

# 2.5V 1A Positive Voltage Regulator

## Features

- Output current in excess of 1A
- Output voltage accuracy +3%/-1%
- Quiescent current, typically 600 $\mu$ A
- Internal short-circuit current-limit
- Internal over-temperature protection

## Applications

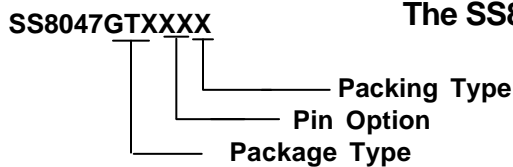
- PC motherboard
- ADSL/Cable Modem
- Set-Top Box
- LAN switch/Hub
- Router

## General Description

The SS8047 positive 2.5V voltage regulator features the ability to source 1A of output current. The typical quiescent current is 0.6mA.

Familiar regulator features such as over-temperature and over-current protection circuits are provided to prevent it from being damaged by abnormal operating conditions.

## Ordering Information



The SS8047 is only available with Pb-free lead finish.

### PACKAGE TYPE

- GT3 : TO 220 Pb-free
- GT4 : TO 252 Pb-free
- GT5 : TO 263 Pb-free
- GT6 : SOT 223 Pb-free

### PIN OPTION

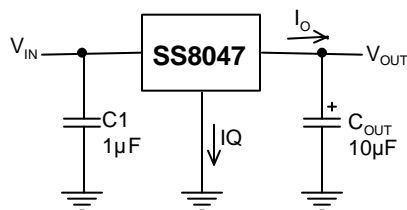
	1	2	3
1 :	V <sub>OUT</sub>	GND	V <sub>IN</sub>
2 :	V <sub>OUT</sub>	V <sub>IN</sub>	GND
3 :	GND	V <sub>OUT</sub>	V <sub>IN</sub>
4 :	GND	V <sub>IN</sub>	V <sub>OUT</sub>
5 :	V <sub>IN</sub>	GND	V <sub>OUT</sub>
6 :	V <sub>IN</sub>	V <sub>OUT</sub>	GND

### PACKING

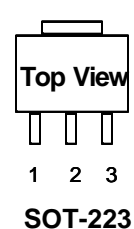
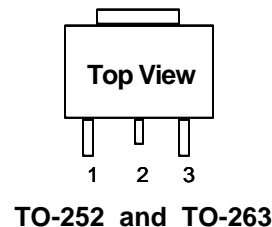
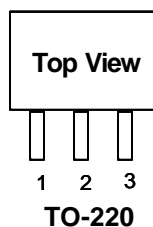
- TR : Tape & Reel
- TB : Tubes

## Typical Application

[Note 4] : Type of C<sub>OUT</sub>



## Pin Configuration



**Absolute Maximum Ratings**

	(Note 1)
Input Voltage.....	.7V
Power Dissipation Internally Limited	(Note 2)
Maximum Junction Temperature.....	150°C
Storage Temperature Range.....	-65°C ≤ T <sub>J</sub> ≤ +150°C
Lead Temperature, Time for Wave Soldering	
TO 220 Package.....	.260°C, 10s
TO 252, TO 263, SOT 223 Package.....	.260°C, 4s
Continuous Power Dissipation (T <sub>A</sub> = + 25°C)	
SOT 223 <sup>(1)</sup> .....	.0.8W
TO 252 <sup>(1)</sup> .....	.1.0W
TO 263 <sup>(1)</sup> .....	.1.6W

Note <sup>(1)</sup>: See Recommended Minimum Footprint.

**Operating Conditions**

(Note 1)

Input Voltage.....	.3.3V~6V
Temperature Range.....	.0°C ≤ T <sub>J</sub> ≤ 125°C

**Electrical Characteristics**

V<sub>IN</sub> = 5V, I<sub>O</sub> = 1A, C<sub>IN</sub> = 1μF, C<sub>OUT</sub> = 10 μF, All specifications apply for T<sub>A</sub> = T<sub>J</sub> = 25°C. [Note 3]

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V <sub>IN</sub> = 5V, 10mA ≤ I <sub>O</sub> ≤ 1A	2.475	2.50	2.575	V
	V <sub>IN</sub> = 3.3V, 10mA ≤ I <sub>O</sub> ≤ 500mA				
Line Regulation	3.3V ≤ V <sub>IN</sub> ≤ 6V, I <sub>O</sub> = 10mA		3	30	mV
Load Regulation	V <sub>IN</sub> = 5V, 10mA ≤ I <sub>O</sub> ≤ 1A		35	50	mV
	V <sub>IN</sub> = 3.3V, 10mA ≤ I <sub>O</sub> ≤ 500mA		25		mV
Output Impedance	200mA DC and 100mA AC, f <sub>o</sub> = 120Hz		80		mΩ
Quiescent Current	V <sub>IN</sub> = 5V		0.6		mA
Ripple Rejection	f <sub>i</sub> = 120Hz, V <sub>ripple</sub> = 2V <sub>P-P</sub> , I <sub>O</sub> = 100mA		46		dB
Dropout Voltage	I <sub>O</sub> = 1A		1.15		V
	I <sub>O</sub> = 500mA		420		mV
	I <sub>O</sub> = 100mA		200		mV
Short Circuit Current			1.6		A
Over Temperature			150		°C

**Note 1:** Absolute Maximum Ratings are limits beyond which damage to the device may occur. Operating Conditions are conditions under which the device functions but the specifications might not be guaranteed. For guaranteed specifications and test conditions see the Electrical Characteristics.

**Note 2:** The maximum power dissipation is a function of the maximum junction temperature, T<sub>Jmax</sub>; total thermal resistance, θ<sub>JA</sub>, and ambient temperature T<sub>A</sub>. The maximum allowable power dissipation at any ambient temperature is T<sub>Jmax</sub> - T<sub>A</sub> / θ<sub>JA</sub>. If this dissipation is exceeded, the die temperature will rise above 150°C and IC will go into thermal shutdown. For the SS8047 in SOT 223 package, θ<sub>JA</sub> is 156°C/W; in TO 263 package, θ<sub>JA</sub> is 75°C/W, and in the TO 252 package, θ<sub>JA</sub> is 125°C/W (See recommend minimum footprint). The safe operation in SOT 223, TO 252 & TO 263 package, it can see "Typical Performance Characteristics" (Safe Operating Area).

**Note3:** Low duty pulse techniques are used during test to maintain junction temperature as close to ambient as possible.

**Note4:** The type of output capacitor should be tantalum or aluminum.

## Definitions

### Dropout Voltage

The input/output Voltage differential at which the regulator output no longer maintains regulation against further reductions in input voltage. Measured when the output drops 100mV below its nominal value. Dropout voltage is affected by junction temperature, load current and minimum input supply requirements.

### Line Regulation

The change in output voltage for a change in input voltage. The measurement is made under conditions of low dissipation or by using pulse techniques such that average chip temperature is not significantly affected.

### Load Regulation

The change in output voltage for a change in load current at constant chip temperature. The measurement is made under conditions of low dissipation or by using pulse techniques such that average chip temperature is not significantly affected.

### Maximum Power Dissipation

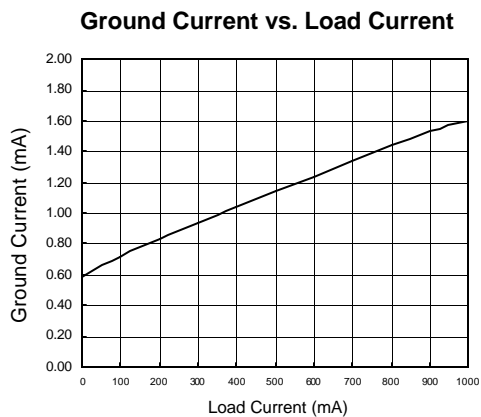
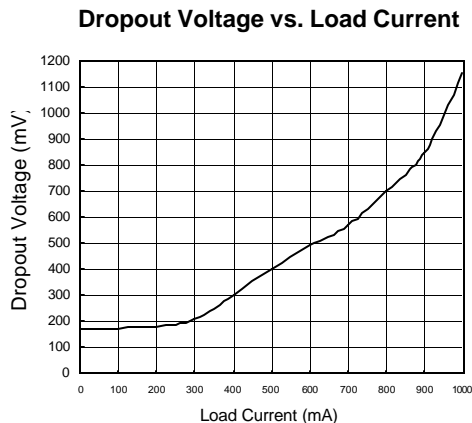
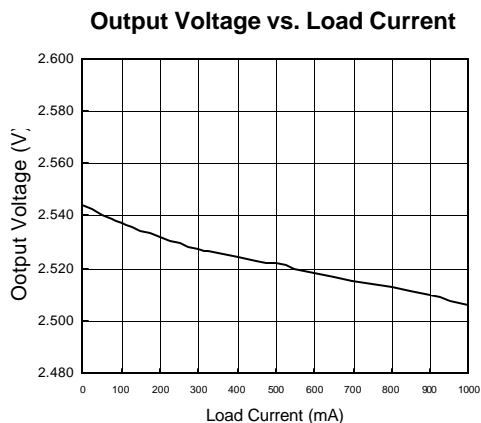
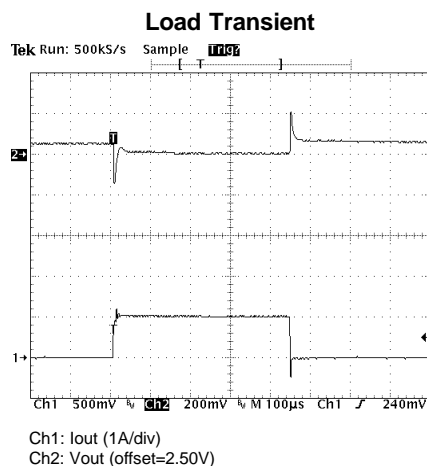
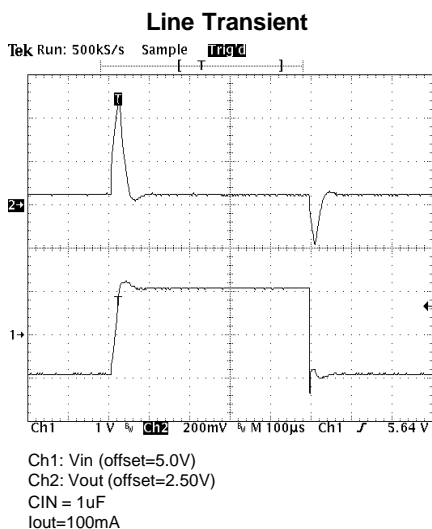
The maximum total device dissipation for which the regulator will operate within specifications.

### Quiescent Bias Current

Current which is used to operate the regulator chip and is not delivered to the load.

## Typical Performance Characteristics

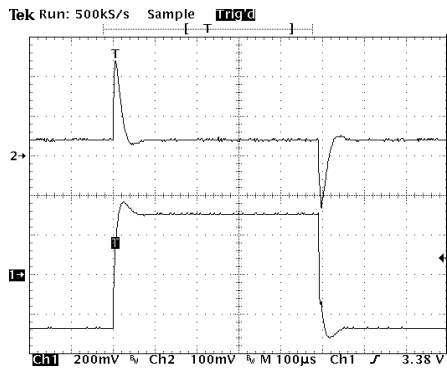
( $V_{IN} = +5V$ ,  $C_{IN} = 1\mu F$ ,  $C_{OUT} = 10\mu F$ ,  $T_A = 25^\circ C$ , unless otherwise noted.)



## Typical Performance Characteristics

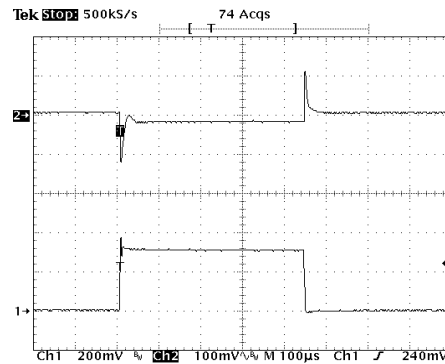
( $V_{IN} = +3.3V$ ,  $C_{IN} = 1\mu F$ ,  $C_{OUT} = 10\mu F$ ,  $T_A = 25^\circ C$ , unless otherwise noted.)

### Line Transient



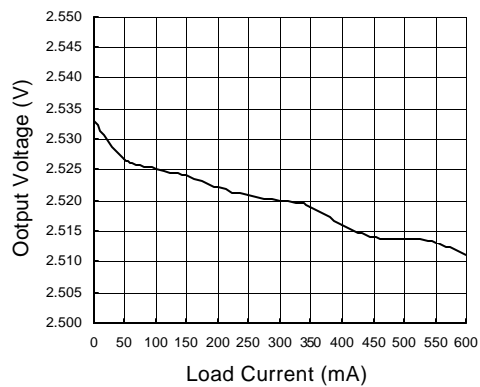
Ch1: Vin (offset=3.3V)  
 Ch2: Vout (offset=2.50V)  
 $C_{IN} = 1\mu F$   
 $I_{out} = 100mA$

### Load Transient

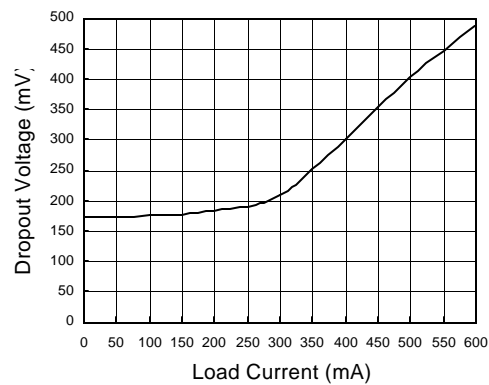


Ch1:  $I_{out}$  (400mA/div)  
 Ch2: Vout is AC coupled

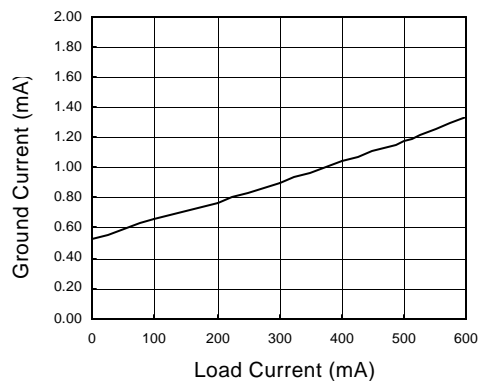
### Output Voltage vs. Load Current



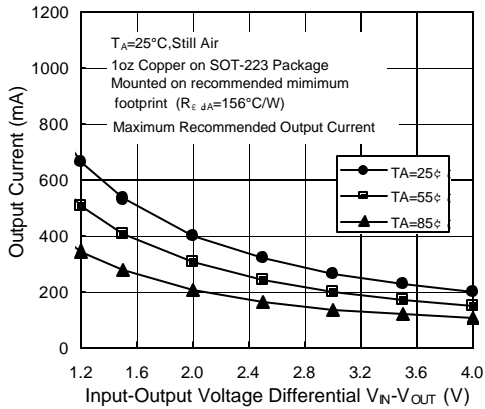
### Dropout Voltage vs. Load Current



### Ground Current vs. Load Current

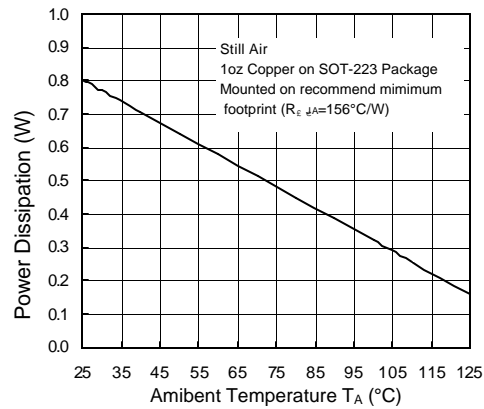


**Safe Operating Area of SOT-223**

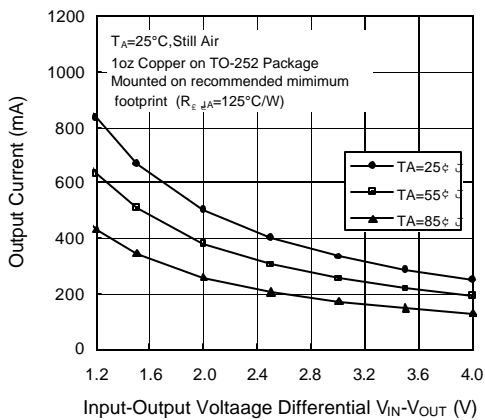


Note:  $V_{IN(max)} \leq 6.5\text{V}$

**Power Dissipation of SOT-223**

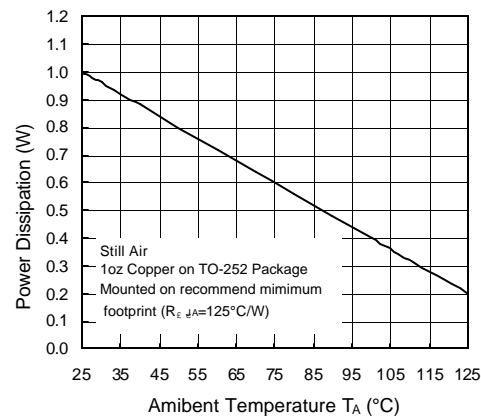


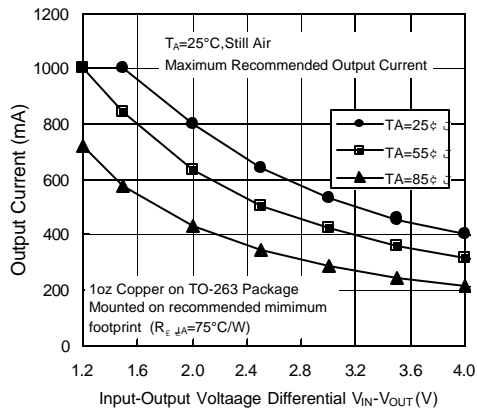
**Safe Operating Area of TO-252**



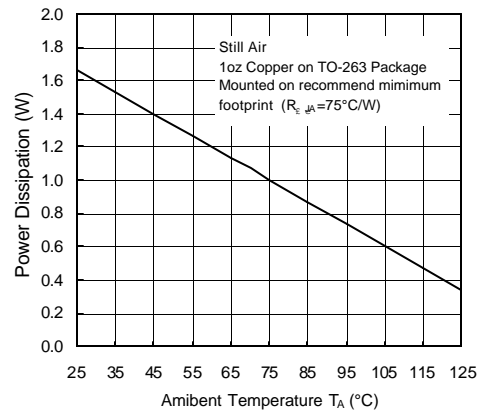
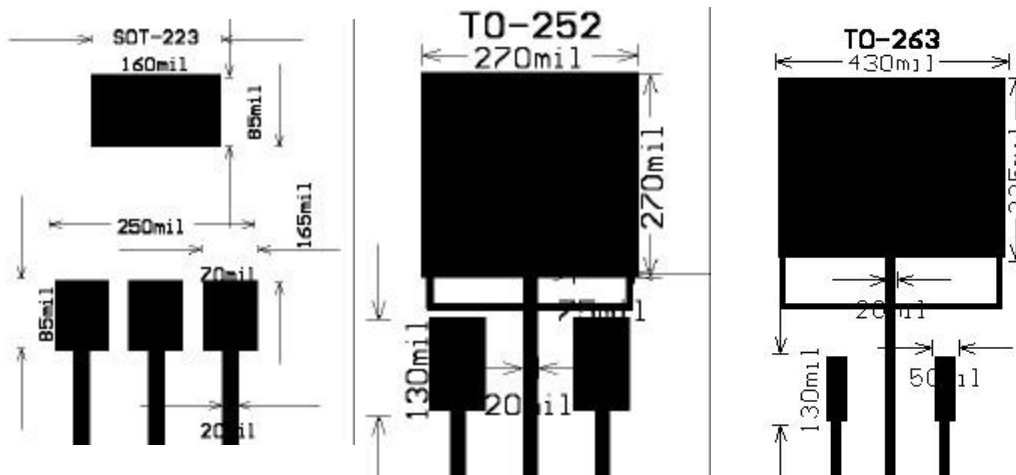
Note:  $V_{IN(max)} \leq 6.5\text{V}$

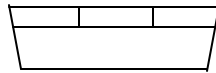
**Power Dissipation of TO-252**



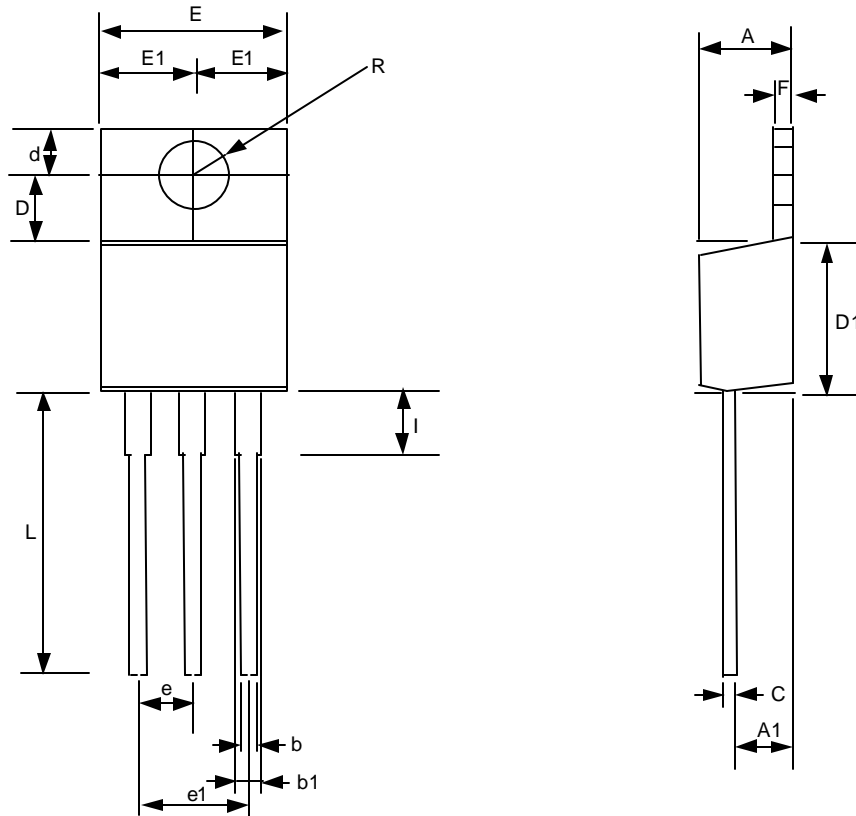
**Safe Operating Area of TO-263**


Note:  $V_{IN(max)} \leq 6.5\text{V}$

**Power Dissipation of TO-263**

**Recommend Minimum Footprint**


**Package Information**


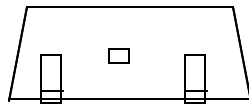
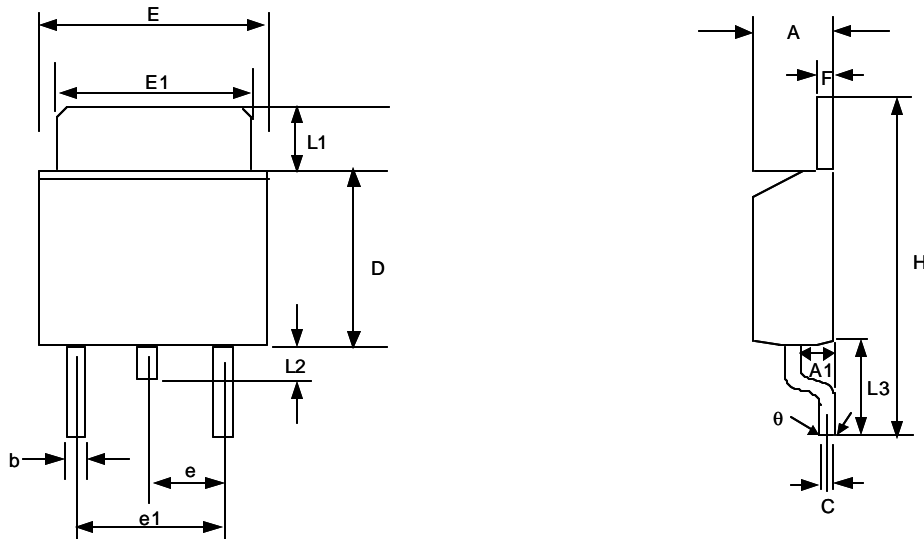
The SS8047 is only available with Pb-free lead finish.



TO-220 (T3) Package

SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.318	4.826	0.170	0.190
A1	2.46	2.72	0.097	0.107
b	0.69	0.94	0.027	0.037
b1	1.143	1.397	0.045	0.055
C	0.304	0.460	0.012	0.018
D	3.429	3.683	0.135	0.145
D1	8.53	9.04	0.336	0.356
d	2.62	2.87	0.103	0.113
E	9.906	10.40	0.390	0.410
E1	2.84	5.13	0.112	0.202
e	2.29	2.79	0.090	0.110
e1	4.83	5.33	0.190	0.210
F	1.143	1.397	0.045	0.055
I	3.454	3.962	0.136	0.156
L	13.589	14.351	0.535	0.565

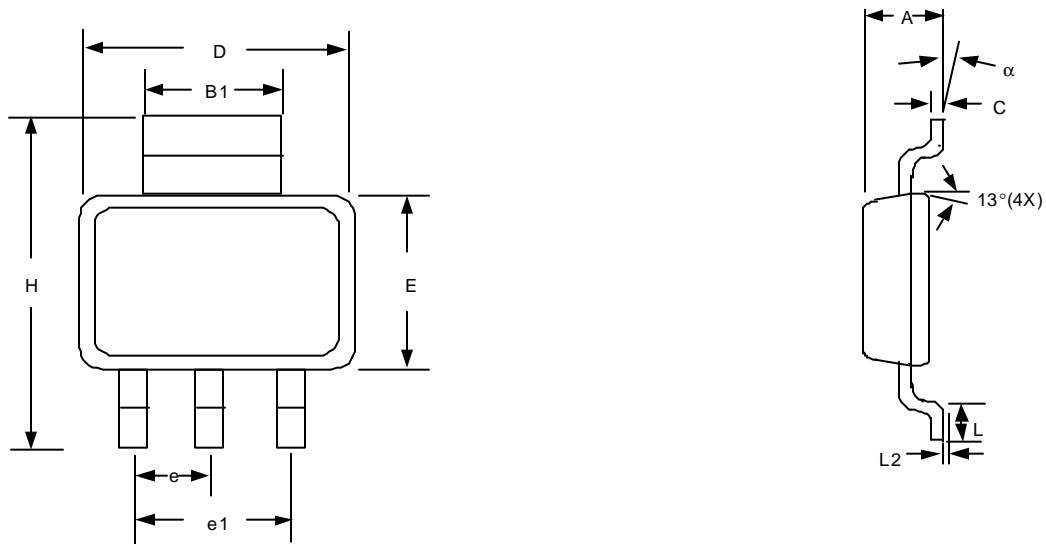




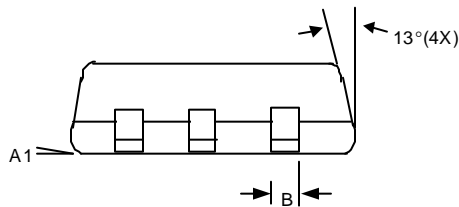
The SS8047 is only available with Pb-free lead finish.

**TO-252 (T4) Package**

SYMBOL	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.19	2.38	0.086	0.094
A1	0.89	1.27	0.035	0.050
b	0.64	0.89	0.025	0.035
C	0.46	0.58	0.018	0.023
D	5.97	6.22	0.235	0.245
E	6.35	6.73	0.250	0.265
E1	5.21	5.46	0.205	0.215
e	2.26BSC		0.09BSC	
e1	3.96	5.18	0.156	0.204
F	0.46	0.58	0.018	0.023
L1	0.89	2.03	0.035	0.080
L2	0.64	1.02	0.025	0.040
L3	2.40	2.80	0.095	0.110
H	9.40	10.40	0.370	0.410
θ	0°	4°	0°	4°



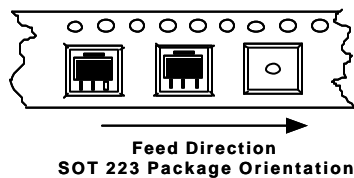
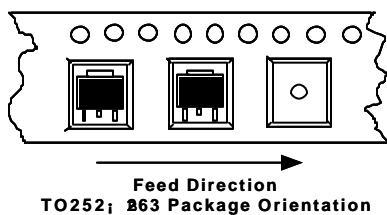
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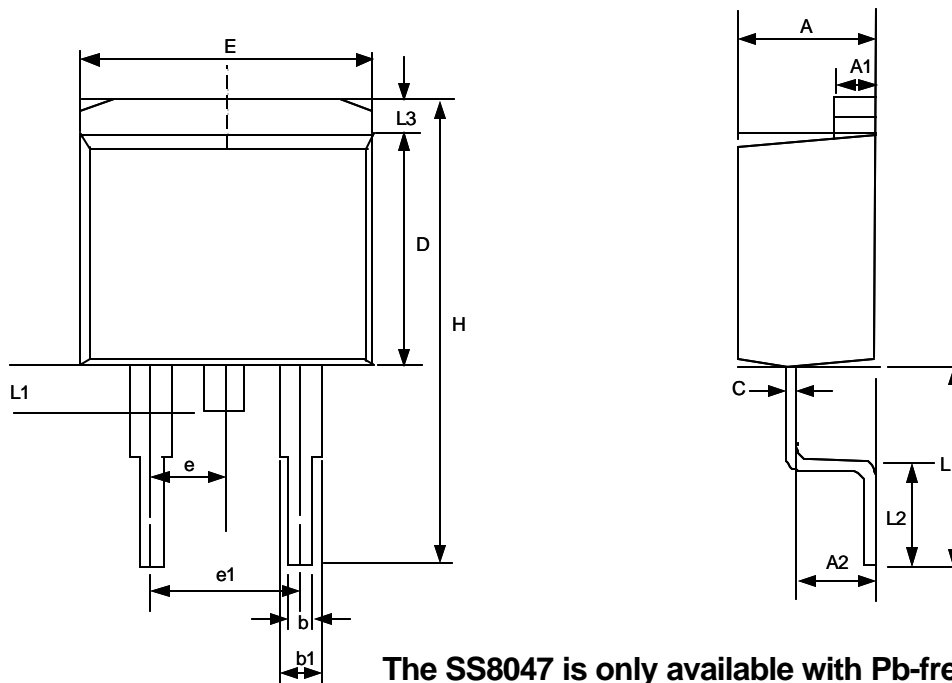


SOT-223 (T6) Package

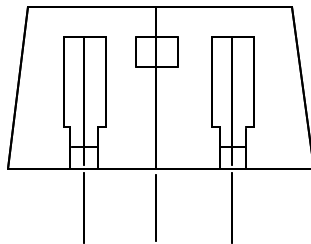
SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.55	1.80	0.061	0.071
A1	0.02	0.12	0.0008	0.0047
B	0.60	0.80	0.024	0.031
B1	2.90	3.10	0.114	0.122
C	0.24	0.32	0.009	0.013
D	6.30	6.70	0.248	0.264
E	3.30	3.70	0.130	0.146
e	2.30 BSC		0.090 BSC	
e1	4.60 BSC		0.181 BSC	
H	6.70	7.30	0.264	0.287
L	0.90 MIN		0.036 MIN	
L2	0.06 BSC		0.0024 BSC	
a	0°	10°	0°	10°

### Package Orientation





The SS8047 is only available with Pb-free lead finish.



TO-263 (T5) Package

SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.70	0.169	0.185
A1	1.22	1.32	0.048	0.055
A2	2.45	2.69	0.104	0.106
b	0.69	0.94	0.027	0.037
b1	1.22	1.40	0.048	0.055
C	0.36	0.56	0.014	0.022
D	8.64	9.652	0.340	0.380
E	9.70	10.54	0.382	0.415
e	2.29	2.79	0.090	0.110
e1	4.83	5.33	0.190	0.210
H	14.60	15.78	0.575	0.625
L	4.70	5.84	0.185	0.230
L1	1.20	1.778	0.047	0.070
L2	2.24	2.84	0.088	0.111
L3	1.40MAX		0.055MAX	

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