

High-Reliability Integrated Circuits



Introduction



Microchip has long been a leading supplier of high-reliability space and military discrete semiconductor components and modules. Microchip's Power Management Integrated Circuits group (PMIC) supplies the Class B integrated circuit products and is certified by the Defense Logistics Agency (DLA) (DLA Land and Maritime) and has been placed on the Qualified Manufacturer's List (QML). Class B QML devices are supplied in conformance with the following Military Specifications:

- MIL-M-38510
- Standard Microcircuit Drawings (SMD)

We develop analog mixed-signal integrated circuits primarily for the space, aerospace and defense markets. We are focused on markets and products operating in harsh environments and requiring rigorous testing and long product availability. Our group is built upon developed expertise in sensor interface and driver products

MIL-STD-883, Compliant Devices (/883B)

Level "S" wafer processing, assembly and screening is performed in accordance with MIL-STD-883, Method 5004, Table 1. Level "S" processing is specified and facilitated by individual customer requirements through Source Control Drawings (SCD).

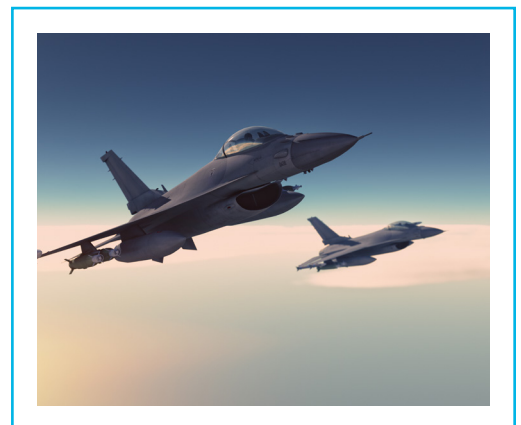
As an option where appropriate, Microchip also offers a broad range of commercial and industrial grade integrated circuits that include DC-DC controllers and voltage regulators, low drop-out linear voltage regulators and integrated circuit controllers.

Certifications for PMIC Process and Products

- MIL-PRF-38535QML

Microchip/MMT Hermetic Packaging Capability

- MMT Founded in 1989, a Microchip company in 2011
- 22,000 sq feet dedicated to hermetic assembly operations
- 8,500 sq. feet of Class 1K
- 14,000 sq. feet of test/scan space
- QML-Q and QML-V Certified
- MIL-PRF-38535, -38534, -19500
- DLA certified Reliability Lab to MIL-STD-883, MIL-STD -750 and MIL-M-38510JAN QCI Group Test
- Turn-key capabilities including:
 - Back grinding, probe test
 - Die attach and wire bonding
 - Hermeticity testing
 - Thermal cycling
 - PIND
 - Burn-in
- Full hermetic product line including:
 - CDIP, CQFP, CERQUAD, Flip-chip BGA
 - TO-3, TO-5, TI-39 up to TO-258
 - Hybrid FlatPack
 - Hi-Rel plastic
 - PDIP, SOIC, TSSOP, PLCC
 - TO-257



Product Selection Guide



Linear Circuits

Interface

SG2000 Driver Array Series, 7 NPN's
50 to 95V, 500 to 600 ma

SG2800 Driver Array Series, 8 NPN's
50 to 95V, 500 to 600 ma

MOSFET Drivers

SG1626 Dual High Speed MOSFET Driver

SG1644 Inverting, Dual High Speed
MOSFET Driver

Operational Amplifier

SG143 Op Amp, 4V to 40V Supply

SG1436 Op Amp, High Voltage

SG1536 Op Amp, Low Offset, High Voltage

Voltage Reference

SG1503 Precision Reference, 2.5V

Supervisory

SG1543 Power Supply Supervisory Circuit

SG1544 Power Supply Supervisory Circuit Low Volt-
age Option

SG1548 Quad Power Fault Monitor

SG1549 Current Sense Latch



Power Supply Circuits

Pulse Width Modulator IC Controllers

| | |
|---------|---|
| SG1524 | Voltage Mode PWM |
| SG1524B | Voltage Mode PWM, $\pm 1\%$ Ref. |
| SG1525A | Voltage Mode PWM, Dual Sink /Source Outputs |
| SG1526B | Voltage Mode PWM, 500 Khz |

Voltage Mode PWM, Inverted

| | |
|--------|---|
| SG1731 | PWM Motor Controller SG1825C Current Mode PWM, 1.5Mhz |
| SG1842 | Current Mode PWM, off-line, 16V UVLO |
| SG1843 | Current Mode PWM, off-line, 8V UVLO |
| SG1844 | Current Mode PWM, off-line, 16V UVLO, Max Duty Cycle 100% |
| SG1845 | Current Mode PWM, off-line, 16V UVLO, Max Duty Cycle 50% |
| SG1846 | Current Mode PWM, dual sink/source outputs, 8–40V |

Linear Voltage Regulators

| | |
|---------|--|
| SG109 | Positive 5.0V Fixed, 1A |
| SG117 | Positive Adjustable, 1.5A |
| SG117A | Positive Adjustable, $\pm 1\%$ Tol., 1.5A |
| SG117HV | Positive Adjustable $\pm 1\%$ Tol |
| SGR117A | Rad Hard Positive, Adjustable, 1.5A |
| SG723 | Precision Regulator/Controller, Adj. |
| SG1532 | Positive or Negative Output Precision Regulator/Controller, Adj. Positive or Negative Output |
| SG78xx | Positive: 5, 6, 8, 12, 15, 18, 20, 24V Fixed |
| SG78xxA | Positive: 5, 6, 8, 12, 15, 18, 20, 24V Fixed |
| SG79xx | Negative 5, 5.2, 8, 12, 15, 18, 20, 24V Fixed |
| SG79xxA | Negative 5, 5.2, 8, 12, 15, 18, 20, 24V Fixed |

Product Listing Sorted by SMD and JAN Number

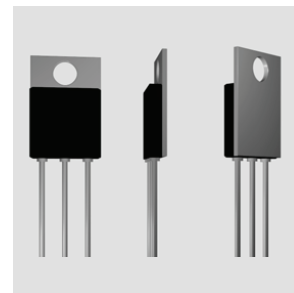
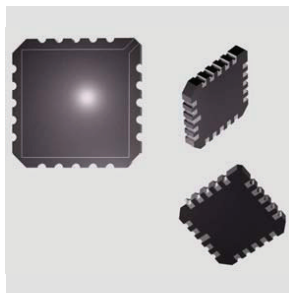
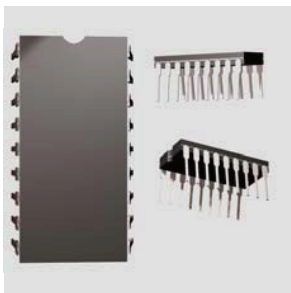
| Microchip Part Number (/883B) | Standard Microcircuit Drawing (SMD) | MIL-M-38510/(JAN) |
|-------------------------------|-------------------------------------|-------------------|
| SG7808AG | 5962-8962801TA | |
| SG7808AIG | 5962-8962801UA | |
| SG7808AT | 5962-8962801XA | |
| SG7808AK | 5962-8962801YA | |
| SG2821L | 5962-89684012A | |
| SG2821J | 5962-8968401VA | |
| SG2823L | 5962-89685012A | |
| SG2823J | 5962-8968501VA | |
| SG2824J | 5962-8968601VA | |
| SG2023J | 5962-8987601EA | |
| SG1548J | 5962-8987801EA | |
| SG7818AIG | 5962-8991501UA | |
| SG7818AT | 5962-8991501XA | |
| SG7818AK | 5962-8991501YA | |
| SG7820AT | 5962-9152301MXA | |
| SG1644L | 5962-9165301M2A | |
| SG1644J | 5962-9165301MCA | |
| SG1644T | 5962-9165301MGA | |
| SG1644Y | 5962-9165301MPA | |
| SG1731J | 5962-9669901MEA | |
| SG117L | 77034012A | |
| SG117G | 7703401TA | |
| SG117IG | 7703401UA | |
| SG117T | 7703401XA | M38510/11703BXA |
| SG117K | 7703401YA | M38510/11704BYA |
| SG137L | 77034032A | |
| SG137T | 7703403XA | |
| SG117AL | 77034052A | |

| Microchip Part Number (/883B) | Standard Microcircuit Drawing (SMD) | MIL-M-38510/ (JAN) |
|-------------------------------|-------------------------------------|--------------------|
| SG117AIG | 7703405UA | |
| SG117AT | 7703405XA | |
| SG117AK | 7703405YA | |
| SG137AL | 77034062A | |
| SG137AT | 7703406XA | |
| SG143Y | 7800303PA | |
| SG143T | 7800303XA | |
| SG1536Y | 7800304PA | |
| SG1536T | 7800304XA | |
| SG1524J | 7802801EA | M38510/12601BEA |
| SG1526BL | 85515012A | |
| SG1526BJ | 8551501VA | M38510/12603BVA |
| SG723J | | M38510/10201BCA |
| SG723F | | M38510/10201BHA |
| SG723T | | M38510/10201BIA |
| SG109T | | M38510/10701BXA |
| SG7815T | | M38510/10704BXA |
| SG7805T | | M38510/10702BXA |
| SG7805K | | M38510/10706BYA |
| SG7812T | | M38510/10703BXA |
| SG7812K | | M38510/10707BYA |
| SG7815K | | M38510/10708BYA |
| SG7905T | | M38510/11501BXA |
| SG7912T | | M38510/11502BXA |
| SG7915T | | M38510/11503BXA |
| SG7905K | | M38510/11505BYA |
| SG7912K | | M38510/11506BYA |
| SG7915K | | M38510/11507BYA |
| SG2003J | | M38510/14103BEA |
| SG2004J | | M38510/14104BEA |
| SG2803J | | M38510/14108BVA |
| SG2804J | | M38510/14109BVA |

Product Listing Sorted by SMD and JAN Number

| Microchip Part Number (/883B) | Standard Microcircuit Drawing (SMD) | MIL-M-38510/ (JAN) |
|-------------------------------|-------------------------------------|--------------------|
| SG2803L | 5962-86058012A | |
| SG2803J | 5962-8605801VA | M38510/14108BVA |
| SG1842L | 5962-86704012A | |
| SG1842J | 5962-8670401CA | |
| SG1842F | 5962-8670401HA | |
| SG1842Y | 5962-8670401PA | |
| SG1843L | 5962-86704022A | |
| SG1843J | 5962-8670402CA | |
| SG1843F | 5962-8670402HA | |
| SG1843Y | 5962-8670402PA | |
| SG1844L | 5962-86704032A | |
| SG1844J | 5962-8670403CA | |
| SG1844F | 5962-8670403HA | |
| SG1844Y | 5962-8670403PA | |
| SG1845L | 5962-86704042A | |
| SG1845J | 5962-8670404CA | |
| SG1845F | 5962-8670404HA | |
| SG1845Y | 5962-8670404PA | |
| SG1846L | 5962-86806012A | |
| SG1846J | 5962-8680601EA | |
| SG1846F | 5962-8680601FA | |
| SG1549Y | 5962-8684901PA | |
| SG1503Y | 5962-8686101PA | |
| SG1503T | 5962-8686101YA | |
| SG1524BJ | 5962-8764501EA | |
| SG1825CL | 5962-87681012A | |
| SG1825CJ | 5962-8768101EA | |
| SG1543L | 5962-87740012A | |
| SG1543J | 5962-8774001EA | |
| SG1544J | 5962-8774002VA | |
| SG1532L | 5962-87770012A | |
| SG1532J | 5962-8777001CA | |
| SG1532T | 5962-8777001IA | |
| SG7812AL | 5962-87776012A | |
| SG7812AG | 5962-8777601TA | |
| SG7812AIG | 5962-8777601UA | |
| SG7812AT | 5962-8777601XA | |
| SG7812AK | 5962-8777601YA | |
| SG7805AL | 5962-87782012A | |
| SG7805AG | 5962-8778201TA | |
| SG7805AIG | 5962-8778201UA | |

| Microchip Part Number (/883B) | Standard Microcircuit Drawing (SMD) | MIL-M-38510/ (JAN) |
|-------------------------------|-------------------------------------|--------------------|
| SG7805AT | 5962-8778201XA | |
| SG7805AK | 5962-8778201YA | |
| SG7815AL | 5962-88553012A | |
| SG7815AG | 5962-8855301TA | |
| SG7815AIG | 5962-8855301UA | |
| SG7815AT | 5962-8855301XA | |
| SG7815AK | 5962-8855301YA | |
| SG7824AT | 5962-8855401XA | |
| SG7824AK | 5962-8855401YA | |
| SG1626J | 5962-8871601CA | |
| SG1626T | 5962-8871601GA | |
| SG1626Y | 5962-8871601PA | |
| SG7905AL | 5962-88746012A | |
| SG7905AG | 5962-8874601TA | |
| SG7905AIG | 5962-8874601UA | |
| SG7905AT | 5962-8874601XA | |
| SG7905AK | 5962-8874601YA | |
| SG7912AL | 5962-88747012A | |
| SG7912AG | 5962-8874701TA | |
| SG7912AIG | 5962-8874701UA | |
| SG7912AT | 5962-8874701XA | |
| SG7912AK | 5962-8874701YA | |
| SG7915AL | 5962-88748012A | |
| SG7915AG | 5962-8874801TA | |
| SG7915AIG | 5962-8874801UA | |
| SG7915AT | 5962-8874801XA | |
| SG7915AK | 5962-8874801YA | |
| SG1525AJ | 5962-8951101EA | M38510/12602BEA |
| SG1525AF | 5962-8951101FA | |
| SG1527AJ | 5962-8951102EA | M38510/12604BVA |
| SG7806AL | 5962-89626012A | |
| SG7806AT | 5962-8962601XA | |
| SG7806AK | 5962-8962601YA | |



Available Package Types

Ceramic Dual-In-Line (DIP)

- Microchip designator "Y": 8-pin
- Microchip designator "J": 14-, 16- and 18-pin

Ceramic Flat Pack (Cerpac)

- Microchip designator "F": 10-, 14-, 16-, 20- and 24-pin

Ceramic Leadless Chip Carrier (LCC)

- Microchip designator "L": 20-pin

Metal Cans

- Low current (500 ma)
 - TO-39, Microchip designator "T": 3-pin
 - TO-99, Microchip designator "T": 8-pin
 - TO-100, Microchip designator "T": 10-pin
- High current (>1.5A)
 - TO-3, Microchip designator "K": 3-pin

Metal Case with mounting tab

- TO-257: 3-pin
- Insulated case, Microchip designator "IG"
- Non-insulated case, Microchip designator "G"

Screening Standards

Customer Generated Source Control Drawings (SCD)

Microchip fully reviews the customer requirements, both the technical and processing, as specified in the SCD and purchase order. A special processing document (SPS) is generated by Microchip to assure that the requirements of the SCD are met.

Microchip Standard Space Level Program

Microchip's Standard Space Level processing is based on the current issue of MIL-PRF-38535 QML level "V" assembled and screened to either Class Level B or Class Level S (Space Level) as defined by MIL-STD-883 Method 5004 with Quality Conformance Inspection performed in accordance with MIL-STD-883 Method 5005.

Microchip Custom Level "S" Flow

The standard Level "S" flow can be modified by adding or deleting screening procedures or process controls to fit the customer's needs. The negotiated processing requirements are documented in an SPS traveler to assure compliance to the purchase order requirements.

Other Offerings

Customer or Government Source Inspection

On-site inspections are available at any in the processing or acceptance testing.

Microchip/MMT Hermetic Packaging Capability



SMART | CONNECTED | SECURE

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