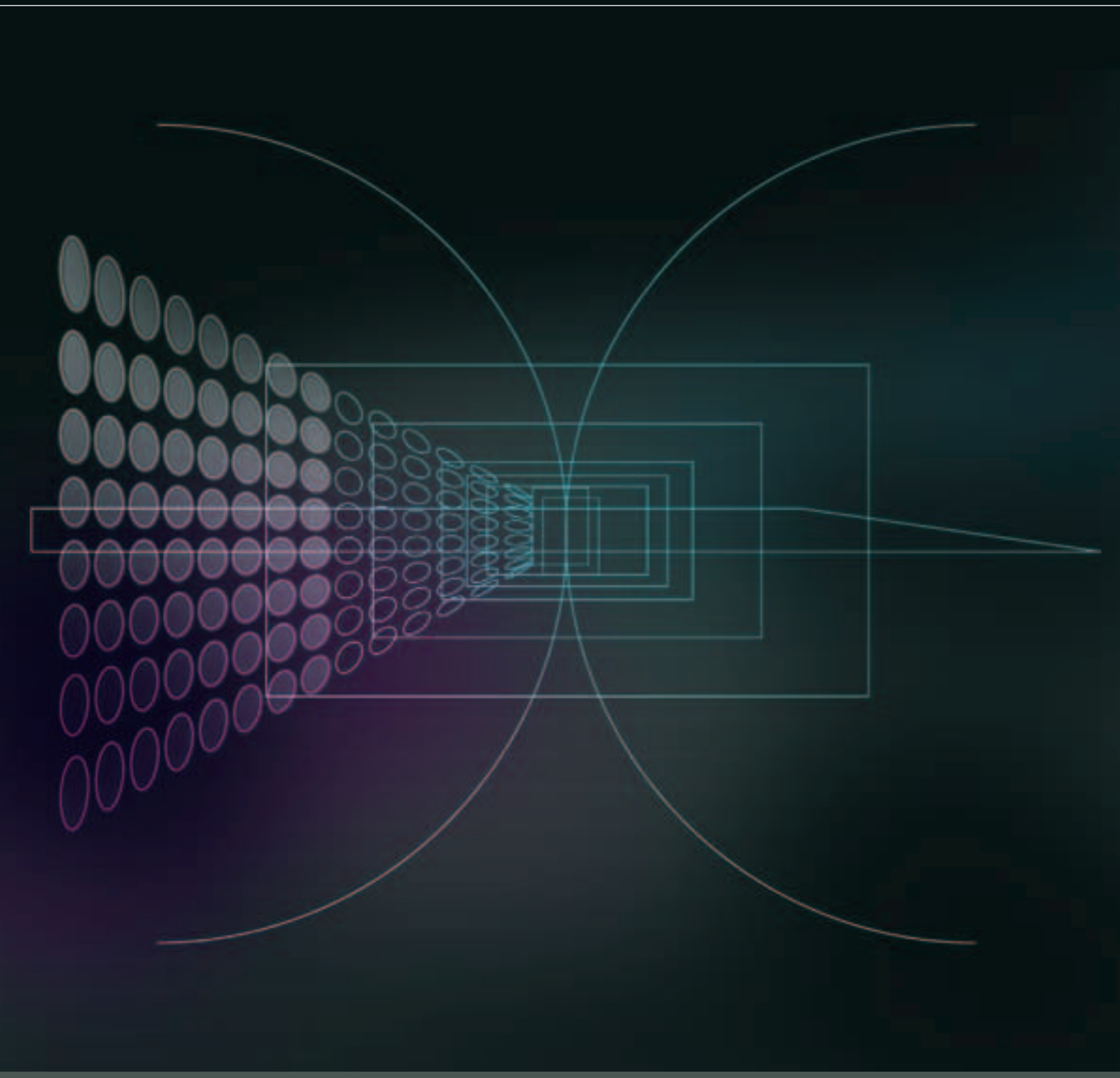
TOSHIBA

Leading Innovation

2007-5

SYSTEM CATALOG

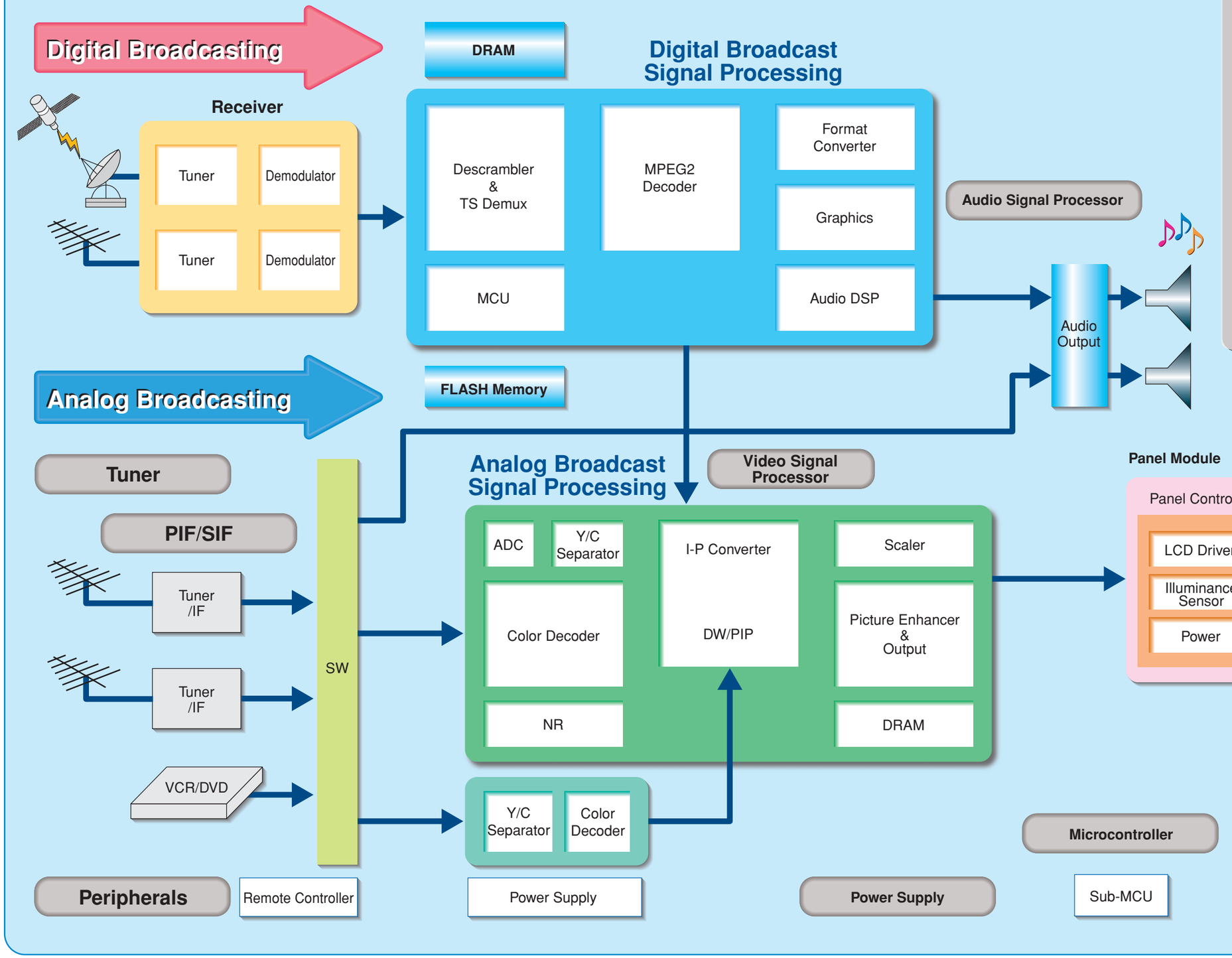
TV Solutions Guide



SEMICONDUCTOR

http://www.semicon.toshiba.co.jp/eng

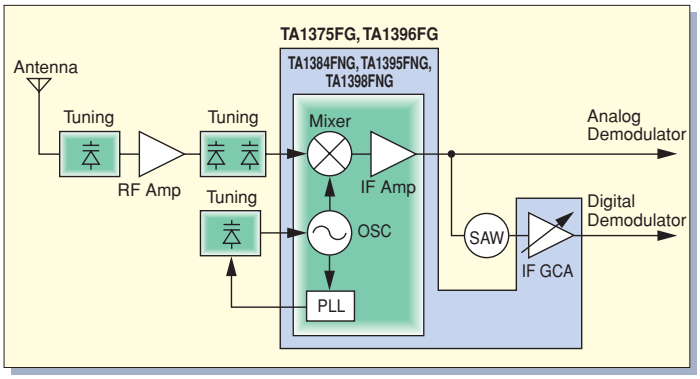
Digital and Analog Flat TV Organizations



Contents

ICs for Tuners

TV Tuner Systems



Part Number	Functions	Power Supply	Package
TA1384FNG	2-band OSC, MIX, IF Amp, PLL, band driver	5 V	SSOP24
TA1395FNG	2-band OSC, MIX, IF Amp, PLL, band driver	5 V	SSOP24
☆**TA1398FNG**	2-band OSC, MIX, IF Amp, PLL, band driver	5 V	SSOP24
TA1375FG	3-band OSC, 2-band MIX, IF Amp, PLL, IF GCA	5 V	LQFP48
TA1396FG	3-band OSC, 2-band MIX, IF Amp, PLL, IF GCA	5 V	LQFP48

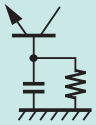
☆: Under development

Transistors and Diodes for Tuners

Application	Type	Band	Package	Part Number
Tuning	Tuning varicap diode	Wideband VHF	USC	**1SV215** **1SV262** **1SV288** **1SV231** **1SV232** **1SV269** **1SV302**
			ESC	**1SV282** **1SV290** **1SV283** **1SV303**
			S-Mini (dual type)	**1SV242**
		UHF	USC	**1SV214**
			ESC	**1SV278**
	AFC diode	VHF to UHF	USC	**1SV216**
RF Amp	Dual-gate FET	Wideband VHF	SMQ	**3SK195** **3SK225** **3SK226** **3SK292**
			USQ	**3SK259** **3SK257** **3SK258** **3SK294**
		UHF	SMQ	**3SK199** **3SK207** **3SK232** **3SK291**
			USQ	**3SK256** **3SK249** **3SK293**
	Bipolar transistor	VHF to UHF	S-Mini	**2SC5084** **MT3S04A** **MT3S106***
Mixer	Dual-gate FET	VHF and wideband VHF	USQ	**3SK260** **3SK259**
	Schottky diode	UHF	S-Mini	**1SS295** (dual)
			USC	**1SS315**
			SSM	**JDH3D01S** (dual)
			fSC	**JDH2S01FS**
			VESM	**JDH3D01FV** (dual)

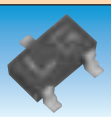
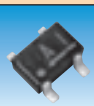
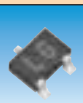
*: New product

Application	Type	Band		Circuit Diagram	Package	Part Number
Tuning	Band switch	Single	VHF and wideband VHF	———	USC	**1SS314**
					ESC	**1SS381**
					sESC	**JDS2S03S**
		Dual		Common anode 	S-Mini	**1SS269**
						1SS268
					USM	**1SS313**
				Common cathode 	USM	**1SS312**
					SSM	**1SS364**

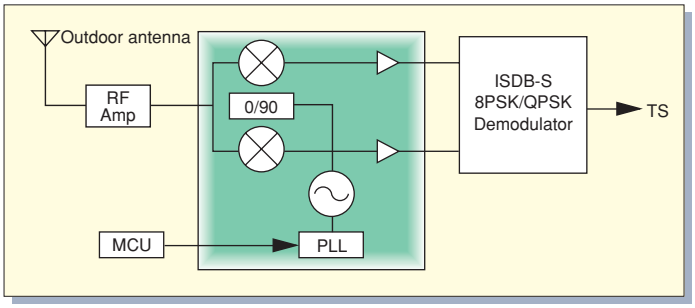
Application	Type	Band	Circuit Diagram	Package	Part Number
RF Amp	Bipolar transistor	UHF	 Common base	USM	**2SC4244**
				SMQ	**2SC4214**

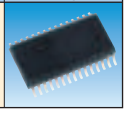
Application	Type	Band	Circuit Diagram	Package	Part Number
OSC	Bipolar transistor	Wideband VHF	Common collector	USM	**2SC4251 2SC4246 2SC4252**
				S-Mini	**2SC3124 2SC3121**
		UHF	Common base	USM	**2SC4246**
				S-Mini	**2SC3121**
			Common collector	USM	**2SC4247**
				S-Mini	**2SC3547A**
Mixer	Bipolar transistor	Wideband VHF	Common emitter	USM	**2SC4250 2SC4245**
				S-Mini	**2SC3123 2SC3120**
			Common base	USM	**2SC4253 2SC4251 2SC4246**
				S-Mini	**2SC3125 2SC3124 2SC3121**
		UHF	Common emitter	S-Mini	**2SC3120 2SC3862**
				S-Mini	**2SC3547A**
			Common base	USM	**2SC4245**
				USM	**2SC4247**

Package

Package	USC	ESC	S-Mini	SMQ	USQ
Package Shape					
パッケージ	**SSM**	**fSC**	**VESM**	**sESC**	**USM**
Package Shape					

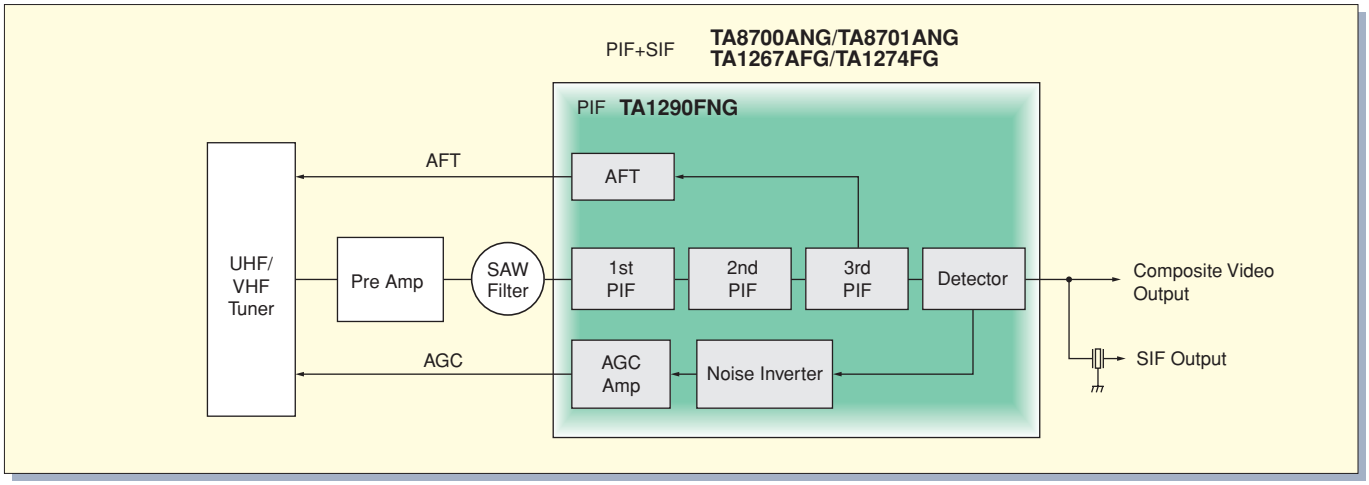
Digital Satellite Broadcast Receivers



Part Number	Functions	Power Supply	Package	Package Shape
TB1293FNG	Direct quadrature demodulator; PLL	3.3 V	SSOP30	

PIF/SIF Systems

PIF/SIF Systems

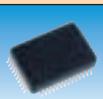


PIF ICs

Functions \ AGC	IF / RF	Peak AGC: Reverse	Peak AGC: Forward	Power Supply
PIF		**TA1290FNG** SSOP16		9 V
PIF + SIF		**TA8700ANG** SDIP20		9 V
PIF + SIF/ATT		**TA8701ANG** SDIP24		9 V
PLL PIF + SIF		**TA8800NG** SDIP24		9 V
		TA1267AFG SSOP24		9 V
		TA1274FG SSOP24		9 V
		☆**TB1338FNG** SSOP24		5 V
Low Voltage PIF + SIF/ATT		**TA8805FG** SSOP24		3.5 to 7.5 V
		TA1207FG SSOP24 (Without noise inverter)		3.5 to 7.5 V
Low Voltage PIF + SIF		**TA1272AFG** SSOP24		3.5 to 5.5 V
PIF + Converter SIF + ACC		**TA1209FG** QFP48		5 V, 8.5 V

☆: Under development

Package

Package	SSOP16	SSOP24	SDIP20	SDIP24	QFP48
Package Shape					

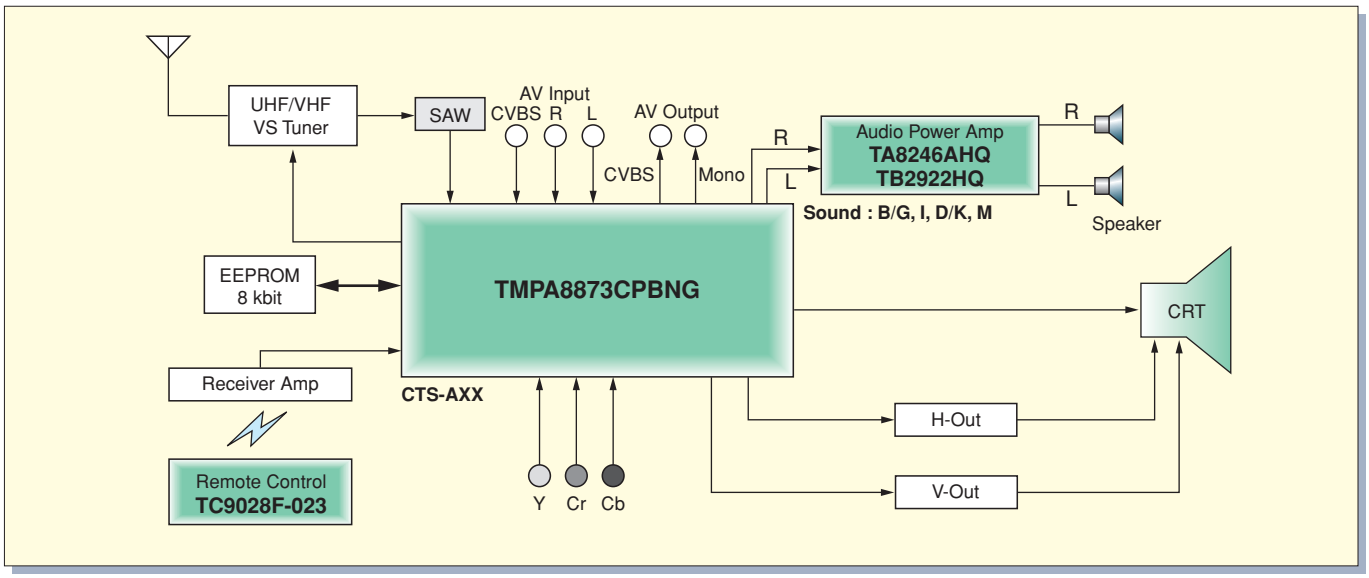
SIF ICs

Part Number	Function	Package	Package Shape
TA8721ASN	Dual SIF	SSIP12	

Video Signal Processing

1H CRT TV Systems

The TMPA88xx series consists of a microcontroller and a TV signal processor. It incorporates basic functionality required for 1H CRT TV systems, such as a microcontroller, OSD, video processing and synchronization processing, eliminating the need for external components. Toshiba also offers a device with an East-West (EA) correction capability designed for large, slim CRT TV applications. Below is a block diagram of a basic TV system using the TMPA8873.



Features \ Part Number	TMPA8851CxNG	TMPA8853CxNG	TMPA8857CxNG	TMPA8859CxNG	TMPA8873CxBNG	TMPA8879CxBNG
Color System	PAL/NTSC/SECAM	PAL/NTSC	PAL/NTSC/SECAM	PAL/NTSC	PAL/NTSC	PAL/NTSC
SIF Carrier System	Intercarrier	Intercarrier	Intercarrier	Intercarrier	Intercarrier	Intercarrier
EW Correction (EW/EHT)	–	–	○	○	–	○
YCbCr Input	1	1	1	1	1	1
Built in Sound Trap	–	–	–	–	○	○
FM Radio (Mono, 10.7 MHz)	–	–	–	–	○	○
Video Inputs	2	2	1	1	2	1
Audio Input / Outputs	1 / 1	1 / 1	– / –	– / –	2 / 2	2 / 2
Audio Monitor Output	–	–	–	–	1	1

Features \ Part Number	TMPA8891CxBNG	TMPA8893CxBNG	☆TMPA8897CxBNG	☆TMPA8899CxBNG
Color System	PAL/NTSC/SECAM	PAL/NTSC	PAL/NTSC/SECAM	PAL/NTSC
SIF Carrier System	Intercarrier	Intercarrier	Intercarrier	Intercarrier
EW Correction (EW/EHT)	–	–	○	○
YCbCr Input	1	1	1	1
Built in Sound Trap	○	○	○	○
FM Radio (Mono, 10.7 MHz)	○	○	○	○
Video Inputs	3	3	2	2
Audio Input / Outputs	2 / 2	2 / 2	2 / 2	2 / 2
Audio Monitor Output	2	2	2	2

x: Mask ROM size (KB) S = 64, R = 56, P = 48 ☆: Under development

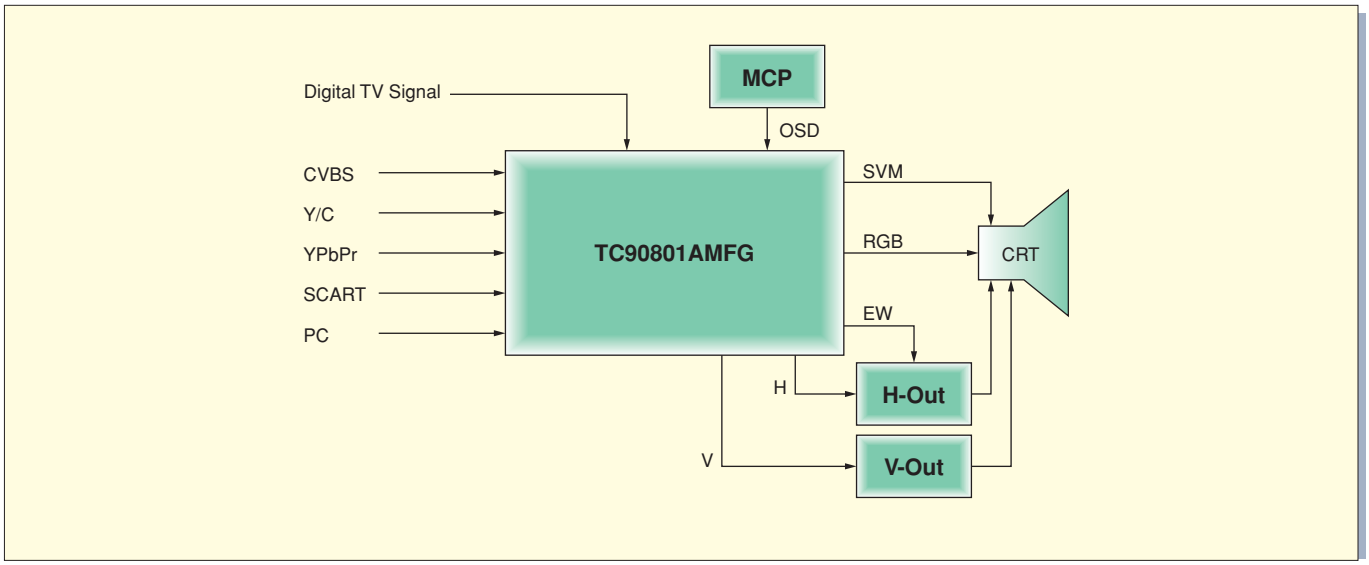
Package	SDIP64
Package Shape	

All the above parts are housed in SDIP64.

Video Signal Processing

2H CRT TV Systems

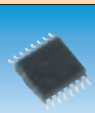
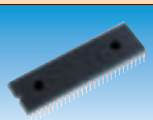
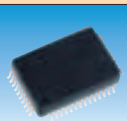
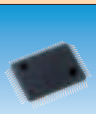
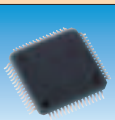
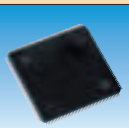
Video Processing Subsystem for a 2H CRT TV
Below is an example of a block diagram of a video processing subsystem for progressive-scan TV, using the **TC90801AMFG.**



Category	Part Number	Functions	Package
Single-Chip	☆**TC90801AMFG**	AV switch, multi-standard color decoder, I-P conversion, picture correction, deflection distortion correction	LQFP208
FEP	**TB1274BFG**	Multi-standard color decoder	QFP48
	TA1270BFG	PAL/NTSC color decoder	QFP48
	TA1383AFG	NTSC color decoder, sync detection	SSOP30
BEP	**TA1360ANG/AFG**	YUV picture improvement, RGB processing, sync processing	SDIP56/QFP80
	TB1306AFG	YUV/RGB processing, sync and deflection processing	QFP48
	TB1307FG	YUV picture improvement, RGB processing, sync and deflection processing	QFP48
Deflection Distortion Correction	**TA8859CPG**	Deflection distortion correction	DIP16
	TA1241ANG	Deflection distortion correction	SDIP24
	TA1317ANG	Deflection distortion correction, DC-coupled Vout	SDIP24
Others	**TA1287PG/FG**	Color difference switch	DIP16/SSOP16
	TB1305FG	Component switch, ADC pre-filter, sync detection	QFP48
	TB1308FG		
	TB1311AFG	AV switch, component switch, ADC pre-filter, sync detection	QFP80
	TB1328FG	AV switch, component switch, ADC pre-filter, sync detection	LQFP64

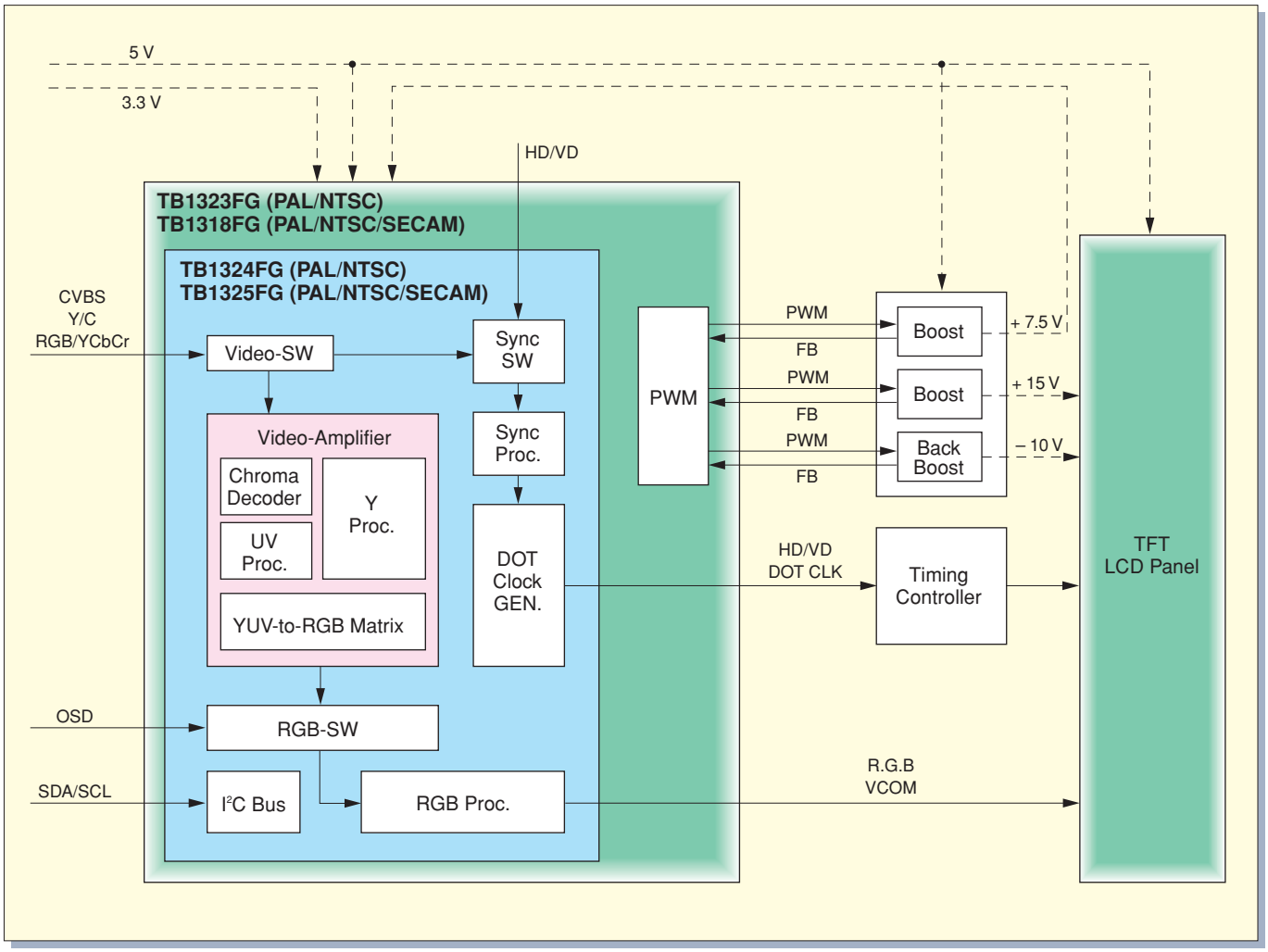
☆: Under development

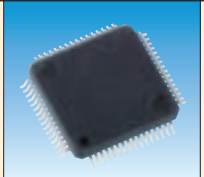
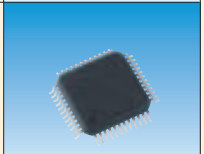
Package

Package	DIP16	SSOP16	SSOP30	SDIP24	SDIP56
Package Shape					
Package	QFP48	QFP80	LQFP64	LQFP208	
Package Shape					

ICs for Small LCD Panels

The **TB1323FG**, **TB1318FG**, **TB1324FG** and **TB1325FG** provide basic functionality required for small LCD panels such as video processing, RGB processing and synchronization processing. These ICs significantly reduce the number of external components needed. Also, small, low-profile packages save board space.



Part Number	Chroma Processing			PWM for DC-DC Converter	Package	Package Shape	Features
	PAL	NTSC	SECAM				
TB1323FG	○	○	–	○	LQFP64		2 CVBS (YC) inputs, 1 RGB (Ys) input and 1 RGB (YCbCr) input 1H delay line (NTSC chroma comb filter) Supports multiple video standards with one crystal Automatic video standard detection Gamma correction Automatic contrast limiting (ACL) Black and white limiting Horizontal VCO (HVCO) Sync separation Dot clock generator for an external timing controller I²C bus interface
TB1318FG	○	○	○				
☆**TB1324FG**	○	○	–	–	LQFP48		
TB1325FG	○	○	○				

Note: **TB1323FG** and **TB1318FG** are pin-compatible.
TB1324FG and **TB1325FG** are pin-compatible.
☆: Under development

Video Signal Processing (Digital Signal Processing)

Video Decoders

Part Number	Function	Features	Operating Supply Voltage	Package
TC90101FG	Color decoder with Y/C separation	• Multi-standard system • Sync regeneration and color system detection • 3-line Y/C separation • Picture improvement • 656 and 601 outputs • VBI data slicer • S/N detection • Copy guard signal detection	3.3 V 2.5 V 1.5 V	LQFP100
TC90103AFG	Color decoder with Y/C separation	• Multi-standard system • Sync regeneration and color system detection • 3D Y/C separation • Picture improvement • 656 and 601 outputs • VBI data slicer • 3D noise reduction (except in 3D YCS mode) • S/N detection • Copy guard signal detection	3.3 V 2.5 V 1.5 V	LQFP144

Extended Temperature ICs (–30°C to +85°C)

Part Number	Functions	Feature	Operating Supply Voltage	Package
TC90A96BFG	Dual-LCD processor	• Analog RGB inputs • Composite video inputs • 2-line Y/C separation • 6-Mbit DRAM • Digital RGB outputs • LCD control outputs (dedicated to Toshiba's QVGA and W-VGA) • Picture adjustment • Digital RGB inputs • Digital PLL • Multi-standard color decoder • OSD interface	3.3 V 2.5 V 1.5 V	QFP176
TC90101AFG	Color decoder with Y/C separation	• Multi-standard system • Sync regeneration and color system detection • 3-line Y/C separation • Picture improvement • 650 and 601 outputs • VBI data slicer • S/N detection • Copy guard signal detection	3.3 V 2.5 V 1.5 V	LQFP100
☆**TC90200AFG**	Single-chip video processor	• Multi-standard system • Sync regeneration and color system detection • 3-line Y/C separation • Digital input interface • SCART connectors supported • Scaler • VBI data slicer • OSD input interface	3.3 V 2.5 V 1.5 V	LQFP208

☆: Under development

VBI Data Slicer

Part Number	Functions	Feature	Operating Supply Voltage	Package
TC90173FG	VBI Data Slicer	• 8-bit ADC • Transversal filter • Sync separation • World's VBI data standards supported • Digital data slicer • Error checking and correction • Parallel microcontroller interface • Single 27-MHz clock	3.3 V 2.5 V 1.5 V	LQFP48

ICs for Digital Y/C Separation

Part Number	Functions	Feature	Operating Supply Voltage	Package
TC90A45FG/PG	2/3-line Y/C separation	2-line Y/C separation (NTSC), x 4 VCO, 8-bit ADC, 1H line memory, Toshiba-proprietary logical comb filter, 2-ch 8-bit DAC	5 V	SOP16/DIP16
TC90A53AFG/ANG		3-line Y/C separation (NTSC), x 4 VCO, 8-bit ADC, 2H line memory, Toshiba-proprietary logical comb filter, 2-ch 8-bit DAC	5 V	SOP28/DIP28
TC90A69NG/FG		3-line Y/C separation (PAL, NTSC) + chroma noise reduction (NTSC), x 8 VCO, 8-bit ADC, 4H line memory, 2-ch 8-bit DAC, Toshiba-proprietary logical comb filter, CNR	5 V	SDIP28/SOP28
TC90A83NG		3-line Y/C separation (NTSC), programmable PLL, 10-bit ADC, 2H line memory, Toshiba-proprietary logical comb filter, 2-ch 10-bit DAC, dot interference reduction	5 V	SDIP28
TC90A65FG	3D Y/C separation	3D Y/C separation (NTSC) 10-bit ADC, 4-Mb DRAM, 10-bit DAC, VCXO	2.5 V 3.3 V	QFP100

Wireless LAN for AV Networking

Wireless LAN Baseband Chip for AV Networking: TC90515XBG

PRELIMINARY

- Supports wireless transmission of MPEG2-TS high-definition (HD) video.
- Provides Quality-of-Service (QoS) control compliant with IEEE 802.11e (HCCA and EDCA).
- Offers security features, permitting use of copyright-protected software.
- Various interfaces for TV sets
- Contains a high-performance TX49 CPU to execute protocols required for home networking.

Key Features

802.11a/b/g/e/h/i wireless LAN features
- a: OFDM (BPSK, QPSK, 16QAM, 64QAM)
- e: QoS control (EDCA, HCCA)
- h: Interference avoidance (Radar detection, TPC, DFS)
- i: Enhanced wireless security mechanisms (WEP, TKIP, AES)

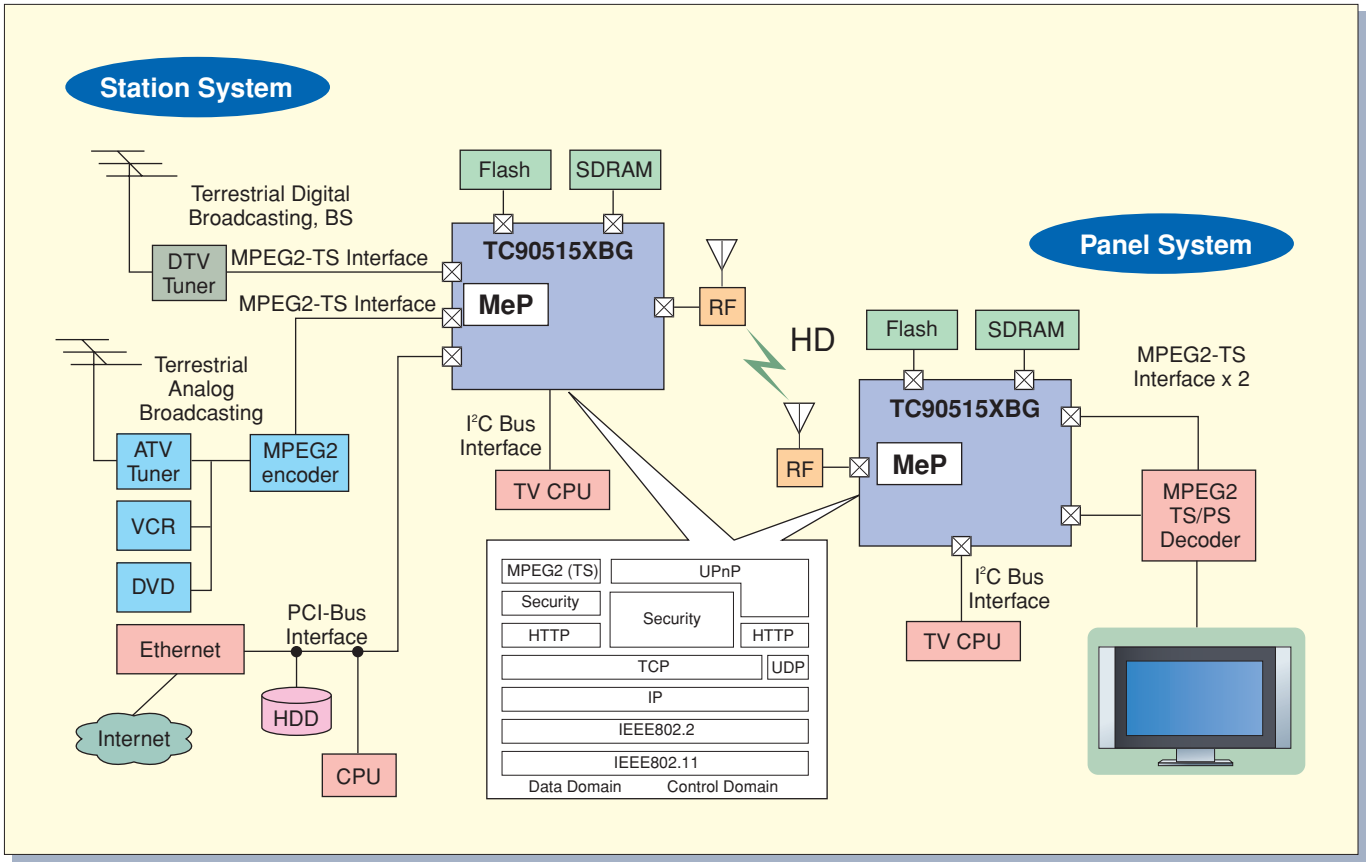
MPEG2-TS interface
- Transmission and reception channels for video streams
- Stream control features
  - ◆ Time Stamper
  - ◆ Smoothing Buffer

PCI interface
- Allows transmission and reception of data streams and control commands.

Security features
- Contains AES-CBC encryption/decryption engines in addition to the IEEE 802.11 features.

Ideal for TV sets
- I²C bus controllable
- Passes the IR remote control signal received at the panel side to the station side via wireless LAN.

Application



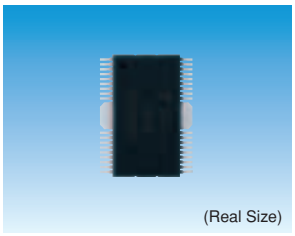
Audio Signal Processing

Audio Power Amplifiers

The following are the new power amplifiers specifically designed to meet the requirements of flat and rear-projection TVs for lower profile and higher output power.

Class-D 20-W x 2-Channel (BTL) Low-Frequency Power Amplifier: TB2924AFG

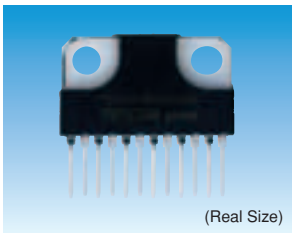
- P_{out} = 7.5 W x 2 ch (R_L = 8 Ω) or 13 W x 2 ch (R_L = 4 Ω) @ V_{CC} = 12 V
- P_{out} = 10.5 W x 2 ch (R_L = 8 Ω) or 19.5 W x 2 ch (R_L = 4 Ω) @ V_{CC} = 15 V
- Efficiency: 88%
  Thermal automatic gain control (AGC) prevents output clipping.
  Multi-channel master/slave configuration
- Characteristic supply voltage ranges: 11 to 18 V (T_{opr} = 0 to 75 °C, R_L = 4 Ω)
  11 to 20 V (T_{opr} = 0 to 75 °C, R_L = 8 Ω)



HSOP36-P-450-0.65

Class-AB MOS-Output 20-W x 2-Channel (BTL) Low-Frequency Power Amplifier: TB2922HQ

- P_{out} = 20 W x 2 ch (R_L = 8 Ω) or 35 W x 2 ch (R_L = 4 Ω) @ V_{CC} = 18 V
- Max Power = 72 W x 2 ch (R_L = 8 Ω) @ V_{CC} = 26 V
- THD = 0.02 % (typ.)
- Standby mode, audio muting, load shorting protection, short-to-supply protection, short-to-ground protection, overvoltage protection, thermal shutdown
- Operating supply voltage ranges: 9 to 26 V (R_L = 8 Ω, 6 Ω)
  9 to 18 V (R_L = 4 Ω)



HZIP12-P-1.78B

Conventional Audio Amplifiers

Part Number	Typ. output (f = 1 kHz, THD = 10%)	Functions	Operating Supply Voltage	Package
TA8200AHQ	13 W x 2 ch (V_{CC} = 28 V, R_L = 8 Ω)	Audio muting, fixed gain (G_V) of 34 dB (fine-tunable), thermal shutdown, interchangeable with **TA8216HQ** and **TA8258HQ**	10 to 37 V	HZIP12-P-1.78B
TA8216HQ	13 W x 2 ch (V_{CC} = 24 V, R_L = 4 Ω)	Audio muting, fixed gain (G_V) of 34 dB (fine-tunable), thermal shutdown, interchangeable with **TA8200HQ** and **TA8258HQ**	10 to 24 V (R_L = 4 Ω) 10 to 37 V (R_L = 8 Ω)	HZIP12-P-1.78B
TA8246AHQ	6 W x 2 ch (V_{CC} = 20 V, R_L = 8 Ω)	Audio muting, fixed gain (G_V) of 34 dB, no NF terminal, thermal shutdown, overvoltage protection, interchangeable with **TA8256BHQ**	10 to 30 V	HZIP12-P-1.78B
TA8256BHQ	6 W x 3 ch (V_{CC} = 20 V, R_L = 8 Ω)	Audio muting, fixed gain (G_V) of 34 dB, no NF terminal, thermal shutdown, overvoltage protection, interchangeable with **TA8246AHQ**		
TA8258HQ	20 W x 2 ch (V_{CC} = 37 V, R_L = 8 Ω)	Audio muting, fixed gain (Gv) of 34 dB (fine-tunable), thermal shutdown, interchangeable with **TA8200HQ** and **TA8216HQ**	15 to 42 V	

Sound Controller ICs

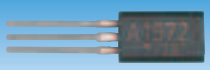
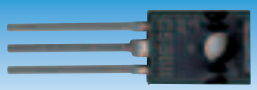
Part Number	Functions	Operating Supply Voltage	Package
TA1304FG/NG	Sound control; I²C bus interface; 2-input, 2-output digital ports	8.1 to 9.9 V	FG: SSOP24 NG: SDIP24
TA1343NG	Sound control; I²C bus interface; phase rotation surround sound	8.1 to 9.9 V	SDIP24

Surround Sound ICs

Part Number	Functions	Operating Supply Voltage	Package
TA2136FG/NG	SRS, 3D sound, stereo, 3D mono, bypass mode	4.5 to 12 V	SSOP24 SDIP24

Note: SRS and the SRS symbol are registered trademarks of SRS Labs, Inc. in the USA and other foreign countries.

Bipolar Transistors for Audio Output

Characteristics \ Package	TO-92MOD	TO-126
V_{CEO} = 160 V, I_C = 1 A	**2SC2383** **2SA1013**	—
V_{CEO} = 150 V, I_C = 1.5 A	—	**2SC3621** **2SA1408**
V_{CEO} = 160 V I_C = 0.1 to 0.2 A	**2SC2230** **x 2**	**2SC3963** **x 2**
V_{CEO} = 180 V I_C = 0.1 to 0.2 A	**2SC2230A** **x 2**	—
Package Shape		

Digital Audio Optical Modules

TOTX147, TXTX177, TORX147 and TORX177 Audio TOSLINK Series

The **TOTX147** and **TOTX177** Series are designed for transmitting audio signals, and the **TORX147** and **TORX177** Series are designed for receiving audio signals. These TOSLINK optical modules are manufactured at Toshiba Semiconductor Thailand (TST). The **TOTX147** and **TORX147** Series have a supply voltage of 3.3 V, while the **TOTX177** and **TORX177** Series have a supply voltage of 5 V. All of them offer a data rate of up to 15 Mb/s.
All these series are available in three package versions: standard panel-mount, standard panel-mount with shutter, and mini with shutter.

Standard Panel-Mount Package	Standard Panel-Mount Package with Shutter	Mini Package with Shutter
		
TOTX147(F,T) / TOTX177(F,T)	TOTX147L(F,T) / TOTX177L(F,T)	TOTX147PL(F,T) / TOTX177PL(F,T)
		
TORX147(F,T) / TORX177(F,T)	TORX147L(F,T) / TORX177L(F,T)	TORX147PL(F,T) / TORX177PL(F,T)

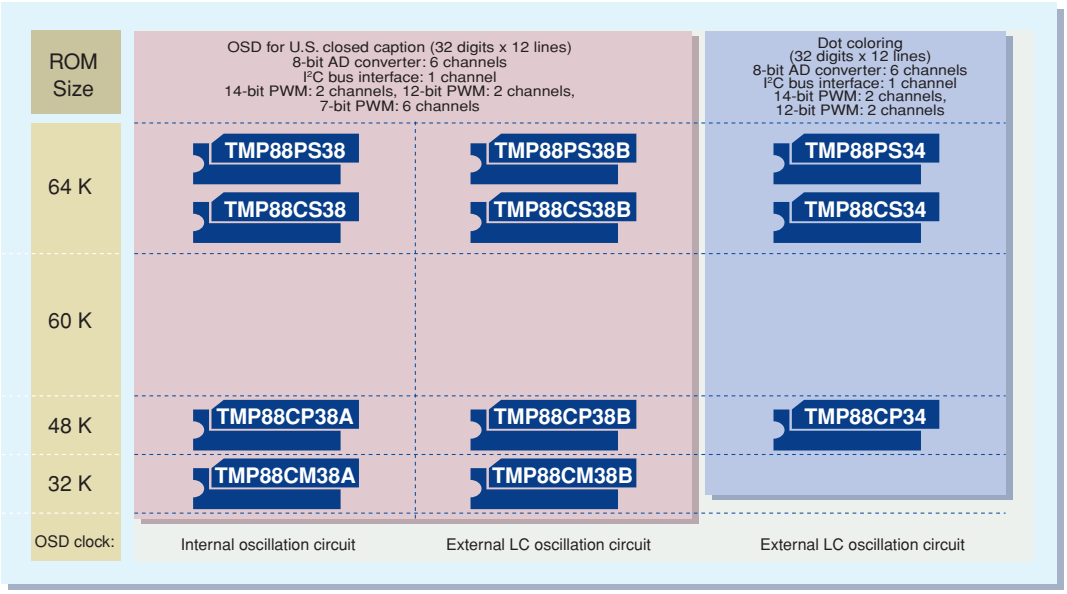
Microcontrollers

For color TV applications, Toshiba offers a line of 8-bit microcontrollers with an OSD function and an I²C bus interface.

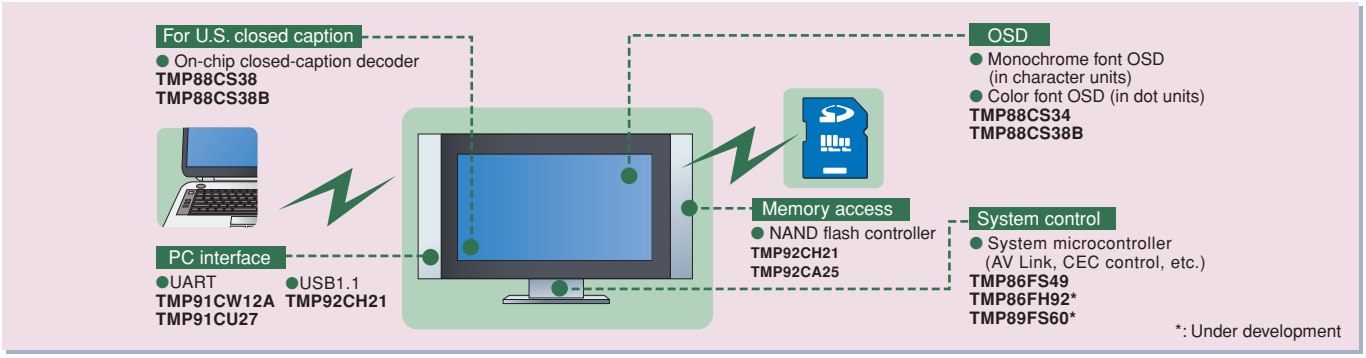
Key Features

- High-performance 8-bit core (870/X Series)
- Large ROM and RAM
- High-speed operation and low power consumption
- Serial interface: I²C bus

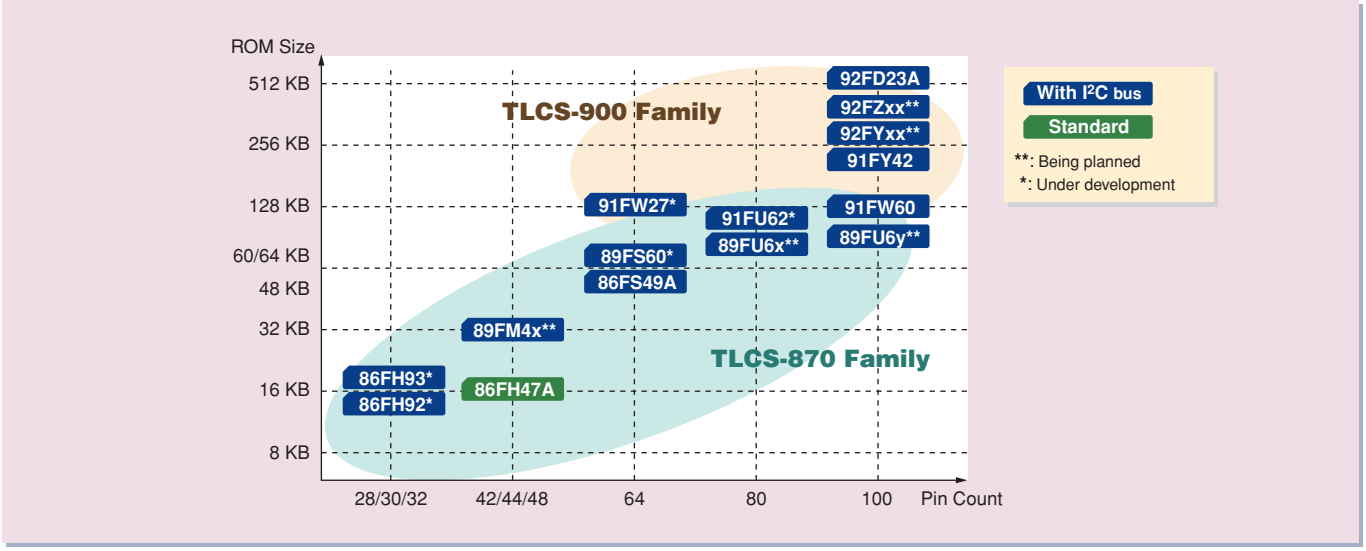
8-bit TV microcontrollers with OSD Logic



Product Outline



Flash MCUs with I²C Bus Interface for TV Systems



RAS (Reference Application Software)

The RAS is a collection of software created by Toshiba to operate the entire TV system.
Toshiba offers the RAS as reference software to assist its customers in cutting software development time. It is intended for evaluation and use at customers' own discretion.

FTS and CTS Series for Two-Chip Solutions

System Name	FTS-171A	☆FTS-172	FTS-151	CTS-777	CTS-851
Application	Color LCD TVs for Asia (for VGA/WXGA panels)	Color LCD TVs for Asia (for VGA panels)	Color LCD TVs for U.S. (for VGA/WXGA panels)	Color TVs for Asia	Color TVs for U.S.
MCU	**TMP88CS34FG /TMP88CS38BFG**	**TMP88CS34FG**	**TMP88CS34FG /TMP88CS38BFG**	**TMP88CP34NG/FG**	**TMP88CP38NG/FG**
Sub-MCU	—	**TMP86FS49AUG** (HDMI/CEC control)	—	—	—
Video Signal Processor	**TC90200FG**	**TC90200FG**	**TC90200FG**	**TB1261N**	**TB1263N**
Color Systems	Multi-standard	Multi-standard	NTSC	Multi-standard	NTSC
Tuner Systems	FS (VS Like) VHF/UHF 200 Pos.	FS (VS Like) VHF/UHF 200 Pos.	FS US 181ch VHF/UHF/CATV	VS with Digital AFT VHF/UHF 100/200 Pos.	FS US 181ch VHF/UHF/CATV
Video Inputs	AV 2ch (CVBS 2ch, S-in, YCbCr, YPbPr, PC-in)	AV 2ch (CVBS 2ch, S-in, YCbCr) HDMI 2ch	AV 2ch (CVBS 2ch, S-in, YCbCr, YPbPr, PC-in)	3+DVD (YCbCr)	2+DVD (YCbCr)
OSD Languages	English, Chinese	English, Chinese	English, French, Spanish	English, Chinese	English, French, Spanish
Others	Video SW: **TB1305FG** A/D: **AD9883A** Surround Sound: **TA1343** Sound Multiplex: NICAM	Video SW: **TB1305FG** Surround Sound: **TA1343** Sound Multiplex: NICAM HDMI Receiver: **TC90704MFG**	Video SW: **TB1305FG** A/D: **AD9883A** CCD/V-Chip Surround Sound: **TA1343** Sound Multiplex: US	3-Line Comb Filter: **TC90A49P** Games Surround Sound: **TA1343** Sound Multiplex: NICAM (option)	3-Line Comb Filter: **TC90A49P** CCD/V-Chip Surround Sound: **TA1343** Sound Multiplex: US

☆: Under development

CTS Series for Single-Chip G2 Solutions

System Name	CTS-B72	CTS-B73	☆CTS-B52
Application	Color TVs for Asia	Color TVs for Asia	Color TVs for U.S.
MCU & V/C/D IC	**TMPA8873CPNG**	**TMPA8879CPNG**	**TMPA8873CPNG**
Color Systems	PAL/NTSC	PAL/NTSC	NTSC
Tuner Systems	FS with Digital AFT VHF/UHF 100/200 Pos.	FS with Digital AFT VHF/UHF 100/200 Pos.	FS US 181ch VHF/UHF/CATV
Video Inputs	2 CVBS +DVD (Y/Cb/Cr) Stereo	2 CVBS +DVD (Y/Cb/Cr) +S (Y/C) Stereo	2 CVBS +DVD (Y/Cb/Cr) Stereo
OSD Languages	English, Chinese	English, Chinese	English, Spanish, French
Others	FM Radio Games Calendar	FM Radio Games Calendar Surround Sound: **TA1343**	CCD/V-Chip Sound Multiplex: US (SAP)

☆: Under development

CTS Series for Single-Chip G8 Solutions

System Name	CTS-B62	CTS-B63
Application	Color TVs for Asia	Color TVs for Asia
MCU & V/C/D IC	**TMPA8891CPANG**	**TMPA8897CPANG**
Color Systems	PAL/SECAM/NTSC	PAL/SECAM/NTSC
Tuner Systems	FS with Digital AFT VHF/UHF 100/200 Pos.	FS with Digital AFT VHF/UHF 100/200 Pos.
Video Inputs	2 CVBS +DVD (Y/Cb/Cr) Stereo	2 CVBS +DVD (Y/Cb/Cr) +S (Y/C) Stereo
OSD Languages	English, Chinese	English, Chinese
Others	FM Radio Games Calendar Au Monitor Stereo	FM Radio Games Calendar Au Monitor Stereo Surround Sound: **TA1343**

Using the RAS requires a license agreement. Consult Toshiba if you want to modify the RAS software according to your system requirements.

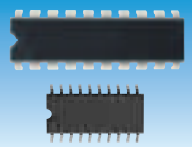
Peripheral ICs

Secondary Microcontrollers for Control Applications (Power Supply Control, Remote Controller Key Read/Decode, AV-Link/CEC Decoding)

Flash Version	Series	ROM (bytes)	RAM (bytes)	I²C Bus (ch)	UART (ch)	Package
☆TMP86FH92DMG	870/C	16 K	512	1	1	SSOP30
☆TMP86FH93NG	870/C	16 K	512	1	2	SDIP32
☆TMP89FM40NG	870/C1	32 K	2 K	1	2	SDIP42
☆TMP89FM42UG	870/C1	32 K	2 K	1	2	LQFP44
☆TMP89FM42UG	870/C1	32 K	2 K	1	2	LQFP48
TMP86FS49BUG/FG	870/C	60 K	2 K	1	2	LQFP64/QFP64
☆TMP89FS60UG/FG	870/C1	60 K	3 K	1	3	LQFP64/QFP64
☆TMP91FW27UG	900/L1	128 K	16 K	1	2	LQFP64
TMP91FY42FG	900/L1	256 K	16 K	1	2	LQFP100
TMP92FD23AFG/DFG	900/H1	512 K	32 K	2	3	LQFP100/QFP100

☆: Under development

Remote Control Transmission ICs

Part Number	Functions	Package	Package Shape
TC9028BPG/BFG-XXX	Programmable transmission format for standard 32-key remote control	DIP20 SOP20	
TC9243APG/AFG	Used for transmission, 32 functions controllable through simultaneous multiple key presses		

Remote Control Transmission and Reception Devices

Infrared LEDs

Part Number	Function	Min. Emission Intensity (mW/sr)	Typ. Half Angle (°)	Package
TLN105B(F)	For Transmission	12	± 23.5	5 φ type
TLN115A(F)		15	± 21	

Photodiodes

Part Number	Function	Min. Short-Circuit Current (μA)	Typ. Sensitivity Wavelength (nm)	Package
TPS703(F)	For Reception	0.9	λ > 700	Side view type
TPS704(F)		0.5	λ > 800	

CMOS Interface Logic ICs

Toshiba's CMOS logic IC families provide outstanding features, including low power consumption, high noise immunity, wide operating temperature ranges and various interface options, making them ideal for a wide range of applications. In particular, the **74VHC/74AC** for 5-V systems and the **74VCX/LCX/LVX** for 3.3-V systems are suitable for interfacing of high-speed digital image processing. For analog signal processing units, in addition to our existing analog switches and multiplexers (**4000/74HC** series), Toshiba also offers a complete line of low-voltage analog multiplexers (LVX series) and a series of bus switches featuring low ON resistance and high-speed switching. In addition to the conventional SOP and TSSOP packages, the VHC and low-voltage series are available in smaller US16 and US20 packages, which help to reduce the product size and weight.

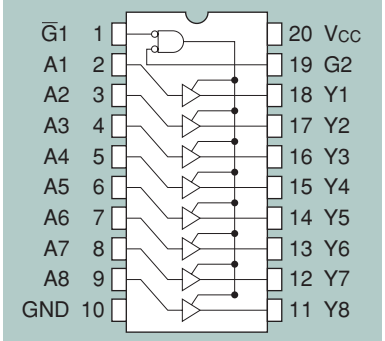
Low-Voltage Analog Multiplexers

TC74LVX4051/52/53, TC77VHC4051/52/53 (US16/TSSOP16)
Same pin assignment and same functions as the **74HC4051/52/53**
(VHC Series) V_{CC} = 2 to 5.5 V, R_{ON} = 45 Ω (typ.), tpd = 6 ns, @ V_{CC} = 3 V

Ultra-high-speed TC74VHC/VHCT Series

Octal Bus Buffer

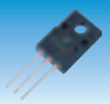
TC74VHCT541A



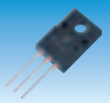
Display Devices

Devices for Plasma Display Panels (PDPs)

IGBTs (300 V)

Part Number	V_{CES} / Icp	$V_{CE(sat)}$ Max (V)	P_C (W) @Ta = 25°C	Package	Package Shape
GT30F122	300 V / 120 A	2.9 (@120 A)	25	TO-220SIS	

IGBTs (400 V)

Part Number	V_{CES} / Icp	$V_{CE(sat)}$ Max (V)	P_C (W) @Ta = 25°C	Package	Package Shape
GT30G122	400 V / 120 A	2.9 (@120 A)	25	TO-220SIS	

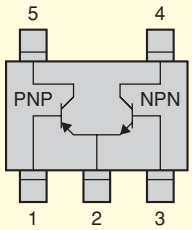
IGBTs/MOS Gate Drivers

Part Number	Package	Polarity	Absolute Maximum Ratings				h_{FE}		V_{CE}	I_C	$V_{CE(sat)}$ (V)		
			V_{CEO} (V)	I_C (A)	I_{CP} (A)	P_C (*1) (mW)	Min	Max	(V)	(A)	Max	I_C (A)	I_B (mA)
SMV	**HN4B101J**	PNP	–30	–1.0	–5	550	200	500	–2	–0.12	–0.2	–0.4	–13
		NPN	30	1.2	5	550	200	500	2	0.12	0.17	0.4	13
	HN4B102J	PNP	–30	–2	–8	TBD	200	500	–2	–0.2	–0.2	–0.6	–20
		NPN	30	2	8	TBD	200	500	2	0.2	0.14	0.6	20
VS-6	**TPC6901A**	PNP	–50	–0.7	–5	400	200	500	–2	–0.1	–0.23	–0.3	–10
		NPN	50	1	5	400	400	1000	2	0.1	0.17	0.3	6
	TPC6902	PNP	–30	–2	–8	400	200	500	–2	–0.2	–0.2	–0.6	–20
		NPN	30	2	8	400	200	500	2	0.2	0.14	0.6	20
PS-8	**TPCP8901**	PNP	–50	–0.8	–5	830	200	500	–2	–0.1	–0.21	–0.3	–10
		NPN	50	1	5	830	400	1000	2	0.1	0.17	0.3	6
	TPCP8902	PNP	–30	–2	–8	890	200	500	–2	–0.2	–0.2	–0.6	–20
		NPN	30	2	8	890	200	500	2	0.2	0.14	0.6	20

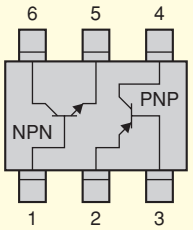
*1: The rating applies when the transistor is mounted on an FR4 board (Cu area = 645 mm², glass-epoxy, t = 1.6 mm) and is in single-device operation.
Thickness of cu: 70 μm for SMV/PS8, 35 μm for VS6

Circuit Configuration (Top View)

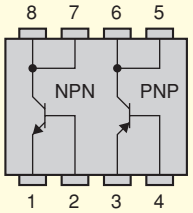
SMV



VS-6

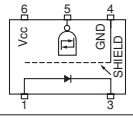
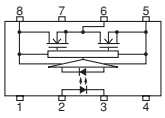
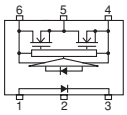
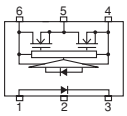
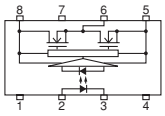


PS-8



Display Devices

Photocouplers

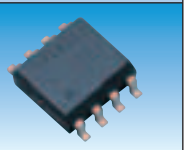
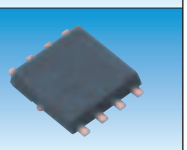
Part Number	Pin Configuration	Features	Data Rate (NRZ) (Max)	Output Form	$I_{FHL/LH}$ Max	BVs	Safety Standards (*1)		
							UL	TÜV	VDE
TLP116		• Mini-flat • 6-pin MFSOP • High-speed: 20 MBd • High CMR • Low power dissipation	60 ns	Totem pole output (Inverter logic)	5 mA	3750 Vrms	○	○	△
TLP351 **TLP351F**		• 8-pin DIP • Direct drive of medium-power IGBT/MOSFET • High-speed • Low power dissipation	0.7 μs	Peak output current (max): ± 0.6 A	5 mA	3750 Vrms	○	○	○
TLP701 **TLP701F**		• 6-pin SDIP small package • Direct drive of medium-power IGBT/MOSFET • High-speed • Low power dissipation	0.7 μs	Peak output current (max): ± 0.6 A	5 mA	5000 Vrms	○	○	△
TLP705 **TLP705F**		• 6-pin SDIP small package • Direct drive of small-power IGBT/MOSFET • 250-kHz high-speed • Low power dissipation	0.2 μs	Peak output current (max): ± 0.45 A	8 mA	5000 Vrms	○	○	△
TLP350 **TLP350F**		• 8-pin DIP • Direct drive of medium-power IGBT/MOSFET • High CMR • High-speed • Low power dissipation	0.5 μs	Peak output current (max): ± 2.5 A	5 mA	3750 Vrms	○	○	○

*1: Legend in the Safety Standard column

○: Approved △: Design which meets safety standard (as of January 2007) TÜV and VDE: EN60747-5-2-approved with option D4

Devices for Liquid Crystal Display (LCDs)

Power MOSFETs for Backlight Inverters

Part Number	Absolute Maximum Ratings		Circuit Configuration	$R_{DS(ON)}$ Max (mΩ)				Q_g Typ. (nC)	Ciss Typ. (pF)	Package	Package Shape
	V_{DSS}(V)	I_D(A)		10 V	4.5 V	4.0 V	2.5 V				
TPC8022-H	40	7.5	N-ch Single	27	35	—	—	11	650	SOP-8	
TPC8110	–40	–8	P-ch Single	25	—	35	—	48	2180		
TPC8116-H	–40	–7.5		30	37	—	—	27	1190		
TPC8406-H	40	6.5	N-ch/P-ch Dual	27	35	—	—	11	65		
	–40	–6.5		30	37	—	—	27	1970		
TPCA8020-H	40	7.5	N-ch Single	27	35	—	—	11	650	SOP Advance	
TPCA8014-H	40	30		9	14	—	—	22	1365		
TPCA8015-H	40	35		5.4	7.9	—	—	37	2155		
TPCA8107-H	–40	–7.5	P-ch Single	30	37	—	—	27	1190		
TPCA8104	–60	–40		16	—	24	—	90	4300		
SSM3K308T	60	2.1	N-ch Single	148	—	181	—	4.1	248	TSM	—
SSM3K125TU	60	1.8		148	—	181	—	4.1	248	UFM	—

Illuminance Sensors for CRTs, PDPs and LCDs

Photo-ICs (Analog Output)

Part Number	Package Type	Electrical and Optical Characteristics (Ta = 25°C)										Package No.	Applications
		Part Number with rank	Light current (μA) Min	Light current (μA) Max	E_V(lx)	V_{CC}(V)	Dark current (μA) Max	Dark current (μA) V_{CC}(V)	Peak-sensitivity wavelength (nm)	Half-angle value (°)	Impermeable to visible light		
TPS851	Chip type	–	37	74	100	3	0.17	3.3	600	± 55	–	5-4	Illuminance sensors
		TPS851(A)	37	62									
TPS852		–	27	54	100	3	0.1	3.3	600	± 55	–	5-5	
		TPS852(A)	30	50									
TPS853		–	37	74	100	3	0.1	3.3	600	± 55	–	5-4	
		TPS853(A)	39	65									
☆**TPS856**		–	40	80	100	3	0.1	3	550	± 55	–	5-5	
		TPS856(A)	44.1	73.7									

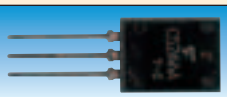
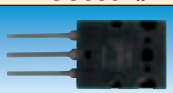
☆: New product Note: V_{CC} = supply voltage, E = radiant incident, E_V = illuminance

Power Supply Systems

Bipolar Transistors

Toshiba offers bipolar transistors in a variety of packages rated at a withstand voltage of 285 to 450 V.

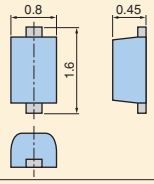
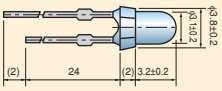
(V_{CEO} = 285 to 450 V)

Package / I_C(A)	TPL	TO-220(N)IS	TO-3P(N)	TO-3P(L)
3		**2SC5459** **2SC5353#**		
5	**2SC5266A**	**2SC5172**	**2SC5354#**	
8		**2SC5439**		
10			**2SC5352**	**2SC3307#**
Package Shape				

#: 800 V Series

LED

Single Color LED Lamps

	Part Number	Color	Typ. Intensity (mcd)	Typ. Emission Wavelength λd (nm) @ 5 mA	Package Dimensions (unit: mm)
Surface mounted	**TLRMV1022**	Red	15 (@5 mA)	626	
	TLSV1022	Red	30 (@5 mA)	613	
	TLOV1022	Orange	38 (@5 mA)	605	
	TLYV1022	Yellow	25 (@5 mA)	587	
	TLGV1022	Green	14 (@5 mA)	571	
	TLPGV1022	Pure green	3.5 (@5 mA)	558	
Lead type	**TLRME68TG**	Red	330 (@20 mA)	626	
	TLSU268G	Red	130 (@20 mA)	623	
	TLYE68TG	Yellow	340 (@20 mA)	587	
	TLGE68TG	Green	155 (@20 mA)	571	(Designed for flush mounting)

General-Purpose Small-Signal Discrete Devices

Category	Part Number	Absolute Maximum Ratings		Package
MOSFET	**SSM3K7002F**	60 V (V_{DSS})	200 mA (I_D)	S-Mini
	SSM3K7002FU			USM
	SSM3K15F	30 V (V_{DSS})	100 mA (I_D)	S-Mini
	SSM3K15FU			USM
Transistor	**2SC2712**	50 V (V_{CEO})	150 mA (I_C)	S-Mini
	2SA1162			S-Mini
	2SC4116			USM
	2SA1586			USM
	HN1C01F			SM6
	HN1A01F			SM6
	HN1C01FU			US6
	HN1A01FU			US6
Diode	**1SS181**	80 V (V_R)	100 mA (I_O)	S-Mini
	1SS184			S-Mini
	1SS226			S-Mini
	1SS352			USC
	1SS403	200 V (V_R)	100 mA (I_O)	USC

Power MOSFETs (Medium to High Withstand Voltages)

The following table lists a line of Toshiba's new power MOSFETs with a withstand voltage (V_{DSS}) of 250 to 1000 V. These power MOSFETs are fabricated using Toshiba's proprietary microfabrication technology to improve the performance over the previous π-MOS series.

V_{DSS}(V) / I_D(A)	250	400	450	500	600	700	800	900	1000
0.5				▲ 2SK2998(20)② ☆ 2SK3302(18)② ◇ 2SK3471(18)②					
1		▼ 2SK3498(5.5)②	♫ 2SK4023(4.6)② ☆ 2SK3374(4.6)② ♩ 2SK3472(4.6)②		♩ 2SK3371(9)② ♫ 2SK4026(9)②			■ 2SK2733(9.0)① ▽ 2SK2845(9)① ▼ 2SK3301(20)①	
1.7	N⧗ TPCS8008-H(0.58)②								
2	▼ 2SJ610(2.55)②		◆ 2SK3543(2.45)② ⊗ 2SK3757(2.45)③ ⊗ 2SK3766(2.45)③	☆ 2SK2599(3.2)② ▼ 2SK3373(3.2)②	☆ 2SK2846(5.0)② ♩ 2SK2865(5.0)② ◆ 2SK3067(5.0)② ⊗ 2SK3767(4.5)③ ♫ 2SK4002(5)②				
2.5								◆ 2SK2718(6.4)① ⊗ 2SK3566(6.4)⑤	
3	♩ 2SK3462(1.7)② ♫ 2SK4022(1.7)②			◆ 2SK2862(3.2)	♫ 2SK4003(2.2)③ ♩ 2SK3975(2.2)③		■ 2SK2603(3.6)① ○ 2SK2883(3.6)①	■ 2SK2608(4.3)① ◆ 2SK2700(4.3)① □ 2SK2719(4.3)① ⊗ 2SK3564(4.3)⑤	
3.5					◆ 2SK2750(2.2)② ■ 2SK3085(2.2)② ⊗ 2SK3567(2.2)③				
4	N▸ TPCA8008-H(0.58)②							⊗ 2SK3798(3.5)⑤	■ 2SK1119(3.8) ○ 2SK1930(3.8)
4.5	♩ 2SK3342(1.0)② ♫ 2SK4021(1.0)②								
5	◆ 2SJ512(1.25)②			◆ 2SK2662(1.5)② ■ 2SK2661(1.5)② ○ 2SK2991(1.5)② ¥◆ 2SK3316(1.8)② ♣ 2SK3466(1.5)② ⊗ 2SK3563(1.5)③ ¥⊗ 2SK3868(1.7)③ ■ 2SK3758(1.5)③ ▽ 2SK3863(1.5)③ ○ 2SK3417(1.8)②		◆ 2SK2274(1.7)	□ 2SK2604(2.2)① ◆ 2SK2605(2.2)① ○ 2SK2884(2.2)①	◆ 2SK2717(2.5)① ⊗ 2SK3565(2.5)⑤ □ 2SK3700(2.5)⑤ ⊗ 2SK3742(2.5)⑤	□ 2SK1359(3.8)
5.5		○ 2SK2838(1.2)② ◆ 2SK2679(1.2)②							
6	◆ 2SJ516(0.8)②				■ 2SK2544(1.25)② ◆ 2SK2545(1.25)② □ 2SK2602(1.25)② ○ 2SK2777(1.25)② ⊗ 2SK3562(1.25)③ ○ 2SK3312(1.25)② ■ 2SK3761(1.25)③ ¥⊗ 2SK3947(1.4)③		⊗ 2SK4013(1.7)⑤	⊗ 2SK4014(2.0)⑤	
6.5							○ 2SK3879(1.7)⑤ ◎ 2SK3880(1.7)⑤		
7							□ 2SK3633(1.7)⑤	□ 2SK2749(2.0)① ⊠ TK07H90A(2.0)⑤	◎ 2SK1365(1.8)
7.5	◆ 2SK2417(0.5)② ■ 2SK2914(0.5)②				⊗ 2SK3667(1.0)③				
8				■ 2SK2542(0.85)② ◆ 2SK2543(0.85)② ○ 2SK2776(0.85)② ♣ 2SK3538(0.85)② ⊗ 2SK3561(0.85)③ ¥⊗2SK4042(0.97)③			◎ 2SK2606(1.2)①	◎ 2SK2847(1.4)① ⊗ 2SK3799(1.3)⑤	□ 2SK2613(1.7)①
8.5								◎ 2SK3017(1.25)①	
9		◆ 2SK2952(0.55)②					□ 2SK2607(1.2)①	□ 2SK2611(1.4)① □ 2SK3473(1.6)⑤ □ 2SK3878(1.3)⑤ ⊠ TK09H90A(1.3)⑤	

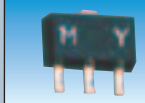
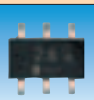
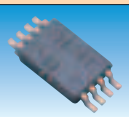
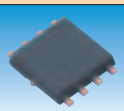
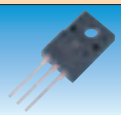
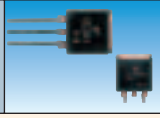
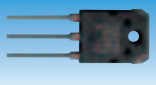
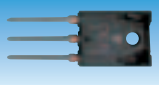
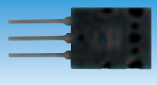
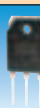
VDSS(V) / ID(A)	250	300	400	450	500	600	700	900	1000
10			■ 2SK2841(0.55)② ○ 2SK2949(0.55)② ♣ 2SK3499(0.55)②	○ 2SK3309(0.65)② ◆ 2SK3310(0.65)② ◆ 2SK3407(0.65)② ⊗ 2SK3869(0.68)③	□ 2SK2601(1.0)②	◆ 2SK2843(0.75)② ■ 2SK2866(0.75)② ○ 2SK2889(0.75)② ◆ 2SK2996(1)② ♣ 2SK3438(1.0)② ○ 2SK3437(1.0)② ○ 2SK3399(0.75)② ⊗ 2SK3569(0.75)③ ¥⊗ 2SK4015(0.86)③	◆ 2SK3265(1.0)⑤ ◎ 2SK3453(1.0)⑤	□ 2SK2968(1.25)①	
12					◆ 2SK2842(0.52)② ○ 2SK3068(0.52)② ¥◆ 2SK3313(0.62)② ♣ 2SK3398(0.52)② ⊗ 2SK3568(0.52)③	□ 2SK2699(0.65)②			● 2SK1489(1.0)
13	◆ 2SK2508(0.25)② ○ 2SK2598(0.25)②			◆ 2SK3743(0.4)② ○ 2SK3403(0.4)② ♣ 2SK3544(0.4)②	⊗ 2SK4012(0.4)③	⊗ 2SK3797(0.43)③ ¥⊗ 2SK4016(0.5)③		■ TK13H90A1(0.95)	
14					◎ 2SK2916(0.4)②	□ 2SK3903(0.44)③			
15					□ 2SK2698(0.4)② ¥□ 2SK3314(0.48)② ⊗ 2SK3934(0.3)③ ⊠ TK15H50C(0.4)③	◎ 2SK2953(0.4)②			
16						□ 2SK2915(0.4)② ⊠ TK16H60C(0.4)③			
17				⊗ 2SK3935(0.25)③	□ 2SK3905(0.31)③				
18					◎ 2SK2917(0.27)②				
19				□ 2SK3904(0.26)③	⊠ TK19H50C(0.3)③				
20	○ 2SK2993(0.105)② ♣ 2SK3445(0.105)② ◆ 2SK3994(0.105)②				□ 2SK2837(0.27)② ◉ 2SK3117(0.27)② ⊠ TK20H50C(0.27)③	□ 2SK3911(0.32)③ □¥ 2SK3906(0.33)③			
30	□ 2SK2967(0.068)② ◎ 2SK2995(0.068)②								
32		● 2SK1486(0.095)							
50					¥●2SK3131(0.11)② ● 2SK3132(0.09)②				

Notes:
( ) = $R_{DS(ON)}$ max ¥ = High-speed diode N = N-ch

Legend

New product series ① : π-MOSIII ② : π-MOSV ③ : π-MOSVI ④ : U-MOS ⑤ : π-MOSIV

Package

Package	◇ PW-Mini	♥ VS-6	▲ TO-92MOD	▼ PW-Mold	♩ New PW-Mold	♫ New PW-Mold2	▽ DP
Package Shape							
Package	☆ TPS	⧗ TSSOP-8	▶ SOP Advance	◆ TO-220NIS	⊗ TO-220SIS	■ TO-220AB	♣ TFP
Package Shape							
Package	○ TO220FL/SM	□ TO-3P(N)	◎ TO-3P(N)IS	● TO-3P(L)	⊠ TO-3P(W)	◉ TO-3P(SM)	
Package Shape							

Regulators

Low-Saturation Series Regulators

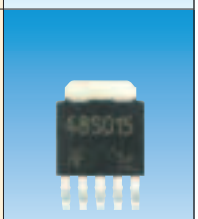
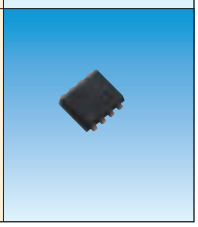
Features

- Active-high enable terminal for on/off control of the output voltage: TA48SxxxAF/TA48LSxxxF
- A small-value capacitor can be used as an output capacitor(*)
- Low quiescent current (OFF mode)
- Variable output voltage by means of an external resistor: TA48S00AF/TA48LS00F

*: C_{OUT} should be optimized, depending on usage conditions and capacitor types.

Product Line

(Ta = 25°C or Tj = 25°C)

Part Number	Absolute Maximum Ratings		Output Voltage Typ. (V)	Output Voltage Accuracy (%)	Dropout Voltage Max (V)	Quiescent Current		Package	Package Shape
	Input Voltage (V)	Output Current (A)				Output OFF Typ. (μA)	Output ON Typ. (mA)		
TA48015BF	16	1	1.5	± 3	1.1 (@I_{OUT} = 0.5 A)	–	0.85(@I_{OUT} = 0 A) 10(@I_{OUT} = 1 A)	New PW-Mold	
TA48018BF			1.8		0.5 (@I_{OUT} = 0.5 A)				
TA48025BF			2.5						
TA48033BF			3.3						
TA4805BF			5						
TA4808BF			8				0.9(@I_{OUT} = 0 A) 10(@I_{OUT} = 1 A)		
TA4809BF			9						
TA4800AF	16	1	Variable	± 2.5(*2)	–	–	0.85(@I_{OUT} = 0 A) 10(@I_{OUT} = 1 A)	New PW-Mold5pin	
TA48S015AF			1.5	± 3	V_{IN} > 2.5(*1)	0.5	0.85(@I_{OUT} = 0 A) 8(@I_{OUT} = 1 A)		
TA48S018AF			1.8						
TA48S025AF			2.5		0.5 (@I_{OUT} = 0.5 A)				
TA48S033AF			3.3						
TA48S05AF			5						
TA48S09AF			9						
TA48S00AF			1.5 to 9 (Variable)	± 2.5(*2)	–				
TA48LS015F	14	0.3	1.5	± 2.5	0.7 (@I_{OUT} = 0.15 A)	0.2	1(@I_{OUT} = 0 A) 5(@I_{OUT} = 1 A)	PS-8	
TA48LS018F			1.8		0.5 (@I_{OUT} = 0.15 A)				
TA48LS025F			2.5						
TA48LS033F			3.3						
TA48LS05F			5						
TA48LS00F			1.5 to 5 (Variable)	± 2.3(*2)	–				

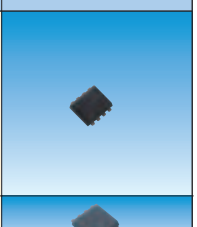
*1: The regulators with V_{OUT} ≤ 1.8 V require an input voltage of at least 2.5 V.
*2: Reference voltage (V_{REF}) accuracy

High-Current DC-DC Converters

Features

- Enhanced load response characteristics with current mode.
- Soft start time programmable with an external capacitor: TCV7100F/TCV7101F
- Thermally enhanced SOP Advance package: TCV7100F/TCV7101F

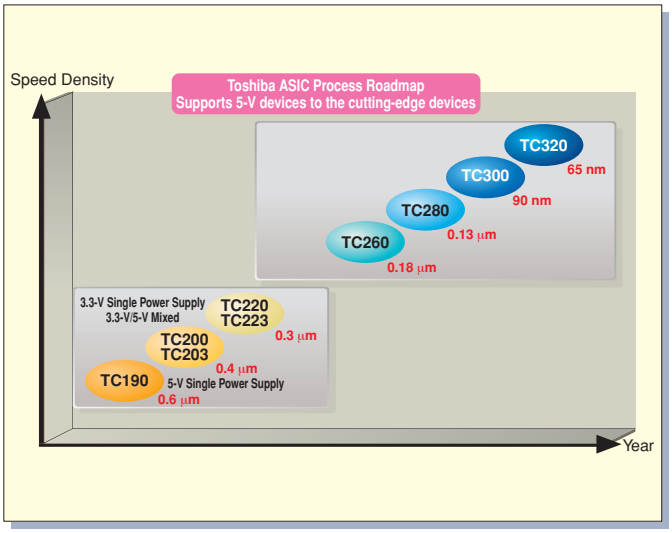
Product Line

Part Number	Absolute Maximum Ratings		Input Voltage Range (V)	Output Voltage (V)	FB Pin Voltage (V)	Typical Switching Freq. (kHz)	Features				Package	Package Shape
	Input Voltage (V)	Output Current (A)					Sync. Rect.	UVLO	Soft Start	Low-Side MOSFET Drivers		
TB7100F	6	0.7	3 to 5.5	Variable	0.8	550	–	○	–	–	PS-8	
☆TB7101F(T5L1.2,F)	6	1	2.7 to 5.5	1.2	–	1000	○	○	○	–		
☆TB7101F(T5L1.5,F)				1.5								
☆TB7101F(T5L1.8,F)				1.8								
☆TB7101F(T5L2.5,F)				2.5								
☆TB7101F(T5L3.3,F)				3.3								
☆TB7102F	6	1	2.7 to 5.5	Variable	0.8	1000	○	○	○	–		
☆TCV7100F	6	2	2.7 to 5.5	Variable	0.8	500	○	○	○	–	SOP Advance	
☆TCV7101F		3								○		

☆: Under development

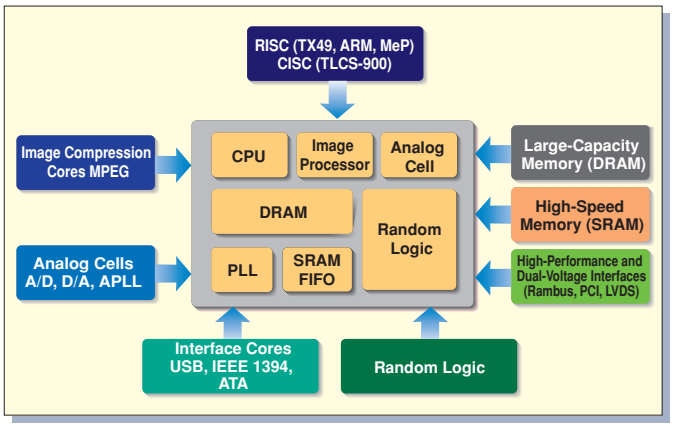
General Technology (System ASICs)

Toshiba leverages its industry-leading microfabrication technology to increase chip density and reduce power dissipation, widening the possibilities of system ASICs.

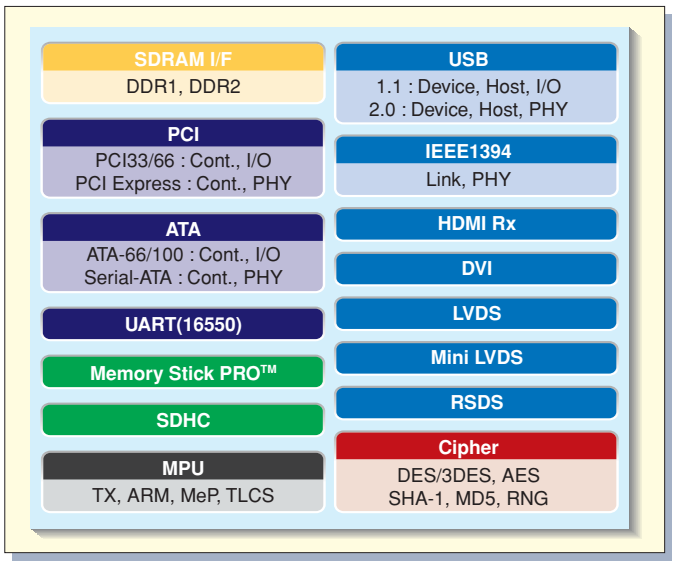


System ASIC Implementation

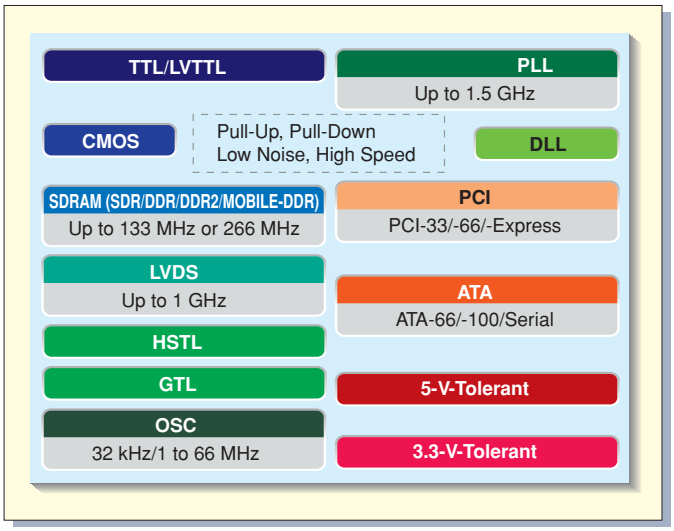
Toshiba offers a gallery of IP cores for system ASICs, including TX49 RISC cores, TLCS-900 CISC cores, DRAM cores and interface cores. Toshiba is also designing discrete components in such a manner as to make it easy to implement them as ASIC-ready IP cores. (Some of the following IP cores are under development.)



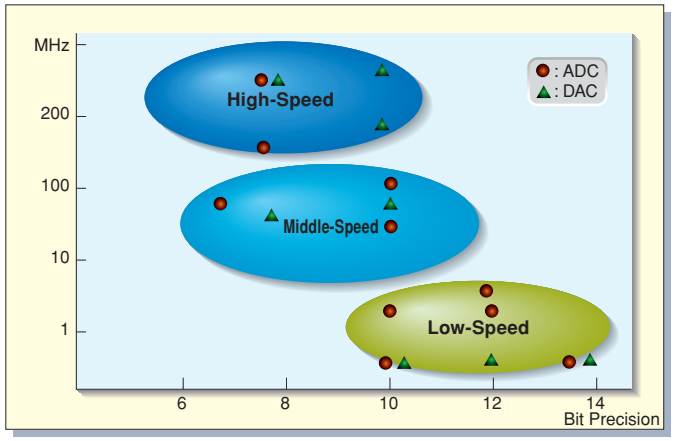
IP Cores



I/O Cells



A/D and D/A Converters



Embedded DRAM Cores

With high memory data transfer rates and low power consumption, EDRAM SoCs enable high-performance and high-value-added systems. EDRAM SoCs also reduce system board area.
— SoCs with synchronous DRAMs and fast-access DRAMs

■ Toshiba's EDRAMs offer the following features and benefits:

- High performance with fast data transfer rates due to wide on-chip memory buses
- Much denser than SRAM
- Low power
- Soft error prevention
- System architecture optimization and reduction of discrete components
- Easy and effective testing with a direct-access test and DRAM BIST
- High yield through redundancy in DRAM macros
- Various types of DRAM macros with configurable depth and width

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