



ASSPs

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Audio & Video Equipment ICs

TV Set ICs (Microcontroller, PIF, SIF, Video, Chroma and Deflection ICs)

Part Number	OTP	Package	Functions and Features	Operating Supply Voltage (V)
TMPA8873CxNG	TMPA8873PSCNG	P-SDIP64-750-1.78	PAL/NTSC systems (1HDL), NTSC CCD, Thai mono bilingual system	7.6 to 8.4 4.75 to 5.25 3.1 to 3.5
TMPA8879CxNG	TMPA8879PSCNG		PAL/NTSC systems (1HDL), NTSC CCD, Thai mono bilingual system, EW	
TMPA8891CxNG	TMPA8891PSCNG		PAL/NTSC/SECAM systems (1HDL), NTSC CCD, Thai mono bilingual system	
TMPA8893CxNG			PAL/NTSC systems (1HDL), NTSC CCD, Thai mono bilingual system	
TMPA8897CxNG	TMPA8897PSCNG		PAL/NTSC/SECAM systems (1HDL), NTSC CCD, Thai mono bilingual system, EW	
TMPA8899CxNG			PAL/NTSC systems (1HDL), NTSC CCD, Thai mono bilingual system, EW	
TMPA8863CxNG **	TMPA8863PSNG		PAL/NTSC systems (1HDL), PAL/NTSC CCD, Thai mono bilingual system	
TMPA8869CxNG **	TMPA8869PSNG		PAL/NTSC systems (1HDL), PAL/NTSC CCD, Thai mono bilingual system, EW	

x: Denotes the size of masked ROM. S: 64K, R: 56K, P: 48K, M: 32K

** : Under development

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(Liquid Crystal TV ICs)

Part Number	Package	Use	Functions and Features	Operating Supply Voltage (V)
TB1318FG ☆	LQFP64-P-1010-0.50A	LCD TVs	PAL/NTSC/SECAM decoding, γ /INV, PWM generation	4.5 to 5.5
TB1323FG ☆	LQFP64-P-1010-0.50A		PAL/NTSC decoding, γ /INV, PWM generation	2.7 to 3.6
TB1325FG ☆	LQFP48-P-0707-0.50		PAL/NTSC/SECAM decoding. Either normal output or γ /INV processing is selectable.	
TB1334FG ☆	HQFP64-P-1010-0.50		PIF/SIF, PAL/NTSC/SECAM decoding, PC input switch, component video input D1-D5 pass-through switches	4.5 to 5.5 8.55 to 9.45
TB1335FG ☆	HQFP64-P-1010-0.50		PIF/SIF, PAL/NTSC decoding, PC input switch, component video input D1-D5 pass-through switches	3.0 to 3.6
TC90A96BFG ☆	LQFP176-P-2424-0.50A		YC separation, color demodulation, gamma correction, image-quality adjustment Liquid crystal display: 480 dots x 234 lines, 800 dots x 480 lines (usage restricted) Compatible with Toshiba's LCD digital interface	1.4 to 1.6 2.3 to 2.7 3.0 to 3.6
TC90101AFG ☆	L-QFP100-1414-0.5C		Multi color system, 3 line YC separation, ADC 3ch, picture improver, S/N detection, macrovision detection, AGC circuit Extended temperature version of TC90101FG (-30°C to +85°C)	1.4 to 1.65 2.3 to 2.7 3.0 to 3.6
TC90196AFG ☆	LQFP208-P-2828-0.50B		YC separation, color demodulation, gamma correction, image-quality adjustment Liquid crystal display: 800 dots x 480 lines	1.4 to 1.6 2.3 to 2.7 3.0 to 3.6
TC90192FG **	LQFP208-P-2828-0.50B		YC separation, color demodulation, gamma correction, image-quality adjustment Liquid crystal display: 800 dots x 480 lines	
TC90192XBG **	P-FBGA265-1515-0.80B6		YC separation, color demodulation, gamma correction, image-quality adjustment Liquid crystal display: 800 dots x 480 lines	
TC90194FG **	LQFP176-P-2424-0.50A		YC separation, color demodulation, gamma correction, image-quality adjustment Liquid crystal display: 400 dots x 234 lines or 480 dots x 234 lines	

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(Color Decoders with a Comb Filter)

Part Number	Package	Use	Functions and Features	Operating Supply Voltage (V)
TC90103AFG ☆	LQFP144-P-2020-0.5A	3D YC separation Color decoder	Motion-adaptive 3D YC separation (NTSC) Multicolor system 3-line YC separation Motion-adaptive 3D YNR and CNR SCART connectors supported (fast blanking input, RGB text mixing) ADC (4-ch) Picture improver ID1/WSS/CC/EDTV-II/Gemstar data slicer S/N detection Macrovision detection D2 detection AGC circuit I ² C bus supported	1.4 to 1.6 2.3 to 2.7 3.0 to 3.6
TC90101FG ☆	L-QFP100-1414-0.5C	3-line YC separation Color decoder	Multicolor system 3-line YC separation ADC (3-ch) Picture improver ID1/CCD/WSS data slicer S/N detection Macrovision detection D1/D2 detection AGC circuit I ² C bus supported	1.4 to 1.65 2.3 to 2.7 3.0 to 3.6

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(Comb Filter ICs)

Part Number	Package	Use	Functions and Features	Operating Supply Voltage (V)
TC90A88F ☆	P-QFP100-1420-0.65Q	Comb filter ICs	Motion-adaptive 3D YC separation (NTSC) Multicolor 3-line YC separation + motion-adaptive 3D YNR and CNR Embedded 4-Mbit DRAM ADC (2-ch), DAC (2-ch) Image-quality correction I ² C bus supported	2.3 to 2.7 3.0 to 3.6
TC90A53ANG TC90A53AFG ☆	P-SDIP28-400-1.78 P-SOP28-450-1.27		Clamp circuit ADC (1-ch), DAC (2-ch) Vertical edge enhancer 1-line color dot interference reducer VCO and PLL Pin control	4.75 to 5.25
TC90A49PG	P-DIP20-300-2.54A		PAL/NTSC multicolor systems Clamp circuit ADC (1-ch), DAC (2-ch) Vertical edge enhancer (NTSC, PAL) VCO and PLL I ² C bus supported	4.75 to 5.25
TC90A69NG TC90A69FG ☆	P-SDIP28-400-1.78 P-SOP28-450-1.27		PAL/NTSC multicolor systems CNR circuit (only NTSC) Clamp circuit ADC (1-ch), DAC (2-ch) Vertical edge enhancer (NTSC, PAL) VCO and PLL I ² C bus supported	4.75 to 5.25
TC90A83NG	P-SDIP28-400-1.78		NTSC system 10-bit ADC (1-ch), DAC (2-ch) H-dot interference reducer 1-line color dot interference reducer Vertical edge enhancer VCO and PLL (fsc, 2fsc, 4fsc and 8fsc) I ² C bus supported (pin control)	4.75 to 5.25
TC90A45PG TC90A45FG ☆	P-DIP16-300-2.54A P-SOP16-300-1.27		Clamp circuit ADC (1-ch), DAC (2-ch) VCO and PLL	4.75 to 5.25

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(Audio Output ICs)

Part Number	Package	Use	Functions and Features	Operating Supply Voltage (V)
TA8200AHQ	P-HZIP12-1.78B	Audio output ICs	Sound output power: 13 W x 2, audio mute	10 to 37
TA8216HQ	P-HZIP12-1.78B		Sound output power: 13 W x 2, audio mute	10 to 37
TA8246AHQ	P-HZIP12-1.78B		Sound output power: 6 W x 2, audio mute, fixed gain (GV = 34dB)	10 to 30
TA8256BHQ	P-HZIP12-1.78B		Sound output power: 6 W x 3, audio mute, fixed gain (GV = 34dB)	10 to 30
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		Sound output power: 20 W x 2, PWM analog-input Class-D amp	11 to 20 (18)

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(Other Optional ICs)

Part Number	Package	Use	Functions and Features	Operating Supply Voltage (V)
TC90A73UG ☆	P-LQFP-44-1010-0.80A	VBI slicer for Japanese terrestrial analog data broadcasting standard	One 6-bit ADC, synchronous separation circuit, transversal filter, error correction circuit, data buffer, asynchronous parallel interface control, Crystal oscillator	3.3
TC90173FG ☆	P-LQFP-48-0707-0.50C	VBI slicer for worldwide standards	One 8-bit ADC, self-clamping, synchronous playback, transversal filter, error correction circuit, data buffer, asynchronous parallel interface control, crystal oscillator (single 27-MHz clock)	1.5/2.5/3.3

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TV Tuning & Channel Decoder ICs (Tuning System ICs)

Part Number	Package	Use	Functions and Features	Operating Supply Voltage (V)
TA1384FNG ☆	P-SSOP24-300-0.65A	Mixer, OSC and PLL for TV/VCRs	UHF/VHF 2-band mixer, oscillator, IF amp, high-voltage transistor for voltage tuning, low distortion, wideband oscillator, UHF/VHF RF unbalanced input, PLL (f ² C bus), 24-pin small SSOP package	4.5 to 5.5
<i>TA1395FNG</i> ☆			UHF/VHF 2-band mixer, oscillator, IF amp, high-voltage transistor for voltage tuning, 3-band output port, standby mode, low distortion, wideband oscillator, UHF/VHF RF unbalanced input, PLL (f ² C bus), 24-pin small SSOP package	4.5 to 5.5
TA1396FG	☆ LQFP48-P-0707-0.5	Digital tuner (mixer + OSC, PLL, GCA)	UHF/VHF mixer, oscillator, IF amp, low distortion, low-phase-noise oscillator, direct two-modulus-type low-phase-noise PLL synthesizer, f ² C bus supported, low-noise IF GCA	4.5 to 5.25
TD7626FG/FNG	☆ P-SOP16-225-1.27/ P-SSOP16-225-0.65B	PLL + prescaler for frequency synthesizer	2.7-GHz prescaler + PLL (f ² C bus control) with band switch, A/D converter	4.5 to 5.5

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(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	PAL/SECAM/NTSC multi-standard PIF/SIF, FM radio receiver support, D/K, I, B/G, M, L, L' PIF VCO, audio trap, SIF filter, general-purpose SW port, split-carrier and intercarrier sound, f ² C bus	4.75 to 5.25
TB1350FNG/FTG ☆	P-SSOP24-300-0.65A QFN36-P-0606-0.50	PLL PIF/SIF	PAL, NTSC, PIF/SIF, FM radio receiver support, PIF VCO, audio trap, SIF filter, general-purpose SW port, split-carrier and intercarrier sound, f ² C bus	4.75 to 5.25
TB1351FTG ** ☆	QFN36-P-0606-0.50	Multi-standard PLL PIF/SIF	PAL/SECAM/NTSC multi-standard PIF/SIF, FM radio receiver support, D/K, I, B/G, M, L, L' PIF VCO, audio trap, SIF filter, general-purpose SW port, split-carrier and intercarrier sound, f ² C bus	4.75 to 5.25
TA1272AFG	P-SSOP24-300-1.00	PIF/SIF for LCD TVs	PIF/SIF, black NI ON output, black NI OFF output (diversity supported), reverse RF AGC, sync separation	3.5 to 5.5

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(BS Tuner/Decoder ICs)

Part Number	Package	Use	Functions and Features	Operating Supply Voltage (V)
TB1293FNG ☆	P-SSOP30-300-0.65	Direct quadrature demodulator for digital satellite tuners	Digital BS broadcasting in Japan, digital CS broadcasting, AGC, detection, I/Q demodulation	3.15 to 3.45

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(Channel Decoder ICs)

Part Number	Package	Use	Functions and Features	Operating Supply Voltage (V)
TC90507XBG ☆	P-FBGA97-0909-0.80C4	OFDM demodulator	Digital terrestrial broadcasting in Japan, OFDM demodulation, error correction, A/D converter, memory	3.0 to 3.6 2.3 to 2.7 1.4 to 1.65
TC90512XBG ☆	P-FBGA177-1313-0.80C	8PSK demodulator OFDM demodulator	Digital BS broadcasting in Japan, digital CS broadcasting, 8PSK, QPSK demodulation, error correction, digital terrestrial broadcasting in Japan, OFDM demodulation, error correction, A/D converter, memory	3.0 to 3.6 2.3 to 2.7 1.1 to 1.35

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(RF Modulating ICs)

Part Number	Package	Use	Functions and Features	Operating Supply Voltage (V)
TA1372FNG	P-SSOP16-225-0.65B	VHF-band RF modulator	VHF-band PLL RF modulator for VCRs, USA (3 ch/4 ch), video modulation, audio FM modulation, RF oscillator	4.5 to 5.5
TA1326FNG	P-SSOP16-225-0.65B	UHF-band RF modulator	UHF-band PLL RF modulator for VCRs, PAL-compatible, I ² C bus control	4.5 to 5.5

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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	AM	FM			
							F/E	IF		
TA7358PG/APG	P-SIP9-2.54A	RF amp		○			■		FM frontend (mixer, local oscillator)	1.6 to 6
TA7371AFG	P-SOP8-225-1.27	RF amp		○			■		FM frontend (mixer, local oscillator, AFC varactor diode)	0.95 to 5
TA7792PG TA7792FG	P-DIP16-300-2.54A P-SSOP16-225-1.00A	AF/FM tuner		○		■	■	■	FM F/E + AM/FM IF + DET AM detector coil and FM mixer coil not required	0.95 to 5
TA8116FG	P-SSOP16-225-1.00A	FM frontend	○				■		FM frontend (balanced mixer, local oscillator, IF amp, AGC, delayed AGC)	6 to 9
TA8122ANG/AFG TA8123ANG/AFG	P-SDIP24-300-1.78 P-SSOP24-300-1.00	Single-chip AM/FM stereo tuner		○		■	■	■	FM DET, Adjustment-free VCO FM stereo demodulator	1.8 to 7
TA8127NG TA8127FG	P-SDIP24-300-1.78 P-SSOP24-300-1.00	Single-chip AM/FM stereo tuner		○		■	■	■		1.8 to 7
TA8132ANG TA8132AFG	P-SDIP24-300-1.78 P-SSOP24-300-1.00	DTS-compatible IF + FM stereo demodulator		○		■	■	■	DTS-compatible IF + FM stereo demodulator, IF counter output, FM DET, adjustment-free VCO FM stereo demodulator	1.8 to 8
TA8158FG	P-SSOP10-225-1.00	RF amp		○			■		FM frontend (mixer, local oscillator)	1.6 to 6
TA8176SNG TA8176FG	P-SSIP12-1.78 P-SSOP16-225-1.00A	RF amp		○			■		FM frontend (mixer, local oscillator, buffer amp, IF amp)	4 to 8(F) 4 to 14 (SN)
TA2003PG/FG	P-DIP16-300-2.54A P-SSOP16-225-1.00A	AM/FM radio IC		○		■	■	■	IFT-less AM/FM, adjustment-free FM DET	1.8 to 7
TA2005SNG	P-SSIP12-1.78	FM noise canceller	○						LPF and HPF	7 to 9
TA2008ANG	P-SDIP24-300-1.78	Single-chip AM/FM stereo tuner		○		■	■	■	DTS-compatible, IF counter output, FM DET, adjustment-free VCO FM stereo demodulator	3.5 to 14
TA2017FNG	P-SSOP24-300-0.65A	FM/IF diversity	○						Double frontend FM/IF diversity	7 to 9
TA2022AFNG ☆	P-SSOP24-300-0.65A	AM/FM IF + MPX		○		■	■	■	DTS-compatible IF + FM stereo demodulator, IF counter output, adjustment-free FM DET, AM stereo supported, MPX with independent main and pilot signal input pins	0.95 to 2.2
TA2030FNG ☆	P-SSOP16-225-0.65B	TV/FM 2-channel RF amp		○			■		TV/FM 2-channel frontend (mixer, local oscillator, IF amp)	0.95 to 4
TA2039FNG	P-SSOP16-225-0.65B	FM antenna diversity	○						Switchable FM antenna diversity	7 to 9
TA2051FNG	P-SSOP24-300-0.65A	AM pulse noise reduction	○						AM pulse noise reduction, AM stereo reception	7 to 9
TA2074FG	P-QFP48-1014-0.80	Single-chip RF processor	○			■	■		FM frontend + AM tuner, AM upconversion tuner, Motorola AM stereo reception, Improved AM transient response to rapid changes in RF fields, Improved AM seek error rate, About 20% fewer external parts	7 to 9
TA2082FG	P-QFP48-1014-0.80	Single-chip RF processor	○			■	■		FM frontend + AM tuner, AM upconversion tuner, Motorola AM stereo reception, Improved AM transient response to rapid changes in RF fields, Improved AM seek error rate, Improved FM interference rejection	7 to 9
TA2083AFNG	P-SSOP16-225-0.65B	FM antenna diversity	○						Switchable FM antenna diversity, Improved version of the TA2083FN	7 to 9
TA2093FG	P-QFP44-1010-0.80H	FM processor	○				■	■	IF amp, quadrature detector, noise canceller, FM stereo demodulator	7 to 9

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Part Number	Package	Description	Intended Use			Functions				Functions and Features	Operating Voltage (V)
			Car Audio	General Audio	Other	AM	FM				
							F/E	IF	Stereo Demodulation		
TA2099NG TA2099FG	P-SDIP24-1.78 P-SSOP24-300-1.00	AM/FM IF + FM stereo demodulation for DTS		○		■		■	■	IF + FM stereo demodulation for DTS, IF counter output, adjustment-free FM DET (coil can be used.), FM narrow band detector circuit, VCO for MPX, FM blender control circuit, anti-birdie circuit	4 to 9
TA2111NG TA2111FG TA2111FNG ☆	P-SDIP24-300-1.78 P-SSOP24-300-1.00 P-SSOP24-300-0.65A	Single-chip AM/FM stereo tuner		○		■	■	■	■	Adjustment-free FM DET, VCO circuit for FM stereo demodulation, AFC diode, compliant with new FCC standards	1.8 to 7
TA2126FG	P-QFP48-1014-0.80	FM processor	○					■	■	IF band select switch, IF amp, quadrature detector, noise canceller, FM stereo demodulator	7 to 9
TA2132BPG TA2132BFG	P-DIP16-300-2.54A P-SSOP16-225-1.00A	AM/FM monaural radio IC		○		■	■	■		Adjustment-free FM DET, AFC diode, compliant with new FCC standards	1.8 to 7
TA2149BNG TA2149BFNG ☆	P-SDIP24-300-1.78 P-SSOP24-300-0.65A	Single-chip AM/FM stereo tuner		○		■	■	■	■	DTS-compatible, IF counter output, FM/AM OSC output, VCO for MPX, compliant with new FCC standards	1.8 to 7
TA2154AFNG ☆	P-SSOP30-300-0.65	Single-chip AM/FM stereo tuner		○		■	■	■	■	TV bands, DTS-compatible, IF counter output, FM/AM OSC output, VCO for MPX, compliant with new FCC standards	1.0 to 2.2
TA2101AFG	P-QFP48-1014-0.8	RF processor	○			■	■			FM frontend, AM downconversion tuner, AM pulse noise reduction, FM 4D NLA	7.5 to 8.9
TA2102AFG	P-QFP64-1212-0.65	FM processor	○					■	■	IF amp, quadrature detector, FM pulse noise reduction, FM stereo demodulator, FM antenna diversity, Keyless entry system	7.5 to 8.9
TA2127AFG	P-QFP84-1014-0.8	Intelligent RF processor	○			■	■	■		FM frontend, FM IF amp, IF band select switch, quadrature detector, AM upconversion tuner, fast lock PLL, DAC output for RF amp and automatic FSD adjustment	V _{CC} = 7.5 to 9.0 V _{DD} = 4.5 to 5.5
TA2135FG	P-QFP84-1014-0.8	Intelligent RF processor	○			■	■	■		FM frontend, FM IF amp, IF band select switch, quadrature detector, AM upconversion tuner, fast lock PLL, DAC output for RF amp and automatic FSD adjustment,	V _{CC} = 7.5 to 8.5 V _{DD} = 4.5 to 5.5
TB2122FG ☆	P-QFP84-1014-0.8	Intelligent RF processor	○			■	■	■		FM frontend, FM IF amp, IF band select switch, quadrature detector, AM upconversion tuner, fast lock PLL, DAC output for RF amp and automatic FSD adjustment, I ² C bus control	V _{CC} = 7.9 to 8.9 V _{DD} = 4.5 to 5.5
TB2123AFG ☆	P-QFP64-1212-0.65	Intelligent audio processor	○						■	FM/AM pulse noise reduction, FM stereo demodulation, electronic volume, I ² C bus control	7.9 to 8.9
TB2124BFG ☆	P-QFP64-1212-0.65	VE1 chip	○			■	■	■	■	FM frontend, FM IF amp, variable IF bandwidth, FM detector, AM upconversion tuner, FM/AM pulse noise reduction, FM stereo decoder, DAC output for RF amp and automatic FSD adjustment, I ² C bus control	V _{CC} = 7.9 to 8.7 V _{DD} = 4.7 to 5.3
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

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(PLL ICs for Car Audio Use)

Part Number	Package	Features	Operating Voltage (V)
TB2118FG ☆	P-SSOP-24-300-1.00	Fast lock PLL, Lock time can be shortened to 900 μs by selecting an appropriate Vt range and low-pass filter constant.	V _{CC} = 8.5 V _{DD} = 5

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(Preamp and Line Amp ICs)

Part Number	Package	Intended Use	Features	Operating Voltage (V)
TA8155FG TA8155FNG ☆	P-SSOP24-300-1.00 P-SSOP24-300-0.65A	Preamp, line amp	Playback and recording amps, ALC-compatible microphone amp, Power ON/OFF switch, Rec/Play select switch, buffer amp	0.9 to 4

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(Power Amp ICs)

Part Number	Package	Intended Use			Output Power (Pout)			Functions and Features	Operating Voltage (V)
		Car Stereos	Cassette Tape Recorders	TV/Home Stereos	Recommended Vcc	R _L = 4 Ω	R _L = 8 Ω		
TA8205AHQ TA8205ALQ	P-HZIP17-2.00 P-HSIP17-2.00	■			13.2 V	15 W x 2	—	2 BTL channels, low thermal resistance, various protection circuits, standby switch	9 to 18
TA8210AHQ TA8210ALQ	P-HZIP17-2.00 P-HSIP17-2.00	■			13.2 V	19 W x 2	—	2 BTL channels, low thermal resistance, various protection circuits, standby switch	9 to 18
TA8215HQ TA8215LQ	P-HZIP17-2.00 P-HSIP17-2.00	■			13.2 V	15 W x 2	—	2 BTL channels, low thermal resistance, various protection circuits, standby switch	9 to 18
TA8220HQ	P-HZIP17-2.00	■			13.2 V	19 W x 2	—	2 BTL channels, standby switch, R _L = 2 Ω guaranteed (30-W output), clipping/shorting detector	9 to 18
TA8221AHQ TA8221ALQ	P-HZIP17-2.00 P-HSIP17-2.00	■			13.2 V	19 W x 2	—	2 BTL channels, standby switch, R _L = 2 Ω guaranteed (30-W output)	9 to 18
TA8225HQ TA8225LQ	P-HZIP17-2.00 P-HSIP17-2.00	■			13.2 V	23 W	—	40-W output power when using R _L = 2 Ω, Standby switch	9 to 18
TA8231LQ	P-HSIP17-2.00	■			13.2 V	22 W x 2	—	2 BTL channels, standby switch, NF capacitor not required, R _L = 2 Ω guaranteed (37-W output)	9 to 18
TA8233BHQ	P-HZIP17-2.00	■			13.2 V	19 W x 2	—	2 BTL channels, standby switch, R _L = 2 Ω guaranteed (30-W output), clipping/shorting detector	9 to 18
TA8246AHQ	P-HZIP12-1.78B			■	20 V	—	6 W x 2	2 channels, mute, output shorting (AC)/thermal shutdown and overvoltage protection for output shorting prevention	10 to 30
TA8254BHQ	P-HZIP15-P-1.27E	■			13.2 V	21 W x 2	—	2 BTL channels, standby switch, mute, clipping/shorting detector, R _L = 2 Ω guaranteed	9 to 18
TA8258HQ	P-HZIP12-1.78B			■	37 V	—	20 W x 2	2 channels, mute, output shorting (AC)/thermal shutdown protection for output shorting prevention	15 to 42
TA8263BHQ	P-HZIP25-1.00F	■			13.2 V	24 W x 4	—	4 BTL channels, standby switch, mute, AUX amp, Diagnostic circuit, Maximum power: 43 W x 4 ch	9 to 18
TA8264AHQ	P-HZIP25-1.00F	■			13.2 V	21 W x 4	—	4 BTL channels, standby switch, mute, AUX amp, Diagnostic circuit, speaker burnout prevention, Maximum power: 41 W x 4 ch	9 to 18
TA8266HQ	P-HZIP25-1.00F	■			13.2 V	20 W x 4	—	4 BTL channels, standby switch, mute, AUX amp, Diagnostic circuit, speaker burnout prevention, Maximum power: 35 W x 4 ch	9 to 18
TA8270HQ	P-HZIP25-1.00F	■			13.2 V	24 W x 4	—	4 BTL channels, standby switch, mute, diagnostic circuit, class-KB efficiency, Maximum power: 43 W x 4 ch	9 to 16
TA8271HQ	P-HZIP25-1.00F	■			13.2 V	21 W x 4	—	4 BTL channels, standby switch, mute, AUX amp, Speaker burnout prevention, Maximum power: 41 W x 4 ch	9 to 18
TA8272HQ	P-HZIP25-1.00F	■			13.2 V	24 W x 4	—	4 BTL channels, standby switch, mute, AUX amp, Diagnostic circuit, Maximum power: 43 W x 4 ch	9 to 18
TA8273HQ	P-HZIP25-1.00F	■			13.2 V	25 W x 4	—	4 BTL channels, standby switch, mute, AUX amp, Diagnostic circuit, Maximum power: 47 W x 4 ch	9 to 16
TA8275HQ	P-HZIP25-1.00F	■			13.2 V	21 W x 4	—	4 BTL channels, standby switch, mute, AUX amp, Diagnostic circuit, speaker burnout prevention, Maximum power: 41 W x 4 ch	9 to 18
TA8276HQ	P-HZIP25-1.00F	■			13.2 V	20 W x 4	—	4 BTL channels, standby switch, mute, AUX amp, Diagnostic circuit, speaker burnout prevention, Maximum power: 35 W x 4 ch	9 to 18
TA8277HQ	P-HZIP25-1.00F	■			13.2 V	24 W x 4	—	4 BTL channels, standby switch, mute, AUX amp, Maximum power: 43 W x 4 ch	9 to 18
TA8283HQ	P-HZIP25-1.00F	■			13.2 V	24 W x 4	—	4 BTL channels, standby switch, mute, AUX amp, Diagnostic circuit, Maximum power: 43 W x 4 ch	9 to 18
TB2901HQ	P-HZIP25-1.00F	■			13.2 V	25 W x 4	—	4 BTL channels, standby switch, mute, high-side switch, Maximum power: 47 W x 4 ch, R _L = 2 Ω guaranteed	9 to 18
TB2902HQ	P-HZIP25-1.00F	■			13.2 V	23 W x 4	—	4 BTL channels, mute, Command-controlled standby mode, Maximum power: 41 W x 4 ch, R _L = 2 Ω guaranteed I ² C-bus-controlled self-diagnosis	9 to 18
TB2903HQ	P-HZIP25-1.00F	■			13.2 V	25 W x 4	—	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	—	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	—	4 BTL channels, standby switch, mute, diagnostic circuit, Class-KB efficiency, Maximum power: 47 W x 4 ch	9 to 18
TB2906HQ	P-HZIP25-1.00F	■			13.2 V	23 W x 4	—	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	—	4 BTL channels, mute, Command-controlled standby mode, Maximum power: 41 W x 4 ch, R _L = 2 Ω guaranteed I ² C-bus-controlled self-diagnosis	9 to 18
TB2913HQ	P-HZIP25-1.00F	■			13.2 V	25 W x 4	—	4 BTL channels, standby switch, mute, clipping detector, Maximum power: 47 W x 4 ch	9 to 18

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

(Power Amp ICs) (Continued)

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 Ω	R _L = 8 Ω		
TB2921HQ	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 Ω guaranteed	8 to 18
TB2922HQ	P-HZIP12-1.78B			■	18 V	30 W x 2	20 W x 2	MOS amplifier for 2 BTL channels, standby switch, mute	9 to 26
TB2923HQ	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, R _L = 2 Ω 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: 45 W x 4 ch	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, Maximum power: 41 W x 4 ch, R _L = 2 Ω guaranteed I ² C-bus-controlled self-diagnosis	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, R _L = 2 Ω guaranteed I ² C-bus-controlled 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: 45 W x 4 ch, 34dB voltage gain	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: 45 W x 4 ch, R _L = 2 Ω guaranteed	8 to 18

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*: New product

(Headphone Amp ICs)

Part Number	Package	Intended Use			Output Power	Functions and Features	Operating Voltage (V)
		Headphone Stereos	Digital Portable Stereos	Mobile Phones			
TA2069AFG ☆	P-SSOP24-300-1.00A	■			28 mW (3 V, 16 Ω) 20 mW (3 V, 32 Ω)	2 channels, motor governor, OCL system, low-frequency boost amp, G _v = 31dB (power stage)	PRE+PW 1.8 to 3.6 GVN 2.1 to 3.6
TA2120FNG ☆	P-SSOP24-300-0.65A		■		8 mW (2.4 V, 16 Ω)	2 channels, headphone power amp, OCL/output capacitor coupling, low current consumption (I _{ccq} = 1.9 mA), low-frequency boost amp, beep, standby switch, mute, G _v = 16dB/8.5dB, volume limiter	1.8 to 4.5
TA2123AFG ☆	P-LQFP48-0707-0.50	■			6 mW (1.5 V, 32 Ω)	Low current consumption (capacitor coupling = 1.5 mA, OCL = 2.2 mA) Preamp stage: Auto reverse, metal mode driver, preamp mute Power stage: Boost function, beep, boost with AGC, power amp mute Others: Ripple filter, power switch, AMS	0.95 to 2.2
TA2131FNG ☆	P-SSOP24-300-0.65A		■	■	8 mW (+B = 1.2 V, 16 Ω)	2 channels, headphone power amp, G _v = 12dB, low current consumption (I _{ccq} = 0.75 mA), low-frequency boost amp with AGC, beep, standby switch, mute	+B = 0.9 to 4.5 V _{cc} = 1.8 to 4.5
TA2145AFG ☆	P-SSOP24-300-1.00A	■			28 mW (3 V, 16 Ω) 20 mW (3 V, 32 Ω)	2 channels, motor governor, OCL system, low-frequency boost amp, preamp muting switch	PRE+PW 1.8 to 3.6 GVN 2.1 to 3.6
TA2152FNG ☆	P-SSOP24-300-0.65A		■	■	8 mW (+B = 1.2 V, 16 Ω) 30 mW (+B = 3 V, 16 Ω)	2 channels, headphone power amp, OCL/output capacitor coupling, G _v = 11.5dB, low current consumption (I _{ccq} = 0.7 mA), beep, phase compensation parts not required, standby switch, mute	+B = 0.9 to 4.5 V _{cc} = 1.8 to 4.5
TA2160FNG ☆	P-SSOP30-300-0.65	■			6 mW (1.5 V, 32 Ω) 12 mW (3 V, 32 Ω)	2 channels, OCL system, low current consumption (1.6 mA (1.5 V), 3 mA (3 V)) Ripple filter, preamp switch, power amp mute switch, boost function, boost with AGC	0.95 to 4.5
TA2170FTG ☆	P-VOON24-0404-0.50		■	■	6 mW (+B = 1.2 V, 32 Ω) 20 mW (+B = 3 V, 32 Ω)	3-input stereo headphone amp, No perceptible change in volume regardless of single or mixer output, G _v ≈ 0dB, standby switch, mute	+B = 0.9 to 4.5 V _{cc} = 1.8 to 4.5
TB2173FTG ☆	P-VOON44-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, G _v = 8dB/24dB, beep, standby switch, mute, port expansion circuit	+B = 0.9 to 4.5 V _{DD} = 1.8 to 4.5 V _{cc} = 1.8 to 4.5

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(Accessories and Others)

Part Number	Package	Use	Functions and Features	Operating Voltage (V)
TA7630PG	P-DIP16-300-2.54A	Electronic tone, volume and balance controls	2 channels, DC control	8 to 14 (single supply) ±4 to ±7 (dual supply)
TA2078PG	P-DIP16-300-2.54A	Preset equalizer	2 channels, 3-mode preset equalizer, flat mode	7.5 to 14

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(Infrared Receiver ICs (f = 2.3 MHz/2.8 MHz))

Part Number	Package	Use	Functions and Features	Operating Voltage (V)
TA2056FNG ☆	P-SSOP24-300-0.65A	Receiver IC	f = 2.3 MHz/2.8 MHz 2-ch frequency modulation tuner, mute, low current consumption	0.95 to 2.2
TA2181AFNG ☆	P-SSOP16-225-0.65B	Transmit IC	f = 2.3 MHz/2.8 MHz, f = 3.2 MHz/3.8 MHz	6.0 to 12.0

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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	Single chip 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	DTS-21	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		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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(Plunger Driver ICs)

Part Number	Package	Features		Operating Voltage (V)
		Output Current (mA) Max	Output Pulse Duty Cycle	
TD6304APG	P-SIP7-2.54A	Io = 400	4:1	8.0 to 16.0
TD6308APG	P-SIP7-2.54A	Io = 400	8:1	8.0 to 16.0

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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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*: New product

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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
TC94A95FG **	P-QFP80-1420-0.80M ☆		High breakdown voltage, 4-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 TC9422AFG	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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*: New product

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** : Under development

(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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(Display Driver ICs)

Part Number	Package	Classification	Description	Operating Voltage (V)
TB2104FG	P-SSOP30-375-1.00 ☆	Display driver	20-bit VFD driver	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
TC94A29FAG ☆	P-LQFP64-1010-0.50E	Embedded firmware 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	Double speed operation	CD-CX system	3.3
TC94A58FAG	P-LQFP64-1010-0.50E				CD-CX+ system	3.3
TA2157FG/FNG ☆	P-SSOP24-300-1.00 P-SSOP24-300-0.65A	Head amp	Head amp, focus/tracking error amp, auto laser power amp, RF-AGC amp, support for CD-R/CD-RW	CD-AX and CD-CX systems		3.3
TA2092ANG	P-SDIP24-300-1.78	4-ch BTL driver	4-ch BTL power driver	CD-AX, CX and CX+ systems		8
TA2125AFG	P-HSOP36-375-0.80	5-ch driver	4-ch BTL power driver, single H switch, 5-V regulator	CD-HX and CD-BX systems		8

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- The products shown in bold are also manufactured in the factories in Malaysia and Thailand. Contact the Toshiba sales representative for further information.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

(Digital Signal Processor ICs & Digital Amp System ICs)

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), embedded software for various audio compression formats such as MP3, WMA and AAC, program ROM (20 k), program RAM (4 k), standby mode	3.3/1.5
TC94A48FG ☆	P-LQFP64-1010-0.50E		Embedded software for various signal processing steps for acoustic field control, program ROM (3 k), program RAM (1 k), 2-ch single-bit ADC, 6-ch multi-bit DAC	3.3

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(Karaoke ICs and Surround ICs)

Part Number	Package	Classification	Features	Operating Voltage (V)
TC9488FG	P-SSOP30-375-1.00	Microphone echo IC	Microphone amp, microphone echo (128-ms delay), electronic volume control, 3-line bus control or DC control	5
TA2136FG/NG (Note)	P-SSOP24-300-1.00 P-SDIP24-300-1.78	Surround-sound IC	SRS 3D stereo, SRS 3D mono	9

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DVD & CD-ROM ICs (DVD ICs)

Part Number	Package	Classification	Features	
TA1397FG ☆	P-LQFP64-1010-0.50A	RF amp	2-laser/2-detector, APC laser control, 1-beam (DPD)/3-beam tracking error detection, x16 DVD read, x48 CD read	
TA1393AFG ☆	P-LQFP80-1212-0.50A		x16 DVD read/write, x48 CD read/write, APC laser control, 2-laser/2-detector, 1-beam (DPD)/3-beam tracking error detection, DVD-RAM read	
TB1299FG ☆			x8 DVD read/write, x48 CD read/write, x5 DVD-RAM read/write, APC laser control, 2-laser/2-detector, 1-beam (DPD)/3-beam tracking error detection	
TC94A85MFG ☆	P-LQFP216-2424-0.40A	Single-chip processor	DVD/CD digital servo, x16 DVD/x48 CD read, RF demodulation, Error correction, CSS/CPRM, ATAPI interface, DVD/CD-ROM decoder, microcontroller (TX19), Flash memory (16 Mbit), Buffer memory (1.5 Mbit), Resume mode	
TC94A53FG ☆			DVD/CD digital servo, x16 DVD read/write, x48 CD read/write, DVD-RAM read, RF demodulation, Error correction, CSS/CPRM, ATAPI interface, DVD/CD-ROM decoder, PUREDRIVE	
TC94A63FG ☆			P-LQFP256-2828-0.40B	DVD/CD digital servo, x8 DVD read/write, x48 CD read/write, x5 DVD-RAM read/write, RF demodulation, Error correction, CSS/CPRM, ATAPI interface, DVD/CD-ROM decoder, microcontroller (TX19), PUREDRIVE

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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)	
TA31136FNG	SSOP16 (0.65 mm)	IF detection	Cordless phones, Car phones, Cell phones	Superior temperature characteristics, low operating voltage (1.8 V), RSSI and noise detection	1.8 to 5.5	
TA31137FNG ☆	SSOP24 (0.65 mm)		Car phones, Cell phones	Superior temperature characteristics, low operating voltage (1.8 V), RSSI and noise detection, on-chip comparator	1.8 to 6.0	
TA31180FNG ☆	SSOP24 (0.65 mm)		Cordless phones	Superior temperature characteristics, low operating voltage (1.8 V), no external ceramic filter and discriminator required, RSSI and noise detection	For low-power Cordless	1.8 to 5.5
TA31188FNG ☆	SSOP24 (0.65 mm)				For CT1 Cordless	
TA31181FNG ☆	SSOP24 (0.65 mm)		Cell phones	Superior temperature characteristics, no external ceramic filter and discriminator required, RSSI	Supports AMPS.	2.3 to 5.5
TA31142FNG	SSOP20 (0.65 mm)		Paging system remote controllers	IF detection for high-speed paging systems, low operating voltage (1.1 V)	IF detection with on-chip 2nd mixer	1.1 to 3.5
TA31145FNG	SSOP20 (0.65 mm)				On-chip 2nd mixer, RSSI	
TA31149FNG ☆	SSOP24 (0.65 mm)				4-level FSK comparator	
TA31161FNG	SSOP16 (0.65 mm)		Digital cordless phones	10.7-MHz waveband, 300-MHz mixer frequency		2.3 to 5.5
TA31165CFLG ☆	QON24 (0.5 mm)	IF amp	PHS phones, Digital cordless phones	On-chip IQ modulator, up-converter, 10.8-MHz IF limiter amp, 40 MHz to 300 MHz mixer frequency, independent BS control for transmit and receive; small package, IQ input reference level = 0.8V _{P-P} differential	2.7 to 5.0	
TA31139BFLG ☆	QON16 (0.65 mm)		Digital mobile phones	High IF amp gain (95dB), on-chip RSSI buffer amp, small package, 2-k Ω ceramic filter impedance	2.3 to 5.5	
TA31183BFNG	SSOP20 (0.65 mm)			120 MHz to 140 MHz mixer frequency, no external filter required thanks to on-chip 100-kHz channel-select filter, filter attenuation at Fo \pm 16 kHz = 10dB (typ.), on-chip IF and RSSI buffer amps	2.4 to 5.5	
TA31331FTG ☆	VQON24 (0.5 mm)	IF receiver IC	Portable digital radios	AGC amp, orthogonal demodulator, local VCO transistor, wide-dynamic-range AGC (94dB typ.) low current consumption (14.3 mA typ.)	2.7 to 3.5	
TB31202FNG	SSOP16 (0.65 mm)	PLL frequency synthesizer	Cordless phones, Specified low-power radio stations	Two 520-MHz channels (PLL + prescaler), low-voltage operation (1.9 V to 5.5 V), low current consumption (8 mA typ. in full-on state), independent standby control for each channel	2.0 to 5.5	
TB31213FNG ☆	SSOP24 (0.65 mm)			Two 520-MHz transmit/receive channels (PLL + prescaler + VCO transistor) + 1st mixer, low-voltage operation (1.9 V to 5.5 V), low current consumption (16 mA typ. in full-on state), independent standby control for transmit and receive		
TB31214FNG ☆	SSOP24 (0.65 mm)			Two 400-MHz transmit/receive channels (PLL + prescaler + VCO transistor) + 1st mixer, low-voltage operation (1.9 V to 5.5 V), low current consumption (16 mA typ. in full-on state), independent standby control for transmit and receive		

☆: Dry-packed

- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

Part Number	Package (Pin Pitch)	Functions	Applications	Features		Power Supply Voltage (V)	
TB31245FNG	☆ SSOP10 (0.65 mm)	PLL frequency synthesizer	Digital mobile and Wireless equipment	Designed for PHS phones, 1.6-GHz PLL + prescaler, phase comparison frequency: 300 kHz (fixed)	Current consumption	Total 6.0 mA (typ.)	2.4 to 5.5
TB31257FTG	☆ VQON16 (0.5 mm)			2.6 GHz + 800 MHz for WCDMA: 2-channel PLL + prescaler, fast lock through fractional-N PLL, Ultra-small, thin package		Total 5.1 mA (typ.)	2.5 to 3.3
TB31356AFLG	☆ QON16 (0.65 mm)			1.8 GHz + 600 MHz: 2-channel PLL + prescaler, independent BS control each channel		Total 3.7 mA (typ.)	2.4 to 3.3
TB31167FLG	☆ QON48 (0.5 mm)	Single-chip RF transceiver	PHS phones, Digital cordless phones	IQ modulator, up-converter, AGC, 1.6 GHz + 233.15 MHz (fixed) dual PLL + prescaler, independent BS control for each circuit, small package	Current consumption	Transmitter: 22 mA (including PLL) (typ.) Receiver: 8.4 mA (including PLL) (typ.) PLL: 4.2 mA (typ.)	2.7 to 3.3
TB31169FLG	☆ QON48 (0.5 mm)			IQ modulator, up-converter, AGC, on-chip IF VCO (254.75 MHz), fast lock through fractional-N PLL (1.63 GHz), independent BS control each circuit, small package		Transmitter: 18 mA (typ.) Receiver: 3.8 mA (typ.) PLL: 12.8 mA (typ.)	
TB31345WLG	WSP96 (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 WSP96 (4.13 mm x 4.16 mm x 0.6 mm)	Transmitter: 66 mA (typ.) (@ +4-dBm output) Receiver: 36 mA (typ.)
TB31224CF	QFP48 (0.8 mm)	Cordless phones	Cordless phones	CTO-compatible PLL, IF detection and compander integrated into a single chip on-chip peripherals	Current consumption	Power-on reset	2.0 to 6.0
TB31261AF	☆ QFP52 (0.65 mm)			900-MHz PLL, IF detection and compander integrated into a single chip, on-chip peripherals		2.7 to 5.5	
TB31262F	☆ 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)			Specified low-power radio		Low-power radio (400-MHz band), designed for telemeters, PLL, VCO, LNA, MIX, BPF, IF amp, detector 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
TA32305FNG	☆ SSOP30 (0.65 mm)	RF/IF IC	Remote control (AM/FM)	240 kHz to 450 MHz RF amp, MIX, AM/FM demodulator, 2-level comparator, Vcc = 2.2 V to 5.5 V, on-chip local x8 multiplier, receiver/transmitter		2.2 to 5.5	
TB31296IXBG	☆ FBGA48 (0.5 mm)	RF IC	Bluetooth (RF for chipset)	PLL, VCO, LNA, MIX, BPF, IF-amp, detector and PA integrated into a single chip, small package	Current consumption	Transmitter: 32.8 mA (typ.) Receiver: 54.0 mA (typ.)	3.0 to 3.5
TB31296XBG	☆ FBGA48 (0.5 mm)			PLL, VCO, LNA, MIX, BPF, IF-amp, Digital detector, ADC, DAC, PA, antenna SW, PLL loopfilter integrated into a single chip		Transmitter: 65 mA (typ.) Receiver: 65 mA (typ.)	
TC31298IXBG	☆ 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	Transmitter: 65 mA (typ.) Receiver: 60 mA (typ.)
TA31273FNG	SSOP20 (0.65 mm)	RF/IF IC	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	
TA31274FNG	☆ SSOP24 (0.65 mm)		Remote control (AM/FM)	240 kHz to 450 MHz RF amp, MIX, AM demodulator, 2-level comparator, on-chip local x8 multiplier			
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)		Remote control (AM/FM)	RF operating frequency: 433.92 MHz on-chip VCO, IF filter, detector		3.6 to 5.5	
TA31276FNG	SSOP16 (0.65 mm)	IF IC	Remote control (AM)	40-MHz AM comparator		2.4 to 5.5	
TB32160AFG	* LOFP48 (0.5 mm)	Single-chip RF transceiver	ETC transceivers	RF operating frequency: 5.775 to 5.845 GHz IF: 40 MHz RF output: -5dBm (max)		2.7 to 3.3	

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*: New product

- The products shown in bold are also manufactured in offshore fabs.
- Contact the Toshiba sales representative for information about RoHS compliance before you purchase any components.

Neuron[®] Chips for LonWorks[®] Technology

Part Number	Package	Applications						Operating Temperature (°C)	Maximum Operating Frequency (MHz)	Features	Supply Voltage (V)
		EEPROM (Bytes)	RAM (Bytes)	ROM (Bytes)	8-Bit CPU	External Memory Interface	16-Bit Timer/Counter				
TMPN3150B1AFG ☆	P-QFP64-1414-0.80C	512	2K	NA	3	Available (Note 1)	2ch	-40 to 85	10	<ul style="list-style-type: none"> • General-purpose distributed communication control ICs suitable for FA, BA and HA systems. • Communications protocols and function I/O facilities are incorporated as firmware, allowing highly reliable communication and control. • Program downloads and modifications of node connectivity information via network, even after installation of nodes. • Allows a network of different media (power-line carrier, RF, twisted pair, etc.). 	4.5 to 5.5
TMPN3120FE3MG ☆	P-SOP32-525-1.27	2K	2K	16K	3	NA	2ch		20		
TMPN3120FE5MG (Note 2) ☆	P-SOP32-525-1.27	3K	4K	16K	3	NA	2ch				

☆: Dry-packed

Note 1: 42 Kbytes of the 58-Kbyte external memory space is available for use as user memory area.

Note 2: The TMPN3120FE5MG has an Enhanced Communication Port (ECP).

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Radio-Frequency Power Amp ICs

Modules (Analog)

Part Number	Package	Structure	Applications		Features				Test Conditions	Power Supply (V)	
					Frequency Range f (MHz)	Po (Min) (W)	η_T (Min) (%)	ρ_i (Max)	Pi (mW)	VGG	VDD
S-AV36A	5-53P	Modules	VHF	60-W FM professional radios	134 to 174	80	45	3	50	5	12.5
S-AV32A	5-53P			50-W FM professional radios	134 to 174	60	45	3	50	5	12.5
S-AV33A	5-53P			25-W FM professional radios	134 to 174	32	45	3	50	5	12.5
S-AV35A	5-32G			25-W FM marine radios	154 to 162	32	50	3	10	5	12.5
S-AV37A	5-32G			25-W FM marine radios	154 to 162	32	50	3	10	5	12.5
S-AV40 *	5-32G			30-W FM professional radios	220 to 246	30	40	3	50	5	12.5
S-AU82ASL *	5-53P		UHF	50-W FM professional radios	350 to 390	60	40	3	50	5	12.5
S-AU82AVL	5-53P				378 to 440	60	40	3	50	5	12.5
S-AU82AL	5-53P				400 to 470	60	40	3	50	5	12.5
S-AU82AH	5-53P				450 to 520	60	40	3	50	5	12.5
S-AU93A	5-53P			50-W FM professional radios	430 to 500	60	40	3	50	5	12.5
S-AU83AL	5-53P			25-W FM professional radios	400 to 470	32	40	3	50	5	12.5
S-AU83AH	5-53P				450 to 520	32	40	3	50	5	12.5
S-AU94	5-23F				5-W FM handheld professional radios	450 to 490	7.55	40	4.5	25	4

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*: New product

Modules (Digital)

Part Number	Package	Structure	Applications		Features		Test Conditions			Power Supply (V)	
					Frequency Range f (MHz)	ACP (dB) (Max)	I _{DD} (A)	Po (dBmW)	Pi (dBmW) (Note 1)	VDD	VGG
S-AV34	5-32F	Modules	VHF	Digital professional radios	150 to 165	-34	2.8	39	adjusted	10.8	adjusted
S-AV38	5-23F				260 to 266	-35	1.7	35		7.2	
S-AU86	5-28C		900 MHz	Digital MCA	889 to 915	-39	1.7	35		12	
S-AU100 *	5-23F				905 to 915	-37	1.8	35		10.8	

Note 1: Modulating signal: $\pi/4$ DQPSK ($\alpha = 0.5$, 32 kbps), Bandwidth: 16 kHz, Detuning frequency: 25 kHz

*: New product

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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 μ A (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 μ A (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 μ A (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 μ A (typ.) Internal 32 kHz clock External transistor required	6 to 16
TB9002FG	** HSOP16	CPU voltage regulator, watchdog timer	5	200 (Max)	45 (1 s)	1.4	Low current consumption: 90 μ A (typ.) Internal output transistor Reset detection: 4.6 V	7 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 μ A ($V_{CC1/2}$: 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 μ A (typ.) Reset on watchdog timeout Reset detection: 4.7 V or 4.2 V (selectable) External transistor required	6 to 18

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

** : Under development

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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)		
TA8050AK	HSIP7	H-bridge driver	—	1500	60 (1 s)	12.5	Standby function	8 to 16
TA8050AFG	HSOP20	H-bridge driver	—	1500	60 (1 s)	2.0	Standby function	8 to 16
TA8050P	HSIP7	H-bridge driver	—	1500	60 (1 s)	12.5		6 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

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(Brushless Motor Drivers)

Part Number	Package	Functions	Features	Supply Voltage (V)
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

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Display Driver ICs

LED Driver ICs (LED Panel Drivers)

Part Number	Package	Applications	Description	Power Supply Voltage (V)
TB62702FG	SOP20	10-segment displays	10-bit DMOS sink driver (SIPO/latch), 30 V/30 mA	7
TB62705CPG/CFG/CFNG	DIP16/SSOP16	Small LED panels	8-bit constant-current sink driver (SIPO/latch), 17 V/90 mA	7
TB62706BNG/BFG	SDIP24N/SSOP24	Large LED panels	16-bit constant-current sink driver (SIPO/latch), 17 V/90 mA	7
TB62707FG	SSOP24	Full-color LED panels	8-bit constant-current sink driver (PIPO, latch), 17 V/90 mA	7
TB62709NG/FG	SDIP24N/SSOP24	7-segment displays	4-digit 7-segment display (common anode) decoder and constant-current driver (SIPO), 17 V/50 mA, -400 mA/digit	7
TB62710FNG	SSOP20	Small LED panels	8-bit constant-current source driver (SIPO/latch), 17 V/-90 mA	7
TB62715FNG	SSOP20	Small LED panels	8-bit constant-current sink driver (SIPO/latch), 17 V/150 mA	7
TB62717FG	QFP48	Full-color LED panels	24-bit constant-current sink driver (SIPO/latch), 17 V/50 mA	7
TB62718AFG	HQFP64	Full-color LED panels	256-level grayscale PWM control and current compensation, 16-bit constant-current sink driver, 26 V/80 mA	7
TB62719AFG	HQFP64	Full-color LED panels	256-level grayscale PWM control and current compensation, 16-bit constant-current sink driver, 26 V/80 mA (upward compatible with the TB62718AF)	7
TB62725BPG/BFG/BFNG	DIP16/SSOP16/SSOP16	Small LED panels	3.3-V to 5-V drive, 8-bit constant-current sink driver (SIPO/latch), 17 V/90 mA	7
TB62726ANG/AFG	SDIP24N/SSOP24	Large LED panels	3.3-V to 5-V drive, 16-bit constant-current sink driver (SIPO/latch), 17 V/90 mA	7
TB62727FNG	SSOP30	Full-color LED panels	16-bit constant-current sink driver with current compensation (SIPO/latch), 17 V/60 mA	7
TCA62746AFNG/AFG * ☆	SSOP24	Large LED panels	5-V drive, 16-bit constant-current sink driver (SIPO/latch), 16 V/50 mA	6
TB62777FNG *	SSOP16	8-ch LED drive	8-channel, constant-current LED driver	6

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*: New product

SIPO: Serial-in parallel-out

PIPO: Parallel-in parallel-out

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

(White LED Drivers)

Part Number	Package	Applications	Description	Power Supply Voltage (V)
TB62731FUG	6-pin SOT23	White LED backlighting	Constant-current step-up DC/DC converter (output: 320 mW, efficiency: 80%, maximum output voltage: 30 V, maximum switching current: 0.3 A)	6
TB62732FUG				
TB62734FMG	SON8	White LED backlighting	Constant current step-up DC/DC converter, efficiency: 85% (max), output: 600 mW, (overvoltage protection)	6
TCA62735AFLG	QFN16	White LED backlighting	Charge-pump DC/DC converter and constant-current driver (4-ch or 3-ch), output current: 120 mA	6
TB62736FUG	6-pin SOT23	White LED backlighting	Constant-current step-up DC/DC converter, efficiency: 87% (max)	6
TB62737FUG	6-pin SOT23	White LED backlighting	Constant-current step-up DC/DC converter, efficiency: 87% (max), (overvoltage protection)	6
TB62752AFUG	6-pin SOT23	White LED backlighting	Constant-current step-up DC/DC converter, efficiency: 87% (max), can drive many LEDs	6
TB62752BFUG	6-pin SOT23	White LED backlighting	Constant-current step-up DC/DC converter, efficiency: 87% (max), can drive many LEDs	6
TB62754AFNG	SSOP20	White LED backlighting	Constant-current step-up DC/DC converter, designed for large-LCD backlighting	6
TB62750FTG **	VOON24	White LED backlighting	Constant-current step-up DC/DC converter, designed for large-current camera flashes, output: 800 mA	6
TCA62753FUG	6-pin SOT23	White LED backlighting	Charge-pump DC/DC converter, 5-V constant voltage output, output current: 100 mA	6

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** : Under development

(RGB LED Drivers)

Part Number	Package	Applications	Description	Power Supply Voltage (V)
TCA62723FMG *	SON-10	3-ch RGB LED illumination	Output: 150 mA, parallel-in/parallel-out control	6
TCA62724FMG	SON-10	3-ch RGB LED illumination	Output: 150 mA, I ² C bus support	6

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*: New product

Driver ICs & Controllers for Large TFT-LCD Modules (PC/TV Module Driver ICs)

Part Number	Package	Functions	No. of LCD Drive Outputs	Features	Supply Voltage (V)	
					Logic (Min)	LCD (Max)
T6LD4	COF	TFT gate driver	350/342	Data transfer: bidirectional shift, 2-level output	2.3	43.5
T6LE2	COF	TFT gate driver	300/263/256	Data transfer: bidirectional shift, 2-level output	2.3	43.5

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

Driver ICs & Controllers for Mobile TFT-LCD Modules (Cellular Phone Module Driver ICs)

Part Number	Package	Functions	No. of LCD Drive Outputs	Features	Supply Voltage (V)		
					I/F (Min)	System (Min)	LCD (Max)
JBT6K72A	Bump chip	LTPS TFT source driver (QVGA/QCIF+)	120 (6-multiplexer)	Single-chip TFT source driver with a 5-V step-up DC-DC converter Color mode: 262,144-, 65,536- or 8-color mode Interfacing: RGB, serial VCOM DC power supply, logic power regulator, dual OTP, double-size characters, Auto and Manual sequence modes	1.7	2.4	5.5
JBT6K74A	Bump chip	LTPS TFT source driver (VGA)	480 (3-multiplexer)	Single-chip TFT source driver with a 5-V step-up DC-DC converter and a still-picture RAM (organized as 240 x 320 x 18 bits for QVGA data) Color mode: 262,144-, 65,536- or 8-color mode Interfacing: RGB, serial (RGB transfer speed = 30 MHz max) VCOM DC power supply, quad data rate (double-size characters)	1.7	2.7	5.5
JBT6K85	Bump chip	LTPS TFT source driver (QVGA)	120 (6-multiplexer)	Single-chip TFT source driver with a 5-V step-up DC-DC converter and a RAM (organized as 240 x 320 x 24 bits) Color mode: 16,777,216-, 262,144-, 65,536- or 8-color mode Interfacing: MPU, RGB, serial, MDDI (with functional limitations) VCOM DC power supply, supply, normal and partial display, OTP, Auto and Manual sequence modes	1.65	2.4	5.5
JBT6K78	Bump chip	LTPS TFT source driver (CIF+)	176 (6-multiplexer)	Single-chip TFT source driver with a 5-V step-up DC-DC converter (8-color partial display memory: 352 x 3 x 50 bits) Color mode: 262,144-, 65,536- or 8-color mode Interfacing: RGB, serial external EEPROM controller, double-size characters, OTP	1.65	2.3	5.5
JBT6K90	Bump chip	LTPS TFT source driver (WVGA)	480 (3-multiplexer)	Single-chip TFT source driver with a 5-V step-up DC-DC converter Color mode: 16,777,216-, 262,144-, 65,536- or 8-color mode Interfacing: RGB, serial, T-LVDS quad data rate (double-size characters), VCOM DC power supply, OTP, Auto and Manual sequence modes	1.6	2.7	5.5
JBT6K98	Bump chip	LTPS TFT source driver (QVGA)	120 (6-multiplexer)	Single-chip TFT source driver with a 5-V step-up DC-DC converter and a RAM RAM (organized as 240 x 320 x 18 bits) Color mode: 262,144-, 65,536- or 8-color mode Interfacing: MPU (80/M68, 18/16/9/8-bit) Fast RAM access (26 MHz max.) VCOM DC power supply, supply, normal and partial display, Independent gamma correction, OTP, Auto and Manual sequence modes	1.65	2.4	5.5

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

Driver ICs & Controllers for Mobile STN-LCD Modules (Graphic Type Driver ICs)

Part Number	Package	Functions	No. of LCD Drive Outputs	Features	Supply Voltage (V)	
					System (Min)	LCD (Max)
T6B65AFG ☆	QFP100	STN column driver	80	Data transfer: 8-bit parallel input from CPU 5120-bit display RAM and 8-bit flag RAM	2.7	V _{DD} -16
T6B66BFG ☆	QFP100	STN row driver	65	Selectable duty cycle: 1/17, 1/33, 1/49, 1/65 power supply dividing resistor and step-up DC-DC converter	2.7	V _{DD} -16
T6C23	TCP	STN column driver	160	Data transfer: 8-bit parallel input from CPU 38,400-bit RAM, display-off function	2.7	30
T6C24	TCP	STN row driver	240	1/240 duty cycle, display-off function	2.7	30
T6K04	TCP	STN column/row driver	128 columns 64 rows	Selectable duty cycle: 1/32, 1/48, 1/56, 1/64, 8192-bit RAM, LCD power supply circuit, step-up DC-DC converter	2.7	V _{DD} -16.5
T6K14	TCP, Bump chip	STN column/row driver	128 columns 65 rows	For reflective color STN LCD, 4-level color display, temperature compensation, voltage regulator, step-up DC-DC converter, Icon display mode	2.4	16.5
JBT6K73-AS	Bump chip	STN column/row driver	160 columns 65 rows	Selectable duty cycle: 1/35, 1/49, 1/57, 1/65, 10,400-bit RAM op amp for LCD power supply, step-up DC-DC converter, contrast control, Icon display mode	2.4	16.5

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(Controllers)

Part Number	Package	Functions	No. of LCD Drive Outputs	Features	Supply Voltage (V)	
					System (Min)	LCD (Max)
T6963CFG ☆	QFP67	LCD controller	—	Designed for both text and graphics displays	4.5	—

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

Network & Interface ICs

Neuron[®] Chips for LonWorks[®] Technology

Part Number	Package	Applications						Operating Temperature (°C)	Maximum Operating Frequency (MHz)	Features	Supply Voltage (V)
		EEPROM (Bytes)	RAM (Bytes)	ROM (Bytes)	8-Bit CPU	External Memory Interface	16-Bit Timer/Counter				
TMPN3150B1AFG ☆	P-QFP64-1414-0.80C	512	2K	NA	3	Available (Note 1)	2ch	-40 to 85	10	<ul style="list-style-type: none"> • General-purpose distributed communication control ICs suitable for FA, BA and HA systems. • Communications protocols and function I/O facilities are incorporated as firmware, allowing highly reliable communication and control. • Program downloads and modifications of node connectivity information via network, even after installation of nodes. • Allows a network of different media (power-line carrier, RF, twisted pair, etc.). 	4.5 to 5.5
TMPN3120FE3MG ☆	P-SOP32-525-1.27	2K	2K	16K	3	NA	2ch		20		
TMPN3120FE5MG (Note 2) ☆	P-SOP32-525-1.27	3K	4K	16K	3	NA	2ch				

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Note 1: 42 Kbytes of the 58-Kbyte external memory space is available for use as user memory area.

Note 2: The TMPN3120FE5MG has an Enhanced Communication Port (ECP).

- Neuron[®] and LonWorks[®] are Echelon Trademarks.
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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)		
TA6009FMG	SON10	Shock sensor amp (voltage amp)	—	—	—	0.012	3.3-V/5.0-V operation, 1 channel, small package	2.7 to 5.5
TA6009FNG	VSOP10	Shock sensor amp (voltage amp)	—	—	—	0.012	3.3-V/5.0-V operation, 1 channel	2.7 to 5.5
TA6038FNG	VSOP10	Shock sensor amp (charge amp)	—	—	—	0.0125	3.3-V/5.0-V operation, 1 channel	2.7 to 5.5
TA6039FNG	VSOP10	Shock sensor amp (low-noise voltage amp)	—	—	—	0.0135	3.3-V/5.0-V operation, 1 channel, low-noise	2.7 to 5.5
TB6066FNG	VSOP16	Shock sensor amp (low-noise charge amp)	—	—	—	0.025	3.3-V/5.0-V operation, 3 op amps, low-noise	2.7 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
TB6073AFNG	VSOP16	Shock sensor amp (2-ch low-noise charge amp)	—	—	—	0.0225	3.3-V/5.0-V operation, 2 channel, low-noise	2.7 to 5.5
TA6038FMG	SON10	Shock sensor amp (charge amp)	—	—	—	0.0125	3.3-V/5.0-V operation, 1 channel, small package	2.7 to 5.5
TC93A14FUG	SSOP6	High-frequency modulator for optical disk drives (2-ch)	—	—	—	—	Spectrum diffusion type	4.5 to 5.5
TC93A16FTG	VOON24☆	Laser diode driver for BlueRay playback	—	100	—	—	3-terminal	4.5 to 12

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Other Consumer Product ICs

Home Appliance ICs

Part Number	Package	Description	Features	Power Supply Voltage (V)
TA7555PG	DIP8	General-purpose timer	Time controlled by two resistors and one capacitor	4.5 to 16
TA7555FG	FLP8	General-purpose timer	Time controlled by two resistors and one capacitor	4.5 to 16

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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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PLC (Power Line Communication) IC

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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