



SGM2249xQ Automotive 40V, 300mA, Low Quiescent Current and Low Dropout Voltage Linear Regulator

GENERAL DESCRIPTION

The SGM2249xQ is a high voltage, low quiescent current and low dropout voltage linear regulator. It is capable of supplying 300mA output current with typical dropout voltage of 740mV. The operating input voltage range is from 2.5V to 40V and output voltage range is from 0.6V to 24V.

Other features include current limit and thermal shutdown protection. The SGM2249xQ is suitable for various automotive applications.

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

The SGM2249xQ is available in a Green MSOP-8 (Exposed Pad) package. It operates over an operating temperature range of -40°C to +125°C.

FEATURES

- **AEC-Q100 Qualified for Automotive Applications Device Temperature Grade 1**
 $T_A = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$
- **Operating Input Voltage Range: 2.5V to 40V**
- **Enable Pin Accept Voltages Higher than the Supply Voltage and up to 40V**
- **Adjustable Output from 0.6V to 24V**
- **300mA Output Current**
- **Output Voltage Accuracy: $\pm 1\%$ at $+25^{\circ}\text{C}$**
- **Low Quiescent Current: 3.2 μA (TYP)**
- **Low Dropout Voltage:**
740mV (TYP) at 300mA, $V_{\text{OUT}} = 24\text{V}$
- **Current Limiting and Thermal Protection**
- **With Output Automatic Discharge**
- **Stable with Small Case Size Ceramic Capacitors**
- **-40°C to +125°C Operating Temperature Range**
- **Available in a Green MSOP-8 (Exposed Pad) Package**

APPLICATIONS

Industrial Equipment
Automotive Applications
Battery-Powered Equipment
Medical Equipment

TYPICAL APPLICATION

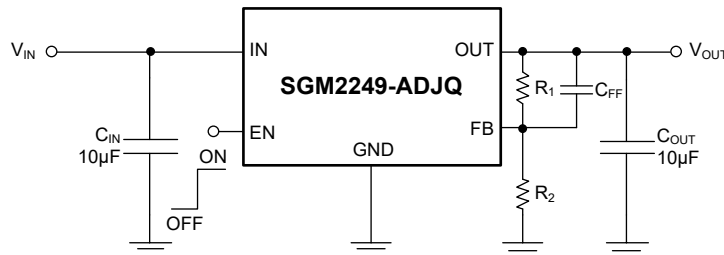


Figure 1. Typical Application Circuit

Automotive 40V, 300mA, Low Quiescent SGM2249xQ Current and Low Dropout Voltage Linear Regulator

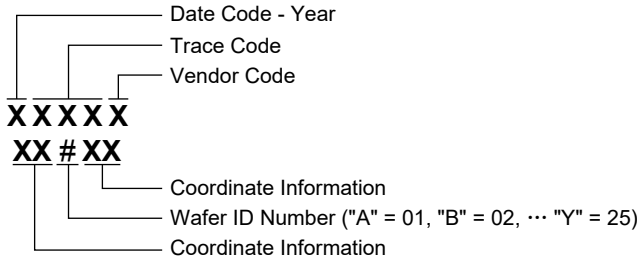
PACKAGE/ORDERING INFORMATION

| MODEL | PACKAGE DESCRIPTION | SPECIFIED TEMPERATURE RANGE | ORDERING NUMBER | PACKAGE MARKING | PACKING OPTION |
|--------------|----------------------|-----------------------------------|----------------------|---------------------------|---------------------|
| SGM2249-ADJQ | MSOP-8 (Exposed Pad) | -40°C to +125°C (T _A) | SGM2249-ADJQPMS8G/TR | 1UZPMS8 XXXXX XX#XX | Tape and Reel, 4000 |

MARKING INFORMATION

NOTE: XXXXX = Date Code, Trace Code and Vendor Code. XX#XX = Coordinate Information and Wafer ID Number.

MSOP-8 (Exposed Pad)



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, EN to GND | -0.3V to 45V |
| OUT to GND | -0.3V to 45V |
| FB to GND | -0.3V to 45V |
| Package Thermal Resistance | |
| MSOP-8 (Exposed Pad), θ_{JA} | 47.6°C/W |
| MSOP-8 (Exposed Pad), θ_{JB} | 23.1°C/W |
| MSOP-8 (Exposed Pad), $\theta_{JC(TOP)}$ | 54.8°C/W |
| MSOP-8 (Exposed Pad), $\theta_{JC(BOT)}$ | 8.3°C/W |
| Junction Temperature | +150°C |
| Storage Temperature Range | -65°C to +150°C |
| Lead Temperature (Soldering, 10s) | +260°C |
| ESD Susceptibility ^{(1) (2)} | |
| HBM..... | ±6000V |
| CDM | ±1000V |

NOTES:

- For human body model (HBM), all pins comply with AEC-Q100-002 specification.
- For charged device model (CDM), all pins comply with AEC-Q100-011 specification.

RECOMMENDED OPERATING CONDITIONS

| | |
|--|-----------------|
| Supply Voltage Range, V _{IN} | 2.5V to 40V |
| Enable Input Voltage Range | 0V to 40V |
| Input Effective Capacitance, C _{IN} | 0.5µF (MIN) |
| Output Effective Capacitance, C _{OUT} | 1µF to 100µF |
| Operating Ambient Temperature Range | -40°C to +125°C |
| Operating Junction Temperature Range..... | -40°C to +150°C |

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

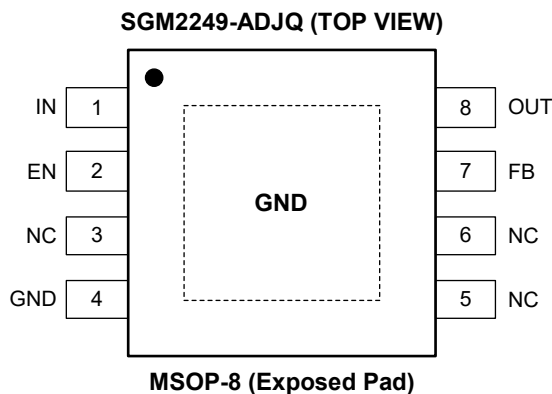
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance 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.

SGM2249xQ Automotive 40V, 300mA, Low Quiescent Current and Low Dropout Voltage Linear Regulator

PIN CONFIGURATION



PIN DESCRIPTION

| PIN | NAME | FUNCTION |
|-------------|------|--|
| 1 | IN | Input Supply Voltage Pin. It is recommended to use a 1 μ F 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 | EN | Enable Pin. Drive EN high to turn on the regulator. Drive EN low to turn off the regulator. |
| 3, 5, 6 | NC | No Connection. |
| 4 | GND | Ground. |
| 7 | FB | Feedback Voltage Input Pin. Connect this pin to the midpoint of an external resistor divider to adjust the output voltage. Place the resistors as close as possible to this pin. |
| 8 | OUT | Regulator Output Pin. It is recommended to use a ceramic capacitor with effective capacitance in the range of 1 μ F to 100 μ F to ensure stability. This ceramic capacitor should be placed as close as possible to OUT pin. |
| Exposed Pad | GND | Exposed Pad. Connect it to GND internally. Connect it to a large ground plane to maximize thermal performance. This pad is not an electrical connection point. |

SGM2249xQ Automotive 40V, 300mA, Low Quiescent Current and Low Dropout Voltage Linear Regulator

FUNCTIONAL BLOCK DIAGRAM

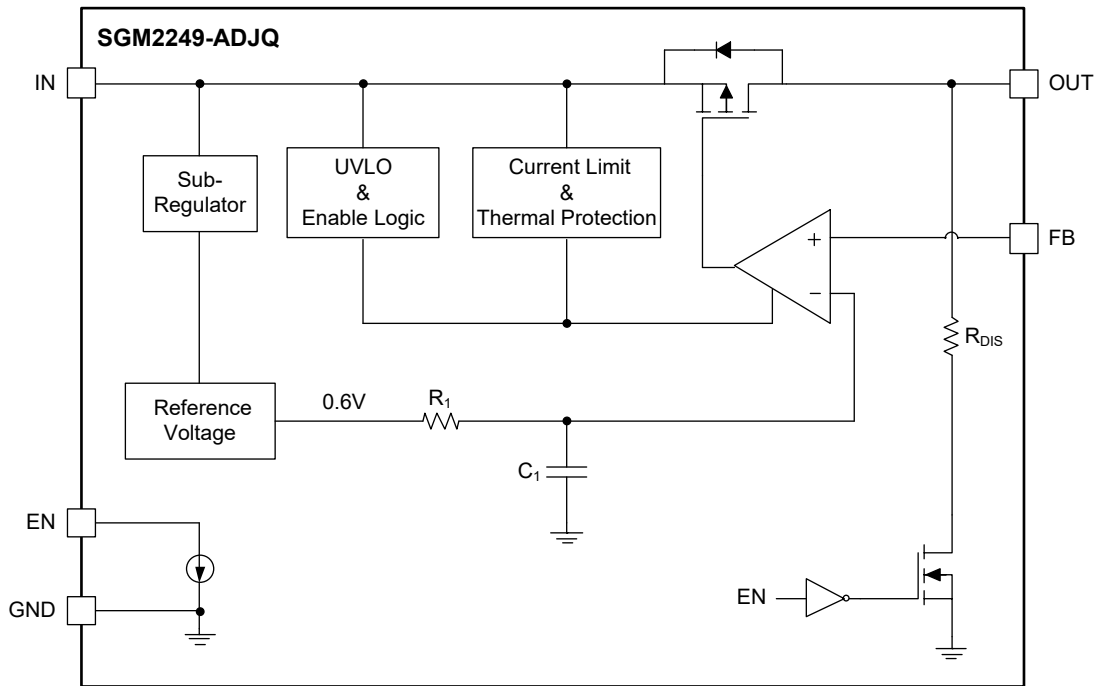
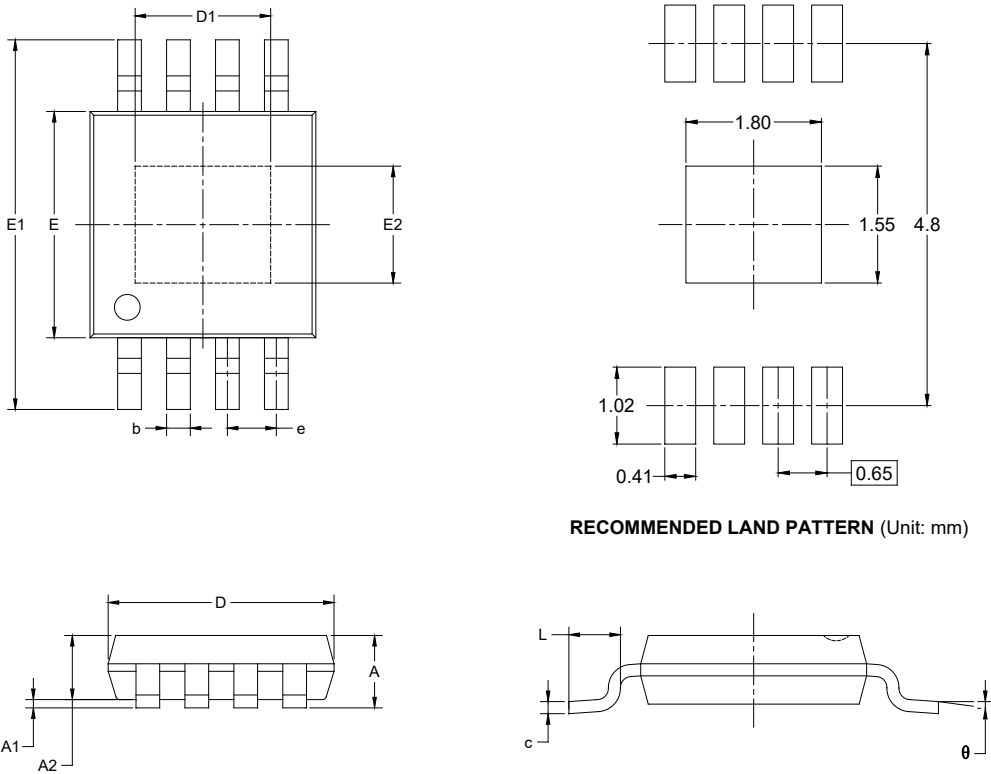


Figure 2. Block Diagram of Adjustable Output Version

PACKAGE OUTLINE DIMENSIONS

MSOP-8 (Exposed Pad)



RECOMMENDED LAND PATTERN (Unit: mm)

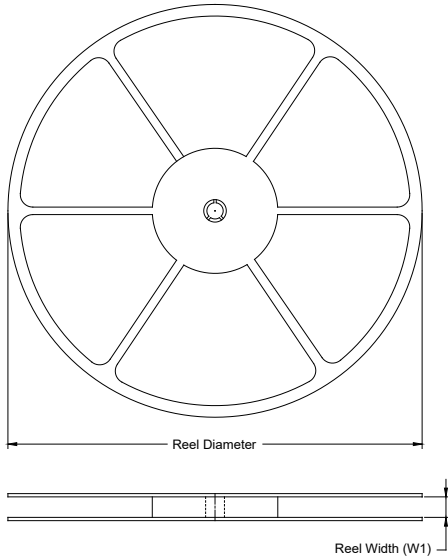
| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|----------|------------------------------|-------|-------------------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.820 | 1.100 | 0.032 | 0.043 |
| A1 | 0.020 | 0.150 | 0.001 | 0.006 |
| A2 | 0.750 | 0.950 | 0.030 | 0.037 |
| b | 0.250 | 0.380 | 0.010 | 0.015 |
| c | 0.090 | 0.230 | 0.004 | 0.009 |
| D | 2.900 | 3.100 | 0.114 | 0.122 |
| D1 | 1.700 | 1.900 | 0.067 | 0.075 |
| e | 0.65 BSC | | 0.026 BSC | |
| E | 2.900 | 3.100 | 0.114 | 0.122 |
| E1 | 4.750 | 5.050 | 0.187 | 0.199 |
| E2 | 1.450 | 1.650 | 0.057 | 0.065 |
| L | 0.400 | 0.800 | 0.016 | 0.031 |
| θ | 0° | 6° | 0° | 6° |

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

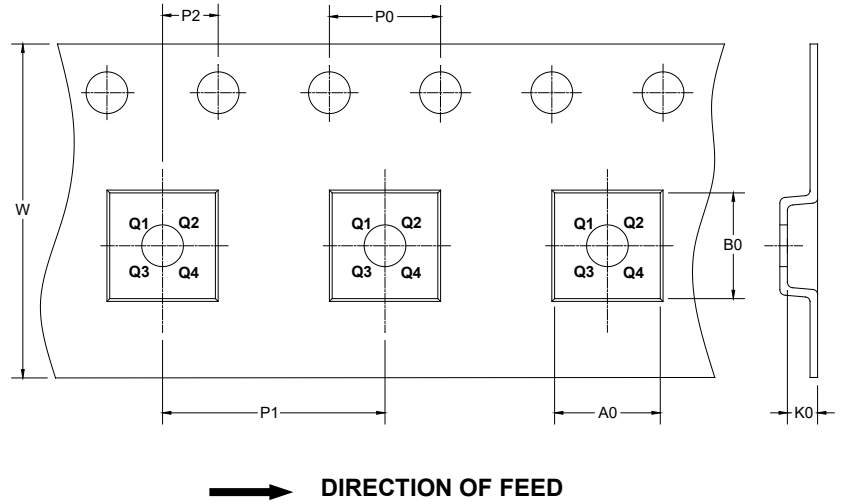
PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



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

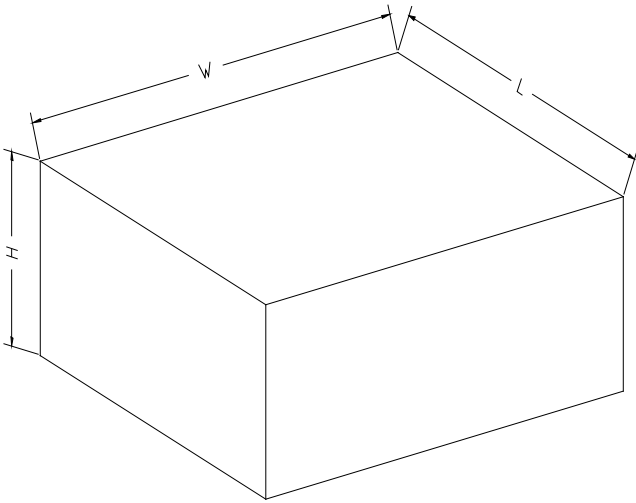
KEY PARAMETER LIST OF TAPE AND REEL

| Package Type | Reel Diameter | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P0 (mm) | P1 (mm) | P2 (mm) | W (mm) | Pin1 Quadrant |
|----------------------|---------------|--------------------|---------|---------|---------|---------|---------|---------|--------|---------------|
| MSOP-8 (Exposed Pad) | 13" | 12.4 | 5.20 | 3.30 | 1.50 | 4.0 | 8.0 | 2.0 | 12.0 | Q1 |

DD0001

PACKAGE INFORMATION

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 |

DD0002