TOSHIBA
Leading Innovation ≫≫

SEMICONDUCTOR GENERAL CATALOG

ASSPs

Audio & Video Equipment ICs
Communications Equipment ICs
Automotive ICs
Peripheral Equipment LSIs
Other Consumer Product ICs

Audio & Video Equipment ICs

TV Set ICs   (Audio Output ICs)

Part Number	Package	Use	Functions and Features	Operating Supply Voltage (V)
TB2922HQ	P-HZIP12-1.78B		Sound output power: 20 W x 2, MOS output stage; Class AB, mute, standby, various protection circuits	9 to 26
TB2924AFG	P-HSOP36-450-0.65	Audio output ICs	Sound output power: 20 W x 2, PWM analog-input Class-D amp	11 to 20 (18)
TB2964FTG	P-QFN48-0707-0.50		Sound output power: 15 W x 2, I²S signal-input Class-D amp	9 to 18

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

TV Tuning & Channel Decoder ICs   (PIF, SIF ICs)

Part Number		Package	Use	Functions and Features	Operating Supply Voltage (V)
TB1338FNG/FTG	☆	P-SSOP24-300-0.65A QFN36-P-0606-0.50	Multi-standard PLL PIF/SIF	D/K, I, B/G, M, L, L', multi-standard PIF/SIF, FM radio receiver support, PIF VCO, audio trap, SIF filter, general-purpose SW port, split-carrier and intercarrier sound, I²C bus	4.75 to 5.25
TB1350FNG/FTG	☆	P-SSOP24-300-0.65A QFN36-P-0606-0.50	D/K, I, B/G, M, PLL PIF/SIF	D/K, I, B/G, M, FM radio receiver support, PIF VCO, audio trap, SIF filter, general-purpose SW port, split-carrier and intercarrier sound, I²C bus	4.75 to 5.25
TB1351FTG	☆	QFN36-P-0606-0.50	Multi-standard PLL PIF/SIF	D/K, I, B/G, M, L, L', multi-standard PIF/SIF, FM radio receiver support, PIF VCO, audio trap, SIF filter, general-purpose SW port, split-carrier and intercarrier sound, I²C bus	4.75 to 5.25
TB1354FTG	☆	QFN36-P-0606-0.50	Multi-standard PLL PIF/SIF	D/K, I, B/G, M, L, L', multi-standard PIF/SIF, FM radio receiver support, PIF VCO, audio trap, SIF filter, general-purpose SW port, split-carrier and intercarrier sound, I²C bus	4.75 to 5.25
TB1356FTG	☆	QFN36-P-0606-0.50	Multi-standard PLL PIF/SIF	D/K, I, B/G, M, L, L', multi-standard PIF/SIF, FM radio receiver support, PIF VCO, audio trap, SIF filter, general-purpose SW port, split-carrier and intercarrier sound, I²C bus, TOP adjustment pin, analog AFT output	4.75 to 5.25

☆: Dry-packed   **: Under development

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(Channel Decoder ICs)

Part Number		Package	Use	Functions and Features	Operating Supply Voltage (V)
TC90532XBG	☆	P-FBGA177-1313-0.80C4	8PSK demodulator OFDM demodulator	Digital BS broadcasting, digital CS broadcasting (ISDB-S), 8PSK, QPSK demodulation, error correction, digital terrestrial broadcasting (ISDB-T), OFDM demodulation, error correction, A/D converter, memory	3.0 to 3.6 1.1 to 1.3
TC90522XBG	☆	P-FBGA177-1313-0.80C4	8PSK demodulator OFDM demodulator (Two channels each)	Digital BS broadcasting, digital CS broadcasting (ISDB-S), 8PSK, QPSK demodulation, error correction, digital terrestrial broadcasting (ISDB-T), OFDM demodulation, error correction, A/D converter, memory	3.0 to 3.6 1.1 to 1.3
TC90517WBG	☆	S-WFBGA76-040A01	OFDM demodulator	Digital terrestrial broadcasting (ISDB-T), OFDM demodulation, error correction, A/D converter, memory	3.0 to 3.6 2.3 to 2.7
TC90517FG	☆	P-LQFP64-1010-0.50E			1.1 to 1.3

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Audio ICs   (AM/FM Receiver ICs)

Part Number	Package	Description	Intended Use			Functions				Functions and Features	Operating Voltage (V)
			Car Audio	General Audio	Other	F/E	IF	Stereo Demodulation	Audio processor		
TB2132FNG ☆	P-SSOP30-300-0.65	Single-chip AM/FM stereo tuner with PLL		○		■	■	■		TV bands, VCO for MPX, compliant with new FCC standards	1.8 to 5.5
TB2178FG ☆	P-LQFP48-0707-0.50	Front End IC for Digital IF sampling tuner system	○			■				AM/FM front-end, IF amplifier, DAC outputs for RF synchronization	8.3
TC94A90FG ☆	P-LQFP216-2424-0.40A	IF sampling AM/FM digital processing tuner and Audio Digital Signal Processor	○				■	■	■	IF-sampling ADC x 2 ch Multipath noise cancellation with dual tuners Multi-bit DA converter x 6 ch Output ports for IBOC decoders On-chip audio processor	3.3/1.5
TC94B01FG ** ☆	P-LQFP64-1010-0.50	IF sampling AM/FM digital processing tuner	○				■	■		IF-sampling ADC x 1 ch Multipath noise cancellation Multi-bit DA converter x 2 ch Output ports for IBOC decoders	3.3/1.5

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(Power Amp ICs)

Part Number	Package	Intended Use			Output Power (P_{OUT})			Functions and Features	Operating Voltage (V)
		Car Stereos	Cassette Tape Recorders	TV/Home Stereos	Recommended V_{CC}	$R_L = 4\,\Omega$	$R_L = 8\,\Omega$		
TB2901HQ	P-HZIP25-1.00F	■			13.2 V	25 W x 4		MOS amplifier for 4 BTL channels, standby switch, mute, high-side switch, Maximum power: 47 W x 4 ch, $R_L = 2\,\Omega$ operation guaranteed	9 to 18
TB2902HQ	P-HZIP25-1.00F	■			13.2 V	23 W x 4		MOS amplifier for 4 BTL channels, mute, Command-controlled standby mode, Maximum power: 41 W x 4 ch, $R_L = 2\,\Omega$ operation guaranteed I²C-bus-controled self-diagnosis	9 to 18
TB2903HQ	P-HZIP25-1.00F	■			13.2 V	25 W x 4		MOS amplifier for 4 BTL channels, standby switch, mute, offset detection, Maximum power: 47 W x 4 ch	9 to 18
TB2904HQ	P-HZIP25-1.00F	■			13.2 V	23 W x 4		MOS amplifier for 4 BTL channels, standby switch, mute, offset detection, Maximum power: 43 W x 4 ch, speaker burnout prevention	9 to 18
TB2905HQ	P-HZIP25-1.00F	■			13.2 V	25 W x 4		MOS amplifier for 4 BTL channels, standby switch, mute, Class-KB efficiency, Maximum power: 47 W x 4 ch, self-diagnosis	9 to 18
TB2906HQ	P-HZIP25-1.00F	■			13.2 V	23 W x 4		MOS amplifier for 4 BTL channels, standby switch, mute, offset detection, Maximum power: 43 W x 4 ch, 34dB voltage gain, Speaker burnout prevention	9 to 18
TB2912HQ	P-HZIP25-1.00F	■			13.2 V	23 W x 4		MOS amplifier for 4 BTL channels, mute, Command-controlled standby mode, Maximum power: 41 W x 4 ch, $R_L = 2\,\Omega$ operation guaranteed I²C-bus-controled self-diagnosis	9 to 18
TB2913HQ	P-HZIP25-1.00F	■			13.2 V	25 W x 4		MOS amplifier for 4 BTL channels, standby switch, mute, clipping detector, Maximum power: 47 W x 4 ch	9 to 18
TB2915HQ	P-HZIP25-1.00F	■			13.2 V	24 W x 4		MOS amplifier for 4 BTL channels, standby switch, mute, Maximum power: 49 W x 4 ch, Class-KB efficiency, DC offset and short-circuit detection, Cross-wiring detection, $R_L = 2\,\Omega$ operation guaranteed	8 to 18
TB2921AHQ	P-HZIP25-1.00F	■			13.2 V	25 W x 4	—	MOS amplifier for 4 BTL channels, standby switch, mute, high-side switch, Maximum power: 51 W x 4 ch, $R_L = 2\,\Omega$ operation guaranteed	8 to 18
TB2922HQ	P-HZIP12-1.78B			■	18 V	37 W x 2	22 W x 2	MOS amplifier for 2 BTL channels, standby switch, mute	9 to 26
TB2923AHQ	P-HZIP25-1.00F	■			13.2 V	25 W x 4	—	MOS amplifier for 4 BTL channels, standby switch, mute, offset detection, Maximum power: 51 W x 4 ch, $R_L = 2\,\Omega$ operation guaranteed	8 to 18
TB2924AFG	HSOP36-P-450-0.65			■	15 V	19.5 W x 2	12 W x 2	Class D amplifier for 2 BTL channels, standby switch, mute, efficiency = 88%	11 to 18 (20)
TB2926HQ	P-HZIP25-1.00F	■			13.2 V	23 W x 4	—	MOS amplifier for 4 BTL channels, standby switch, mute, offset detection, Maximum power: 49 W x 4 ch	8 to 18
TB2929HQ	P-HZIP25-1.00F	■			13.2 V	21 W x 4		MOS amplifier for 4 BTL channels, standby switch, mute, offset detection, Maximum power: 45 W x 4 ch, AUX amp	8 to 18
TB2932AHQ	P-HZIP25-1.00F	■			13.2 V	23 W x 4		MOS amplifier for 4 BTL channels, mute, Command-controlled standby mode, Hardware-standby mode, $R_L = 2\,\Omega$ operation guaranteed, I²C-bus-controled self-diagnosis, Selectable voltage gain (26/12 dB)	8 to 18
TB2932HQ	P-HZIP25-1.00F	■			13.2 V	23 W x 4		MOS amplifier for 4 BTL channels, mute, Command-controlled standby mode, $R_L = 2\,\Omega$ operation guaranteed I²C-bus-controled self-diagnosis, Selectable voltage gain (26/12 dB)	8 to 18

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(Power Amp ICs) (Continued)

Part Number	Package	Intended Use			Output Power (POUT)			Functions and Features	Operating Voltage (V)
		Car Stereos	Cassette Tape Recorders	TV/Home Stereos	Recom-mended VCC	RL = 4 Ω	RL = 8 Ω		
TB2933HQ	P-HZIP25-1.00F	■			13.2 V	23 W x 4		MOS amplifier for 4 BTL channels, mute, Command-controlled standby mode, RL = 2 Ω operation guaranteed I²C-bus-controled self-diagnosis, Selectable voltage gain (34/20 dB)	8 to 18
TB2934HQ	P-HZIP25-1.00F	■			13.2 V	23 W x 4		MOS amplifier for 4 BTL channels, mute, Command-controlled standby mode, Maximum power: 41 W x 4 ch, RL = 2 Ω operation guaranteed I²C-bus-controled self-diagnosis, 34dB voltage gain	9 to 18
TB2936HQ	P-HZIP25-1.00F	■			13.2 V	23 W x 4		MOS amplifier for 4 BTL channels, standby switch, mute, offset detection, Maximum power: 49 W x 4 ch, 34dB voltage gain	8 to 18
TB2939HQ	P-HZIP25-1.00F	■			13.2 V	24 W x 4		MOS amplifier for 4 BTL channels, standby switch, mute, offset detection, Maximum power: 45 W x 4 ch, self-diagnosis	8 to 18
TB2946HQ	P-HZIP25-1.00F	■			13.2 V	23 W x 4		MOS amplifier for 4 BTL channels, standby switch, mute, offset detection, Maximum power: 49 W x 4 ch, RL = 2 Ω operation guaranteed	8 to 18
TB2956HQ	P-HZIP25-1.00F	■			13.2 V	23 W x 4		MOS amplifier for 4 BTL channels, standby switch, mute, clipping detector Maximum power: 45 W x 4 ch	8 to 18
TB2964FTG ☆	QFN48-P-0707-0.50			■	15 V	15 W x 2	10 W x 2	MOS amplifier for 2 BTL channels, Muting control (soft mute, forced mute), Oversampling digital filter with an asynchronous sampling rate converter, De-emphasis, Digital attenuator, Protection circuits	9 to 18

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(Headphone Amp ICs)

Part Number	Package	Intended Use			Output Power	Functions and Features	Operating Voltage (V)
		Headphone Stereos	Digital Portable Stereos	Mobile Phones			
TB2173FTG ☆	P-VQON44-P-0606-0.4		■	■	9.5 mW (+B = 1.2 V, 16 Ω)	Support for 2 sources, electric volume, bass boost with AGC, OCL/output capacitor coupling, Gv = 8dB/24dB, beep, standby switch, mute, port expansion circuit	+B = 0.9 to 4.5 VDD = 1.8 to 4.5 VCC = 1.8 to 4.5

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(Digital Tuning Systems (DTS))

Part Number	Package	System No.	Remarks	Features					Operating Voltage (V)
				Crystal Oscillator	ROM Size	RAM Size	Display Format	I/O Ports	
TC9324FG ☆	P-QFP100-1420-0.65Q	DTS-20	Suitable for car stereos	4.5 MHz/ 75 kHz	16 bits x 16K	4 bits x 4096	LCD drive: 1/4, 1/3 & 1/2 duty, 1/2 & 1/3 bias	IN: 35 lines OUT: 13 lines I/O: 40 lines	4.5 to 5.5
TC9318AFAG ☆	P-LQFP64-1010-0.50E		Low-voltage operation Single chip Suitable for portables	75 kHz	16 bits x 4K	4 bits x 256	LCD drive: 1/3 duty, 1/2 bias	IN: 11 lines OUT: 33 lines I/O: 10 lines	1.8 to 3.6
TC9327BFG ☆	P-QFP80-1212-0.50F		Low-voltage operation Single chip Suitable for portables	75 kHz	16 bits x 7K	4 bits x 256	LCD drive: 1/4 duty, 1/2 bias	IN: 9 lines OUT: 33 lines I/O: 24 lines	1.8 to 3.6
TC9328AFG ☆	P-QFP80-1212-0.50F	DTS-21	Low-voltage operation Single chip Suitable for portables	75 kHz	16 bits x 8K	4 bits x 512	LCD drive: 1/4 duty, 1/2 bias	IN: 8 lines OUT: 21 lines I/O: 36 lines	0.9 to 1.8
TC9329AFAG ☆	P-LQFP64-1010-0.50A P-TFP64-1010-0.50C		Low-voltage operation Single chip Suitable for portables	75 kHz	16 bits x 4K	4 bits x 256	LCD drive: 1/4 duty, 1/2 bias	IN: 4 lines OUT: 16 lines I/O: 28 lines	0.9 to 1.8
TC9349AFG ☆	P-LQFP64-1010-0.50E		Low-voltage operation Single chip Suitable for portables	75 kHz	16 bits x 8K	4 bits x 512	LCD drive: 1/4 duty, 1/2 & 1/3 bias	IN: 4 lines OUT: 2 lines I/O: 45 lines	0.9 to 1.8

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(Analog Switches)

Part Number	Package	Features	Operating Voltage (V)	
			V$_{DD}$	V$_{SS}$
TC9162CNG/CFG	P-SDIP28-400-1.78 P-SOP28-450-1.27B ☆	High breakdown voltage, analog function switch array	6.0 to 17.0	−17.0 to −6.0
TC9163CNG/CFG			6.0 to 17.0	−17.0 to −6.0
TC9164CNG/CFG			6.0 to 17.0	−17.0 to −6.0
TC9273CNG/CFG	P-SDIP28-400-1.78 P-SOP28-450-1.27B ☆	High breakdown voltage, analog function switch array semi-customization available	6.0 to 17.0	−17.0 to −6.0
TC9274CNG/CFG	P-SDIP42-600-1.78 P-QFP44-1414-0.80K ☆		6.0 to 17.0	−17.0 to −6.0
TC94A46CNG/CFG	P-SDIP42-600-1.78 P-QFP80-1420-0.80M ☆	High breakdown voltage, analog function switch array 14-circuit, 3-contact analog switch x 2	6.0 to 17.0	−17.0 to −6.0
TC94A88FG *	P-QFP80-1420-0.80M ☆	High breakdown voltage, analog function switch array 13-circuit, 4-contact analog switch x 2	6.0 to 17.0	−17.0 to −6.0

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(Electronic Volume Control ICs)

Part Number	Package	Classification	Features	Operating Voltage (V)	
				V$_{DD}$	V$_{SS}$
TC9235APG/AFG	P-DIP16-300-2.54A	Volume control	Up/down-type electronic volume control	4.5 to 12.0	—
TC9260APG/AFG	P-SOP16-300-1.27 ☆		Serial-data-controlled electronic volume control	4.5 to 12.0	—
TC9459BNG/BFG	P-SDIP28-400-1.78 P-SOP28-450-1.27B ☆	High-breakdown-voltage volume control	High breakdown voltage, serial-data-controlled electronic volume control + loudness control	6.0 to 17.0	−17.0 to −6.0
TC9482BNG/BFG	P-SDIP28-400-1.78 P-SOP28-450-1.27B ☆		High breakdown voltage, 6-channel serial-data-controlled electronic volume control	6.0 to 17.0	−17.0 to −6.0
TC94A32BFG	P-SOP28-450-1.27B ☆		High breakdown voltage, serial-data-controlled electronic volume control with trim volume	6.0 to 17.0	−17.0 to −6.0
TC94A27BUG	P-LQFP44-1010-0.80A ☆		4-channel serial-data-controlled electronic volume control with trim volume	6.0 to 17.0	−17.0 to −6.0
TC94A81UG	P-LQFP44-1010-0.80A ☆		High breakdown voltage, 2-channel serial-data-controlled electronic volume control with trim volume, 4-input selector and zero crossing detection circuit	6.0 to 17.0	−17.0 to −6.0
TC9422ANG/AFG	P-SDIP28-400-1.78 P-SOP28-450-1.27B ☆	Single-chip volume control	Volume, 2-band tone control, 4-input selector	6.0 to 12.0	—
TC9498ANG/AFG *			6-channel serial-data-controlled electronic volume control with trim volume settings (single power supply)	4.5 to 14.0	—
TC9499ANG/AFG			6-channel serial-data-controlled electronic volume control with trim volume settings (dual power supplies)	4.5 to 7.0	−7.0 to −4.5

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(PLLs, Prescalers)

Part Number	Package	Classification	Features	Operating Voltage (V)
TC9256APG	P-DIP16-300-2.54A	PLL	High-speed PLL incorporating a DTS prescaler	4.5 to 5.5
TC9256AFG	P-SOP16-300-1.27 ☆			4.5 to 5.5
TC9257APG	P-DIP20-300-2.54A			4.5 to 5.5
TC9257AFG	P-SOP20-300-1.27 ☆			4.5 to 5.5

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(Compact Disc Player ICs)

Part Number	Package	Classification	Features			Operating Voltage (V)
TC94A15FG ☆	P-LQFP100-1414-0.50C	Single-chip processor	Sync separation, EFM demodulation, error detection/correction, error-corrected output, microcontroller interface, search control, digital equalizer, text data decoding, variable-speed playback, x8 oversampling digital filter, 1-bit DA converter, Integrated head amp	x4 play back mode for CD-DA/R	CD-RX system	3.3/5

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(CD/MP3 Player IC)

Part Number	Package	Classification	Features	Operating Voltage (V)
TC94A92FG ☆	P-LQFP80-1212-0.50F	Single-chip processor	CD-DA/R/RW: x2 playback, low power consumption, 1-Mbit SRAM (128 Kwords x 8 bits), standby mode Supports various compressed audio formats: MP3, WMA, AAC RF amp, CD digital servo, 8fs digital filter Multi-bit DA converter	3.3/1.5

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(Digital Signal Processor for Digital Amp System Applications)

Part Number	Package	Classification	Features	Operating Voltage (V)
TC94A34FG ☆	P-LQFP64-1010-0.50E	Audio digital signal processor	Low power consumption, 1-Mbit SRAM (128 Kwords x 8 bits) Supports various compressed audio formats: MP3, WMA, AAC Program ROM (20 K), program RAM (4 K), standby mode	3.3/1.5

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Communications Equipment ICs

Mobile Radio IC Series   (Bipolar/Bi-CMOS ICs)

Part Number	Package (Pin Pitch)	Functions	Applications	Features		Power Supply Voltage (V)
TB31345WLG	WCSP96 (0.4 mm)		Digital mobile and Wireless equipment	Freq. bands: Band I (2-GHz band), Band V/VI(800-MHz band), Band IX (1.7-GHz band) Reduced external parts: Direct conversion transmitter and receiver Low EVM: Tx = 3% (typ.); Rx = 10% (typ.) Fast lock & low noise: Fractional-N PLL + VCO + loop filter Reduced interference: LPF for GSM and CDMA2000 Ultra-small, thin package WCSP96 (4.13 mm x 4.16 mm x 0.6 mm)	Current consumption: Transmitter: 66 mA (typ.) (@ +4-dBm output) Receiver: 36 mA (typ.)	2.8 to 3.1
TB31224CFG	QFP48 (0.8 mm)		Cordless phones	CT0-compatible PLL, IF detection and compander integrated into a single chip on-chip peripherals	Power-on reset	2.0 to 6.0
TB31261AFG ☆	QFP52 (0.65 mm)		Cordless phones	900-MHz PLL, IF detection and compander integrated into a single chip, on-chip peripherals		2.7 to 5.5
TB31262FG ☆	QFP52 (0.65 mm)				VCO, varicap, LNA, MIX and PA integrated into a single chip	2.0 to 5.0
TB32302FG ☆	QFP52 (0.65 mm)		Low-power radio	400-MHz low-power radio, telemeter support, PLL, VCO, LNA, MIX, IF detection and PA integrated into a single chip		2.2 to 4.0
JTB32303-AS	Chip		Transceiver (FRS/GMRS/PMR)	Chip supply PLL, XOUT, LNA, MIX, IF amp, RSSI, Noise detector, Audio amp and TX-buffer into a single chip		2.5 to 4.5
JTB32304-AS	Chip	RF IC		Chip supply PLL, XOUT, LNA, 2nd MIX, IF amp, RSSI, Noise detector, Audio amp and TX-buffer into a single chip		2.5 to 4.5
ETB32304-AS	Wafer			Wafer supply PLL, XOUT, LNA, 2nd MIX, IF amp, RSSI, Noise detector, Audio amp and TX-buffer into a single chip		2.5 to 4.5
TA32305FNG ☆	SSOP30 (0.65 mm)		Remote control (AM/FM)	240 kHz to 450 MHz RF amp, MIX, AM/FM demodulator, 2-level comparator, V_{CC} = 2.2 V to 5.5 V, on-chip local x8 multiplier, receiver/transmitter		2.2 to 5.5
TC31298IXBG ☆	FBGA52 (0.5 mm)		Bluetooth (RF for chipset)	PLL, VCO, LNA, MIX, BPF, IF-amp, Digital detector, ADC, DAC, PA, antenna SW, PLL loopfilter integrated into a single chip	Current consumption: Transmitter: 65 mA (typ.) Receiver: 65 mA (typ.)	3.0 to 3.6
TC31299IXBG ☆	FBGA52 (0.5 mm)		Bluetooth EDR (RF IC chip)	Bluetooth EDR-compliant single-chip RF IC with PLL, VCO, LNA, MIX, BPF, IF amp, digital detector, DAC, ADC, PA, antenna switch and PLL loop filter	Current consumption: Transmitter: 65 mA (typ.) Receiver: 60 mA (typ.)	
TA31273FNG	SSOP20 (0.65 mm)		Remote control (AM)	240 kHz to 450 MHz RF amp, MIX, AM demodulator, 2-level comparator, on-chip local x8 multiplier		3.0 to 5.5
TA31275FNG ☆	SSOP24 (0.65 mm)		Remote control (AM/FM)	240 kHz to 450 MHz RF amp, narrow band system, MIX, AM/FM demodulator, 2-level comparator, on-chip local x8 multiplier		2.4 to 5.5
TB31370FNG ☆	SSOP24 (0.65 mm)		Remote control (AM/FM)	RF operating frequency: 315 MHz on-chip VCO, IF filter, detector		4.0 to 5.5
TB31371FNG ☆	SSOP24 (0.65 mm)			RF operating frequency: 433.92 MHz on-chip VCO, IF filter, detector		3.6 to 5.5
TB31372FNG ∗ ☆	SSOP24 (0.65 mm)		Remote control (AM/FM)	RF operating frequency: 315 MHz on-chip VCO, IF filter, detector, on-chip high-speed comparator		3.6 to 5.5
TB31373FNG ∗ ☆	SSOP24 (0.65 mm)			RF operating frequency: 433.92 MHz on-chip VCO, IF filter, detector, on-chip high-speed comparator		

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Automotive ICs

System Power Supplies

Part Number	Package	Functions	Characteristics				Remarks	Supply Voltage (V)
			Output Voltage Typ. (V)	Output Current Max (mA)	Input Voltage Max (V)	Power Dissipation Max (W)		
TB9000FG	SSOP16	CPU voltage regulator, watchdog timer	5	10 (Max) (Note)	45 (1 s)	0.6	Low current consumption: 120 μA (typ.) Reset on watchdog timeout Reset detection: 4.7 V External transistor required	6 to 16
TB9000AFG	SSOP16	CPU voltage regulator, watchdog timer	5	10 (Max) (Note)	45 (1 s)	0.6	Low current consumption: 120 μA (typ.) Reset on watchdog timeout Reset detection: 4.2 V External transistor required	6 to 16
TB9000CFNG	SSOP20 (0.65)	CPU voltage regulator, watchdog timer	5	10 (Max) (Note)	45 (1 s)	0.68	Low current consumption: 120 μA (typ.) Reset on watchdog timeout Reset detection: 4.7 V External transistor required	6 to 16
TB9001FNG	SSOP20 (0.65)	CPU voltage regulator, watchdog timer	5	5 (Max) (Note)	45 (1 s)	0.68	Low current consumption: 95 μA (typ.) Internal 32 kHz clock External transistor required	6 to 16
TB9004FNG ☆	SSOP24 (0.65)	CPU dual voltage regulator, watchdog timer	3.4/2.5/1.5 5.0	10 (Max) (Note)	45 (1 s)	0.85	3.4/2.5/1.5 V selectable 2 reset pins Low current consumption: 0 μA (Vcc1/2: off) (typ.) External transistor required	6 to 16
TB9005FG **	SSOP20	CPU voltage regulator, watchdog timer	5	10 (Max) (Note)	45 (1 s)	0.68	Low current consumption: 90 μA (typ.) Reset on watchdog timeout Reset detection: 4.7 V or 4.2 V (selectable) External transistor required	6 to 18

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Note: An external transistor is required. The gain varies with the transistor.

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Actuator Drivers   (DC Motor Drivers)

Part Number	Package	Functions	Characteristics				Remarks	Supply Voltage (V)
			Output Voltage Typ. (V)	Output Current Max (mA)	Input Voltage Max (V)	Power Dissipation Max (W)		
TA8050AFG	HSOP20	H-bridge driver	—	1500	60 (1 s)	2.0	Standby function	8 to 16
TA8050FG	HSOP20	H-bridge driver	—	1500	60 (1 s)	2.0		6 to 16
TA8083PG	DIP16	H-bridge driver	—	500	60 (1 s)	1.4	Diagnosis function and standby function	8 to 16
TA8083FG	HSOP20	H-bridge driver	—	500	60 (1 s)	2.0	Diagnosis function and standby function	8 to 16
TA8083AFG	HSOP20	H-bridge driver	—	800	60 (1 s)	2.0	Diagnosis function and standby function	8 to 16
TB9056FNG ☆	SSOP24 (0.65)	LIN-compatible H-bridge driver	—	300	40 (1 s)	0.85	LIN Rev. 1.3 Motor driver: RDSON (H bridge: P-ch + N-ch) = 2.2 Ω (typ.) Potentiometer support	7 to 18

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(Brushless Motor Drivers)

Part Number	Package	Functions	Features	Supply Voltage (V)
TB9061FNG ☆	SSOP24 (0.65)	3-phase sensorless motor pre-driver	3-phase, full-wave sensorless drive PWM pulse input control/DC level input control (selectable) Comparator for induced voltage detection Thermal shutdown, overcurrent detection, overvoltage detection 5-V regulated voltage, 5.12-MHz oscillator	5.5 to 18
TB9065FG ☆	QFP64 (0.65)	3 phase motor pre-driver	Charge-pump brushless pre-driver LIN transceiver 5 V power supply for a microcontroller (Requires external PNP transistors.) Watchdog timer, power-on-reset timer 3 ch analog comparator for Hall-effect devices Op-amp/comparator for motor overcurrent detection	7 to 18
TB9066FG ☆	QFP48 (0.5)	3-phase motor driver	Motor driver R_{DSON}: P-ch = 1 Ω (typ.), N-ch = 1 Ω (typ.) 120-degree commutation logic LIN 1.3-based transceiver 5-V supply for a microcontroller (external PNP transistor required) Watchdog timer, power-on reset timer Three analog comparators for Hall devices	7 to 18
TB9067FNG ☆	SSOP24 (0.65)	3-phase motor pre-driver	120-degree commutation logic Pre-drivers for a high-side P-ch FET and a low-side N-h FET Internal PWM drive/external direct drive (selectable) Two options for setting the output duty cycle (pulse input, analog input) Overcurrent detection, thermal shutdown, supply voltage increase, supply voltage decrease Soft start	6 to 18
TB9068FG ** ☆	QFP48 (0.5)	3-phase motor driver	Motor driver R_{DSON}: P-ch = 1 Ω (typ.), N-ch = 1 Ω (typ.) 120-degree commutation logic LIN 1.3-based transceiver 5-V supply for a microcontroller (external PNP transistor required) Watchdog timer, power-on reset timer Three analog comparators for Hall devices	7 to 18

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Peripheral Equipment LSIs

Part Number	Package	Device Type	Characteristics				Remarks	Power Supply Voltage (V)
			Output Voltage Typ. (V)	Output Current Max (mA)	Input Voltage Max (V)	Power Dissipation Max (W)		
TB6066FNG	VSOP16	Shock sensor amp (low-noise charge amp)	—	—	—	0.025	1 channel, Window Comparator	2.7 to 5.5
TB6073AFNG	VSOP16	Shock sensor amp (low-noise charge amp)	—	—	—	0.0225	2 channel	2.7 to 5.5
TB6078AFUG	SM8	Shock sensor amp (low-noise charge amp)	—	—	—	0.0195	1 channel, small package, low-noise	2.7 to 5.5
TB6079AFKG　　*	US16	Shock sensor amp (Sensor signal processor)	—	—	—	0.022	Two I/O rail-to-rail op amps, reference amp, Window Comparator, small package	2.3 to 5.5
TB6082FNG　　*	VSOP10	Shock sensor amp (low-noise charge amp)	—	—	—	0.03	1 channel, Circuitry used to build a notch filter, low-noise	2.3 to 5.5
TB6086FKG　　*	US16	Shock sensor amp (Sensor signal processor)	—	—	—	0.022	1 channel, Circuitry used to build a notch filter, Window Comparator, small package	3.0 to 5.5
TC9384FUG	SSOP6	High-frequency modulator for optical disk drives	—	—	—	—	Designed for laser diodes	4.5 to 5.5
TC9350BFNG	VSOP16	USB optical mouse controller	—	—	—	0.026	USB optical mouse controller	4.35 to 5.25
TC93A02FUG/AFUG	SSOP6	High-frequency modulator for optical disk drives (2-ch)	—	—	—	—	Designed for dual-wavelength laser diodes	4.5 to 5.5
TC9399FNG	VSOP16	Laser diode driver for CD-RW drives	—	400	—	—	Designed for optical disk drives	4.5 to 5.5
TC93A04FNG/FTG	VSOP16 /TSSOP16	Laser diode driver for combo drives	—	400	—	—	Designed for dual-wavelength laser diodes	4.5 to 5.5
TC93A05FNG	VSOP16	Laser diode driver for combo drives	—	400	—	—	Designed for dual-wavelength laser diodes	4.5 to 5.5
TC93A14AFUG	SSOP6	High-frequency modulator for optical disk drives (2-ch)	—	—	—	—	Spectrum diffusion type	4.5 to 5.5
TC93A16FTG	VQON24☆	Laser diode driver for Blu-ray Disc playback	—	100	—	—	3-terminal	4.5 to 12
TC93A24FUG　　*	SSOP6	High-frequency superimposition for Blu-ray Disc	—	—	—	—	Designed for blue-violet lasers	4.5 to 5.0

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Other Consumer Product ICs

Remote Controller ICs

Part Number	Package	Description/Use	Functions and Features	Operating Voltage (V)
TC9243APG TC9243AFG	P-DIP20-300-2.54A P-SOP20-300-1.27 ☆	Remote control transmitter suitable for TVs, VCRs and audio equipment	Used for transmission, 32 functions controllable through simultaneous multiple key presses	2.0 to 4.0

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Mixed-Signal Controllers

Part Number	ROM (Kbytes)	RAM (Bytes)	Minimum Instruction Execution Times (μs)	SIO (Ch)	I²C (Ch)	10-Bit AD Converter (Ch)	18-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	10-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Watchdog Timer	Clock Gear	Power-On Reset	Sensor Sampling Circuit	Offset Voltage Adjustment Circuit	On-chip Debug Function	Internal Oscillator (High-Speed)	Internal Oscillator (Low-Speed)	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	Package
TMP89FH00DUG	16	1024	0.2	1	1	4		1			Yes	Yes	Yes	(Note1) Yes	Yes	Yes	Yes	Yes	15	2.2 to 3.6	−40 to 85	LQFP48 (7×7 mm)
TMP89FH00WBG	16	1024	0.2	1	1	4		1			Yes	Yes	Yes	(Note1) Yes	Yes	Yes	Yes	Yes	15	2.2 to 3.6	−40 to 85	WCSP39 (3.8×3.8 mm)

Note1) Supports 1- to 4-axes resistive-bridge-type acceleration sensors.

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CLC (Common Line Communication) ICs

Part Number	Package	Applications	Features	Supply Voltage (V)
T6B70BFG ☆	SOP16-P-300-1.27	Interface IC for boilers	Carrier receiver, carrier identification, carrier pseudo-sine wave generator	4.5 to 5.5
T6B70BFNG	SSOP16-P-225-0.65B	Interface IC for boilers	Carrier receiver, carrier identification, carrier pseudo-sine wave generator Smaller package version of T6B70BFG	4.5 to 5.5

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