contact your local Toshiba sales representative.
- *4: These are ADLINKS's products.

** : Under development

TLCS-900 Family (1/4)

□Software Products

Toshiba Integrated Development Environment		Real-Time OS (μTRON 3.0)
C Compiler	Integrated Development Environment *1	
SW96CN0-ZCC: 1 license SW96CN3-ZCC: 10 licenses	SW00MN0-ZCC: 1 license SW00MN3-ZCC: 10 licenses	SW96RN2-ZCC: Object code can be freely copied. SW96RNC-ZCC: Object code can be freely copied and comes with source code.

□Hardware Products

Target MCU		RTE900 model 15/25 In-Circuit Emulation System						
		In-Circuit Emulator		Accessory				
Part Number	Package	Controller *2	Emulation Pod	MCU Probe/Probe Set	Package Converter	MCU Mount Adapter		
TMP91CU10FG	LQFP100 (14 x 14)	BM1040R0B-G /BM1055R0C	BM91CU10F0B-M15 *4	PN120013 *3	—	PN210023		
TMP91PW10FG			BM91CW11F0B-M15	PN120013 *3		PN210023		
TMP91CW11FG		BM1040R0B-G /BM1055R0C	BM91CW12AF0A-M15 *5	PN120013 *3		PN210023		
TMP91PW11FG			BM1040R0B-G /BM1055R0C	BM91CW12F0A-M15		PN120013 *3	PN210023	
TMP91CW12AFG				BM1040R0B-G /BM1055R0C		BM91CW12F0A-M15	PN120013 *3	PN210023
TMP91CW12FG			BM1040R0B-G /BM1055R0C			BM91CW12F0A-M15	PN120013 *3	PN210023
TMP91PW12FG	QFP128 (14 x 14)	BM1040R0B-G		BM91C815F0A-M15 *5	PN120057 *3	PN210054		
TMP91C815FG			LQFP100 (14 x 14)	BM1040R0B-G	BM91C016F0A-M15 *5	PN120013 *3	PN210023	
TMP91C016FG	LQFP100 (14 x 14)	BM1040R0B-G			BM91C219F0A-M15	PN120013 *3	PN210023	
TMP91C219FG			LQFP144 (16 x 16)	/BM1055R0C	BM91CM20F0A-M15	PN120044 *3	PN210044 *3	
TMP91C820AFG	LQFP100 (14 x 14)	BM1040R0B-G			BM91CW12AF0A-M15 *5	PN120013 *3	PN210023	
TMP91CY22FG			BM1040R0B-G /BM1055R0C	BM91C824F0A-M15 *5	PN120013 *3	PN210023		
TMP91CY22IFG				BM1040R0B-G /BM1055R0C	BM91C025F0A-M15	PN120013 *3	PN210023	
TMP91C824FG					BM1040R0B-G	BM91C025F0A-M15	PN120013 *3	PN210023
TMP91C025FG				QFP64 (14 x 14)		BM1040R0B-G	TEC-064SA-T2/SET *6	HOPACK064SA *7
TMP91CU27FG			LQFP64 (10 x 10)		BM1040R0B-G			
TMP91FW27FG								
TMP91CK27UG								
TMP91CP27UG								
TMP91CU27UG								
TMP91CU27RUG **								
TMP91FW27UG	LQFP100 (14 x 14)	BM1040R0B-G /BM1055R0C	BM91C829F0A-M15	PN120013 *3	—	PN210023		
TMP91C829FG			BM91C630F0A-M15	PN120013 *3		PN210023		
TMP91C630FG			BM1040R0B-G	BM91CW40F0A-M15		PN120013 *3	PN210023	
TMP91CW40FG				BM1040R0B-G		BM91CW12AF0A-M15	PN120013 *3	PN210023
TMP91FW40FG			LQFP100 (14 x 14)			BM1040R0B-G	BM91CW60F0A-M15	PN120013 *3
TMP91FY42FG				QFP100 (14 x 20)				BM1040R0B-G /BM1055R0C
TMP91CW60FG	LQFP80 (12 x 12)	BM1040R0B-G /BM1055R0C	BM91CW60F0A-M15		TEC-080SD-T2/SET *6	HOPACK080SD *7		
TMP91CW60DFG				QFP80 (14 x 20)	BM1040R0B-G /BM1055R0C	BM91CW60F0A-M15	TEC-080RA-T2/SET *6	HOPACK080RA178 *7
TMP91FU62FG	LQFP100 (14 x 14)	BM1040R0B-G /BM1055R0C	BM91CW60F0A-M15				TEC-100SD-T1/SET *6	HOPACK100SD *7
TMP91FU62DFG				QFP100 (14 x 20)	BM1040R0B-G /BM1055R0C	BM91FW64F0A-GM	TEC-100RB-T1/SET *6	HOPACK100RB179 *7
TMP91FW64FG	QFP100 (14 x 20)	BM1040R0B-G /BM1055R0C	BM91FW64F0A-GM				TEC-100RB-T1/SET *6	HOPACK100RB179 *7
TMP91FW64DFG								

- The TLCS-900 Family software products run on the Japanese or English Microsoft® Windows® 2000, Microsoft® Windows® XP, Microsoft® Windows Vista®. Microsoft, Windows and Windows Vista are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. ** : Under development
 - The real-time OS requires a license agreement. For details, please contact your local Toshiba sales representative.
 - One QFP adaptor and one pin protector are supplied with an MCU probe or a package converter whose name begins with "PN12." When you purchase additional QFP adaptors or pin protectors, check their part numbers in the section "Spare Parts from Toshiba."
 - For the supported Programming tools, see the section "Programming Tools".
 - Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.
- *1: The controller comes with a single-seat download license for the Integrated Development Environment.
 *2: BM1040R0B-G: model 15 controller, BM1055R0C: model 25 controller
- For connection with the host system via RS-232C:
 the BM1055R0C requires a 9-pin cross cable;
 the BM1055R0B and BM1055R0A (old version) require a 25-pin straight cable;
 the BM1040R0B-G requires a 25-pin straight cable.
 - The previous version of the controller requires a dedicated cable shown below. For details, contact your local Toshiba sales representative.
 To perform a performance analysis and a coverage measurement using the BM1055R0B with an MCU whose name begins with "TMP92", the PN300007 is required.
 BM1055R0A: The PN300001 is required. The BM1055R0A cannot be used for an MCU whose name begins with "TMP92".
- *3: These are spare parts. One spare part is supplied with each emulation pod.
 *4: To operate the TMP91CU10FG at 2 V on the target board, a 2-V conversion adaptor (PN410001) is required. For information about the 2-V conversion adaptor, contact your local Toshiba sales representative.
 *5: 2-V operation is not supported.
 *6: These are Tokyo Eletech's products.
 *7: These are top covers for IC packages. These are Tokyo Eletech's products.

TLCS-900 Family (2/4)

□ Software Products

Toshiba Integrated Development Environment		Real-Time OS (μITRON 3.0)
C Compiler	Integrated Development Environment *1	
SW96CN0-ZCC: 1 license SW96CN3-ZCC: 10 licenses	SW00MN0-ZCC: 1 license SW00MN3-ZCC: 10 licenses	SW96RN2-ZCC: Object code can be freely copied. SW96RNC-ZCC: Object code can be freely copied and comes with source code.

□ Hardware Products

Target MCU		Emulation System				
Part Number	Package	Emulator		Accessory		
		Controller *2	Emulation Pod/Emulator	MCU Probe/Probe Set	MCU Mount Adapter / Top Cover for IC Package	Communication Cable: Connector
TMP92C820FG	LQFP144 (16 x 16)	BM1040R0B-G /BM1055R0C	BM92C820F0A-M15	PN120044 *3	PN210044 *3	—
TMP92CH21FG			BM92CH21F0A-M15	PN120044 *3	PN210044 *3	
TMP92CM22FG	LQFP100 (14 x 14)		BM92CM22F0A-M15	PN120013 *3	PN210023	
TMP92CY23FG	LQFP100 (14 x 14)		BM92CY23F0A-M15	PN120013 *3	PN210023	
TMP92CY23DFG	QFP100 (14 x 20)			TEC-100RB-T1/SET *4	HQPACK100RB179 *4	
TMP92CA25FG	LQFP144 (16 x 16)		BM92CA25F0A-M15	PN120044 *3	PN210044 *3	
TMP92CZ26AXBG	FBGA228 (15 x 15)	—	HW92DG000AG	—	—	FTSH-110-01-L-DV-K *5 *6
TMP92CF26AXBG		—	—	—	—	
TMP92CM27FG	LQFP144 (16 x 16)	BM1040R0B-G /BM1055R0C	BM92CM27F0A-M15	PN120044 *3	PN210044 *3	—
TMP92CD28AFG	LQFP100 (14 x 14)		BM92CD28F0A-GM	PN120013 *3	PN210023	
TMP92FD28AFG				QFP100 (14 x 20)	TEC-100RB-T1/SET *4	
TMP92FD28ADFG	QFP100 (14 x 20)		—		HW92DG000AG + BMC92CF29F0A-G *7	
TMP92CF29AFG				LQFP176 (20 x 20)	—	
TMP92CF30FG	—		—			
TMP92CD54IFG **	LQFP100 (14 x 14)	BM1040R0B-G /BM1055R0C	BM92CY54F0A-M15	PN120013 *3	PN210023	—
TMP92FD54AIFG **						

- Choose either the RTE900 model 15 / model 25 In-Circuit Emulation system or the RTE900 In-Circuit Emulation system. Both system can use the same accessories.

Target MCU		Emulation System			Accessory	
		RTE900 model 15 / model25 In-Circuit Emulation System		RTE900 In-Circuit Emulation System	MCU Probe/Probe Set	MCU Mount Adapter / Top Cover for IC Package
		Controller	Emulation Pod	In-Circuit Emulator		
TMP92CD23AFG	LQFP100 (14 x 14)	BM1040R0B-G /BM1055R0C	BM92FD23AF0A-M15	HW92ES230AG	PN120013 *8	PN210023 *8
TMP92FD23AFG					/ TEC-100SD-T1/SET	/ HQPACK100SD
TMP92CD23ADFG	QFP100 (14 x 20)				TEC-100RB-T1/SET *4	HQPACK100RB179 *4
TMP92FD23ADFG					—	—

- The TLCS-900 Family software products run on the Japanese or English Microsoft® Windows® 2000, Microsoft® Windows® XP, Microsoft® Windows Vista®. Microsoft, Windows and Windows Vista are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. **: Under development

- The real-time OS requires a license agreement. For details, please contact your local Toshiba sales representative.
- One QFP adaptor and one pin protector are supplied with an MCU probe or a package converter whose name begins with "PN12." When you purchase additional QFP adaptors or pin protectors, check their part numbers in the section "Spare Parts from Toshiba."
- For the supported Programming tools, see the section "Programming Tools".
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

*1: The controller comes with a single-seat download license for the Integrated Development Environment.

*2: BM1040R0B-G: model 15 controller, BM1055R0C: model 25 controller

- For connection with the host system via RS-232C:
 - the BM1055R0C requires a 9-pin cross cable;
 - the BM1055R0B and BM1055R0A (old version) require a 25-pin straight cable;
 - the BM1040R0B-G requires a 25-pin straight cable.
- The previous version of the controller requires a dedicated cable shown below. For details, contact your local Toshiba sales representative.
 - To perform a performance analysis and a coverage measurement using the BM1055R0B with an MCU whose name begins with "TMP92", the PN300007 is required.
 - BM1055R0A: The PN300001 is required. The BM1055R0A cannot be used for an MCU whose name begins with "TMP92".

*3: These are spare parts. One spare part is supplied with each emulation pod.

*4: These are Tokyo Eletech's products.

*5: These are Samtec's products. The part number shown here denotes surface mount type with keying shroud (recommended). Other mount types, such as through-hole, and other mating options are also available. For the specifications and purchase inquiries about this product, please contact the supplier Samtec, Inc. The recommended connector can also be purchased from it-sim corporation, Sophia Systems Co., Ltd. and UNIDUX INC.

*6: One spare part is supplied with each emulator.

*7: The BMC92CF29F0A-G is an in-circuit adaptor and should be purchased together with the emulator.

*8: Appropriate accessories vary with the emulation system to be used.

RTE900 model 15 / model 25 system:

Use the MCU probe (PN120013) that comes with the BM92FD23AF0A-M15 and MCU mount adapter (PN210023).

RTE900 system:

Use the probe set (TEC-100SD-T1/SET) and top cover for IC package (HQPACK100SD) from Tokyo Eletech.

TLCS-900 Family (3/4)

□Software Products

Toshiba Integrated Development Environment		Real-Time OS (μITRON 3.0)
C Compiler	Integrated Development Environment *1	
SW96CN0-ZCC: 1 license SW96CN3-ZCC: 10 licenses	SW00MN0-ZCC: 1 license SW00MN3-ZCC: 10 licenses	SW96RN2-ZCC: Object code can be freely copied. SW96RNC-ZCC: Object code can be freely copied and comes with source code.

□Hardware Products

Target MCU		RTE900 model 15/25 In-Circuit Emulation System						
		In-Circuit Emulator		Accessory				
Part Number	Package	Controller *2	Emulation Pod	MCU Probe	Package Converter	MCU Mount Adapter		
TMP93CS20FG	LQFP144 (16 x 16)	BM1040R0B-G /BM1055R0C	BM93CS20F0B-M15	PN120044 *3	—	PN210044 *3		
TMP93PW20AFG			BM93CS32F0B-M15	PN120039A *3		PN210026		
TMP93CS32FG	QFP64 (14 x 14)		PN120063	PN210020A				
TMP93PW32FG	LQFP44 (10 x 10)		BM93CM40F0C-M15	PN120013 *3	—	PN210023		
TMP93CS36UG			BM93CS44F0B-M15	PN120042 *3		PN210008		
TMP93CS40DFG				PN120009		PN210002		
TMP93CW40DFG						PN120042 *3	PN210008	
TMP93PS40DFG							PN120013 *3	PN210023
TMP93PW40DFG								PN210002
TMP93CS41DFG	LQFP80 (12 x 12)		PN120042 *3	PN210008				
TMP93CW41DFG			PN120013 *3	PN210023				
TMP93CS44FG	QFP80 (14 x 20)		PN120042 *3	PN210008				
TMP93PS44FG			PN120013 *3	PN210023				
TMP93CU44DFG			PN120042 *3	PN210008				
TMP93CW44DFG	LQFP80 (12 x 12)		PN120042 *3	PN210008				
TMP93PW44ADFG			PN120013 *3	PN210023				
TMP93CS45FG	LQFP100 (14 x 14)	PN120042 *3	PN210008					
TMP93CW46AFG		PN120013 *3	PN210023					
TMP93PW46AFG								

● The TLCS-900 Family software products run on the Japanese or English Microsoft® Windows® 2000, Microsoft® Windows® XP, Microsoft® Windows Vista®. Microsoft, Windows and Windows Vista are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

● The real-time OS requires a license agreement. For details, please contact your local Toshiba sales representative.

● One QFP adapter and one pin protector are supplied with an MCU probe or a package converter whose name begins with "PN12."
When you purchase additional QFP adaptors or pin protectors, check their part numbers in the section "Spare Parts from Toshiba."

● For the supported Programming tools, see the section "Programming Tools".

● Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

*1: The controller comes with a single-seat download license for the Integrated Development Environment.

*2: BM1040R0B-G: model 15 controller, BM1055R0C: model 25 controller

● For connection with the host system via RS-232C:

the BM1055R0C requires a 9-pin cross cable;

the BM1055R0B and BM1055R0A (old version) require a 25-pin straight cable;

the BM1040R0B-G requires a 25-pin straight cable.

● The previous version of the controller requires a dedicated cable shown below. For details, contact your local Toshiba sales representative.

To perform a performance analysis and a coverage measurement using the BM1055R0B with an MCU whose name begins with "TMP92", the PN300007 is required.

BM1055R0A: The PN300001 is required. The BM1055R0A cannot be used for an MCU whose name begins with "TMP92".

These are spare parts. One spare part is supplied with each emulation pod.

*3: These are spare parts. One spare part is supplied with each emulation pod.

TLCS-900 Family (4/4)

□Software Products

Toshiba Integrated Development Environment		Real-Time OS (μITRON 3.0)
C Compiler	Integrated Development Environment *1	
SW96CN0-ZCC: 1 license SW96CN3-ZCC: 10 licenses	SW00MN0-ZCC: 1 license SW00MN3-ZCC: 10 licenses	SW96RN2-ZCC: Object code can be freely copied. SW96RNC-ZCC: Object code can be freely copied and comes with source code.

□Hardware Products

Target MCU		RTE900 model 15/25 In-Circuit Emulation System				
		In-Circuit Emulator		Accessory		
Part Number	Package	Controller *2	Emulation Pod	MCU Probe	Package Converter	MCU Mount Adaptor
TMP94C241CFG	QFP160 (28 x 28)	BM1056R0B ##	BM94C241F0A	PN120040A *3	—	PN210030
TMP94C251ADFG	LQFP144 (20 x 20)		BM94C251F0A	PN120050 *3		PN210036
TMP95C001FG	QFP64 (14 x 14)		BM95C001F0B-M15	PN120039A *3		PN210026
TMP95C061BDFG	LQFP100 (14 x 14)		BM95C061F0C-M15	PN120013 *3		PN210023
TMP95C063DFG	LQFP144 (20 x 20)		BM95C063F0B-M15	PN120027 *3		PN210036
TMP95CS64FG	LQFP100 (14 x 14)		BM1040R0B-G /BM1055R0C	BM95CS64F0B-M15		PN120013 *3
TMP95CW64FG						
TMP95PW64FG						
TMP95C265FG						
TMP95CW65FG						
TMP95CS66FG						
TMP96C031ZFG	QFP64 (14 x 20)	BM1055R0B ##	BM96C031F0A *4	PN110007 *3	PN120007 *3	PN210011A
TMP96CM40FG	QFP80 (14 x 20)	BM1040R0B-G /BM1055R0C	BM96C141F0D-M15	PN120009 *3	—	PN210002
TMP96PM40FG						
TMP96C041BFG						
TMP96C141BFG						

● The TLCS-900 Family software products run on the Japanese or English Microsoft® Windows® 2000, Microsoft® Windows® XP, Microsoft® Windows Vista®. Microsoft, Windows and Windows Vista are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

● The real-time OS requires a license agreement. For details, please contact your local Toshiba sales representative.

● One QFP adaptor and one pin protector are supplied with an MCU probe or a package converter whose name begins with "PN12." When you purchase additional QFP adaptors or pin protectors, check their part numbers in the section "Spare Parts from Toshiba."

● For the supported Programming tools, see the section "Programming Tools".

● Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

##: Contact your local Toshiba sales representative before ordering products.

*1: The controller comes with a single-seat download license for the Integrated Development Environment (excluding the BM1056R0B).

*2: BM1040R0B-G: model 15 controller, BM1055R0C: model 25 controller, BM1056R0B: model 25/2 controller

• For connection with the host system via RS-232C:

the BM1055R0C requires a 9-pin cross cable;

the BM1055R0B and BM1055R0A (old version) require a 25-pin straight cable;

the BM1040R0B-G requires a 25-pin straight cable.

• The previous version of the controller requires a dedicated cable shown below. For details, contact your local Toshiba sales representative.

To perform a performance analysis and a coverage measurement using the BM1055R0B with an MCU whose name begins with "TMP92", the PN300007 is required.

BM1055R0A: The PN300001 is required. The BM1055R0A cannot be used for an MCU whose name begins with "TMP92".

*3: These are spare parts. One spare part is supplied with each emulation pod.

*4: To connect the BM96C031F0A to the controller (BM1055R0B), a dedicated adaptor is required. For details, please contact your local Toshiba sales representative.

TX19 Series

□Software Products

Toshiba Integrated Development Environment		Real-Time OS (μITRON 3.0)
C Compiler	Integrated Development Environment *1	
SW19CN0-ZCC: 1 license SW19CN3-ZCC: 10 licenses	SW00MN0-ZCC: 1 license SW00MN3-ZCC: 10 licenses	SW19RN2-ZCC: Object code can be freely copied. SW19RN3-ZCC: The Green Hills Software (GHS) compiler is supported. Object code can be freely copied. SW19RNC-ZCC: Object code can be freely copied and comes with source code. SW19RND-ZCC: The Green Hills Software (GHS) compiler is supported. Object code can be freely copied and comes with source code.

□Hardware Products

Target MCU	RTE19 for N-WIRE On-Chip Debug Emulation System	
	On-Chip Debug Emulator	Accessory
	DSU PROBE for N-WIRE	Connector
TMP1940CYAFG	BM1200R0A	104068-1 *2 / FTSH-110-01-F-D-K *3
TMP1940FDBFG		
TMP1941AFG	BM1200R0A ##	
TMP1942CYUE	BM1200R0A	
TMP1942CZUE		
TMP1942CZXBG		
TMP1942FDU		
TMP1942FDXBG **		
TMP1962C10BDBG		
TMP1962F10AXBG		

- The TX19 series software products run in the following environments: **: Under development
 Toshiba Integrated Development Environment: Japanese or English Microsoft® Windows® 2000 and Microsoft® Windows® XP.
 TX19 Series Real-Time OS (μITRON 3.0): Japanese or English Microsoft® Windows® 98, Microsoft® Windows NT® 4.0 and Microsoft® Windows® 2000.
 Microsoft, Windows and Windows NT are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
 - The real-time OS requires a license agreement. For details, please contact your local Toshiba sales representative.
 - Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.
- ##: Contact your local Toshiba sales representative before ordering products.
- *1: The emulator comes with a single-seat download license for the Integrated Development Environment.
- *2: These are Available from Tyco Electronics's products.
- *3: These are Samtec's products.
 These connectors have through-hole leads. Other options, such as surface mount leads and ejectors are also available. Please visit Samtec, Inc.'s website for more details.

TX19A Series

□Software Products

Toshiba Integrated Development Environment		Real-Time OS (μITRON 4.0)
C Compiler	Integrated Development Environment *1	
SW1ACN0-ZCC: 1 license SW1ACN3-ZCC: 10 license	SW00MN0-ZCC: 1 license SW00MN3-ZCC: 10 license	SW1ARN5-ZCC: Object code can be freely copied. SW1ARNF-ZCC: Object code can be freely copied and comes with source code.

□Hardware Products

Target MCU	RTE19A model 110 On-Chip Debug Emulation System		RTE19A model 120 On-Chip Debug Emulation System	
	On-Chip Debug Emulator	Accessory	On-Chip Debug Emulator	Accessory
		Communication Cable: Connector		Communication Cable: Connector
TMP19A23FYFG	BM1210R0A	FFSD-10-D-9.00-01-N: FTSH-110-01-F-D-K *2 FFSD-17-D-8.00-01-N: FTSH-117-01-F-D-K	BM1211R0A	FFSD-10-D-9.00-01-N: FTSH-110-01-F-D-K *2 FFSD-17-D-8.00-01-N: FTSH-117-01-F-D-K *2 FFSD-10-D-8.00-01-N: FTSH-110-01-F-D-K
TMP19A23FYXBG				
TMP19A43CDXBG				
TMP19A43CZXBG				
TMP19A43FZXBG				
TMP19A43FDXBG				
TMP19A61C10XBG				
TMP19A61CDXBG				
TMP19A61F10XBG				
TMP19A64C1DXBG				
TMP19A64F20BXBG				
TMP19A71CYUG				
TMP19A71CYFG				
TMP19A71FYFG				
TMP19A71FYUG				

- Choose either the RTE19A model 110 On-Chip Debug Emulation system RTE19A model 120 On-Chip Debug Emulation system.
- The TX19A Series software products run on the Japanese or English Microsoft® Windows® 2000, Microsoft® Windows® XP and Microsoft® Windows Vista®. Microsoft, Windows and Windows Vista are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
- The real-time OS requires a license agreement. For details, please contact your local Toshiba sales representative.
- For the supported Programming tools, see the section "Programming Tools".
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

*1: The emulator comes with a single-seat download license for the Integrated Development Environment.

*2: These communication cables and connectors are provided by Samtec, Inc. Each emulator comes with a communication cable. If you need an additional communication cable, please contact Samtec directly. A connector must be purchased separately. The part numbers listed here denote connectors with through-hole leads. Other options, such as surface-mount leads and ejectors, are also available. For details, please visit Samtec's website.

FFSD-10-D-9.00-01-N: Communication cable for EJTAG (20 pin)	FTSH-110-01-F-D-K: EJTAG Connector (20 pin)
FFSD-17-D-8.00-01-N: Communication cable for TPC (34 pin)	FTSH-117-01-F-D-K: TPC Connector (34 pin)
FFSD-10-D-8.00-01-N: Communication cable for TPD (20 pin)	FTSH-110-01-F-D-K: TPD Connector (20 pin)

TX19A/H1 Series

□Software Products

Toshiba Integrated Development Environment		Real-Time OS (μITRON 4.0)
C Compiler	Integrated Development Environment *1	
SW1ACN0-ZCC: 1 license SW1ACN3-ZCC: 10 licenses	SW00MN0-ZCC: 1 license SW00MN3-ZCC: 10 licenses	SW1ARN5-ZCC: Object code can be freely copied. SW1ARNF-ZCC: Object code can be freely copied and comes with source code.

□Hardware Products

Target MCU	RTE19A/H1 Light On-Chip Debug Emulation System		
	On-Chip Debug Emulator	Accessory	
		Communication Cable *2	Connector *2
TMP19A31CYFG	HW19DG100AG	FFSD-10-D-07.00-01-N	FTSH-110-01-L-DV-K *3
TMP19A33F20NG			
TMP19A33F20NG-OTP			
TMP19A44FDXBG			
TMP19A44FEXBG			
TMP19A44F10XBG			

● The TX19A/H1 Series software products run on the Japanese or English Microsoft® Windows® 2000, Microsoft® Windows® XP and Microsoft® Windows Vista®. Microsoft, Windows and Windows Vista are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

- The real-time OS requires a license agreement. For details, please contact your local Toshiba sales representative.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

*1: The emulator comes with a single-seat download license for the Integrated Development Environment.

*2: These communication cables and connectors are provided by Samtec, Inc. One communication cable and one connector are supplied with each emulator.

*3: One spare part is supplied with each emulator. The part number shown here denotes surface mount type with keying shroud (recommended). Other mount types, such as through-hole, and other mating options are also available.

For the specifications and purchase inquiries about this product, please contact the supplier Samtec, Inc. The recommended connector can also be purchased from it-sim corporation, Sophia Systems Co., Ltd. and UNIDUX INC.

TX49 Family

□Hardware Products

Reference Board	Target MPU		Functions
	Part Number		
RBTX4951	TMPR4951BFG-200		These are reference boards for evaluating the TMPR4951 and TMPR 4955 respectively. Since both the TMPR4951 and TMPR 4955 have the SysAD Bus interface, the same board can be used for evaluation; the RBTX4951 and RBTX4955 simply come with different CPUs.
	RBHMA4601(CE)		
RBTX4955	TMPR4955CFG-400		These reference boards have a system controller (SysAD bridge), a NOR flash ROM, a DIMM DRAM, an SIO, an Ethernet controller, an I/O controller, and an EEPROM and an RTC connected to the SPI. Also, the reference boards provide an EJTAG connector, a ROM emulator connector and an expansion connector.
	RBHMA4605(CE)		
RBTX4925	TMPR4925XBG-200 RBHMA4300(CE)		This is a PCI-card-compliant reference board for evaluating the TMPR4925. This board has a CPU, a flash ROM, an SDRAM, a PCI controller, an Ethernet controller, an SIO interface, and PCMCIA and SmartMedia™ card slots. It also provides an expansion connector.
RBTX4937	TMPR4937XBG-300/333		This is a PCI-card-compliant reference board for evaluating the TMPR4937. This board has a CPU, a flash ROM, an SDRAM, an Ethernet controller and an SIO interface. It also provides a connector that can be connected to an external AC'97 board.
	RBHMA4400(CE)		
RBTX4938	TMPR4938XBG-300/333		This is a PCI-card-compliant reference board for evaluating the TMPR4938. This board has a CPU, a 128-MB SO-DIMM DRAM, a 16-MB NOR flash ROM, a detachable 32-MB NAND flash ROM and a PCI controller. On-chip features include an Ethernet controller, a debug Ethernet, an SIO, an ATA (IDE), an AC-Link interface, and an EEPROM and an RTC connected to the SPI. It also provides an expansion connector.
	RBHMA4500(CE)		
RBTX4939	TX4939XBG-400		This is an ATX-compliant reference board for evaluating the TX4939. It mainly consists of two modules: an independent CPU module having a DDR-SDRAM and an EJTAG interface, and a BASE board with a CPU module that allows the on-chip PCI, ATA, Ethernet MAC (RMII) and Video/Audio to be evaluated.
	RBHMS4700(CE)		
RBTC86C1	TC86C001FG(GOKU-S)		This is a reference board is compliant with the PCI card edge specification (3.3 V, 33-MHz, 32-bit) and is used to evaluate the TC86C001FG. It has a connector to which the ATA/ATAPI, two USB 1.1 host channels, a USB 1.1 device, I ² C and SIO channels can be attached.
	RBHPE4300(CE)		
RBHBK4400	—		This is a backplane board that can be used for system evaluation in conjunction with a PCI-compliant referenced board. It consists of a PCI-card-type CPU board and four PCI bard slots. A commercially-available ATX-compliant power supply may be used.
	RBHBK4400(CE)		

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

Programming Tools (1/4)

Target MCU		OTP Programming		Flash Programming			
Family/Series	Part Number	Package	OTP Programming Adapter	Off-Board Programming *2	On-Board Programming *3		
				FLASH Adapter *4	FLASH Writer: BM1401W0A-G *4 Connector: FTSH-110-01-L-DV-K *5		
TLCS-47 Family	TMP47P201VPG	DIP16	BM1187	—	—		
	TMP47P202VMG	SOP20	BM11613				
	TMP47P202VPG	DIP20	BM1187				
	TMP47P403VMG	SOP28	BM11541				
	TMP47P403VNG	SDIP28	BM1140				
	TMP47P206VMG	SOP20	BM11626				
	TMP47P206VPG	DIP20	BM11125 ##				
	TMP47P422VFG	QFP44 (14 x 14)	BM11603				
	TMP47P422VNG	SDIP42	BM11102				
	TMP47P422VUG	LQFP44 (10 x 10)	BM11670				
	TMP47P241VMG	SOP28	BM11557				
	TMP47P241VNG	SDIP28	BM1156				
	TMP47P443VDMG	SSOP30	BM11115 *1				
	TMP47P443VMG	SOP28	BM11601				
TMP47P443VNG	SDIP28	BM11100					
TLCS-870/C Series	TMP86P202MG	SOP20	BM11704	—	—		
	TMP86P202PG	DIP20	BM11203				
	TMP86P203MG	SOP20	BM11704				
	TMP86P203PG	DIP20	BM11203				
	TMP86PH06NG	SDIP42	BM11155				
	TMP86PH06UG	LQFP44 (10 x 10)	BM11656				
	TMP86F807MG	SOP28	—			PN410117	⊙
	TMP86F807NG	SDIP28	—			PN410119	⊙
	TMP86P807MG	SOP28	BM11684			—	—
	TMP86P807NG	SDIP28	BM11197-G			—	—
	TMP86F808DMG	SSOP30	—			PN410118	⊙
	TMP86F808NG	SDIP30	—			PN410119	⊙
	TMP86P808DMG	SSOP30	BM11683			—	—
	TMP86P808NG	SDIP30	BM11210			—	—
	TMP86F409NG	SDIP32	—			PN410119	⊙
	TMP86F809NG	SDIP32	—			PN410119	⊙
	TMP86FH09ANG	SDIP32	—			PN410119	⊙
	TMP86FH12MG	SSOP30	—			PN410118	⊙
	TMP86P820FG	QFP64 (14 x 14)	BM11663			—	—
	TMP86P820UG	LQFP64 (10 x 10)	BM11662-G			—	—
	TMP86PH22UG	LQFP44 (10 x 10)	BM11713			—	—
	TMP86FS23UG	LQFP64 (10 x 10)	—			PN410105A	⊙
	TMP86PM23UG	LQFP64 (10 x 10)	BM11698			—	—
	TMP86PS23UG	LQFP64 (10 x 10)	BM11698			—	—
	TMP86FP24FG	LQFP80 (12 x 12)	—			PN410107	⊙
	TMP86FM25FG	QFP100 (14 x 20)	—			PN410111	⊙
	TMP86PS25FG	QFP100 (14 x 20)	BM11672-G			—	—
	TMP86FS27FG	QFP80 (14 x 20)	—			PN410104	⊙
	TMP86PS27FG	QFP80 (14 x 20)	BM11701-G			—	—
	TMP86FS28DFG	LQFP80 (12 x 12)	—			PN410107	⊙
	TMP86FS28FG	QFP80 (14 x 20)	—			PN410104	⊙
	TMP86FM29FG	QFP64 (14 x 14)	—			PN410108	⊙
	TMP86FM29UG	LQFP64 (10 x 10)	—			PN410105A	⊙
	TMP86PM29BFG	QFP64 (14 x 14)	BM11663			—	—
TMP86PM29BUG	LQFP64 (10 x 10)	BM11662-G	—	—			
TMP86PS44UG	LQFP44 (10 x 10)	BM11687-G	—	—			
TMP86FH46ANG	SDIP42	—	PN410110	⊙			
TMP86PH46NG	SDIP42	BM11188	—	—			
TMP86PM46NG	SDIP42	BM11188	—	—			
TMP86FH47ADUG	LQFP48 (7 x 7)	—	PN410115	⊙			

● Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

⊙: Supported

##: Contact your local Toshiba sales representative before ordering products.

*1: As a guideline, the adapter should be replaced after 2,000 writes.

*2: Off-board Programming: Programs a Flash microcontroller before it is mounted on the target board.

*3: On-board Programming: Programs a Flash microcontroller while it is mounted on the target board.

*4: Comes with a download license for control software.

*5: These are Samtec's products. The part number shown here denotes surface mount type with keying shroud (recommended). Other mount types, such as through-hole, and other mating options are also available. For the specifications and purchase inquiries about this product, please contact the supplier Samtec, Inc. The recommended connector can also be purchased from it-sim corporation, Sophia Systems Co., Ltd. and UNIDUX INC.

Programming Tools (2/4)

Target MCU			OTP Programming	Flash Programming	
Family/Series	Part Number	Package	OTP Programming Adapter	Off-Board Programming *2	On-Board Programming *3
				FLASH Adapter *4	FLASH Writer: BM1401W0A-G *4 Connector: FTSH-110-01-L-DV-K *5
TLCS-870/C Series	TMP86FH47AUG	LQFP44 (10 x 10)	—	PN410109	⊙
	TMP86PH47UG	LQFP44 (10 x 10)	BM11687-G	—	—
	TMP86PM47AUG	LQFP44 (10 x 10)	BM11687-G	—	—
	TMP86FM48FG	QFP64 (14 x 14)	—	PN410108	⊙
	TMP86FM48UG	LQFP64 (10 x 10)		PN410105A	⊙
	TMP86FS49AIFG	QFP64 (14 x 14)		++	++
	TMP86FS49AIUG	LQFP64 (10 x 10)		++	++
	TMP86PM49FG	QFP64 (14 x 14)	BM11709	—	—
	TMP86PM49UG	LQFP64 (10 x 10)	BM11708	—	—
	TMP86FS49BFG	QFP64 (14 x 14)	—	PN410108	⊙
	TMP86FS49BUG	LQFP64 (10 x 10)		PN410105A	⊙
	TMP86PS64FG	QFP100 (14 x 20)	BM11690	—	—
	TMP86PM72FG	QFP64 (14 x 14)	BM11707-G		
	TMP86PM74AFG	QFP80 (14 x 20)	BM11689		
	TMP86PM87RUG	LQFP44 (10 x 10)	BM11687-G		
	TMP86FH92DMG	SSOP30	—	PN410118	⊙
TMP86FH92IDMG	SSOP30	PN410118		⊙	
TMP86FH93NG	SDIP32	PN410119		⊙	
TLCS-870 Series	TMP87PM14FG	QFP64 (14 x 20)	BM1199	—	—
	TMP87PM14NG	SDIP64	BM1198		
	TMP87PP21DFG	LQFP80 (12 x 12)	BM11605		
	TMP87PP21FG	QFP80 (14 x 20)	BM11604		
	TMP87PP23FG	QFP100 (14 x 20)	BM11585		
	TMP87PM29NG	SDIP64	BM11143		
	TMP87PM29UG	LQFP64 (10 x 10)	BM11617		
	TMP87PH40AFG	QFP64 (14 x 20)	BM1137-G		
	TMP87PH40ANG	SDIP64	BM1136-G		
	TMP87PM40AFG	QFP64 (14 x 20)	BM1137-G		
	TMP87PM40ANG	SDIP64	BM11714		
	TMP87PM41FG	QFP64 (14 x 20)	BM1137-G		
	TMP87PM41NG	SDIP64	BM1136-G		
	TMP87PM41UG	LQFP64 (10 x 10)	BM11621		
	TMP87PH46NG	SDIP42	BM1193-G		
	TMP87PH47LUG	LQFP44 (10 x 10)	BM11594-G		
	TMP87PH47UG	LQFP44 (10 x 10)	BM11594-G		
	TMP87PH48DFG	QFP64 (14 x 14)	BM11647		
	TMP87PH48UG	LQFP64 (10 x 10)	BM11617		
	TMP87PM48DFG	QFP64 (14 x 14)	BM11647		
	TMP87PM48UG	LQFP64 (10 x 10)	BM11617		
	TMP87PM53FG	QFP80 (14 x 20)	BM11604		
	TMP87PS68DFG	LQFP80 (12 x 12)	BM11605		
	TMP87PM70FG	QFP80 (14 x 20)	BM11550		
	TMP87PS71AFG	QFP80 (14 x 20)	BM11607		
	TMP87PM74FG	QFP80 (14 x 20)	BM11620		
	TMP87PM75FG	QFP100 (14 x 20)	BM11624		
	TMP87P808LMG	SOP28	BM11616		
	TMP87P808LNG	SDIP28	BM11122-G		
	TMP87P808MG	SOP28	BM11616		
	TMP87P808NG	SDIP28	BM11122-G		
	TMP87P809MG	SOP28	BM11616		
TMP87P809NG	SDIP28	BM11122-G			

● Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

++: Being planned

*1: As a guideline, the adapter should be replaced after 2,000 writes.

⊙: Supported

*2: Off-board Programming: Programs a Flash microcontroller before it is mounted on the target board.

*3: On-board Programming: Programs a Flash microcontroller while it is mounted on the target board.

*4: Comes with a download license for control software.

*5: These are Samtec's products. The part number shown here denotes surface mount type with keying shroud (recommended). Other mount types, such as through-hole, and other mating options are also available.

For the specifications and purchase inquiries about this product, please contact the supplier Samtec, Inc. The recommended connector can also be purchased from it-sim corporation, Sophia Systems Co., Ltd. and UNIDUX INC.

Programming Tools (3/4)

Target MCU			OTP Programming	Flash Programming	
Family/Series	Part Number	Package	OTP Programming Adapter	Off-Board Programming *2	On-Board Programming *3
				FLASH Adapter *4	FLASH Writer: BM1401W0A-G *4 Connector: FTS-110-01-L-DV-K *5
TLCS-870/X Series	TMP88PH40MG	SOP28	BM11695	—	—
	TMP88PH40NG	SDIP28	BM11196	—	—
	TMP88FH41UG	LQFP44 (10 x 10)	—	PN410109	⊙
	TMP88PH41NG	SDIP42	BM11205	—	—
	TMP88PH41UG	LQFP44 (10 x 10)	BM11706	—	—
	TMP88PS42FG	QFP64 (14 x 20)	BM11200 *1	—	—
	TMP88PS42NG	SDIP64	BM11199	—	—
	TMP88PS43FG	QFP80 (14 x 20)	BM11680-G	—	—
	TMP88FW45AFG	QFP80 (14 x 20)	—	PN410104	⊙
	TMP88F84UG	LQFP44 (10 x 10)	—	PN410109	⊙
	TMP88PU74FG	QFP80 (14 x 20)	BM11631	—	—
TMP88PU77FG	QFP100 (14 x 20)	BM11650	—	—	
TLCS-870/C1 Series	TMP89FH00DUG	LQFP48(7 x 7)	—	PN410115	⊙
	TMP89FH00WBG	WCSP39 (3.8 x 3.8)	—	—	⊙
	TMP89FW20UG	LQFP64 (10 x 10)	—	PN410105A	⊙
	TMP89FW24DFG	QFP80 (14 x 20)	—	PN410104	⊙
	TMP89FW24FG	LQFP80 (12 x 12)	—	PN410107	⊙
	TMP89FM40NG	SDIP42	—	PN410110	⊙
	TMP89FH40NG	SDIP42	—	PN410110	⊙
	TMP89FM42UG	LQFP44 (10 x 10)	—	PN410109	⊙
	TMP89FM42LUG	LQFP44 (10 x 10)	—	PN410109	⊙
	TMP89FM42AUG	LQFP44 (10 x 10)	—	PN410109	⊙
	TMP89FM42KUG	LQFP44 (10 x 10)	—	PN410109	⊙
	TMP89FH42UG	LQFP44 (10 x 10)	—	PN410109	⊙
	TMP89FH42LUG	LQFP44 (10 x 10)	—	PN410109	⊙
	TMP89FM43LOG	VQON44 (5.3 x 5.3)	—	PN410121-G	⊙
	TMP89FM46DUG	LQFP48 (7 x 7)	—	PN410115	⊙
	TMP89FM46ADUG	LQFP48 (7 x 7)	—	PN410115	⊙
	TMP89FM46KDUG	LQFP48 (7 x 7)	—	PN410115	⊙
	TMP89FH46DUG	LQFP48 (7 x 7)	—	PN410115	⊙
	TMP89FH46LDUG	LQFP48 (7 x 7)	—	PN410115	⊙
	TMP89FS60UG	LQFP64 (10 x 10)	—	PN410105A	⊙
	TMP89FS60FG	QFP64 (14 x 14)	—	PN410108	⊙
	TMP89FM82DUG	LQFP48 (7 x 7)	—	PN410115	⊙
	TMP89FM82TDUG	LQFP48 (7 x 7)	—	PN410115	⊙

● Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

⊙: Supported

*1: As a guideline, the adapter should be replaced after 2,000 writes.

*2: Off-board Programming: Programs a Flash microcontroller before it is mounted on the target board.

*3: On-board Programming: Programs a Flash microcontroller while it is mounted on the target board.

*4: Comes with a download license for control software.

*5: These are Samtec's products. The part number shown here denotes surface mount type with keying shroud (recommended). Other mount types, such as through-hole, and other mating options are also available.

For the specifications and purchase inquiries about this product, please contact the supplier Samtec, Inc. The recommended connector can also be purchased from It-sim corporation, Sophia Systems Co., Ltd. and UNIDUX INC.

Programming Tools (4/4)

Target MCU			OTP Programming	Flash Programming			
Family/Series	Part Number	Package	OTP Programming Adapter	Off-Board Programming *2	On-Board Programming *3		
				FLASH Adapter *4	FLASH Writer: BM1401W0A-G *4 Connector: FTSH-110-01-L-DV-K *5		
TLCS-900 Family	TMP91PW10FG	LQFP100 (14 x 14)	BM11629	—	—		
	TMP91PW11FG	LQFP100 (14 x 14)	BM11629				
	TMP91PW12FG	LQFP100 (14 x 14)	BM11649				
	TMP91PW18AFG	QFP80 (14 x 20)	BM11679	—	—		
	TMP91FW27FG	QFP64 (14 x 14)	—			PN410108	⊙
	TMP91FW27UG	LQFP64 (10 x 10)				PN410105A	⊙
	TMP91FW40FG	LQFP100 (14 x 14)				PN410106	⊙
	TMP91FY42FG	LQFP100 (14 x 14)				PN410106	⊙
	TMP91FU62DFG	QFP80 (14 x 20)				PN410104	⊙
	TMP91FU62FG	LQFP80 (12 x 12)				PN410107	⊙
	TMP91FW64DFG	LQFP100 (14 x 20)				PN410111	⊙
	TMP91FW64FG	LQFP100 (14 x 14)				PN410106	⊙
	TMP92FD23ADFG	QFP100 (14 x 20)				PN410111	⊙
	TMP92FD23AFG	LQFP100 (14 x 14)				PN410106	⊙
	TMP92FD28ADFG	QFP100 (14 x 20)				PN410111	⊙
	TMP92FD28AFG	LQFP100 (14 x 14)				PN410106	⊙
	TMP92FD54AIFG	LQFP100 (14 x 14)				—	—
	TMP93PW20AFG	LQFP144 (16 x 16)				BM11641	—
	TMP93PW32FG	QFP64 (14 x 14)		BM11632			
	TMP93PS40DFG	LQFP100 (14 x 14)	BM11629				
	TMP93PW40DFG	LQFP100 (14 x 14)	BM11629				
	TMP93PS44FG	LQFP80 (12 x 12)	BM11628				
	TMP93PW44ADFG	QFP80 (14 x 20)	BM11652				
TMP93PW46AFG	LQFP100 (14 x 14)	BM11629					
TMP95PW64FG	LQFP100 (14 x 14)	BM11629					
TMP96PM40FG	QFP80 (14 x 20)	BM11539					
TMP19A23FYFG	LQFP144 (20 x 20)	—	PN410120-G	⊙			

● Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

⊙: Supported

*1: As a guideline, the adapter should be replaced after 2,000 writes.

*2: Off-board Programming: Programs a Flash microcontroller before it is mounted on the target board.

*3: On-board Programming: Programs a Flash microcontroller while it is mounted on the target board.

*4: Comes with a download license for control software.

*5: These are Samtec's products. The part number shown here denotes surface mount type with keying shroud (recommended). Other mount types, such as through-hole, and other mating options are also available.

For the specifications and purchase inquiries about this product, please contact the supplier Samtec, Inc. The recommended connector can also be purchased from it-sim corporation, Sophia Systems Co., Ltd. and UNIDUX INC.

Accessory Tools

Expendable and optional hardware items for the development system are collectively referred to as accessory tools.

- MCU probe
 - Probe set
 - QFP adaptor
 - Pin protector
 - Package converter
 - MCU mount adaptors
 - Communication cable
 - Connector
- ◆ To provide versatility, the footprint pattern of the QFP adaptor leads is slightly different from that of an MCU. If there is a need to install both the QFP adaptor and the MCU with an identical footprint, the board must be designed to be compatible with both of them.
 - ◆ Before beginning a board design or purchasing these accessory tools, be sure to check the latest product specification, recommended footprints, etc. with each manufacturer.
 - ◆ Other than those listed below, accessory tools that can be used together with the Toshiba products are available from Tokyo Eletech Corporation. Please visit Tokyo Eletech Corporation's website for more details.

Adlinks Corp.	http://www.adlinks.co.jp
Emulation Technology Inc.	http://www.emulation.com
Samtec Inc.	http://www.samtec.com
Tokyo Eletech Corp.	http://www.tetc.co.jp/e-index.htm
Tyco Electronics Corp.	http://www.tycoelectronics.com
Yamaichi Electronics Co., Ltd.	http://www.yamaichi.co.jp/index_e.shtml

Spare Parts from Toshiba

The TLC-870/C model 15 target connection boards, MCU probes and package converters whose part numbers begin with "PN12" come with a QFP adaptor and a pin protector. When you purchase additional QFP adaptors or pin protectors, check their part numbers in the following Spare Parts table. For information about spare parts for third-party accessory tools, please contact the manufacturer or distributor of each product.

- ◆ Note that if you are using a package converter, use spare parts for package converters, not those for MCU probes.
- ◆ QFP adaptors and pin protectors are available from Tokyo Eletech and Toshiba.

Target Connection Board Spare Parts

Part Number	Target MCU Package	Spare Part			
		QFP Adaptor *1		Pin Protector *2	
		Toshiba *3	Tokyo Eletech (QFP Socket)	Toshiba	Tokyo Eletech (Emulator Connector)
BMP86D044DE0A	LQFP44 (10 x 10)	PN210019	TQPACK044SA	PN210021	TQSOCKET044SAG
BMP86D044DE1A					
BMP86D064DE0A	QFP64 (14 x 14)	PN210025	TQPACK064SA	PN210027	TQSOCKET064SAG
BMP86D064DG0A	LQFP64 (10 x 10)	PN210031	TQPACK064SD	PN210032	TQSOCKET064SDG
BMP86D080DG0A	LQFP80 (12 x 12)	PN210007	TQPACK080SD	PN210009	TQSOCKET080SDG
BMP86D080DG1A					
BMP86D080FE0A	QFP80 (14 x 20)	PN210001	TQPACK080RA	PN210003	TQSOCKET080RAG
BMP86D100DG0A	LQFP100 (14 x 14)	PN210022	TQPACK100SD	PN210024	TQSOCKET100SDG
BMP86D100FF0A	QFP100 (14 x 20)	PN210004	TQPACK100RB	PN210006	TQSOCKET100RBG

*1: QFP adaptors and QFP Sockets connectors are soldered onto the pc board of the target system. Once soldered, they should not be unsoldered from the pc board and resoldered.

*2: Pin protectors are sockets used to protect the target connection boards for QFPs and the pins of QFP adaptors and QFP Sockets. Be sure to use a pin protector to protect the portion where the target connection board is connected. It is recommended to replace the pin protector or the emulator Connectors after 100 attachments and detachments.

*3: For the recommended footprints pattern, please visit Tokyo Eletech Corporation's website.

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

MCU Probe Spare Parts

Part Number	Target MCU Package	Spare Part			
		QFP Adaptor *1		Pin Protector *2	
		Toshiba *3	Tokyo Eletech (QFP Socket)	Toshiba	Tokyo Eletech (Emulator Connector)
PN120004	QFP80 (14 x 20)	PN210001	TQPACK080RA	PN210003	TQSOCKET080RAG
PN120005	QFP100 (14 x 20)	PN210004	TQPACK100RB	PN210006	TQSOCKET100RBG
PN120006A	LQFP80 (12 x 12)	PN210007	TQPACK080SD	PN210009	TQSOCKET080SDG
PN120009	QFP80 (14 x 20)	PN210001	TQPACK080RA	PN210003	TQSOCKET080RAG
PN120011	QFP44 (10 x 10)	PN210019	TQPACK044SA	PN210021	TQSOCKET044SAG
PN120013	LQFP100 (14 x 14)	PN210022	TQPACK100SD	PN210024	TQSOCKET100SDG
PN120014	QFP64 (14 x 20)	PN210010	TQPACK064RZ	PN210012	TQSOCKET064RZG
PN120022	LQFP64 (10 x 10)	PN210031	TQPACK064SD	PN210032	TQSOCKET064SDG
PN120023B	QFP100 (14 x 20)	PN210004	TQPACK100RB	PN210006	TQSOCKET100RBG
PN120027	LQFP144 (20 x 20)	PN210034	TQPACK144SD	PN210035	TQSOCKET144SDG
PN120039A	QFP64 (14 x 14)	PN210025	TQPACK064SA	PN210027	TQSOCKET064SAG
PN120040A	QFP160 (28 x 28)	PN210028	TQPACK160SB	PN210029	TQSOCKET160SBG
PN120042	LQFP80 (12 x 12)	PN210007	TQPACK080SD	PN210009	TQSOCKET080SDG
PN120044	LQFP144 (16 x 16)	PN210043	NQPACK144SE	PN210045	YQPACK144SE
PN120050	LQFP144 (20 x 20)	PN210034	TQPACK144SD	PN210035	TQSOCKET144SDG
PN120052	QFP64 (14 x 14)	PN210025	TQPACK064SA	PN210027	TQSOCKET064SAG
PN120057	TQFP128 (14 x 14)	PN210053	NQPACK128SE	PN210055	YQPACK128SE

*1: QFP adaptors and QFP Sockets connectors are soldered onto the pc board of the target system. Once soldered, they should not be unsoldered from the pc board and resoldered.

*2: Pin protectors are sockets used to protect the MCU probes for QFPs and the pins of QFP adaptors and QFP sockets. Be sure to use a pin protector to protect the portion where the MCU probe is connected. It is recommended to replace the pin protector or the emulator connectors after 100 attachments and detachments.

*3: For the recommended footprints pattern, please visit Tokyo Eletech Corporation's website.

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

Package Converter Spare Parts

Part Number	Target MCU Package	Spare Part			
		QFP Adaptor *1		Pin Protector *2	
		Toshiba *3	Tokyo Eletech (QFP Socket)	Toshiba	Tokyo Eletech (Emulator Connector)
PN120007	QFP64 (14 x 20)	PN210010	TQPACK064RZ	PN210012	TQSOCKET064RZG
PN120035	LQFP64 (10 x 10)	PN210031	TQPACK064SD	PN210032	TQSOCKET064SDG
PN120063	LQFP44 (10 x 10)	PN210019	TQPACK044SA	PN210021	TQSOCKET044SAG
PN120065-G	LQFP64 (10 x 10)	PN210031	TQPACK064SD	PN210032	TQSOCKET064SDG

*1: QFP adaptors and QFP Sockets connectors are soldered onto the pc board of the target system. Once soldered, they should not be unsoldered from the pc board and resoldered.

*2: Pin protectors are sockets used to protect the package converters for QFPs and the pins of QFP adaptors and QFP sockets. Be sure to use a pin protector to protect the portion where the package converter is connected. It is recommended to replace the pin protector or the emulator connectors after 100 attachments and detachments.

*3: For the recommended footprints pattern, please visit Tokyo Eletech Corporation's website.

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

MCU Mount Adaptor Spare Parts

Part Number	Target MCU Package	Spare Part			
		QFP Adaptor *1		Pin Protector *2	
		Toshiba *3	Tokyo Eletech (QFP Socket)	Toshiba	Tokyo Eletech (Emulator Connector)
PN210002	QFP80 (14 x 20)	PN210001	TQPACK080RA	PN210003	TQSOCKET080RAG
PN210005A	QFP100 (14 x 20)	PN210004	TQPACK100RB	PN210006	TQSOCKET100RBG
PN210008	LQFP80 (12 x 12)	PN210007	TQPACK080SD	PN210009	TQSOCKET080SDG
PN210011A	QFP64 (14 x 20)	PN210010	TQPACK064RZ	PN210012	TQSOCKET064RZG
PN210020A	QFP44 (10 x 10)	PN210019	TQPACK044SA	PN210021	TQSOCKET044SAG
PN210023	LQFP100 (14 x 14)	PN210022	TQPACK100SD	PN210024	TQSOCKET100SDG
PN210026	QFP64 (14 x 14)	PN210025	TQPACK064SA	PN210027	TQSOCKET064SAG
PN210030	QFP160 (28 x 28)	PN210028	TQPACK160SB	PN210029	TQSOCKET160SBG
PN210033	LQFP64 (10 x 10)	PN210031	TQPACK064SD	PN210032	TQSOCKET064SDG
PN210036	LQFP144 (20 x 20)	PN210034	TQPACK144SD	PN210035	TQSOCKET144SDG
PN210044	LQFP144 (16 x 16)	PN210043	NQPACK144SE	—	—
PN210054	TQFP128 (14 x 14)	PN210053	NQPACK128SE	—	—

*1: QFP adaptors and QFP Sockets connectors are soldered onto the pc board of the target system. Once soldered, they should not be unsoldered from the pc board and resoldered.

*2: Pin protectors are sockets used to protect the MCU mount adaptors for QFPs and the pins of QFP adaptors and QFP sockets. Be sure to use a pin protector to protect the portion where the MCU mount adaptor is connected. It is recommended to replace the pin protector or the emulator connectors after 100 attachments and detachments.

*3: For the recommended footprints pattern, please visit Tokyo Eletech Corporation's website.

• QFP adaptors and the pin protector are not attached to the MCU mount adaptor.

- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

Toshiba America**Electronic Components, Inc.**

- Irvine, Headquarters
Tel: (949)623-2900 Fax: (949)474-1330
- Buffalo Grove (Chicago)
Tel: (847)484-2400 Fax: (847)541-7287
- Duluth/Atlanta
Tel: (770)931-3363 Fax: (770)931-7602
- El Paso
Tel: (915)771-8156
- Houston
Tel: (713)466-6277
- Marlborough
Tel: (508)481-0034 Fax: (508)481-8828
- Parsippany
Tel: (973)541-4715 Fax: (973)541-4716
- San Jose
Tel: (408)526-2400 Fax: (408)526-2410
- Wixom (Detroit)
Tel: (248)347-2607 Fax: (248)347-2602

Toshiba Electronics do Brasil Ltda.

Tel: (011)2539-6681 Fax: (011)2539-6675

Toshiba India Private Ltd.

Tel: (011)2331-8422 Fax: (011)2371-4603

Toshiba Electronics Europe GmbH

- Düsseldorf Head Office
Tel: (0211)5296-0 Fax: (0211)5296-400
- France Branch
Tel: (1)47282828 Fax: (1)42046491
- Italy Branch
Tel: (039)68701 Fax: (039)6870205
- Spain Branch
Tel: (91)660-6798 Fax: (91)660-6799
- U.K. Branch
Tel: (1252)5300 Fax: (1252)53-0250
- Sweden Branch
Tel: (8)704-0900 Fax: (8)80-8459

Toshiba Electronics Asia (Singapore) Pte. Ltd.

Tel: (6278)5252 Fax: (6271)5155

Toshiba Electronics Service (Thailand) Co., Ltd.

Tel: (02)501-1635 Fax: (02)501-1638

Toshiba Electronics Trading (Malaysia) Sdn. Bhd.

- Kuala Lumpur Head Office
Tel: (03)5631-6311 Fax: (03)5631-6307
- Penang Office
Tel: (04)226-8523 Fax: (04)226-8515

Toshiba Electronics Asia, Ltd.

- Hong Kong Head Office
Tel: 2375-6111 Fax: 2375-0969
- Beijing Office
Tel: (010)6590-8796 Fax: (010)6590-8791
- Chengdu Office
Tel: (028)8675-1773 Fax: (028)8675-1065
- Qingdao Office
Tel: (532)8579-3328 Fax: (532)8579-3329

Toshiba Electronics Shenzhen Co., Ltd.

Tel: (0755)2399-6897 Fax: (0755)2399-5573

Toshiba Electronics (Shanghai) Co., Ltd.

- Shanghai Head Office
Tel: (021)6841-0666 Fax: (021)6841-5002
- Hangzhou Office
Tel: (0571)8717-5004 Fax: (0571)8717-5013
- Nanjing Office
Tel: (025)8689-0070 Fax: (025)8689-0125

Toshiba Electronics (Dalian) Co., Ltd.

Tel: (0411)8368-6882 Fax: (0411)8369-0822

Tsurong Xiamen Xiangyu Trading Co., Ltd.

Tel: (0592)226-1398 Fax: (0592)226-1399

Toshiba Electronics Korea Corporation

- Seoul Head Office
Tel: (02)3484-4334 Fax: (02)3484-4302
- Daegu Office
Tel: (053)428-7610 Fax: (053)428-7617

Toshiba Electronics Taiwan Corporation

- Taipei Head Office
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