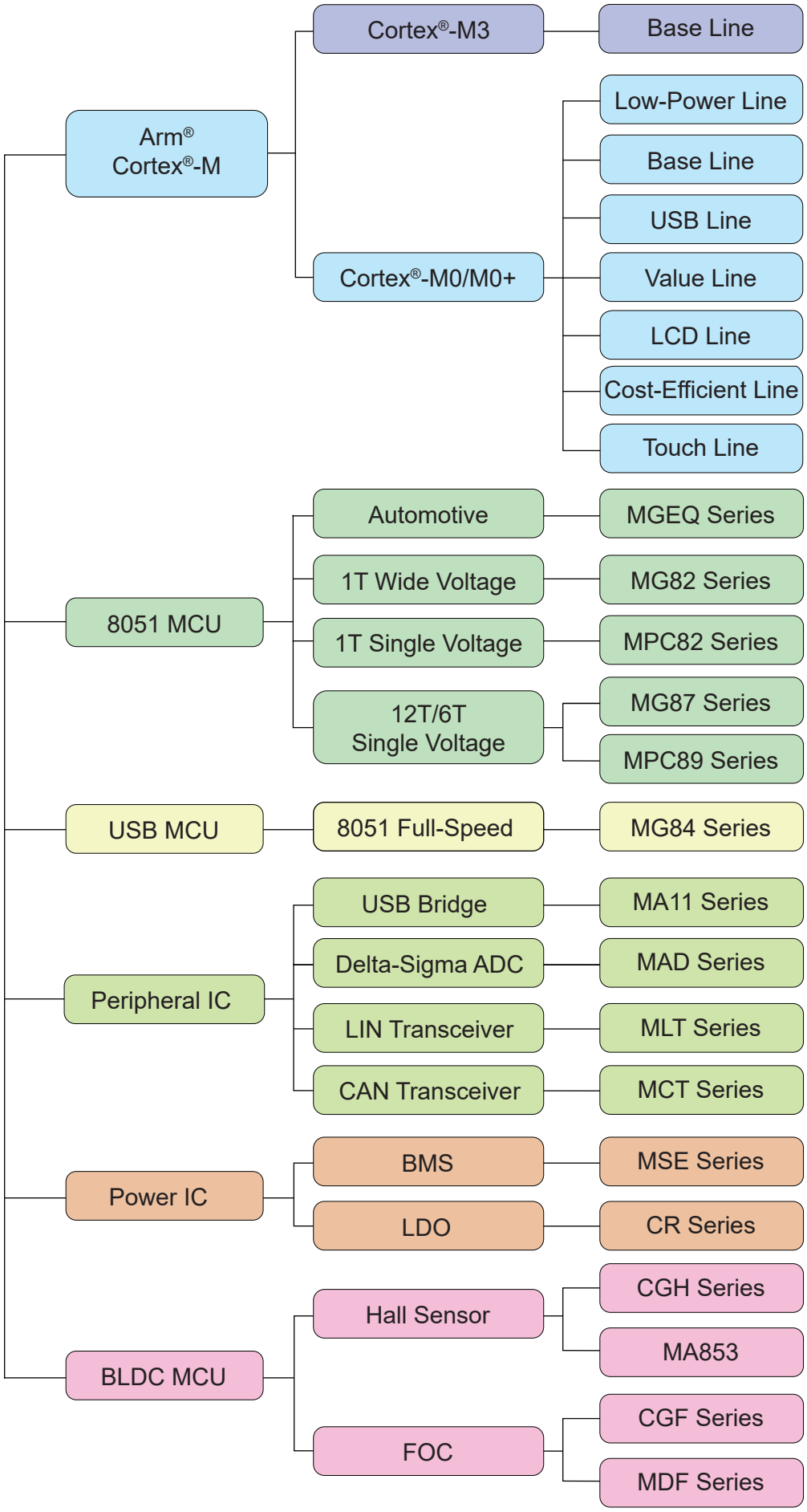
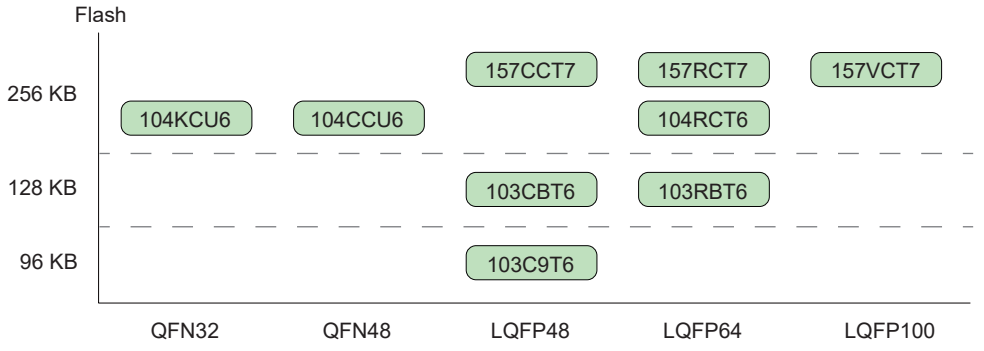
# Product Category



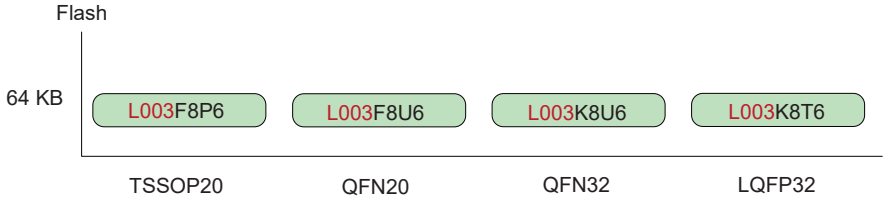
# Arm® Cortex®-M3 Base Line




| Part No. | Vdd | Flash ROM | Data RAM | Max Freq. | 20-Bit Timer | IO | 12-Bit ADC | Comp. | Features | Package |
|---|---|---|---|---|---|---|---|---|---|---|
| MG32F103 | 2V~3.6V | 96KB<br>128KB | 28KB | 72MHz | 4+RTC | 37<br>51 | 10-CH<br>16-CH | 2 | UARTx3, I²C x2, SPI Mx1,<br>SPI S x2,QSPI,I²S,USB,<br>LED SEG x8 | LQFP48<br>LQFP64 |
| MG32F104 | 2V~3.6V | 256KB | 36KB | 96MHz | 4+RTC | 25<br>37<br>51 | 16-CH | 2 | UARTx3, I²C x2, SPI Mx1,<br>SPI S x2,QSPI,I²S,USB,<br>LED SEG x8 | QFN32<br>QFN48<br>LQFP64 |
| MG32F157 | 2V~3.6V | 256KB | 64KB | 96MHz | 8+RTC | 37<br>51<br>80 | 18-CH | 3*1 | UARTx5, I²C x2, SPIx3,<br>QSPI,CAN,USB,SDIO<br>CRC,OPA x3,AES,DAC x2,ADC x3 | LQFP48<br>LQFP64<br>LQFP100 |

*1 Comparator shared with OPA

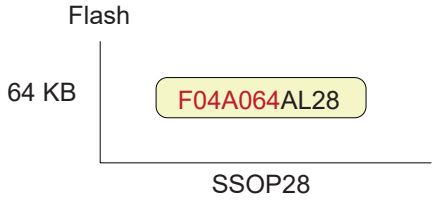
# Low-Power Line Arm® Cortex®-M0+




| Part No. | Vdd | Flash ROM | Data RAM | Max Freq. | Timer | IO | 12-Bit ADC | ACMP. | Features | CCP*4 | ISP/IAP | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MG32L003*1 | 2.5V~<br>5.5V | 64KB | 4KB | 24MHz | 9+RTC<br>LP Timer | 16/28 | 15-CH | 1*5 | UART*2x2, LPUART,<br>I²C, SPI, CRC16,1-Wire | 6-CH | YES*3 | TSSOP20<br>QFN20<br>QFN32<br>LQFP32 |

*1 Support M-LINK ICE; *2 UART x2: Support SPI Master mode, not support Slave mode;
*3 Share with all Flash zone; *4 CCP: Input Capture/Output Compare/PWM; *5 Low Voltage Detector (LVD) / Voltage Comparator (ACMP)

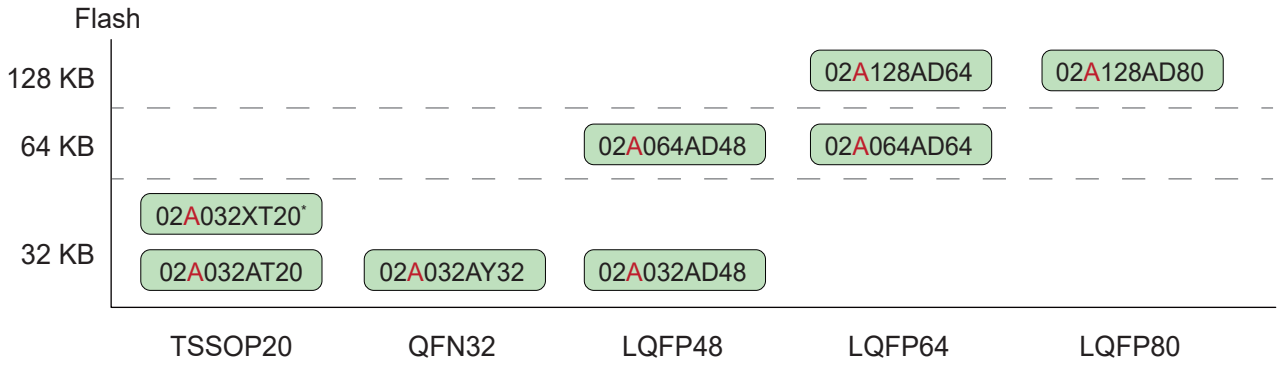
# Arm® Cortex®-M0+




| Part No. | Vdd | Flash ROM | Data RAM | Max Freq. | Timer | IO | 12-Bit ADC | ACMP. | Features | CCP*3 | ISP/IAP | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MG32F04A064*1 | 2.5V~<br>5.5V | 64KB | 4KB | 48MHz | 3 | 22 | 12-CH | 1 | UART*2x2, SPI, I²C,<br>CRC32, UID, LED SEGx5 | 4-CH | NA | SSOP28 |

*1 Support M-LINK ICE; *2 UART x2: Support SPI Master mode, not support Slave mode;
*3 CCP: Input Capture/Output Compare/PWM

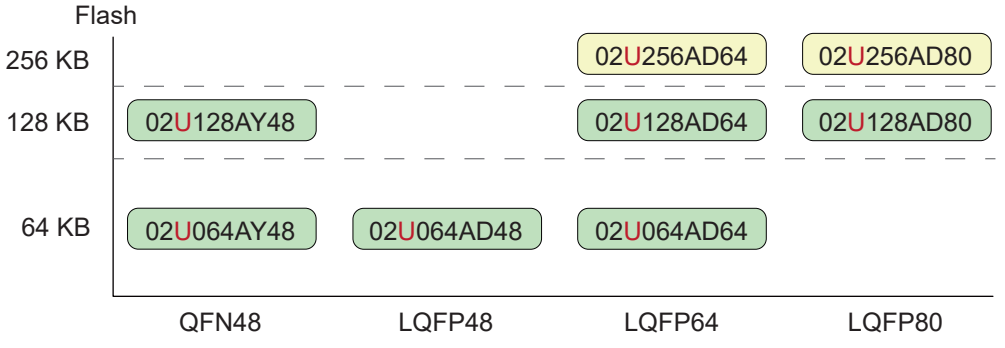
# Arm® Cortex®-M0 Base Line




| Part No. | Vdd | Flash ROM | Data RAM | Max. Freq. | Timer | IO | 12-Bit ADC | Comp. | Features | CCP*4 | ISP/IAP | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **MG32F02A032*1** | 1.8V~ 5.5V | 32KB | 4KB | 48MHz | 5+RTC | 17/29/44 | 12-CH | 2 | UART*2 x2, I²C,SPI/QPI, PWM,CRC32, DMA | 4-CH | YES*3 | TSSOP20 QFN32 LQFP48 |
| **MG32F02A064*1** | 1.8V~ 5.5V | 64KB | 8KB | 48MHz | 7+RTC | 44/59 | 16-CH | 2 | UART*5x7, I²Cx2,SPI*6 x4, CRC32,DMA,DAC,EMB | 8-CH | YES*3 | LQFP48 LQFP64 |
| **MG32F02A128*1** | 1.8V~ 5.5V | 128KB | 16KB | 48MHz | 7+RTC | 59/73 | 16-CH | 2 | UART*5x7, I²Cx2,SPI*6 x4, CRC32,DMA,DAC,EMB | 8-CH | YES*3 | LQFP64 LQFP80 |

* MG32F02A032XT20 Supports operation temperature: -40~125°C;
*1 Support M-LINK ICE;
*2 All UART support SPI Master;
*3 Share with all Flash zone;
*4 CCP: Input Capture/Output Compare/PWM;
*5 Advanced UART x 3: Support SPI Master/Slave (UART 0/1/2 modules); Basic UART x 4: UART only (UART 4/5/6/7 modules).
*6 Advanced SPI x 1: Support SPI/QPI/OPI (SPI 0 modules); Basic SPI x 3: Standard SPI only (Configurable in UART 0/1/2 modules).

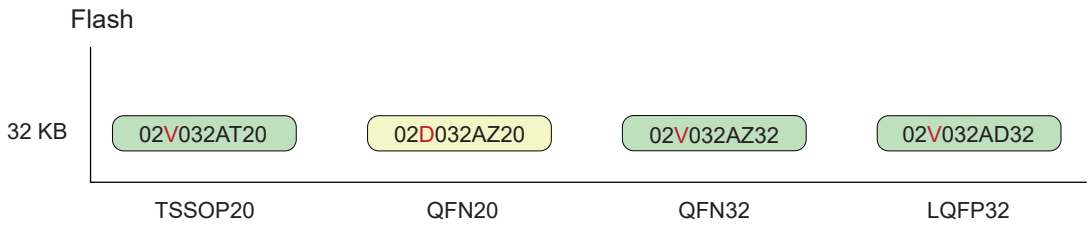
# Arm® Cortex®-M0 USB Line




| Part No. | Vdd | Flash ROM | Data RAM | Max. Freq. | Timer | IO | 12-Bit ADC | Comp. | Features | CCP*3 | ISP/IAP | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **MG32F02U064*1** | 1.8V~ 5.5V~ | 64KB | 16KB | 48MHz | 7+RTC | 41/56 | 16-CH | 2 | UART*4 x7,I²C x2, SPI*5 x4, USB,CRC32, DMA, DAC, EMB | 8-CH | YES*2 | QFN48 LQFP48 LQFP64 |
| **MG32F02U128*1** | 1.8V~ 5.5V | 128KB | 16KB | 48MHz | 7+RTC | 56/70 | 16-CH | 2 | UART*4 x7,I²C x2, SPI*5 x4, USB,CRC32, DMA, DAC, EMB | 8-CH | YES*2 | QFN48 LQFP64 LQFP80 |
| **MG32F02U256*1** | 1.8V~ 5.5V | 256KB | 32KB | 48MHz | 7+RTC | 56/70 | 16-CH | 2 | UART*4 x7,I²C x2, SPI*5 x4, USB,CRC32, DMA, DAC, EMB | 8-CH | YES*2 | LQFP64 LQFP80 |

<Models in the yellow grid will be launched soon.>
*1 Support M-LINK ICE;
*2 Share with all Flash zone;
*3 CCP: Input Capture/Output Compare/PWM;
*4 Advanced UART x 3: Support SPI Master/Slave (UART 0/1/2 modules); Basic UART x 4: UART only (UART 4/5/6/7 modules);
*5 Advanced SPI x 1: Support SPI/QPI/OPI (SPI 0 module); Basic SPI x 3: Standard SPI only (Configurable in UART 0/1/2 modules).

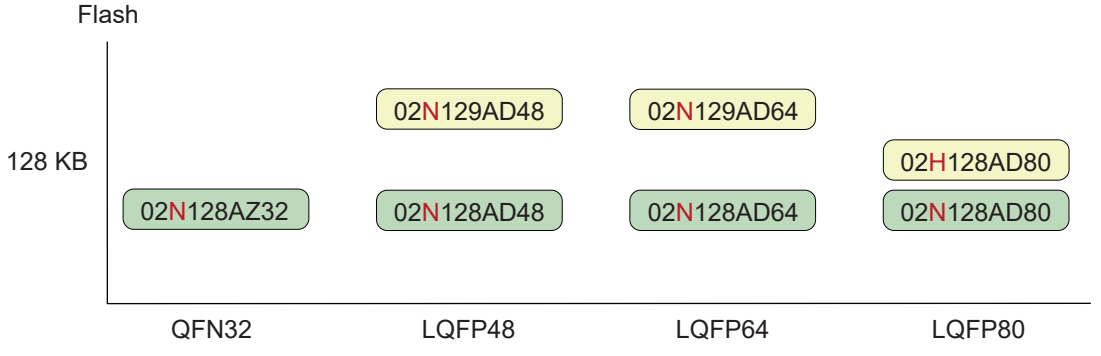
# Arm® Cortex®-M0 Value Line




| Part No. | Vdd | Flash ROM | Data RAM | Max Freq. | Timer | IO | 12-Bit ADC | Comp. | Features | CCP*4 | ISP/IAP | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MG32F02V032*1 | 1.8V~ 3.6V | 32KB | 4KB | 48MHz | 6+RTC | 17/29 | 8-CH | NA | UART*2 x3, I²C x2 SPI/QPI,PWM CRC32,DMA,ASB | 6-CH | YES*3 | TSSOP20 LQFP32 QFN32 |
| MG32F02D032*1 | 2.7V~ 5.5V | 32KB | 2KB | 24MHz | 3 | 13 | 4-CH | NA | UART*2, I²C, SPI PWM, DAC x2 | 2-CH | YES*3 | QFN20 |

<Models in the yellow grid will be launched soon.>
*1 Support M-LINK ICE; *2 Advanced UART x2: Support SPI Master/Slave (UART 0/1 modules);
*3 Share with all Flash zone; *4 CCP: Input Capture/Output Compare/PWM.

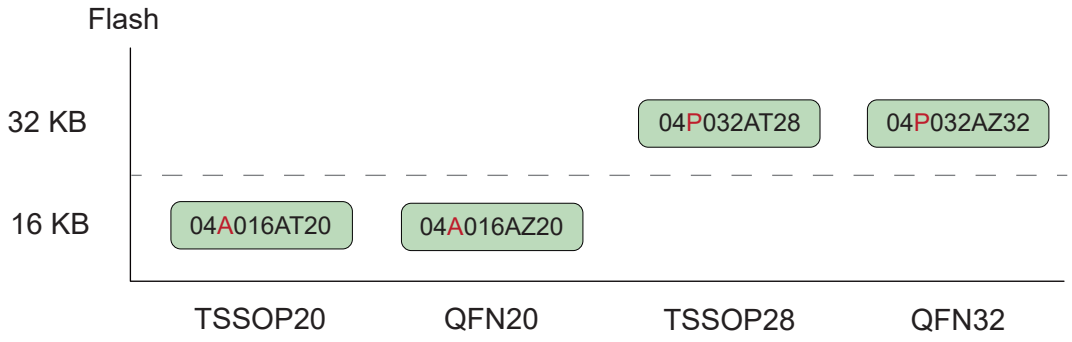
# Arm® Cortex®-M0 LCD Line




| Part No. | Vdd | Flash ROM | Data RAM | Max. Freq. | Timer | IO | 12-Bit ADC | Comp. | Features | CCP*3 | ISP/IAP | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MG32F02N128*1 | 1.8V~ 5.5V | 128KB | 16KB | 48MHz | 5+RTC | 29/44 59/73 | 16-CH | 2 | UARTx7,I²Cx2,SPIx4,LIN,LCD, CAN,OPA,DMA,CRC32 | 8-CH | YES*2 | QFN32 LQFP48 LQFP64 LQFP80 |
| MG32F02H128*1 | 1.8V~ 5.5V | 128KB | 16KB | 48MHz | 7+RTC | 73 | 16-CH | 2 | UARTx7,I²Cx2,SPIx4,LIN,LCD, OPA,DMA,CRC32,△-Σ ADC | 8-CH | YES*2 | LQFP80 |
| MG32F02N129*1 | 1.8V~ 5.5V | 128KB | 16KB | 72MHz | 5+RTC | 44/59 | 16-CH | 2 | UARTx3,I²Cx2, SPI, LIN, CANx2, DMA,CRC32 | 8-CH | YES*2 | LQFP48 LQFP64 |

<Models in the yellow grid will be launched soon.>
MG32F02N129: Support operation temperature: -40~125°C
*1 Support M-LINK ICE;
*2 Share with all Flash zone;
*3 CCP: Input Capture/Output Compare/PWM.

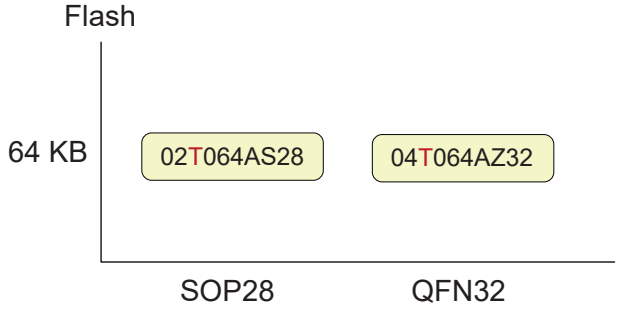
# Arm® Cortex®-M0 Cost-Efficient Line




| Part No. | Vdd | Flash ROM | Data RAM | Max Freq. | Timer | IO | 12-Bit ADC | Comp. | Features | CCP*2 | ISP/IAP | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **MG32F04A016*1** | 2V~5.5V | 16KB | 2KB | 48MHz | 3 | 18 | 8-CH | NA | UARTx2,SPI,I²C, CRC32,UID | 5-CH | NA | QFN20 TSSOP20 |
| **MG32F04P032*1** | 2.5V~5.5V | 32KB | 4KB | 60MHz | 5 | 26 | 10-CH | 2 | OPAx2,USART, DMA,UID,HW Divider | 5-CH | YES | TSSOP28 QFN32 |

*1 Support M-LINK ICE;
*2 CCP: Input Capture/Output Compare/PWM.

# Arm® Cortex®-M0 Touch Line




| Part No. | Vdd | Flash ROM | Data RAM | Max Freq. | Timer | IO | 12-Bit ADC | Comp. | Features | CCP*4 | ISP/IAP | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **MG32F02T064*1** | 1.8V~ 5.5V | 64KB | 10KB | 72MHz | 6+RTC | 26/30 | 8-CH | 1 | UART*2x2, SPI, I²C CRC, DMA,Touch Key x16 | 6-CH | YES*3 | SOP28 QFN32 |

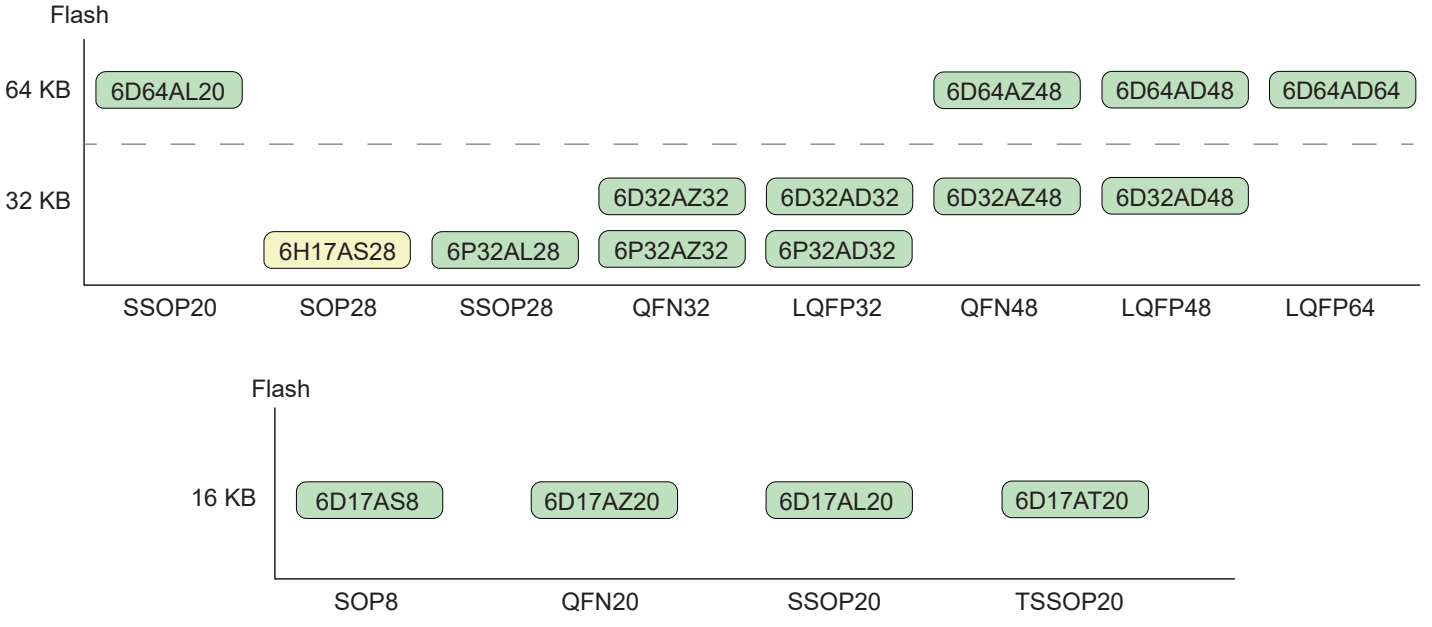
<Models in the yellow grid will be launched soon.>
*1 Support M-LINK ICE;
*2 Advanced UART: Support SPI Master/Slave;
*3 Share with all Flash zone;
*4 CCP: Input Capture/Output Compare/PWM

# Automotive-Grade MCU: MGEQ1C064

| Part No. | Operating Voltage | Flash ROM / Data RAM | Max. Operation Freq. | Timer (16-Bit) / IO | 12-Bit ADC / ACMP | Features | PCA / PWM | WDT | ISP / IAP | Package |
|---|---|---|---|---|---|---|---|---|---|---|
| MGEQ1C064*1 | 2.4V~5.5V | 64KB / 4KB | 36MHz | 5 + RTC / 44 | 16-CH / 3 | UART*2x2,SPI,I²Cx2 S/W I²C,LIN,CRC16 | 1 / 8-CH | YES*2 | 7.5KB Max. / 63.5KB Max.*3 | LQFP48 |

Passed the certification of AEC-Q100 Grade 2 (Support operation temperature: -40~105°C)
Support Code Protection
*1 Support SPI Master Mode;
*2 Support Watch Mode;
*3 Support S/W setting.

# 1T 8051 Wide Voltage Base Line



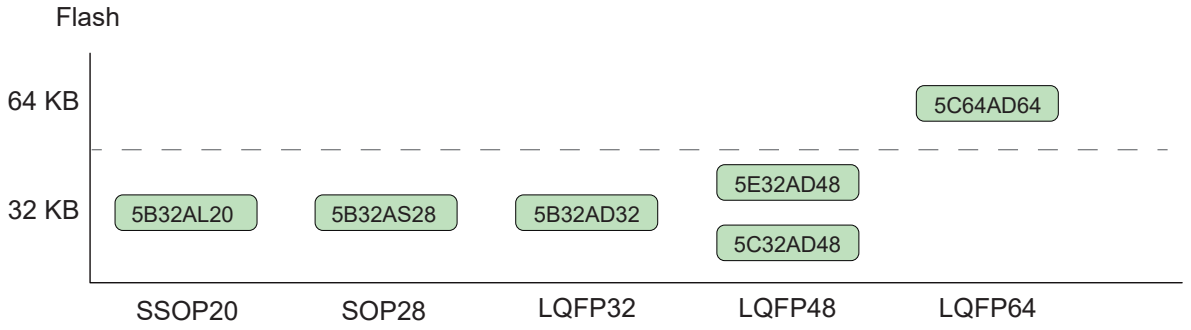


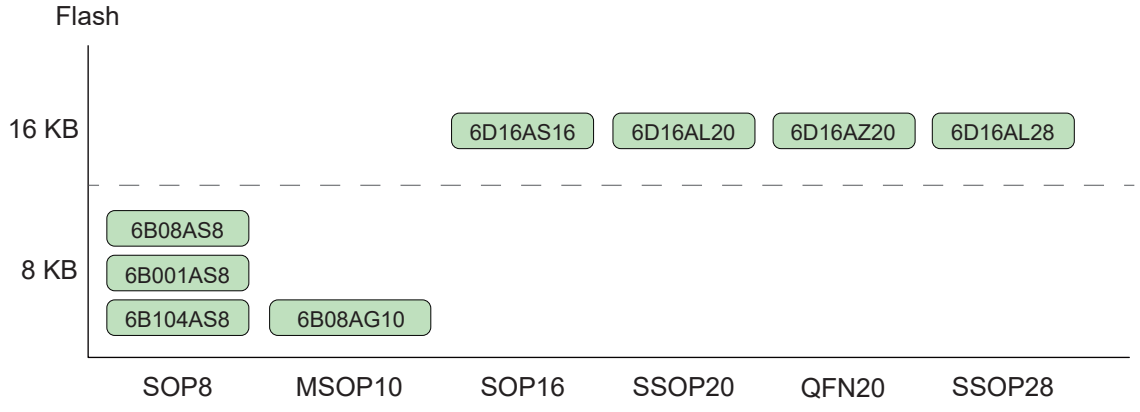


| Part No. | Operating Voltage | Flash ROM / Data RAM | Max. Operation Freq. | Timer (16-Bit) / IO | 12-Bit ADC / ACMP | Features | PCA / PWM | WDT | ISP / IAP | Package |
|---|---|---|---|---|---|---|---|---|---|---|
| MG82F6D17*1 | 1.8V~5.5V | 16KB / 1KB | 36MHz*5 | 4 + RTC / 5/17 | 8-CH / NA | UART*2 x2, SPI, I²C S/W I²C, LIN,CRC16 | 1 / 8-CH | YES*3 | 7.5KB Max. / 15.5KB Max.*4 | SOP8 QFN20 SSOP20 TSSOP20 |
| MG82F6H17*1 | 1.8V~5.5V | 16KB / KB | 36MHz*5 | 4 + RTC / 17 | 8-CH / NA | UART*2 x2, SPI, I²C S/W I²C, LIN,CRC16 △-Σ ADC | 1 / 8-CH | YES*3 | 7.5KB Max. / 15.5KB Max.*4 | SOP28 |
| MG82F6P32*1 | 1.8V~5.5V | 32KB / 2KB | 32MHz*5 | 6 + RTC / 25/29 | 8-CH / 2 | OPAx2, PGA, PD en/decoder,DMA UART*2 x2, SPI, I²Cx2 S/W I²C, CRC16/32 | 2 / 8-CH | YES*3 | 7.5KB Max. / 31.5KB Max.*4 | SSOP28 QFN32 LQFP32 |
| MG82F6D32*1 | 1.8V~5.5V | 32KB / 2KB | 36MHz*5 | 4 + RTC / 29/44 | 10-CH / 3 | UART*2 x2, SPI, I²Cx2 S/W I²C, LIN,CRC16 | 1 / 8-CH | YES*3 | 7.5KB Max. / 31.5KB Max.*4 | QFN32 LQFP32 QFN48 LQFP48 |
| MG82F6D64*1 | 1.8V~5.5V | 64KB / 4KB | 36MHz*5 | 5 + RTC / 44/59 | 16-CH / 3 | UART*2 x4, SPI, I²Cx2 S/W I²C, LIN,CRC16 | 1 / 8-CH | YES*3 | 7.5KB Max / 63.5KB Max.*4 | SSOP20 QFN48 LQFP48 LQFP64 |

<Models in the yellow grid will be launched soon.>
Support Code Protection
*1 Support M-LINK ICE, except SOP8;
*2 Support SPI Master Mode;
*3 Support Watch Mode;
*4 Support S/W setting;
*5 12MHz and 11.059MHz as internal RC oscillator, used 12MHz as default. Frequency deviation: at 25℃, under ±1% ; at -40℃~105℃, under ±2%.

# 1T 8051 Wide Voltage Base Line

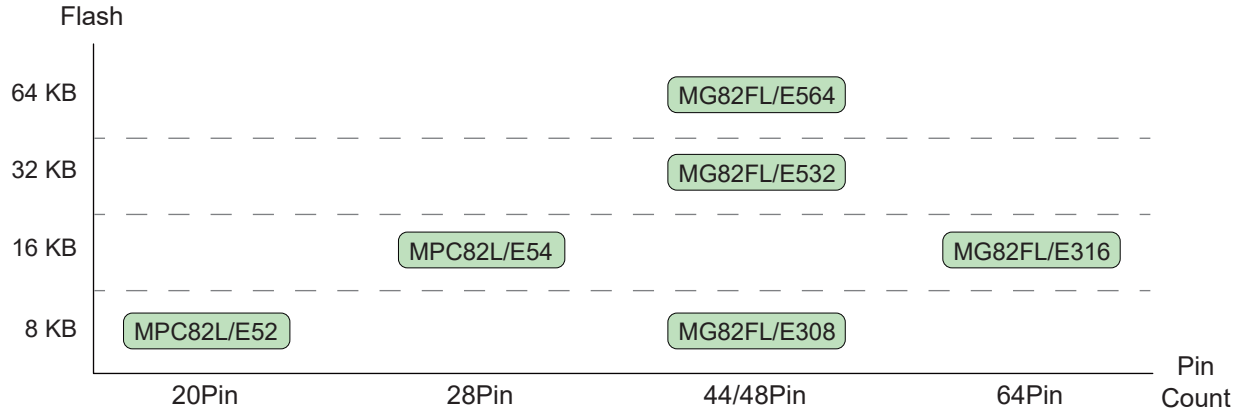



| Part No. | Operating Voltage | Flash ROM / Data RAM | Max Operation Freq. | Timer (16-Bit) / IO | 10-Bit ADC / ACMP | Features | PCA / PWM | WDT | ISP / IAP | Package |
|---|---|---|---|---|---|---|---|---|---|---|
| MG82F6B08[*1] MG82F6B001[*1] MG82F6B104[*1] | 2.4V~5.5V | 8KB / 1KB | 16/22.12 MHz[*6] | 3 + RTC / 6/8 | 6-CH / 1 | UART[*2],SPI,LIN S/W I²C,I²C,CRC16 | 1 / 4-CH | YES[*3] | 3.5KB Max. / EEPROM 512B IAP Default NA | SOP8 MSOP10 |
| MG82F6D16[*1] | 1.8V~5.5V | 16KB / 1KB | 32MHz[*5] | 3 + RTC / 13/17/25 | 8-CH / 1 | UART[*2],SPI,LIN I²C,S/W I²C,CRC16 | 1 / 6-CH | YES[*3] | 7.5KB Max. / 15.5KB Max.[*4] | SOP16 SSOP20 QFN20 SSOP28 |
| MG82F5B32[*1] | 1.8V~5.5V | 32KB / 2KB | 32MHz[*5] | 3 + RTC / 25/29 | 8-CH[*7] / NA | UART[*2]x2,SPI ISO-7816,LIN,I²C | 1 / 8-CH | YES[*3] | 4KB Max. / 31.5KB Max.[*4] | SSOP20 SOP28 LQFP32 |
| MG82FG5C32[*1] | 1.8V~5.5V | 32KB / 2KB | 32MHz | 5 + RTC / 44 | 16-CH / 3 | UART[*2]x4,SPI/QPI I²Cx2,LIN,ISO-7816x3 | 2 / 12-CH | YES[*3] | 7.5KB Max. / 31.5KB Max.[*4] | LQFP48 |
| MG82FG5C64[*1] | 1.8V~5.5V | 64KB / 4KB | 32MHz[*5] | 5 + RTC / 59 | 16-CH / 3 | UART[*2]x4,SPI/QPI I²Cx2,LIN,ISO-7816x3 | 2 / 12-CH | YES[*3] | 7.5KB Max. / 63.5KB Max.[*4] | LQFP64 |
| MG82G5E32[*1] | 1.8V~5.5V | 32KB / 2KB | 32MHz[*5] | 4 + RTC / 44 | 8-CH / 2 | UART[*2]x2,SPI,I²C S/W I²C,CRC16 | 1 / 8-CH | YES[*3] | 7.5KB Max. / 31.5KB Max.[*4] | LQFP48 |

Support Code Protection;[*1] Support M-LINK ICE, except SOP8;[*2] Support SPI Master Mode;
[*3] Support Watch Mode;[*4] Support S/W setting;
[*5] 12MHz and 11.059MHz as internal RC oscillator, used 12MHz as default. Frequency deviation: at 25℃, under ±1% ; at -40℃~85℃, under ±2%;
[*6] 16MHz and 22.12MHz as internal RC oscillator. Frequency deviation: at 25℃, under ±2% ; at -40℃~85℃, under ±3.8%;
[*7] Factory default 10 Bit,200Ksps; Program adjustment 12 Bit,400Ksps.

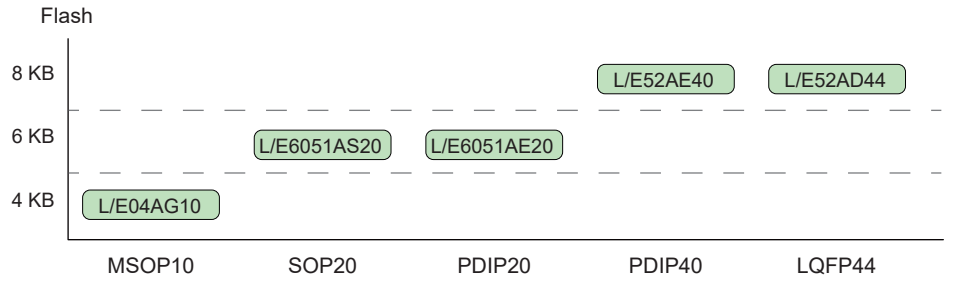
# 1T 8051 Single Voltage MCU




| Part No. | Operating Voltage | Flash ROM / Data RAM | Max Operation Freq. | Timer (16-Bit) / IO | ADC / ACMP | Comm. | PCA / PWM | WDT | Code Protection | ISP / IAP | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MPC82L/E52 | L:2.4V~3.6V<br>E:4.5V~5.5V | 8KB<br>256B | 25MHz | 2<br>15 | 8-Bit,8-CH<br>NA | UART,SPI | 1<br>2-CH | YES | YES | 3KB Max.<br>7.5KB Max. | PDIP20<br>SOP20<br>TSSOP20 |
| MPC82L/E54 | L:2.4V~3.6V<br>E:4.5V~5.5V | 15.5KB<br>512B | 25MHz | 2<br>23 | 10-Bit,8-CH<br>NA | UART,SPI | 1<br>4-CH | YES | YES | 3.5KB Max.<br>15KB Max. | PDIP28<br>SOP28<br>SSOP28 |
| MG82FL/E532[*1] | L:2.4V~3.6V<br>E:4.5V~5.5V | 32KB<br>1280B | 24MHz[*2] | 3<br>45 | 10-Bit,8-CH<br>NA | UARTx2,SPI | 1<br>6-CH | YES[*4] | YES | 4KB Max.<br>32KB Max.[*5] | LQFP44<br>LQFP48 |
| MG82FL/E564[*1] | L:2.4V~3.6V<br>E:4.5V~5.5V | 64KB<br>1280B | 24MHz[*2] | 3<br>45 | 10-Bit,8-CH<br>NA | UARTx2,SPI | 1<br>6-CH | YES[*4] | YES | 4KB Max.<br>63.5KB Max.[*5] | LQFP44<br>LQFP48 |
| MG82FL/E308 | L:2.4V~3.6V<br>E:4.5V~5.5V | 8KB<br>512B | 24MHz[*3] | 3<br>45 | NA<br>1 | UART | NA<br>1-CH | YES | YES | 4KB Max.<br>8KB Max.[*5] | LQFP48 |
| MG82FL/E316 | L:2.4V~3.6V<br>E:4.5V~5.5V | 16KB<br>512B | 24MHz[*3] | 3<br>57 | NA<br>1 | UART | NA<br>1-CH | YES | YES | 4KB Max.<br>15.5KB Max.[*5] | LQFP64 |

[*1] Support M-LINK ICE;
[*2] Used internal RC oscillator 22.118MHz as default. Frequency deviation: at 25°C,under ±1%; at-20°C ~50°C,under ±2% ; at-40°C ~85°C, under ±4%;
[*3] Internal RC oscillator 12MHz as default. Frequency deviation: at 25°C,under ±1%; at-20°C ~50°C,under ±2% ; at-40°C ~85°C, under ±4%;
[*4] Support Watch Mode;
[*5] Support S/W setting.

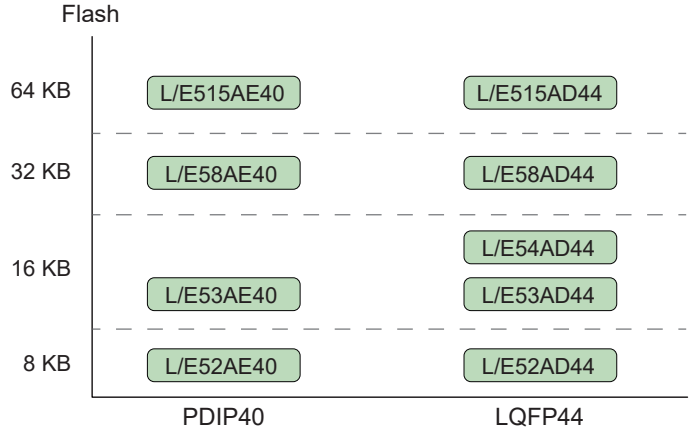
# 12T/6T 8051 Single Voltage with internal RC oscillator MCU




| Part No. | Operating Voltage | Flash ROM / Data RAM | Max. Operation Freq. | Timer (16-Bit) / IO | ACMP | Comm. | PCA / PWM | WDT | ISP / IAP | Package |
|---|---|---|---|---|---|---|---|---|---|---|
| MG87FL/E52* | L:2.4V~3.6V<br>E:4.5V~5.5V | 8KB<br>256B | 48MHz @ 12T<br>24MHz @ 6T | 3<br>32/36 | NA | UART | NA<br>NA | YES | 3.5KB Max.<br>S/W setting | PDIP40<br>LQFP44 |
| MG87FL/E6051* | L:2.4V~3.6V<br>E:4.5V~5.5V | 6KB<br>256B | 48MHz @ 12T<br>24MHz @ 6T | 2<br>17 | 1 | UART | NA<br>1-CH | YES | 3.5KB Max.<br>S/W setting | PDIP20<br>SOP20 |
| MG87FL/E04 | L:2.4V~3.6V<br>E:4.5V~5.5V | 4KB<br>256B | 22.118MHz/Int RC | 2<br>7 | 1 | UART | NA<br>1-CH | YES | 1.5KB<br>S/W setting | MSOP10 |

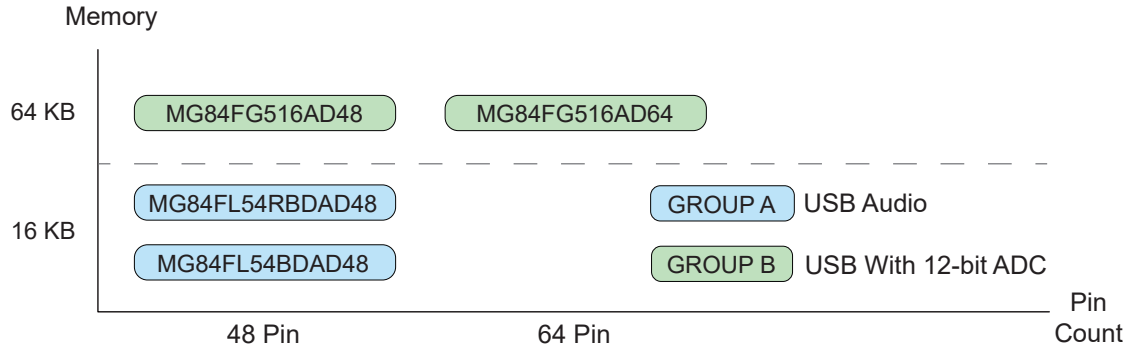
Support Code Protection
* Built-in internal RC oscillator with ±1% frequency deviation at 25°C. And there are 6 kinds of frequency selectable: 6M/11.059M/12M/22.118M/24M/24.576MHz.

# 12T/6T 8051 Single Voltage without internal RC oscillator MCU




| Part No. | Operating Voltage | Flash ROM / Data RAM | Max. Operation Freq. | Timer (16-Bit) / IO | ACMP | Comm. | PCA / PWM | WDT | Code Protection | ISP / IAP | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MPC89L/E52 | L:2.4V~3.6V<br>E:4.5V~5.5V | 8KB<br>512B | 48MHz @ 12T<br>24MHz @ 6T | 3<br>32/36 | NA | UART | NA<br>NA | YES | YES | 4KB Max.<br>6KB Max. | PDIP40<br>LQFP44 |
| MPC89L/E53 | L:2.4V~3.6V<br>E:4.5V~5.5V | 15KB<br>512B | 48MHz @ 12T<br>24MHz @ 6T | 3<br>32/36 | NA | UART | NA<br>NA | YES | YES | 4KB Max.<br>NA | PDIP40<br>LQFP44 |
| MPC89L/E54 | L:2.4V~3.6V<br>E:4.5V~5.5V | 16KB<br>1280B | 48MHz @ 12T<br>24MHz @ 6T | 3<br>32/36 | NA | UART | NA<br>NA | YES | YES | 4KB Max.<br>46KB Max. | LQFP44 |
| MPC89L/E58 | L:2.4V~3.6V<br>E:4.5V~5.5V | 32KB<br>1280B | 48MHz @ 12T<br>24MHz @ 6T | 3<br>32/36 | NA | UART | NA<br>NA | YES | YES | 4KB Max.<br>30KB Max. | PDIP40<br>LQFP44 |
| MPC89L/E515 | L:2.4V~3.6V<br>E:4.5V~5.5V | 63KB<br>1280B | 48MHz @ 12T<br>24MHz @ 6T | 3<br>32/36 | NA | UART | NA<br>NA | YES | YES | 4KB Max.<br>NA | PDIP40<br>LQFP44 |

# 8051 USB MCU




# MG84 (USB FS )

| Part No. | Operating Voltage | Flash ROM / Data RAM | Max. Operation Freq. | Timer (16-Bit) / IO | ADC / ACMP | Comm. | PCA / PWM | WDT | End Points | ISP / IAP | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MG84FL54BD | 2.7V~3.6V | 16KB / 832B | 24MHz | 3 / 36 | NA / NA | USB, UART, TWI(I²C), SPI | NA / NA | NA | 4 | 4KB Max. / 15KB Max. | LQFP48 |
| MG84FL54RBD | 2.7V~3.6V | 16KB / 256B | 24MHz | 3 / 31 | NA / NA | USB, UART, TWI(I²C), SPI | NA / NA | NA | 6 | 4KB Max. / 15KB Max. | LQFP48 |
| MG84FG516*1 | 2.0V~5.5V | 64KB / 4352B | 32MHz*2 | 4 / 41/55 | 12-Bit, 8-CH / NA | USB, UARTx2, TWI(I²C), SPI | 1 / 6-CH | YES*4 | 11 | 4KB Max. / 63.5KB Max.*5 | LQFP48 / LQFP64 |

*1 Support M-LINK ICE;
*2 Used internal RC oscillator 12MHz as default. Frequency deviation: at 25℃, under ±1% ; at -40℃~85℃, under ±1.5% ; at USB activated, under ±0.25%;
*3 Support SPI Master Mode;
*4 Support Watch Mode;
*5 Support S/W setting.

# Peripheral IC (USB Bridge)

| Part No. | Operating Voltage | USB Speed | Function | Features | Driver | Package |
|---|---|---|---|---|---|---|
| MA111 | 2.4V~5.5V | Full Speed*1 | USB HID to Serial Bridge | UART, SPI Master, TWI(I²C) Master, GPIO | FREE | SOP16, QFN16 |
| MA112 | 3.0V~5.5V | Full Speed*1 | USB to UART Data Bridge<br>MS Windows Driver Supported | Virtual COM<br>(TXD/RXD) | OS | SOP16, QFN16 |
| MA113 | 3.0V~5.5V | Full Speed*1 | USB Data Bridge for UART,<br>RS-232 Modem signal, RS-485<br>MS Windows Standard Driver supported | Virtual COM(TXD/RXD),<br>RS-232 Modem Signals<br>RS-485 Transceiver Control | OS | SOP16, QFN16 |

*1 Built in internal RC oscillator 12MHz as default. Frequency deviation: at 25℃, under ±1% ; at -40℃~85℃, under ±1.5%, USB online mode ±0.25%.

# Peripheral IC (Delta-Sigma ADC)

| Part No. | Operating Voltage | Power(mA) | ENOB (Bits) | ADC Channel (diff) | AD Rate (Hz) | PGA | Features | Package |
|---|---|---|---|---|---|---|---|---|
| MAD2402 | 2.5V~5.5V | 0.7 | 19.8 | 1 | 1280 | 128 | SIF (Serial Interface) | SOP8, DIP8 |
| MAD2418 | 5V | 7 | 23 | 4 | 30K | 64 | SPI | SSOP28W |
| MAD2408 | 2.5V~5.3V | 1 | 22 | 4 | 2K | 128 | SIF (Serial Interface) | SOP16 |

<Models in the yellow grid will be launched soon.>

# Peripheral IC (LIN /CAN Transceiver)

| Part No. | Data Transmission Standard | Operating Voltage | Data Rate (bps) | LDO | Operating Temperature (°C) | Package |
|---|---|---|---|---|---|---|
| MLT1021 | LIN2.x | 9V~27V | 20K | NA | -40 ~ 105 | SOP8 |
| MCT1042T-3 | CAN2.0x/CAN-FD | 3V~5V | 5M | NA | -40 ~ 125 | SOP8 |

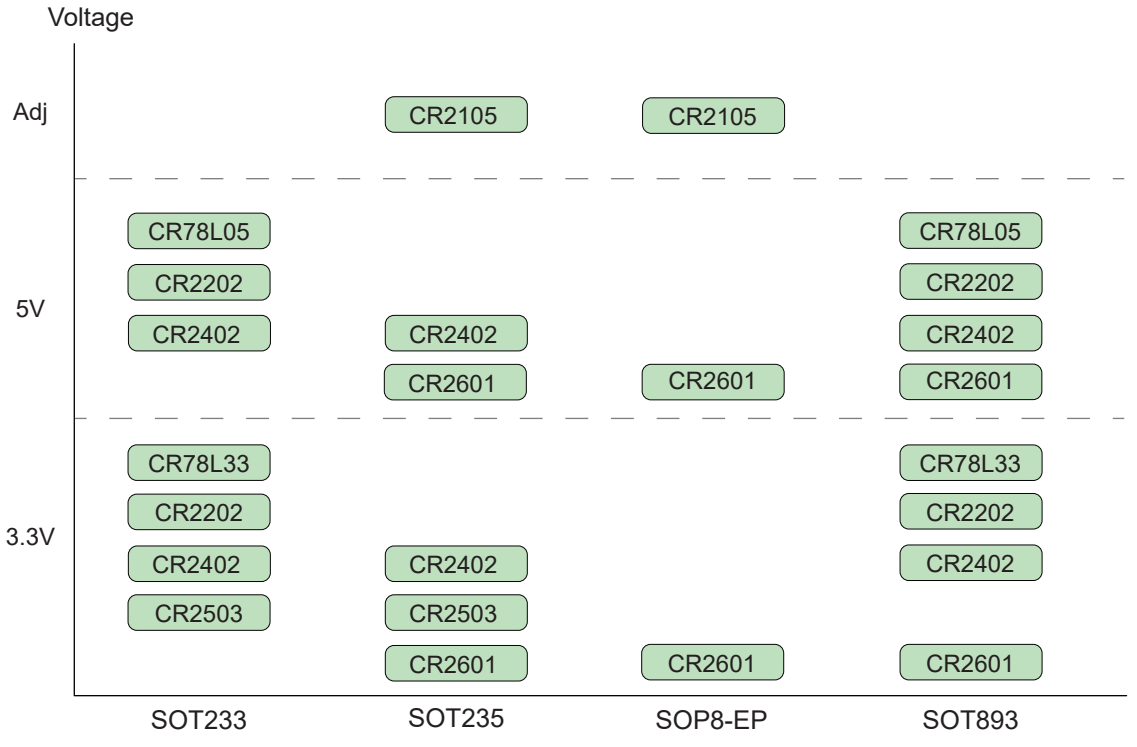
<Models in the yellow grid will be launched soon.>

# Power IC (BMS)

| Part No. | Type | Number of series cells | Battery chemistry | Operating Voltage | Features | Package |
|---|---|---|---|---|---|---|
| MSE03GM1 | Gauge | 3 | NCA | 8.1V ~ 12.75V | UART, I²C | LQFP48 |
| MSE01PC1 | Battery Passport | 1 | NCM, NCA, LTO, $LiFePO_4$ | 1.9V ~ 5V | NFC, UART | QFN20 |
| MSE06GC1 | Gauge | 6 | NCA, $LiFePO_4$ | 6V ~ 30V | I²C | QFN32 |

<Models in the yellow grid will be launched soon.>

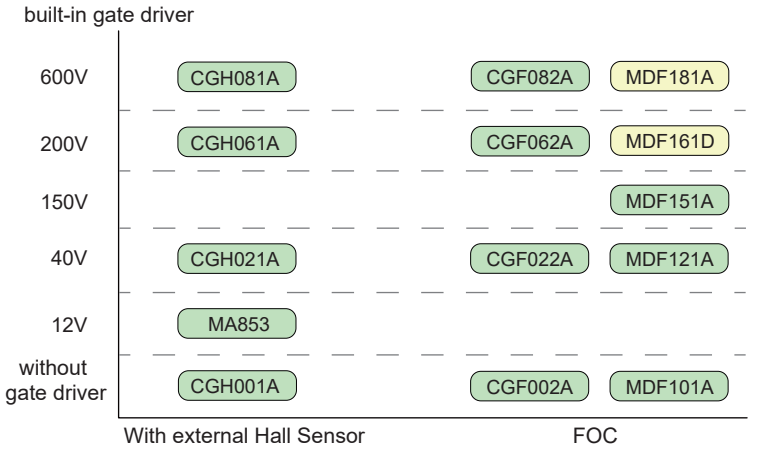
# Power IC (LDO)




| Part No. | Min. $V_{IN}$(V) | Max. $V_{IN}$(V) | $I_{OUT}$ (mA) | $V_{OUT}$ (V) | $I_Q$ (uA) | $\triangle V_{LINE}$ (%) | $\triangle V_{LOAD}$ (%) | PSRR @1KHz(dB) | $C_{OUT}$ (uF) | EN | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CR78L33 CR78L05 | 7 | 30 | 100 | 3.3/5 | 300 | 0.3 | 0.3 | 84 | 0.1 | NA | SOT233 SOT893 |
| CR2105 | 7 | 100 | 50 | Adj*1 | 23 | 0.18 | 1.25 | 65 | 10 | Yes | SOT235 SOP8-EP |
| CR2202 | 2.7 | 24 | 150 | 3.3/5 | 1.5 | 0.06 | 0.15 | 80 | 1 | NA | SOT233 SOT893 |
| CR2402 | 2.7 | 40 | 250 | 3.3/5 | 1.5 | 0.06 | 0.6 | 80 | 1 | Yes | SOT233 SOT235 SOT893 |
| CR2503 | 2.5 | 6 | 300 | 3.3 | 0.5 | 0.6 | 1 | 60 | 1 | Yes | SOT233 SOT235 |
| CR2601 | 2.7 | 60 | 150 | 3.3/5 | 2.8 | 0.01 | 1.5 | 60 | 1 | Yes | SOT235 SOT893 SOP8-EP |

*1 Adj: means the voltage can be adjusted.

# BLDC




## 8051 core BLDC

| Part No. | Mode | Gate Driver | | $V_{IN}$ | LDO | VDD | Max Freq. | ADC 10-Bit | Capture 16-Bit | OPA*1 | Operation Temp. | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Voltage | Type | | | | | | | | | |
| CGH001A | Hall | NA | | 5V | NA | 4.5~5.5V | 48MHz | 8 CH | 1 CH | 1 set | -40℃~105℃ | SSOP28 QFN32 |
| CGH021A | Hall | 40V | P+N | 40V | 5V/30mA | 4.5~5.5V | 48MHz | 8 CH | 1 CH | 1 set | -40℃~105℃ | SSOP28W QFN40 |
| CGH061A | Hall | 200V | N+N | 15V | 5V/30mA | 4.5~5.5V | 48MHz | 8 CH | 1 CH | 1 set | -40℃~105℃ | LQFP48 |
| CGH081A | Hall | 600V | N+N | 15V | 5V/30mA | 4.5~5.5V | 48MHz | 8 CH | 1 CH | 1 set | -40℃~105℃ | LQFP48 |
| CGF002A | FOC | NA | | 5V | NA | 4.5~5.5V | 48MHz | 8 CH | 1 CH | 1 set | -40℃~105℃ | LQFP48 |
| CGF022A | FOC | 40V | P+N | 40V | 5V/30mA | 4.5~5.5V | 48MHz | 8 CH | 1 CH | 1 set | -40℃~105℃ | LQFP48 |
| CGF062A | FOC | 200V | N+N | 15V | 5V/30mA | 4.5~5.5V | 48MHz | 8 CH | 1 CH | 1 set | -40℃~105℃ | QFN40 LQFP48 |
| CGF082A | FOC | 600V | N+N | 15V | 5V/30mA | 4.5~5.5V | 48MHz | 8 CH | 1 CH | 1 set | -40℃~105℃ | LQFP48 |

*1 OPA: For peripheral use.

## Arm® Cortex®-M0 BLDC

| Part No. | Mode | Gate Driver | | $V_{IN}$ | LDO | VDD | Max Freq. | ADC 12-Bit | Capture 16-Bit | OPA*1 | Operation Temp. | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Voltage | Type | | | | | | | | | |
| MDF101A | FOC | NA | | 5V | NA | 2.5~5.5V | 60MHz | 10 CH | 5 CH | 2 sets | -40℃~105℃ | TSSOP28 QFN32 |
| MDF121A | FOC | 40V | P+N | 40V | 5V/30mA | 2.5~5.5V | 60MHz | 10 CH | 5 CH | 2 sets | -40℃~105℃ | QFN32 |
| MDF151A | FOC | 150V | N+N | 21V 13V | 12V/300mA 5V/30mA | 2.5~5.5V | 60MHz | 10 CH | 5 CH | 2 sets | -40℃~105℃ | QFN40 |
| MDF161D*2 | FOC | 200V | N+N | 150V 200V | 12V/160mA 5V/30mA | 2.5~5.5V | 60MHz | 10 CH | 5 CH | 2 sets | -40℃~105℃ | QFN32 QFN40 |
| MDF181A | FOC | 600V | N+N | 15V | 5V/30mA | 2.5~5.5V | 60MHz | 10 CH | 5 CH | 2 sets | -40℃~105℃ | LQFP48 |

<Models in the yellow grid will be launched soon.>  *2 MDF161D includes DC-DC converter

## ASIC BLDC

| Part No. | Mode | Gate Driver | | $V_{IN}$ | LDO | VDD | Max Freq. | ADC 12-Bit | Capture 16-Bit | OPA*1 | Operation Temp. | Package |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Voltage | Type | | | | | | | | | |
| MA853 | 180°/150° Sine-wave | 12V | N+N | 9~16V | 5V | 2.0~5.5V | 48MHz | 2 CH | 2 CH | 2 sets | -40℃~105℃ | QFN32 |

# Package Type

| Code | Description | Code | Description | Code | Description |
|---|---|---|---|---|---|
| AB | COB | AC | LQFP64 (10 x 10mm) | AD | LQFP (others) |
| AE | PDIP | AF | PQFP | AG | MSOP |
| AL | SSOP | AM | TQFP | AP | PLCC |
| AS | SOP | AT | TSSOP | AY | QFN (5 x 5mm ↑) |
| HS | SOP (Heat Sink) | AK | TOxxx | AZ | QFN (4 x 4mm ↓) |
| AR | SOT | AI | Ink die | AN | DFN |
| AW | Wafer | WL | SSOPW (209mil Outline Dimensions) | AH | DICE |
| AWP | WLCSP | | | | |

# Ordering Information - M0 (M0+)

MG 32 F 0 2A 128 AD 48

**megawin**

**Device family**
32 = 32 bit MCU

**Application family**
F = Mainstream
L = Low power

**MCU series**
0 = Arm® Cortex®-M0/M0+

**Device series**
A = Base Line
U = USB Line
V/D = Value Line
H/N = LCD Line
P = Cost-Efficient Line
T = Touch Line

**Program memory size**
128 = 128 Kbyte
064 = 64 Kbyte
032 = 32 Kbyte
016 = 16 Kbyte

**Package type**
AS = SOP
AD = LQFP
AL = SSOP
AT = TSSOP
AY = QFN (5 x 5mm ↑)
AZ = QFN (4 x 4mm ↓)

**Pin count**
80 = 80 pins
64 = 64 pins
48 = 48 pins
32 = 32 pins
20 = 20 pins

# Ordering Information - M0+/M3

MG 32 F 1 0 3 C B T 6

**megawin**

**Device family**
32 = 32 bit MCU

**Application family**
F = Mainstream
L = Low Power

**MCU series**
1 = Arm® Cortex®-M3
0 = Arm® Cortex®-M0+

**Pin count**
V = 100 pins
R = 64 pins
C = 48 pins
K = 32 pins
F = 20 pins

**Flash memory size**
C = 256 Kbyte
B = 128 Kbyte
9 = 96 Kbyte
8 = 64 Kbyte

**Package type**
T = LQFP
P = TSSOP
U = QFN

**Temperature**
6 = -40°C to 85°C
7 = -40°C to 105°C

# Ordering Information - Automotive MCU

MG E Q1 C 064 AD 48

**megawin**

**MCU type**
E = 8 bit
T = 32 bit

**Automotive Grade**
Q = AEC-Q series
1 = Product series

**Temperature**
A = -40°C to 150°C
B = -40°C to 125°C
C = -40°C to 105°C

**Flash memory size**

**Package type**
AD = LQFP

**Pin count**
48 = 48 pins

MG Website

LinkedIn

www.megawin.com.tw

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