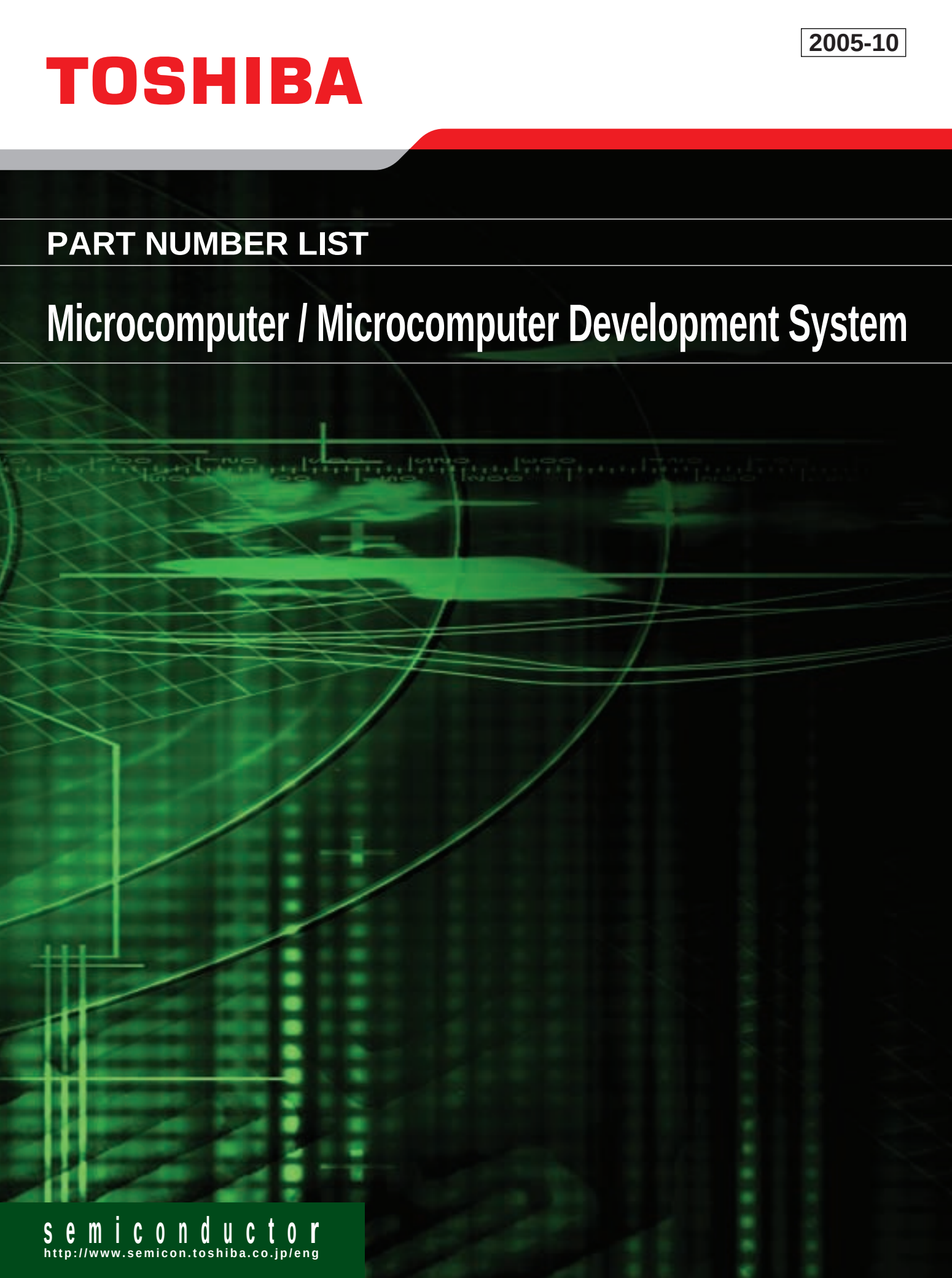
2005-10

TOSHIBA

PART NUMBER LIST

Microcomputer / Microcomputer Development System



semiconductor
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PART NUMBER LIST
Microcomputer / Microcomputer Development System

Part Number Decoding

ex.

TMP 47 c r xx y z p G

Lead-free product

Package

P:	Plastic standard dual in-line package (DIP)
N:	Plastic shrink dual in-line package (SDIP)
M, DM:	Plastic small-outline package (SOP), Dry-packed product
F, DF, U, DU:	Plastic quad flat package (QFP), Dry-packed product

Automotive quality grade

- R: Grade A, −40°C to +85°C
- T: Grade A, −40°C to +125°C
- I: Grade B, −40°C to +85°C
- S: Grade B, −40°C to +125°C

Microcontroller revision

Microcontroller Subtype

ROM size

	1	2	3	4	6	8	C	H
KB	1	2	3	4	6	8	12	16

	K	M	N	P	S	U	W	Y	Z
KB	24	32	40	48	60	96	128	256	288

ROM Type

- C: Mask
- E: EEPROM
- F: Flash
- P: OTP

Microcontroller Core

47:	47E
86:	870/C
87:	870
88:	870/X
91:	900/L1
92, 94:	900/H1
93:	900/L
95:	900/H
96:	900

Toshiba Micro Processor

Microcomputers Selection Guide

Microcomputer Selection Guide P.5

Microcomputer Development System Selection Guide P.23

Microcomputer Selection Guide

4-Bit Microcontrollers

TLCS-47 Family: TLCS-47E Series (CMOS)

Part Number	ROM (Bytes)	RAM (Nibbles)	Minimum Instruction Execution Times (μs)	LED Driver (Ch)	LCD Driver (Ch)	SIO (Ch)	AD Converter (Ch)	Pulse Generator (Ch)	Watchdog Timer	Dual Clocks	Standby Mode	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP Version	Package
TMP47C101PG/MG	1K	64	1.3	4							●	11	2.2 to 5.5 (Note 1)	–30 to 70	TMP47P201VPG	DIP16/SOP16 (Note 5)
TMP47C102PG/MG				4					●		●	15			TMP47P202VPG/MG	DIP20/SOP20
TMP47C103NG/MG				8		1			●		●	23			TMP47P403VNG/MG	SDIP28/SOP28
TMP47C201PG/MG				4							●	11			TMP47P201VPG	DIP16/SOP16 (Note 5)
TMP47C202PG/MG				4					●		●	15			TMP47P202VPG/MG	DIP20/SOP20
TMP47C203NG/MG				8		1			●		●	23			TMP47P403VNG/MG	SDIP28/SOP28
TMP47C206PG/MG	2K	128	1.0	5				1	●		●	15	4.0 to 5.7	–40 to 85	TMP47P206VPG/MG	DIP20/SOP20
TMP47C241NG/MG			1.3	5		1	4		●		●	21	2.7 to 6.0		TMP47P241VNG/MG	SDIP28/SOP28
TMP47C243NG/MG/DMG (Note 3)				8		1	8	1	●		●	23			TMP47P443VNG/MG/DMG	SDIP28/SOP28/ SSOP30
TMP47C222NG/FG/UG (Note 3)		192	1.0 (244) (Note 2)		20	1	4	1	●	●	●	(Note 4) 20/22	2.7 to 5.5 (2.2 to 5.5) (Note 2)	–30 to 70	TMP47P422VNG/FG/UG	SDIP42/ QFP44 (14 x 14 mm)/ LQFP44 (10 x 10 mm)
TMP47C422NG/FG/UG (Note 3)	4K	256			20	1	4	1	●	●	●					
TMP47C443NG/MG/DMG (Note 3)				8		1	8	1	●		●	23			TMP47P443VNG/MG/DMG	SDIP28/SOP28/ SSOP30

Note 1: When CR oscillation is used (2.7 V to 5.5 V when a resonator is used)

Note 2: Numbers in parentheses indicate the minimum instruction execution time and power supply voltage when operating with the slower clock.

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

Note 4: 20 for SDIP; 22 for QFP

Note 5: An OTP version is available only in DIP16.

◆ Not recommended for automotive applications.

◆ The suffix (G) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

8-Bit Microcontrollers

TLCS-870 Family: TLCS-870/C Series (CMOS)

Part Number	ROM (Bytes)	RAM (Bytes)	Minimum Instruction Execution Times (µs) (Note 4)	Flash Version	LED Driver (Ch)	LCD Driver (Ch)	VFT Driver (fluor. tube) (Ch)	SEI (Ch)	SIO (Ch)	SIO/UART (Ch) (Note 1)	I²C (Ch)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	18-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	10-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Program Patch Logic	Watchdog Timer	Dual Clocks	Clock Gear	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP/Flash Version	Package
TMP86P202PG/MG	2K	128	0.50		2							4					2		●			14	3.3 to 5.5		—	DIP20/SOP20
TMP86P203PG/MG					2							4					2		●							
TMP86C407MG/NG	4K		(1)0.25/122 (2)0.50/122		8			1		(Note2) 1		6			1		2		●	●		22	(1)4.5 to 5.5 (2)2.7 to 5.5		TMP86P807MG/NG TMP86F807MG/NG	SOP28/SDIP28
TMP86C408DMG/NG					8			1		(Note2) 1		6			1		2		●	●		24			TMP86P808DMG/NG TMP86F808DMG/NG	SSOP30/SDIP30
TMP86C420UG/FG			(1)0.25/122 (2)0.50/122 (3)0.95/122		4	32			1			8		1			2		●	●		39	(1)4.5 to 5.5 (2)2.7 to 5.5 (3)1.8 to 5.5		TMP86P820UG/FG	LQFP64 (10 x 10 mm)/ QFP64 (14 x 14 mm)
TMP86C807MG/NG		256	(1)0.25/122 (2)0.50/122		8			1		(Note2) 1		6			1		2		●	●		22	(1)4.5 to 5.5 (2)2.7 to 5.5		TMP86P807MG/NG TMP86F807MG/NG	SOP28/SDIP28
TMP86F807MG/NG				●																					—	
TMP86C808DMG/NG					8			1		(Note2) 1		6			1		2		●	●		24			TMP86P808DMG/NG TMP86F808DMG/NG	SSOP30/SDIP30
TMP86F808DMG/NG				●																					—	
TMP86C809NG **					8			1					6		1		2		●	●		26			TMP86FH09NG Δ **	SDIP32
TMP86C820UG/FG			(1)0.25/122 (2)0.50/122 (3)0.95/122		4	32			1			8		1			2		●	●		39	(1)4.5 to 5.5 (2)2.7 to 5.5 (3)1.8 to 5.5		TMP86P820UG/FG	LQFP64 (10 x 10 mm)/ QFP64 (14 x 14 mm)
TMP86C845UG	8K		0.50/122		19				1				8				2		●	●		35	2.7 to 5.5		TMP86PM47AUG TMP86PH47UG TMP86FH47AUG/DUG Δ	LQFP44 (10 x 10 mm)
TMP86C822UG ◇					3	23			1	(Note2) 1		4		1			2		●	●		33			TMP86PH22UG ◇	
TMP86C829BUG/FG					4	32				1			8	1			4		●	●		39			TMP86PM29BUG/FG	LQFP64 (10 x 10 mm)/ QFP64 (14 x 14 mm)
TMP86C846NG			(1)0.25/122 (2)0.50/122 (3)0.95/122		19				1	(Note2) 1			8		1		2		●	●		33	(1)4.5 to 5.5 (2)2.7 to 5.5 (3)1.8 to 5.5		TMP86PH46NG TMP86PM46NG TMP86FH46ANG Δ	SDIP42
TMP86C847UG					19				1	(Note2) 1			8		1		2		●	●		35		–40 to 85	TMP86PM47AUG TMP86PH47UG TMP86FH47AUG/DUG Δ	LQFP44 (10 x 10 mm)
TMP86CH06NG/UG					8					(Note3) 2					1		2		●	●	●				TMP86PH06NG/UG	SDIP42/ LQFP44 (10 x 10 mm)
TMP86CH06AUG ◇																									TMP86PH06UG	LQFP44 (10 x 10 mm)
TMP86CH09NG **					8			1					6		1		2		●	●		26			TMP86FH09NG Δ **	SDIP32
TMP86FH09NG Δ **				●	8			1					6		1		2		●	●					—	
TMP86CH12MG **			(1)0.25/122 (2)0.50/122		8				1	(Note2) 1			8		1	1	2		●	●		24	(1)4.5 to 5.5 (2)2.7 to 5.5		TMP86FH12MG Δ	SSOP30
TMP86FH12MG Δ		512		●	8				1	(Note2) 1			8		1	1	2		●	●					—	
TMP86CH21UG/FG					4	32				1		8		1			4		●	●		39			TMP86PM29BUG/FG	LQFP64 (10 x 10 mm)/ QFP64 (14 x 14 mm)
TMP86CH21AUG ◇			(1)0.25/122																				(1)4.5 to 5.5			LQFP64 (10 x 10 mm)
TMP86CH22UG ◇			(2)0.50/122 (3)0.95/122		3	23			1	(Note2) 1		4		1			2		●	●			(2)2.7 to 5.5 (3)1.8 to 5.5		TMP86PH22UG ◇	LQFP44 (10 x 10 mm)
TMP86CH46ANG ◇	16K				19				1	(Note2) 1			8		1		2		●	●		33			TMP86PH46NG TMP86PM46NG TMP86FH46ANG Δ	SDIP42
TMP86FH46ANG Δ			(1)0.25/122 (2)0.50/122	●																			(1)4.5 to 5.5 (2)2.7 to 5.5		—	
TMP86CH47AUG ◇			(1)0.25/122 (2)0.50/122 (3)0.95/122		19				1	(Note2) 1			8		1		2		●	●		35	(1)4.5 to 5.5 (2)2.7 to 5.5 (3)1.8 to 5.5		TMP86PM47AUG TMP86PH47UG TMP86FH47AUG/DUG Δ	LQFP44 (10 x 10 mm)
TMP86FH47AUG/DUG Δ			(1)0.25/122 (2)0.50/122	●																			(1)4.5 to 5.5 (2)2.7 to 5.5		—	LQFP44 (10 x 10 mm)/ LQFP48 (7 x 7 mm)
TMP86CH49UG/FG/NG			(1)0.25/122 (2)0.50/122 (3)0.95/122		13				2	(Note2) 2	1		16		2		4		●	●		56	(1)4.5 to 5.5 (2)2.7 to 5.5 (3)1.8 to 5.5		TMP86PM49UG/FG/NG TMP86FS49AUG/FG Δ	LQFP64 (10 x 10 mm)/ QFP64 (14 x 14 mm)/ SDIP64
TMP86CH72FG		1K	(1)0.25/122 (2)0.50/122				32		1	(Note2) 1	1	6			1		2	●	●	●		54	(1)4.5 to 5.5 (2)2.7 to 5.5	–30 to 70	TMP86PM72FG **	QFP64 (14 x 14 mm)

◇: Guaranteed over the ambient temperature (Topr) range of –20 to 85°C at 1.8 V ≤ V_{DD} < 2.0 V.

Δ: Guaranteed over the ambient temperature (Topr) range of –20 to 85°C at 2.7 V ≤ V_{DD} < 3.0 V.

**: Under development

Note 1: Configurable as UART via software.

Note 2: UART only

Note 3: Either one or both of UART channels can be configured as SIO channels via software.

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

◆ The suffix (G) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

Part Number	ROM (Bytes)	RAM (Bytes)	Minimum Instruction Execution Times (µs) (Note 3)	Flash Version	LED Driver (Ch)	LCD Driver (Ch)	VFT Driver (fluor. tube) (Ch)	SEI (Ch)	SIO (Ch)	UART (Ch)	SIO/UART (Ch) (Note 1)	I²C (Ch)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	8-Bit DA Converter (Ch)	18-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	10-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Multiply-Accumulate (MAC)	Program Patch Logic	Watchdog Timer	Dual Clocks	Clock Gear	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP/Flash Version	Package
TMP86CH29BUG/FG	16K	1.5K	(1)0.25/122 (2)0.50/122 (3)0.95/122		4	32					1			8		1			4			●	●		39	(1)4.5 to 5.5 (2)2.7 to 5.5 (3)1.8 to 5.5	–40 to 85	TMP86PM29BUG/FG	LQFP64 (10 x 10 mm)/ QFP64 (14 x 14 mm)
TMP86CK74AFG	24K	1K	(1)0.25/122 (2)0.50/122		2		37		1				8				2		2			●	●		70	(1)4.5 to 5.5 (2)2.7 to 5.5	–30 to 70	TMP86PM74AFG	QFP80 (14 x 20 mm)
TMP86CM23AUG ◇			(1)0.25/122 (2)0.50/122 (3)0.95/122		5	32			1	1				8		1			4	●		●	●		48	(1)3.5 to 5.5 (2)2.7 to 5.5 (3)1.8 to 5.5		TMP86PM23UG	LQFP64 (10 x 10 mm)
TMP86CM29BUG/FG		1.5K			4	32					1			8		1			4			●	●		39	(1)4.5 to 5.5 (2)2.7 to 5.5 (3)1.8 to 5.5		TMP86PM29BUG/FG	LQFP64 (10 x 10 mm)/ QFP64 (14 x 14 mm)
TMP86FM29UG/FG				●	4	32					1			8		1			4			●	●			(1)2.7 to 3.6 (2)1.8 to 3.6		—	
TMP86FM26UG			(1)0.25/122	●	23	32				1	1					1			4			●	●		41		–40 to 85		LQFP64 (10 x 10 mm)
TMP86CM27FG			(2)0.50/122		8	40			1	1				8				1	2			●	●		55	(1)4.5 to 5.5 (2)2.7 to 5.5		TMP86PS27FG TMP86FS27FG	QFP80 (14 x 20 mm)
TMP86CM46ANG					19				1	1				8			1		2			●	●		33			TMP86PM46NG	SDIP42
TMP86CM47AUG		1K	(1)0.25/122		19				1	1				8			1		2			●	●		35	(1)4.5 to 5.5		TMP86PM47AUG	LQFP44 (10 x 10 mm)
TMP86CM49UG/FG/NG	32K		(2)0.50/122 (3)0.95/122		13				2	2		1		16			2		4			●	●		56	(2)2.7 to 5.5 (3)1.8 to 5.5		TMP86PM49UG/FG/NG TMP86FS49AUG/FG Δ	LQFP64 (10 x 10 mm)/ QFP64 (14 x 14 mm)/ SDIP64
TMP86CM72FG			(1)0.25/122 (2)0.50/122				32		1	1		1	6				1		2		●	●	●		54	(1)4.5 to 5.5 (2)2.7 to 5.5	–30 to 70	TMP86PM72FG **	QFP64 (14 x 14 mm)
TMP86CM25FG			(1)0.25/122 (2)0.50/122 (3)0.95/122		4	(Note2) 60			1		1		8			1			4			●	●		42	(1)4.5 to 5.5 (2)2.7 to 5.5 (3)1.8 to 5.5		TMP86PS25FG	QFP100 (14 x 20 mm)
TMP86CM25AFG					4	(Note2) 60			1		1		8			1			4			●	●					TMP86FM25FG	
TMP86FM25FG				●																							–40 to 85		
TMP86FM48UG/FG		2K	(1)0.25/122 (2)0.50/122	●	11				1		1	1		16			2		2			●	●		54	(1)2.7 to 3.6 (2)1.8 to 3.6		—	LQFP64 (10 x 10 mm)/ QFP64 (14 x 14 mm)
TMP86CM74AFG					2		37		1				8				2		2			●	●		70	(1)4.5 to 5.5 (2)2.7 to 5.5	–30 to 70	TMP86PM74AFG	QFP80 (14 x 20 mm)
TMP86CP23AUG ◇			(1)0.25/122 (2)0.50/122 (3)0.95/122		5	32			1	1				8		1			4	●		●	●		48	(1)3.5 to 5.5 (2)2.7 to 5.5 (3)1.8 to 5.5		TMP86PS23UG TMP86FS23UG Δ	LQFP64 (10 x 10 mm)
TMP86FP24FG	48K		(1)0.25/122 (2)0.50/122	●	12	24			1		1			8			2		2		●	●	●		54	(1)2.7 to 3.6 (2)1.8 to 3.6	–40 to 85	—	LQFP80 (12 x 12 mm)
TMP86CP27AFG					8	40			1	1				8				1	2			●	●		55			TMP86PS27FG TMP86FS27FG	QFP80 (14 x 20 mm)
TMP86FS27FG		1K	(1)0.25/122 (2)0.50/122	●	8	40			1	1				8				1	2			●	●			(1)4.5 to 5.5 (2)2.7 to 5.5	–40 to 70	—	
TMP86CS44UG					19				1	1				8	1		2		2			●	●		35			TMP86PS44UG	LQFP44 (10 x 10 mm)
TMP86FS23UG Δ				●	5	32			1	1				8		1			4	●		●	●		48			—	LQFP64 (10 x 10 mm)
TMP86CS25AFG ◇																										(1)4.5 to 5.5		TMP86PS25FG	QFP100 (14 x 20 mm)
TMP86CS25ADFG ◇					4	(Note2) 60			1		1		8			1			4			●	●		42	(2)2.7 to 5.5 (3)1.8 to 5.5		—	LQFP100 (14 x 14 mm)
TMP86CS28FG/DFG **			(1)0.25/122			40					1	1		8			2		4			●	●		62	(1)4.0 to 5.5		TMP86FS28FG/DFG Δ	QFP80 (14 x 20 mm)/
TMP86FS28FG/DFG Δ **	60K		(2)0.50/122 (3)0.95/122	●		40					1	1		8			2		4			●	●			(2)2.7 to 5.5		—	LQFP80 (12 x 12 mm)
TMP86CS49UG/FG ◇		2K			13				2	2		1		16			2		4			●	●		56	(1)4.5 to 5.5 (2)2.7 to 5.5 (3)1.8 to 5.5	–40 to 85	TMP86FS49AUG/FG Δ	LQFP64 (10 x 10 mm)/ QFP64 (14 x 14 mm)
TMP86FS49AUG/FG Δ				●	13				2	2		1		16			2		4			●	●					—	
TMP86CS64AFG			(1)0.25/122 (2)0.50/122		16				2	1				16			2		4			●	●		91	(1)4.5 to 5.5 (2)2.7 to 5.5		TMP86PS64FG TMP86FS64FG Δ	QFP100 (14 x 20 mm)
TMP86FS64FG Δ				●	16				2	1				16			2		4			●	●					—	

◇: Guaranteed over the ambient temperature (Topr) range of –20 to 85°C at 1.8 V ≤ V_{DD} < 2.0 V.
Δ: Guaranteed over the ambient temperature (Topr) range of –20 to 85°C at 2.7 V ≤ V_{DD} < 3.0 V.
**: Under development
Note 1: Configurable as UART via software.
Note 2: Up to 960 LCD segments (60 seg. x 16 com.)
Note 3: Minimum instruction execution times (1) to (3) correspond to power supply voltages (1) to (3).
◆ The suffix (G) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

TLCS-870 Family: TLCS-870 Series (CMOS)

Part Number	ROM (Bytes)	RAM (Bytes)	Minimum Instruction Execution Times (µs) (Note 3)	LED Driver (Ch)	LCD Driver (Ch)	VFT Driver (fluor. tube) (Ch)	SIO (Ch)	UART (Ch)	I²C (Ch) (Note 1)	High-Speed Serial Output (Ch)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	AD Converter Input (Ch)	18-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Watchdog Timer	Dual Clocks	Clock Gear	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP Version	Package
TMP87C405AMG			(1)0.50 (2)0.95	6											2		●		●		(1)4.5 to 5.5 (2)2.7 to 5.5		TMP87P808MG	SOP28
TMP87C408MG/NG/DMG (Note 2)		256		6			1				6				2		●		●	22			TMP87P808NG/MG	SOP28/SDIP28/ SSOP30
TMP87C408LMG/NG	4K		0.95	6			1				6				2		●		●		1.8 to 4.0		TMP87P808LMG/NG	
TMP87C409BMG/NG			(1)0.50 (2)0.95	6					1			8			1	2	●				(1)4.5 to 5.5 (2)2.2 to 5.5		TMP87P809MG/NG	SOP28/SDIP28
TMP87C446NG		512	(1)0.50/122 (2)0.95/122	8			1			1	8				2	2	●	●		35			TMP87PH46NG	SDIP42
TMP87C447UG				8			1			1	8				2	2	●	●		37	(1)4.5 to 5.5 (2)2.7 to 5.5	–30 to 70	TMP87PH47UG	QFP44 (10 x 10 mm)
TMP87C807UG				8			1			1					2	2	●	●						
TMP87C808MG/NG			(1)0.50 (2)0.95	6			1				6				2		●		●				TMP87P808MG/NG	
TMP87C808LMG/NG			0.95	6			1				6				2		●		●	22	1.8 to 4.0		TMP87P808LMG/NG	SOP28/SDIP28
TMP87C809BMG/NG		256	(1)0.50 (2)0.95	6					1			8			1	2	●				(1)4.5 to 5.5 (2)2.2 to 5.5		TMP87P809MG/NG	
TMP87C840NG/FG	8K		(1)0.50/122 (2)0.95/122	8			2				8				2	2	●	●			(1)4.5 to 6.0 (2)2.7 to 6.0		TMP87PH40ANG/FG	SDIP64/ QFP64 (14 x 20 mm)
TMP87C841NG/FG/UG				8			2					16			2	2	●	●		56	(1)4.5 to 5.5 (2)2.7 to 5.5	–40 to 85	TMP87PM41NG/FG/UG	SDIP64/ QFP64 (14 x 20 mm)/ LQFP64 (10 x 10 mm)
TMP87C814NG/FG			(1)0.50/122 (2)122			16	1				8				2	2	●	●		55			TMP87PM14NG/FG	SDIP64/ QFP64 (14 x 20 mm)
TMP87C846NG			(1)0.50/122	8			1			1	8				2	2	●	●		35			TMP87PH46NG	SDIP42
TMP87C847UG			(2)0.95/122	8			1			1	8				2	2	●	●		37		–30 to 70	TMP87PH47UG	QFP44 (10 x 10 mm)
TMP87C847LUG			0.95/122	8			1			1	8				2	2	●	●			1.8 to 4.0		TMP87PH47LUG	
TMP87CC40NG/FG			(1)0.50/122 (2)0.95/122	8			2				8				2	2	●	●			(1)4.5 to 6.0 (2)2.7 to 6.0		TMP87PH40ANG/FG	SDIP64/ QFP64 (14 x 20 mm)
TMP87CC41NG/FG/UG	12K			8			2					16			2	2	●	●		56	(1)4.5 to 5.5 (2)2.7 to 5.5	–40 to 85	TMP87PM41NG/FG/UG	SDIP64/ QFP64 (14 x 20 mm)/ LQFP64 (10 x 10 mm)
TMP87CC78FG			(1)0.50/122 (2)122			40	2				8				2	2	●	●		89			TMP87PM78FG	QFP100 (14 x 20 mm)
TMP87CH14NG/FG		512				16	1				8				2	2	●	●		55		–30 to 70	TMP87PM14NG/FG	SDIP64/ QFP64 (14 x 20 mm)
TMP87CH40NG/FG				8			2				8				2	2	●	●			(1)4.5 to 6.0 (2)2.7 to 6.0		TMP87PH40ANG/FG	SDIP64/ QFP64 (14 x 20 mm)
TMP87CH41NG/FG/UG			(1)0.50/122 (2)0.95/122	8			2					16			2	2	●	●		56	(1)4.5 to 5.5 (2)2.7 to 5.5	–40 to 85	TMP87PM41NG/FG/UG	SDIP64/ QFP64 (14 x 20 mm)/ LQFP64 (10 x 10 mm)
TMP87CH46NG				8			1			1	8				2	2	●	●		35			TMP87PH46NG	SDIP42
TMP87CH47UG				8			1			1	8				2	2	●	●		37		–30 to 70	TMP87PH47UG	QFP44 (10 x 10 mm)
TMP87CH47LUG	16K		0.95/122	8			1			1	8				2	2	●	●			1.8 to 4.0		TMP87PH47LUG	
TMP87CH48UG/DFG			(1)0.50/122 (2)0.95/122	8				1	1			16			2	2	●	●		56		–40 to 85	TMP87PH48UG/DFG	LQFP64 (10 x 10 mm)/ QFP64 (14 x 14 mm)
TMP87CH74AFG			(1)0.50/122 (2)122	16		37	1		1		12				2	2	●	●		71	(1)4.5 to 5.5 (2)2.7 to 5.5	–30 to 70	TMP87PM74FG	QFP80 (14 x 20 mm)
TMP87CH75FG				16		51	1		1		16				2	2	●	●		89			TMP87PM75FG	QFP100 (14 x 20 mm)
TMP87CH78FG						40	2				8				2	2	●	●					TMP87PM78FG	
TMP87CH21CFG/DFG		1K	(1)0.50/122 (2)0.95/122	1	32		2				8				2	2	●	●		52			TMP87PP21FG/DFG	QFP80 (14 x 20 mm)/ LQFP80 (12 x 12 mm)
TMP87CH29NG/UG				3	24			1			5			1		4	●	●		43			TMP87PM29NG/UG	SDIP64/ LQFP64 (10 x 10 mm)

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

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

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

◆ The suffix (G) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

Part Number	ROM (Bytes)	RAM (Bytes)	Minimum Instruction Execution Times (µs) (Note 2)	LED Driver (Ch)	LCD Driver (Ch)	VFT Driver (fluor. tube) (Ch)	SIO (Ch)	UART (Ch)	I²C (Ch) (Note 1)	High-Speed Serial Output (Ch)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	AD Converter Input (Ch)	18-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Watchdog Timer	Dual Clocks	Clock Gear	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP Version	Package
TMP87CK14NG/FG			(1)0.50/122 (2)122			16	1				8				2	2	●	●		55			TMP87PM14NG/FG	SDIP64/ QFP64 (14 x 20 mm)
TMP87CK29NG/UG				3	24			1			5			1		4	●	●		43		–30 to 70	TMP87PM29NG/UG	SDIP64/ LQFP64 (10 x 10 mm)
TMP87CK40ANG/FG	24K	1K	(1)0.50/122 (2)0.95/122	8			2				8				2	2	●	●					TMP87PM40ANG/FG	SDIP64/ QFP64 (14 x 20 mm)
TMP87CK41NG/FG/UG				8			2					16			2	2	●	●		56		–40 to 85	TMP87PM41NG/FG/UG	SDIP64/ QFP64 (14 x 20 mm)/ LQFP64 (10 x 10 mm)
TMP87CK78FG			(1)0.50/122 (2)122			40	2				8				2	2	●	●		89			TMP87PM78FG	QFP100 (14 x 20 mm)
TMP87CM70BFG		512	(1)0.50/122 (2)0.95/122			16	1			1			6		2	2	●	●		73	(1)4.5 to 5.5 (2)2.7 to 5.5		TMP87PM70FG	QFP80 (14 x 20 mm)
TMP87CM14NG/FG			(1)0.50/122 (2)122			16	1				8				2	2	●	●		55			TMP87PM14NG/FG	SDIP64/ QFP64 (14 x 20 mm)
TMP87CM21CFG/DFG				1	32		2				8				2	2	●	●		52		–30 to 70	TMP87PP21FG/DFG	QFP80 (14 x 20 mm)/ LQFP80 (12 x 12 mm)
TMP87CM23AFG				1	40		2				8				2	2	●	●		70			TMP87PP23FG	QFP100 (14 x 20 mm)
TMP87CM29NG/UG				3	24			1			5			1		4	●	●		43			TMP87PM29NG/UG	SDIP64/ LQFP64 (10 x 10 mm)
TMP87CM40ANG/FG			(1)0.50/122	8			2				8				2	2	●	●					TMP87PM40ANG/FG	SDIP64/ QFP64 (14 x 20 mm)
TMP87CM41NG/FG/UG	32K	1K	(2)0.95/122	8			2					16			2	2	●	●		56		–40 to 85	TMP87PM41NG/FG/UG	SDIP64/ QFP64 (14 x 20 mm)/ LQFP64 (10 x 10 mm)
TMP87CM48UG/DFG				8				1	1			16			2	2	●	●					TMP87PM48UG/DFG	LQFP64 (10 x 10 mm)/ QFP64 (14 x 14 mm)
TMP87CM53FG				7			1	1			8				2	2	●	●	●	72	(1)4.5 to 5.5 (2)2.2 to 5.5	–30 to 60	TMP87PM53FG	QFP80 (14 x 20 mm)
TMP87CM74AFG			(1)0.50/122 (2)122	16		37	1		1		12				2	2	●	●		71	(1)4.5 to 5.5 (2)2.7 to 5.5	–30 to 70	TMP87PM74FG	QFP80 (14 x 20 mm)
TMP87CM75FG				16		51	1		1		16				2	2	●	●		89			TMP87PM75FG	QFP100 (14 x 20 mm)
TMP87CM78FG						40	2				8				2	2	●	●					TMP87PM78FG	
TMP87CM24AFG				1	40		2				8				2	2	●	●		69	(1)4.5 to 5.5 (2)2.2 to 5.5	–10 to 70	TMP87PP24AFG	LQFP100 (14 x 14 mm)
TMP87CP21CFG/DFG			(1)0.50/122	1	32		2				8				2	2	●	●		52	(1)4.5 to 5.5 (2)2.7 to 5.5	–30 to 70	TMP87PP21FG/DFG	QFP80 (14 x 20 mm)/ LQFP80 (12 x 12 mm)
TMP87CP23FG	48K	2K	(2)0.95/122	1	40		2				8				2	2	●	●		70			TMP87PP23FG	QFP100 (14 x 20 mm)
TMP87CP24AFG				1	40		2				8				2	2	●	●		69	(1)4.5 to 5.5 (2)2.2 to 5.5	–10 to 70	TMP87PP24AFG	LQFP100 (14 x 14 mm)
TMP87CS68DFG				7			1	1			8				2	2	●	●	●	72	(1)4.5 to 5.5 (2)2.7 to 5.5	–30 to 70	TMP87PS68DFG	LQFP80 (12 x 12 mm)
TMP87CS71BFG	60K		(1)0.50/122 (2)122			16	1			1			6		2	2	●	●		73			TMP87PS71AFG	QFP80 (14 x 20 mm)

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

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

◆ The suffix (G) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

TLCS-870 Family: TLCS-870/X Series (CMOS)

Part Number	ROM (Bytes)	RAM (Bytes)	Minimum Instruction Execution Times (µs) (Note 4)	Flash Version	LED Driver (Ch)	VFT Driver (fluor. tube) (Ch)	SIO (Ch)	UART (Ch)	I²C (Ch) (Note 1)	PWM (Ch)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	16-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Motor Controller (Ch)	Remote Control Preprocessor	Watchdog Timer	Dual Clocks	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP/Flash Version	Package
TMP88CH40NG/MG	16K	512	0.20		14		(Note 2) 1	(Note 2) 1				4	1	2	1		●		19	4.5 to 5.5	–40 to 85	TMP88PH40NG/MG	SDIP28/SOP28
TMP88CH41NG/UG					16		(Note 2) 1	(Note 2) 1				8	2	2	1		●					TMP88PH41NG/UG	SDIP42/ LQFP44 (10 x 10 mm)
TMP88CM38ANG	32K	1.5K	0.25		4				(Note 3) 1	10	6		2	2		●	●		33			TMP88PS38NG	SDIP42/ QFP44 (14 x 14 mm)
TMP88CM38AF (Note 5)																						TMP88PS38FG	
TMP88CM38BNG/FG					4				(Note 3) 1	10	6		2	2		●	●					TMP88PS38BNG/FG	
TMP88CP77FG	48K	1K	(1)0.32/122 (2)122			53	2		1		12		3	1			●	●	88	(1)4.5 to 5.5 (2)2.7 to 5.5	–30 to 70	TMP88PU77FG	QFP100 (14 x 20 mm)
TMP88CP34NG/FG		1.5K	0.25		1				(Note 3) 1	4	6		2	2		●	●		33	4.5 to 5.5		TMP88PS34NG/FG	SDIP42/ QFP44 (14 x 14 mm)
TMP88CP38ANG					4				(Note 3) 1	10	6		2	2		●	●					TMP88PS38NG	
TMP88CP38AF (Note 5)																						TMP88PS38FG	
TMP88CP38BNG/FG					4				(Note 3) 1	10	6		2	2		●	●					TMP88PS38BNG/FG	
TMP88CS34NG/FG					1				(Note 3) 1	4	6		2	2		●	●					TMP88PS34NG/FG	
TMP88CS38NG/FG					4				(Note 3) 1	10	6		2	2		●	●					TMP88PS38NG/FG	
TMP88CS38BNG/FG	64K	2K			4				(Note 3) 1	10	6		2	2		●	●					TMP88PS38BNG/FG	
TMP88CS42NG/FG			0.20		24		1	1		2		16	2	4	2		●		55		–40 to 85	TMP88PS42NG/FG	SDIP64/ QFP64 (14 x 20 mm)
TMP88CS43FG					24		1	1		2		16	2	4	2		●		71			TMP88PS43FG	QFP80 (14 x 20 mm)
TMP88CS77FG	96K	3K	(1)0.32/122 (2)122			53	2		1		12		3	1			●	●	88	(1)4.5 to 5.5 (2)2.7 to 5.5	–30 to 70	TMP88PU77FG	QFP100 (14 x 20 mm)
TMP88CU74FG						37	1		1		12		2	2			●	●	71			TMP88PU74FG	QFP80 (14 x 20 mm)
TMP88CU77FG						53	2		1		12		3	1			●	●	88			TMP88PU77FG	
TMP88CW44FG **	120K	4K	0.20		24		1	2		2		16	2	4	2		●		91	4.5 to 5.5	–40 to 85	TMP88FW44FG **	QFP100 (14 x 20 mm)
TMP88FW44FG **				●	24		1	2		2		16	2	4	2		●		91			—	
TMP88CW45FG **					24		1	2		2		16	2	4	2		●		71			TMP88FW45FG **	QFP80 (14 x 20 mm)
TMP88FW45FG **				●	24		1	2		2		16	2	4	2		●		71			—	

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

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

Note 3: Has two selectable SDA/SCL pairs.

Note 4: Minimum instruction execution times (1) to (2) correspond to power supply voltages (1) to (2).

Note 5: Although the part number does not have a (G) suffix, this product is Lead(Pb)-Free.

◆ The suffix (G) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

**: Under development

16-Bit Microcontrollers

TLCS-900 Family TLCS-900/L1 Series (CMOS)

Part Number	ROM (Bytes)	RAM (Bytes)	Minimum Instruction Execution Times (ns) 5V±10%	3V±10%	2V±10%	Flash Version	CAN (8 Mailboxes) (Ch)	SIO/UART (Ch)	SIO (Ch)	I²C Bus/SIO (Ch)	DRAM Controller (Ch)	Memory Bank Controller	10-Bit AD Converter (Ch)	LCD Controller	LCD Driver (Ch)	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	32-kHz Timer (for S/W RTC)	H/W RTC	8-Bit PWM Timer (Ch)	16-Bit PWM Timer (Ch)	CS/WAIT Controller (Ch)	PDC (Ch)	Watchdog Timer	Dual Clocks	Clock Gear	I/O Port (Pins)	Operating Temperature (°C)	OTP/Flash Version	Package
TMP91C016FG			—	148	400			1			1	●		●		4			●			4		●	●	●	31			
TMP91C025FG		NA	—	(Note 5) 111				2				●	4	●		4			●			4		●	●	●	38	–40 to 85		LQFP100 (14 x 14 mm)
TMP91C219FG		2K	(Note 1) 111	—	—			1					4			6	1					4		●		●	54	–20 to 70		
TMP91C630FG	NA	6K		111				2					8			6	1					4		●		●				
TMP91C815FG			—	148	400			2		1		●	8	●		4			●			4		●	●	●	61	–40 to 85	—	TQFP128 (14 x 14 mm)
TMP91C824FG				122				2		1		●	8			4			●			4		●	●	●	35			LQFP100 (14 x 14 mm)
TMP91C829FG		8K	(Note 1) 111	—	—			2					8			6	1					4		●		●	54	–20 to 70		
TMP91C820AFG	8K			(Note 4) 111				3		1	1	●	8	●		4	1		●			4		●	●	●	77			LQFP144 (16 x 16 mm)
TMP91CK27UG	24K	1K						2		1			4			6	1	●				3		●	●	●	53		TMP91FY27UG	LQFP64 (10 x 10 mm)
TMP91CP27UG	48K	4K	—	148	400			2		1			4			6	1	●				3		●	●	●	53		TMP91FY27UG	LQFP64 (10 x 10 mm)
TMP91CU10FG	96K	3K		296	—			3					8			8	2					3		●	●	●	80	–40 to 85	TMP91PW10FG	LQFP100 (14 x 14 mm)
TMP91CU27UG		10K		148	400			2		1			4			6	1	●				3		●	●	●	53		TMP91FY27UG	LQFP64 (10 x 10 mm)
TMP91CW11FG			160	320	—			3	2	1			8			2	2	●		2		4		●	●	●	79		TMP91PW11FG	LQFP100 (14 x 14 mm)
TMP91CW12FG				250				2		1			8			8	2	●				4		●	●	●	81		TMP91PW12FG	
TMP91CW12AFG			—	148	400			2		1			8			8	2	●				4		●	●	●			TMP91FY42FG **	
TMP91CW18AFG		4K	160	—	—			(Note3) 1		(Note2) 3			12			8	1							●		●	62	–20 to 70	TMP91PW18AFG	QFP80 (14 x 20 mm)
TMP91CW40FG **				148	—			4					4		40	4	3		●					●	●		61	–40 to 85	TMP91FW40FG **	
TMP91FW40FG **	128K		—			●		4					4		40	4	3		●					●	●				—	LQFP100 (14 x 14 mm)
TMP91CW28FG					(Note 6) 400			1		2			8			4	2					4		●		●	80	–20 to 70	TMP91FY28FG **	
TMP91CW60FG/DFG ++		8K	200	—	—			3		2			16			6	5	●				4		●	●	●	83	–40 to 85	TMP91FW60FG/DFG **	LQFP100 (14 x 14 mm)
TMP91FW60FG/DFG **						●		3		2			16			6	5	●				4		●	●	●	83		—	QFP100 (14 x 20 mm)
TMP91CY28FG					(Note 6)			1		2			8			4	2					4		●		●	80	–20 to 70	TMP91FY28FG **	LQFP100 (14 x 14 mm)
TMP91FY28FG **					400	●		1		2			8			4	2					4		●		●	80		—	
TMP91CY22FG					400			2		1			8			8	2	●				4		●	●	●	81		TMP91FY42FG **	
TMP91FY42FG **	256K	16K	—	148	—	●		2		1			8			8	2	●				4		●	●	●	81	–40 to 85	—	LQFP100 (14 x 14 mm)
TMP91FY27UG				(Note 7) 148		●		2		1			4			6	1	●				3		●	●	●	53	–20 to 70		LQFP64 (10 x 10 mm)

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

Note 2: I²C/SIO selectable: 1 channel, I²C: 2 channels

Note 3: UART only

Note 4: Operating voltage is 3.0 V to 3.6 V.

Note 5: The relationships between voltage ranges and minimum instruction execution times are as follows:

2.4 V to 3.6 V: 250 ns at 16 MHz

2.7 V to 3.6 V: 148 ns at 27 MHz

3.0 V to 3.6 V: 111 ns at 36 MHz

Note 6: 1.8 V to 2.6 V

Note 7: Operating voltage is 2.85 V to 3.3 V.

**: Under development

++: Being planned

◆ The suffix (G) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

TLCS-900 Family: TLCS-900/L Series (CMOS)

Part Number	ROM (Bytes)	RAM (Bytes)	Minimum Instruction Execution Times (ns) 5V±10%	Minimum Instruction Execution Times (ns) 3V±10%	SIO/UART (Ch)	SIO (Ch)	I²C Bus/SIO (Ch)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	LCD Driver (Ch)	VFT Driver (fluor. tube) (Ch)	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	32-kHz Timer (for S/W RTC)	Timebase Counter	Motor Pattern Generator (Ch)	8-Bit PWM Timer (Ch)	14-Bit PWM Timer (Ch)	CS/WAIT Controller (Ch)	VCR Servo Controller	Watchdog Timer	Dual Clocks	Clock Gear	I/O Port (Pins)	Operating Temperature (°C)	OTP Version	Package
TMP93CS41DFG		2K			2				8			2	2			2	2		3		●	●	●	61			LQFP100 (14 x 14 mm)
TMP93CS45FG	NA			320	2		1		8			4	2								●	●	●	44		—	LQFP80 (12 x 12 mm)
TMP93CW41DFG		4K			2				8			2	2			2	2		3		●	●	●	61			LQFP100 (14 x 14 mm)
TMP93CM40DFG	32K			400	2				8			2	2			2	2		3		●	●	●	79		TMP93PS40DFG	LQFP100 (14 x 14 mm)
TMP93CS20FG			200		2		1		8	●		4	4	●							●	●	●	88	–40 to 85	TMP93PW20AFG	LQFP144 (16 x 16 mm)
TMP93CS32FG				320	2				6			4	2								●		●	49		TMP93PW32FG	QFP64 (14 x 14 mm)
TMP93CS36UG	64K	2K			2				4			4	2								●		●	33		—	LQFP44 (10 x 10 mm)
TMP93CS40DFG					2				8			2	2			2	2		3		●	●	●	79		TMP93PS40DFG	LQFP100 (14 x 14 mm)
TMP93CS42ADFG				—	2				5			2	2				2		3		●		●	80		TMP93PS42ADFG	LQFP100 (14 x 14 mm)
TMP93CS44FG				320	2		1		8			4	2								●	●	●	62		TMP93PS44FG	LQFP80 (12 x 12 mm)
TMP93CT76FG	72K		250	—		1	1	10			●	1	5	●	●		1	3		●	●	●		85	–20 to 70	TMP93PW76FG	QFP100 (14 x 20 mm)
TMP93CU76FG	96K	2.5K				1	1	10			●	1	5	●	●		1	3		●	●	●					
TMP93CU44DFG (Note 1)		3K	200	320	2		1		8			4	2								●	●	●	62	–40 to 85	TMP93PW44ADFG (Note 1)	QFP80 (14 x 20 mm)
TMP93CW76FG		2.5K	250	—		1	1	10			●	1	5	●	●		1	3		●	●	●		85	–20 to 70	TMP93PW76FG	QFP100 (14 x 20 mm)
TMP93CW40DFG	128K				2				8			2	2			2	2		3		●	●	●	79		TMP93PW40DFG	LQFP100 (14 x 14 mm)
TMP93CW44DFG (Note 1)		4K	200	320	2		1		8			4	2								●	●	●	62	–40 to 85	TMP93PW44ADFG (Note 1)	QFP80 (14 x 20 mm)
TMP93CW46AFG					5				8			2	2				2		3		●	●	●	79		TMP93PW46AFG	LQFP100 (14 x 14 mm)
TMP93CF77FG	160K		250	—		1	1	10			●	1	5	●	●		1	3		●	●	●		85	–20 to 70	TMP93PF76FG	QFP100 (14 x 20 mm)
TMP93CF76FG	192K					1	1	10			●	1	5	●	●		1	3		●	●	●					

Note 1: Operating voltage of OTP-version TMP93PW44ADFG is 4.5 V to 5.5 V.

◆ The suffix (G) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

TLCS-900 Family: TLCS-900/H Series (CMOS)

Part Number	ROM (Bytes)	RAM (Bytes)	Minimum Instruction Execution Times (ns)		CAN (16 Mailboxes) (Ch)	SEI (Ch)	SIO/UART (Ch)	DRAM Controller (Ch)	6-Bit AD Converter (Ch)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	8-Bit DA Converter (Ch)	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	Motor Pattern Generator (Ch)	8-Bit PWM Timer (Ch)	CS/WAIT Controller (Ch)	Watchdog Timer	I/O Port (Pins)	Operating Temperature (°C)	OTP Version	Package
			5V±10%	3V±10%																		
TMP95C001FG				320													4		0			QFP64 (14 x 14 mm)
TMP95C061BDFG		NA		—			2	1			4		4	2	2		4	●	56			LQFP100 (14 x 14 mm)
TMP95C063DFG	NA		160				2	2			8	2	8	2	2		4	●	91	–20 to 70	—	LQFP144 (20 x 20 mm)
TMP95C265FG		2K		400			3				8	2	8	2			4	●	55			
TMP95CW65FG		4K					3				8	2	8	2			4	●				
TMP95CS54FG (Note 1)			167	—	1	1	2				8		8	2				●		–40 to 85	TMP95PS54FG (Note 1)	
TMP95CS64FG	64K	2K	160	400			3				8	2	8	2			4	●		–20 to 70	TMP95PW64FG	LQFP100 (14 x 14 mm)
TMP95CS66FG							1						8	2			4	●	81			
TMP95CU54AFG	96K	3K	167	—	1	1	2				8		8	2				●		–40 to 85	—	
TMP95CW54AFG	128K	4K			1	1	2				8		8	2				●				
TMP95CW64FG			160	400			3				8	2	8	2			4	●		–20 to 70	TMP95PW64FG	LQFP100 (14 x 14 mm)

Note 1: Operating voltage is 4.7 V to 5.3 V.

◆ The suffix (G) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

TLCS-900 Family: TLCS-900 Series (CMOS)

Part Number	ROM (Bytes)	RAM (Bytes)	Minimum Instruction Execution Times (ns)		CAN (16 Mailboxes) (Ch)	SEI (Ch)	SIO/UART (Ch)	DRAM Controller (Ch)	6-Bit AD Converter (Ch)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	8-Bit DA Converter (Ch)	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	Motor Pattern Generator (Ch)	8-Bit PWM Timer (Ch)	CS/WAIT Controller (Ch)	Watchdog Timer	I/O Port (Pins)	Operating Temperature (°C)	OTP Version	Package
			5V±10%	3V±10%																		
TMP96C031ZFG		NA					2	1	4				4	1	2		4	●	37			QFP64 (14 x 20 mm)
TMP96C041BFG	NA		(Note 1)	—			2				4		2	2	2	2	3	●	47	–40 to 85	—	
TMP96C141BFG		1K	200				2				4		2	2	2	2	3	●				QFP80 (14 x 20 mm)
TMP96CM40FG	32K						2				4		2	2	2	2	3	●	65		TMP96PM40FG	

Note 1: Guaranteed minimum instruction execution time is 200 ns for –20°C to 70°C, and 250 ns for –40°C to 85°C.

◆ The suffix (G) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

32-Bit Microcontrollers

TLCS-900 Family: TLCS-900/H1 Series (CMOS)

Part Number	ROM (Bytes)	RAM (Bytes)	Minimum Instruction Execution Times (ns) 5V±10%	Minimum Instruction Execution Times (ns) 3.3V±0.3V	Flash Version	USB Device (Full Speed)	SPI (SD Card)	High-Speed SIO (Ch)	SIO/UART (Ch)	I²C Bus/SIO (Ch)	DMA Controller	DRAM Controller (Ch)	NAND Flash Controller (Ch)	Memory Bank Controller	10-Bit AD Converter (Ch)	8-Bit DA Converter (Ch)	LCD Controller	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	32-kHz Timer (for S/W RTC)	H/W RTC	Motor Pattern Generator (Ch)	Multiply-Accumulate (MAC)	CS/WAIT Controller (Ch)	Watchdog Timer	Dual Clocks	Clock Gear	I/O Port (Pins)	Operating Temperature (°C)	Flash Version	Package
TMP94C241CFG ◇		2K	50	—					2			2			8	2		4	4					6	●			64			QFP160 (28 x 28 mm)
TMP94C251ADFG ◇									2			2			8	2		4	4					6	●						LQFP144 (20 x 20 mm)
TMP92C820FG		8K		50					3	1		1		●	5		●	4	1		●			4	●	●	●	83	–20 to 70		
TMP92CA25FG	NA	10K		(Note 2) 50			●		1	1		1	2	●	4		●	4	1		●			4	●	●	●	92			LQFP144 (16 x 16 mm)
TMP92CH21FG		16K				●			2			1	2	●	4		●	4	1		●			4	●	●	●	82		—	
TMP92CM22FG		32K		50					2	1					8			4	2					4	●		●	58			LQFP100 (14 x 14 mm)
TMP92CM27FG			—					2	4	2		1			12	2		8	6			2		6	●		●	83	–40 to 85		LQFP144 (16 x 16 mm)
TMP92CZ26XBG **		288K		(Note 1) 16.7		●	●		1	1	●	1	2	●	6		●	8	2		●		●	4	●		●	136	0 to 70		FBGA228 (15 x 15 mm)
TMP92CY23FG/DFG **	256K	16K							3	2					12			6	2	●				4	●	●	●	84	–40 to 85	TMP92FY23FG/DFG **	LQFP100 (14 x 14 mm)/ QFP100 (14 x 20 mm)
TMP92FY23FG/DFG **				50	●				3	2					12			6	2	●				4	●	●	●			—	
TMP92CD23AFG/DFG **	512K	32K						1	3	2					12			6	2	●				4	●	●	●			TMP92FD23AFG/DFG **	
TMP92FD23AFG/DFG **					●			1	3	2					12			6	2	●				4	●	●	●			—	

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

**: Under development

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

Note 2: Minimum instruction execution times depend on operating voltage, as follows:

2.7 to 3.6 V: 74 ns at 13.5 MHz (fsys)

3.0 to 3.6 V: 50 ns at 20 MHz (fsys)

◆ The suffix (G) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

Automotive Microcomputer Selection Guide

8-Bit Microcontrollers for Automotive

TLCS-870 Family: TLCS-870/C Series (CMOS)

Part Number	ROM (Bytes)	RAM (Bytes)	Minimum Instruction Execution Times (µs) (Note 4)	LED Driver (Ch)	LCD Driver (Ch)	CAN (Ch) (Note 5)	SEI (Ch)	SIO (Ch)	UART (Ch)	SIO/UART (Ch)	I²C (Ch)	8-Bit AD Converter (Ch)	10-Bit AD Converter (Ch)	18-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Watchdog Timer	Dual Clocks	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP/Flash Version	Package
TMP86C407IMG/ING	4K	256	(1)0.25/122 (2)0.50/122	8			1			(Note2) 1		6			1	2	●	●	22	(1)4.5 to 5.5 (2)2.7 to 5.5	–40 to 85	TMP86P807MG/NG	SOP28/SDIP28
TMP86C407SMG/SNG				8			1			(Note2) 1		6			1	2	●	●			–40 to 125		
TMP86C408IDMG				8			1			(Note2) 1		6			1	2	●	●	24		–40 to 85	TMP86P808DMG	SSOP30
TMP86C408SDMG				8			1			(Note2) 1		6			1	2	●	●			–40 to 125		
TMP86C807IMG/ING	8K			8			1			(Note2) 1		6			1	2	●	●	22		–40 to 85	TMP86P807MG/NG	SOP28/SDIP28
TMP86C807SMG/SNG				8			1			(Note2) 1		6			1	2	●	●			–40 to 125		
TMP86C808IDMG				8			1			(Note2) 1		6			1	2	●	●	24		–40 to 85	TMP86P808DMG	SSOP30
TMP86C808SDMG				8			1			(Note2) 1		6			1	2	●	●					
TMP86C847IUG	16K	512		19				1		(Note2) 1			8		1	2	●	●	35			TMP86PM47AUG	LQFP44 (10 x 10 mm)
TMP86C847SUG																					–40 to 125	TMP86PH47UG	
TMP86CH47IUG				19				1		(Note2) 1			8		1	2	●	●			–40 to 85	TMP86FH47AUG	
TMP86CH47SUG																					–40 to 125		
TMP86CH49IUG/IFG ++	16K		(1)0.25/122 (2)0.50/122 (3)0.95/122	13				2		(Note2) 2	1		16		2	4	●	●	56	(1)4.5 to 5.5 (2)2.7 to 5.5 (3)1.8 to 5.5		TMP86PM49UG/FG TMP86FS49AIUG ◇ ++	LQFP64 (10 x 10 mm)/ QFP64 (14 x 14 mm)
TMP86CH87RUG		1K	0.25/122	8		(Note6) 1	1			(Note2) 1			14		1	2	●	●	35	4.5 to 5.5		TMP86PM87RUG	LQFP44 (10 x 10 mm)
TMP86CM47AIUG ++	32K	1K	(1)0.25/122 (2)0.50/122 (3)0.95/122	19				1	1				8		1	2	●	●	35	(1)4.5 to 5.5 (2)2.7 to 5.5 (3)1.8 to 5.5		TMP86PM47AUG	LQFP44 (10 x 10 mm)
TMP86CM87RUG			0.25/122	8		(Note6) 1	1			(Note2) 1			14		1	2	●	●		4.5 to 5.5		TMP86PM87RUG	
TMP86CM89IFG ++		2K		8	40	1	1			(Note3) 2			8		2	4	●	●	62			TMP86FS89FG ++	QFP80 (14 x 20 mm)
TMP86CS89IFG ++	60K																						

◇: The minimum instruction execution time is 500 ns for the supply voltage range of 3.0 to 5.5 V.

++: Being planned

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

Note 2: UART only

Note 3: One channel can be configured as either SIO or UART via software, and the other channel can only be used as UART.

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

Note 5: There are four channels of mailboxes.

Note 6: Either the SEI or UART module should be selected via software.

◆ For further information about the I/R/S/T grade levels, please contact your nearest Toshiba sales representative.

◆ The suffix (G) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

TLCS-870 Family: TLCS-870/X Series (CMOS)

Part Number	ROM (Bytes)	RAM (Bytes)	Minimum Instruction Execution Times (µs)	LED Driver (Ch)	SIO (Ch)	UART (Ch)	10-Bit AD Converter (Ch)	16-Bit Timer/Counter (Ch)	8-Bit Timer/Counter (Ch)	Motor Controller (Ch)	Watchdog Timer	I/O Port (Pins)	Power Supply Voltage (V)	Operating Temperature (°C)	OTP Version	Package
TMP88CH40IMG				14	(Note 1) 1	(Note 1) 1	4	1	2	1	●	19			TMP88PH40MG	SOP28
TMP88CH41IUG ++	16K	512	0.20	16	(Note 1) 1	(Note 1) 1	8	2	2	1	●	33	4.5 to 5.5	−40 to 85	TMP88PH41UG	LQFP44(10 x 10 mm)
TMP88CH41SUG ++				16	(Note 1) 1	(Note 1) 1	8	2	2	1	●			−40 to 125		

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

++: Being planned

◆ For further information about the I/R/S/T grade levels, please contact your nearest Toshiba sales representative.

◆ The suffix (G) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

16-Bit Microcontrollers for Automotive

TLCS-900 Family: TLCS-900/L1 Series (CMOS)

Part Number	ROM (Bytes)	RAM (Bytes)	Minimum Instruction Execution Times (ns)			CAN (16 Mailboxes) (Ch)	SEI (Ch)	SIO/UART (Ch)	I²C Bus/SIO (Ch)	10-Bit AD Converter (Ch)	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	32-kHz Timer (for S/W RTC)	16-Bit PWM Timer (Ch)	CS/WAIT Controller (Ch)	PDC (Ch)	Watchdog Timer	Dual Clocks	Clock Gear	I/O Port (Pins)	Operating Temperature (°C)	OTP/Flash Version	Package
			5V±10%	3V±10%	2V±10%																		
TMP91CP82TFG	48K	2K	200	—	—	1	1	2		12	4	2		4		1				●	80	–40 to 125	TMP91PP82TFG	LQFP100 (14 x 14 mm)
TMP91CP27RUG **		4K						2	1	4	6	1	●		3		●	●	●	53	–40 to 85	TMP91FY27UG	LQFP64 (10 x 10 mm)
TMP91CU27RUG **	96K	10K	—	148	400			2	1	4	6	1	●		3		●	●	●				
TMP91CY22IFG	256K	16K						2	1	8	8	2	●		4		●	●	●	81		TMP91FY42FG **	LQFP100 (14 x 14 mm)

◆ For further information about the I/R/S/T grade levels, please contact your nearest Toshiba sales representative.

**: Under development

◆ The suffix (G) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

32-Bit Microcontrollers for Automotive

TLCS-900 Family: TLCS-900/H1 Series (CMOS)

Part Number	ROM (Bytes)	RAM (Bytes)	Minimum Instruction Execution Times (ns)			Flash Version	CAN (32 Mailboxes) (Ch)	CAN (16 Mailboxes) (Ch)	SEI (Ch)	SIO/UART (Ch)	SIO/UART/SEI (Ch)	I²C Bus/SIO (Ch)	10-Bit AD Converter (Ch)	LCD Driver (Ch)	8-Bit Timer/Counter (Ch)	16-Bit Timer/Counter (Ch)	16-Bit PPG (Ch)	H/W RTC	CS/WAIT Controller (Ch)	Watchdog Timer	Dual Clocks	I/O Port (Pins)	Operating Temperature (°C)	Flash Version	Package
			5V±5%	3V±10%	2V±10%																			
TMP92CD54IFG (Note 1)	512K	32K	(Note 2)	—	—			1	1	2		3	12		8	2		●	1	●		68	–40 to 85	TMP92FD54AIFG	LQFP100 (14 x 14 mm)
TMP92FD54AIFG (Note 1)			50			●		1	1	2		3	12		8	2		●	1	●				—	

Note 1: Contains voltage regulator.

Note 2: Operating voltage is 4.5 V to 5.25 V.

◆ For further information about the I/R/S/T grade levels, please contact your nearest Toshiba sales representative.

◆ The suffix (G) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

TX System RISC Selection Guide

32-Bit Microcontrollers

TX19 Family

Part Number	Maximum Operating Frequency (MHz)	Internal Bus Width (Bits)	External Bus Width (Bits)	Internal ROM (Kbytes)	Internal RAM (Kbytes)	DMAC Channels (Ch)	I/O Ports (Pins)	Serial Interface (Ch)	Timer Channels (Ch)	External Interrupt Pins (Pins)	Dual Clocks	Debug Support Unit	Features	Package
TMP1940CYAFG	32	32	16	Mask 256	10	4	77	5	8	11	●	●	AD converter	
TMP1940FDBFG	32	32	16	Flash 512	16	4	77	5	8	11	●	●	Flash version of TMP1940CYAFG, AD converter	LQFP100
TMP1941AFG	40	32	16	None	10	4	46	5	8	11	●	●	ROM-less version of TMP1940CYAFG, AD converter	
TMP1942CYUG	32	32	16	Mask 256	16	4	108	6	26	29	●	●	AD converter, DA converter	
TMP1942CZUG	32	32	16	Mask 384	16	4	108	6	26	29	●	●	AD converter, DA converter	LQFP144
TMP1942FDUG	32	32	16	Flash 512	20	4	108	6	26	29	●	●	Flash version of TMP1942CYUG/CZUG, AD converter, DA converter	
TMP1942CZXBG	32	32	16	Mask 384	16	4	108	6	26	29	●	●	AD converter, DA converter	
TMP1942FDXBG	32	32	16	Flash 512	20	4	108	6	26	29	●	●	Flash version of TMP1942CZXBG, AD converter, DA converter Only engineering samples are available now.	FBGA177
TMP19A43FDXBG **	40	32	16	Flash 512	24	8	143	7	17	48	●	●	AD converter, DA converter 32-bit timer: 1 channel (4 input capture channels, 8 output compare channels) For availability, please contact Toshiba.	FBGA193
TMP1962C10BXBG	40.5	32	16	Mask 1024	40	8	202	8	17	25		●	Multiplexed/separate external bus interface, 32-bit timer: 1 channel (8 input capture channels, 8 output compare channels)	FBGA281
TMP1962F10AXBG	40.5	32	16	Flash 1024	40	8	202	8	17	25		●		
TMP19A51FYFG (Note 1) **	56	32	16	Flash 256	16	8	62	5	13	16		●	2, 8-ch ADCs; 2 CANs For availability, please contact Toshiba.	LQFP100
TMP19A64F20AXBG **	54	32	16	Flash 2048	64	8	209	8	26	20	●	●	Multiplexed/separate external bus interface, 32-bit timer: 1 channel (4 input capture channels, 10 output compare channels)	FBGA281
TMP19A70CYUG	56	32	—	Mask 256	10	8	75	3	4	10		●	AD converter, third-generation PMD	LQFP100
TMP19A70CYFG	56	32	—	Mask 256	10	8	75	3	4	10		●	AD converter, third-generation PMD	QFP100
TMP19A70FYUG	56	32	—	Flash 256	10	8	75	3	4	10		●	Flash version of TMP19A70CYUG AD converter, third-generation PMD	LQFP100
TMP19A70FYFG	56	32	—	Flash 256	10	8	75	3	4	10		●	Flash version of TMP19A70CYFG AD converter, third-generation PMD	QFP100
TMP19A71CYUG **	56	32	—	Mask 256	10	8	75	4	4	10		●	AD converter, third-generation PMD	LQFP100
TMP19A71CYFG **	56	32	—	Mask 256	10	8	75	4	4	10		●	AD converter, third-generation PMD	QFP100
TMP19A71FYUG **	56	32	—	Flash 256	10	8	75	4	4	10		●	Flash version of TMP19A71CYUG AD converter, third-generation PMD	LQFP100
TMP19A71FYFG **	56	32	—	Flash 256	10	8	75	4	4	10		●	Flash version of TMP19A71CYFG AD converter, third-generation PMD	QFP100

Note 1: This product is for automotive applications.

**: Under development

◆ The suffix (G) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

32-Bit Microprocessors

TX39 Family

Part Number	Maximum Operating Frequency (MHz)	Internal Bus Width (Bits)	External Bus Width (Bits)	Instruction Cache (Kbytes)	Data Cache (Kbytes)	DMAC Channels (Ch)	I/O Ports (Pins)	Serial Interface (Ch)	Timer Channels (Ch)	External Interrupt Pins (Pins)	PCMCIA Interface	Debug Support Unit	Memory Controller	Others	Package
TMPR3911BU	58	32	32	4	1		39	3	2	39	●				LQFP176
TMPR3911BXB	58	32	32	4	1		39	3	2	39	●		SDRAM, ROM, SRAM, Flash	LCD interface	FBGA177
TMPR3912AUG-92	92	32	32	4	1		39	3	2	39	●				LQFP208
TMPR3912XB-92	92	32	32	4	1		39	3	2	39	●				FBGA217
TMPR3916FG	60	32	32	4	1	2	30	4	2	3		●	SDRAM, ROM, SRAM, Flash	DA converter, CAN controller, graphics controller	QFP208
TMPR3927CF	133	32	32	8	4	4	16	2	3	6		●	SDRAM, SRAM, ROM, Flash	PCI controller (33 MHz)	QFP240

◆ The suffix (G) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

64-Bit Microprocessors

TX49 Family

Part Number	Maximum Operating Frequency (MHz)	Internal Bus Width (Bits)	External Bus Width (Bits)	Instruction Cache (Kbytes)	Data Cache (Kbytes)	DMAC Channels (Ch)	I/O Ports (Pins)	Serial Interface (Ch)	Timer Channels (Ch)	External Interrupt Pins (Pins)	PCMCIA Interface	Debug Support Unit	Memory Controller	Others	Package
TMPR4951BFG-200	200	64	32	16	8				1	7		●			QFP100
TMPR4955AFG-200B	200	64	32	32	32				1	7		●			
TMPR4955BFG-300	300	64	32	32	32				1	7		●		FPU	QFP160
TMPR4955CFG-400	400	64	32	32	32				1	7		●			
TMPR4956CXBG-400	400	64	64	32	32				1	7		●			PFBGA217
TMPR4925XBG-200	200	64	32	16	16	4	32	2	3	8	●	●	NAND Flash, SDRAM, SRAM, ROM, NOR Flash	PCI controller (33 MHz), FPU	PBGA256
TMPR4926XBG-200	200	64	32	16	16	4	32	2	3	8	●	●		PCI controller (33 MHz), FPU, DES/3DES	
TMPR4927ATBG-200	200	64	32	32	32	4	16	2	3	6		●	SDRAM, SRAM, ROM, Flash	PCI controller (66 MHz), FPU	TBGA420
TMPR4937XBG-300/333	300 /333	64	32	32	32	8	16	2	3	6		●	SDRAM, SRAM, ROM, Flash		PBGA484
TMPR4938XBG-300/333	300 /333	64	32	32	32	8	16	2	3	6		●	NAND Flash, SDRAM, SRAM, ROM, NOR Flash	PCI controller (66 MHz), FPU, Ether MAC	
TX4939XBG-400 **	400	64	32	32	32	8	14	4	3	6		●		PCI controller (66 MHz), RTC, FPU, Ether MAC, ATA/ATAPI, I^2S/I^2C, Crypt engine (DES/3DES, etc.)	PBGA456

◆ The suffix (G) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

**: Under development

64-Bit Microprocessors (Superscalar)

TX99 Family

Part Number	Maximum Operating Frequency (MHz)	Internal Bus Width (Bits)	External Bus Width (Bits)	Instruction Cache (Kbytes)	Data Cache (Kbytes)	DMAC Channels (Ch)	I/O Ports (Pins)	Serial Interface (Ch)	Timer Channels (Ch)	External Interrupt Pins (Pins)	PCMCIA Interface	Debug Support Unit	Memory Controller	Others	Package
TX9956XBG-533 **	533	64	64	32	32				1	7		●		256-KB Level-2 cache, FPU	PBGA272

◆ The suffix (G) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

**: Under development

64-Bit Microprocessor Peripherals (PCI companion chip)

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

◆ The suffix (G) appended to the part number represents a Lead(Pb)-Free product. For details, please contact your nearest Toshiba sales representative.

Microcomputer Development System Selection Guide

Microcomputer Selection Guide P.5

Microcomputer Development System Selection Guide P.23

TLCS-47 Family Development System

☐ Software Products

Language Tool		Test Tool
Assembler	C-Like Compiler	Debugger
SW471E0-ZZJ: Japanese edition SW471E0-ZZE: English edition	SW476E0-ZZJ: Japanese edition SW476E0-ZZE: English edition	SW477E0-ZZJ: Controller: BM1020A (for the RTE emulation system), Japanese edition SW477E0-ZZE: Controller: BM1020A (for the RTE emulation system), English edition SW477E1-ZZJ: Controller: BM1022R0B (for the model10 emulation system), Japanese edition SW477E1-ZZE: Controller: BM1022R0B (for the model10 emulation system), English edition

☐ Hardware Products

Target MCU			Test Tools				
Part Number	OTP/Flash MCU	Package	Controller	Emulator/Emulation Pod	MCU Probe (#1, #2)	Package Converter (#1, #2)	
TMP47C101MG	—	SOP16	BM1020A ##	BM4721A ##	(PN100002 + PN200001)	BM1160 + AS-DIP.3-016-SO03-1	
TMP47C201MG							
TMP47C101PG	TMP47P201VPG	DIP16				BM1160	
TMP47C201PG							
TMP47C102MG	TMP47P202VMG	SOP20		BM47C203N0A ##	(PN100004)	AS-DIP.3-020-SO03-1	
TMP47C202MG							
TMP47C102PG	TMP47P202VPG	DIP20				—	
TMP47C202PG							
TMP47C103MG	TMP47P403VMG	SOP28			(PN100003)	AS-DIP.6-028-SO08-1	
TMP47C203MG							
TMP47C103NG	TMP47P403VNG	SDIP28				(PN200004)	
TMP47C203NG							
TMP47C206MG	TMP47P206VMG	SOP20		BM47C206M0A	(PN100004)	(AS-DIP.3-020-SO03-1)	
TMP47C206PG	TMP47P206VPG	DIP20					
TMP47C222FG	TMP47P422VFG	QFP44 (14 x 14)	BM1022R0B	BM47C422N0B	PN120019	—	
TMP47C422FG							
TMP47C222NG	TMP47P422VNG	SDIP42			(PN100002)	(PN200001)	
TMP47C422NG							
TMP47C222UG	TMP47P422VUG	LQFP44 (10 x 10)			PN120030	—	
TMP47C422UG							
TMP47C241MG	TMP47P241VMG	SOP28	BM1020A ##	BM47214A ##	(PN110003)	BM1152 + AS-SDP.4-028-SO05-2	
TMP47C241NG	TMP47P241VNG	SDIP28				BM1152	
TMP47C243DMG	TMP47P443VDMG	SSOP30	BM1022R0B	BM47C443N0B	(PN100003)	PN200007	
TMP47C443DMG							
TMP47C243MG	TMP47P443VMG	SOP28				AS-DIP.6-028-SO08-1	
TMP47C443MG							
TMP47C243NG	TMP47P443VNG	SDIP28				(PN200004)	
TMP47C443NG							

- The TLCS-47 family software runs in the following environments:
  Japanese edition: DOS-compatible box under the Japanese Windows 95 or NT 4.0 environment, or Japanese MS-DOS.
  English edition: DOS-compatible box under the English Windows 95 or NT 4.0 environment, or English MS-DOS.

#1: Those enclosed within parentheses are spare parts. One each is supplied with an emulation pod.
#2: One QFP adapter and one pin protector are supplied with an MCU probe or a package converter whose name begins with "PN12."

※: Emulation Technology products are available from Micron, Inc.
**: Under development
##: Contact your local Toshiba sales representative before ordering products.

Note 1: The OTP programming adapter durability is lowered when used with lead (Pb)-free packaged products.
As a guideline, the adapter should be replaced after 2,000 writes.

Accessories				Notes
QFP Adapter (#1)	MCU Mount Adapter (#1)	Pin Protector (#1)	OTP/Flash Programming Adapter	
			—	The package converter (AS-DIP.3-016-SO03-1) is made by Emulation Technology, Inc. (ET). ※
			BM1187	—
			BM11613 **	The package converter (AS-DIP.3-020-SO03-1) is made by Emulation Technology, Inc. (ET). ※
	—		BM1187	—
			BM11541	The package converter (AS-DIP.6-028-SO08-1) is made by Emulation Technology, Inc. (ET). ※
			BM1140	—
			BM11626 **	The package converter (AS-DIP.3-020-SO03-1) is made by Emulation Technology, Inc. (ET). ※
			BM11125	—
—	IC149-044-039-B5	—	BM11603	One IC socket (IC149-044-039-B5) is supplied with the PN120019. The IC socket (IC149-044-039-B5) is available from Yamaichi Electronics, Co. Ltd.
	—		BM11102	—
	IC149-044-052-B5		BM11670	One IC socket (IC149-044-052-B5) is supplied with the PN120030. The IC socket (IC149-044-052-B5) is available from Yamaichi Electronics, Co. Ltd.
	—		BM11557	The package converter (AS-SDP.4-028-SO05-2) is made by Emulation Technology, Inc. (ET). ※
			BM1156	—
	IC253-030-0002-B		BM11115	One IC socket (IC253-030-0002-B) is supplied with the PN200007. The IC socket (IC253-030-0002-B) is available from Yamaichi Electronics, Co. Ltd. (Note 1)
	—		BM11601	The package converter (AS-DIP.6-028-SO08-1) is made by Emulation Technology, Inc. (ET). ※
			BM11100	—

TLCS-870/C series Development System model15 System (1/2)

☐ Software Products

Language Tool	Test Tool
C Compiler & Assembler Set (%1)	Debugger (%1)
SW86YN0-ZCK: 1 license (Japanese edition)	SW86DN9-ZCJ: 1 license (Japanese edition)
SW86YN0-ZCF: 1 license (English edition)	SW86DN9-ZCE: 1 license (English edition)
SW86YN3-ZCK: 10 licenses (Japanese edition)	SW86DN3-ZCJ: 10 licenses (Japanese edition)
SW86YN3-ZCF: 10 licenses (English edition)	SW86DN3-ZCE: 10 licenses (English edition)

☐ Hardware Products

Target MCU			Test Tools					
Part Number	OTP/Flash MCU	Package	Controller	Interface Module	Emulation Module	Emulation Chip (#2)	Target Connection Board	
TMP86CH06UG	TMP86PH06UG	LQFP44 (10 x 10)				TMP86C906XB **	BMP86D044DE0A	
TMP86CH06AUG								
TMP86CH06NG	TMP86PH06NG	SDIP42					BMP86D042NB0A	
TMP86P202MG	—	SOP20					BMP86D020MC0A	
TMP86P203MG								
TMP86P202PG		DIP20					BMP86D020NA0A	
TMP86P203PG								
TMP86C407NG	TMP86P807NG	SDIP28					BMP86D028NB0A	
TMP86C807NG	TMP86F807NG							
TMP86C407ING	TMP86P807NG							
TMP86C407SNG								
TMP86C807ING								
TMP86C807SNG								
TMP86C407MG	TMP86P807MG	SOP28			BMP86A200010B	TMP86C908XB **	BMP86D028MC0A	
TMP86C807MG	TMP86F807MG							
TMP86C407IMG	TMP86P807MG							
TMP86C407SMG								
TMP86C807IMG								
TMP86C807SMG								
TMP86C408NG	TMP86P808NG	SDIP30					BMP86D030NB0A	
TMP86C808NG	TMP86F808NG							
TMP86C408DMG	TMP86P808DMG	SSOP30					BMP86D030MF1A	
TMP86C808DMG	TMP86F808DMG							
TMP86C408IDMG	TMP86P808DMG							
TMP86C408SDMG								
TMP86C808IDMG								
TMP86C808SDMG								
TMP86CH12MG **	TMP86FH12MG **		BM1040R0A	BMP86A100010B	BMP86A200020A	TMP86C912XB **	BMP86D030MF0A **	
TMP86FH12MG **	—							
TMP86C822UG	TMP86PH22UG	LQFP44 (10 x 10)					BMP86D044DE1A	
TMP86CH22UG								
TMP86CM23AUG	TMP86PM23UG	LQFP64 (10 x 10)			BMP86A200010B	TMP86C923XB **	BMP86D064DG0A	
TMP86CP23AUG	TMP86FS23UG TMP86PS23UG							
TMP86CM25AFG	TMP86FM25FG	QFP100 (14 x 20)			BMP86A200020A	TMP86C925XB **	BMP86D100FF0A	
TMP86CM25FG	TMP86PS25FG							
TMP86CS25AFG								
TMP86CS25ADFG	—	LQFP100 (14 x 14)					BMP86D100DG0A	
TMP86CM27FG	TMP86PS27FG	QFP80 (14 x 20)				TMP86C927XB **	BMP86D080FE0A	
TMP86CP27AFG	TMP86FS27FG							
TMP86C420UG	TMP86P820UG	LQFP64 (10 x 10)					BMP86D064DG0A	
TMP86C820UG								
TMP86CH21UG	TMP86PM29BUG							
TMP86CH21AUG								
TMP86C829BUG								
TMP86CH29BUG								
TMP86CM29BUG					BMP86A200010B			
TMP86FM29UG	—					TMP86C929AXB **		
TMP86FM29FG								
TMP86C420FG	TMP86P820FG	QFP64 (14 x 14)					BMP86D064DE0A	
TMP86C820FG								
TMP86CH21FG	TMP86PM29BFG							
TMP86C829BFG								
TMP86CH29BFG								
TMP86CM29BFG								

%1: The Japanese edition runs on Japanese Windows, and the English edition runs on English Windows.

#1: Those enclosed within parentheses are spare parts. One each is supplied with a target connection board.
#2: The emulation chip is specifically designed for each target MCU.

**: Under development
++: Being planned

Note 1: The OTP programming adapter durability is lowered when used with lead (Pb)-free packaged products.
As a guideline, the adapter should be replaced after 2,000 writes.

Accessories				Notes
QFP Adapter (#1)	MCU Mount Adapter (#1)	Pin Protector (#1)	OTP/Flash Programming Adapter	
(PN210019)	PN210020A	(PN210021)	BM11656	—
	—		BM11155	
	(IC253-020-0004-B)		BM11704 **	One IC socket (IC253-020-0004-B) is supplied with the target connection board. The IC socket (C253-020-0004-B) is available from Yamaichi Electronics, Co., Ltd.
			BM11203	
			TMP86P807NG: BM11197 TMP86F807NG: PN410119	
	—			—
			BM11197	
			TMP86P807MG: BM11684 TMP86F807MG: PN410117	
—	(IC253-028-0003-B)	—		One IC socket (IC253-028-0003-B) is supplied with the target connection board. The IC socket (IC253-028-0003-B) is available from Yamaichi Electronics, Co., Ltd.
			BM11684	
	—		TMP86P808NG: BM11210 TMP86F808NG: PN410119	—
			TMP86P808DMG: BM11183 TMP86F808DMG: PN410118	
	(IC253-030-0002-B)		BM11183	One IC socket (IC253-030-0002-B) is supplied with the target connection board. The IC socket (IC253-030-0002-B) is available from Yamaichi Electronics, Co., Ltd. (Note 1)
			PN410118 **	
(PN210019)	PN210020A	(PN210021)	BM11713	
			BM11698	
(PN210031)	PN210033	(PN210032)	TMP86PS23UG: BM11698 TMP86FS23UG: PN410105	
			PN410111	
(PN210004)	PN210005A	(PN210006)	BM11672	
(PN210022)	PN210023	(PN210024)	—	
(PN210001)	PN210002	(PN210003)	TMP86PS27FG: BM11701 TMP86FS27FG: PN410104	
			BM11662	
				—
(PN210031)	PN210033	(PN210032)	BM11662 **	
			PN410105 **	
			PN410108 **	
			BM11663	
(PN210025)	PN210026	(PN210027)		
			BM11663 **	

TLCS-870/C series Development System model15 System (2/2)

☐ Software Products

Language Tool	Test Tool
C Compiler & Assembler Set (%1)	Debugger (%1)
SW86YN0-ZCK: 1 license (Japanese edition)	SW86DN9-ZCJ: 1 license (Japanese edition)
SW86YN0-ZCF: 1 license (English edition)	SW86DN9-ZCE: 1 license (English edition)
SW86YN3-ZCK: 10 licenses (Japanese edition)	SW86DN3-ZCJ: 10 licenses (Japanese edition)
SW86YN3-ZCF: 10 licenses (English edition)	SW86DN3-ZCE: 10 licenses (English edition)

☐ Hardware Products

Target MCU			Test Tool				
Part Number	OTP/Flash MCU	Package	Controller	Interface Module	Emulation Module	Emulation Chip (#2)	Target Connection Board
TMP86CS44UG	TMP86PS44UG					TMP86C944XB **	
TMP86C845UG	TMP86PM47AUG TMP86PH47UG TMP86FH47AUG TMP86FH47ADUG	LQFP44 (10 x 10)			BMP86A200010B	TMP86C947XB **	BMP86D044DE0A
TMP86C847UG							
TMP86CH47AUG							
TMP86C847IUG							
TMP86C847SUG							
TMP86CH47IUG							
TMP86CH47SUG							
TMP86CM47AUG	TMP86PM47AUG						
TMP86CM47AIUG ++							
TMP86FH46ANG	—	SDIP42					BMP86D042NB1A
TMP86C846NG	TMP86PH46NG TMP86PM46NG TMP86FH46ANG						
TMP86CH46ANG							
TMP86CM46ANG	TMP86PM46NG						
TMP86FH47ADUG		LQFP48 (7 x 7)					BMP86D048DG0A **
TMP86FM26UG	—	LQFP64 (10 x 10)			BMP86A200030A	TMP86C926XB **	BMP86D064DG0A
TMP86FM48UG							
TMP86FP24FG		LQFP80 (12 x 12)				TMP86C948XB **	BMP86D080DG1A
TMP86FM48FG		QFP64 (14 x 14)	BM1040R0A	BMP86A100010B			BMP86D064DE0A
TMP86CH49FG	TMP86PM49FG						
TMP86CM49FG	TMP86FS49AFG						
TMP86CS49FG	TMP86FS49AFG						
TMP86CH49NG	TMP86PM49NG	SDIP64			BMP86A200010B	TMP86C949XB **	BMP86D064NB0A
TMP86CM49NG							
TMP86CH49UG	TMP86PM49UG TMP86FS49AUG	LQFP64 (10 x 10)					BMP86D064DG0A
TMP86CH49IUG ++							
TMP86CM49UG							
TMP86CS49UG	TMP86FS49AUG						
TMP86CS64AFG	TMP86PS64FG TMP86FS64FG	QFP100 (14 x 20)			BMP86A200020A	TMP86C964XB **	BMP86D100FF0A
TMP86CH72FG	TMP86PM72FG **	QFP64 (14 x 14)			BMP86A200010B	TMP86C972XB **	BMP86D064DE0A
TMP86CM72FG							
TMP86CK74AFG	TMP86PM74AFG	QFP80 (14 x 20)				TMP86C974XB **	BMP86D080FE0A
TMP86CM74AFG							
TMP86CH87RUG	TMP86PM87RUG	LQFP44 (10 x 10)			BMP86A200020A	TMP86C987XB **	BMP86D044DE0A
TMP86CM87RUG							
TMP86C809NG **	TMP86FH09NG **	SDIP32					BMP86D032NB0A
TMP86CH09NG **							
TMP86CS28FG **	TMP86FS28FG **	QFP80 (14 x 20)			BMP86A200010B	TMP86C989XB **	BMP86D080FE0A
TMP86CS28DFG **	TMP86FS28DFG **	LQFP80 (12 x 12)					BMP86D080DG0A
TMP86CM89IFG ++	TMP86FS89FG ++	QFP80 (14 x 20)					BMP86D080FE0A
TMP86CS89IFG ++							

%1: The Japanese edition runs on Japanese Windows, and the English edition runs on English Windows.

#1: Those enclosed within parentheses are spare parts. One each is supplied with a target connect board.
#2: The emulation chip is specifically designed for each target MCU.

**: Under development
++: Being planned

Accessories				Notes
QFP Adapter (#1)	MCU Mount Adapter (#1)	Pin Protector (#1)	OTP/Flash Programming Adapter	
			BM11687	
			TMP86PM47AUG: BM11687	
			TMP86PH47UG: BM11687 **	
(PN210019)	PN210020A	(PN210021)	TMP86FH47AUG: PN410109 **	
			TMP86FH47ADUG: PN410115 **	
			BM11687	
			PN410110 **	
			TMP86PH46NG/TMP86PM46NG: BM11188	
—	—	—	TMP86FH46ANG: PN410110 **	
			BM11188	
**	**	**	PN410115 **	
(PN210031)	PN210033	(PN210032)	PN410105	
(PN210007)	PN210008	(PN210009)	TBD	
			PN410108	
			TMP86PM49FG: BM11709	
(PN210025)	PN210026	(PN210027)	TMP86FS49AFG: TBD	—
			TBD	
—	—	—	BM11211	
			TMP86PM49UG: BM11708	
(PN210031)	PN210033	(PN210032)	TMP86FS49AUG: PN410105 **	
			PN410105 **	
(PN210004)	PN210005A	(PN210006)	TMP86PS64FG: BM11690	
			TMP86FS64FG: PN410111	
(PN210025)	PN210026	(PN210027)	BM11707	
(PN210001)	PN210002	(PN210003)	BM11689	
(PN210019)	PN210020A	(PN210021)	BM11687	
—	—	—	PN410119 **	
(PN210001)	PN210002	(PN210003)	PN410104 **	
(PN210007)	PN210008	(PN210009)	PN410007 **	
(PN210001)	PN210002	(PN210003)	PN410104 **	

TLCS-870/C series Development System Light System (1/2)

☐ Software Products

Language Tool	Test Tool
C Compiler & Assembler Set (%1)	Debugger (%2)
SW86YN0-ZCK: 1 license (Japanese edition) SW86YN0-ZCF: 1 license (English edition) SW86YN3-ZCK: 10 licenses (Japanese edition) SW86YN3-ZCF: 10 licenses (English edition)	The emulator comes with a download license.

%1: The Japanese edition runs on Japanese Windows, and the English edition runs on English Windows.
%2: A dedicated debugger can be downloaded from the TOSHIBA Microcomputer Development System Web site.

#2: The emulation chip is specifically designed for each target MCU.
#3: Adlinks probe sets are available from Daimaru Kogyo, Ltd.

**: Under development
++: Being planned

Note 1: The OTP programming adapter durability is lowered when used with lead (Pb)-free packaged products. As a guideline, the adapter should be replaced after 2,000 writes.

☐ Hardware Products

Target MCU			Test Tools		Accessories		Notes
Part Number	OTP/Flash MCU	Package	Emulator	Emulation Chip (#2)	Adlinks Probe Set (#3)	OTP/Flash Programming Adapter	
TMP86CH06UG	TMP86PH06UG	LQFP44 (10 x 10)		TMP86C906XB **	AP44QP	BM11656	
TMP86CH06AUG							
TMP86CH06NG	TMP86PH06NG	SDIP42			AP42D0U-2	BM11155	
TMP86P202MG	—	SOP20			AP20S3U-2	BM11704 **	
TMP86P203MG							
TMP86P202PG		DIP20			AP20D3W-2	BM11203	
TMP86P203PG							
TMP86C407NG	TMP86P807NG	SDIP28			AP28D4U	TMP86P807NG: BM11197	
TMP86C807NG	TMP86F807NG					TMP86F807NG: PN410119	
TMP86C407ING	TMP86P807NG					BM11197	
TMP86C407SNG							
TMP86C807ING							
TMP86C807SNG							
TMP86C407MG	TMP86P807MG	SOP28	BMP86A300010A	TMP86C908XB **	AP28S9T	TMP86P807MG: BM11684	
TMP86C807MG	TMP86F807MG					TMP86F807MG: PN410117	
TMP86C407IMG	TMP86P807MG					BM11684	
TMP86C407SMG							
TMP86C807IMG							
TMP86C807SMG							
TMP86C408NG	TMP86P808NG	SDIP30			AP30D4U-2	TMP86P808NG: BM11210	
TMP86C808NG	TMP86F808NG					TMP86F808NG: PN410119	
TMP86C408DMG	TMP86P808DMG	SSOP30			AP30S3N-2	TMP86P808DMG: BM11183	(Note1)
TMP86C808DMG	TMP86F808DMG					TMP86F808DMG: PN410118	
TMP86C408IDMG	TMP86P808DMG					BM11183	
TMP86C408SDMG							
TMP86C808IDMG							
TMP86C808SDMG							
TMP86CH12MG **	TMP86FH12MG **		BMP86A300020A	TMP86C912XB **	AP30S3N **	PN410118	
TMP86FH12MG **	—						
TMP86C822UG	TMP86PH22UG	LQFP44 (10 x 10)			AP44QP-2	BM11713 **	
TMP86CH22UG							
TMP86CM23AUG	TMP86PM23UG	LQFP64 (10 x 10)	BMP86A300010A	TMP86C923XB **	AP64QM	BM11698	
TMP86CP23AUG	TMP86FS23UG TMP86PS23UG					TMP86FS23UG: PN410105 ** TMP86PS23UG: BM11698	
TMP86CM25AFG	TMP86FM25FG	QFP100 (14 x 20)	BMP86A300020A	TMP86C925XB **	AP100QN	PN410111	
TMP86CM25FG	TMP86PS25FG					BM11672	
TMP86CS25AFG							
TMP86CS25ADFG	—	LQFP100 (14 x 14)			AP100QM-2	—	
TMP86CM27FG	TMP86PS27FG	QFP80 (14 x 20)		TMP86C927XB **	AP80QP	TMP86PS27FG: BM11701	
TMP86CP27AFG	TMP86FS27FG					TMP86FS27FG: PN410104	
TMP86C420UG	TMP86P820UG	LQFP64 (10 x 10)			AP64QM	BM11662	
TMP86C820UG							
TMP86CH21UG	TMP86PM29BUG					BM11662 **	
TMP86CH21AUG							
TMP86C829BUG							
TMP86CH29BUG							
TMP86CM29BUG			BMP86A300010A				
TMP86FM29UG	—			TMP86C929AXB **		PN410105 **	
TMP86FM29FG		QFP64 (14 x 14)			AP64QP	PN410108 **	
TMP86C420FG	TMP86P820FG					BM11663	
TMP86C820FG							
TMP86CH21FG	TMP86PM29BFG					BM11663 **	
TMP86C829BFG							
TMP86CH29BFG							
TMP86CM29BFG							

TLCS-870/C series Development System Light System (2/2)

☐ Software Products

Language Tool	Test Tool
C Compiler & Assembler Set (%1)	Debugger (%2)
SW86YN0-ZCK: 1 license (Japanese edition) SW86YN0-ZCF: 1 license (English edition) SW86YN3-ZCK: 10 licenses (Japanese edition) SW86YN3-ZCF: 10 licenses (English edition)	The emulator comes with a download license.

%1: The Japanese edition runs on Japanese Windows, and the English edition runs on English Windows.
%2: A dedicated debugger can be downloaded from the TOSHIBA Microcomputer Development System Web site.
#2: The emulation chip is specifically designed for each target MCU.
#3: Adlinks probe sets are available from Daimaru Kogyo, Ltd.
**: Under development
++: Being planned

☐ Hardware Products

Target MCU			Test Tools		Accessories		Notes
Part Number	OTP/Flash MCU	Package	Emulator	Emulation Chip (#2)	Adlinks Probe Set (#3)	OTP/Flash Programming Adapter	
TMP86CS44UG	TMP86PS44UG			TMP86C944XB **		BM11687	
TMP86C845UG							
TMP86C847UG	TMP86PM47AUG TMP86PH47UG TMP86FH47AUG TMP86FH47ADUG	LQFP44 (10 x 10)	BMP86A300010A	TMP86C947XB **	AP44QP	TMP86PM47AUG: BM11687 TMP86PH47UG: BM11687 ** TMP86FH47AUG: PN410109 ** TMP86FH47ADUG: PN410115 **	
TMP86CH47AUG							
TMP86C847IUG							
TMP86C847SUG							
TMP86CH47IUG							
TMP86CH47SUG							
TMP86CM47AUG	TMP86PM47AUG					BM11687	
TMP86CM47AIUG ++							
TMP86FH46ANG	—	SDIP42			AP42D0U-3	PN410110 **	
TMP86C846NG	TMP86PH46NG TMP86PM46NG TMP86FH46ANG					TMP86PH46NG/TMP86PM46NG : BM11188 TMP86FH46ANG: PN410110 **	
TMP86CH46ANG							
TMP86CM46ANG	TMP86PM46NG					BM11188	
TMP86FH47ADUG		LQFP48 (7 x 7)			**	PN410115 **	
TMP86FM26UG		LQFP64 (10 x 10)	BMP86A300030A	TMP86C926XB **	AP64QM	PN410105	
TMP86FM48UG	—			TMP86C948XB **			
TMP86FP24FG		LQFP80 (12 x 12)	—	—	—	TBD	Currently supported by model15 system
TMP86FM48FG			BMP86A300030A	TMP86C948XB **		PN410108	
TMP86CH49FG	TMP86PM49FG	QFP64 (14 x 14)			AP64QP	TMP86PM49FG: BM11709	
TMP86CM49FG	TMP86FS49AFG					TMP86FS49AFG: TBD	
TMP86CS49FG	TMP86FS49AFG					TBD	
TMP86CH49NG	TMP86PM49NG	SDIP64	BMP86A300010A	TMP86C949XB **	AP64D0U-2	BM11211	
TMP86CM49NG							
TMP86CH49UG	TMP86PM49UG TMP86FS49AUG	LQFP64 (10 x 10)			AP64QM	TMP86PM49UG: BM11708 TMP86FS49AUG: PN410105 **	
TMP86CH49IUG ++							
TMP86CM49UG							
TMP86CS49UG	TMP86FS49AUG					PN410105 **	
TMP86CS64AFG	TMP86PS64FG TMP86FS64FG	QFP100 (14 x 20)	BMP86A300020A	TMP86C964XB **	AP100QN	TMP86PS64FG: BM11690 TMP86FS64FG: PN410111	
TMP86CH72FG	TMP86PM72FG **	QFP64 (14 x 14)	BMP86A300010A	TMP86C972XB **	AP64QP	BM11707	
TMP86CM72FG							
TMP86CK74AFG	TMP86PM74AFG	QFP80 (14 x 20)		TMP86C974XB **	AP80QP	BM11689	
TMP86CM74AFG							
TMP86CH87RUG	TMP86PM87RUG	LQFP44 (10 x 10)	BMP86A300020A	TMP86C987XB **	AP44QP	BM11687	
TMP86CM87RUG							
TMP86C809NG **	TMP86FH09NG **	SDIP32			AP32D4U	PN410119 **	
TMP86CH09NG **							
TMP86CS28FG **	TMP86FS28FG **	QFP80 (14 x 20)	BMP86A300010A	TMP86C989XB **	AP80QP	PN410104 **	
TMP86CS28DFG **	TMP86FS28DFG **	LQFP80 (12 x 12)			AP80QM	PN410007 **	
TMP86CM89IFG ++	TMP86FS89FG ++	QFP80 (14 x 20)			AP80QP	PN410104 **	
TMP86CS89IFG ++							

TLCS-870 series Development System (1/2)

☐ Software Products

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

☐ Hardware Products

Target MCU			Test Tools		Accessories			
Part Number	OTP/Flash MCU	Package	Controller	Emulation Pod	MCU Probe (#1, #2)	Package Converter (#1, #2)	QFP Adapter (#1)	
TMP87C405AMG	TMP87P808MG	SOP28		BM87C408M0A	(PN100003)	(AS-DIP.6-028-SO08-1)	—	
TMP87C807UG	TMP87PH47UG	QFP44 (10 x 10)		BM87CH47U0B	(PN120011)	—	(PN210019)	
TMP87C408DMG	TMP87P808MG TMP87P808NG	SSOP30				PN200007		
TMP87C408LMG	TMP87P808LMG	SOP28				(AS-DIP.6-028-SO08-1)		
TMP87C808LMG								
TMP87C408LNG	TMP87P808LNG	SDIP28		BM87C408M0A		PN200004		
TMP87C808LNG								
TMP87C408MG	TMP87P808MG	SOP28			(PN100003)	(AS-DIP.6-028-SO08-1)	—	
TMP87C808MG								
TMP87C408NG	TMP87P808NG	SDIP28				PN200004		
TMP87C808NG								
TMP87C409BMG	TMP87P809MG	SOP28				AS-DIP.6-028-SO08-1		
TMP87C809BMG				BM87C809N0A				
TMP87C409BNG	TMP87P809NG	SDIP28				(PN200004)		
TMP87C809BNG								
TMP87C814FG	TMP87PM14FG	QFP64 (14 x 20)				PN120007	PN210010	
TMP87CH14FG								
TMP87CK14FG								
TMP87CM14FG				BM87CM14N0A	(PN110008)			
TMP87C814NG	TMP87PM14NG	SDIP64	BM1022R0B				—	
TMP87CH14NG								
TMP87CK14NG								
TMP87CM14NG								
TMP87CH21CDFG	TMP87PP21DFG	LQFP80 (12 x 12)			PN120006A		PN210007	
TMP87CP21CDFG								
TMP87CH21CFG	TMP87PP21FG	QFP80 (14 x 20)			PN120004		PN210001	
TMP87CP21CFG				BM87CP23F0B				
TMP87CM21CDFG	TMP87PP21DFG	LQFP80 (12 x 12)			PN120006A		PN210007	
TMP87CM21CFG	TMP87PP21FG	QFP80 (14 x 20)			PN120004		PN210001	
TMP87CM23AFG	TMP87PP23FG	QFP100 (14 x 20)			(PN120005)		(PN210004)	
TMP87CP23FG						—		
TMP87CM24AFG	TMP87PP24AFG	LQFP100 (14 x 14)		BM87CP24F0A	(PN120013)		(PN210022)	
TMP87CP24AFG								
TMP87CH29NG	TMP87PM29NG	SDIP64			PN110005		—	
TMP87CK29NG								
TMP87CM29NG				BM87CM29U0B				
TMP87CH29UG	TMP87PM29UG	LQFP64 (10 x 10)			(PN120022)		(PN210031)	
TMP87CK29UG								
TMP87CM29UG								
TMP87CK40AFG	TMP87PM40AFG	QFP64 (14 x 20)			PN120014		PN210010	
TMP87CM40AFG				BM87CK40N0B				
TMP87CK40ANG	TMP87PM40ANG	SDIP64			(PN110005)		—	
TMP87CM40ANG								

%1: The Japanese edition runs on Japanese Windows, and the English edition runs on English Windows.

#1: Those enclosed within parentheses are spare parts. One each is supplied with an emulation pod.

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

※: Emulation Technology products are available from Micron, Inc.

Note 1: The OTP programming adapter durability is lowered when used with lead (Pb)-free packaged products.
As a guideline, the adapter should be replaced after 2,000 writes.

			Notes
MCU Mount Adapter (#1)	Pin Protector (#1)	OTP/Flash Programming Adapter	
—	—	BM11616	The package converter (AS-DIP.6-028-SO08-1) is made by Emulation Technology, Inc. (ET). ※
PN210020A	(PN210021)	BM11594	—
IC253-030-0002-B		TMP87P808MG: BM11616 TMP87P808NG: BM11122	One IC socket (IC253-030-0002-B) is supplied with the PN200007. The IC socket (IC253-030-0002-B) is available from Yamaichi Electronics, Co. Ltd. The TMP87C408DMG is packaged in a 30-pin SSOP. However, the OTP version is not available in the same package. If necessary, use the 28-pin TMP87P808MG (SOP) or TMP87P808NG (SDIP) with on-chip OTP.
—	—	BM11616	The package converter (AS-DIP.6-028-SO08-1) is made by Emulation Technology, Inc. (ET). ※
		BM11122	—
		BM11616	The package converter (AS-DIP.6-028-SO08-1) is made by Emulation Technology, Inc. (ET). ※
		BM11122	—
		BM11616	The package converter (AS-DIP.6-028-SO08-1) is made by Emulation Technology, Inc. (ET). ※
		BM11122	—
PN210011A	PN210012	BM1199	(Note 1)
—	—	BM1198	
PN210008	PN210009	BM11605	
PN210002	PN210003	BM11604	
PN210008	PN210009	BM11605	
PN210002	PN210003	BM11604	
PN210005A	(PN210006)	BM11585	—
PN210023	(PN210024)	BM11627	
—	—	BM11143	
PN210033	(PN210032)	BM11617	
PN210011A	PN210012	BM1137	(Note 1)
—	—	BM11714	—

TLCS-870 series Development System (2/2)

☐ Software Products

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

☐ Hardware Products

Target MCU			Test Tools		Accessories			
Part Number	OTP/Flash MCU	Package	Controller	Emulation Pod	MCU Probe (#1, #2)	Package Converter (#1, #2)	QFP Adapter (#1)	
TMP87C840FG								
TMP87CC40FG	TMP87PH40AFG	QFP64 (14 x 20)			PN120014		PN210010	
TMP87CH40FG				BM87CK40N0B				
TMP87C840NG								
TMP87CC40NG	TMP87PH40ANG	SDIP64			(PN110005)		—	
TMP87CH40NG								
TMP87C841FG								
TMP87CC41FG						—		
TMP87CH41FG	TMP87PM41FG	QFP64 (14 x 20)			PN120014		PN210010	
TMP87CK41FG								
TMP87CM41FG								
TMP87C841NG								
TMP87CC41NG								
TMP87CH41NG	TMP87PM41NG	SDIP64		BM87CM41N0A			—	
TMP87CK41NG								
TMP87CM41NG					(PN110005)			
TMP87C841UG								
TMP87CC41UG								
TMP87CH41UG	TMP87PM41UG	LQFP64 (10 x 10)				PN120035	PN210031	
TMP87CK41UG								
TMP87CM41UG								
TMP87C446NG								
TMP87C846NG	TMP87PH46NG	SDIP42	BM1022R0B		(PN100002 + PN200001)		—	
TMP87CH46NG								
TMP87C847LUG	TMP87PH47LUG			BM87CH47U0B				
TMP87CH47LUG								
TMP87C447UG		QFP44 (10 x 10)			(PN120011)		(PN210019)	
TMP87C847UG	TMP87PH47UG							
TMP87CH47UG								
TMP87CH48DFG	TMP87PH48DFG	QFP64 (14 x 14)			PN120052		PN210025	
TMP87CM48DFG	TMP87PM48DFG			BM87CH48U0A				
TMP87CH48UG	TMP87PH48UG	LQFP64 (10 x 10)			(PN120022)		(PN210031)	
TMP87CM48UG	TMP87PM48UG							
TMP87CM53FG	TMP87PM53FG	QFP80 (14 x 20)		BM87CM53F0A	(PN120004)	—	(PN210001)	
TMP87CS68DFG	TMP87PS68DFG	LQFP80 (12 x 12)		BM87CS68DF0A	(PN120006A)		(PN210007)	
TMP87CM70BFG	TMP87PM70FG							
TMP87CS71BFG	TMP87PS71AFG	QFP80 (14 x 20)		BM87CK70F0B	PN120004		PN210001	
TMP87CH74AFG	TMP87PM74FG							
TMP87CM74AFG				BM87CM75F0A				
TMP87CH75FG	TMP87PM75FG							
TMP87CM75FG								
TMP87CC78FG		QFP100 (14 x 20)			(PN120005)		(PN210004)	
TMP87CH78FG	TMP87PM78FG			BM87CM78F0A				
TMP87CK78FG								
TMP87CM78FG								

%1: The Japanese edition runs on Japanese Windows, and the English edition runs on English Windows.

#1: Those enclosed within parentheses are spare parts. One each is supplied with an emulation pod.

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

Note 1: The OTP programming adapter durability is lowered when used with lead (Pb)-free packaged products.
As a guideline, the adapter should be replaced after 2,000 writes.

MCU Mount Adapter (#1)	Pin Protector (#1)	OTP/Flash Programming Adapter	Notes
PN210011A	PN210012	BM1137	(Note 1)
—	—	BM1136	—
PN210011A	PN210012	BM1137	(Note 1)
—	—	BM1136	
PN210033	PN210032	BM11621	
—	—	BM1193	—
PN210020A	(PN210021)	BM11594	
PN210026	PN210027	BM11647	
PN210033	(PN210032)	BM11617	
PN210002	(PN210003)	BM11604	
PN210008	(PN210009)	BM11605	
PN210002	PN210003	BM11550	To connect the supplied probe (which has two 40-pin flat cables with the HIF3BA-40D-2.54R sockets) to the target system, the target system must have the pin header HIF3BA-40PA-2.54DSA or its equivalent. The socket (HIF3BA-40D-2.54R) and the pin header (HIF3BA-40PA-2.54DSA) are available from Hirose Electric, Co., Ltd.
		BM11607	
PN210005A	(PN210006)	BM11620	—
		BM11624	
		BM11588	

TLCS-870/X series Development System

☐ Software Products

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

☐ Hardware Products

Target MCU			Test Tools				
Part Number	OTP/Flash MCU	Package	Controller	Emulation Pod	MCU Probe (#1, #2)	Package Converter (#1, #2)	
TMP88CP34FG	TMP88PS34FG	QFP44 (14 x 14)		BM88CS34N0A-M15	PN120066		
TMP88CS34FG							
TMP88CP34NG	TMP88PS34NG	SDIP42			(PN110016)		
TMP88CS34NG							
TMP88CM38AF	TMP88PS38FG	QFP44 (14 x 14)		BM88CS38N0A-M15	PN120058		
TMP88CM38BFG	TMP88PS38BFG				PN120064		
TMP88CP38AF	TMP88PS38FG				PN120058		
TMP88CP38BFG	TMP88PS38BFG				PN120064		
TMP88CS38FG	TMP88PS38FG				PN120058		
TMP88CS38BFG	TMP88PS38BFG				PN120064		
TMP88CM38ANG	TMP88PS38NG	SDIP42	BM1040R0A/ BM1055R0B		(PN110013)		
TMP88CM38BNG	TMP88PS38BNG				PN110015		
TMP88CP38ANG	TMP88PS38NG				(PN110013)		
TMP88CP38BNG	TMP88PS38BNG				PN110015		
TMP88CS38NG	TMP88PS38NG				(PN110013)		
TMP88CS38BNG	TMP88PS38BNG				PN110015		
TMP88CH40MG	TMP88PH40MG	SOP28		BM88CS43F0A-M15	PN100003 + PN200008	—	
TMP88CH40IMG							
TMP88CH40NG	TMP88PH40NG	SDIP28			PN100003 + PN200004		
TMP88CH41NG	TMP88PH41NG	SDIP42			PN100002 + PN200001		
TMP88CH41UG	TMP88PH41UG	LQFP44 (10 x 10)			PN120011		
TMP88CH41IUG ++							
TMP88CH41SUG ++							
TMP88CS42FG	TMP88PS42FG	QFP64 (14 x 20)			PN120014		
TMP88CS42NG	TMP88PS42NG	SDIP64			PN110005		
TMP88CS43FG	TMP88PS43FG	QFP80 (14 x 20)			(PN120004)		
TMP88CW44FG **	TMP88FW44FG	QFP100 (14 x 20)	T.B.D.	T.B.D.	T.B.D.		
TMP88CW45FG **	TMP88FW45FG	QFP80 (14 x 20)					
TMP88CU74FG	TMP88PU74FG			BM88CU74F0A	(PN120004)		
TMP88CP77FG	TMP88PU77FG	QFP100 (14 x 20)	BM1055R0B	BM88CP77F0A	(PN120005)		
TMP88CS77FG							
TMP88CU77FG							

%1: The Japanese edition runs on Japanese Windows, and the English edition runs on English Windows.

#1: Those enclosed within parentheses are spare parts. One each is supplied with an emulation pod.
#2: One QFP adapter and one pin protector are supplied with an MCU probe or a package converter whose name begins with "PN12."

**: Under development
++: Being planned

Note 1: The OTP programming adapter durability is lowered when used with lead (Pb)-free packaged products.
As a guideline, the adapter should be replaced after 2,000 writes.

Accessories				Notes
QFP Adapter (#1)	MCU Mount Adapter (#1)	Pin Protector (#1)	OTP/Flash Programming Adapter	
	IC149-044-039-B5		BM11675	One IC socket (IC149-044-039-B5) is supplied with the PN120066. The IC socket is (IC149-044-039-B5) is available from Yamaichi Electronics, Co., Ltd.
	—		BM11174A	—
	IC149-044-039-B5		BM11675	One IC socket (IC149-044-039-B5) is supplied with the PN120058 or PN120064. The IC socket is (IC149-044-039-B5) is available from Yamaichi Electronics, Co., Ltd.
—	—	—	BM11174A	—
	IC253-028-0003-B		BM11695	One IC socket (IC253-028-0003-B) is supplied with the PN200008. The IC socket is (IC253-028-0003-B) is available from Yamaichi Electronics, Co., Ltd.
	—		BM11196	
			BM11205	
PN210019	PN210020A	PN210021	BM11706	—
PN210010	PN210011A	PN210012	BM11200	(Note 1)
—	—	—	BM11199	
(PN210001)	PN210002	(PN210003)	BM11680	
T.B.D.	T.B.D.	T.B.D.	T.B.D	
(PN210001)	PN210002	(PN210003)	BM11631	—
(PN210004)	PN210005A	(PN210006)	BM11650	

TLCS-900 Family Development System (1/2)

☐ Software Products

Toshiba Integrated Development Environment (TIDE)		Real-Time OS
C Compiler	Build Manager, Debugger & Simulator	μITRON 3.0
SW96CN0-ZCC: 1 license SW96CN3-ZCC: 10 licenses	SW96MN0-ZCC: 1 license SW96MN3-ZCC: 10 licenses	SW96RN2-ZCC: Object code can be freely copied. SW96RNC-ZCC: Object code can be freely copied and comes with source code.

☐ Hardware Products

Target MCU			Test Tools		Accessories		
Part Number	OTP/Flash MCU	Package	Controller	Emulation Pod (#3)	MCU Probe (#1, #2)	Package Converter (#1, #2)	QFP Adapter (#1)
TMP96C031ZFG	—	QFP64 (14 x 20)	BM1055R0B	BM96C031F0A	(PN110007)	(PN120007)	(PN210010)
TMP96CM40FG	TMP96PM40FG	QFP80 (14 x 20)		BM96C141F0D-M15	(PN120009)		(PN210001)
TMP96C041BFG							
TMP96C141BFG	—						
TMP95C001FG		QFP64 (14 x 14)		BM95C001F0B-M15	(PN120039A)		(PN210025)
TMP95CS54FG	TMP95PS54FG	LQFP100 (14 x 14)		BM95CS54F0A-M15	(PN120013)		(PN210022)
TMP95C061BDFG		LQFP100 (14 x 14)		BM95C061F0C-M15			
TMP95C063DFG	—	LQFP144 (20 x 20)	BM1040R0A/ BM1055R0B	BM95C063F0B-M15	(PN120027)		(PN210034)
TMP95CS64FG	TMP95PW64FG	LQFP100 (14 x 14)		BM95CS64F0B-M15	(PN120013)	—	(PN210022)
TMP95CW64FG							
TMP95C265FG	—						
TMP95CW65FG							
TMP95CS66FG	TMP95PW64FG						
TMP95CU54AFG				BM95FW54F0A-M15			
TMP95CW54AFG	—						
TMP94C241CFG		QFP160 (28 x 28)	BM1056R0B	BM94C241F0A	(PN120040A)		(PN210028)
TMP94C251ADFG		LQFP144 (20 x 20)		BM94C251F0A	(PN120050)		(PN210034)
TMP93CS20FG	TMP93PW20AFG	LQFP144 (16 x 16)		BM93CS20F0B-M15	(PN120044)		(PN210043)
TMP93CS32FG	TMP93PW32FG	QFP64 (14 x 14)		BM93CS32F0B-M15	(PN120039A)		(PN210025)
TMP93CS36UG	—	LQFP44 (10 x 10)				PN120063	PN210019
TMP93CS40DFG	TMP93PS40DFG	LQFP100 (14 x 14)		BM93CM40F0C-M15	(PN120013)		(PN210022)
TMP93CW40DFG	TMP93PW40DFG						
TMP93CM40DFG	TMP93PS40DFG						
TMP93CS41DFG	—						
TMP93CW41DFG							
TMP93CS42ADFG	TMP93PS42ADFG		BM1040R0A/ BM1055R0B	BM93CS42F0B-M15			
TMP93CU44DFG	TMP93PW44ADFG	QFP80 (14 x 20)		BM93CS44F0B-M15	PN120009	—	PN210001
TMP93CW44DFG							
TMP93CS44FG	TMP93PS44FG	LQFP80 (12 x 12)			(PN120042)		(PN210007)
TMP93CS45FG	—						
TMP93CW46AFG	TMP93PW46AFG	LQFP100 (14 x 14)		BM93CW46F0B-M15	(PN120013)		(PN210022)
TMP93CF76FG	TMP93PF76FG	QFP100 (14 x 20)		BM93CW76F0A-M15	(PN120023B)		(PN210004)
TMP93CF77FG							
TMP93CW76FG	TMP93PW76FG						
TMP93CU76FG							
TMP93CT76FG							

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

#1: Those enclosed within parentheses are spare parts. One each is supplied with an emulation pod.
#2: One QFP adapter and one pin protector are supplied with an MCU probe or a package converter whose name begins with "PN12."
#3: The model25 and model15 pods can use the same accessories.

Note 1: The OTP programming adapter durability is lowered when used with lead (Pb)-free packaged products.
As a guideline, the adapter should be replaced after 2,000 writes.

MCU Mount Adapter (#1)	Pin Protector (#1)	OTP/Flash Programming Adapter	Notes
PN210011A	(PN210012)	—	The BM96C031F0A requires a dedicated adapter for connection to the controller (BM1055R0B).
		BM11539	
PN210002	(PN210003)		
		—	
PN210026	(PN210027)		
PN210023	(PN210024)	BM11629	
		—	
PN210036	(PN210035)		
		BM11629	
		—	
PN210023	(PN210024)		—
		BM11629	
		—	
PN210030	(PN210029)		
PN210036	(PN210035)		
(PN210044)	(PN210045)	BM11641	
PN210026	(PN210027)	BM11632	
PN210020A	PN210021	—	
		BM11629	
PN210023	(PN210024)	BM11109	
		—	—
		BM11109	
PN210002	PN210003	BM11652	
PN210008	(PN210009)	BM11628	—
		—	
PN210023	(PN210024)	BM11629	
PN210005A	(PN210006)	BM11646	—

TLCS-900 Family Development System (2/2)

☐ Software Products

Toshiba Integrated Development Environment (TIDE)		Real-Time OS
C Compiler	Build Manager, Debugger & Simulator	μITRON 3.0
SW96CN0-ZCC: 1 license SW96CN3-ZCC: 10 licenses	SW96MN0-ZCC: 1 license SW96MN3-ZCC: 10 licenses	SW96RN2-ZCC: Object code can be freely copied. SW96RNC-ZCC: Object code can be freely copied and comes with source code.

☐ Hardware Products

Target MCU			Test Tools		Accessories		
Part Number	OTP/Flash MCU	Package	Controller	Emulation Pod (#3)	MCU Probe (#1, #2)	Package Converter (#1, #2)	QFP Adapter (#1)
TMP92CM22FG		LQFP100 (14 x 14)		BM92CM22F0A-M15	(PN120013)		(PN210022)
TMP92C820FG	—			BM92C820F0A-M15		—	
TMP92CA25FG		LQFP144 (16 x 16)		BM92CA25F0A-M15	(PN120044)		(PN210043)
TMP92CH21FG				BM92CH21F0A-M15			
TMP92CD23AFG **	TMP92FD23AFG **	LQFP100 (14 x 14)		T.B.D	T.B.D	T.B.D	T.B.D
TMP92CD23ADFG **	TMP92FD23ADFG **	QFP100 (14 x 20)					
TMP92CY23FG **	TMP92FY23FG **	LQFP100 (14 x 14)	BM1040R0A BM1055R0B	BM92CY23F0A-M15 **	(PN120013)	—	(PN210022)
TMP92CY23DFG **	TMP92FY23DFG **	QFP100 (14 x 20)				PN120068	(PN210004)
TMP92CZ26XBG **	—	FBGA228 (15 x15)		T.B.D	T.B.D	T.B.D	T.B.D
TMP92CM27FG		LQFP144 (16 x 16)		BM92CM27F0A-M15	(PN120044)		(PN210043)
TMP92CD54IFG	TMP92FD54AIFG	LQFP100 (14 x 14)		BM92CY54F0A-M15	(PN120013)		(PN210022)
TMP92FD54AIFG	—						
TMP91CU10FG	TMP91PW10FG			BM91CU10F0B-M15			
TMP91CW11FG	TMP91PW11FG			BM91CW11F0B-M15			
TMP91CW12FG	TMP91PW12FG			BM91CW12F0A-M15			
TMP91CW12AFG	TMP91FY42FG **			BM91CW12AF0A-M15			
TMP91C815FG	—	TQFP128 (14 x 14)	BM1040R0A	BM91C815F0A-M15	(PN120057)	—	(PN210053)
TMP91C016FG		LQFP100 (14 x 14)		BM91C016F0A-M15	(PN120013)		(PN210022)
TMP91CW18AFG	TMP91PW18AFG	QFP80 (14 x 20)	BM1040R0A BM1055R0B	BM91CW18F0A-M15	(PN120009)		(PN210001)
TMP91C219FG	—	LQFP100 (14 x 14)		BM91C219F0A-M15	(PN120013)		(PN210022)
TMP91C820AFG		LQFP144 (16 x 16)		BM91CM20F0A-M15	(PN120044)		(PN210043)
TMP91CY22FG	TMP91FY42FG **	LQFP100 (14 x 14)	BM1040R0A	BM91CW12AF0A-M15	(PN120013)		(PN210022)
TMP91CY22IFG							
TMP91C824FG	—		BM1040R0A BM1055R0B	BM91C824F0A-M15			
TMP91C025FG				BM91C025F0A-M15			
TMP91CK27UG							
TMP91CP27RUG							
TMP91CP27UG	TMP91FY27UG	LQFP64 (10 x 10)	BM1040R0A	BM91CW12AF0A-M15		PN120065	PN210031
TMP91CU27RUG							
TMP91CU27UG							
TMP91CW28FG	TMP91FY28FG **	LQFP100 (14 x 14)	BM1040R0A BM1055R0B	BM91CW28F0A-M15 **			
TMP91CY28FG							
TMP91C829FG	—			BM91C829F0A-M15		—	(PN210022)
TMP91C630FG				BM91C630F0A-M15			
TMP91CW40FG **	TMP91FW40FG **			BM91CW40F0A-M15 **			
TMP91CW60FG ++	TMP91FW60FG **		T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.
TMP91CW60DFG ++	TMP91FW60DFG **	QFP100 (14 x 20)					
TMP91CP82TFG	TMP91PP82TFG	LQFP100 (14 x 14)	BM1040R0A BM1055R0B	BM91CP82F0B-M15 **	(PN120013)	—	(PN210022)

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

#1: Those enclosed within parentheses are spare parts. One each is supplied with an emulation pod.
#2: One QFP adapter and one pin protector are supplied with an MCU probe or a package converter whose name begins with "PN12."
#3: The model25 and model15 pods can use the same accessories.

**: Under development
++: Being planned

Note1: For details of the dedicated cable, please contact your local Toshiba sales representative.

OTP/MCU Mount Adapter (#1)	Pin Protector (#1)	OTP/Flash Programming Adapter	Notes
PN210023	(PN210024)		A dedicated cable is required in combination to perform performance analysis by using BM92CM22F0A-M15 and BM1055R0B. (Note1)
		—	A dedicated cable is required in combination to perform performance analysis by using BM92C820F0A-M15 and BM1055R0B. (Note1)
(PN210044)	(PN210045)		A dedicated cable is required in combination to perform performance analysis by using BM92CA25F0A-M15 and BM1055R0B. (Note1)
			A dedicated cable is required in combination to perform performance analysis by using BM92CH21F0A-M15 and BM1055R0B. (Note1)
T.B.D	T.B.D	T.B.D	—
PN210023	(PN210024)	PN410106	A dedicated cable is required in combination to perform performance analysis by using BM92CY23F0A-M15 and BM1055R0B. (Note1)
PN210005A	(PN210006)	PN410111	
T.B.D	T.B.D	T.B.D	—
(PN210044)	(PN210045)		A dedicated cable is required in combination to perform performance analysis by using BM92CM27F0A-M15 and BM1055R0B. (Note1)
		—	A dedicated cable is required in combination to perform performance analysis by using BM92CY54F0A-M15 and BM1055R0B. (Note1)
PN210023	(PN210024)	BM11629	The 2-V conversion adapter (PN410001) is required to operate the TMP91CU10FG off a 2-V power supply on the target board.
			—
		BM11649	
		PN410106 **	The BM91CW12AF0A-M15 does not support 2-V operation.
PN210054	(PN210055)		The BM91C815F0A-M15 does not support 2-V operation.
PN210023	(PN210024)	—	The BM91C016F0A-M15 does not support 2-V operation.
PN210002	(PN210003)	BM11679 **	
PN210023	(PN210024)		—
(PN210044)	(PN210045)	—	
		PN410106 **	The BM91CW12AF0A-M15 does not support 2-V operation.
PN210023	(PN210024)		The BM91C824F0A-M15 does not support 2-V operation.
		—	—
PN210033	PN210032	PN410105	The BM91CW12AF0A-M15 does not support 2-V operation.
		PN410106	
PN210023	(PN210024)		
		—	
			—
T.B.D	T.B.D	T.B.D	
PN210023	(PN210024)	BM11671	

TX19 series Development System

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

#1: DSU PROBE model110 is a simplified version of DSU PROBE model120.

**: Under development

☐ Software Products

Toshiba Integrated Development Environment (TIDE)		Real-Time OS
C Compiler	Build Manager, Debugger & Simulator	μITRON 3.0
SW19CN0-ZCC: 1 license SW19CN3-ZCC: 10 licenses	SW19MN0-ZCC: 1 license SW19MN3-ZCC: 10 licenses	SW19RN2-ZCC: Object code can be freely copied. SW19RN3-ZCC: The Green Hills Software (GHS) compiler is supported. Object can be fleely copied. SW19RNC-ZCC: Object code can be freely copied and comes with source code. SW19RND-ZCC: The Green Hills Software (GHS) compiler is supported. Object can be fleely copied and comes with source code.

☐ Hardware Products

Target MCU Part Number	Test Tool DSU PROBE for N-Wire	Notes
TMP1940FDBFG		
TMP1942FDUG		The BM1200R0A is shipped with the TX19 Family DSU PROBE debugger, a dedicated debugger for the TMP1940/42.
TMP1942FDXBG **	BM1200R0A	
TMP1962C10BXBG **		Does not support the debugger shipped with the BM1200R0A. Please separately order the TX19 Series integrated development environment.
TMP1962F10AXBG		You can download firmware from the TOSHIBA Microcomputer Development Systems Web site.

TX19A series Development System

☐ Software Products

Toshiba Integrated Development Environment (TIDE)		Real-Time OS
C Compiler	Build Manager, Debugger & Simulator	μITRON 4.0
SW1ACN0-ZCC: 1 license SW1ACN3-ZCC: 10 licenses	SW1AMN0-ZCC: 1 license SW1AMN3-ZCC: 10 licenses	SW1ARN5-ZCC: Object code can be freely copied. SW1ARNF-ZCC: Object code can be freely copied and comes with source code.

☐ Hardware Products

Target MCU Part Number	Test Tool DSU PROBE model110/120 (#1)	Notes
TMP19A43FDXBG **	BM1210R0A BM1211R0A	Incorporates a license to download the TX19A Series integrated development environment dedicated to the DSU PROBE model110/120 (SW1AMN5-Z0C). (Simulators are not supported.) Firmware for the TX19A43/51/64/71 is under development.
TMP19A64F20AXBG **		
TMP19A70CYUG		
TMP19A70CYFG		
TMP19A70FYUG		
TMP19A70FYFG		
TMP19A71CYUG **		
TMP19A71CYFG **		
TMP19A71FYUG **		
TMP19A71FYFG **		
TMP19A51FYFG **		

Accessory Tools

QFP Adapter Footprint

The QFP adapter provides a convenient way to plug the MCU probe of an emulation pod to your target system. Since the adapter is designed to be compatible with many QFP packages, its footprint slightly differs from those of the MCUs and OTPs. When both a QFP adapter and an MCU or OTP are to be mounted on the same board, it must be designed to accommodate both their dimensions. (Toshiba's QFP adapters/Pin Protectors are compatible with the Tokyo Eletec products. For the recommended footprint dimensions, please check out the Web/Pin Protectors page of Tokyo Eletec: http://www.tetc.co.jp/e_tet.htm)

Tokyo Eletec QFP Adaptors and Pin Protectors

QFP adaptors and pin protectors compatible with Toshiba's are available from Tokyo Eletec Corporation.

IC Package (Unit: mm)			QFP Adapter		Pin Protector	
Package	Body Size	Lead Pitch	Toshiba Part Number	Tokyo Eletec Part Number	Toshiba Part Number	Tokyo Eletec Part Number
QFP44	10x10	0.8	PN210019	TQPACK044SA	PN210021	TQSOCKET044SAG
QFP64	14x20	1	PN210010	TQPACK064RZ	PN210012	TQSOCKET064RZG
QFP64	14x14	0.8	PN210025	TQPACK064SA	PN210027	TQSOCKET064SAG
QFP64	10x10	0.5	PN210031	TQPACK064SD	PN210032	TQSOCKET064SDG
QFP80	14x20	0.8	PN210001	TQPACK080RA	PN210003	TQSOCKET080RAG
QFP80	12x12	0.5	PN210007	TQPACK080SD	PN210009	TQSOCKET080SDG
QFP80	14x14	0.65	PN210017	TQPACK080SB	PN210016	TQSOCKET080SBG
QFP100	14x20	0.65	PN210004	TQPACK100RB	PN210006	TQSOCKET100RBG
QFP100	22x22	0.8	PN210015	TQPACK100SA	PN210014	TQSOCKET100SAG
QFP100	14x14	0.5	PN210022	TQPACK100SD	PN210024	TQSOCKET100SDG
QFP120	14x14	0.4	PN210050	NQPACK120SE	PN210052	YQPACK120SE
QFP128	14x14	0.4	PN210053	NQPACK128SE	PN210055	YQPACK128SE
QFP144	16x16	0.4	PN210043	NQPACK144SE	PN210045	YQPACK144SE
QFP144	20x20	0.5	PN210034	TQPACK144SD	PN210035	TQSOCKET144SDG
QFP160	28x28	0.65	PN210028	TQPACK160SB	PN210029	TQSOCKET160SBG

Yamaichi Electronics

IC Sockets

The indicated part numbers are Yamaichi's.

Part Number	IC Package (Unit: mm)		
	Package	Body Size	Lead Pitch
IC149-044-039-B5	QFP44	14X14	0.8
IC149-044-052-B5	QFP44	10X10	0.8
IC149-120K13207-0B	QFP120	28X28	0.8
IC253-028-0003-B	SOP28	—	—
IC253-030-0002-B	SSOP30	—	—
IC253-020-0004-B	SOP	—	—

Emulation Technology (ET)

Package Converters

The indicated part numbers are ET's.

Part Number	Conversion
AS-DIP.3-016-SO03-1	DIP16 → SOP16
AS-DIP.3-020-SO03-1	DIP20 → SOP20
AS-DIP.6-028-SO08-1	DIP28 → SOP28
AS-DIP.6-040-SO11-1	DIP40 → SSOP40
AS-SDIP-QF52S-47C800F	SDIP42 → QFP44
AS-SDP.4-028-SO05-2	SDIP28 → SOP28

Accessory Manufacturers and Distributors

Please check out the latest product information before designing pc boards or purchasing accessories.

TOKYO ELETECH CORPORATION http://www.tetc.co.jp/e_tet.htm
YAMAICHI ELECTRONICS Co., Ltd. http://www.yamaichi.co.jp/index_e.shtml

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2005-10

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