

300/500mA Low Dropout Linear Voltage Regulator

General Description

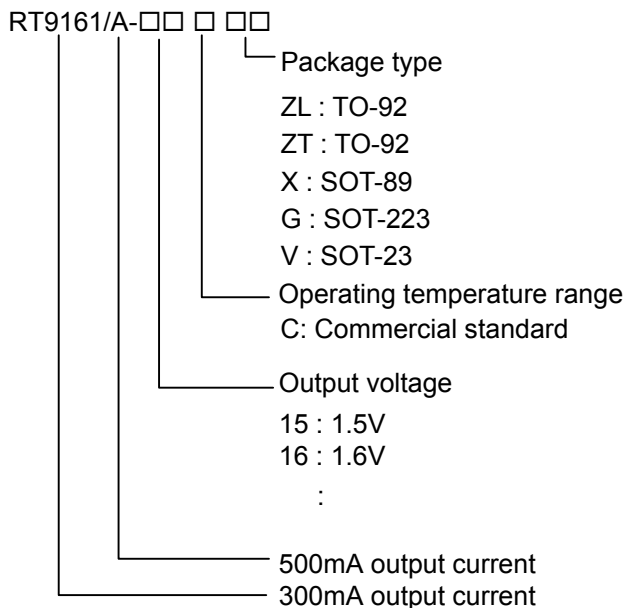
The RT9161/A is a 300/500mA fixed output voltage low dropout linear regulator. Typical ground current is approximately 110 μ A, from zero to maximum loading conditions. Wide range of available output voltage fits most of applications. Built-in output current-limiting most thermal-limiting provide maximal protection against any fault conditions.

For ease of application, the RT9161/A comes in the popular 3-pin SOT-89 (300mA), SOT-223 (500mA), or TO-92 packages.

Applications

- Voltage Regulator for LAN Card, CD-ROM, and DVD
- Wireless Communication Systems
- Battery Powered Systems

Ordering Information



Marking Information

For marking information, contact our sales representative directly or through a RichTek distributor located in your area, otherwise visit our website for detail.

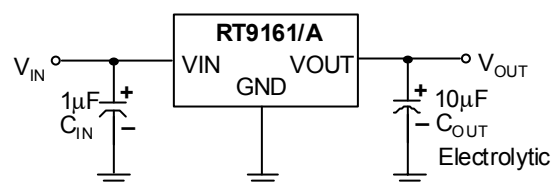
Features

- Low Dropout Voltage of 200mV at Output Current 100mA, 450mV at Output Current 300mA, and 750mV at 500mA Output Current
- Guaranteed 300/500mA Output Current
- Internal 1.5 Ω P-MOSFET Draws No Base Current
- Low Ground Current 110 μ A
- 2% Accuracy Output Voltage
- Input Voltage Range up to 12V
- Extremely Tight Load Regulation
- Fast Transient Response
- Current-limiting and Thermal-limiting

Pin Configurations

Part Number	Pin Configurations
RT9161/A-□□CZL/T (Plastic TO-92)	<p>TOP VIEW</p> <p>ZL ZT</p> <p>1. VIN 1. GND</p> <p>2. GND 2. VIN</p> <p>3. VOUT 3. VOUT</p>
RT9161-□□CV (Plastic SOT-23)	<p>TOP VIEW</p> <p>1. GND</p> <p>2. VOUT</p> <p>3. VIN</p>
RT9161/A-□□CX (Plastic SOT-89)	<p>TOP VIEW</p> <p>1. GND</p> <p>2. VIN (TAB)</p> <p>3. VOUT</p>
RT9161A-□□CG (Plastic SOT-223)	<p>TOP VIEW</p> <p>1. GND</p> <p>2. VIN (TAB)</p> <p>3. VOUT</p>

Typical Application Circuit



Absolute Maximum Ratings

- Input Voltage -0.3 ~ 14V
- Operating Junction Temperature Range -40°C ~ 125°C
- Storage Temperature Range -65°C ~ 150°C
- Power Dissipation, P_D @ $T_A = 25^\circ\text{C}$
 - SOT-89 0.5W
 - TO-92 0.6W
 - SOT-23 0.15W
- Package Thermal Resistance
 - SOT-89, θ_{JC} 100°C/W
 - SOT-89, θ_{JA} 300°C/W
 - SOT-223, θ_{JC} 15°C/W
 - SOT-223, θ_{JA} 60°C/W
 - TO-92, θ_{JA} 160°C/W
 - SOT-23, θ_{JA} 250°C/W

Electrical Characteristics

($T_A = 25^\circ\text{C}$, $C_{IN} = 1\mu\text{F}$, $C_{OUT} = 10\mu\text{F}$, unless otherwise specified.)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units	
Output Voltage Accuracy	ΔV_{OUT}	$I_L = 1\text{mA}$, $V_{IN} = 5\text{V}$	-2	--	+2	%	
Output Voltage Temperature Coefficient			--	50	150	PPM/°C	
Line Regulation	ΔV_{LINE}	$I_L = 1\text{mA}$, $V_{IN} = 4.5 \sim 12\text{V}$	--	2	3	% V_{OUT}	
Load Regulation (2)	ΔV_{LOAD}	$I_L = 1\text{mA} \sim 300/500\text{mA}$, $V_{IN} = 5\text{V}$	--	1	30/50	mV	
Current Limit (3)	RT9161	I_{LIMIT}	$V_{IN} = 5\text{V}$, $V_{OUT} = 0\text{V}$	350	580	--	mA
	RT9161A			500	900	--	
Dropout Voltage (4) (5)	V_{DROP}	$I_L = 300/500\text{mA}$	--	450/750	600/1000	mV	
Standby Current	$I_{STANDBY}$	$I_L = 0$, $V_{IN} = 12\text{V}$	--	110	180	μA	

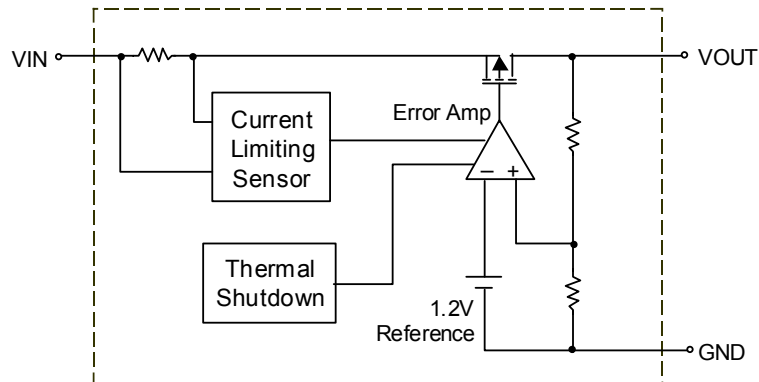
Note:

- (1) Guaranteed by design.
- (2) Regulation is measured at constant junction temperature, using pulsed ON time.
- (3) Current Limit is measured at constant junction temperature, using pulsed ON time.
- (4) Dropout is measured at constant junction temperature, using pulsed ON time, and the criterion is V_{OUT} inside target value $\pm 2\%$.
- (5) Dropout test is skipped at the condition of $V_{IN} < 3\text{V}$.

Pin Description

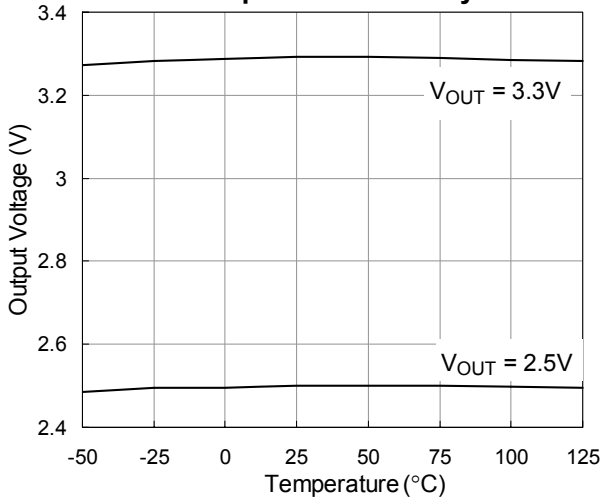
Pin Name	Pin Function
VOUT	Output Voltage
GND	Ground
VIN	Power Input

Function Block Diagram

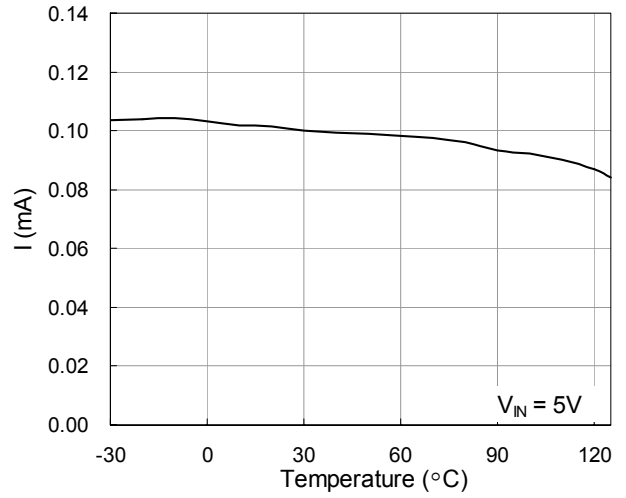


Typical Operating Characteristics

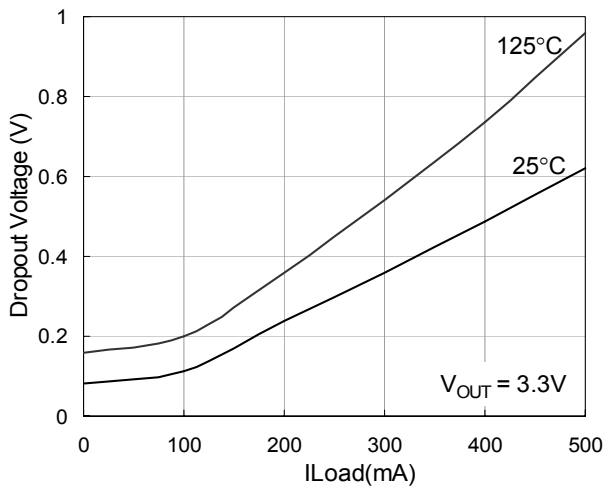
Temperature Stability



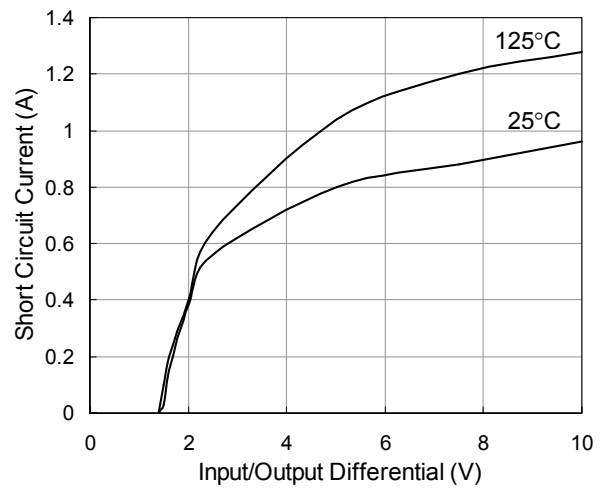
Quiescent Current



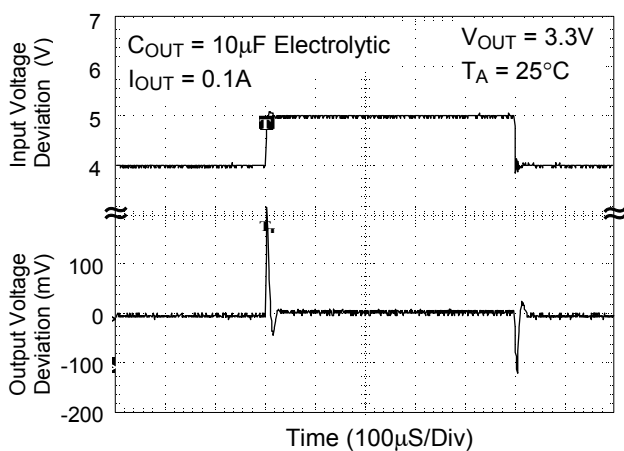
Dropout Voltage ($V_{in}-V_{out}$)



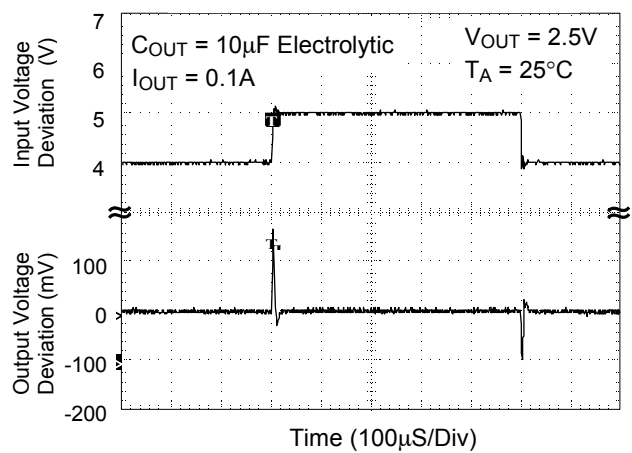
Short Circuit Current



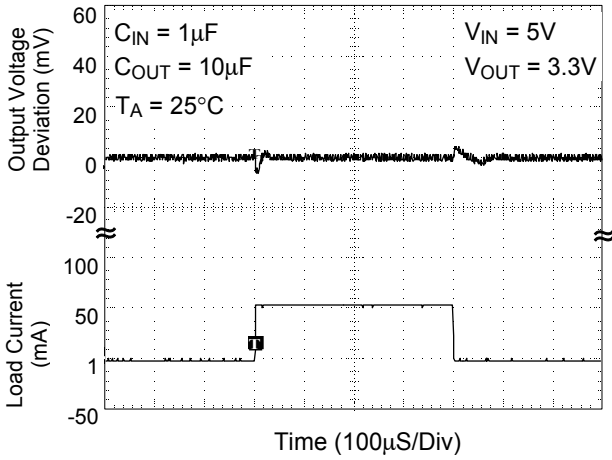
Line Transient Response



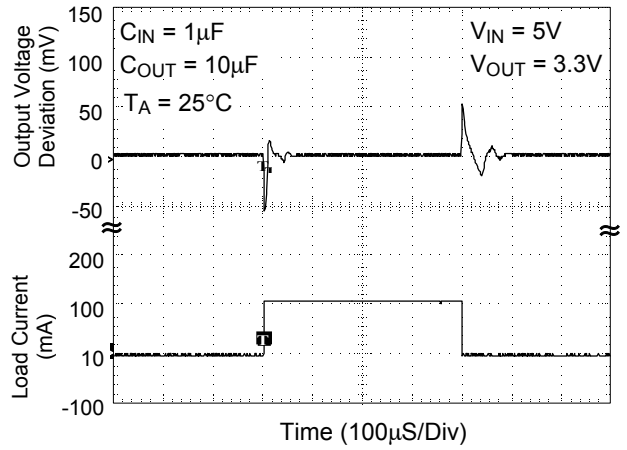
Line Transient Response



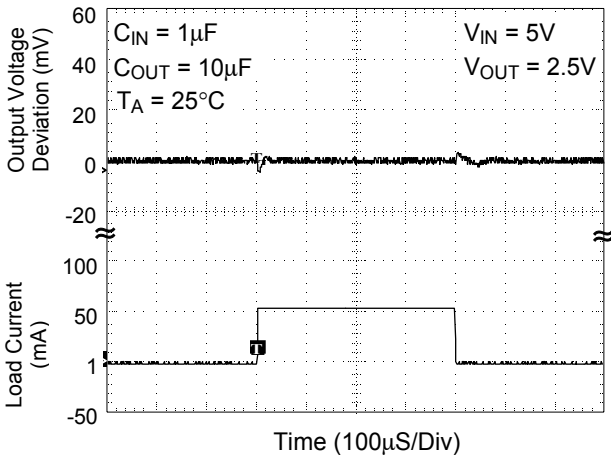
Load Transient Response



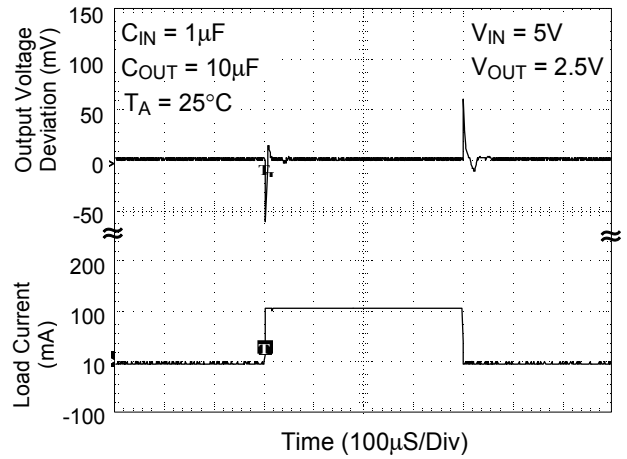
Load Transient Response



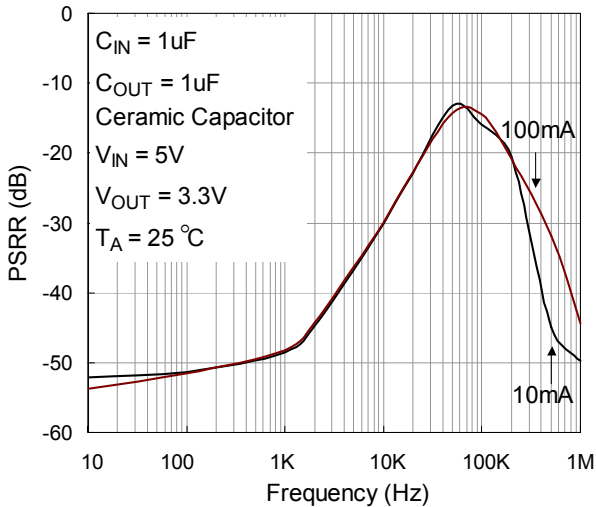
Load Transient Response



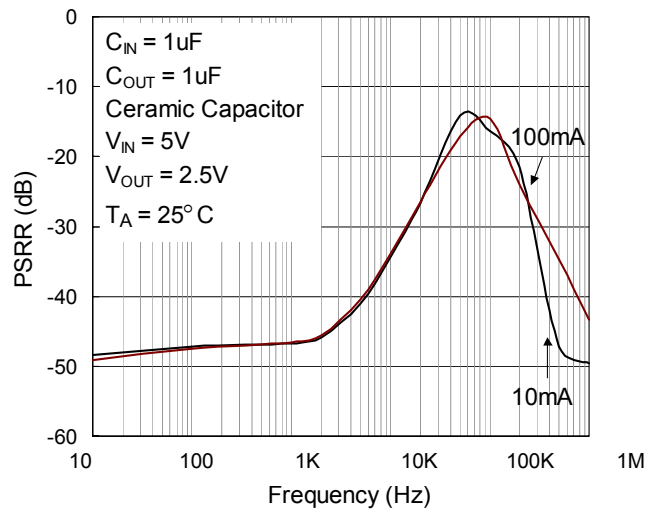
Load Transient Response



PSRR



PSRR

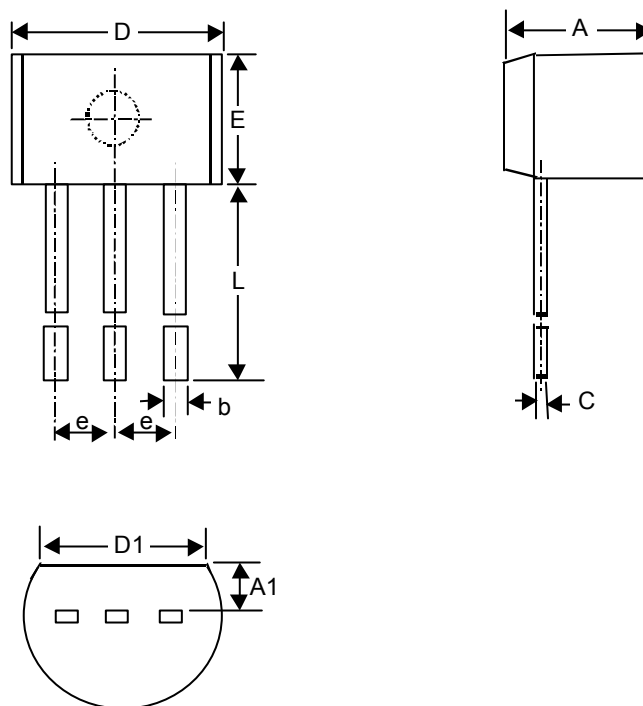


Application Information

A 10 μ F (or larger) capacitor is recommended between VOUT and GND for stability. The part may oscillate without the capacitor. Any type of capacitor can be used, but not Aluminum electrolytics when operating below -25°C. The capacitance may be increased without limit.

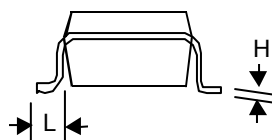
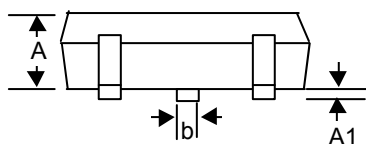
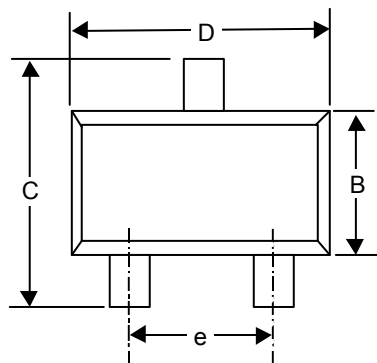
A 1 μ F capacitor (or larger) should be placed between VIN to GND.

Package Information



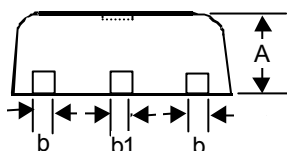
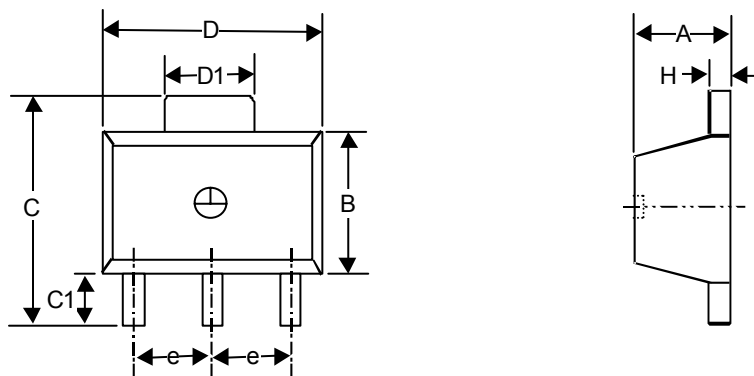
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.175	4.191	0.125	0.165
A1	1.143	1.372	0.045	0.054
b	0.406	0.533	0.016	0.021
C	0.406	0.533	0.016	0.021
D	4.445	5.207	0.175	0.205
D1	3.429	--	0.135	--
E	4.318	5.334	0.170	0.210
e	1.143	1.397	0.045	0.055
L	12.700	--	0.500	--

3-Lead TO-92 Package



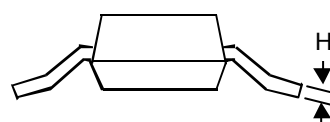
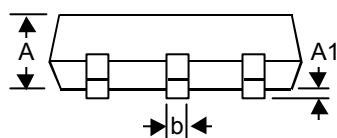
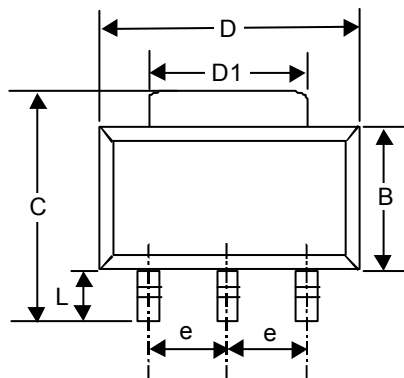
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.889	1.295	0.035	0.051
A1	--	0.152	--	0.006
B	1.397	1.803	0.055	0.071
b	0.356	0.508	0.014	0.020
C	2.591	2.997	0.102	0.118
D	2.692	3.099	0.106	0.122
e	1.803	2.007	0.071	0.079
H	0.102	0.254	0.004	0.010
L	0.356	0.610	0.014	0.024

SOT-23 Plastic Surface Mount



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.397	1.600	0.055	0.063
b	0.356	0.483	0.014	0.019
B	2.388	2.591	0.094	0.102
b1	0.406	0.533	0.016	0.021
C	--	4.242	--	0.167
C1	0.787	1.194	0.031	0.047
D	4.394	4.597	0.173	0.181
D1	1.397	1.753	0.055	0.069
e	1.448	1.549	0.057	0.061
H	0.355	0.432	0.014	0.017

3-Lead SOT-89 Surface Mount



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	--	1.803	--	0.071
A1	0.020	0.100	0.0008	0.0047
b	0.610	0.787	0.024	0.031
B	3.302	3.708	0.130	0.146
C	6.706	7.290	0.264	0.287
D	6.299	6.706	0.248	0.264
D1	2.896	3.150	0.114	0.124
e	2.261	2.362	0.089	0.093
H	0.229	0.330	0.009	0.013
L	0.914	--	0.036	--

3-Lead SOT-223 Plastic Surface Mount

RICHTEK TECHNOLOGY CORP.

Headquarter

5F, No. 20, Taiyuen Street, Chupei City

Hsinchu, Taiwan, R.O.C.

Tel: (8863)5526789 Fax: (8863)5526611

RICHTEK TECHNOLOGY CORP.

Taipei Office (Marketing)

8F-1, No. 137, Lane 235, Paochiao Road, Hsintien City

Taipei County, Taiwan, R.O.C.

Tel: (8862)89191466 Fax: (8862)89191465

Email: marketing@richtek.com