# SGM2247xQ
# Automotive 40V, 500mA, Low Quiescent Current and Low Dropout Voltage Linear Regulator

## GENERAL DESCRIPTION

The SGM2247xQ is a high voltage, low quiescent current and low dropout voltage linear regulator. It is capable of supplying 500mA output current with typical dropout voltage of 750mV. The operating input voltage range is from 3V to 40V and output voltage range is from 1.8V to 12V.

Other features include current limit and thermal shutdown protection.

This device is AEC-Q100 qualified (Automotive Electronics Council (AEC) standard Q100 Grade 1) and it is suitable for automotive applications.

The SGM2247xQ is available in Green SOT-223-3 and TO-252-2A packages. It operates over an operating temperature range of -40℃ to +125℃.

## FEATURES

- **AEC-Q100 Qualified for Automotive Applications**
  **Device Temperature Grade 1**
  **$T_A$ = -40℃ to +125℃**
- **Operating Input Voltage Range: 3V to 40V**
- **Fixed Output from 1.8V to 12V**
- **500mA Output Current**
- **Output Voltage Accuracy: ±1% at +25℃**
- **Low Quiescent Current: 3.8μA (TYP)**
- **Low Dropout Voltage:**
  **750mV (TYP) at 500mA, $V_{OUT(NOM)}$ ≥ 3.3V**
- **Current Limiting and Thermal Protection**
- **Stable with Small Case Size Ceramic Capacitors**
- **-40℃ to +125℃ Operating Temperature Range**
- **Available in Green SOT-223-3 and TO-252-2A Packages**

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联系电话 138 2526 5270

## APPLICATIONS

Automotive
Battery-Powered Equipment
Ultra-Low Power System
Medical Equipment
Industrial Equipment

## TYPICAL APPLICATION

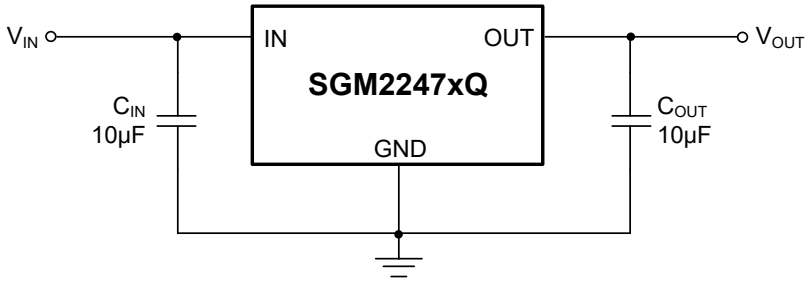



**Figure 1. Typical Application Circuit**

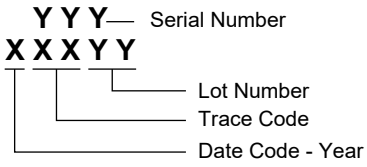
# PACKAGE/ORDERING INFORMATION

| MODEL | PACKAGE DESCRIPTION | SPECIFIED TEMPERATURE RANGE | ORDERING NUMBER | PACKAGE MARKING | PACKING OPTION |
|---|---|---|---|---|---|
| SGM2247-1.8Q | SOT-223-3 | -40℃ to +125℃ ($T_A$) | SGM2247-1.8QKC3G/TR | 1UQ<br>XXXYY | Tape and Reel, 2500 |
| SGM2247-2.5Q | SOT-223-3 | -40℃ to +125℃ ($T_A$) | SGM2247-2.5QKC3G/TR | 1UR<br>XXXYY | Tape and Reel, 2500 |
| SGM2247-3.3Q | SOT-223-3 | -40℃ to +125℃ ($T_A$) | SGM2247-3.3QKC3G/TR | 1US<br>XXXYY | Tape and Reel, 2500 |
| SGM2247-5.0Q | SOT-223-3 | -40℃ to +125℃ ($T_A$) | SGM2247-5.0QKC3G/TR | 1UT<br>XXXYY | Tape and Reel, 2500 |
| SGM2247-12Q | SOT-223-3 | -40℃ to +125℃ ($T_A$) | SGM2247-12QKC3G/TR | 1UU<br>XXXYY | Tape and Reel, 2500 |
| SGM2247-1.8Q | TO-252-2A | -40℃ to +125℃ ($T_A$) | SGM2247-1.8QOC2G/TR | 1UVOC2<br>XXXXX | Tape and Reel, 2500 |
| SGM2247-2.5Q | TO-252-2A | -40℃ to +125℃ ($T_A$) | SGM2247-2.5QOC2G/TR | 1UWOC2<br>XXXXX | Tape and Reel, 2500 |
| SGM2247-3.3Q | TO-252-2A | -40℃ to +125℃ ($T_A$) | SGM2247-3.3QOC2G/TR | 1UXOC2<br>XXXXX | Tape and Reel, 2500 |
| SGM2247-5.0Q | TO-252-2A | -40℃ to +125℃ ($T_A$) | SGM2247-5.0QOC2G/TR | 1NZOC2<br>XXXXX | Tape and Reel, 2500 |
| SGM2247-12Q | TO-252-2A | -40℃ to +125℃ ($T_A$) | SGM2247-12QOC2G/TR | 1UYOC2<br>XXXXX | Tape and Reel, 2500 |

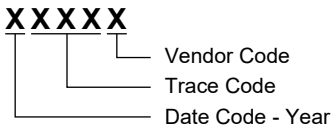
## MARKING INFORMATION

NOTE: XXXYY = Date Code, Trace Code and Lot Number. XXXXX = Date Code, Trace Code and Vendor Code.

**SOT-223-3**




**TO-252-2A**




Green (RoHS & HSF): SG Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your SGMICRO representative directly.

## ABSOLUTE MAXIMUM RATINGS

IN to GND ..... -0.3V to 42V
OUT to GND ..... -0.3V to MIN(42V, $V_{IN}$ + 0.3V)
Package Thermal Resistance
SOT-223-3, $\theta_{JA}$ ..... 55.4℃/W
SOT-223-3, $\theta_{JB}$ ..... 8.4℃/W
SOT-223-3, $\theta_{JC(TOP)}$ ..... 29.6℃/W
SOT-223-3, $\theta_{JC(BOT)}$ ..... 10.9℃/W
TO-252-2A, $\theta_{JA}$ ..... 25.8℃/W
TO-252-2A, $\theta_{JB}$ ..... 6.6℃/W
TO-252-2A, $\theta_{JC(TOP)}$ ..... 35.7℃/W
TO-252-2A, $\theta_{JC(BOT)}$ ..... 2.4℃/W
Junction Temperature ..... +150℃
Storage Temperature Range ..... -65℃ to +150℃
Lead Temperature (Soldering, 10s) ..... +260℃
ESD Susceptibility (1) (2)
HBM ..... ±4000V
CDM ..... ±1000V

NOTES:

1. For human body model (HBM), all pins comply with AEC-Q100-002 specification.

2. For charged device model (CDM), all pins comply with AEC-Q100-011 specification.

## RECOMMENDED OPERATING CONDITIONS

Supply Voltage Range, $V_{IN}$ ..... 3V to 40V
Input Effective Capacitance, $C_{IN}$ ..... 1μF (MIN)
Output Effective Capacitance, $C_{OUT}$ ..... 1μF to 100μF
Operating Ambient Temperature Range ..... -40℃ to +125℃
Operating Junction Temperature Range ..... -40℃ to +150℃

## OVERSTRESS CAUTION

Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions section is not implied.

## ESD SENSITIVITY CAUTION

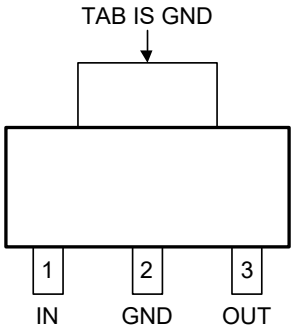
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because even small parametric changes could cause the device not to meet the published specifications.

## DISCLAIMER

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

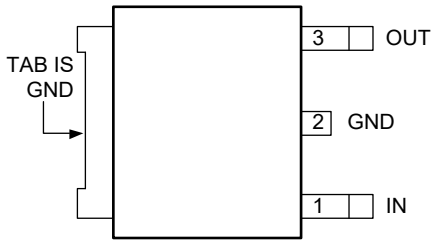
## PIN CONFIGURATIONS

**SGM2247xQ (TOP VIEW)**




**SOT-223-3**

**SGM2247xQ (TOP VIEW)**




**TO-252-2A**

## PIN DESCRIPTION

| PIN | NAME | FUNCTION |
|---|---|---|
| 1 | IN | Input Supply Voltage Pin. It is recommended to use a 2.2μF or larger ceramic capacitor from IN pin to ground to get good power supply decoupling. This ceramic capacitor should be placed as close as possible to IN pin. |
| 2 | GND | Ground. |
| 3 | OUT | Regulator Output Pin. It is recommended to use a ceramic capacitor with effective capacitance in the range of 1μF to 100μF to ensure stability. This ceramic capacitor should be placed as close as possible to OUT pin. |

## FUNCTIONAL BLOCK DIAGRAM

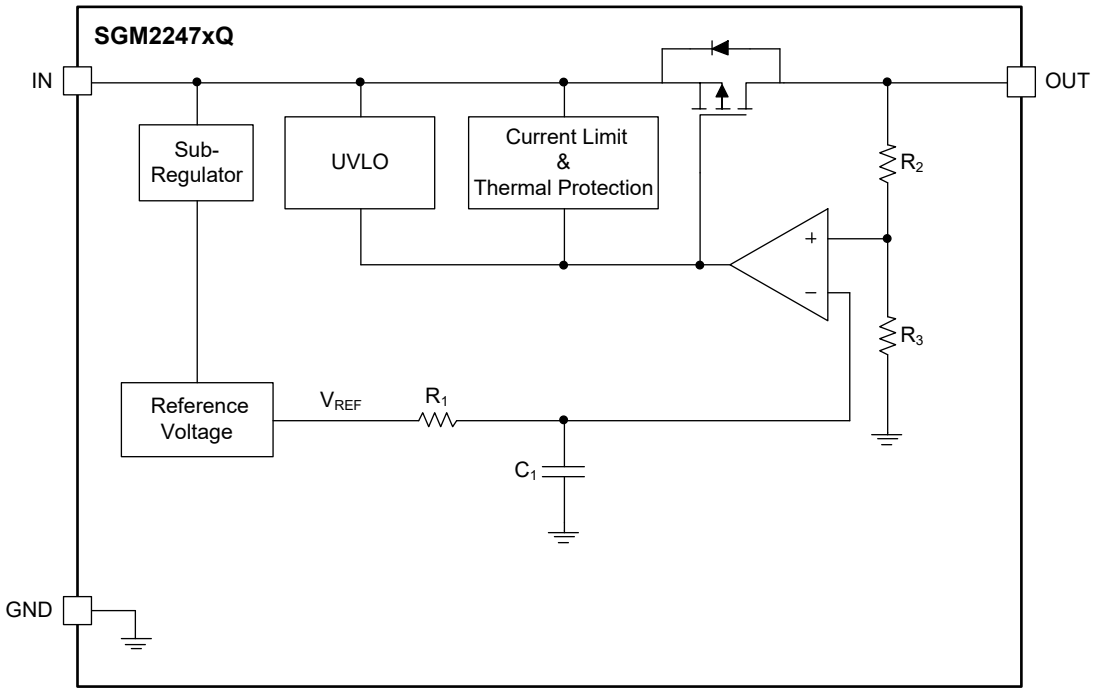
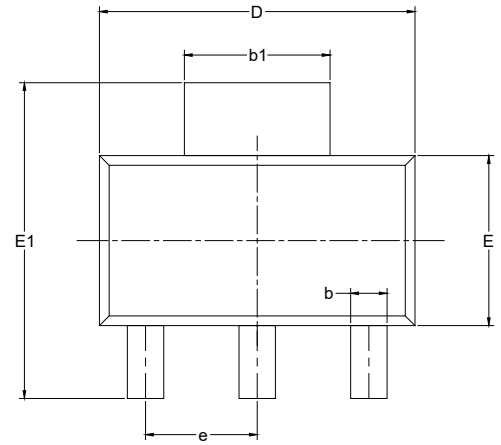
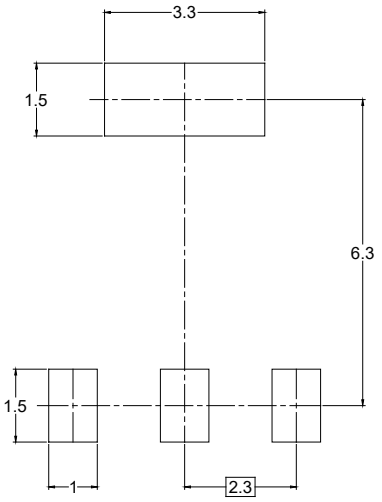



**Figure 2. Block Diagram**

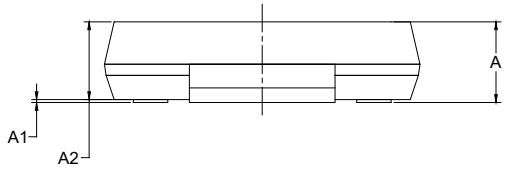
# PACKAGE OUTLINE DIMENSIONS

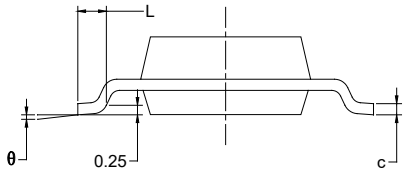
## SOT-223-3




**RECOMMENDED LAND PATTERN** (Unit: mm)



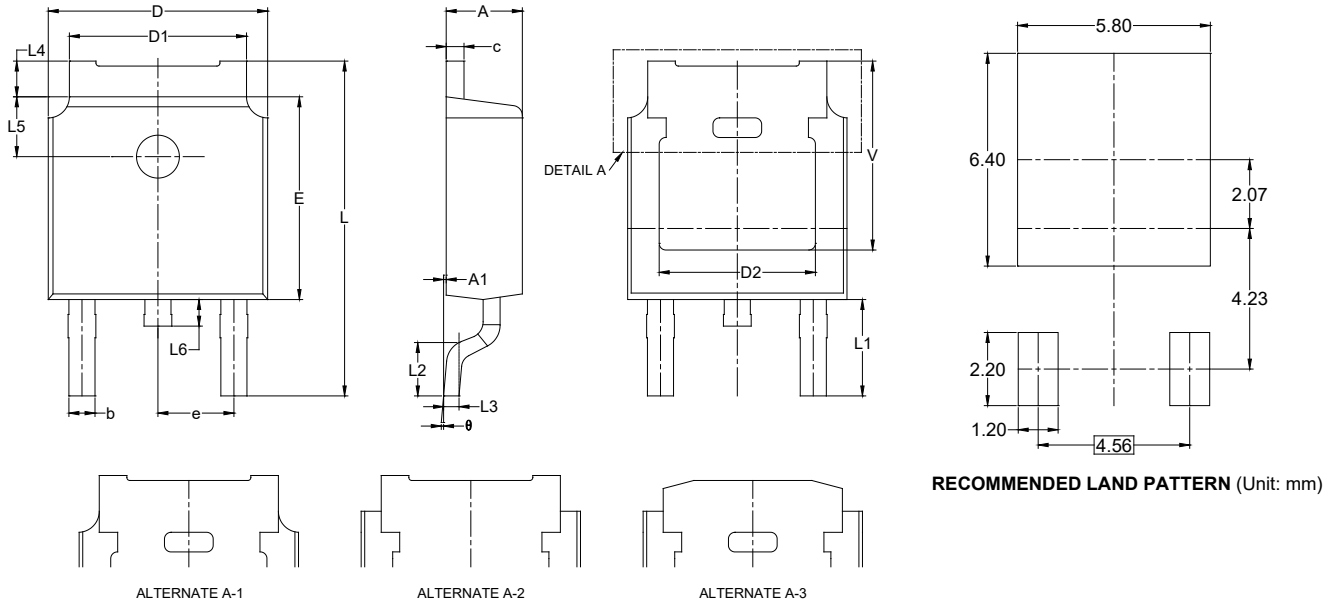




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | | 1.800 | | 0.071 |
| A1 | 0.020 | 0.100 | 0.001 | 0.004 |
| A2 | 1.500 | 1.700 | 0.059 | 0.067 |
| b | 0.660 | 0.840 | 0.026 | 0.033 |
| b1 | 2.900 | 3.100 | 0.114 | 0.122 |
| c | 0.230 | 0.350 | 0.009 | 0.014 |
| D | 6.300 | 6.700 | 0.248 | 0.264 |
| E | 3.300 | 3.700 | 0.130 | 0.146 |
| E1 | 6.700 | 7.300 | 0.264 | 0.287 |
| e | 2.300 BSC | | 0.091 BSC | |
| L | 0.750 | | 0.030 | |
| θ | 0° | 10° | 0° | 10° |

NOTES:
1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice.

# PACKAGE OUTLINE DIMENSIONS

## TO-252-2A




**RECOMMENDED LAND PATTERN** (Unit: mm)

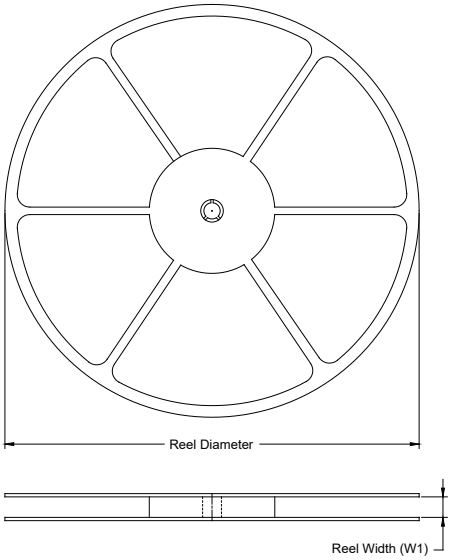
**DETAIL A**

| Symbol | Dimensions In Millimeters | | |
|---|---|---|---|
| | MIN | NOM | MAX |
| A | 2.184 | - | 2.388 |
| A1 | 0.000 | - | 0.127 |
| b | 0.635 | - | 0.889 |
| c | 0.457 | - | 0.889 |
| D | 6.350 | - | 6.731 |
| D1 | 4.953 | - | 5.461 |
| D2 | 4.318 | - | 5.500 |
| E | 5.969 | - | 6.223 |
| e | 2.286 BSC | | |
| L | 9.398 | - | 10.414 |
| L1 | 2.900 REF | | |
| L2 | 1.397 | - | 1.778 |
| L3 | 0.508 BSC | | |
| L4 | 0.889 | - | 1.270 |
| L5 | 1.800 REF | | |
| L6 | 0.600 | - | 1.106 |
| V | 5.150 | - | 5.650 |
| θ | 0° | - | 10° |

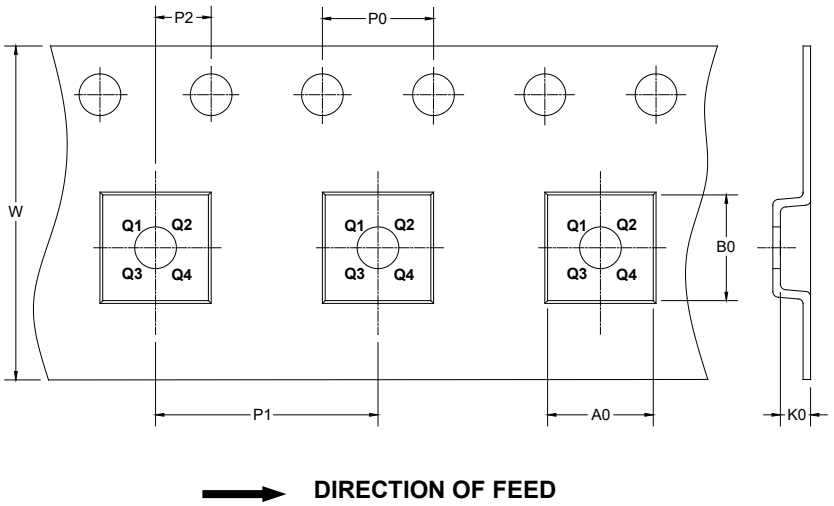
NOTES:
1. This drawing is subject to change without notice.
2. The dimensions do not include mold flashes, protrusions or gate burrs.
3. Reference JEDEC TO-252.

# TAPE AND REEL INFORMATION

### REEL DIMENSIONS




### TAPE DIMENSIONS



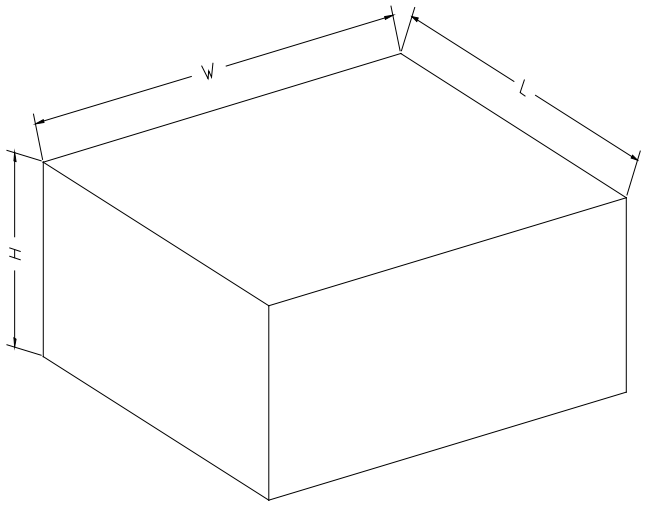

NOTE: The picture is only for reference. Please make the object as the standard.

## KEY PARAMETER LIST OF TAPE AND REEL

| Package Type | Reel Diameter | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P0 (mm) | P1 (mm) | P2 (mm) | W (mm) | Pin1 Quadrant |
|---|---|---|---|---|---|---|---|---|---|---|
| SOT-223-3 | 13" | 12.4 | 6.55 | 7.25 | 1.90 | 4.0 | 8.0 | 2.0 | 12.0 | Q3 |
| TO-252-2A | 13" | 16.4 | 6.90 | 10.50 | 2.70 | 4.0 | 8.0 | 2.0 | 16.0 |  |

DD0001

## CARTON BOX DIMENSIONS




NOTE: The picture is only for reference. Please make the object as the standard.

## KEY PARAMETER LIST OF CARTON BOX

| Reel Type | Length (mm) | Width (mm) | Height (mm) | Pizza/Carton |
|---|---|---|---|---|
| 13″ | 386 | 280 | 370 | 5 |

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