SULR1722A

Technical Data
Data Sheet N1580, Rev. -

300mA Low Dropout Linear Regulator

Description:

The SULR1722A is a 3-pin low dropout linear regulator. The superior characteristics of the SULR1722A include zero base current loss, very low dropout voltage, and 2% accuracy output voltage. Typical ground current remains approximately 55µA, from no load to maximum loading conditions. Dropout voltage at 300mA output current is exceptionally low. Output current limiting and thermal limiting are built in to provide maximal protection to the SULR1722A against fault conditions. The SULR1722A comes in the popular 3-pin SOT-23 package.

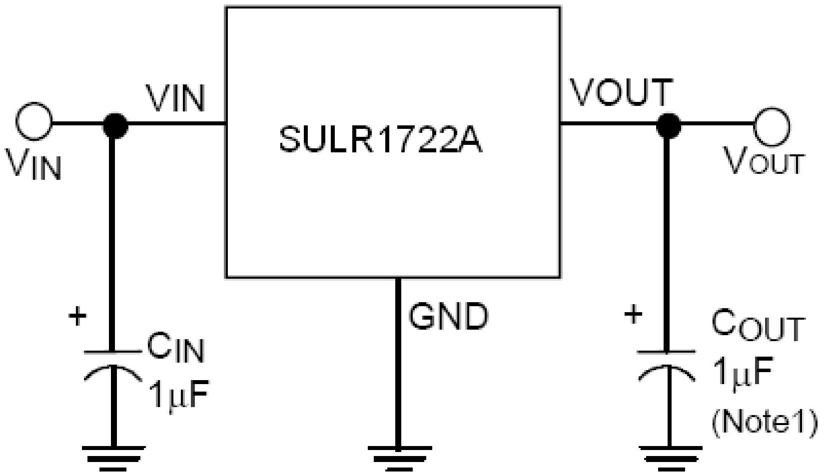
Features:

- Low Dropout Voltage of 470mV at 300mA Output Current (3.0V Output Version).
- Guaranteed 300mA Output Current.
- Maximum Input Voltage is 8V
- Low Ground Current at 55µA.
- 2% Accuracy Output Voltage of 1.5V/1.8V/2.0V /2.5V /2.7V/ 3.0V/ 3.3V/ 3.5V/ 3.7V/ 3.8V/5.0V/ 5.2V.
- Needs only 1µF for Stability.
- Current and Thermal Limiting.

Applications:

- Voltage Regulator for CD-ROM Drivers.
- Voltage Regulator for LAN Cards.
- Voltage Regulator for Microprocessor.
- Wireless Communication Systems.
- Battery Powered Systems.

Typical application circuit:



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Ordering Information:

SULR1722A-XXXXX

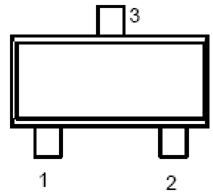
PACKING TYPE
TB: TUBE
TR: TAPING & REEL

PACKAGING TYPE
F: SOT-23

OUTPUT VOLTAGE
15: 1.5V
18: 1.8V
20: 2.0V
25: 2.5V
27: 2.7V
30: 3.0V
33: 3.3V
35: 3.5V
37: 3.7V
38: 3.8V
50: 5.0V
52: 5.2V

PIN CONFIGURATION

SOT-23
TOP VIEW
1: GND
2: VOUT
3: VIN



Marking Diagram:

Part No.	Marking
SULR1722A-18FTR	**BN18G**
SULR1722A-20FTR	**BN20G**
SULR1722A-25FTR	**BN25G**
SULR1722A-27FTR	**BN27G**
SULR1722A-30FTR	**BN30G**
SULR1722A-33FTR	**BN33G**
SULR1722A-35FTR	**BN35G**
SULR1722A-37FTR	**BN37G**
SULR1722A-52FTR	**BN52G**

Absolute Maximum Ratings:

Input Supply Voltage .... -0.3~8V
Operating Temperature Range .... –40°C to 85°C
Maximum Junction Temperature ....125°C
Storage Temperature Range ....–65°C ~ 150°C
Lead Temperature (Soldering) 10 sec. ....260°C
Thermal Resistance Junction to Case SOT-23 ....130°C/W
Thermal Resistance Junction to Ambient SOT-23...180°C/W
(Assume no ambient airflow, no heatsink)

Absolute Maximum Ratings are those values beyond which the life of a device may be impaired.

Test Circuit

Refer to the TYPICAL APPLICATION CIRCUIT.

Electrical Characteristics

(C_{IN} =1μF, C_{OUT}= 1μF, T_A=25℃, unless otherwise specified)(Note 2)

PARAMETER	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	V_{IN}=8V, No Load	-2		+2	%
Line Regulation	I_L=1mA, 1.4V≤V_{OUT}≤3.2V V_{IN}=4V~8V 3.3V≤V_{OUT}≤5.2V V_{IN}=5.5V~8V		 3 3	 10 15	mV
Load Regulation (Note 3)	I_L=0.1~300mA 1.4V≤V_{OUT}≤3.9V V_{IN}=5V 4.0V≤V_{OUT}≤5.2V V_{IN}=7V		 7 15	 20 40	mV
Current Limit (Note 4)	V_{IN}=7V, V_{OUT}=0V	300			mA
Dropout Voltage (Note 5)	I_L=300mA 4.0V≤V_{OUT}≤5.2V 3.0V≤V_{OUT}≤3.9V 2.5V≤V_{OUT}≤2.9V 2.0V≤V_{OUT}≤2.4V 1.4V≤V_{OUT}≤1.9V		400 470 570 800 1260	500 570 670 900 1360	mV
Ground Current	I_O=0.1mA~I_{MAX} 1.4V≤V_{OUT}≤3.9V V_{IN}=5~8V 4.0V≤V_{OUT}≤5.2V V_{IN}=7~8V		 55 55	 80 80	μA
Thermal Shutdown Hysteresis	Guaranteed by design		20		ºC

Note 1: To avoid output oscillation, aluminum electrolytic output capacitor is recommended and ceramic capacitor is not suggested.
Note 2: Specifications are production tested at T_A =25℃. Specifications over the -40℃ to 85℃ operating temperature range are assured by design, characterization and correlation with Statistical Quality Controls (SQC).
Note 3: Regulation is measured at constant junction temperature, using pulse testing with a low ON time.
Note 4: Current limit is measured by pulsing a short time.
Note 5: Dropout voltage is defined as the input to output differential at which the output voltage drops 100mV below the value measured with a 1V differential.

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300mA Low Dropout Linear Regulator

Typical Performance Characteristics

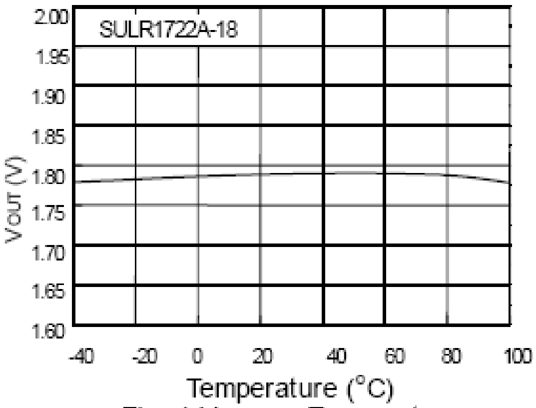

Fig. 1 V_{OUT} vs. Temperature

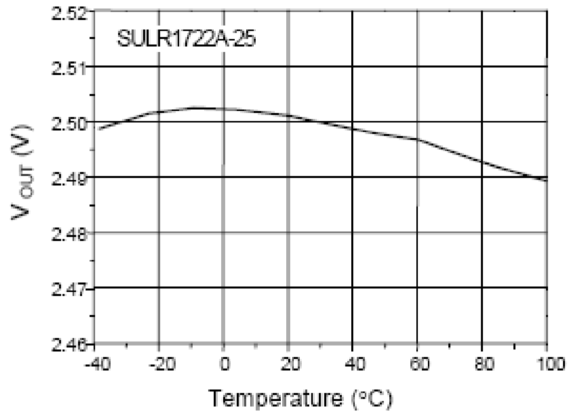

Fig. 2 V_{OUT} vs. Temperature

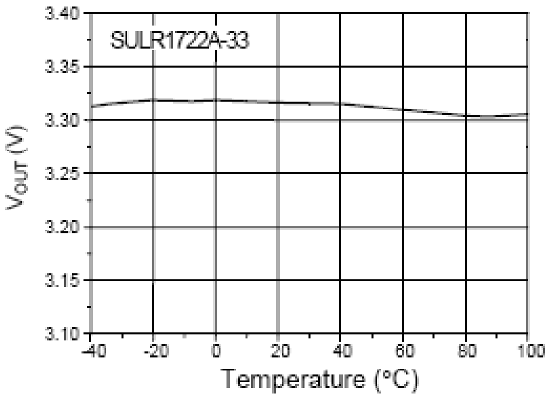

Fig. 3 V_{OUT} vs. Temperature

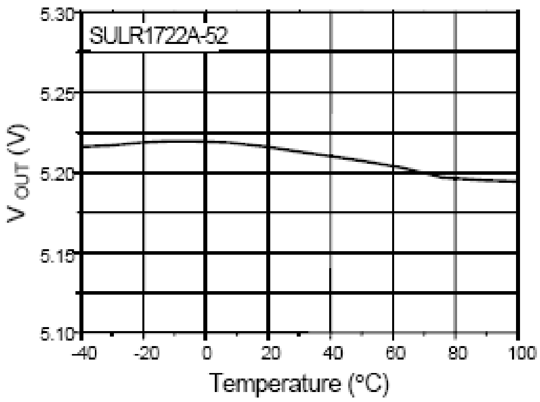

Fig. 4 V_{OUT} vs. Temperature

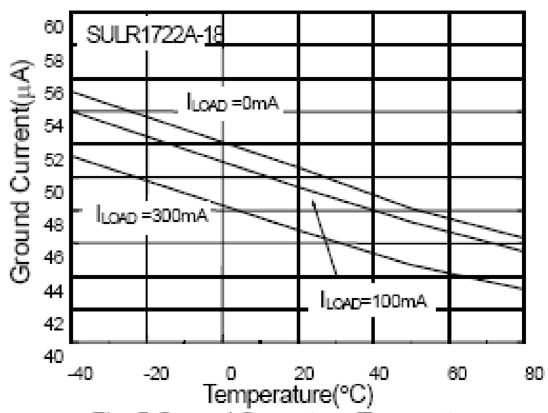

Fig. 5 Ground Current vs. Temperature

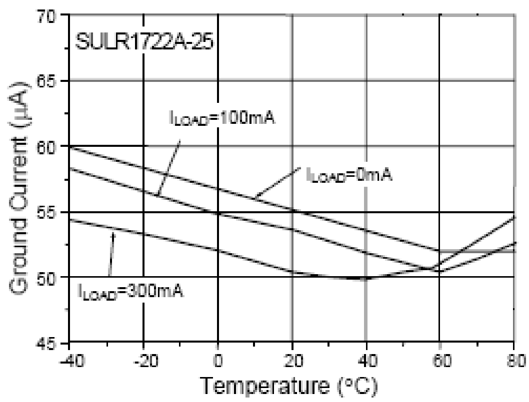

Fig. 6 Ground Current vs. Temperature

Technical Data **300mA Low Dropout Linear Regulator**

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Typical Performance Characteristics (Continued)

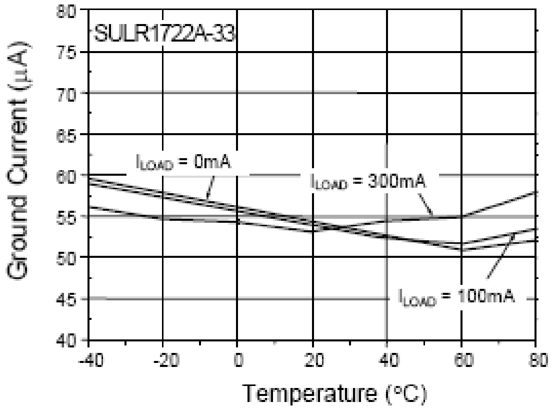

Fig. 7 Ground Current vs. Temperature

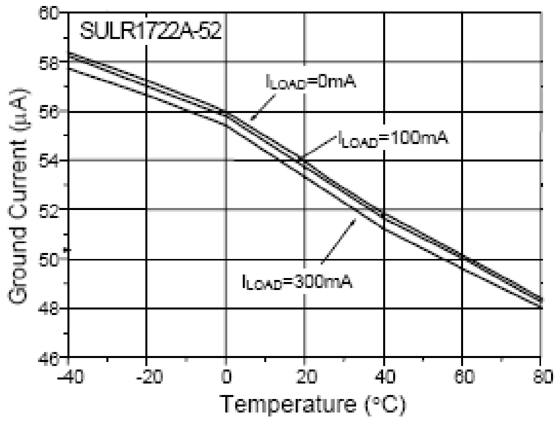

Fig. 8 Ground Current vs. Temperature

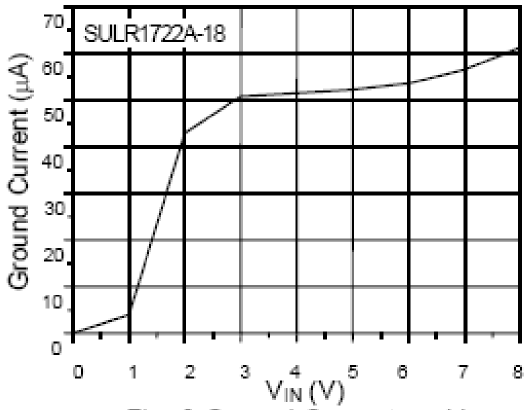

Fig. 9 Ground Current vs. V_{IN}

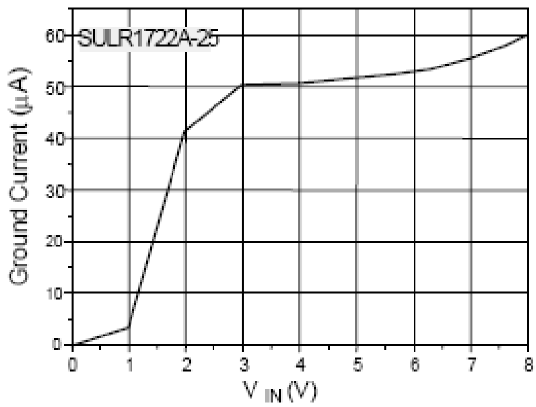

Fig. 10 Ground Current vs. V_{IN}

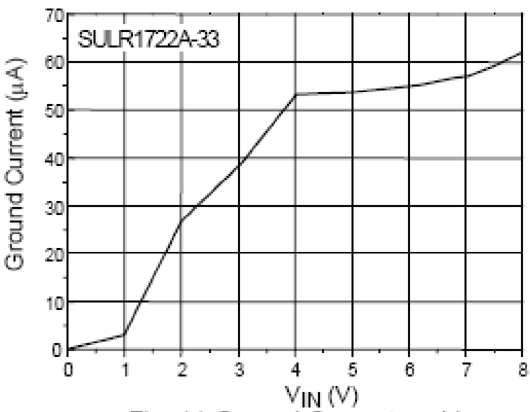

Fig. 11 Ground Current vs. V_{IN}

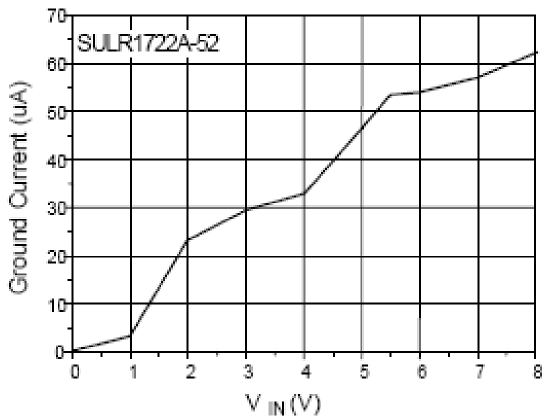

Fig.12 Ground Current vs. V_{IN}

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Typical Performance Characteristics (Continued)

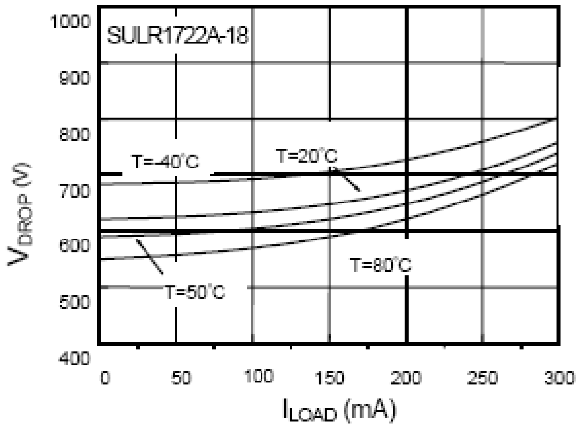


Fig. 13 V_{DROP} vs. I_{LOAD}

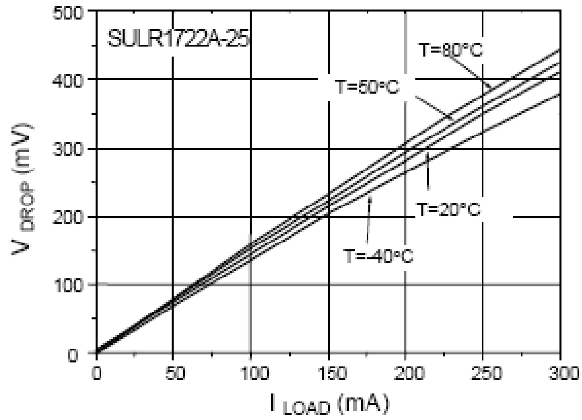


Fig. 14 V_{DROP} vs. I_{LOAD}

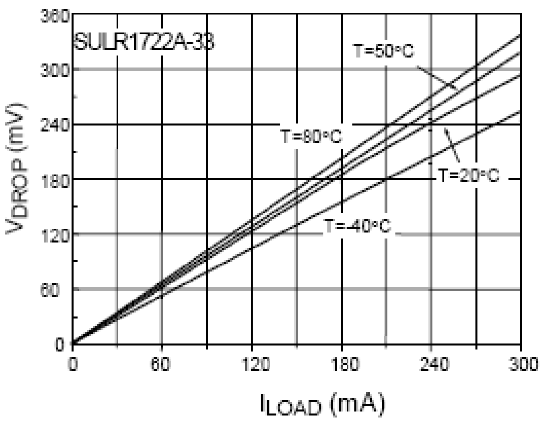


Fig. 15 V_{DROP} vs. I_{LOAD}

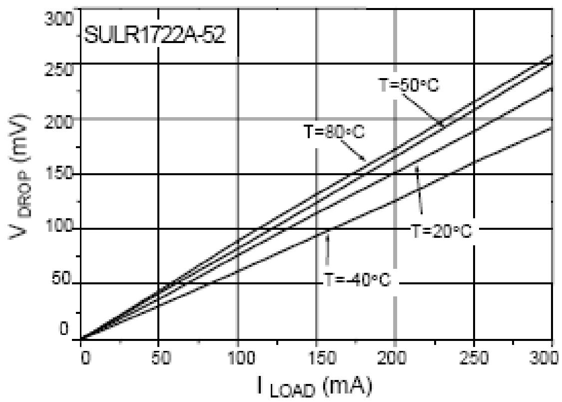


Fig. 16 V_{DROP} vs. I_{LOAD}

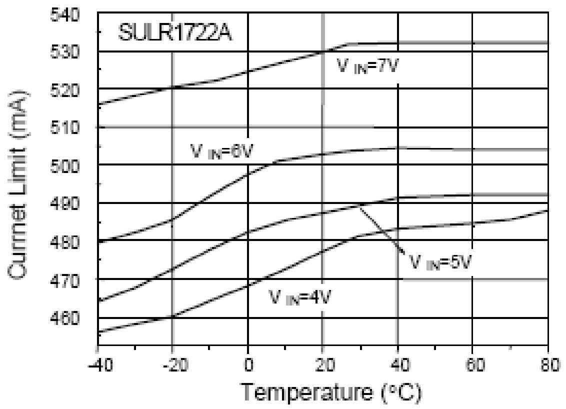
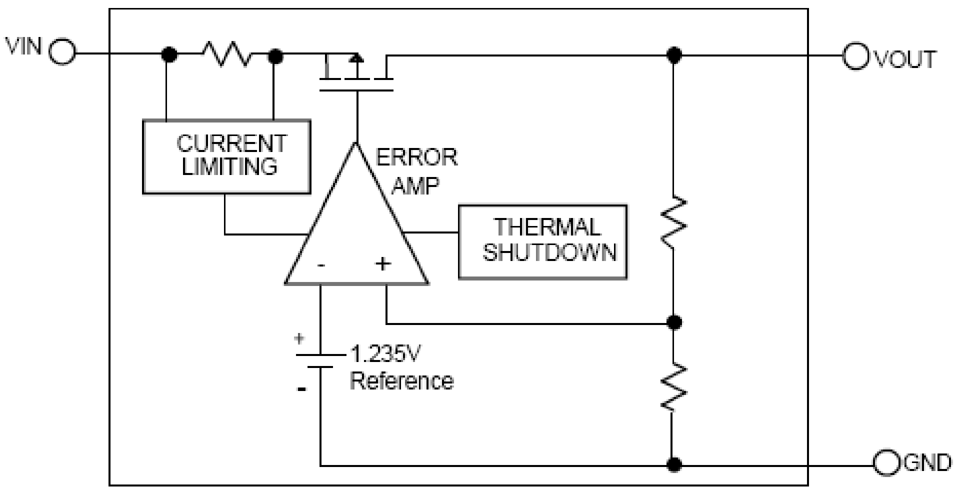


Fig. 17 Current Limit vs. Temperature

300mA Low Dropout Linear Regulator

Block Diagram



Pin Descriptions

VOUT PIN - Output pin.
GND PIN - Power GND.
VIN PIN - Power Supply Input.

Application Information

INPUT-OUTPUT CAPACITORS

Linear regulators require input and output capacitors to maintain stability. Input capacitor at 1μF with 1μF aluminum electrolytic output capacitor is recommended.

POWER DISSIPATION

The SULR1722A obtains thermal-limiting circuitry, which is designed to protect the device against overload condition. For continuous load condition, maximum rating of junction temperature must not be exceeded. It is important to pay more attention in thermal resistance. It includes junction to case, junction to ambient. The maximum power dissipation of SULR1722A depends on the thermal resistance of its case and circuit board, the temperature difference between the die junction and ambient air, and the rate of airflow. The rate of temperature rise is greatly affected by the mounting pad configuration on the PCB, the board material, and the ambient temperature. When the IC mounting with good thermal conductivity is used, the junction temperature will be low even when large power dissipation applies.

The power dissipation across the device is $P = I_{OUT}(V_{IN}-V_{OUT})$.

The maximum power dissipation is:

$$P_{MAX} = \frac{(T_{J\text{-}max} - T_A)}{R_{\Theta JA}}$$

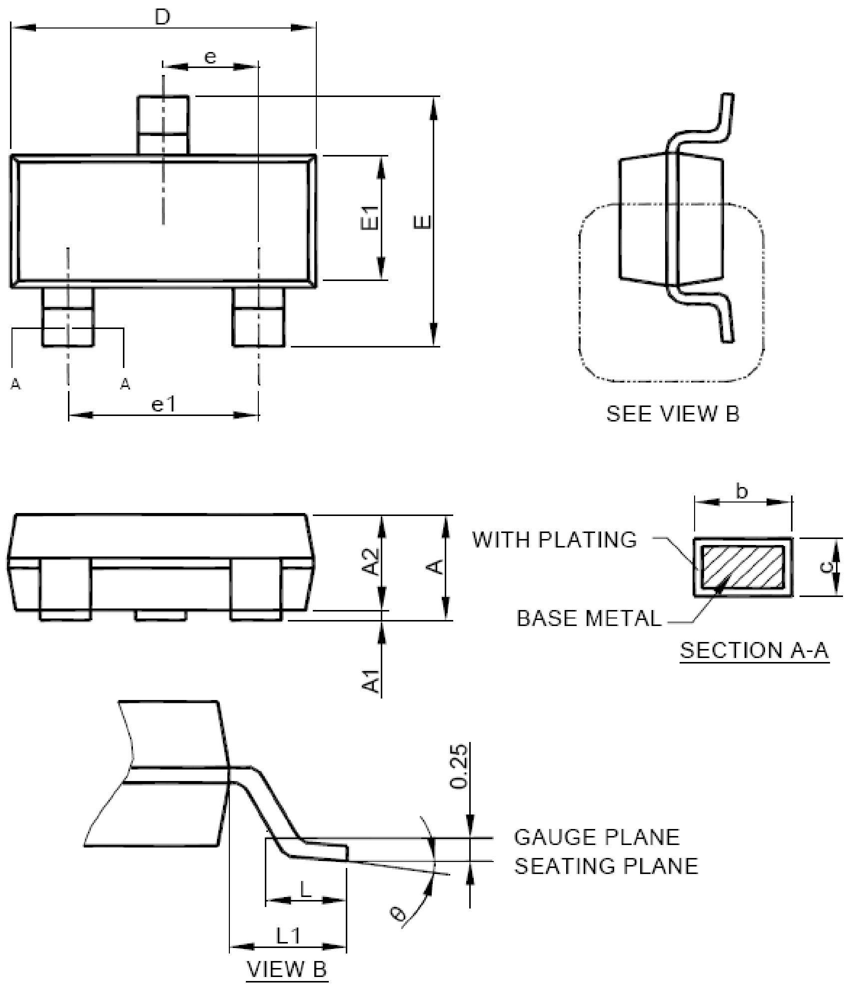
Where $T_{J\text{-}max}$ is the maximum allowable junction temperature (125°C), and T_A is the ambient temperature suitable in application.

As a general rule, the lower temperature is, the better reliability of the device is. So the PCB mounting pad should provide maximum thermal conductivity to maintain low device temperature.

GND pin performs a dual function for providing an electrical connection to ground and channeling heat away. Therefore, connecting the GND pin to ground with a large pad or ground plane would increase the power dissipation and reduce the device temperature.

Physical Dimensions

SOT-23 (unit: mm)



SYMBOL	SOT-23	
	MILLIMETERS	
	MIN.	MAX.
A	0.95	1.45
A1	0.00	0.15
A2	0.90	1.30
b	0.30	0.50
c	0.08	0.22
D	2.80	3.00
E	2.60	3.00
E1	1.50	1.70
e	0.95 BSC	
e1	1.90 BSC	
L	0.30	0.60
L1	0.60 REF	
θ	0°	8°

Note: 1. Refer to JEDEC MO-178.
2. Dimension "D" does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 10 mil per side.
3. Dimension "E1" does not include inter-lead flash or protrusions.
4. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

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