

GENERAL DESCRIPTION

The SGM2300 is a high voltage, low power consumption and high accuracy linear regulator. It is capable of supplying 50mA output current. The operating input voltage is up to 18V. The output voltage range is from 1.5V to 5.0V in fixed output version. For adjustable output version, the output voltage can be adjusted from 1.5V to 5.0V by using external resistors.

Other features include current limit and thermal shutdown protection.

The SGM2300 is suitable for application which needs high accuracy and high voltage, such as palmtops high-power boost applications, etc. Fixed or adjustable output voltage versions are provided.

The SGM2300 is available in Green SOT-23 and SOT-23-5 packages. It operates over an operating temperature range of -40°C to +85°C.

FEATURES

- **High Input Voltage: Up to 18V**
- **Fixed Output Voltages: 1.5V, 1.8V, 2.5V, 2.8V, 3.0V, 3.3V, 3.6V and 5.0V**
- **Adjustable Output Voltages: 1.5V to 5.0V**
- **50mA Guaranteed Output Current**
- **Output Voltage Accuracy: $\pm 3\%$ at +25°C**
- **Low Dropout Voltage**
- **Low Power Consumption: 1.7 μ A (TYP)**
- **Low Temperature Coefficient**
- **Thermal Shutdown Protection**
- **Output Current Limit**
- **-40°C to +85°C Operating Temperature Range**
- **Available in Green SOT-23 and SOT-23-5 Packages**

APPLICATIONS

Palmtops

High-Power Boost Applications

Power Source for Battery-Powered Equipment

Home Electric/Electronic Appliances

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM2300-1.5	SOT-23-5	-40°C to +85°C	SGM2300-1.5YN5G/TR	SIFXX	Tape and Reel, 3000
SGM2300-1.8	SOT-23-5	-40°C to +85°C	SGM2300-1.8YN5G/TR	SJ1XX	Tape and Reel, 3000
SGM2300-2.5	SOT-23-5	-40°C to +85°C	SGM2300-2.5YN5G/TR	SJ0XX	Tape and Reel, 3000
SGM2300-2.8	SOT-23-5	-40°C to +85°C	SGM2300-2.8YN5G/TR	SJ2XX	Tape and Reel, 3000
SGM2300-3.0	SOT-23-5	-40°C to +85°C	SGM2300-3.0YN5G/TR	SJBXX	Tape and Reel, 3000
SGM2300-3.3	SOT-23-5	-40°C to +85°C	SGM2300-3.3YN5G/TR	SJCXX	Tape and Reel, 3000
SGM2300-3.6	SOT-23-5	-40°C to +85°C	SGM2300-3.6YN5G/TR	SJDXX	Tape and Reel, 3000
SGM2300-5.0	SOT-23-5	-40°C to +85°C	SGM2300-5.0YN5G/TR	SJFXX	Tape and Reel, 3000
SGM2300-ADJ	SOT-23-5	-40°C to +85°C	SGM2300-ADJYN5G/TR	SK0XX	Tape and Reel, 3000
SGM2300-1.5	SOT-23	-40°C to +85°C	SGM2300-1.5YN3LG/TR	SD7XX	Tape and Reel, 3000
SGM2300-1.8	SOT-23	-40°C to +85°C	SGM2300-1.8YN3LG/TR	SD8XX	Tape and Reel, 3000
SGM2300-2.5	SOT-23	-40°C to +85°C	SGM2300-2.5YN3LG/TR	SD9XX	Tape and Reel, 3000
SGM2300-2.8	SOT-23	-40°C to +85°C	SGM2300-2.8YN3LG/TR	SDAXX	Tape and Reel, 3000
SGM2300-3.0	SOT-23	-40°C to +85°C	SGM2300-3.0YN3LG/TR	SDBXX	Tape and Reel, 3000
SGM2300-3.3	SOT-23	-40°C to +85°C	SGM2300-3.3YN3LG/TR	SCCXX	Tape and Reel, 3000
SGM2300-3.6	SOT-23	-40°C to +85°C	SGM2300-3.6YN3LG/TR	SDCXX	Tape and Reel, 3000
SGM2300-5.0	SOT-23	-40°C to +85°C	SGM2300-5.0YN3LG/TR	SCDXX	Tape and Reel, 3000

MARKING INFORMATION

NOTE: XX = Date Code.

YYY X X

Date Code - Month
 Date Code - Year
 Serial Number

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

Supply Voltage	-0.3V to 21V
VOUT, FB to GND	-0.3V to Min(V _{IN} + 0.3V, 6V)
Power Dissipation, P _D @ T _A = 25°C	
SOT-23-5	0.4W
SOT-23	0.28W
Package Thermal Resistance	
SOT-23-5, θ _{JA}	260°C/W
SOT-23, θ _{JA}	360°C/W
Junction Temperature	+150°C
Storage Temperature Range	-65°C to +150°C
Lead Temperature (Soldering, 10s)	+260°C
ESD Susceptibility (Fixed Voltage Version)	
HBM	3000V
MM	250V
ESD Susceptibility (Adjustable Voltage Version)	
HBM	2000V
MM	200V

RECOMMENDED OPERATING CONDITIONS

Operating Temperature Range	-40°C to +85°C
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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.

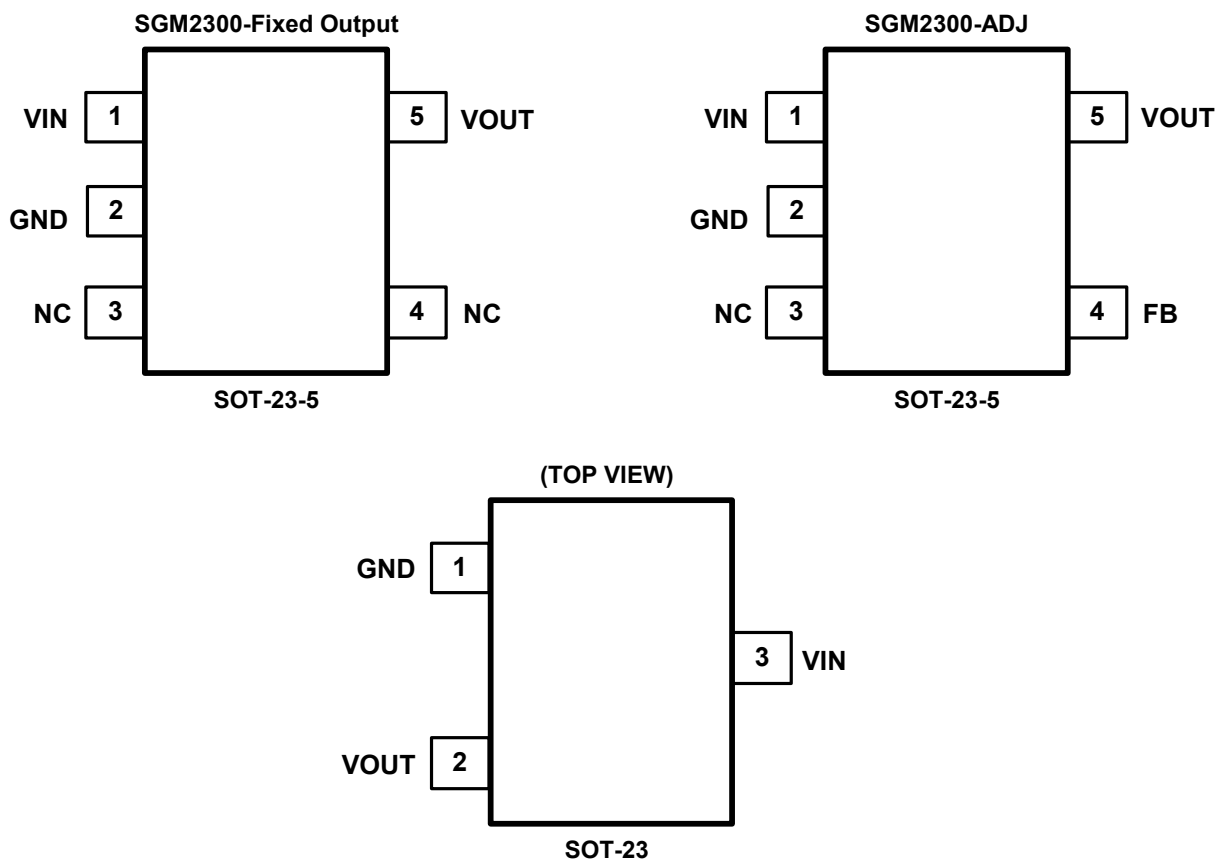
ESD SENSITIVITY CAUTION

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



PIN DESCRIPTION

PIN		NAME	FUNCTION
SOT-23-5	SOT-23		
1	3	VIN	Regulator Input Pin. Up to 18V operation voltage. It is recommended to use a 1 μ F or larger ceramic capacitor from VIN pin to ground.
2	1	GND	Ground.
3	—	NC	No Internal Connection.
4	—	FB	Feedback Voltage Input Pin (Adjustable voltage version only). Connect this pin to the external resistor divider to adjust the output voltage.
		NC	No Internal Connection. (Fixed voltage version only).
5	2	VOUT	Regulator Output Pin. It is recommended to use an output capacitor with effective capacitance in the range of 1 μ F to 10 μ F. The capacitor should be located very close to this pin.

ELECTRICAL CHARACTERISTICS

SGM2300-1.5, $V_{IN} = 4V$, $T_A = +25^{\circ}C$, unless otherwise noted.

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT}	$I_{OUT} = 10mA$	1.455	1.500	1.545	V
Output Current	I_{OUT}		30	50		mA
Current Limit	I_{LIM}		55			mA
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$V_{IN} = 3V \text{ to } 18V, I_{OUT} = 1mA$		0.01		%/V
Load Regulation	ΔV_{OUT}	$I_{OUT} = 1mA \text{ to } 30mA$		0.7	10	mV
Current Consumption	I_Q	No Load		1.7	3.6	μA
Thermal Shutdown Temperature	T_{SHDN}			130		$^{\circ}C$
Thermal Shutdown Hysteresis	ΔT_{SHDN}			15		$^{\circ}C$
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A \times V_{OUT}}$	$I_{OUT} = 10mA, -40^{\circ}C < T_A < +85^{\circ}C$		± 60		ppm/ $^{\circ}C$

SGM2300-1.8, $V_{IN} = 4V$, $T_A = +25^{\circ}C$, unless otherwise noted.

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT}	$I_{OUT} = 10mA$	1.746	1.800	1.854	V
Output Current	I_{OUT}		30	50		mA
Current Limit	I_{LIM}		55			mA
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$V_{IN} = 3V \text{ to } 18V, I_{OUT} = 1mA$		0.01		%/V
Load Regulation	ΔV_{OUT}	$I_{OUT} = 1mA \text{ to } 30mA$		0.9	10	mV
Current Consumption	I_Q	No Load		1.7	3.6	μA
Thermal Shutdown Temperature	T_{SHDN}			130		$^{\circ}C$
Thermal Shutdown Hysteresis	ΔT_{SHDN}			15		$^{\circ}C$
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A \times V_{OUT}}$	$I_{OUT} = 10mA, -40^{\circ}C < T_A < +85^{\circ}C$		± 60		ppm/ $^{\circ}C$

SGM2300-2.5, $V_{IN} = 4.5V$, $T_A = +25^{\circ}C$, unless otherwise noted.

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT}	$I_{OUT} = 10mA$	2.425	2.500	2.575	V
Output Current	I_{OUT}		30	50		mA
Current Limit	I_{LIM}		55			mA
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$V_{IN} = 3.5V \text{ to } 18V, I_{OUT} = 1mA$		0.01		%/V
Load Regulation	ΔV_{OUT}	$I_{OUT} = 1mA \text{ to } 30mA$		1.2	10	mV
Dropout Voltage		$I_{OUT} = 1mA$		35		mV
Current Consumption	I_Q	No Load		1.7	3.8	μA
Thermal Shutdown Temperature	T_{SHDN}			130		$^{\circ}C$
Thermal Shutdown Hysteresis	ΔT_{SHDN}			15		$^{\circ}C$
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A \times V_{OUT}}$	$I_{OUT} = 10mA, -40^{\circ}C < T_A < +85^{\circ}C$		± 60		ppm/ $^{\circ}C$

ELECTRICAL CHARACTERISTICS (continued)SGM2300-2.8, $V_{IN} = 4.8V$, $T_A = +25^{\circ}C$, unless otherwise noted.

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT}	$I_{OUT} = 10mA$	2.716	2.800	2.884	V
Output Current	I_{OUT}		30	50		mA
Current Limit	I_{LIM}		55			mA
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$V_{IN} = 3.8V \text{ to } 18V, I_{OUT} = 1mA$		0.01		%/V
Load Regulation	ΔV_{OUT}	$I_{OUT} = 1mA \text{ to } 30mA$		1.5	10	mV
Dropout Voltage		$I_{OUT} = 1mA$		35		mV
Current Consumption	I_Q	No Load		1.7	3.8	μA
Thermal Shutdown Temperature	T_{SHDN}			130		$^{\circ}C$
Thermal Shutdown Hysteresis	ΔT_{SHDN}			15		$^{\circ}C$
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A \times V_{OUT}}$	$I_{OUT} = 10mA, -40^{\circ}C < T_A < +85^{\circ}C$		± 60		ppm/ $^{\circ}C$

SGM2300-3.0, $V_{IN} = 5.0V$, $T_A = +25^{\circ}C$, unless otherwise noted.

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT}	$I_{OUT} = 10mA$	2.91	3.00	3.09	V
Output Current	I_{OUT}		30	50		mA
Current Limit	I_{LIM}		55			mA
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$V_{IN} = 4V \text{ to } 18V, I_{OUT} = 1mA$		0.01		%/V
Load Regulation	ΔV_{OUT}	$I_{OUT} = 1mA \text{ to } 30mA$		1.6	10	mV
Dropout Voltage		$I_{OUT} = 1mA$		35		mV
Current Consumption	I_Q	No Load		1.7	3.8	μA
Thermal Shutdown Temperature	T_{SHDN}			130		$^{\circ}C$
Thermal Shutdown Hysteresis	ΔT_{SHDN}			15		$^{\circ}C$
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A \times V_{OUT}}$	$I_{OUT} = 10mA, -40^{\circ}C < T_A < +85^{\circ}C$		± 60		ppm/ $^{\circ}C$

SGM2300-3.3, $V_{IN} = 5.5V$, $T_A = +25^{\circ}C$, unless otherwise noted.

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT}	$I_{OUT} = 10mA$	3.201	3.300	3.399	V
Output Current	I_{OUT}		30	50		mA
Current Limit	I_{LIM}		55			mA
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$V_{IN} = 4.5V \text{ to } 18V, I_{OUT} = 1mA$		0.01		%/V
Load Regulation	ΔV_{OUT}	$I_{OUT} = 1mA \text{ to } 30mA$		2	10	mV
Dropout Voltage		$I_{OUT} = 1mA$		35		mV
Current Consumption	I_Q	No Load		1.7	3.8	μA
Thermal Shutdown Temperature	T_{SHDN}			130		$^{\circ}C$
Thermal Shutdown Hysteresis	ΔT_{SHDN}			15		$^{\circ}C$
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A \times V_{OUT}}$	$I_{OUT} = 10mA, -40^{\circ}C < T_A < +85^{\circ}C$		± 60		ppm/ $^{\circ}C$

ELECTRICAL CHARACTERISTICS (continued)SGM2300-3.6, $V_{IN} = 5.6V$, $T_A = +25^{\circ}C$, unless otherwise noted.

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT}	$I_{OUT} = 10mA$	3.492	3.600	3.708	V
Output Current	I_{OUT}		30	50		mA
Current Limit	I_{LIM}		55			mA
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$V_{IN} = 4.6V \text{ to } 18V, I_{OUT} = 1mA$		0.01		%/V
Load Regulation	ΔV_{OUT}	$I_{OUT} = 1mA \text{ to } 30mA$		2	10	mV
Dropout Voltage		$I_{OUT} = 1mA$		35		mV
Current Consumption	I_Q	No Load		1.7	3.8	μA
Thermal Shutdown Temperature	T_{SHDN}			130		$^{\circ}C$
Thermal Shutdown Hysteresis	ΔT_{SHDN}			15		$^{\circ}C$
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A \times V_{OUT}}$	$I_{OUT} = 10mA, -40^{\circ}C < T_A < +85^{\circ}C$		± 60		ppm/ $^{\circ}C$

SGM2300-5.0, $V_{IN} = 7V$, $T_A = +25^{\circ}C$, unless otherwise noted.

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT}	$I_{OUT} = 10mA$	4.85	5.00	5.15	V
Output Current	I_{OUT}		30	50		mA
Current Limit	I_{LIM}		55			mA
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$V_{IN} = 6V \text{ to } 18V, I_{OUT} = 1mA$		0.01		%/V
Load Regulation	ΔV_{OUT}	$I_{OUT} = 1mA \text{ to } 30mA$		2.4	10	mV
Dropout Voltage		$I_{OUT} = 1mA$		35		mV
Current Consumption	I_Q	No Load		1.7	3.8	μA
Thermal Shutdown Temperature	T_{SHDN}			130		$^{\circ}C$
Thermal Shutdown Hysteresis	ΔT_{SHDN}			15		$^{\circ}C$
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A \times V_{OUT}}$	$I_{OUT} = 10mA, -40^{\circ}C < T_A < +85^{\circ}C$		± 60		ppm/ $^{\circ}C$

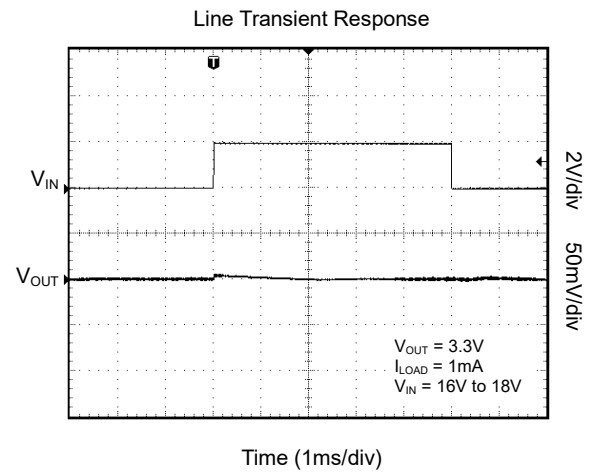
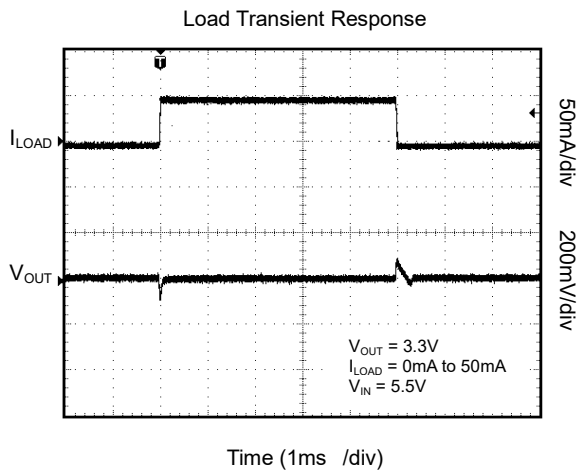
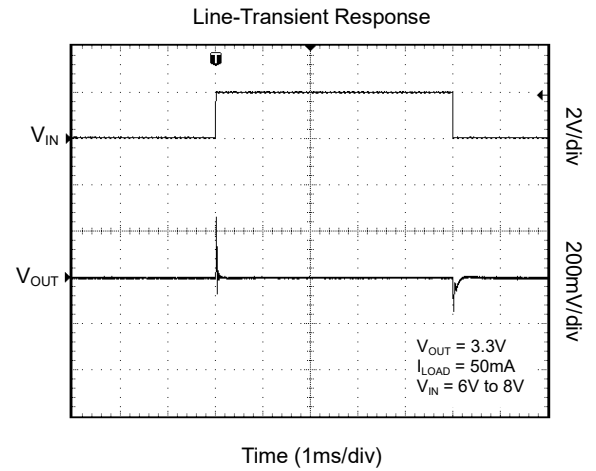
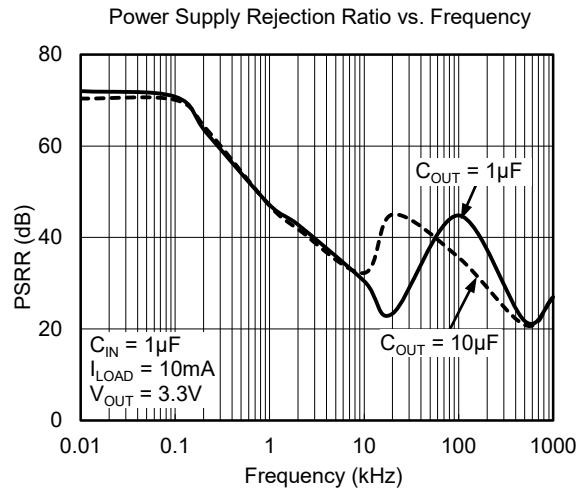
ELECTRICAL CHARACTERISTICS (continued)SGM2300-ADJ, $V_{IN} = V_{OUT(NOMINAL)} + 2V$ or $4V$ (whichever is greater), $T_A = +25^{\circ}C$, unless otherwise noted.

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Adjustable Output Voltage Range	V_{OUT}		1.5		5.0	V
Output Voltage Accuracy ⁽¹⁾		$I_{OUT} = 10mA$	-3		+3	%
Output Current	I_{OUT}		30	50		mA
Current Limit	I_{LIM}		55			mA
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$V_{IN} = 4.6V$ to $18V$, $I_{OUT} = 1mA$, $V_{OUT} = 3.6V$		0.01		%/V
Load Regulation	ΔV_{OUT}	$I_{OUT} = 1mA$ to $30mA$, $V_{OUT} = 3.6V$		2	10	mV
Dropout Voltage		$I_{OUT} = 1mA$, $V_{OUT} = 3.6V$		35		mV
Current Consumption	I_Q	Ground Current		1.45	3.5	μA
Feedback Voltage	V_{FB}			1.221		V
Thermal Shutdown Temperature	T_{SHDN}			130		$^{\circ}C$
Thermal Shutdown Hysteresis	ΔT_{SHDN}			15		$^{\circ}C$
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A \times V_{OUT}}$	$I_{OUT} = 10mA$, $-40^{\circ}C < T_A < +85^{\circ}C$		± 60		ppm/ $^{\circ}C$

NOTE:

1. The accuracy of the feedback resistors used in Figure 2, has a direct impact on the output voltage accuracy.

TYPICAL PERFORMANCE CHARACTERISTICS



TYPICAL APPLICATION CIRCUITS

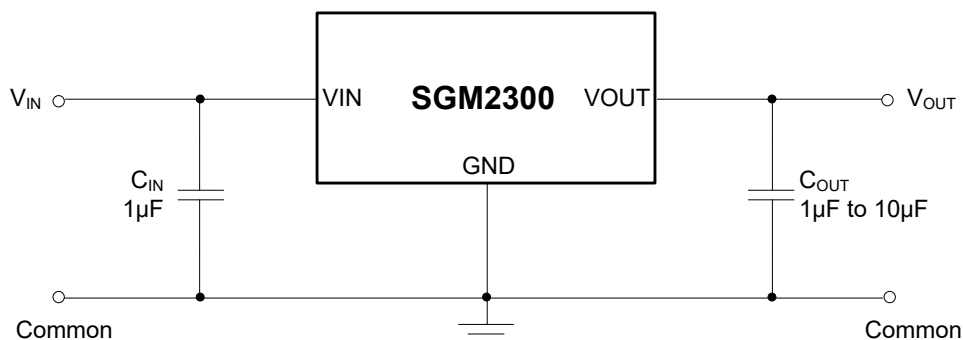


Figure 1. Fixed Voltage Typical Application Circuit

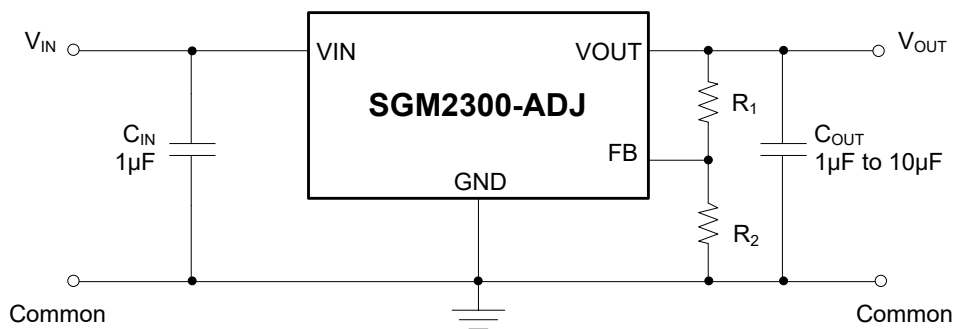


Figure 2. Adjustable Voltage Typical Application Circuit

Standard 1% Resistor Values for Common Output Voltages of Adjustable Voltage Version

V _{OUT} (V)	R ₁ (kΩ)	R ₂ (kΩ)
1.5	120	523
1.8	280	590
2.5	680	649
3.3	953	560
3.6	1000	511
4.4	1500	576
5.0	2000	649

NOTE: $V_{OUT} = (R_1 + R_2)/R_2 \times 1.221$

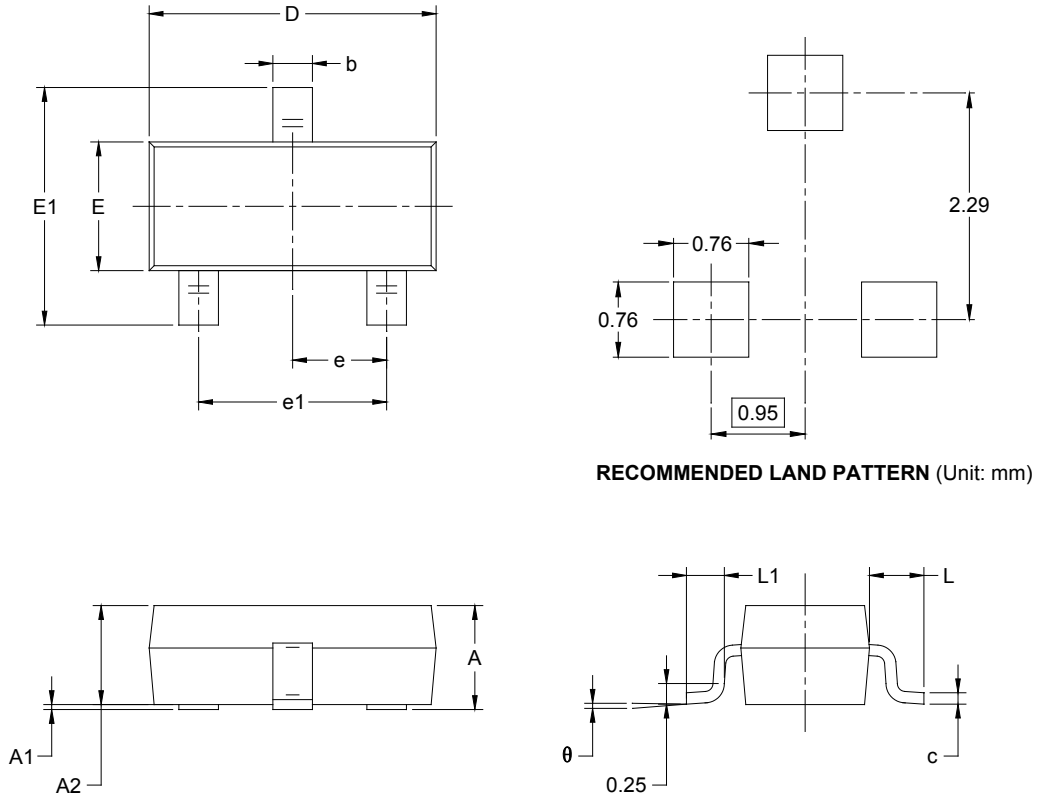
REVISION HISTORY

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

JANUARY 2013 – REV.A.1 to REV.A.2	Page
Updated ELECTRICAL CHARACTERISTICS section.....	5-8
DECEMBER 2012 – REV.A to REV.A.1	Page
Updated ELECTRICAL CHARACTERISTICS section.....	7
Added the Table of Resistor Values for Common Output Voltages of Adjustable Voltage Version.....	10
Changes from Original (NOVEMBER 2012) to REV.A	Page
Changed from product preview to production data.....	All

PACKAGE OUTLINE DIMENSIONS

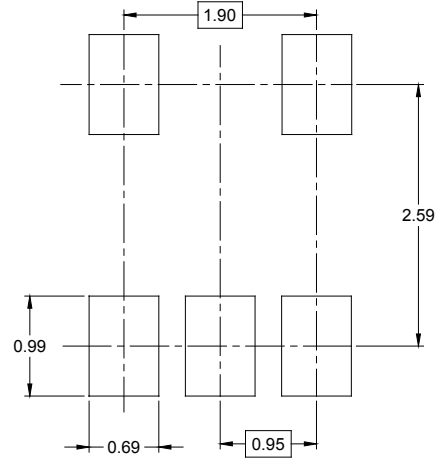
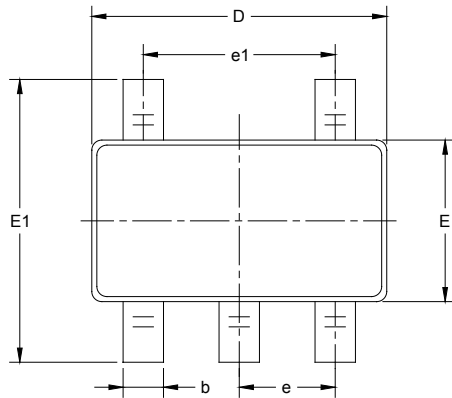
SOT-23



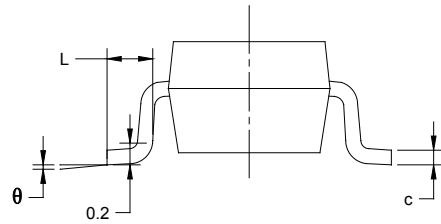
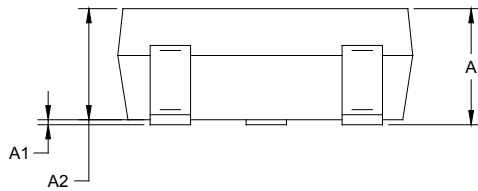
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 BSC		0.037 BSC	
e1	1.900 BSC		0.075 BSC	
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

PACKAGE OUTLINE DIMENSIONS

SOT-23-5



RECOMMENDED LAND PATTERN (Unit: mm)

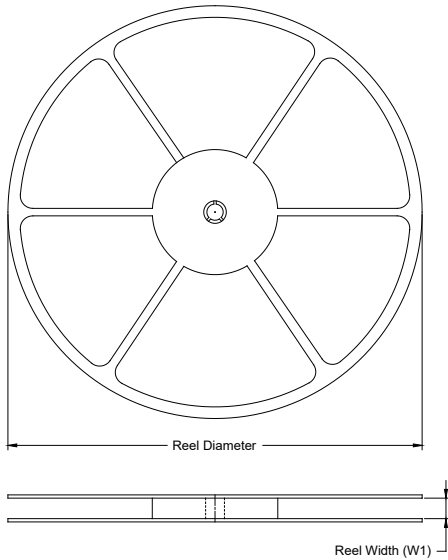


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037 BSC	
e1	1.900 BSC		0.075 BSC	
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

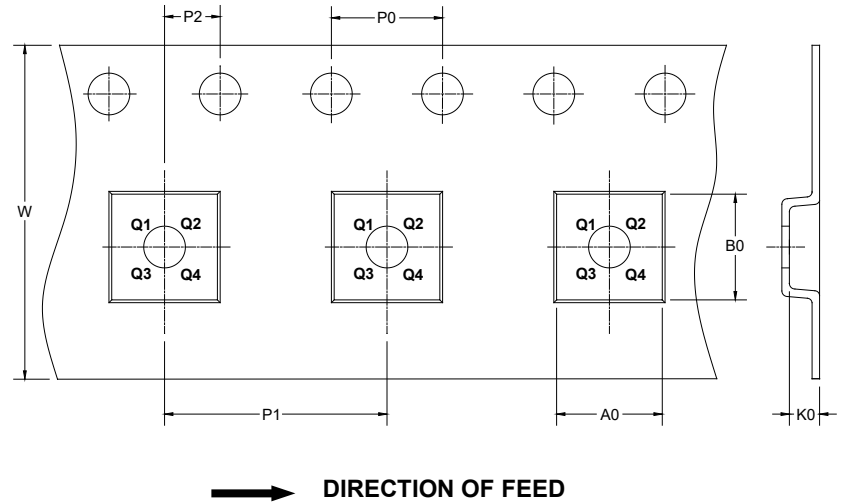
PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



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

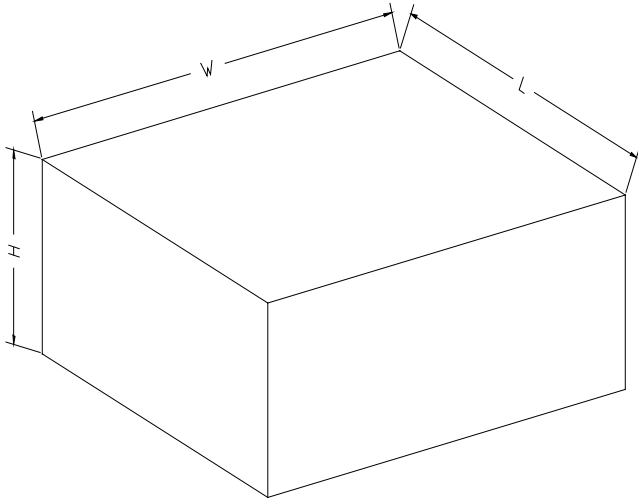
KEY PARAMETER LIST OF TAPE AND REEL

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-23	7"	9.5	3.15	2.77	1.22	4.0	4.0	2.0	8.0	Q3
SOT-23-5	7"	9.5	3.20	3.20	1.40	4.0	4.0	2.0	8.0	Q3

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
7" (Option)	368	227	224	8
7"	442	410	224	18

DD0002