

GENERAL DESCRIPTION

The SGM2238xQ 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 450mV. The operating input voltage range is from 3V to 40V. The fixed output voltage range is from 1.8V to 12V and the adjustable output voltage range is from 1.25V to 24V.

Other features include logic-controlled shutdown mode and thermal shutdown protection. The SGM2238xQ has automatic discharge function to quickly discharge V_{OUT} in the disabled status.

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

The SGM2238xQ is available in a Green SOIC-8 (Exposed Pad) package. It operates over an operating temperature range of -40°C to $+125^{\circ}\text{C}$.

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
- Enable Pin Accept Voltages Higher than the Supply Voltage and up to 40V
- Fixed Output from 1.8V to 12V
- Adjustable Output from 1.25V to 24V
- 300mA Output Current
- Output Voltage Accuracy: $\pm 1\%$ at $+25^{\circ}\text{C}$
- Low Quiescent Current: $3.8\mu\text{A}$ (TYP)
- Low Dropout Voltage: 450mV (TYP) at 300mA
- Current Limiting and Thermal Protection
- Support Power-Good Indicator Function
- With Output Automatic Discharge
- Stable with Small Case Size Ceramic Capacitors
- -40°C to $+125^{\circ}\text{C}$ Operating Temperature Range
- Available in a Green SOIC-8 (Exposed Pad) Package

APPLICATIONS

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

TYPICAL APPLICATION

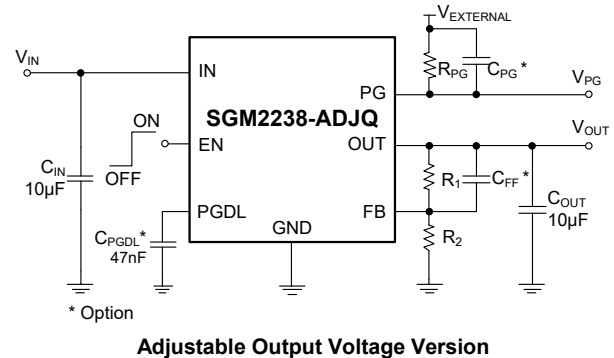
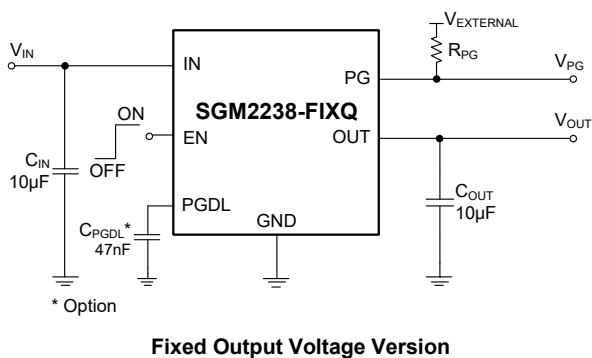


Figure 1. Typical Application Circuits

SGM2238xQ Automotive 40V, 300mA, Low Quiescent Current and Low Dropout Voltage Linear Regulator

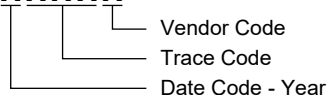
PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM2238-3.3Q	SOIC-8 (Exposed Pad)	-40°C to +125°C (T _A)	SGM2238-3.3QPS8G/TR	160PS8 XXXXXX	Tape and Reel, 4000
SGM2238-3.6Q	SOIC-8 (Exposed Pad)	-40°C to +125°C (T _A)	SGM2238-3.6QPS8G/TR	1E2PS8 XXXXXX	Tape and Reel, 4000
SGM2238-4.2Q	SOIC-8 (Exposed Pad)	-40°C to +125°C (T _A)	SGM2238-4.2QPS8G/TR	1E3PS8 XXXXXX	Tape and Reel, 4000
SGM2238-5.0Q	SOIC-8 (Exposed Pad)	-40°C to +125°C (T _A)	SGM2238-5.0QPS8G/TR	15ZPS8 XXXXXX	Tape and Reel, 4000
SGM2238-8.0Q	SOIC-8 (Exposed Pad)	-40°C to +125°C (T _A)	SGM2238-8.0QPS8G/TR	1E4PS8 XXXXXX	Tape and Reel, 4000
SGM2238-9.0Q	SOIC-8 (Exposed Pad)	-40°C to +125°C (T _A)	SGM2238-9.0QPS8G/TR	1E5PS8 XXXXXX	Tape and Reel, 4000
SGM2238-12Q	SOIC-8 (Exposed Pad)	-40°C to +125°C (T _A)	SGM2238-12QPS8G/TR	161PS8 XXXXXX	Tape and Reel, 4000
SGM2238-ADJQ	SOIC-8 (Exposed Pad)	-40°C to +125°C (T _A)	SGM2238-ADJQPS8G/TR	162PS8 XXXXXX	Tape and Reel, 4000

MARKING INFORMATION

NOTE: XXXXXX = Date Code, Trace Code and Vendor Code.

XXXXXX



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.

SGM2238xQ Automotive 40V, 300mA, Low Quiescent Current and Low Dropout Voltage Linear Regulator

ABSOLUTE MAXIMUM RATINGS

IN, EN to GND	-0.3V to 45V
OUT, FB to GND.....	-0.3V to 45V
PG to GND.....	-0.3V to 45V
PGDL to GND	-0.3V to 6V
Package Thermal Resistance	
SOIC-8 (Exposed Pad), θ_{JA}	40°C/W
SOIC-8 (Exposed Pad), θ_{JB}	16.7°C/W
SOIC-8 (Exposed Pad), $\theta_{JC(TOP)}$	55.9°C/W
SOIC-8 (Exposed Pad), $\theta_{JC(BOT)}$	6°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.....	±2000V
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
Enable Input Voltage Range, V_{EN}	3V to 40V
Input Effective Capacitance, C_{IN}	1 μ F (MIN)
Output Effective Capacitance, C_{OUT}	1 μ F to 100 μ F
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

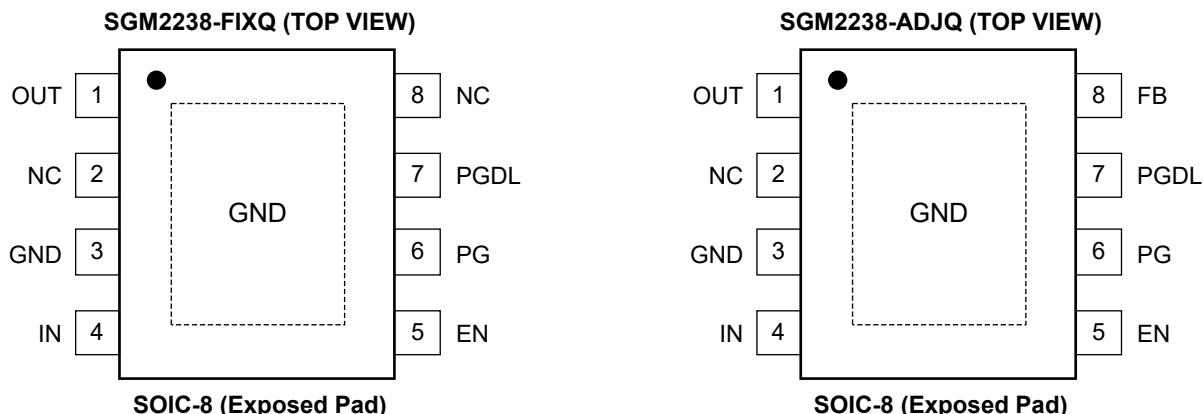
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance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

SGM2238xQ Automotive 40V, 300mA, Low Quiescent Current and Low Dropout Voltage Linear Regulator

PIN CONFIGURATIONS



PIN DESCRIPTION

PIN	NAME	FUNCTION
1	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.
2	NC	No Connection.
3	GND	Ground.
4	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.
5	EN	Enable Pin. Drive EN high to turn on the regulator. Drive EN low to turn off the regulator.
6	PG	Power-Good Indicator Output Pin. An open-drain, active-high output that indicates the status of V _{OUT} . When the output voltage reaches PG _{HTH} of the target, the PG pin goes into a high-impedance state.
7	PGDL	Power-Good Delay Pin. Keep this pin floating when it is not in use.
8	NC	No Connection (Fixed Version Only).
	FB	Feedback Voltage Input Pin (adjustable voltage version only). 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.
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.

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FUNCTIONAL BLOCK DIAGRAMS

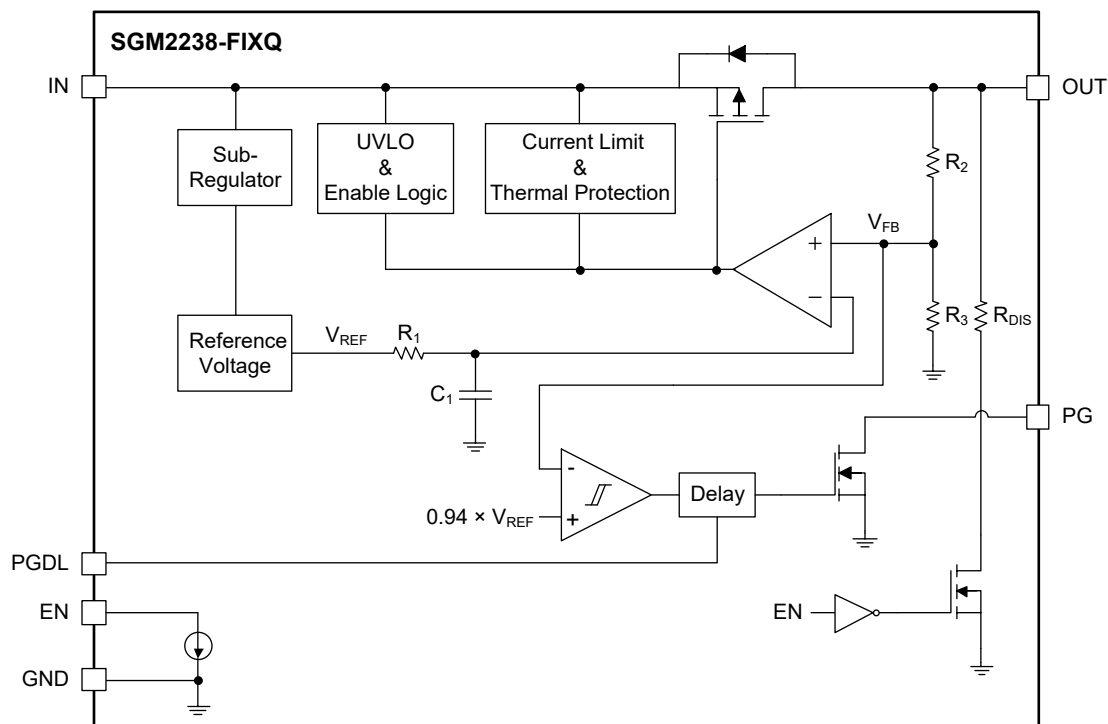


Figure 2. Block Diagram of Fixed Output Version

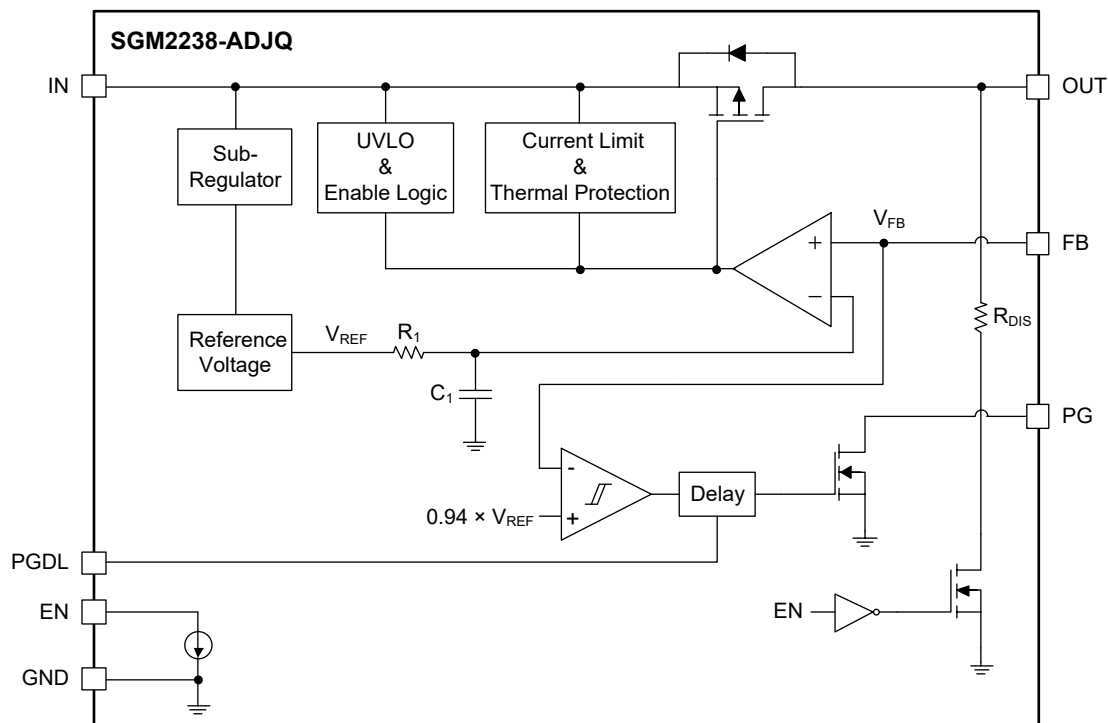
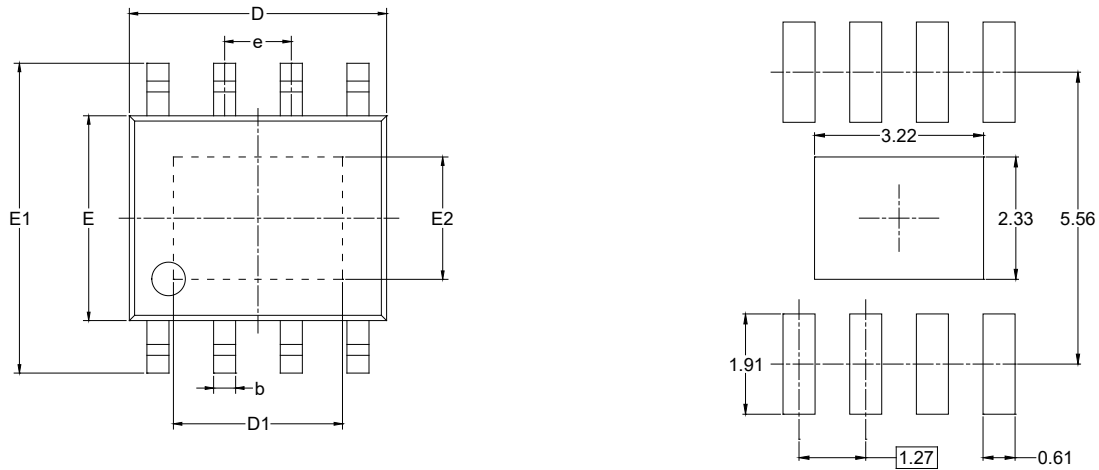


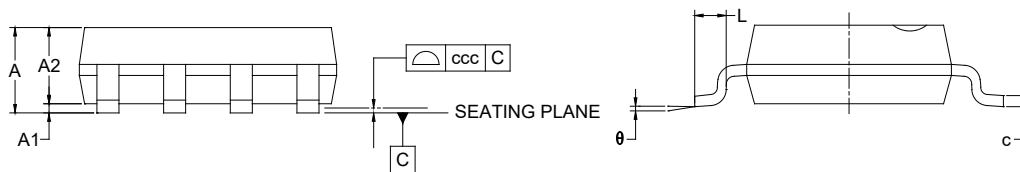
Figure 3. Block Diagram of Adjustable Output Version

PACKAGE OUTLINE DIMENSIONS

SOIC-8 (Exposed Pad)



RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A			1.700
A1	0.000	-	0.150
A2	1.250	-	1.650
b	0.330	-	0.510
c	0.170	-	0.250
D	4.700	-	5.100
D1	3.020	-	3.420
E	3.800	-	4.000
E1	5.800	-	6.200
E2	2.130	-	2.530
e	1.27 BSC		
L	0.400	-	1.270
θ	0°	-	8°
ccc	0.100		

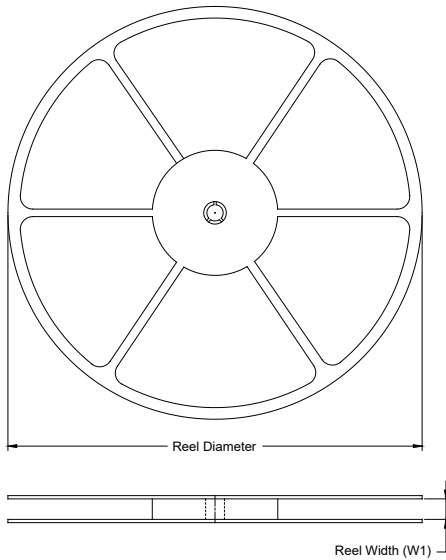
NOTES:

1. This drawing is subject to change without notice.
2. The dimensions do not include mold flashes, protrusions or gate burrs.
3. Reference JEDEC MS-012.

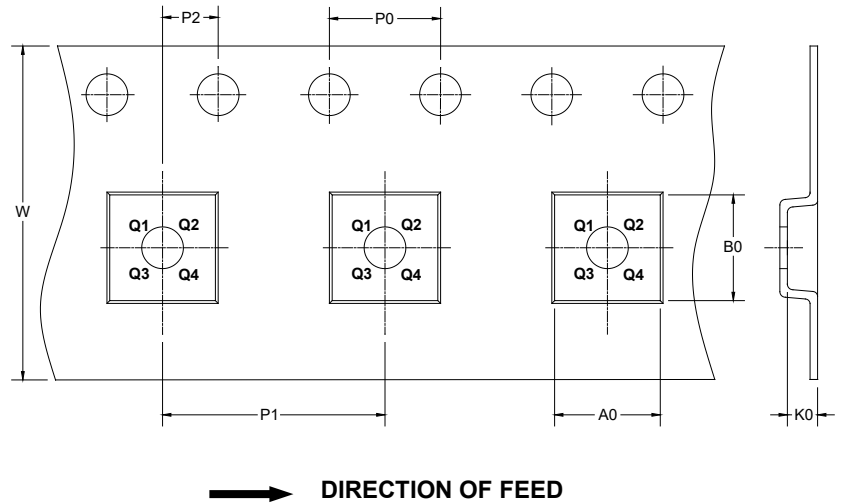
PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



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

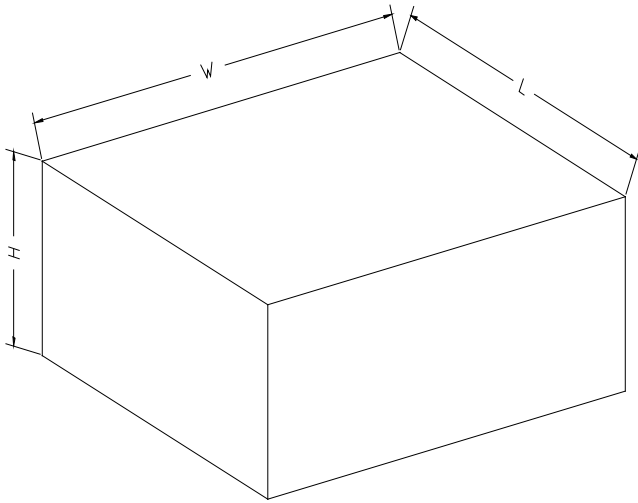
KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SOIC-8 (Exposed Pad)	13"	12.4	6.40	5.40	2.10	4.0	8.0	2.0	12.0	Q1

DD00001

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