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Category Microcontroller

ICs

Microcontroller

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Microcontroller (MCU)

General-Purpose MCU (16bit) ML62Q1000 series	Multiple Built-In Safety Functions	P.100
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LAPIS Technology's MCU controllers utilize original low power technology cultivated over many years to achieve class-leading*1 low-power consumption.

As such they have been widely adopted in a variety of applications, from compact battery-driven devices such as high-performance digital watches to consumer appliances, industrial equipment, and social infrastructure. In addition, we have added MCUs to the lineup suitable for automotive applications. And going forward, LAPIS Technology will continue to provide MCUs that meet market needs for low power consumption by leveraging the latest technologies.

*1 LAPIS Technology study

*2 **Ky's Technology** HQ-ADPCM: A high quality sound compression technology developed by Ky's. Ky's is a registered trademark of Kyushu Institute of Technology.

*3 HLC: Short for Hardware Linkage Controller, HLC is a function that enables interoperation between peripherals without using LAPIS Technology's proprietary CPU.

Multiple Built-In Safety Functions

General-purpose MCU (16bit) ML62Q1000 series (U16 Core*1)

Normal type ML62Q1300 group ROM Capacity: 16KB to 64KB Pin number: 16pin to 32pin (Industrial Grade)

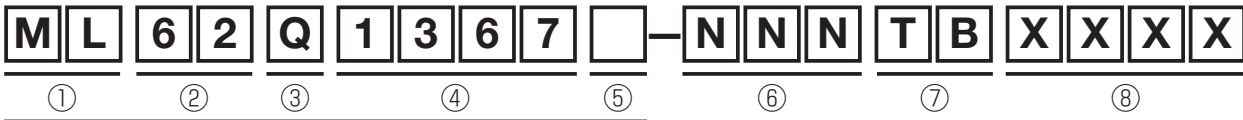
Part No.	Operating Voltage (V)	ROM type	ROM Capacity (Byte)	Data Flash Capacity (Byte)	RAM Capacity (Byte)	Port			Operating Frequency (Max)		Minimum Instruction Execution Time	Current Consumption (Typ@HALT)	Operating Temperature (°C)
						Input	Output	Input/Output	High Speed	Low Speed			
ML62Q1323	1.6 to 5.5	Flash	16K	2K	2K	-	-	12	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation)	41ns/30.5μs	4.3μA (Internal RC oscillation)	-40 to +105
ML62Q1324			24K										
ML62Q1325			32K										
ML62Q1333	1.6 to 5.5	Flash	16K	2K	2K	-	-	16	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation)	41ns/30.5μs	4.3μA (Internal RC oscillation)	-40 to +105
ML62Q1334			24K										
ML62Q1335			32K										
ML62Q1345	1.6 to 5.5	Flash	32K	2K	4K	-	-	20	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation)	41ns/30.5μs	4.3μA (Internal RC oscillation)	-40 to +105
ML62Q1346			48K										
ML62Q1347			64K										
ML62Q1365	1.6 to 5.5	Flash	32K	2K	4K	-	-	28	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation)	41ns/30.5μs	4.3μA (Internal RC oscillation)	-40 to +105
ML62Q1366			48K										
ML62Q1367			64K										

*1 U16 Core: LAPIS Technology's original 16bit RISC CPU nX-U16/100 Core

*2 A check mark of halogen free support means that we will be able to ship out the halogen free products. For details, please inquire to the sales.

*3 For use of industrial equipment, please inquire to the sales.

ML62Q1000 series Part Number Explanation



Part Number

- ① Device type
ML: Bipolar Logic
- ② CPU Core type
62: 16bit CPU nX-U16/100
- ③ ROM type
Q: Flash ROM
- ④ Part Code
- ⑤ Option Code
None to x: Set for product
- ⑥ ROM Code
NNN : Blank
001 to xxx: Custom Code Number
- ⑦ Package Code
GD: WQFN
MB: SSOP
TD: TSSOP
TB: TQFP
GA: QFP
- ⑧ Company's Code in LAPIS Technology

- 13xx: ML62Q1300 Group
2x: 16pin
3x: 20pin
4x: 24pin
6x: 32pin

x3: ROM 16KB
x4: ROM 24KB
x5: ROM 32KB
x6: ROM 48KB
x7: ROM 64KB
- 15xx: ML62Q1500 Group
3x: 48pin
4x: 52pin
5x: 64pin
6x: 80pin
7x: 100pin

x0: ROM 32KB
x1: ROM 48KB
x2: ROM 64KB
x3: ROM 96KB
x4: ROM 128KB
x5: ROM 160KB
x6: ROM 192KB
x7: ROM 256KB
- 17xx: ML62Q1700 Group
(Built-in LCD Driver)
0x: 48pin
1x: 52pin
2x: 64pin
3x: 80pin
4x: 100pin

x0: ROM 32KB
x1: ROM 48KB
x2: ROM 64KB
x3: ROM 96KB
x4: ROM 128KB
x5: ROM 160KB
x6: ROM 192KB
x7: ROM 256KB
x8: ROM 384KB
x9: ROM 512KB
- 18xx: ML62Q1800 Group
5x: 64pin
6x: 80pin
7x: 100pin

x8: ROM 384KB
x9: ROM 512KB

(LAPIS Technology products)

	16bit Timer	16bit Multi Functions Timer	WDT	ADC (method)	DAC	Serial Port			Supply Voltage Detection	LCD Driver	External Interrupt Sources	Others	Notes	Package	Chip Support	Halogen Free Support*2	Industrial Grade*3
						PC	SSIO	UART									
	4 (8bitx8)	4 (TMR, PWM, IGBT, Capture)	1	10bitx6 (SA type)	-	Master/Slavex1, Masterx1	UART Full Duplex/SSIOx2		VLSx1	-	8	Safety function, Multiplier/Divider, Comparatorx1, DMA	-	P-SSOP16-0225-0.65-TK6	-	✓	✓
														P-WQFN16-0404-0.50-63	-	✓	✓
														P-SSOP16-0225-0.65-TK6	-	✓	✓
	4 (8bitx8)	4 (TMR, PWM, IGBT, Capture)	1	10bitx8 (SA type)	-	Master/Slavex1, Masterx1	UART Full Duplex/SSIOx2		VLSx1	-	8	Safety function, Multiplier/Divider, Comparatorx1, DMA	-	P-TSSOP20-0225-0.65-TK6	-	✓	✓
														P-SSOP20-44-0.65-TK6	-	✓	✓
														P-TSSOP20-0225-0.65-TK6	-	✓	✓
	6 (8bitx12)	4 (TMR, PWM, IGBT, Capture)	1	10bitx8 (SA type)	8bitx1	Master/Slavex1, Masterx1	UART Full Duplex/SSIOx2		VLSx1	-	8	Safety function, Multiplier/Divider, Comparatorx1, DMA	-	P-WQFN24-0404-0.50-A63	-	✓	✓
														P-WQFN24-0404-0.50-A63	-	✓	✓
														P-WQFN24-0404-0.50-A63	-	✓	✓
	6 (8bitx12)	4 (TMR, PWM, IGBT, Capture)	1	10bitx8 (SA type)	8bitx1	Master/Slavex1, Masterx1	UART Full Duplex/SSIOx2		VLSx1	-	8	Safety function, Multiplier/Divider, Comparatorx1, DMA	-	P-WQFN32-0505-0.50-A63	-	✓	✓
														P-TQFP32-0707-0.80-ZK6	-	✓	✓
														P-WQFN32-0505-0.50-A63	-	✓	✓
													P-TQFP32-0707-0.80-ZK6	-	✓	✓	

Multiple Built-In Safety Functions

General-purpose MCU (16bit) ML62Q1000 series (U16 Core*1)

Normal type ML62Q1500 group ROM Capacity: 32KB to 256KB Pin number: 48pin to 100pin (Industrial Grade)

Part No.	Operating Voltage (V)	ROM type	ROM Capacity (Byte)	Data Flash Capacity (Byte)	RAM Capacity (Byte)	Port			Operating Frequency (Max)		Minimum Instruction Execution Time	Current Consumption (Typ@HALT)	Operating Temperature (°C)
						Input	Output	Input/Output	High Speed	Low Speed			
ML62Q1530	1.6 to 5.5	Flash	32K	4K	8K	2	-	42	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/30.5µs	4.7/3.0µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105
ML62Q1531			48K										
ML62Q1532			64K										
ML62Q1533			96K										
ML62Q1534			128K										
ML62Q1540	1.6 to 5.5	Flash	32K	4K	8K	2	-	46	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/30.5µs	4.7/3.0µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105
ML62Q1541			48K										
ML62Q1542			64K										
ML62Q1543			96K										
ML62Q1544			128K										
ML62Q1550	1.6 to 5.5	Flash	32K	4K	8K	2	-	58	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/30.5µs	4.7/3.0µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105
ML62Q1551			48K										
ML62Q1552			64K										
ML62Q1553			96K										
ML62Q1554			128K	16K	2	-	58	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/30.5µs	5.5/4.5µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105	
ML62Q1555			160K										
ML62Q1556			192K										
ML62Q1557			256K										
ML62Q1563	1.6 to 5.5	Flash	96K	4K	16K	2	-	72	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/30.5µs	5.5/4.5µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105
ML62Q1564			128K										
ML62Q1565			160K										
ML62Q1566			192K										
ML62Q1567			256K										
ML62Q1573	1.6 to 5.5	Flash	96K	4K	16K	2	-	92	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/30.5µs	5.5/4.5µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105
ML62Q1574			128K										
ML62Q1575			160K										
ML62Q1576			192K										
ML62Q1577			256K										
ML62Q1543C	1.6 to 5.5	Flash	96K	4K	8K	2	-	46	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/30.5µs	4.3/3.0µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105
ML62Q1544C			128K										
ML62Q1553C	1.6 to 5.5	Flash	96K	4K	8K	2	-	58	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/30.5µs	4.3/3.0µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105
ML62Q1554C			128K										
ML62Q1563C	1.6 to 5.5	Flash	96K	4K	8K	2	-	74	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/30.5µs	4.3/3.0µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105
ML62Q1564C			128K										

Normal type ML62Q1800 group ROM Capacity: 384KB to 512KB Pin number: 64pin to 100pin (Industrial Grade)

Part No.	Operating Voltage (V)	ROM type	ROM Capacity (Byte)	Data Flash Capacity (Byte)	RAM Capacity (Byte)	Port			Operating Frequency (Max)		Minimum Instruction Execution Time	Current Consumption (Typ@HALT)	Operating Temperature (°C)
						Input	Output	Input/Output	High Speed	Low Speed			
ML62Q1858	1.6 to 5.5	Flash	384K	8K	32K	2	-	58	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/30.5µs	6.0/4.5µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105
ML62Q1859			512K										
ML62Q1868	1.6 to 5.5	Flash	384K	8K	32K	2	-	72	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/30.5µs	6.0/4.5µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105
ML62Q1869			512K										
ML62Q1878	1.6 to 5.5	Flash	384K	8K	32K	2	-	92	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/30.5µs	6.0/4.5µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105
ML62Q1879			512K										

*1 U16 Core: LAPIS Technology's original 16bit RISC CPU nX-U16/100 Core

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*3 For use of industrial equipment, please inquire to the sales.

(LAPIS Technology products)

	16bit Timer	16bit Multi Functions Timer	WDT	ADC (method)	DAC	Serial Port			Supply Voltage Detection	LCD Driver	External Interrupt Sources	Others	Notes	Package	Chip Support	Halogen Free Support*2	Industrial Grade*3
						I ² C	SSIO	UART									
	6 (8bitx12)	6 (TMR, PWM, IGBT, Capture)	1	10bitx12 (SA type)	8bitx1	Master/ Slavex1, Masterx2	UART Full Duplex/ SSIOx2	VLSx1	-	10	Safety function, Multiplier/Divider, Comparatorx2, DMA	-	P-TQFP48-0707-0.50-ZK6	-	✓	✓	
													P-TQFP48-0707-0.50-ZK6	-	✓	✓	
													P-TQFP48-0707-0.50-ZK6	-	✓	✓	
													P-TQFP48-0707-0.50-ZK6	-	✓	✓	
	6 (8bitx12)	6 (TMR, PWM, IGBT, Capture)	1	10bitx12 (SA type)	8bitx1	Master/ Slavex1, Masterx2	UART Full Duplex/ SSIOx2	VLSx1	-	10	Safety function, Multiplier/Divider, Comparatorx2, DMA	-	P-TQFP52-1010-0.65-ZK6	-	✓	✓	
													P-TQFP52-1010-0.65-ZK6	-	✓	✓	
													P-TQFP52-1010-0.65-ZK6	-	✓	✓	
													P-TQFP52-1010-0.65-ZK6	-	✓	✓	
	6 (8bitx12)	6 (TMR, PWM, IGBT, Capture)	1	10bitx12 (SA type)	8bitx1	Master/ Slavex1, Masterx2	UART Full Duplex/ SSIOx2	VLSx1	-	10	Safety function, Multiplier/Divider, Comparatorx2, DMA	-	P-TQFP64-1010-0.50-ZK6	-	✓	✓	
													P-QFP64-1414-0.80-ZK6	-	✓	✓	
													P-TQFP64-1010-0.50-ZK6	-	✓	✓	
													P-QFP64-1414-0.80-ZK6	-	✓	✓	
													P-TQFP64-1010-0.50-ZK6	-	✓	✓	
													P-QFP64-1414-0.80-ZK6	-	✓	✓	
													P-TQFP64-1010-0.50-ZK6	-	✓	✓	
													P-QFP64-1414-0.80-ZK6	-	✓	✓	
	8 (8bitx16)	8 (TMR, PWM, IGBT, Capture)	1	10bitx16 (SA type)	8bitx2	Master/ Slavex1, Masterx2	UART Full Duplex/ SSIOx6	VLSx1	-	12	Safety function, Multiplier/Divider, Comparatorx2, DMA	-	P-QFP80-1414-0.65-ZK6	-	✓	✓	
													P-QFP80-1414-0.65-ZK6	-	✓	✓	
													P-QFP80-1414-0.65-ZK6	-	✓	✓	
													P-QFP80-1414-0.65-ZK6	-	✓	✓	
	8 (8bitx16)	8 (TMR, PWM, IGBT, Capture)	1	10bitx16 (SA type)	8bitx2	Master/ Slavex1, Masterx2	UART Full Duplex/ SSIOx6	VLSx1	-	12	Safety function, Multiplier/Divider, Comparatorx2, DMA	-	P-TQFP100-1414-0.50-ZK6	-	✓	✓	
													P-QFP100-1420-0.65-BK6	-	✓	✓	
													P-TQFP100-1414-0.50-ZK6	-	✓	✓	
													P-QFP100-1420-0.65-BK6	-	✓	✓	
													P-TQFP100-1414-0.50-ZK6	-	✓	✓	
	6 (8bitx12)	6 (TMR, PWM, IGBT, Capture)	1	10bitx12 (SA type)	8bitx1	Master/ Slavex1, Masterx2	UART Full Duplex/ SSIOx3	VLSx1	-	10	Safety function, Multiplier/Divider, Comparatorx2, DMA	-	P-TQFP52-1010-0.65-ZK6	-	✓	✓	
													P-TQFP52-1010-0.65-ZK6	-	✓	✓	
	6 (8bitx12)	6 (TMR, PWM, IGBT, Capture)	1	10bitx12 (SA type)	8bitx1	Master/ Slavex1, Masterx2	UART Full Duplex/ SSIOx4	VLSx1	-	10	Safety function, Multiplier/Divider, Comparatorx2, DMA	-	P-TQFP64-1010-0.50-ZK6	-	✓	✓	
													P-QFP64-1414-0.80-ZK6	-	✓	✓	
													P-TQFP64-1010-0.50-ZK6	-	✓	✓	
	6 (8bitx12)	6 (TMR, PWM, IGBT, Capture)	1	10bitx12 (SA type)	8bitx1	Master/ Slavex1, Masterx2	UART Full Duplex/ SSIOx4	VLSx1	-	12	Safety function, Multiplier/Divider, Comparatorx2, DMA	-	P-QFP80-1414-0.65-ZK6	-	✓	✓	
													P-QFP80-1414-0.65-ZK6	-	✓	✓	
	6 (8bitx12)	6 (TMR, PWM, IGBT, Capture)	1	10bitx12 (SA type)	8bitx1	Master/ Slavex1, Masterx2	UART Full Duplex/ SSIOx2	VLSx1	-	10	Safety function, Multiplier/Divider, Comparatorx2, DMA	-	P-TQFP64-1010-0.50-ZK6	-	✓	✓	
													P-QFP64-1414-0.80-ZK6	-	✓	✓	
	8 (8bitx16)	8 (TMR, PWM, IGBT, Capture)	1	10bitx16 (SA type)	8bitx2	Master/ Slavex1, Masterx2	UART Full Duplex/ SSIOx6	VLSx1	-	12	Safety function, Multiplier/Divider, Comparatorx2, DMA	-	P-QFP80-1414-0.65-ZK6	-	✓	✓	
													P-QFP80-1414-0.65-ZK6	-	✓	✓	
	8 (8bitx16)	8 (TMR, PWM, IGBT, Capture)	1	10bitx16 (SA type)	8bitx2	Master/ Slavex1, Masterx2	UART Full Duplex/ SSIOx6	VLSx1	-	12	Safety function, Multiplier/Divider, Comparatorx2, DMA	-	P-TQFP100-1414-0.50-ZK6	-	✓	✓	
													P-QFP100-1420-0.65-BK6	-	✓	✓	

Microcontroller



Multiple Built-In Safety Functions

General-purpose MCU (16bit) ML62Q1000 series (U16 Core*1)

Built-In LCD Driver type ML62Q1700 group ROM Capacity: 32KB to 512KB Pin number: 48pin to 100pin (Industrial Grade)

Part No.	Operating Voltage (V)	ROM type	ROM Capacity (Byte)	Data Flash Capacity (Byte)	RAM Capacity (Byte)	Port			Operating Frequency (Max)		Minimum Instruction Execution Time	Current Consumption (Typ@HALT)	Operating Temperature (°C)							
						Input	Output	Input/Output	High Speed	Low Speed										
ML62Q1700	1.6 to 5.5	Flash	32K	4K	8K	2	-	37	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/ 30.5µs	4.9/3.3µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105							
ML62Q1701			48K																	
ML62Q1702			64K																	
ML62Q1703			96K																	
ML62Q1704			128K																	
ML62Q1710	1.6 to 5.5	Flash	32K	4K	8K	2	-	41	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/ 30.5µs	4.9/3.3µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105							
ML62Q1711			48K																	
ML62Q1712			64K																	
ML62Q1713			96K																	
ML62Q1714			128K																	
ML62Q1720	1.6 to 5.5	Flash	32K	4K	8K	2	-	53	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/ 30.5µs	4.9/3.3µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105							
ML62Q1721			48K																	
ML62Q1722			64K																	
ML62Q1723			96K																	
ML62Q1724			128K																	
ML62Q1725			160K	16K	6.0/4.5µA (Internal RC oscillation/ Crystal oscillation)															
ML62Q1726			192K																	
ML62Q1727			256K																	
ML62Q1728			384K																	
ML62Q1729			512K									8K		32K	6.0/4.5µA (Internal RC oscillation/ Crystal oscillation)					
ML62Q1733	96K	4K	16K	2	-	67	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/ 30.5µs	5.7/4.5µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105									
ML62Q1734	128K																			
ML62Q1735	160K																			
ML62Q1736	192K																			
ML62Q1737	256K																			
ML62Q1738	384K	8K	32K	2	-	67	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/ 30.5µs	6.0/4.5µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105									
ML62Q1739	512K																			
ML62Q1743	1.6 to 5.5	Flash	96K	4K	16K	2	-	87	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/ 30.5µs	5.7/4.5µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105							
ML62Q1744			128K																	
ML62Q1745			160K																	
ML62Q1746			192K																	
ML62Q1747			256K																	
ML62Q1748			384K	8K	32K							2		-	87	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/ 30.5µs	6.0/4.5µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105
ML62Q1749			512K																	
ML62Q1713C	1.6 to 5.5	Flash	96K	4K	8K	2	-	41	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/ 30.5µs	4.3/3.0µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105							
ML62Q1714C			128K																	
ML62Q1723C	1.6 to 5.5	Flash	96K	4K	8K	2	-	53	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/ 30.5µs	4.3/3.0µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105							
ML62Q1724C			128K																	
ML62Q1733C	1.6 to 5.5	Flash	96K	4K	8K	2	-	69	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/ 30.5µs	4.3/3.0µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105							
ML62Q1734C			128K																	

*1 U16 Core: LAPIS Technology's original 16bit RISC CPU nX-U16/100 Core

*2 A check mark of halogen free support means that we will be able to ship out the halogen free products. For details, please inquire to the sales.

*3 For use of industrial equipment, please inquire to the sales.

(LAPIS Technology products)

	16bit Timer	16bit Multi Functions Timer	WDT	ADC (method)	DAC	Serial Port			Supply Voltage Detection	LCD Driver	External Interrupt Sources	Others	Notes	Package	Chip Support	Halogen Free Support ²	Industrial Grade ³
						I ² C	SSIO	UART									
	6 (8bitx12)	6 (TMR, PWM, IGBT, Capture)	1	10bitx12 (SA type)	8bitx1	Master/ Slave ^x 1, Master ^x 2	UART Full Duplex/ SSIOx2	VLSx1	Max 192dot 24segx 8com	10	Safety function, Multiplier/Divider, Comparatorx2, DMA	-	P-TQFP48-0707-0.50-ZK6	-	✓	✓	
P-TQFP48-0707-0.50-ZK6													-	✓	✓		
P-TQFP48-0707-0.50-ZK6													-	✓	✓		
P-TQFP48-0707-0.50-ZK6													-	✓	✓		
P-TQFP48-0707-0.50-ZK6													-	✓	✓		
	6 (8bitx12)	6 (TMR, PWM, IGBT, Capture)	1	10bitx12 (SA type)	8bitx1	Master/ Slave ^x 1, Master ^x 2	UART Full Duplex/ SSIOx2	VLSx1	Max 216dot 27segx 8com	10	Safety function, Multiplier/Divider, Comparatorx2, DMA	-	P-TQFP52-1010-0.65-ZK6	-	✓	✓	
P-TQFP52-1010-0.65-ZK6													-	✓	✓		
P-TQFP52-1010-0.65-ZK6													-	✓	✓		
P-TQFP52-1010-0.65-ZK6													-	✓	✓		
P-TQFP52-1010-0.65-ZK6													-	✓	✓		
	6 (8bitx12)	6 (TMR, PWM, IGBT, Capture)	1	10bitx12 (SA type)	8bitx1	Master/ Slave ^x 1, Master ^x 2	UART Full Duplex/ SSIOx2	VLSx1	Max 280dot 35segx 8com	10	Safety function, Multiplier/Divider, Comparatorx2, DMA	-	P-TQFP64-1010-0.50-ZK6 P-QFP64-1414-0.80-ZK6	-	✓	✓	
P-TQFP64-1010-0.50-ZK6 P-QFP64-1414-0.80-ZK6													-	✓	✓		
P-TQFP64-1010-0.50-ZK6 P-QFP64-1414-0.80-ZK6													-	✓	✓		
P-TQFP64-1010-0.50-ZK6 P-QFP64-1414-0.80-ZK6													-	✓	✓		
P-TQFP64-1010-0.50-ZK6 P-QFP64-1414-0.80-ZK6													-	✓	✓		
P-TQFP64-1010-0.50-ZK6 P-QFP64-1414-0.80-ZK6													-	✓	✓		
P-TQFP64-1010-0.50-ZK6 P-QFP64-1414-0.80-ZK6													-	✓	✓		
P-TQFP64-1010-0.50-ZK6 P-QFP64-1414-0.80-ZK6													-	✓	✓		
P-TQFP64-1010-0.50-ZK6 P-QFP64-1414-0.80-ZK6													-	✓	✓		
P-TQFP64-1010-0.50-ZK6 P-QFP64-1414-0.80-ZK6													-	✓	✓		
P-TQFP64-1010-0.50-ZK6 P-QFP64-1414-0.80-ZK6													-	✓	✓		
P-TQFP64-1010-0.50-ZK6 P-QFP64-1414-0.80-ZK6													-	✓	✓		
													8 (8bitx16)	8 (TMR, PWM, IGBT, Capture)	1	10bitx16 (SA type)	8bitx2
P-QFP80-1414-0.65-ZK6	-	✓	✓														
P-QFP80-1414-0.65-ZK6	-	✓	✓														
P-QFP80-1414-0.65-ZK6	-	✓	✓														
P-QFP80-1414-0.65-ZK6	-	✓	✓														
P-QFP80-1414-0.65-ZK6	-	✓	✓														
P-QFP80-1414-0.65-ZK6	-	✓	✓														
	8 (8bitx16)	8 (TMR, PWM, IGBT, Capture)	1	10bitx16 (SA type)	8bitx2	Master/ Slave ^x 1, Master ^x 2	UART Full Duplex/ SSIOx6	VLSx1	Max 480dot 60segx 8com	12	Safety function, Multiplier/Divider, Comparatorx2, DMA	-	P-TQFP100-1414-0.50-ZK6 P-QFP100-1420-0.65-BK6	-	✓	✓	
P-TQFP100-1414-0.50-ZK6 P-QFP100-1420-0.65-BK6													-	✓	✓		
P-TQFP100-1414-0.50-ZK6 P-QFP100-1420-0.65-BK6													-	✓	✓		
P-TQFP100-1414-0.50-ZK6 P-QFP100-1420-0.65-BK6													-	✓	✓		
P-TQFP100-1414-0.50-ZK6 P-QFP100-1420-0.65-BK6													-	✓	✓		
P-TQFP100-1414-0.50-ZK6 P-QFP100-1420-0.65-BK6													-	✓	✓		
P-TQFP100-1414-0.50-ZK6 P-QFP100-1420-0.65-BK6													-	✓	✓		
P-TQFP100-1414-0.50-ZK6 P-QFP100-1420-0.65-BK6													-	✓	✓		
	6 (8bitx12)	6 (TMR, PWM, IGBT, Capture)	1	10bitx12 (SA type)	8bitx1	Master/ Slave ^x 1, Master ^x 2	UART Full Duplex/ SSIOx3	VLSx1	Max 216dot 27segx 8com	10	Safety function, Multiplier/Divider, Comparatorx2, DMA	-	P-TQFP52-1010-0.65-ZK6	-	✓	✓	
P-TQFP52-1010-0.65-ZK6													-	✓	✓		
	6 (8bitx12)	6 (TMR, PWM, IGBT, Capture)	1	10bitx12 (SA type)	8bitx1	Master/ Slave ^x 1, Master ^x 2	UART Full Duplex/ SSIOx4	VLSx1	Max 280dot 35segx 8com	10	Safety function, Multiplier/Divider, Comparatorx2, DMA	-	P-TQFP64-1010-0.50-ZK6 P-QFP64-1414-0.80-ZK6	-	✓	✓	
P-TQFP64-1010-0.50-ZK6 P-QFP64-1414-0.80-ZK6													-	✓	✓		
	6 (8bitx12)	6 (TMR, PWM, IGBT, Capture)	1	10bitx12 (SA type)	8bitx1	Master/ Slave ^x 1, Master ^x 2	UART Full Duplex/ SSIOx4	VLSx1	Max 360dot 45segx 8com	12	Safety function, Multiplier/Divider, Comparatorx2, DMA	-	P-QFP80-1414-0.65-ZK6	-	✓	✓	
P-QFP80-1414-0.65-ZK6													-	✓	✓		

Microcontroller

Class-Leading Low Power Consumption (0.6μA current in HALT)

General-Purpose MCU (16bit) ML62Q2000 series/

Normal type ML62Q2500 group ROM Capacity: 64KB to 128KB Pin number: 32pin to 48pin (Industrial Grade)

Part No.	Operating Voltage (V)	ROM type	ROM Capacity (Byte)	Data Flash Capacity (Byte)	RAM Capacity (Byte)	Port			Operating Frequency (Max)		Minimum Instruction Execution Time	Current Consumption (Typ@HALT*)	Operating Temperature (°C)
						Input	Output	Input/Output	High Speed	Low Speed			
New ML62Q2502	1.8 to 5.5	Flash	64K	4K	8K	3	-	24	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ External oscillation)	41ns/30.5μs	0.6μA (Internal RC oscillation)	-40 to +105
New ML62Q2504			128K										
New ML62Q2522	1.8 to 5.5	Flash	64K	4K	8K	3	-	32	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ External oscillation)	41ns/30.5μs	0.6μA (Internal RC oscillation)	-40 to +105
New ML62Q2524			128K										
New ML62Q2532	1.8 to 5.5	Flash	64K	4K	8K	3	-	40	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ External oscillation)	41ns/30.5μs	0.6μA (Internal RC oscillation)	-40 to +105
New ML62Q2534			128K										

*1 U16 Core: LAPIS Technology's original 16bit RISC CPU nX-U16/100 Core

*2 HALT-D mode.

*3 A check mark of halogen free support means that we will be able to ship out the halogen free products. For details, please inquire to the sales.

*4 For use of industrial equipment, please inquire to the sales.

Built-In Speech Playback Hardware Engine and LCD Driver

General-Purpose MCU (16bit) ML62Q2000 series/

Built-In LCD Driver type ML62Q2700 group ROM Capacity: 64KB to 256KB Pin number: 48pin to 100pin (Industrial Grade)

Part No.	Operating Voltage (V)	ROM type	ROM Capacity (Byte)	Data Flash Capacity (Byte)	RAM Capacity (Byte)	Port			Operating Frequency (Max)		Minimum Instruction Execution Time	Current Consumption (Typ@HALT*)	Operating Temperature (°C)
						Input	Output	Input/Output	High Speed	Low Speed			
New ML62Q2725	1.8 to 5.5	Flash	160K	4K	16K	3	-	51	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/30.5μs	0.9μA (Internal RC oscillation)	-40 to +105
New ML62Q2726			192K										
New ML62Q2727			256K										
New ML62Q2735	1.8 to 5.5	Flash	160K	4K	16K	3	-	65	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/30.5μs	0.9μA (Internal RC oscillation)	-40 to +105
New ML62Q2736			192K										
New ML62Q2737			256K										
New ML62Q2745	1.8 to 5.5	Flash	160K	4K	16K	3	-	85	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/30.5μs	0.9μA (Internal RC oscillation)	-40 to +105
New ML62Q2746			192K										
New ML62Q2747			256K										
☆ ML62Q2702	1.8 to 5.5	Flash	64K	4K	8K	3	-	35	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/30.5μs	(TBD)	-40 to +105
☆ ML62Q2703			96K										
☆ ML62Q2712	1.8 to 5.5	Flash	64K	4K	8K	3	-	39	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/30.5μs	(TBD)	-40 to +105
☆ ML62Q2713			96K										
☆ ML62Q2722	1.8 to 5.5	Flash	64K	4K	8K	3	-	51	24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41ns/30.5μs	(TBD)	-40 to +105
☆ ML62Q2723			96K										

*1 U16 Core: LAPIS Technology's original 16bit RISC CPU nX-U16/100 Core

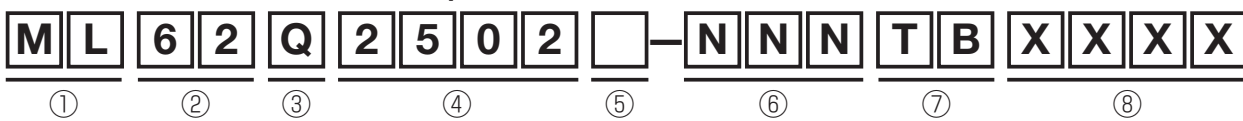
*2 HALT-D mode.

*3 A check mark of halogen free support means that we will be able to ship out the halogen free products. For details, please inquire to the sales.

*4 For use of industrial equipment, please inquire to the sales.

☆: Under Development. The contents are subject to change without notice for improvement.

ML62Q2000 series Part Number Explanation



Part Number

- ① Device type
ML: Bipolar Logic
- ② CPU Core type
62: 16bit CPU nX-U16/100
- ③ ROM type
Q: Flash ROM
- ④ Part Code
25xx: ML62Q2500 Group
0x: 32pin
2x: 40pin
3x: 48pin

x2: ROM 64KB
x4: ROM 128KB
- ⑤ Option Code
None to x: Set for product
- ⑥ ROM Code
NNN : Blank
001 to xxx: Custom Code Number
- ⑦ Package Code
GD: WQFN
TB: TQFP
GA: QFP
- ⑧ Company's Code in LAPIS Technology

ML62Q2500 group (U16 Core*1)

(LAPIS Technology products)

16bit Timer	16bit Multi Functions Timer	WDT	ADC (method)	DAC	Serial Port			Supply Voltage Detection	LCD Driver	External Interrupt Sources	Others	Notes	Package	Chip Support	Halogen Free Support*3	Industrial Grade*4
					I ² C	SSIO	UART									
6	2 (TMR, PWM, IGBT, Capture)	1	12bit×14 (SA type)	-	Master/Slave×1, Master×1	2	Full Duplex ×3	VLS×1	-	8	Safety function, Multiplier/Divider	-	P-TQFP32-0707-0.80-ZK6	-	✓	✓
													P-WQFN32-0505-0.50-A63	-	✓	✓
													P-WQFN32-0707-0.80-ZK6	-	✓	✓
6	2 (TMR, PWM, IGBT, Capture)	1	12bit×14 (SA type)	-	Master/Slave×1, Master×1	2	Full Duplex ×3	VLS×1	-	8	Safety function, Multiplier/Divider	-	P-WQFN40-0606-0.50-63	-	✓	✓
													P-WQFN40-0606-0.50-63	-	✓	✓
													P-TQFP48-0707-0.50-ZK6	-	✓	✓
6	2 (TMR, PWM, IGBT, Capture)	1	12bit×14 (SA type)	-	Master/Slave×1, Master×1	2	Full Duplex ×3	VLS×1	-	8	Safety function, Multiplier/Divider	-	P-TQFP48-0707-0.50-ZK6	-	✓	✓
													P-TQFP48-0707-0.50-ZK6	-	✓	✓
													P-WQFN48-0707-0.50-63	-	✓	✓

ML62Q2700 group (U16 Core*1)

(LAPIS Technology products)

16bit Timer	16bit Multi Functions Timer	WDT	ADC (method)	DAC	Serial Port			Supply Voltage Detection	LCD Driver	External Interrupt Sources	Others	Notes	Package	Chip Support	Halogen Free Support*3	Industrial Grade*4
					I ² C	SSIO	UART									
8	8 (TMR, PWM, IGBT, Capture)	1	12bit×16 (SA type)	-	Master/Slave×1, Master×2	7	Full Duplex ×6	VLS×1	Max 280dot 35seg× 8com	9	Safety function, Multiplier/Divider, Speech playback function/ADPCM2 decoder	-	P-QFP64-1414-0.80-ZK6	-	✓	✓
													P-TQFP64-1010-0.50-ZK6	-	✓	✓
													P-TQFP64-1010-0.50-ZK6	-	✓	✓
8	8 (TMR, PWM, IGBT, Capture)	1	12bit×16 (SA type)	-	Master/Slave×1, Master×2	7	Full Duplex ×6	VLS×1	Max 360dot 45seg× 8com	9	Safety function, Multiplier/Divider, Speech playback function/ADPCM2 decoder	-	P-QFP80-1414-0.65-ZK6	-	✓	✓
													P-QFP80-1414-0.65-ZK6	-	✓	✓
													P-QFP80-1414-0.65-ZK6	-	✓	✓
8	8 (TMR, PWM, IGBT, Capture)	1	12bit×16 (SA type)	-	Master/Slave×1, Master×2	7	Full Duplex ×6	VLS×1	Max 480dot 60seg× 8com	9	Safety function, Multiplier/Divider, Speech playback function/ADPCM2 decoder	-	P-QFP100-1420-0.65-BK6	-	✓	✓
													P-TQFP100-1414-0.50-ZK6	-	✓	✓
													P-TQFP100-1414-0.50-ZK6	-	✓	✓
8	8 (TMR, PWM, IGBT, Capture)	1	12bit×12 (SA type)	-	Master/Slave×1, Master×2	2	Full Duplex ×2	VLS×1	Max 192dot 24seg× 8com	TBD	Safety function, Multiplier/Divider, Speech playback function/ADPCM2 decoder	-	P-TQFP100-1420-0.65-BK6	-	✓	✓
													P-WQFN48-0707-0.50-63	-	✓	✓
													P-TQFP100-1414-0.50-ZK6	-	✓	✓
8	8 (TMR, PWM, IGBT, Capture)	1	12bit×12 (SA type)	-	Master/Slave×1, Master×2	2	Full Duplex ×2	VLS×1	Max 216dot 27seg× 8com	TBD	Safety function, Multiplier/Divider, Speech playback function/ADPCM2 decoder	-	P-TQFP52-1010-0.65-ZK6	-	✓	✓
													P-TQFP52-1010-0.65-ZK6	-	✓	✓
													P-TQFP52-1010-0.65-ZK6	-	✓	✓
8	8 (TMR, PWM, IGBT, Capture)	1	12bit×12 (SA type)	-	Master/Slave×1, Master×2	2	Full Duplex ×2	VLS×1	Max 280dot 35seg× 8com	TBD	Safety function, Multiplier/Divider, Speech playback function/ADPCM2 decoder	-	P-QFP64-1414-0.80-ZK6	-	✓	✓
													P-TQFP64-1010-0.50-ZK6	-	✓	✓
													P-TQFP64-1010-0.50-ZK6	-	✓	✓

Microcontroller

Built-In Original High Fidelity High Compression HQ-ADPCM Algorithm

Speech Playback MCU (8bit) ML610Q300 (U8 Core*1)

Normal type ROM Capacity: 96KB to 256KB Pin number: 32pin to 64pin (Industrial Grade)

Part No.	Operating Voltage (V)	ROM type	ROM Capacity (Byte)	Data Flash Capacity (Byte)	Memory for Sound	RAM Capacity (Byte)	Port			Operating Frequency (Max)		Minimum Instruction Execution Time	Current Consumption (Typ@HALT)	Operating Temperature (°C)
							Input	Output	Input/Output	High Speed	Low Speed			
ML610Q305	2.0 to 5.5	Flash	96K	2K	Flash ROM	1K	1	3	12	8.192MHz	32.768kHz (Internal RC oscillation)	0.122µs/30.5µs	2.0µA	-40 to +85
ML610Q306									15					
New ML610Q327	2.0 to 5.5	Flash	192K	2K	Flash ROM	4K	-	6	26	8.192MHz	32.768kHz (Internal RC oscillation)	0.122µs/30.5µs	2.0µA	-40 to +85
New ML610Q338	2.0 to 5.5	Flash	256K	2K	Flash ROM	4K	-	6	30	8.192MHz	32.768kHz (Internal RC oscillation)	0.122µs/30.5µs	2.0µA	-40 to +85
New ML610Q339									42					

© Ky's Technology HQ-ADPCM: A high quality sound compression technology developed by Ky's. Ky's is a registered trademark of Kyushu Institute of Technology.

*1 U8 Core: LAPIS Technology's original 8bit RISC CPU nX-U8/100 Core

*2 A check mark of halogen free support means that we will be able to ship out the halogen free products. For details, please inquire to the sales.

*3 For use of industrial equipment, please inquire to the sales.

Ideal for USB Data Loggers

USB/Security MCU (32bit) ML630Q400 (Arm® Cortex®-M0+)

Built-In LCD Driver type ROM Capacity: 64KB to 128KB Pin number: 100pin (Industrial Grade)

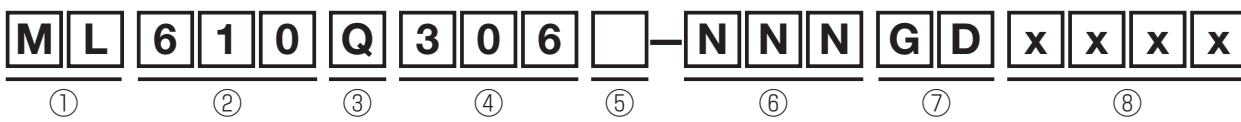
Part No.	Operating Voltage (V)	ROM type	ROM Capacity (Byte)	Data Flash Capacity (Byte)	RAM Capacity (Byte)	Port			Operating Frequency (Max)		Minimum Instruction Execution Time	Current Consumption (Typ@HALT)	Operating Temperature (°C)	Co-processor for Multiplication and Division	8bit Timer	16bit Multi Functions Timer
						Input	Output	Input/Output	High Speed	Low Speed						
ML630Q464	1.8 to 3.6	Flash	64K	2K	8K	-	-	38	16MHz (Internal RC oscillation) 24MHz (PLL oscillation)	32.768kHz (Internal RC oscillation/ Crystal oscillation)	41.7ns/30.5µs	0.8µA (Crystal oscillation)	-40 to +85	32bit multiplier	8 (16bitx4)	4
ML630Q466			128K		16K											

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*1 A check mark of halogen free support means that we will be able to ship out the halogen free products. For details, please inquire to the sales.

*2 For use of industrial equipment, please inquire to the sales.

ML610Q/ML630Q Part Number Explanation



Part Name

① Device type
ML: Bipolar Logic

② CPU Core type
610: 8bit CPU nX-U8/100
630: 32bit CPU Arm® Cortex®-M0+

③ ROM type
Q: Flash ROM

④ Part Code
3xx: Built-in Speech Playback function
4xx: Low Power

⑤ Option Code
None to x: Set for product

⑥ ROM Code
NNN: Blank
001 to xxx: Custom Code Number

⑦ Package Code
GD: WQFN
TB: TQFP

⑧ Company's Code in LAPIS Technology

(LAPIS Technology products)

	8bit Timer	PWM	WDT	ADC (method)	Serial Port			Supply Voltage Detection	LCD Driver	External Interrupt Sources	SP Amp Output (W)/ Class	Others	Notes	Package	Chip Support	Halogen Free Support*2	Industrial Grade*3
					I ² C	SSIO	UART										
	4 (16bit×2)	—	1	10bit×3 (SA type)	Master/ Slave x1	2	Half Duplex x1	LLDx1	—	9	1.0 (@5V)/ D class	Speech playback function/ ADPCM2 HQ-ADPCM decoder/ Built-in speaker Amplifier	—	P-WQFN32-0505-0.50-A63	—	✓	✓
				P-TQFP32-0707-0.80-ZK6													
				10bit×4 (SA type)										P-WQFN36-0606-0.50-A63			
	4 (16bit×2)	3	1	10bit×8 (SA type)	Master/ Slave x1	2	Half Duplex x2	LLDx1	—	8	1.0 (@5V)/ D class	Speech playback function/ ADPCM2 HQ-ADPCM decoder/ Built-in speaker Amplifier	—	P-TQFP48-0707-0.50-ZK6	—	✓	✓
	4 (16bit×2)	3	1	10bit×8 (SA type)	Master/ Slave x1	2	Half Duplex x2	LLDx1	—	8	1.0 (@5V)/ D class	Speech playback function/ ADPCM2 HQ-ADPCM decoder/ Built-in speaker Amplifier	—	P-TQFP52-1010-0.65-ZK6	—	✓	✓
														P-TQFP64-1010-0.50-ZK6			

(LAPIS Technology products)

	PWM	Capture	WDT	ADC (method)	Serial Port				Supply Voltage Detection	LCD Driver	External Interrupt Sources	Others	Notes	Package	Chip Support	Halogen Free Support*1	Industrial Grade*2
					I ² C	SSIO (SPI)	UART	USB									
	16bit×4 (use 16bit Timer)	16bit×4 (use 16bit Timer)	1	24bit×2 (RC type)	Master/ Slave x2	2	Full Duplex x2	1	VLSx1, LLDx1	Max 400dot 50seg× 8com	8	AES 128bit HW accelerator (CBC, CTR, CTR), Random generator, DMA, RTC, Analog comparator×2, 1kHz Timer	—	P-TQFP100-1414-0.50-ZK6	—	✓	✓
				P-TQFP100-1414-0.50-ZK6													
				12bit×12 (SA type)													

Microcontroller



Built-In HLC*1 enables coordinated operation of peripherals without software control

Automotive MCU (32bit) ML63Q8000 series (Arm® Core)

Sensor/Actuator type ML63Q8000 group (Cortex®-M0+) 128KB to 480KB Pin number: 48pin to 64pin

Part No.	Operating Voltage (V)	ROM type	ROM Capacity (Byte)	Data Flash Capacity (Byte)	RAM Capacity (Byte)	Port (Max)	Operating Frequency (Max)		Minimum Instruction Execution Time	Current Consumption (Typ@HALT)	Operating Temperature (°C)	16bit Timer	32bit Timer
							High Speed	Low Speed					
New ML63Q8034	2.7 to 5.5	Flash	128K	8K	16K	37	48MHz	256kHz	20.8ns	(TBD)	-40 to +125	17 (TMR, PWM, Capture)	4
New ML63Q8036			256K	16K	32K								
New ML63Q8037			480K										
New ML63Q8054	2.7 to 5.5	Flash	128K	8K	16K	53	48MHz	256kHz	20.8ns	(TBD)	-40 to +125	17 (TMR, PWM, Capture)	4
New ML63Q8056			256K	16K	32K								
New ML63Q8057			480K										

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*1 HLC: Short for Hardware Linkage Controller, HLC is a function that enables interoperation between peripherals without using LAPIS Technology's proprietary CPU.

*2 A check mark of halogen free support means that we will be able to ship out the halogen free products. For details, please inquire to the sales.

*3 Please inquire to the sales for AEC-Q100.

(LAPIS Technology products)

	ADC (method)	DAC	Analog Comparator	Serial Port				CAN	LIN	Supply Voltage Detection	External Interrupt Sources	Others	Notes	Package	Chip Support	Halogen Free Support*2	Automotive Grade*3	Functional safety Support
				IC	SSIO (SPI)	UART	FS											
	12bit×16 (SA type)	12bit×1	1ch×5	Master/ Slavex2	4	Full Duplex x2	Masterx1	1	Master/ Slavex2	LVDx1	8	HLC*1, WDT, RTC, DMA, CRC, Clock Monitor	-	P-TQFP48-0707-0.50-ZK6	-	✓	YES	✓
P-TQFP48-0707-0.50-ZK6														-	✓	YES	✓	
P-TQFP48-0707-0.50-ZK6														-	✓	YES	✓	
	12bit×16 (SA type)	12bit×1	1ch×5	Master/ Slavex2	4	Full Duplex x2	Masterx1	1	Master/ Slavex2	LVDx1	8	HLC*1, WDT, RTC, DMA, CRC, Clock Monitor	-	P-TQFP64-1010-0.50-ZK6	-	✓	YES	✓
P-TQFP64-1010-0.50-ZK6														-	✓	YES	✓	
P-TQFP64-1010-0.50-ZK6														-	✓	YES	✓	