



General-purpose 16bit MCU

ML62Q1000 series

Standard type 1300 Group 16bit MCU (Industrial Grade)

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

Standard type 1500 Group 16bit MCU (Industrial Grade)

Part No.	Operating Conditions					ROM/RAM				Functions/Features			
	Operating Voltage (V)	Operating Frequency (Max)		Minimum Instruction Execution Time	Current Consumption (Typ@HALT)	Operating Temperature (°C)	ROM type	ROM Capacity (Byte)	Data Flash Capacity (Byte)	RAM Capacity (Byte)	Port		
		Low Speed	High Speed								Input	Output	Input/Output
New ML62Q1530	1.6 to 5.5	32.768kHz (Internal RC oscillation/ Crystal oscillation)	24MHz (PLL oscillation)	41ns 30.5µs	4.7/3.0µA (Internal RC oscillation/ Crystal oscillation)	-40 to +105	Flash	4K	8K	2	-	-	42
New ML62Q1531											-	-	
New ML62Q1532											-	-	
New ML62Q1533											-	-	
New ML62Q1534											-	-	
New ML62Q1540											-	-	46
New ML62Q1541											-	-	
New ML62Q1542											-	-	
New ML62Q1543											-	-	58
New ML62Q1544											-	-	
New ML62Q1550											-	-	
New ML62Q1551											-	-	16K
New ML62Q1552											-	-	
New ML62Q1553											-	-	
New ML62Q1554											-	-	32K
New ML62Q1555					-						-		
New ML62Q1556					-						-		
New ML62Q1557					-						-	32K	
ML62Q1558					-						-		
ML62Q1559					-						-		
New ML62Q1563					-						-	16K	
New ML62Q1564					-						-		
New ML62Q1565					-						-		
New ML62Q1566					-						-	16K	
New ML62Q1567					-						-		
ML62Q1568					-						-		
ML62Q1569					-						-	32K	
New ML62Q1573					-						-		
New ML62Q1574					-						-		
New ML62Q1575					-						-	16K	
New ML62Q1576	-	-											
New ML62Q1577	-	-											
ML62Q1578	-	-	32K										
ML62Q1579	-	-											
ML62Q1543C	-	-		8K									
ML62Q1544C	-	-											
ML62Q1553C	-	-											
ML62Q1554C	-	-	8K										
ML62Q1563C	-	-											
ML62Q1564C	-	-											
New ML62Q1573	-	-	16K										
New ML62Q1574	-	-											
New ML62Q1575	-	-											
New ML62Q1576	-	-	16K										
New ML62Q1577	-	-											
ML62Q1578	-	-											
ML62Q1579	-	-	32K										
ML62Q1543C	-	-											
ML62Q1544C	-	-											
ML62Q1553C	-	-	8K										
ML62Q1554C	-	-											
ML62Q1563C	-	-											
ML62Q1564C	-	-	8K										
New ML62Q1573	-	-											
New ML62Q1574	-	-											
New ML62Q1575	-	-	16K										
New ML62Q1576	-	-											
New ML62Q1577	-	-											
ML62Q1578	-	-	32K										
ML62Q1579	-	-											
ML62Q1543C	-	-		8K									
ML62Q1544C	-	-											
ML62Q1553C	-	-											
ML62Q1554C	-	-	8K										
ML62Q1563C	-	-											
ML62Q1564C	-	-											

*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.

(LAPIS Semiconductor products)

Functions/Features											Notes	Package	Chip Support	Halogen Free Support ¹⁾	Industrial Grade										
16bit Timer	16bit Multi Functions Timer	WDT	ADC (method)	DAC	Serial Port			Supply Voltage Detection	LCD Driver	External Interrupt Sources						Others									
							UART																		
4 (8bit×8)	4 (TMR, PWM, IGBT, Capture)	1	10bit×6 (SA type)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P-SSOP16-0225-0.65	-	✓	✓
																					-	P-WQFN16-0404-0.50	-	✓	✓
																					-	P-SSOP16-0225-0.65	-	✓	✓
																					-	P-WQFN16-0404-0.50	-	✓	✓
																					-	P-SSOP16-0225-0.65	-	✓	✓
																					-	P-WQFN16-0404-0.50	-	✓	✓
6 (8bit×12)	4 (TMR, PWM, IGBT, Capture)	1	10bit×8 (SA type)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P-TSSOP20-0225-0.65	-	✓	✓
																					-	P-TSSOP20-0225-0.65	-	✓	✓
																					-	P-TSSOP20-0225-0.65	-	✓	✓
																					-	P-WQFN24-0404-0.50	-	✓	✓
																					-	P-WQFN24-0404-0.50	-	✓	✓
																					-	P-WQFN24-0404-0.50	-	✓	✓
																					-	P-TQFP32-0707-0.80	-	✓	✓
																					-	P-WQFN32-0505-0.50	-	✓	✓
																					-	P-TQFP32-0707-0.80	-	✓	✓
																					-	P-WQFN32-0505-0.50	-	✓	✓
																					-	P-TQFP32-0707-0.80	-	✓	✓
																					-	P-WQFN32-0505-0.50	-	✓	✓

Functions/Features											Notes	Package	Chip Support	Halogen Free Support ¹⁾	Industrial Grade																															
16bit Timer	16bit Multi Functions Timer	WDT	ADC (method)	DAC	Serial Port			Supply Voltage Detection	LCD Driver	External Interrupt Sources						Others																														
							UART																																							
6 (8bit×12)	6 (TMR, PWM, IGBT, Capture)	1	10bit×12 (SA type)	8bit×1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P-TQFP48-0707-0.50	-	✓	✓																					
																					-	P-TQFP48-0707-0.50	-	✓	✓																					
																					-	P-TQFP48-0707-0.50	-	✓	✓																					
																					-	P-TQFP48-0707-0.50	-	✓	✓																					
																					-	P-TQFP48-0707-0.50	-	✓	✓																					
																					-	P-TQFP52-1010-0.65	-	✓	✓																					
																					-	P-TQFP52-1010-0.65	-	✓	✓																					
																					-	P-TQFP52-1010-0.65	-	✓	✓																					
																					-	P-TQFP52-1010-0.65	-	✓	✓																					
																					-	P-TQFP52-1010-0.65	-	✓	✓																					
																					-	P-TQFP52-1010-0.65	-	✓	✓																					
																					-	P-QFP64-1414-0.80	-	✓	✓																					
																					-	P-TQFP64-1010-0.50	-	✓	✓																					
																					-	P-QFP64-1414-0.80	-	✓	✓																					
																					-	P-TQFP64-1010-0.50	-	✓	✓																					
																					8 (8bit×16)	8 (TMR, PWM, IGBT, Capture)	1	10bit×16 (SA type)	8bit×2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P-QFP64-1414-0.80	-	✓	✓
																																										-	P-TQFP64-1010-0.50	-	✓	✓
																																										-	P-QFP64-1414-0.80	-	✓	✓
-	P-TQFP64-1010-0.50	-	✓	✓																																										
-	P-QFP64-1414-0.80	-	✓	✓																																										
-	P-TQFP64-1010-0.50	-	✓	✓																																										
-	P-QFP64-1414-0.80	-	✓	✓																																										
-	P-TQFP64-1010-0.50	-	✓	✓																																										
-	P-QFP64-1414-0.80	-	✓	✓																																										
-	P-TQFP64-1010-0.50	-	✓	✓																																										
-	P-QFP64-1414-0.80	-	✓	✓																																										
-	P-TQFP64-1010-0.50	-	✓	✓																																										
6 (8bit×12)	6 (TMR, PWM, IGBT, Capture)	1	10bit×12 (SA type)	8bit×1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	P-QFP64-1414-0.80	-	✓	✓																					
																					-	P-TQFP64-1010-0.50	-	✓	✓																					
																					-	P-QFP80-1414-0.65	-	✓	✓																					
																					-	P-QFP80-1414-0.65	-	✓	✓																					
																					-	P-QFP80-1414-0.65	-	✓	✓																					
																					-	P-QFP80-1414-0.65	-	✓	✓																					
																					-	P-QFP100-1420-0.65	-	✓	✓																					
																					-	P-TQFP100-1414-0.50	-	✓	✓																					
																					-	P-QFP100-1420-0.65	-	✓	✓																					
																					-	P-TQFP100-1414-0.50	-	✓	✓																					
																					-	P-QFP100-1420-0.65	-	✓	✓																					
																					-	P-TQFP100-1414-0.50	-	✓	✓																					
																					-	P-QFP100-1420-0.65	-	✓	✓																					
																					-	P-TQFP100-1414-0.50	-	✓	✓																					
																					-	P-QFP100-1420-0.65	-	✓	✓																					
																					-	P-TQFP100-1414-0.50	-	✓	✓																					
																					-	P-QFP52-1010-0.65	-	✓	✓																					
																					-	P-TQFP52-1010-0.65	-	✓	✓																					
																					-	P-QFP64-1414-0.80	-	✓	✓																					
																					-	P-TQFP64-1010-0.50	-	✓	✓																					
																					-	P-QFP64-1414-0.80	-	✓	✓																					
																					-	P-TQFP64-1010-0.50	-	✓	✓																					
																					-	P-QFP80-1414-0.65	-	✓	✓																					
																					-	P-QFP80-1414-0.65	-	✓	✓																					

: Under Development

Built-in LCD Driver Segments type 1700 Group 16bit MCU (Industrial Grade)

Microcontroller

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

*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.

Functions/Features												Notes	Package	Chip Support	Halogen Free Support*	Industrial Grade
16bit Timer	16bit Multi Functions Timer	WDT	ADC (method)	DAC	Serial Port			Supply Voltage Detection	LCD Driver	External Interrupt Sources	Others					
					IC	SSIO	UART									
6 (8bitx12)	6 (TMR, PWM, IGBT, Capture)	1	10bitx12 (SA type)	8bitx1	Master Slavex1 Masterx2	UART Full Duplex/ SSIOx2 (UART Half Duplexx4)	VLSx1	10	10	Comparatorx2, DMA, MPY	-	P-TQFP48-0707-0.50	-	✓	✓	
											-	P-TQFP48-0707-0.50	-	✓	✓	
											-	P-TQFP48-0707-0.50	-	✓	✓	
											-	P-TQFP48-0707-0.50	-	✓	✓	
											-	P-TQFP48-0707-0.50	-	✓	✓	
											-	P-TQFP52-1010-0.65	-	✓	✓	
											-	P-TQFP52-1010-0.65	-	✓	✓	
											-	P-TQFP52-1010-0.65	-	✓	✓	
											-	P-TQFP52-1010-0.65	-	✓	✓	
											-	P-QFP64-1414-0.80 P-TQFP64-1010-0.50	-	✓	✓	
											-	P-QFP64-1414-0.80 P-TQFP64-1010-0.50	-	✓	✓	
											-	P-QFP64-1414-0.80 P-TQFP64-1010-0.50	-	✓	✓	
8 (8bitx16)	8 (TMR, PWM, IGBT, Capture)	1	10bitx16 (SA type)	8bitx2	Master Slavex1 Masterx2	UART Full Duplex/ SSIOx6 (UART Half Duplexx12)	VLSx1	12	12	Comparatorx2, DMA, MPY	-	P-QFP80-1414-0.65	-	✓	✓	
											-	P-QFP80-1414-0.65	-	✓	✓	
											-	P-QFP80-1414-0.65	-	✓	✓	
											-	P-QFP80-1414-0.65	-	✓	✓	
											-	P-QFP80-1414-0.65	-	✓	✓	
											-	P-QFP80-1414-0.65	-	✓	✓	
											-	P-QFP80-1414-0.65	-	✓	✓	
											-	P-QFP80-1414-0.65	-	✓	✓	
											-	P-QFP80-1414-0.65	-	✓	✓	
											-	P-QFP100-1420-0.65 P-TQFP100-1414-0.50	-	✓	✓	
											-	P-QFP100-1420-0.65 P-TQFP100-1414-0.50	-	✓	✓	
											-	P-QFP100-1420-0.65 P-TQFP100-1414-0.50	-	✓	✓	
6 (8bitx12)	8 (TMR, PWM, IGBT, Capture)	1	10bitx12 (SA type)	8bitx1	Master Slavex1 Masterx2	UART Full Duplex/ SSIOx3 (UART Half Duplexx6)	VLSx1	10	10	Comparatorx2, DMA, MPY	-	P-TQFP52-1010-0.65	-	✓	✓	
						UART Full Duplex/ SSIOx4 (UART Half Duplexx8)					-	P-TQFP52-1010-0.65	-	✓	✓	
						UART Full Duplex/ SSIOx3 (UART Half Duplexx6)					-	P-QFP64-1414-0.80 P-TQFP64-1010-0.50	-	✓	✓	
						UART Full Duplex/ SSIOx4 (UART Half Duplexx8)					-	P-QFP64-1414-0.80 P-TQFP64-1010-0.50	-	✓	✓	
						UART Full Duplex/ SSIOx3 (UART Half Duplexx6)					-	P-QFP80-1414-0.65	-	✓	✓	
						UART Full Duplex/ SSIOx4 (UART Half Duplexx8)					-	P-QFP80-1414-0.65	-	✓	✓	

: Under Development

Low Power 16bit MCU

ML620Q500/ML620Q400

Standard type 16bit MCU (Industrial Grade)

Part No.	Operating Conditions						ROM/RAM				Functions/Features					
	Operating Voltage (V)	Operating Frequency (Max)		Minimum Instruction Execution Time	Current Consumption (Typ@HALT)	Operating Temperature (°C)	ROM type	ROM Capacity (Byte)	Data Flash Capacity (Byte)	RAM Capacity (Byte)	Co-processor for Multiplication and Division	Port			8bit Timer	16bit Timer
		Low Speed	High Speed									Input	Output	Input/Output		
ML620Q503H	1.8 to 5.5	32.768kHz (Internal RC oscillation/ Crystal oscillation/ External input)		62.5ns 30.5µs	0.45µA (Crystal oscillation)	-40 to +85	Flash	32K	2K	2K	✓	2	—	36	8 (16bitx4)	4
ML620Q504H		64K	6K													

Built-in LCD Driver Dot Matrix type 16bit MCU

ML620Q416A	1.8 to 3.6	32.768kHz (Internal RC oscillation/ Crystal oscillation)		62.5ns 30.5µs	0.38µA (Crystal oscillation)	-40 to +85	Flash	128K	4K	16K	✓	—	—	52	8 (16bitx4)	4
ML620Q418A		256K														

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USB Interface & Security Function 32bit MCU

ML630Q400 (Cortex-M0+)

Built-in LCD Driver Dot Matrix type 32bit MCU (Industrial Grade)

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

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(LAPIS Semiconductor products)

Functions/Features																
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
				IC	SSIO (SPI)	UART	USB									
16bit×4 (use 16bit Timer)	16bit×4 (use 16bit Timer)	1	24bit×2 (RC type) 12bit×12 (SA type)	Master x2	2	Full Duplex x2	-	VLSx1 LLDx1	-	8	Low speed frequency correction/ Analog comparatorx2/ Melody: Buzzer	-	P-TQFP48-0707-0.50	✓	✓	✓
												-	P-TQFP48-0707-0.50	✓	✓	✓
16bit×4 (use 16bit Timer)	16bit×4 (use 16bit Timer)	1	24bit×2 (RC type) 12bit×12 (SA type)	Master/ Slave x3	2	Full Duplex x3	-	VLSx1 LLDx1	Max 2048dot 64seg.x 32com.	8	Low speed frequency correction/ Analog comparatorx2/ Melody: Buzzer/ 1kHz Timer	-	-	✓	✓	-
												-	-	✓	✓	-

(LAPIS Semiconductor products)

Functions/Features																
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
				IC	SSIO (SPI)	UART	USB									
16bit×4 (use 16bit Timer)	16bit×4 (use 16bit Timer)	1	24bit×2 (RC type) 12bit×12 (SA type)	Master/ Slave x2	2	Full Duplex x2	1	VLSx1 LLDx1	Max 400dot 50seg.x 8com.	8	AES/Random generator/DMA/ RTC/Analog comparatorx2/ 1kHz Timer	-	P-TQFP100-1414-0.50	-	✓	✓
										8	AES/Random generator/DMA/ RTC/Analog comparatorx2/ 1kHz Timer	-	P-TQFP100-1414-0.50	-	✓	✓

Low Voltage Operation 8bit MCU

ML610400/ML610Q400

Standard type 8bit MCU																										
Part No.	Operating Conditions						ROM/RAM				Functions/Features															
	Operating Voltage (V)	Operating Frequency (Max)		Minimum Instruction Execution Time	Current Consumption (Typ@HALT)	Operating Temperature (°C)	ROM type	ROM Capacity (Byte)	Data Flash Capacity (Byte)	RAM Capacity (Byte)	Port			8bit Timer	1kHz Timer	PWM	Capture	WDT								
Low Speed		High Speed	Input								Output	Input/Output														
ML610482	1.1 to 3.6	32.768kHz (Crystal oscillation)	4.096MHz 500kHz	0.244µs/2µs/30.5µs	0.5µA	-20 to +70	Mask	64K	-	4K	6	4	22	4 (16bit×2)	-	16bit×1	-	1								
ML610Q482							Flash																			
Standard type 8bit MCU (Industrial Grade)																										
ML610482P	1.1 to 3.6	32.768kHz (Crystal oscillation)	4.096MHz 500kHz	0.244µs/2µs/30.5µs	0.5µA	-40 to +85	Mask	64K	-	4K	6	4	22	4 (16bit×2)	-	16bit×1	-	1								
ML610Q482P							Flash																			
Built-in LCD Driver Dot Matrix type 8bit MCU																										
ML610421	1.1 to 3.6	32.768kHz (Crystal oscillation)	4.096MHz 500kHz	0.244µs/2µs/30.5µs	0.5µA	-20 to +70	Mask	32K	-	2K	6	3	22	4 (16bit×2)	-	16bit×1	-	1								
ML610Q421							Flash																			
ML610Q422							Flash																			
ML610426							Mask																			
ML610Q426			Flash																							
ML610Q426C			Flash																							
ML610428			1MHz	1µs/30.5µs			4.096MHz 2MHz	0.244µs/0.5µs/30.5µs		Flash	40K	6	3	14	4 (16bit×2)	-	-	-	-	-	-	-				
ML610Q428										Flash																
ML610429										Mask																
ML610Q429										Flash																
ML610Q431			4.096MHz 500kHz	0.244µs/2µs/30.5µs			4.096MHz 2MHz	0.244µs/0.5µs/30.5µs		Flash	48K	4K	6	3	14	2 (16bit×1)	-	-	-	-	-	-				
ML610Q431A										Mask																
ML610Q432										Flash																
ML610Q432A										Flash																
ML610Q435			4.096MHz 500kHz	0.244µs/2µs/30.5µs			4.096MHz 2MHz	0.244µs/0.5µs/30.5µs		Flash	96K	3K	6	3	14	4 (16bit×2)	-	-	-	-	-	-				
ML610Q435A										Flash																
ML610Q436										Flash																
ML610Q436A										Flash																
ML610Q438			4.096MHz 2MHz	0.244µs/0.5µs/30.5µs			4.096MHz 2MHz	0.244µs/0.5µs/30.5µs		Flash	128K	7K	10	3	20	-	-	-	-	-	-	-				
ML610Q439										Flash																
ML610Q439P	1.1 to 3.6	32.768kHz (Crystal oscillation)	4.096MHz 500kHz	0.244µs/2µs/30.5µs	0.5µA	-40 to +85	Flash	32K	-	2K	6	3	22	4 (16bit×2)	1	16bit×1	2	1								
ML610Q422P																			128K	7K	10	3	20	-	-	-
ML610Q439P																										
Built-in LCD Driver Dot Matrix type 8bit MCU (Industrial Grade)																										

*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.

(LAPIS Semiconductor products)

Functions/Features													Notes	Package	Chip Support	Halogen Free Support ¹⁾	Industrial Grade
ADC (method)	Serial Port			Supply Voltage Detection	LCD Driver	External Interrupt Sources	Others										
	I ² C	SSIO	UART														
24bit×2 (RC type)	Master x1	1	Half Duplex x1	BLD×1	-	5	Low speed frequency correction/ Buzzer	-	-	✓	✓	-					
									P-TQFP48-0707-0.50	✓	✓	-					
24bit×2 (RC type)	Master x1	1	Half Duplex x1	BLD×1	-	5	Low speed frequency correction/ Buzzer	-	-	✓	✓	✓					
									P-TQFP48-0707-0.50	✓	✓	✓					
24bit×2 (RC type) 12bit×2 (SA type)						5	Low speed frequency correction/ Melody: Buzzer	-	-	✓	✓	-					
									P-TQFP120-1414-0.40	✓	✓	-					
16bit×1 (RC type)						5	Low speed frequency correction/Melody: Buzzer/ EL Driver/External input voltage detection	-	Low-speed scillation stop detect reset: enable	✓	✓	-					
									P-TQFP120-1414-0.40	✓	✓	-					
24bit×2 (RC type)						5	Low speed frequency correction/ Melody: Buzzer	-	Selectable oscillation stop detection reset: function enable/disable according to mask option	✓	✓	-					
									TQFP128-P-1414-0.40	✓	✓	-					
24bit×2 (RC type)						9	Low speed frequency correction/ Melody: Buzzer	-	Selectable oscillation stop detection reset: function enable/disable according to mask option	✓	✓	-					
									-	✓	✓	-					
24bit×2 (RC type) 12bit×2 (SA type)	Master x1	1	Half Duplex x1	BLD×1		5	RTC/Low speed frequency correction/ Melody: Buzzer	-	Low-speed scillation stop detect reset: enable	✓	✓	-					
									P-LQFP144-2020-0.50	✓	✓	-					
24bit×2 (RC type) 12bit×2 (SA type)						5	RTC/Low speed frequency correction/ Melody: Buzzer	-	Low-speed scillation stop detect reset: disable	✓	✓	-					
									P-LQFP144-2020-0.50	✓	✓	-					
24bit×2 (RC type) 12bit×2 (SA type)						5	RTC/Low speed frequency correction/ Melody: Buzzer	-	Low-speed scillation stop detect reset: enable	✓	✓	-					
									P-LQFP144-2020-0.50	✓	✓	-					
24bit×2 (RC type) 12bit×2 (SA type)						5	RTC/Low speed frequency correction/ Melody: Buzzer	-	Low-speed scillation stop detect reset: disable	✓	✓	-					
									P-LQFP144-2020-0.50	✓	✓	-					
24bit×2 (RC type) 12bit×2 (SA type)						9	Low speed frequency correction/ Melody: Buzzer	-	Selectable oscillation stop detection reset: function enable/disable according to software	✓	✓	-					
									P-LQFP144-2020-0.50	✓	✓	-					
24bit×2 (RC type) 12bit×2 (SA type)	Master x1	1	Half Duplex x1	BLD×1		5	Low speed frequency correction/ Melody: Buzzer	-	Selectable oscillation stop detection reset: function enable/disable according to software	✓	✓	-					
									P-TQFP120-1414-0.40	✓	✓	-					
24bit×2 (RC type) 12bit×2 (SA type)						9	Low speed frequency correction/ Melody: Buzzer	-	Low-speed scillation stop detect reset: enable	✓	✓	✓					
									P-TQFP120-1414-0.40	✓	✓	✓					
24bit×2 (RC type) 12bit×2 (SA type)						9	Low speed frequency correction/ Melody: Buzzer	-	Selectable oscillation stop detection reset: function enable/disable according to software	-	✓	✓					
									P-LQFP144-2020-0.50	-	✓	✓					

Microcontroller

Built-in LCD Driver Segments type 8bit MCU

Part No.	Operating Conditions					ROM/RAM				Functions/Features													
	Operating Voltage (V)	Operating Frequency (Max)		Minimum Instruction Execution Time	Current Consumption (Typ@HALT)	Operating Temperature (°C)	ROM type	ROM Capacity (Byte)	Data Flash Capacity (Byte)	RAM Capacity (Byte)	Port			8bit Timer	1kHz Timer	PWM	Capture	WDT					
		Low Speed	High Speed								Input	Output	Input/Output										
ML610401	1.25 to 3.6	32.768kHz (Crystal oscillation)	500kHz	2µs/ 30.5µs	0.9µA	-20 to +70	Mask	6K	-	192	4	12	18	2 (16bitx1)	-								
ML610402							Mask					8											
ML610403							Mask					4											
ML610404			Mask	8K			256	12	5	22	4	16bitx1	-	2	1								
ML610405			Mask					8															
ML610406			Mask					4															
ML610407			Mask	16K			1K	12	6	18	4	16bitx1	-	2	1								
ML610Q407			Flash					12															
ML610Q407A			Flash					12															
ML610Q407D			Flash	12			22	8	4	16bitx1	2	1											
ML610408			Mask	8																			
ML610Q408			Flash	8																			
ML610409			Mask	16K			1K	4	5	14	6	16bitx1	-	2	1								
ML610Q409			Flash					4															
ML610Q409A			Flash					4															
ML610Q411			1.1 to 3.6	32.768kHz (Crystal oscillation)			500kHz	2µs/ 30.5µs	0.9µA	-20 to +70	Flash	128K	4K	4	6	3	18	4	16bitx1	2	1		
ML610Q412											Flash					3							14
ML610Q418											Flash					3							18
ML610Q418C							Flash	64K			2K	3	6	26	4	16bitx1	-	2	1				
ML610Q419	Flash	3			18																		
ML610Q419C	Flash	3			26																		
ML610Q461	1.25 to 3.6	32.768kHz (Crystal oscillation)			2MHz	0.5µs/2µs/ 30.5µs	0.8µA	-40 to +85			Flash	16K	1K	1	5	10	14	4	16bitx3	-			
ML610Q462											Flash					6							
ML610Q463											Flash					2							
ML610Q477					Flash	24K					2K	10	4	15	6	16bitx3	-						
ML610Q478					Flash							6											
ML610Q479					Flash							2											

Built-in LCD Driver Segments type 8bit MCU (Industrial Grade)

ML610401P	1.25 to 3.6	32.768kHz (Crystal oscillation)	500kHz	2µs/ 30.5µs	0.9µA	-40 to +85	Mask	6K	-	192	4	12	18	2 (16bitx1)	-							
ML610402P							Mask					8										
ML610403P							Mask					4										
ML610404P			Mask	8K			256	12	5	22	4	16bitx1	-	2	1							
ML610405P			Mask					8														
ML610406P			Mask					4														
ML610407P			Mask	16K			1K	12	6	18	4	16bitx1	-	2	1							
ML610Q407P			Flash					12														
ML610Q407PA			Flash					12														
ML610408P			Mask	16K			1K	8	4	15	6	16bitx3	-									
ML610Q408P			Flash					8														
ML610409P			Mask					4														
ML610Q409P			Flash	4																		
ML610Q411P			1.1 to 3.6	32.768kHz (Crystal oscillation)			500kHz	2µs/ 30.5µs	0.5µA	-40 to +85	Flash	24K	2K	1	6	3	14	4	16bitx3	-		
ML610Q411PA											Flash					3						
ML610Q412P											Flash					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.

	Functions/Features										Notes	Package	Chip Support	Halogen Free Support ^{††}	Industrial Grade	
	ADC (method)	Serial Port			Supply Voltage Detection	LCD Driver	External Interrupt Sources	Others								
		IC	SSIO	UART												
16bit×2 (RC type)	-	-	-	-	-	-	8 (include 4bit-OR input)	Low speed frequency correction/ Melody: Buzzer	-	Selectable oscillation stop detection reset: function enable according to software LCD bias: 1/3	-	✓	✓	-		
										Selectable oscillation stop detection reset: function enable according to software LCD bias: 1/3	-	✓	✓	-		
										Selectable oscillation stop detection reset: function enable according to software LCD bias: 1/3	-	✓	✓	-		
										Selectable oscillation stop detection reset: function enable according to software LCD bias: 1/2, 1/3	-	✓	✓	-		
										Selectable oscillation stop detection reset: function enable according to software LCD bias: 1/2, 1/3	-	✓	✓	-		
										Selectable oscillation stop detection reset: function enable according to software LCD bias: 1/2, 1/3	-	✓	✓	-		
										Selectable oscillation stop detection reset: function enable according to software LCD bias: 1/3	-	✓	✓	-		
										Low-speed scillation stop detect reset: enable LCD bias: 1/3	P-TQFP100-1414-0.50	✓	✓	-		
							Low-speed scillation stop detect reset: disable LCD bias: 1/2, 1/3			-	✓	✓	-			
							Low-speed scillation stop detect reset: enable LCD bias: 1/2, 1/3			-	✓	✓	-			
							Selectable oscillation stop detection reset: function enable according to software LCD bias: 1/3			-	✓	✓	-			
							Low-speed scillation stop detect reset: enable LCD bias: 1/3			P-TQFP100-1414-0.50	✓	✓	-			
							Selectable oscillation stop detection reset: function enable according to software LCD bias: 1/3			-	✓	✓	-			
							Low-speed scillation stop detect reset: enable LCD bias: 1/3			P-TQFP100-1414-0.50	✓	✓	-			
							Low-speed scillation stop detect reset: disable LCD bias: 1/2, 1/3			-	✓	✓	-			
							24bit×2 (RC type) 12bit×2 (SA type)			-	Master x1	1	-	-	-	5
-	P-TQFP120-1414-0.40	✓	✓	-												
-	P-TQFP100-1414-0.50	✓	✓	-												
-	P-TQFP100-1414-0.50	✓	✓	-												
-	P-TQFP100-1414-0.50	✓	✓	-												
-	P-TQFP100-1414-0.50	✓	✓	-												
16bit×2 (RC type)	-	-	1	-	-	-	-	Low speed frequency correction	-	-	P-TQFP64-1010-0.50	-	✓	-		
										-	P-TQFP64-1010-0.50	-	✓	-		
										-	P-TQFP64-1010-0.50	-	✓	-		
16bit×1 (RC type)	-	-	-	-	-	-	12 (include 8bit-OR input)	Low speed frequency correction/ Analog comparator	-	-	-	✓	✓	-		
										-	-	✓	✓	-		
										-	-	✓	✓	-		
16bit×2 (RC type)	-	-	2	Half Duplex x1	-	-	8 (include 4bit-OR input)	Low speed frequency correction/ Melody: Buzzer	-	Selectable oscillation stop detection reset: function enable according to software LCD bias: 1/3	-	✓	✓	✓		
										Selectable oscillation stop detection reset: function enable according to software LCD bias: 1/3	-	✓	✓	✓		
										Selectable oscillation stop detection reset: function enable according to software LCD bias: 1/3	-	✓	✓	✓		
										Selectable oscillation stop detection reset: function enable according to software LCD bias: 1/2, 1/3	-	✓	✓	✓		
										Selectable oscillation stop detection reset: function enable according to software LCD bias: 1/2, 1/3	-	✓	✓	✓		
										Selectable oscillation stop detection reset: function enable according to software LCD bias: 1/2, 1/3	-	✓	✓	✓		
										Selectable oscillation stop detection reset: function enable according to software LCD bias: 1/3	-	✓	✓	✓		
										Low-speed scillation stop detect reset: enable LCD bias: 1/3	P-TQFP100-1414-0.50	✓	✓	✓		
							Low-speed scillation stop detect reset: disable LCD bias: 1/2, 1/3			-	✓	✓	✓			
							Low-speed scillation stop detect reset: enable LCD bias: 1/3			P-TQFP100-1414-0.50	✓	✓	✓			
							Selectable oscillation stop detection reset: function enable according to software LCD bias: 1/3			-	✓	✓	✓			
							Low-speed scillation stop detect reset: enable LCD bias: 1/3			P-TQFP100-1414-0.50	✓	✓	✓			
							Selectable oscillation stop detection reset: function enable according to software LCD bias: 1/3			-	✓	✓	✓			
							Low-speed scillation stop detect reset: enable LCD bias: 1/3			P-TQFP100-1414-0.50	✓	✓	✓			
							Low-speed scillation stop detect reset: disable LCD bias: 1/2, 1/3			-	✓	✓	✓			
							24bit×2 (RC type) 12bit×2 (SA type)			-	Master x1	1	-	-	-	5
Low-speed scillation stop detect reset: disable	P-TQFP120-1414-0.40	✓	✓	✓												
-	P-TQFP120-1414-0.40	✓	✓	✓												

Microcontroller

Speech Play Back 8bit MCU

ML610Q300

Standard type 8bit MCU (Industrial Grade)															
Part No.	Operating Conditions						ROM/RAM					Functions/Features			
	Operating Voltage (V)	Operating Frequency (Max)		Minimum Instruction Execution Time	Current Consumption (Typ@HALT)	Operating Temperature (°C)	ROM type	ROM Capacity (Byte)	Data Flash Capacity (Byte)	Memory for Sound	RAM Capacity (Byte)	Port			
		Low Speed	High Speed									Input	Output	Input/Output	
ML610Q304	2.0 to 5.5	32.768kHz (Internal RC oscillation)		0.122µs/30.5µs	2.7µA	-40 to +85	Flash	96K	2K	Flash ROM	1K	1	3	11	
ML610Q360	2.2 to 3.6	32.768kHz (Crystal oscillation)			8.192MHz		1.7µA	Flash P2ROM	160K	3K	P2ROM: 16Mbit	2K	8	3	29
Built-in LCD Driver Segments type 8bit MCU															
ML610Q380	2.2 to 5.5	32.768kHz (Internal RC oscillation/ Crystal oscillation)		8.192MHz	0.122µs/30.5µs	2.0µA	-40 to +70	Flash	128K	—	Flash ROM	2K	7	4	34

*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.

ML610/ML610Q/ML620Q/ML630Q Part Number Explanation

M L 6 2 0 Q 1 5 1 B - N N N T B x x x x

Part Name

Device type ML: Bipolar Logic	Part Code 1xx: High Temperature Operation 3xx: Speech Play Back 4xx: Low Power or Low Voltage Operation 5xx: Low Power 79x: Sensor HUB	Package Code GD: VQFN, WQFN MB: SSOP TD: TSSOP TB: TQFP GA: QFP WA: Chip
CPU Core type 610: 8bit CPU nX-U8/100 620: 16bit CPU nX-U16/100 630: 32bit CPU ARM CortexM0+	Option Code None to x: Set for product	Company's Code in LAPIS
ROM type None: Mask ROM Q: Flash ROM	ROM Code NNN: Blank 001 to xxx: Custom Code Number	

(LAPIS Semiconductor products)

Functions/Features														Notes	Package	Chip Support	Halogen Free Support**	Industrial Grade
8bit Timer	PWM	WDT	ADC (method)	Serial Port			Supply Voltage Detection	LCD Driver	External Interrupt Sources	SP Amp Output (W)/ Class	Others							
				I ² C	SSIO	UART												
4 (16bit×2)			10bit×3 (SA type)	Master/ Slave x1	2	Half Duplex x1	—	—	9	1.0 (@5V)/ D class			—	P-VQFN28-0505-0.50 P-SSOP30-56-0.65 P-WQFN32-0505-0.50	—	✓	✓	
8 (16bit×4)	—	1	12bit×4 (SA type)	—	2	Half Duplex x2 (Full Duplex×1 +Half Duplex×1)	VLSx1	—	7	0.5 (@3V)/ AB class	Speech function/ADPCM decoder/ Built-in speaker Amplifier.		—	P-TQFP64-1010-0.50	—	—	✓	
6 (16bit×3)	16bit×2	1	10bit×8 (SA type)	Master x1	2	Half Duplex x2	BLDx1	Max 96dot 24seg. x4com.	5	0.6 (@5V)/ AB class	Speech function/ADPCM decoder/ Built-in speaker Amplifier.		—	P-QFP80-1414-0.65	—	—	—	

ML62Q1000 series Part Number Explanation



Part Number

Device type

ML: Bipolar Logic

CPU Core type

62: 16bit CPU nX-U16/100

ROM type

Q: Flash ROM

Option Code

None to x: Set for product

ROM Code

NNN : Blank

001 to xxx: Custom Code Number

Package Code

GD: WQFN

MB: SSOP

TD: TSSOP

TB: TQFP

GA: QFP

Company's Code in LAPIS

Part Code

13xx: 1300 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: 1500 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

x8: ROM 384KB

x9: ROM 512KB

17xx: 1700 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

19xx: 1900 Group (Built-in LCD Driver)

6x: 80pin

7x: 100pin

x3: ROM 96KB

x4: ROM 128KB

x5: ROM 160KB

x6: ROM 192KB

x7: ROM 256KB