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SEMICONDUCTOR GENERAL CATALOG

東芝半導体製品総覧表2016年7月版

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専用IC

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Automotive ICs / 車載用

Image Recognition Processors / 画像認識プロセッサ

Part Number	Maximum Operating Frequency (MHz) MeP, MPE	Maximum Operating Frequency (MHz) ARM Cortex-A9 MPCore	Media Processing Engine [MPE]	Image Processing Accelerator										Video Input Interface (ch)	Video Output Interface (ch)	PCI Express® (lane)	UART (ch)	SPI (ch)	I ² C (ch)	CAN (ch)	CAN FD (ch)	PCM (ch)	Memory Controller	CPU Core		Package
				Affine Transformation	Pyramid	Filter	Histogram	Histogram of Oriented Gradients [HOG]	Enhanced CoHOG	Matching	SfM	Toshiba's Proprietary 32-bit RISC CPU MeP	ARM 32-bit RISC ARM® Cortex®-A9 MPCore													
TMPV7502XBG ☆	266.7	—	○	○	—	○	○	○	—	○	—	1	1	—	5	1	4	2	—	2	DDR2-SDRAM, SRAM, ROM, NOR Flash	○	—	PLFBGA324		
TMPV7504XBG ☆	266.7	—	○	○	—	○	○	—	—	○	—	2	1	—	5	4	4	3	—	2	DDR2-SDRAM, SRAM, ROM, NOR Flash	○	—	PBGA516		
TMPV7506XBG ☆	266.7	—	○	○	—	○	○	○	—	○	—	4	1	1	5	4	4	3	—	2	DDR2-SDRAM, SRAM, ROM, NOR Flash	○	—	PBGA516		
TMPV7528XBG ☆	266.7	300	○	○	—	○	○	○	—	○	—	4	1	1	5	4	4	3	—	2	DDR2-SDRAM, SRAM, ROM, NOR Flash	○	○	PBGA516		
TMPV7602XBG **☆	266.7	—	○	○	○	○	○	○	○	○	—	2	1	—	5	4	4	2	2	2	LPDDR2-SDRAM, SRAM, ROM, NOR Flash	○	—	PLFBGA521		
TMPV7608XBG **☆	266.7	—	○	○	○	○	○	○	○	○	○	8	2	—	5	4	8	3	—	2	LPDDR2-SDRAM, SRAM, ROM, NOR Flash	○	—	PFBGA796		

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Automotive Display Controllers / 車載ディスプレイコントローラ

Part Number	Maximum Operating Frequency (MHz)	3D Graphic Accelerator	2D Graphic Accelerator	Display Controller (ch)	Video Capture (ch)	Stepper Motor Controller (ch)	On-Chip Flash (MByte)	DMAC (ch)	UART (ch)	SPI (ch)	I ² C (ch)	CAN (ch)	Timer (ch)	PWM (ch)	ADC (ch)	Memory Controller	Others	Package
TX4961XBG-240 ☆	240	—	○	1	1	—	—	8	3	2	1	3	8	6	8	NAND Flash, DDR-SDRAM, SRAM, ROM, NOR Flash	MLB, AC-link controller	PBGA456
TX4964FG-120 ☆	120	—	○	1	1	—	—	4	2	2	1	2	5	3	—	SRAM, ROM, NOR Flash	Embedded DRAM: 4 MBytes, I ² S: 2 ch	LQFP176
TX4966XBG-280 ☆	280	○	○	2	2	—	—	8	2	4	1	4	19	14	—	SDRAM, SRAM, ROM, NOR Flash	Embedded DRAM: 8 MBytes, APIX: 2 ch, MLB, I ² S: 2 ch	PBGA456
TMPR460XBG-300 ☆	300	—	○	1	1	4	—	8	2	2	1	2	10	10	8	Q-SPI Flash, LPDDR/SDRAM, SRAM, ROM, NAND/NOR Flash	I ² S: 2 ch, RTC, Voltage regulator	PBGA244
TMPR461XBG-300 ☆	300	—	○	2	1	5	—	8	2	2	1	3	10	24	14	Q-SPI Flash, LPDDR/SDRAM, SRAM, ROM, NAND/NOR Flash	I ² S: 2 ch, MLB, RTC, Voltage regulator	PBGA328

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Automotive Video Processors / 車載ディスプレイ用映像処理IC
(Dual/Single-Picture Video Processors) / (2画面/単画面映像処理IC)

Part Number	Function	Package	ADC	Color Decoder	Overlay	Muteless Input Switch	New Picture Adjustment	LVDS Input I/F	Two Digital Video Output	Panel	Operating Temperature (°C)	Supply Voltage (V)												
TC90195XBG	Dual pictures processing	LFBGA293	1	1	○	○	○	○	○	WXGA+	-40 to +85	1.1 to 1.3 3.0 to 3.6												
TC90175XBG **	Picture processing	LFBGA293	1	1	—	○	○	○	○	Full-HD		-40 to +85	1.4 to 1.6 2.3 to 2.7 3.0 to 3.6											
TC90197XBG	Dual pictures processing	LBGA 256	4	2	○	—	○	—	—	WVGA			-40 to +85	1.4 to 1.6 2.3 to 2.7 3.0 to 3.6										
TC90196BFG		LQFP208	4	2	○	—	—	—	—															
TC90192FG	Single picture processing	LQFP208	3	1	—	—	—	—	—						WVGA	-40 to +85	1.4 to 1.6 2.3 to 2.7 3.0 to 3.6							
TC90192XBG		FBGA265	3	1	—	—	—	—	—															
TC90193SBG	Quick display function for Rear view monitor	FBGA228	1	1	—	—	○	—	—									WVGA	-40 to +85	1.4 to 1.6 2.3 to 2.7 3.0 to 3.6				
TC90193ASBG			1	1	—	○	○	—	—															
TC90202XBG	LCD Timing control & Picture quality adjustment	FBGA121	—	—	—	—	○	—	—												WVGA	-40 to +85	1.4 to 1.6 2.3 to 2.7 3.0 to 3.6	
TC90205FG		LQFP80	—	—	—	—	○	—	—															
TC90207FG	LVDS to LVTTL	LQFP64	—	—	—	—	—	○	—		WVGA													-40 to +85

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(Video Decoder ICs) / (ビデオデコーダIC)

Part Number	Function	Package	ADC	Color Decoder	Component Input (D2)	New Picture Adjustment	ITU-R BT.601 Output	ITU-R BT.656 Output	8 bit Serial Output (D2)	Operating Temperature (°C)	Supply Voltage (V)
TC90104FG	Video Decoder	LQFP64	3	1	○	—	○	○	—	-40 to +85	1.4 to 1.6 2.3 to 2.7 3.0 to 3.6
TC90104AFG			3	1	○	—	○	○	○		
TC90106FG			3	1	○	—	—	○	○ Embedded SAV/EAV		
TC90105FG	Video Decoder with 2.5 V regulator	LQFP80	2	2	—	○	○	○	—		
TC90107FG		LQFP64	1	1	—	○	—	○	—		

System Power Supplies / システム電源

Part Number	Package	Functions	Characteristics			Remarks	Supply Voltage (V)
			Output Voltage Typ. (V)	Input Voltage Max (V)	Power Dissipation Max (W)		
TB9004FNG	SSOP24 (0.65)	2 ch CPU voltage regulators Watchdog timer	3.4/2.5/1.5 5	45 (1 s)	0.78	Watchdog timer enable/disable All regulators enable/disable 5 V regulator enable/disable 2 reset outputs External transistor required	6 to 16
TB9005FNG	☆ SSOP20 (0.65)	CPU voltage regulator Watchdog timer	5	45 (60 s)	0.68	Low current consumption: 90 μ A (typ.) Watchdog timer enable/disable Reset detection: 4.75 V or 4.25 V (selectable) External transistor required	6 to 18
TB9021FNG	☆ HTSSOP16	CPU voltage regulator Watchdog timer	5	50 (60 s)	2.8	Low current consumption: 30 μ A (typ.) Output transistors included Window watchdog timer Reset detection: 4.7 V or 4.2 V (selectable)	6 to 18
TB9042FTG	** ☆ HQFN52	CPU voltage regulator Switching regulator Series regulator Watchdog timer SPI communications	1.5/1.2 5 5 5/3.3	40 (1 s)	4.5	2 switching regulators 1.2 V/1.5 V selectable 3 series regulators 2 watchdog timers SPI communications Diagnosis functions	7 to 20.1
TB9044FNG	** ☆ HTSSOP48	CPU voltage regulator Switching regulator Series regulator Tracker Watchdog timer SPI communications	5 5 5 5	40 (1 s)	3.84	Buck/Boost Switching regulator 1 series regulator 3 trackers 1 watchdog timers SPI communications Diagnosis functions	2.7 to 18

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Blushed DC Motor Driver ICs / ブラシ付きモータドライバ

Part Number	Package	Functions	Remarks	Output Current Max (A)	Supply Voltage (V)
TB9051FTG	** ☆ PQFN28 (0.65)	1-ch H-bridge driver	PWM control, Small package, Built-in overcurrent detection, etc.	5	4.5 to 28
TB9052FNG	☆ HTSSOP48 (0.5)	H-bridge pre-driver	High speed pre-driver = 250 ns (typ.) High speed current monitor = 3 V/ μ s (min) Sequence control logic Diagnostic function	1	6 to 18
TB9056FNG	☆ SSOP24 (0.65)	LIN-compatible H-bridge driver	LIN Rev. 1.3 Motor driver: R _{DS(on)} (H bridge: P-ch + N-ch) = 2.2 Ω (typ.) Potentiometer support	0.3	7 to 18
TB9057FG	** ☆ LQFP48 (0.5)	H-bridge pre-driver	High speed pre-driver = 250 ns (typ.) High speed current monitor = 3 V/ μ s (min) Motor rotation detection Diagnostic function	1	5 to 21
TB9101FNG	☆ SSOP24 (0.65)	2-ch H-bridge driver	Diagnostic function, standby function, P-ch + N-ch = 1.2 Ω (typ.)	1	7 to 18
TB9102FNG	☆ SSOP24 (0.65)	6-ch Half-bridge driver / 3-ch H-bridge driver	SPI communications, Diagnosis function P-ch + N-ch = 1.0 Ω (typ.)	1	7 to 18
TB9110FNG	☆ SSOP24 (0.65)	N-ch MOS gate driver	Diagnosis function and standby function, Built-in charge pump, Ta = 105°C	0.02 ⁽¹⁾	7 to 18
TB9110AFNG	** ☆ SSOP24 (0.65)	N-ch MOS gate driver	Diagnosis function and standby function, Built-in charge pump, Ta = 125°C	0.02 ⁽¹⁾	7 to 18

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Note (1): An external N-channel FET is required as a gate driver. / Gate Driver: 外付け Nch-FET 使用。

Brushless Motor Driver ICs / ブラシレスモータドライバ

Part Number	Package	Functions	Characteristics	Supply Voltage (V)
TB9061FNG ☆	SSOP24 (0.65)	Sensorless control with 120 degree commutation, Pre-driver	3-phase, full-wave sensorless drive PWM pulse input control/DC level input control (selectable) Comparator for induced voltage detection Thermal shutdown, overcurrent detection, overvoltage detection	5.5 to 18
TB9061AFNG ☆	SSOP24 (0.65)	Sensorless control with 120 degree commutation, Pre-driver	3-phase, full-wave sensorless drive PWM pulse input control/DC level input control (selectable) Comparator for induced voltage detection Thermal shutdown, overcurrent detection, overvoltage detection Output PWM Dynamic range expansion	5.5 to 18
TB9067FNG ☆	SSOP24 (0.65)	Hall IC, Pre-driver for 120 degree commutation	120-degree commutation logic Pre-drivers for a high-side P-ch FET and a low-side N-ch FET PWM pulse input control/DC level input control (selectable) Two options for setting the output duty cycle (pulse input, analog input) Overcurrent detection, thermal shutdown, supply voltage increase, supply voltage decrease Soft start	6 to 18
TB9068FG ☆	LQFP48 (0.5)	Motor driver with a LIN transceiver	Motor driver R _{DS(on)} : P-ch = 1 Ω (typ.), N-ch = 1 Ω (typ.) 120-degree commutation logic LIN 1.3-based transceiver 5-V supply for a microcontroller (external PNP transistor required) Watchdog timer, power-on reset timer Three analog comparators for Hall devices	7 to 18
TB9080FG ☆	LQFP64 (0.5)	Hall elements, Pre-driver for sine-wave control	Supports both PWM and DC inputs for sine-wave driver logic. Motor RPM feedback, auto lead angle correction Abnormal condition detection such as overcurrent, overvoltage, overtemperature and motor lock Sleep mode	7 to 18
TB9081FG ** ☆	LQFP64 (0.5)	3-Phase Brushless Motor Pre-driver	5-channel safety relay Selectable operation on fault detection Initial diagnosis of detection circuits	4.5 to 18

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IGBT Gate-Pre Driver Control IC / IGBTゲートプリドライバコントロールIC

Part Number	Package	Functions	Characteristics	Supply Voltage (V)
TB9150FNG ** ☆	SSOP48 (0.5)	IGBT Gate-Pre driver control IC for in-vehicle inverters, Built-in isolation device (optical coupling) for primary-side and secondary-side	IGBT Gate-Pre driver control, IGBT temperature monitor, Short circuit detection (current sense, DESAT), UVLO, etc., Built-in fly-back controller	6 to 20 (GND1 Standard, Primary-side) 11 to 18 (VE Standard, Secondary-side)

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Interface Bridges / インタフェースブリッジ

Part Number	Package	Applications	Functions and Features	Supply Voltage (V)
TC9560XBG ** ☆	PLFBGA170 (0.65)	Ethernet AVB Bridge Solution For Automotive Applications	Host (External application) I/F: PCIe I/F [Gen2.0 (5 GT/s), Endpoint, Single lane], HSIC I/F (480 Mbps) Automotive I/F: Ethernet AVB [IEEE802.1AS, IEEE802.1Qav], MAC Audio I/F: I2S/TDM Peripheral I/F: I2C/SPI, Quad-SPI, UART, GPIO, INTC CPU Core: ARM Cortex-M3	1.8/3.3 for IO 1.2 for HSIC 1.8/2.5/3.3 for RGMII/RMII/MII 1.1 for Core
TC9560AXBG ** ☆	PLFBGA170 (0.65)	Ethernet AVB Bridge Solution For Automotive Applications	Host (External application) I/F: PCIe I/F [Gen2.0 (5 GT/s), Endpoint, Single lane], HSIC I/F (480 Mbps) Automotive I/F: Ethernet AVB [IEEE802.1AS, IEEE802.1Qav], MAC, 2ch CAN-FD Audio I/F: I2S/TDM Peripheral I/F: I2C/SPI, Quad-SPI, UART, GPIO, INTC CPU Core: ARM Cortex-M3	1.8/3.3 for IO 1.2 for HSIC 1.8/2.5/3.3 for RGMII/RMII/MII 1.1 for Core

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Communications ICs / 通信用

Wireless Communications ICs / 無線通信用 IC

Part Number	Package (Pin Pitch)	Functions	Applications	Functions and Features	Supply Voltage (V)	
TC32306FTG ☆	QFN36 (0.5 mm)	RF-IC	Remote keyless entry (remote door lock/unlock), TPMS (tire pressure monitoring system), Remote control (AM/FM), etc.	Single-chip RF transceiver; Supported modulation: ASK/FSK. Use for four RF Band: 315, 434, 868/915-MHz, Fractional-N ΔΣ PLL Receiver sensitivity: under -116 dBm (At IF BW = 320 kHz, data rate = 600 Hz, frequency deviation = +/-40 kHz) Transmitter power: +10 dBm (typ. by maximum coarse step control) Two IF Filter bandwidths: wide 320 kHz (typ.) at IF = 230 kHz/ middle 270 kHz (typ.) at IF = 280 kHz Signal Detection: RSSI detection, noise detection (only for FSK), preamble detection Serial control (4 wire SPI) /EEPROM control (This IC also can be used as a specialized for receiving.)	TX: 12 mA (typ. /@Output level: +10 dBm) RX: 9.7 mA (typ.) Battery Saving: 0 μA (typ.)	3V Use: 2.0 to 3.3 5V Use: 2.4 to 5.5
TC32163FG ☆	LQFP48 (0.5 mm)		DSRC (Dedicated Short Range Communication), ETC (Electronic Toll Collection System)	5.8-GHz transceiver; ASK/QPSK, transmit power = -15 dBm to -2 dBm Transmitter EVM = 6.5% (typ.) ACPR $\leq 5\text{ MHz}$ = -42 dBc (typ.), receiver EVM = 8% (typ.)		RX (ASK/QPSK): 62 mA/66 mA (typ.) TX (ASK/QPSK): 75 mA/75 mA (typ.)
TC32166FNG ☆	SSOP10 (0.65 mm)		DSRC (Dedicated Short Range Communication), ETC (Electronic Toll Collection System)	5.8-GHz power amp; Power gain = 20 dB (typ.), ACPR (ASK/QPSK, $\leq 5\text{ MHz}$) = -44 dBc (@Output level: +14 dBm)	TX: 75 mA (typ. /@Output level: +14 dBm)	3.0 to 3.6
TC32168FTG ☆	QFN32 (0.5 mm)		ETC (Electronic Toll Collection System) for China	Single-Chip 5.8 GHz transceiver including Wakeup function and FM0 Modem Supported modulation: ASK/OOK Receiving sensitivity: -60 dBm (typ.) Wakeup sensitivity: -45 dBm (typ.) Transmit power: +3 dBm	Sleep: 5 μA RX: 30 mA (typ.) TX: 35 mA (typ.)	1.8 to 3.6

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Proximity Wireless Compliant Products / 近接無線対応製品

Part Number	Package	Applications	Functions and Features	Supply Voltage (V)
TC35420AXLG ☆	WFLGA81	Proximity wireless transceiver	TransferJet™-compliant Wireless IC On-chip RF circuitry, digital signal processing SDIO UHS-I support	3.3 to 1.8
TJM35420XLQ ☆	LGA68	Proximity wireless transceiver	TransferJet™-compliant Wireless Module Built-in RF components SDIO UHS-I support	3.3 to 1.8

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Bluetooth® ICs / Bluetooth® IC

(Bluetooth® / Bluetooth® Smart Ready ICs for Consumer) / (民生用 Bluetooth® / Bluetooth® Smart Ready IC)

CPU	Host-IF	Interfaces
ARM7TDMI-S™	UART host interface	I2C/SPI /GPIO

Part Number	Bluetooth version	Profiles	Feature	Operating temperature (°C)	Supply Voltage (V)	Package
TC35661SBG-203 ☆	Bluetooth Ver.3.0	SPP	<ul style="list-style-type: none"> · Receiver sensitivity -90 dBm · Transmit power 2 dBm · Current consumption in TX/RX (peak) 63 mA · Current consumption in deep sleep mode 30 μA 	-40 to +85	1.7 to 1.9 or 2.7 to 3.6	BGA64 (0.5 mm Pitch) 5.0 mm x 5.0 mm
TC35661DBG-203 ☆ **						BGA64 (0.8 mm Pitch) 7.0 mm x 7.0 mm
TC35661SBG-007 ☆	Bluetooth Smart Ready Ver.4.0	HCI	<ul style="list-style-type: none"> · Receiver sensitivity -91 dBm · Transmit power 2 dBm · Current consumption in TX/RX (peak) 63 mA · Current consumption in deep sleep mode 30 μA 	-40 to +85	1.7 to 1.9 or 2.7 to 3.6	BGA64 (0.5 mm Pitch) 5.0 mm x 5.0 mm
TC35661SBG-502 ☆		SPP, GATT, SMP				BGA64 (0.8 mm Pitch) 7.0 mm x 7.0 mm
TC35661SBG-501 ☆						BGA64 (0.5 mm Pitch) 5.0 mm x 5.0 mm
TC35661DBG-501 ☆						BGA64 (0.5 mm Pitch) 5.0 mm x 5.0 mm
TC35661SBG-503 ☆	Bluetooth Smart Ready Ver.4.2					BGA64 (0.5 mm Pitch) 5.0 mm x 5.0 mm

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Host-IF	Interfaces	Others
UART host interface	I2C/SPI/GPIO	ADC/PWM/DC-DC

Part Number	Bluetooth version	Profiles	NFC Tag	CPU	Feature	Operating temperature (°C)	Supply Voltage (V)	Package
TC35667FTG-005 ☆	Bluetooth Smart Ver.4.0			ARM® ARM7TDMI-S™	<ul style="list-style-type: none"> Receiver sensitivity -92 dBm Transmit power 0 dBm Current consumption in TX/RX (peak) 6.3 (3.0 V, -4 dBm TX power)/6.3 mA Current consumption in deep sleep mode 0.05 μA 	-40 to +85	1.8 to 3.6	QFN40 (0.5 mm Pitch) 6.0 mm x 6.0 mm
TC35670FTG-005 ☆			✓		<ul style="list-style-type: none"> Receiver sensitivity -92 dBm Transmit power 0 dBm Current consumption in TX/RX (peak) 6.3 (3.0 V, -4 dBm TX power)/6.3 mA Current consumption in deep sleep mode 0.05 μA 	-30 to +85		QFN40 (0.4 mm Pitch) 5.0 mm x 5.0 mm
TC35667FSG-006 ☆	Bluetooth Smart Ver.4.1	HCI, GATT, SMP		ARM® ARM7TDMI-S™	<ul style="list-style-type: none"> Receiver sensitivity -92 dBm Transmit power 0 dBm Current consumption in TX/RX (peak) 6.3 (3.0 V, -4 dBm TX power)/6.3 mA Current consumption in deep sleep mode 0.05 μA 	-40 to +85	1.8 to 3.6	QFN40 (0.5 mm Pitch) 6.0 mm x 6.0 mm
TC35667FTG-006 ☆					<ul style="list-style-type: none"> Receiver sensitivity -92 dBm Transmit power 0 dBm Current consumption in TX/RX (peak) 6.3 (3.0 V, -4 dBm TX power)/6.3 mA Current consumption in deep sleep mode 0.05 μA 	-40 to +85		QFN40 (0.5 mm Pitch) 6.0 mm x 6.0 mm
TC35667WBG-006 ☆ **								WCSF41 (0.4 mm Pitch) 2.9 mm x 3.0 mm
TC35670FTG-006 ☆			✓		<ul style="list-style-type: none"> Receiver sensitivity -92 dBm Transmit power 0 dBm Current consumption in TX/RX (peak) 6.3 (3.0 V, -4 dBm TX power)/6.3 mA Current consumption in deep sleep mode 0.05 μA 	-30 to +85		QFN40 (0.5 mm Pitch) 6.0 mm x 6.0 mm
TC35676FSG-001 ☆	Bluetooth Smart Ver.4.1/4.2			Cortex®-M0	<ul style="list-style-type: none"> Receiver sensitivity -92 dBm Transmit power 0 dBm Current consumption in TX/RX (peak) 6.3 (3.0 V, -4 dBm TX power)/6.3 mA Current consumption in deep sleep mode 0.05 μA 	-40 to +85	1.8 to 3.6	QFN40 (0.4 mm Pitch) 5.0 mm x 5.0 mm
TC35676FTG-001 ☆					<ul style="list-style-type: none"> Receiver sensitivity -92 dBm Transmit power 0 dBm Current consumption in TX/RX (peak) 6.3 (3.0 V, -4 dBm TX power)/6.3 mA Current consumption in deep sleep mode 0.05 μA 	-40 to +85		QFN40 (0.5 mm Pitch) 6.0 mm x 6.0 mm
TC35675XBG-001 ☆			✓					BGA52 (0.5 mm Pitch) 4.5 mm x 4.5 mm
TC35678FSG-001 ☆	Bluetooth Smart Ver.4.1/4.2			Cortex®-M0	<ul style="list-style-type: none"> Receiver sensitivity -92 dBm Transmit power 0 dBm Current consumption in TX/RX (peak) 3.6 (3.0 V, 0 dBm TX power)/3.6 mA Current consumption in deep sleep mode 0.05 μA 	-40 to +85	1.8 to 3.6	QFN40 (0.4 mm Pitch) 5.0 mm x 5.0 mm
TC35678FXG-001 ☆					<ul style="list-style-type: none"> Receiver sensitivity -92 dBm Transmit power 0 dBm Current consumption in TX/RX (peak) 3.6 (3.0 V, 0 dBm TX power)/3.6 mA Current consumption in deep sleep mode 0.05 μA 	-40 to +85		QFN60 (0.4 mm Pitch) 7.0 mm x 7.0 mm
TC35679FSG-001 ☆								QFN40 (0.4 mm Pitch) 5.0 mm x 5.0 mm

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 (車載用Bluetooth® / Bluetooth® SMART READY / Bluetooth® SMART IC)

Part Number	Bluetooth version	Profiles	Feature	Operating temperature (°C)	Supply Voltage (V)	Package
TC35661IDBG-203 ☆	Bluetooth Ver.3.0	SPP	<ul style="list-style-type: none"> ・ Receiver sensitivity -90 dBm ・ Transmit power 2 dBm ・ Current consumption in TX/RX (peak) 63 mA ・ Current consumption in deep sleep mode 30 μA 	-40 to +85	2.7 to 3.6	BGA64 (0.8 mm Pitch) 7.0 mm x 7.0 mm
TC35661IDBG-007 ☆	Bluetooth Smart Ready Ver.4.0	HCI	<ul style="list-style-type: none"> ・ Receiver sensitivity -90 dBm ・ Transmit power 2 dBm ・ Current consumption in TX/RX (peak) 63 mA ・ Current consumption in deep sleep mode 30 μA ・ Wide band Speech 			
TC35661IDBG-008 ☆			<ul style="list-style-type: none"> ・ Receiver sensitivity -93 dBm ・ Transmit power 1 dBm ・ Current consumption in TX/RX (peak) 174 mA ・ On-chip DSP ・ Wide band speech 			
TC35668IXBG ☆		HFP, A2DP, AVRCP, PBAP, SPP	<ul style="list-style-type: none"> ・ Receiver sensitivity -92 dBm ・ Transmit power 0 dBm ・ Current consumption in TX/RX (peak) 6.3 (3.0 V, -4dBm TX power)/6.3 mA ・ Current consumption in deep sleep mode 0.05 μA 		3.0 to 3.6	BGA97 (0.5 mm Pitch) 6.0 mm x 6.0 mm
TC35667IFTG-005 ☆	Bluetooth Smart Ver.4.0	HCI, GATT, SMP	<ul style="list-style-type: none"> ・ Receiver sensitivity -91 dBm ・ Transmit power 2 dBm ・ Current consumption in TX/RX (peak) 63 mA ・ Current consumption in deep sleep mode 30 μA ・ Wide band Speech 		1.8 to 3.6	QFN40 (0.5 mm Pitch) 6.0 mm x 6.0 mm
TC35667IFTG-006 ☆	Bluetooth Smart Ver.4.1					
TC35661IDBG-009 ☆ **	Bluetooth Smart Ready Ver.4.2	HCI	<ul style="list-style-type: none"> ・ Receiver sensitivity -91 dBm ・ Transmit power 2 dBm ・ Current consumption in TX/RX (peak) 63 mA ・ Current consumption in deep sleep mode 30 μA ・ Wide band Speech 	2.7 to 3.6	BGA64 (0.8 mm Pitch) 7.0 mm x 7.0 mm	

☆: Dry-packed / 防湿梱包品

** : Under development / 開発中

TV and Audio ICs / テレビ/オーディオ用

TV Tuning & Channel Decoder ICs / TVチューナ/伝送復調用IC

(Channel Decoder ICs) / (伝送復調用IC)

Part Number	Package	Use	Features	Supply Voltage (V)
TC90532XBG ☆	FBGA177	8PSK demodulator OFDM demodulator	Digital BS broadcasting, digital CS broadcasting (ISDB-S), 8PSK, QPSK demodulation, error correction, Digital terrestrial broadcasting (ISDB-T), OFDM demodulation, error correction, A/D converter, memory	3.0 to 3.6 1.1 to 1.3
TC90522XBG ☆	FBGA177	8PSK demodulator OFDM demodulator (Two channels each)	Digital BS broadcasting, digital CS broadcasting (ISDB-S), 8PSK, QPSK demodulation, error correction, Digital terrestrial broadcasting (ISDB-T), OFDM demodulation, error correction, A/D converter, memory	3.0 to 3.6 1.1 to 1.3
TC90527AFG ☆	LQFP48	OFDM demodulator	Digital terrestrial broadcasting (ISDB-T), OFDM demodulation, error correction, A/D converter, memory	3.0 to 3.6 1.1 to 1.3

☆: Dry-packed / 防湿梱包品

Audio ICs / オーディオ用IC

(Power Amp ICs) / (パワーアンプIC)

Part Number	Package	Intended Use		Output Power (P _{OUT})			Features	Supply Voltage (V)
		Car Stereos	Engine Sound	Recommended V _{CC}	R _L = 4 Ω THD = 10%	R _L = 8 Ω THD = 10%		
TB2909FNG	HTSSOP16		○	12 V		2 W x 1	MOS amplifier for 1 SEPP channel, Standby function, Mute function, Maximum power: 5 W x 1 ch, Output short detection, Thermal detection, Speaker open detection, Overvoltage detection	6 to 16
TB2931HQ	SPP25	○		13.2 V	24 W x 4		MOS amplifier for 4 BTL channels, Standby function, Mute function, Maximum power: 49 W x 4 ch, R _L = 2 Ω operation guaranteed, Output DC offset detection, Output short detection, +B overvoltage detection, Half short detection	6 to 18 (R _L = 4 Ω) 6 to 16 (R _L = 2 Ω)
TB2938HQ	SPP25	○		13.2 V	24 W x 4		MOS amplifier for 4 BTL channels, Standby function, Mute function, Maximum power: 49 W x 4 ch, Output DC offset detection, Output short detection, +B overvoltage detection, Half short detection, Speaker burning prevention	6 to 18
TB2959HQ	SPP25	○		13.2 V	23 W x 4		MOS amplifier for 4 BTL channels, Standby function, Mute function, Maximum power: 47 W x 4 ch, AUX amp, +B overvoltage detection, Speaker burning prevention	6 to 18
TB2941HQ	SPP25	○		13.2 V	24 W x 4		MOS amplifier for 4 BTL channels, Standby function, Mute function, Maximum power: 49 W x 4 ch, R _L = 2 Ω operation guaranteed, High-side-switch, Output DC offset detection, 6 V operations (Engine idling reduction capability), Proof against from GSM	6 to 18 (R _L = 4 Ω) 6 to 16 (R _L = 2 Ω)
TB2952AHQ	SPP25	○		13.2 V	24 W x 4		MOS amplifier for 4 BTL channels, Command-controlled standby and mute mode, Hardware-standby mode, Maximum power: 49 W x 4 ch, I ² C-bus controlled self-diagnosis, R _L = 2 Ω operation guaranteed, Selectable voltage gain (26/12 dB), 6 V operations (Engine idling reduction capability), Proof against from GSM	6 to 18 (R _L = 4 Ω) 6 to 16 (R _L = 2 Ω)

Audio ICs / オーディオ用IC
(Power Amp ICs) / (パワーアンプIC)

Part Number	Package	Intended Use		Output Power (P _{OUT})			Features	Supply Voltage (V)
		Car Stereos	Engine Sound	Recommended V _{CC}	R _L = 4 Ω THD = 10%	R _L = 8 Ω THD = 10%		
TB2975HQ	SPP25	○		13.2 V	24 W x 4		MOS amplifier for 4 BTL channels, Command-controlled standby, and mute mode, Hardware-standby mode, Maximum power: 49 W x 4 ch, Class-KB efficiency, I ² C-bus controlled self-diagnosis, Cross-wiring detection, R _L = 2 Ω operation guaranteed, Selectable voltage gain (26/16 dB), 6 V operations (Engine idling reduction capability), Proof against from GSM	6 to 18 (R _L = 4 Ω) 6 to 16 (R _L = 2 Ω)
TB2925HQ	SPP25	○		13.2 V	24 W x 4		MOS amplifier for 4 BTL channels, Standby function, Mute function, Maximum power: 49 W x 4 ch, Class-KB efficiency, R _L = 2 Ω operation guaranteed, Output DC offset detection, Output short detection, +B overvoltage detection, Cross-wiring detection, 6 V operations (Engine idling reduction capability), Proof against from GSM	6 to 18 (R _L = 4 Ω) 6 to 16 (R _L = 2 Ω)
TB2996HQ	SPP25	○		13.2 V	24 W x 4		MOS amplifier for 4 BTL channels, Standby function, Mute function, Maximum power: 49 W x 4 ch, R _L = 2 Ω operation guaranteed, High quality sound, Output DC offset detection, Output short detection, +B overvoltage detection, 6 V operations (Engine idling reduction capability), Proof against from GSM	6 to 18 (R _L = 4 Ω) 6 to 16 (R _L = 2 Ω)
TCB001HQ	SPP25	○		13.2 V	22 W x 4		MOS amplifier for 4 BTL channels, Standby function, Mute function, Maximum power: 45 W x 4 ch, Output DC offset detection, Output short detection, +B overvoltage detection, 6 V operations (Engine idling reduction capability), Proof against from GSM	6 to 18 (R _L = 4 Ω)

(Compact Disc Player IC) / (コンパクトディスクプレーヤ用IC)

Part Number	Package	Classification	Features	Supply Voltage (V)
TC94B16FG ☆	LQFP80	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, multi-bit D/A converter, head amp On-chip 3.3-to-1.5-V regulator, x4 playback mode for CD-DA/R	3.3/1.5

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(CD/MP3 Player ICs) / (CDMP3プレーヤ用IC)

Part Number	Package	Classification	Features	Supply Voltage (V)
TC94A92FG ☆	LQFP80	Single-chip processor	CD-DA/R/RW: x2 playback, low power consumption, 1-Mbit SRAM (128 Kwords x 8 bits), standby mode, Supports various compressed audio formats: MP3, WMA, AAC RF amp, CD digital servo, 8fs digital filter, Multi-bit D/A converter	3.3/1.5
TC94A93MFG ☆	LQFP80	Single-chip processor	CD-DA/R/RW: x2 playback, low power consumption, 1-Mbit SRAM (128 Kwords x 8 bits), standby mode, Supports various compressed audio formats: MP3, WMA, AAC RF amp, CD digital servo, 8fs digital filter Multi-bit D/A converter, shock-proof feature	3.3/1.5

☆: Dry-packed / 防湿梱包品

Application Processors / アプリケーションプロセッサ

TZ1000 Series / TZ1000 シリーズ

Part Number	Package	CPU															True Random Number Generator	Compressor & decompressor	SPI (ch)	Quad SPI for Flash connection	PWM (ch)	32-bit Timer	Watchdog Timer	12-bit ADC	24-bit ADC	DAC	LED driver	USB	Operating temperature (°C)			
		CPU Frequency (MHz)	SRAM	NOR Flash (MB)	e-MMC™ (ch)	External bus	Graphics accelerator	LCD Controller	Accelerometer	Gyroscope	Magnetometer	Bluetooth® core specification version	Bluetooth® Low Energy controller	GPIO	I²C (Master/Slave) (ch)	UART (ch)														DMA (ch)	AES	
TZ1011MBG	PLFBGA153	48	288 KB	(1) 1	—	—	—	—	—	MIPIDBI Type B, Type C, DSI	1	1	1	4.0	1	(2) 24 [32]	(2) 2 [3]	(2) 2 [3]	8	128/192/256-bits key length	1	—	(2) 3 [4]	Supported	4	2	1	4	3	—	—	USB 2.0 Device Ta = -20 to 70
TZ1021MBG	PVFBGA110										—	—	—	—	—	32	3	3					4									
TZ1031MBG	PLFBGA153										1	1	—	4.0	1	(2) 24 [32]	(2) 2 [3]	(2) 2 [3]					(2) 3 [4]									
TZ1041MBG	PLFBGA136										—	—	—	4.1	1	(2) 24 [32]	(2) 2 [3]	(2) 2 [3]					(2) 3 [4]									
TZ1201XBG	** PUFBGA210	96 (up to 120)	2.2 MB	—	2	1	2D	—	—	—	—	—	120	2	4	16	1	1	4	8	2	1	16	4	1	4						

Note (1): NOR Flash is connected internally via SPI. / Nor Flash は SPI 経由で内部接続。

** : Under development / 開発中

(2): Number inside brackets means the channel counts of internal MCU. / []内の数字は内蔵のMCUのチャンネル数を含めた数です。

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TZ2000 Series / TZ2000 シリーズ

Part Number	Package	CPU	CPU Frequency	L1 I Cache (Kbyte)	L1 D Cache (Kbyte)	L2 Cache (Kbyte)	FPU	Secure boot system & Encrypt data function	SRAM (Byte)	DRAM Controller	External extended bus interface	2D Graphic Engine	LCD Controller	USB	Camera I/F	UART	I ² C	I ² S	SPIB	SPIM	PWM	12-bit ADC	SDIO/e-MMC	GPIO	Other peripheral function	Operating temperature (°C)
TZ2002XBG	PLFBGA280	ARM® Cortex®-A9 MPCore	200	16	16	—	—	—	1 MB	DDR3/DDR3L x 8 bit	—	Toshiba original graphics accelerator	WVGA (800 x 480 pixel) 60 fps, 24 bit Parallel I/F	USB2.0 host/device	—	5	2	2	5	2	64	DMA controller, Timer/Counter, RTC	Ta = -20 to 70 Ta = -40 to 85 ⁽¹⁾			
TZ2003XBG	PLFBGA280							Yes																		
TZ2100XBG	PLFBGA310		300	32	32	128	Yes	—	1 MB + 32 KB	DDR3/DDR3L x 16 bit	Address: 27 bit, Data: 32 bit	Toshiba original graphics accelerator	WVGA (800 x 480 pixel) 60 fps, 24 bit Parallel I/F	USB2.0 host/device	4	4	2	2	7	6	3	128	DMA controller, Timer/Counter, RTC	Ta = -20 to 80 Ta = -40 to 85 ⁽¹⁾		
TZ2101XBG	PLFBGA310		Yes																							
TZ2102XBG	PLFBGA310		600					—																		

Note (1): Extended temperature range / 温度拡張品

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TZA300 Series / TZA300 シリーズ

Part Number	Package	Video I/O Interface	Feature	Applications	Supply Voltage (V)
TZA300XBG	PFBGA448	<ul style="list-style-type: none"> LVC MOS Parallel I/O - YUV/RGB 444 (24 bit) - YUV 422 (16 bit) - YUV 422 (8 bit YC multiplex for only 480p/576p) Supported video formats - up to 1080p @ 60 (*) Video input 1port and Video output 2ports are supported 	<ul style="list-style-type: none"> Video Dynamic Range Enhancing Ultra-low latency processing (100 pixel clock cycles or less) 3D Noise Reduction Control Interface: I²C BUS 	<ul style="list-style-type: none"> Surveillance camera system Surveillance monitor system 	Core, PLL: 1.2 DDR3 I/F: 1.5/2.5 I/O: 1.8/3.3
RBTZA300-1MD	Compact module board	<ul style="list-style-type: none"> LVC MOS Parallel I/O Supported video formats - up to 1080p @ 60⁽¹⁾ 	<ul style="list-style-type: none"> RBTZA300-1MD is a compact Module board containing TZA300XBG, RAM, ROM, power converters and other various peripherals. Compact Module size: 42 mm x 42 mm Connector to Mother board: DF40C-100DP-0.4 V 	<ul style="list-style-type: none"> Surveillance camera system Surveillance monitor system 	3.3 1.8 (Optional)

Note (1): Special license file is required for performing dynamic range enhancer processing of input videos other than VGA, 480p and 576p. For more Information kindly contact the sales division. / VGA、480P及び576P以外の入力映像に対する鮮明化には特別なライセンスファイルが必要です。詳細については、営業部門にお問い合わせください。

Interface Bridges / インタフェースブリッジ

MPD: Mobile Peripheral Devices

Part Number	Package (Ball Pitch)	Functions		Applications	Feature/Supported Resolution	Supply Voltage (V)
		Input	Output			
TC358743XBG ☆	P-TFPGA64 (0.65 mm)	HDMI® 1.4	MIPI® CSI-2 1.01	Smart TV, smart monitor, smart set-top box, digital media adapter (DMA)	HDMI® to MIPI® CSI-2 Camera Serial Interface Bridge HDMI® Video format: Up to FHD (1920 x 1080, 60 fps, 24 bpp (bits per pixel))	1.2 (MIPI®/Core) 3.3 (HDMI®) 1.8 to 3.3 (I/O) 2.5 (APLL)
TC358749XBG ☆	P-VFPGA80 (0.65 mm)	HDMI® 1.4b	MIPI® CSI-2 1.01	Smart TV, smart monitor, smart set-top box, DMA	HDMI® to MIPI® CSI-2 Camera Serial Interface Bridge Video de-interlacing, Video scaling HDMI® Video format: Up to FHD (1920 x 1080, 60 fps, 24 bpp)	1.2 (MIPI®/Core/PLL) 3.3 (HDMI®) 1.8 to 3.3 (I/O)
TC358779XBG ☆	P-VFPGA80 (0.65 mm)	HDMI® 1.4b	MIPI® DSI 1.1	Tablet, digital still camera (DSC), LCD displays, video projector, head mount device (HMD), game accessory, other integrated display panel application with MIPI® DSI interface	HDMI® to MIPI® DSI Display Serial Interface Bridge Video de-interlacing, Video scaling HDMI® Video format: Up to FHD (1920 x 1080, 60 fps, 24 bpp)	1.2 (MIPI®/CORE/PLL) 3.3 (HDMI®) 1.8 to 3.3 (I/O)
TC358840XBG ☆	P-VFPGA80 (0.65 mm)	HDMI® 1.4b	MIPI® CSI-2 1.01	Smart set top box, smart TV, smart monitor, DMA	HDMI® to MIPI® CSI-2 Camera Serial Interface Bridge HDMI® Video format: Up to 4K Ultra HD (3840 x 2160, 30 fps, 24 bpp)	1.2 MIPI® 1.1 CORE/PLL 3.3 (HDMI®) 1.8 to 3.3 (I/O)
TC358870XBG ☆	P-VFPGA80 (0.65 mm)	HDMI® 1.4b	MIPI® DSI 1.1	Head-mounted display (HMD), mobile devices, gaming accessories, wearable computers display	HDMI® to MIPI® DSI Display Serial Interface Bridge HDMI® Video format: Up to 4K Ultra HD (3840 x 2160, 30 fps, 24 bpp)	1.2 MIPI® 1.1 CORE/PLL 3.3 (HDMI®) 1.8 to 3.3 (I/O)
TC358746AXBG ☆	P-VFPGA72 (0.40 mm)	(1) MIPI® CSI-2 1.01 (2) Parallel	(1) Parallel (2) MIPI® CSI-2 1.01	Smartphone, tablet, VOIP phone, industrial device	MIPI® CSI-2 to Parallel Camera Interface Bridge Parallel to MIPI® CSI-2 Camera Interface Bridge Up to 100 MHz PCLK frequency for Output mode, and 166 MHz for Input mode.	1.2 (MIPI®/Core) 1.8 to 3.3 (I/O)
TC358748XBG ☆	P-VFPGA80 (0.65 mm)					
TC358762XBG ☆	P-VFPGA64 (0.50 mm)	(1) MIPI® DSI 1.01 (2) MIPI® DSI 1.01	(1) MIPI® DPI 2.0 (2) MIPI® DBI-2 2.0	Tablet, smartphone, smart watch, HMD, PND	MIPI® DSI to MIPI® DPI/DBI Display Interface Bridge Up to WXGA (1366 x 768, 60 fps, 24 bpp)	1.2 (MIPI®/Core) 1.8 to 3.3 (I/O)
TC358763XBG ☆	P-VFPGA72 (0.40 mm)	(1) MIPI® DPI 2.0 (2) MIPI® DBI-2 2.0	(1) MIPI® DSI 1.01 (2) MIPI® DSI 1.01	Smartphone, DSC digital video camera (DVC), smart watch, HMD, PND	MIPI® DPI/DBI to MIPI® DSI Display Interface Bridge Up to XGA (1024 x 768, 60 fps, 24 bpp)	1.2 (MIPI®/Core) 1.8 to 3.3 (I/O)
TC358764XBG ☆	P-TFPGA49 (0.65 mm)	MIPI® DSI 1.01	LVDS Single Link	Tablet, Ultrabook™	MIPI® DSI to LVDS Display Interface Bridge TC358764XBG: Up to WXGA (1366 x 768, 60 fps, 24 bpp) TC358765XBG: Up to UXGA (1600 x 1200, 60 fps, 24 bpp)	1.2 (MIPI®/Core) 3.3 (LVDS) 1.8 to 3.3 (I/O)
TC358765XBG ☆	P-TFPGA64 (0.65 mm)	MIPI® DSI 1.01	LVDS Dual Link			
TC358766XBG ☆	P-VFPGA120 (0.50 mm)	(1) MIPI® DSI 1.01 (2) MIPI® DPI 2.0 (3) MIPI® DSI 1.01	(1) VESA DisplayPort™ 1.1a (2) VESA DisplayPort™ 1.1a (3) MIPI® DPI 2.0	Tablet, Ultrabook™	MIPI® DSI to DisplayPort™ Display Interface Bridge MIPI® DPI to DisplayPort™ Display Interface Bridge MIPI® DSI to MIPI® DPI Display Interface Bridge Up to WUXGA (1920 x 1200, 60 fps, 24 bpp)	1.2 (MIPI®/Core) 1.2 & 1.8 (DisplayPort™) 1.8 (I/O)
TC358767XBG ☆	P-VFPGA81 (0.50 mm)	(1) MIPI® DSI 1.01 (2) MIPI® DPI 2.0	(1) VESA DisplayPort™ 1.1a (2) VESA DisplayPort™ 1.1a	Tablet, Ultrabook™	MIPI® DSI to DisplayPort™ Display Interface Bridge MIPI® DPI to DisplayPort™ Display Interface Bridge Up to WUXGA (1920 x 1200, 60 fps, 24 bpp) Non-ASSR, non-audio data	1.2 (MIPI®/Core) 1.2 & 1.8 (DisplayPort™) 1.8 (I/O)
TC358767AXBG ☆	P-VFPGA81 (0.50 mm)	(1) MIPI® DSI 1.01 (2) MIPI® DPI 2.0	(1) VESA DisplayPort™ 1.1a (2) VESA DisplayPort™ 1.1a	Tablet, Ultrabook™	MIPI® DSI to DisplayPort™ Display Interface Bridge MIPI® DPI to DisplayPort™ Display Interface Bridge Up to WUXGA (1920 x 1200, 60 fps, 24 bpp)	1.2 (MIPI®/Core) 1.2 & 1.8 (DisplayPort™) 1.8 (I/O)
TC358768AXBG ☆	P-VFPGA72 (0.40 mm)	RGB	MIPI® DSI 1.02	Smartphone, tablet, Ultrabook™	RGB to MIPI® DSI Display Interface Bridge Up to WUXGA (1920 x 1200, 60 fps, 24 bpp)	1.2 (MIPI®/Core) 1.8 to 3.3 (I/O)
TC358778XBG ☆	P-VFPGA80 (0.65 mm)					
TC358770AXBG ☆	P-VFPGA100 (0.40 mm)	MIPI® DSI 1.02	VESA DisplayPort™ 1.1a	Tablet, Ultrabook™	MIPI® DSI to DisplayPort™ Display Interface Bridge Up to QSXGA (2560 x 2048, 60 fps, 24 bpp)	1.2 (MIPI®/Core) 1.2 & 1.8 (DisplayPort™) 1.8 (I/O)
TC358777XBG ☆	P-VFPGA80 (0.65 mm)					

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MPD: Mobile Peripheral Devices

Part Number	Package (Ball Pitch)	Functions		Applications	Feature/Supported Resolution	Supply Voltage (V)
		Input	Output			
TC358771XBG ☆	P-VFBGA49 (0.65 mm)	MIPI® DSI 1.01	LVDS Single Link	Tablet, Ultrabook™	MIPI® DSI to LVDS Display Interface Bridge with Back Light Control TC358771XBG: Up to UXGA (1600 x 1200, 60 fps, 24 bpp) TC358772XBG: Up to WUXGA (1920 x 1200, 60 fps, 24 bpp)	1.2 (MIPI®/Core) 1.8 (LVDS) 1.8 to 3.3 (I/O)
TC358772XBG ☆	P-VFBGA64 (0.65 mm)	MIPI® DSI 1.01	LVDS Dual Link			
TC358774XBG ☆	P-VFBGA49 (0.65 mm)	MIPI® DSI 1.01	LVDS Single Link	Tablet, Ultrabook™	MIPI® DSI to LVDS Display Interface Bridge TC358774XBG: Up to UXGA (1600 x 1200, 60 fps, 24 bpp) TC358775XBG: Up to WUXGA (1920 x 1200, 60 fps, 24 bpp)	1.2 (MIPI®/Core) 1.8 (LVDS) 1.8 to 3.3 (I/O)
TC358775XBG ☆	P-VFBGA64 (0.65 mm)	MIPI® DSI 1.01	LVDS Dual Link			
TC358860XBG ☆	P-VFBGA65 (0.5 mm)	VESA Embedded DisplayPort (eDP™) ver1.4	MIPI® DSI ver. 1.02	Phablet , tablet , portable game and PC, HMD	4K2K VESA's Embedded Display Port (eDP™) to MIPI® DSI Display Serial Interface Bridge Up to 4K Ultra HD (4096 x 2048, 60 fps, 24 bpp or 3840 x 2160, 60 fps, 24 bpp)	1.2 (MIPI®) 1.1 (Core, MIPI® D-PHY, eDP-PHY) 1.8 (eDP™-PHY) 1.8 or 3.3 (I/O, HPD)

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I/O Expander

Part Number	Package (Pin Pitch)	Functions	Applications	Functions and Features	Supply Voltage (V)
TC35893XBG ☆	P-VFBGA25 (0.5 mm)	I/O expander	I/O port expansion	Up to 20 GPIO ports. GPIO ports can be used for key matrix (up to 96 keys) or PWM/timer (up to 3 channels). Chattering reduction, internal clock oscillator, internal pull-up/pull-down resistors	1.62 to 3.60
TC35894XBG ☆	P-TFBGA36 (0.5 mm)			Up to 24 GPIO ports. GPIO ports can be used for key matrix (up to 96 keys) or PWM/timer (up to 3 channels). Chattering reduction, internal clock oscillator, internal pull-up/pull-down resistors Up to 26-port direct key functionality (when GPIOs are not used).	1.62 to 3.60
TC35894FG ☆	P-LQFP44 (0.8 mm)			Up to 24 GPIO ports. GPIO ports can be used for key matrix (up to 96 keys) or PWM/timer (up to 3 channels). Chattering reduction, internal clock oscillator, internal pull-up/pull-down resistors Up to 26-port direct key functionality (when GPIOs are not used)	1.62 to 3.60

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Other Product ICs / その他機器用

Shock Sensor ICs / ショックセンサIC

Part Number	Package	Device Type	Output Source Current Min (μ A)	Output Sink Current Min (μ A)	Window-Comparator Detection Voltage Levels Typ. (V)	Supply Current ($T_a = 25^\circ\text{C}$) Max (mA)	Supply Voltage (V)	Remarks
TB6082FNG	VSOP10	Shock sensor amp (low-noise charge amp)	80 (OP-AMP2) (@ $V_{CC} - 0.3$ V)	500 (OP-AMP2) (@ 0.3 V)	—	5.0 ($V_{CC} = 2.5$ V, $V_{ref} = 1.0$ V)	2.3 to 5.5	1 channel, Built-in amplifier for notch filter, low-noise
TB6082FTG	QFN16	Shock sensor amp (low-noise charge amp)	80 (OP-AMP2) (@ $V_{CC} - 0.3$ V)	500 (OP-AMP2) (@ 0.3 V)	—	5.0 ($V_{CC} = 2.5$ V, $V_{ref} = 1.0$ V)	2.3 to 5.5	1 channel, Built-in amplifier for notch filter, low-noise
TB6086FTG	QFN16	Shock sensor amp (Sensor signal Amplifier)	100 (OP-AMP) (@ $V_{CC} - 0.3$ V)	100 (OP-AMP) (@ 0.3 V)	2.05 (High) 1.25 (Low)	4.0 ($V_{CC} = 3.3$ V, $V_{ref} = 1.65$ V)	3.0 to 5.5	1 channel, Built-in amplifier for notch filter, Window Comparator
TC93A33FTG	QFN16	Shock sensor amp (low-noise charge amp)	80 (OP-AMP2) (@ $V_{CC} - 0.3$ V)	80 (OP-AMP2) (@ 0.3 V)	—	4.5 ($V_{CC} = 1.8$ V, EN = H)	1.6 to 2.3	1 channel, Built-in amplifier for notch filter, low-noise

High-Frequency Modulator ICs / 高周波重畳IC

Part Number	Package	Device Type	Frequency (MHz)	Amplitude (mApp)	Operating Current Consumption ($V_{DD} = 5.0$ V, $T_a = 25^\circ\text{C}$) Max (mA)	Supply Voltage (V)	Remarks
TC93A14AFUG	SSOP6	High-frequency modulator for optical disk (2-ch)	250 to 450	25 to 80	21.5	4.5 to 5.5	Spread spectrum type

Interface ICs for Hot Water Dispensers / 給湯器用インタフェースIC

Part Number	Package	Features	Applications	Supply Voltage (V)
T6B70BFG	SOP16	Carrier receiver, carrier identification, carrier pseudo-sine wave generator	Communication for hot water dispensers	4.5 to 5.5
T6B70BFNG	SSOP16	Carrier receiver, carrier identification, carrier pseudo-sine wave generator Smaller package version of T6B70BFG	Communication for hot water dispensers	4.5 to 5.5

SEMICONDUCTOR GENERAL CATALOG

東芝半導体製品総覧表

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