



SGM2093xQ

Automotive 500mA, Fast Transient Response, Low Noise and High Accuracy LDO with Power-Good

GENERAL DESCRIPTION

The SGM2093xQ is a CMOS, fast transient response, low noise and high accuracy linear regulator. It is capable of supplying 500mA output current with typical dropout voltage of only 70mV. The operating input voltage range is from 1.5V to 5.5V. The adjustable output voltage range is from 0.5V to 5.0V.

Other features include an open-drain power-good (PG) output, logic-controlled shutdown mode, current limit and thermal shutdown protection. The SGM2093xQ 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 SGM2093xQ is available in a Green TDFN-2×3-8DL package. It operates over an ambient temperature range of -40°C to +125°C.

APPLICATIONS

Portable Equipment

Industrial and Medical Equipment

TYPICAL APPLICATION CIRCUIT

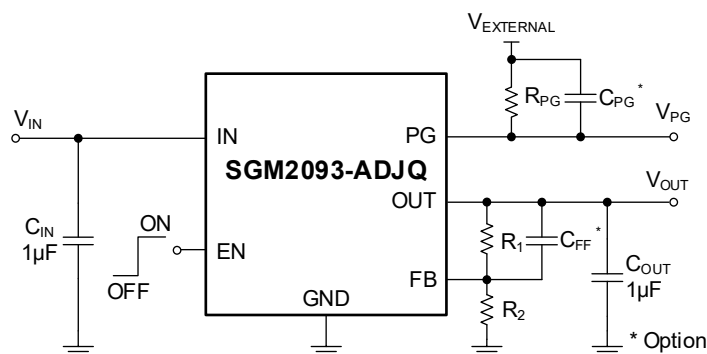


Figure 1. Typical Application Circuit

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: 1.5V to 5.5V
- Adjustable Output from 0.5V to 5.0V
- 500mA Output Current
- Output Voltage Accuracy: $\pm 1\%$ at $+25^{\circ}\text{C}$
- Quiescent Current: 85 μA (TYP)
- Low Dropout Voltage:
70mV (TYP) at 500mA, $V_{OUT(NOM)} = 5\text{V}$
- Current Limiting and Thermal Protection
- Excellent Load and Line Transient Responses
- With Output Automatic Discharge
- UVLO with Hysteresis
- Support Power-Good Indicator Function
- Stable with Small Case Size Ceramic Capacitors
- -40°C to $+125^{\circ}\text{C}$ Operating Temperature Range
- Available in a Green TDFN-2×3-8DL Package

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PACKAGE/ORDERING INFORMATION

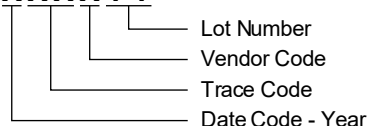
MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM2093-ADJQ	TDFN-2×3-8DL	-40°C to +125°C (T _A)	SGM2093-ADJQTIW8G/TR	2B7 XXXXYY	Tape and Reel, 6000

MARKING INFORMATION

NOTE: XXXX = Date Code, Trace Code and Vendor Code. YY = Lot Number.

TDFN-2×3-8DL

XXXXYY



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 6V
OUT to GND	-0.3V to (V _{IN} + 0.3V)
EN, PG to GND.....	-0.3V to 6V
Power-Good Current.....	±12mA
Package Thermal Resistance	
TDFN-2×3-8DL, θ _{JA}	44.1°C/W
TDFN-2×3-8DL, θ _{JB}	18.2°C/W
TDFN-2×3-8DL, θ _{JC(TOP)}	68.6°C/W
TDFN-2×3-8DL, θ _{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.....	±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

Input Voltage Range	1.5V to 5.5V
Enable Input Voltage Range	0V to 5.5V
Power-Good Voltage Range	0V to 5.5V
Power-Good Current.....	±10mA
Input Effective Capacitance, C _{IN}	0.5μF (MIN)
Output Effective Capacitance, C _{OUT}	0.5μF to 220μF
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

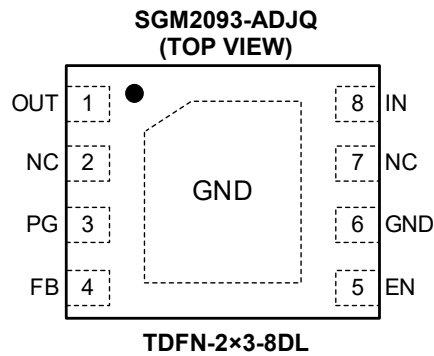
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance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



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 0.5 μ F to 220 μ F to ensure stability. This ceramic capacitor should be placed as close as possible to OUT pin.
4	FB	Feedback 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.
6	GND	Ground.
5	EN	Enable Pin. Drive EN high to turn on the regulator. Drive EN low to turn off the regulator.
3	PG	Open-Drain Power-Good Output Pin. An open-drain output and active high when the output voltage reaches the target voltage.
8	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, 7	NC	No Connection.
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 DIAGRAM

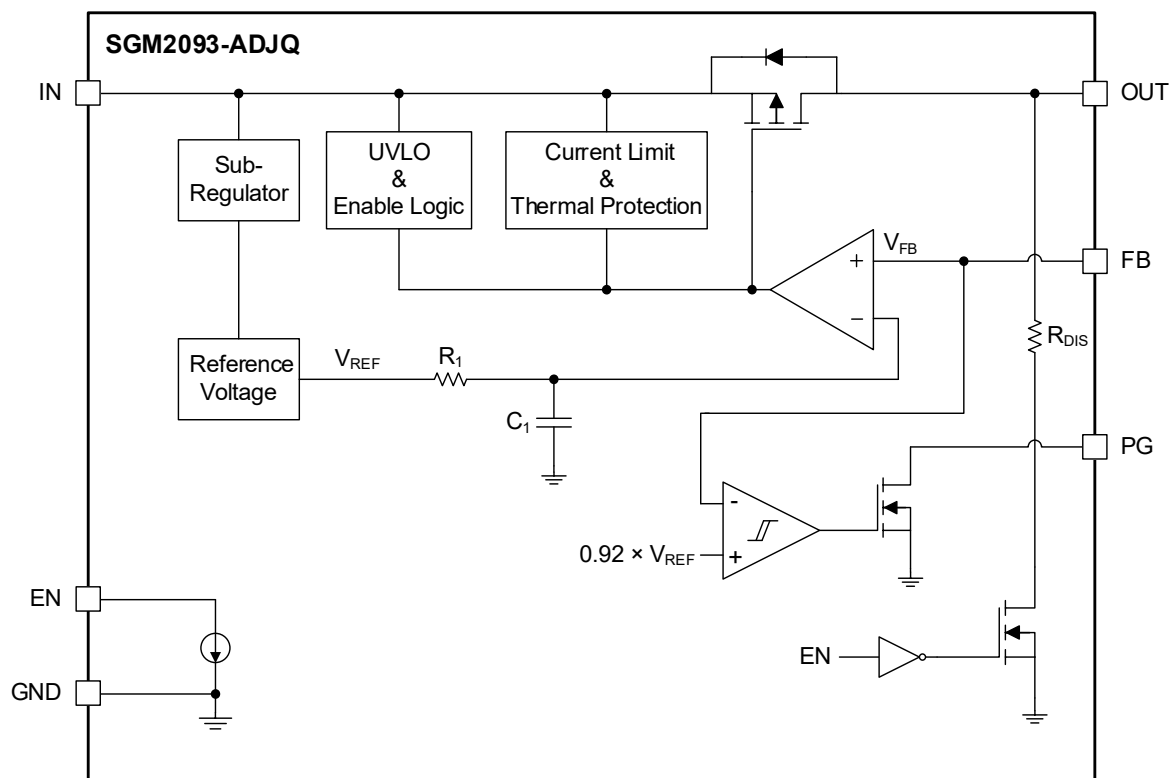
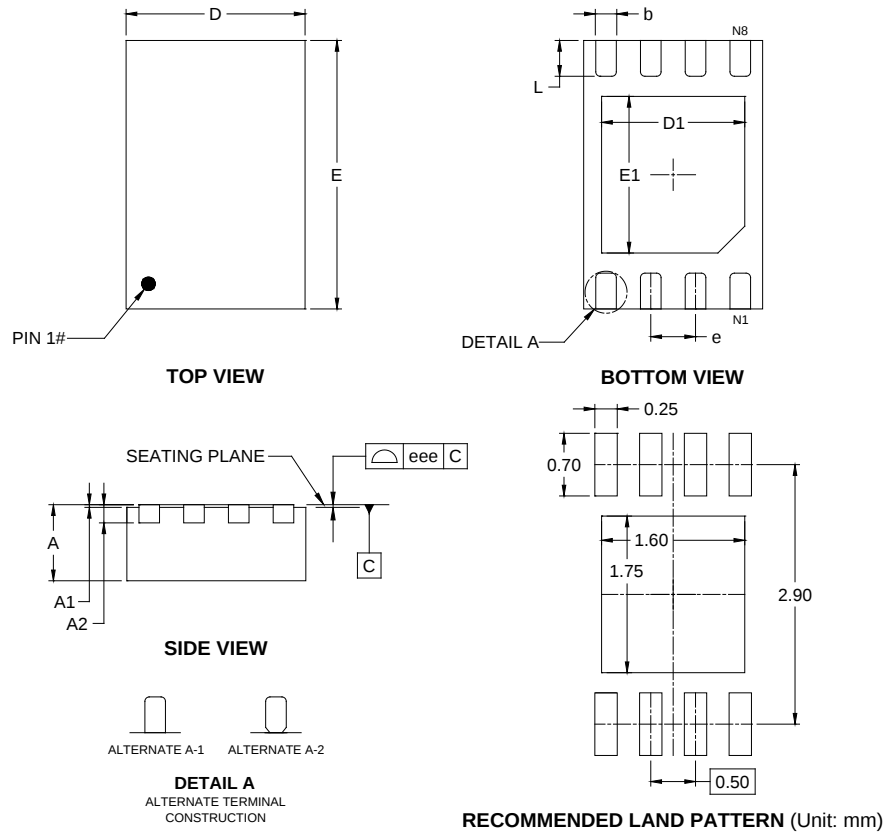


Figure 2. Block Diagram

PACKAGE OUTLINE DIMENSIONS

TDFN-2×3-8DL



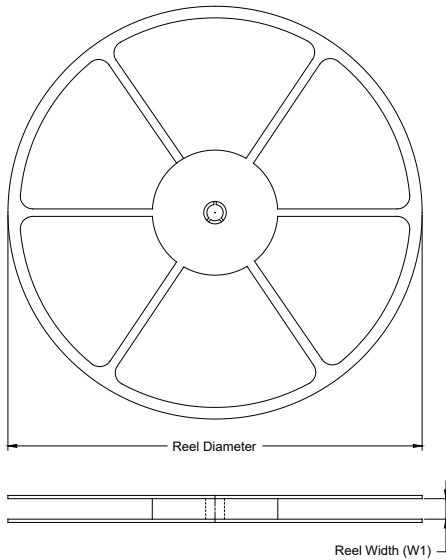
Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	0.800	-	0.900
A1	0.000	-	0.050
A2	0.203 REF		
b	0.180	-	0.300
D	1.900	-	2.100
D1	1.500	-	1.700
E	2.900	-	3.100
E1	1.650	-	1.850
e	0.500 BSC		
L	0.300	-	0.500
eee	0.080		

NOTE: This drawing is subject to change without notice.

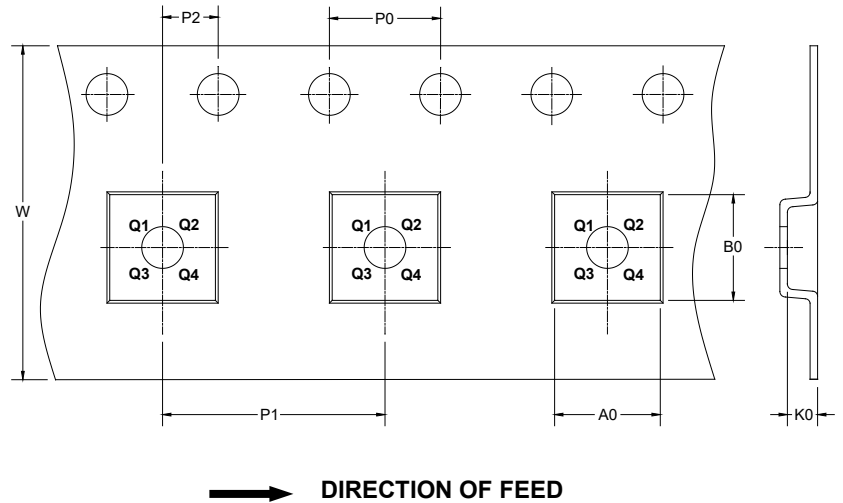
PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



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

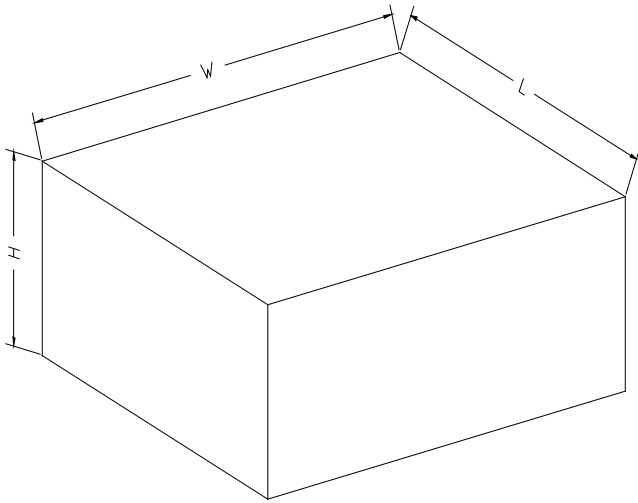
KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
TDFN-2×3-8DL	13"	12.4	2.20	3.25	1.00	4.0	8.0	2.0	12.0	Q2

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