



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°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: 3V to 40V**
- **Fixed Output from 1.8V to 12V**
- **500mA Output Current**
- **Output Voltage Accuracy: $\pm 1\%$ at $+25^{\circ}\text{C}$**
- **Low Quiescent Current: 3.8 μA (TYP)**
- **Low Dropout Voltage:**
750mV (TYP) at 500mA, $V_{\text{OUT(NOM)}} \geq 3.3\text{V}$
- **Current Limiting and Thermal Protection**
- **Stable with Small Case Size Ceramic Capacitors**
- **-40°C to +125°C Operating Temperature Range**
- **Available in Green SOT-223-3 and TO-252-2A Packages**

APPLICATIONS

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

TYPICAL APPLICATION

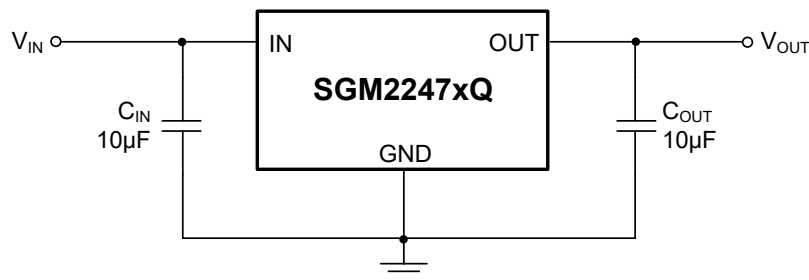


Figure 1. Typical Application Circuit

SGM2247xQ

PACKAGE/ORDERING INFORMATION

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

YYY— Serial Number
XXXXYY
 — Lot Number
 — Trace Code
 — Date Code - Year

TO-252-2A

XXXXX

Vendor Code

Trace Code

Date Code - Year

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.

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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, θ_{JA}	55.4°C/W
SOT-223-3, θ_{JB}	8.4°C/W
SOT-223-3, $\theta_{JC(TOP)}$	29.6°C/W
SOT-223-3, $\theta_{JC(BOT)}$	10.9°C/W
TO-252-2A, θ_{JA}	25.8°C/W
TO-252-2A, θ_{JB}	6.6°C/W
TO-252-2A, $\theta_{JC(TOP)}$	35.7°C/W
TO-252-2A, $\theta_{JC(BOT)}$	2.4°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	±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°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.

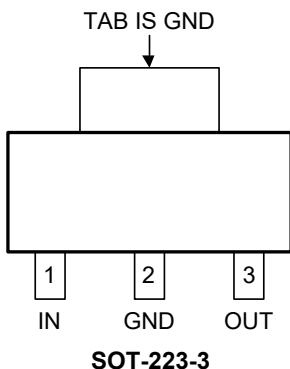
DISCLAIMER

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

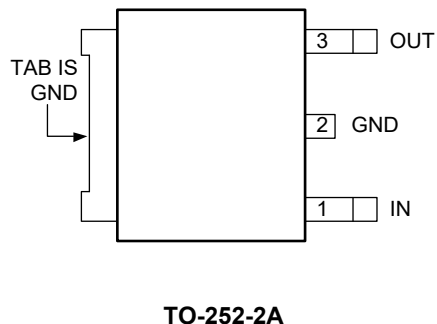
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PIN CONFIGURATIONS

SGM2247xQ (TOP VIEW)



SGM2247xQ (TOP VIEW)



PIN DESCRIPTION

PIN	NAME	FUNCTION
1	IN	Input Supply Voltage Pin. It is recommended to use a 2.2 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	GND	Ground.
3	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.

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FUNCTIONAL BLOCK DIAGRAM

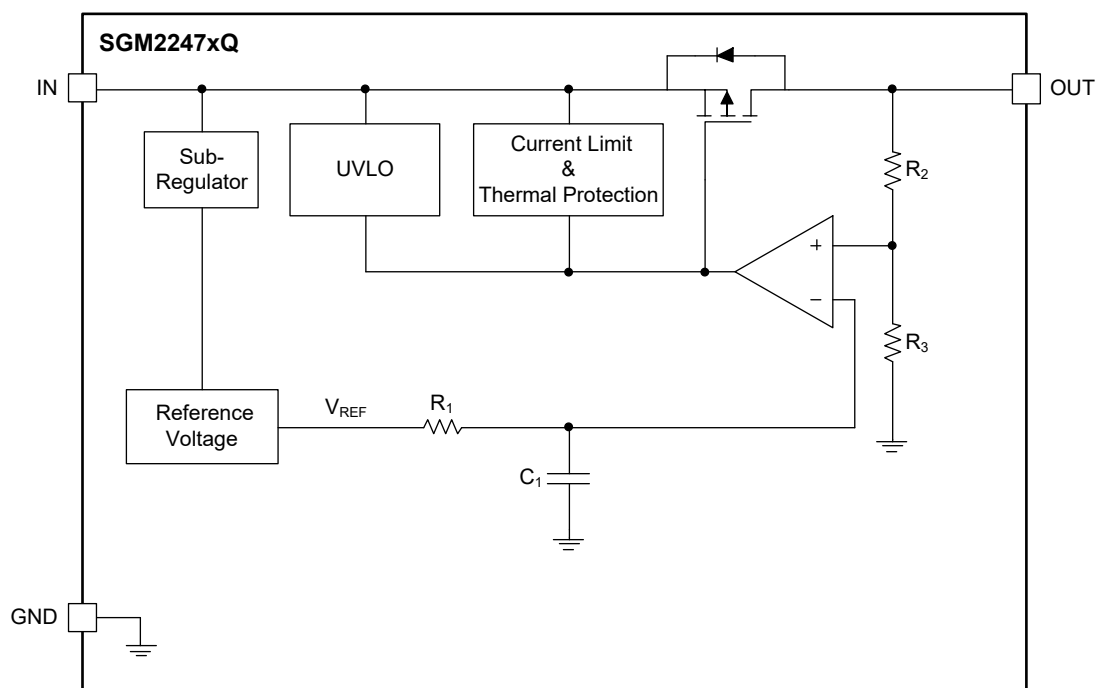
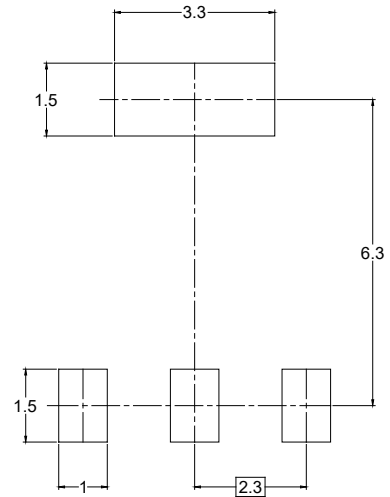
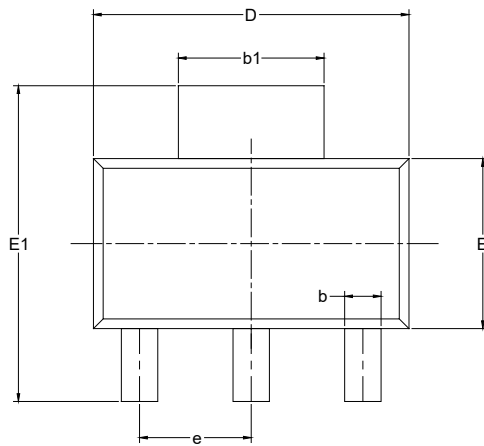


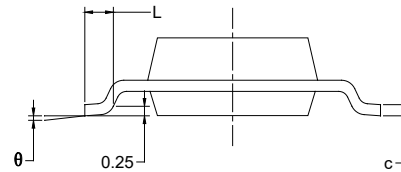
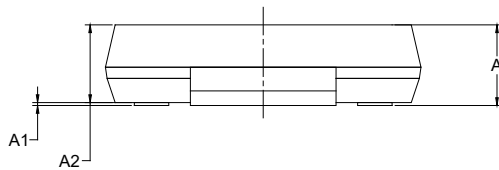
Figure 2. Block Diagram

PACKAGE OUTLINE DIMENSIONS

SOT-223-3



RECOMMENDED LAND PATTERN (Unit: mm)



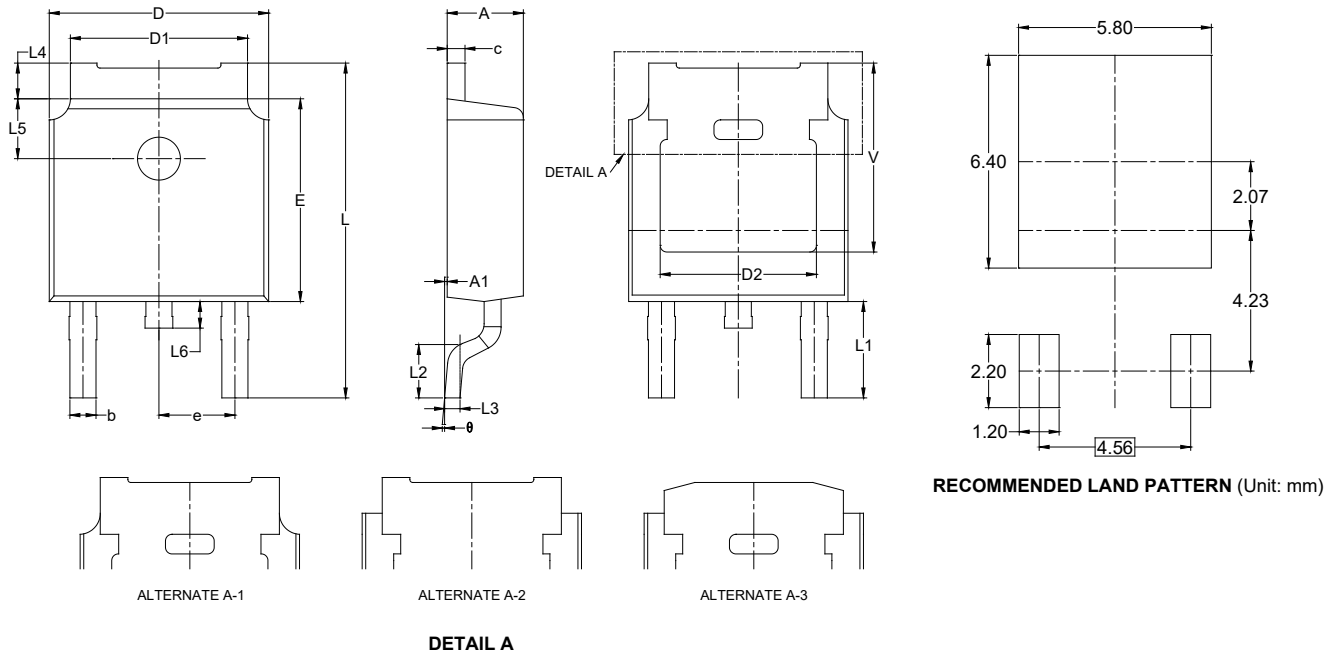
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A		1.800		0.071
A1	0.020	0.100	0.001	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.840	0.026	0.033
b1	2.900	3.100	0.114	0.122
c	0.230	0.350	0.009	0.014
D	6.300	6.700	0.248	0.264
E	3.300	3.700	0.130	0.146
E1	6.700	7.300	0.264	0.287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

NOTES:

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

PACKAGE OUTLINE DIMENSIONS

TO-252-2A



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°

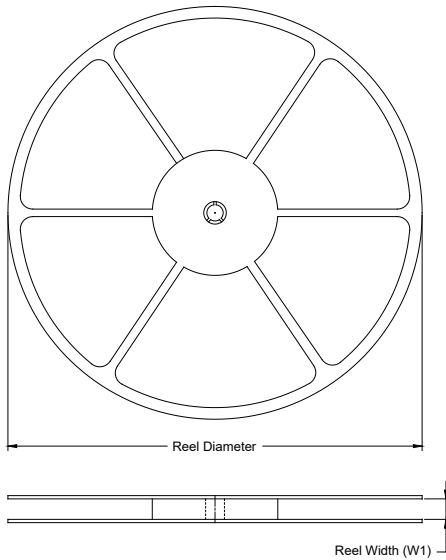
NOTES:

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.

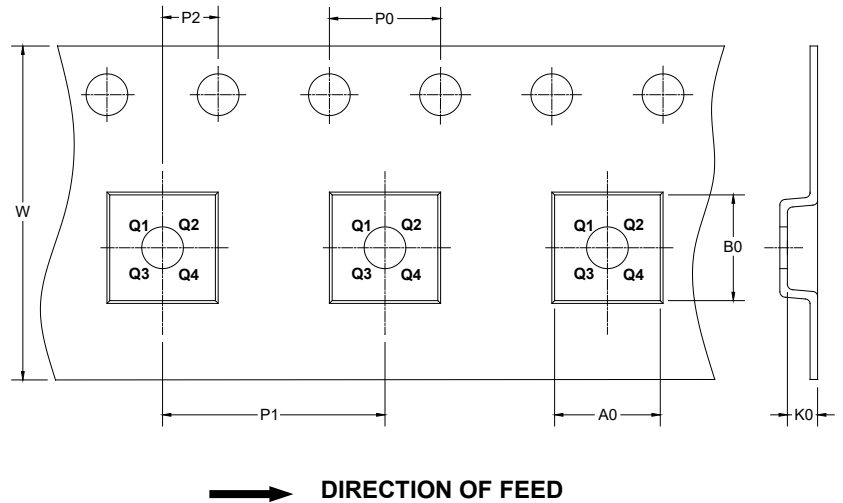
PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



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

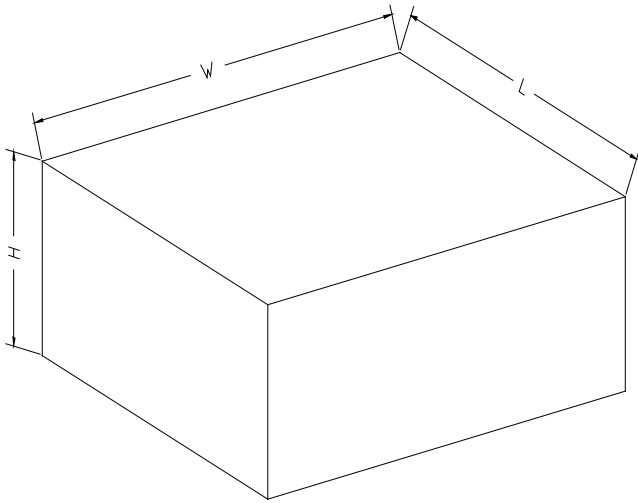
KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
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

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