

SK6216 20V 500mA High PSRR, Low Power Consumption LDO

GENERAL DESCRIPTION

The SK6216 series is a set of three-terminal, low power, high voltage regulators implemented in CMOS technology. The series features extremely low quiescent current which is typically 2.0 μ A. They allow input voltages as high as 20V. The device provides large current with a significantly small dropout voltage.

The SK6216 consists of a high-precision voltage reference, an error correction circuit, an over temperature protection circuit, and a current limited output driver. They are available with several fixed output voltages ranging from 1.8V to 5.5V. CMOS technology ensures low dropout voltage and low current consumption.

The SK6216 regulators are available in standard SOT89-3L, and SOT23-3L packages. Standard products are Pb-free and Halogen-free.

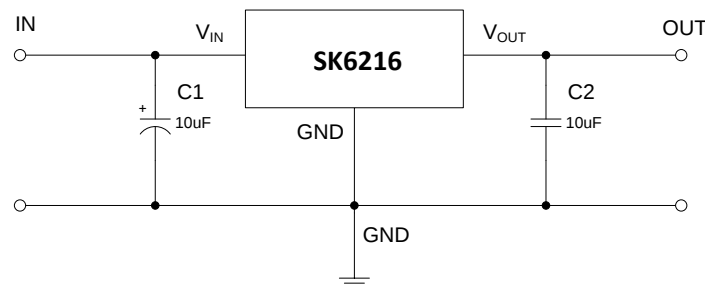
FEATURES

- Input Voltage: 3V~20V
- Output Range: 1.8V~5.5V
- Output Current: 500mA (Within Max Power Dissipation)
- Dropout Voltage: 140mV @ 100mA, when $V_{OUT}=3.3V$
- Quiescent Current: 2 μ A Typ.
- PSRR: 70dB@10KHz
- Fast Load Transient Response
- Good Line Regulation: 0.01%/V
- Good Load Regulation: 5mV@1mA $\leq I_O \leq$ 50mA
- Soft Start

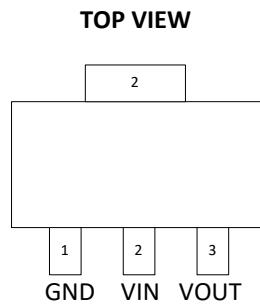
APPLICATIONS

- Battery powered equipment
- Voltage regulator for microprocessor
- Voltage regulator for LAN cards
- Wireless communication equipment
- Audio/Video equipment

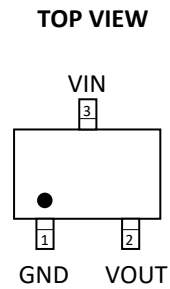
TYPICAL APPLICATION CIRCUIT



PIN CONFIGURATION



SOT89-3L



SOT23-3L

PIN DESCRIPTIONS

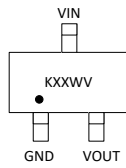
PIN NO		SYMBOL	I/O	DESCRIPTION
SK6216T3B	SK6216S3			
1	1	GND	Ground	Ground
2	3	VIN	I	Power Supply
3	2	VOUT	O	Output

ORDERING INFORMATION

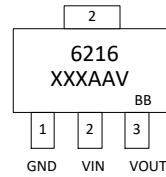
PART NO	ACCURACY	PACAKGE	TEMPERATURE	TAPE & REEL
SK6216S3-XX	± 2%	SOT23-3L	-40°C to +85°C	3000/REEL
SK6216S3-XX-A	± 1%	SOT23-3L	-40°C to +85°C	3000/REEL
SK6216T3B-XX	± 2%	SOT89-3L	-40°C to +85°C	1000/REEL

“XX”: fixed output voltages ranging from 1.8V to 5.5V

MARKING DESCRIPTION



SOT23-3L



SOT89-3L

“K”: product code, stands for “SK6216”.

“XX”: Internal Control Code.

“W”: The week of manufacturing.

“A” stands for week 1,

“Z” stands for week 26,

“a” stands for week 27,

“z” stands for week 52.

“V”: Output voltage code.

“XXX, BB”: Internal Control Code.

“AA”: Serial Number.

“V”: Output voltage code.

TYPICAL OUTPUT VOLTAGE CODE TABLE

V _{OUT}	CODE	V _{OUT}	CODE
1.8V	D	2.5V	E
2.8V	M	3.0V	G
3.3V	H	3.6V	I
4.0V	J	4.4V	4
5.0V	K		

ABSOLUTE MAXIMUM RATINGS (Note)

SYMBOL	ITEMS		VALUE	UNIT
V _{IN}	Input Voltage		-0.3~25	V
V _{OUT}	Output Voltage		-0.3~6	V
P _{DMAX}	Power Dissipation	SOT23-3L	0.2	W
		SOT89-3L	0.7	W
R _{θJA}	Thermal Resistance of Junction to Ambient	SOT23-3L	400	°C/W
		SOT89-3L	160	°C/W
T _J	Junction Temperature		-40~150	°C
T _A	Ambient Temperature		-40~85	°C
T _{STG}	Storage Temperature		-55~150	°C
T _{SOLDER}	Package Lead Soldering Temperature		260°C, 10s	
ESD	HBM		±5.5	KV

Note: Exceed these limits to damage to the device. Exposure to absolute maximum rating conditions may affect device reliability.

RECOMMENDED OPERATING CONDITIONS

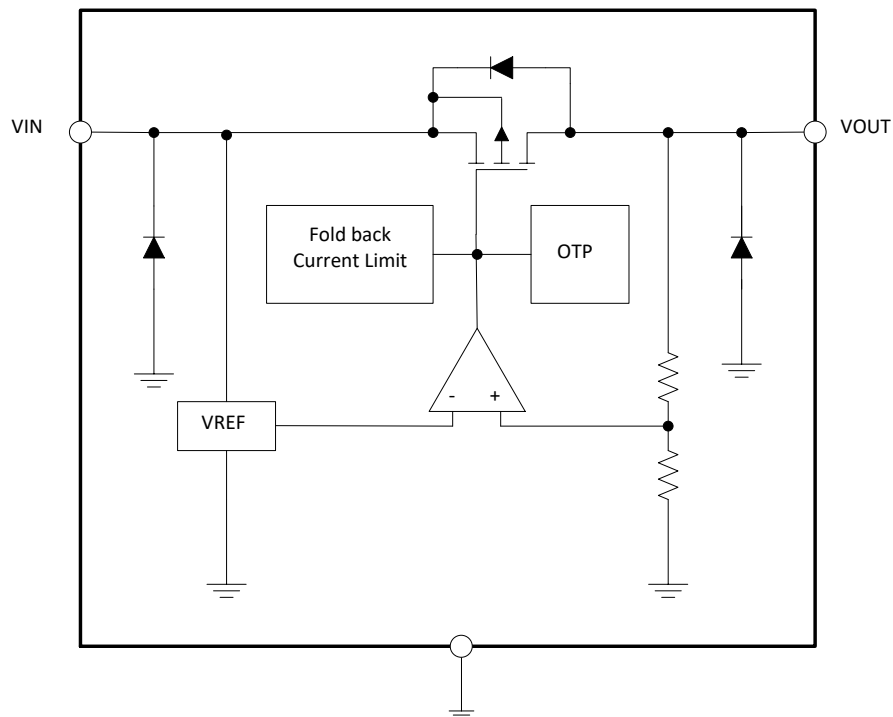
SYMBOL	ITEMS	VALUE	UNIT
V _{IN}	Supply Voltage	3~20	V
C _{IN}	Input Capacitor	0.1~10	μF
C _O	Output Capacitor	1~10	μF

ELECTRICAL CHARACTERISTICS

The following specifications apply for $V_{OUT}=3.3V$ $T_A=25^{\circ}C$, unless specified otherwise.

SYMBOL	ITEMS	CONDITIONS		MIN	TYP	MAX	UNIT
V _{IN}	Input Voltage			3	5	20	V
V _{OUT}	V _{OUT} Range	V _{IN} =V _{OUT} +2V, I _{OUT} =1mA	SK6216S3-XX-A	-1	V _{OUT}	+1	%
			SK6216S3-XX	-2	V _{OUT}	+2	%
			SK6216T3B-XX	-2	V _{OUT}	+2	%
I _{OUT}	Output Current	Within Maximum Power Dissipation		500			mA
I _Q	Quiescent Current	No Load			2		μA
V _{DROP}	Dropout Voltage	V _{OUT} = 3.3 V, I _{OUT} = 100 mA, ΔV=2%			140		mV
		V _{OUT} = 5.0 V, I _{OUT} = 100 mA, ΔV=2%			115		
Δ V _{LINE}	Line Regulation	V _{IN} = 5~12V, I _{OUT} = 1mA				6	mV
Δ V _{LOAD}	Load Regulation	V _{IN} = 12V, I _{OUT} = 1~100 mA				20	mV
I _{SHORT}	Short Current	V _{OUT} Short to GND with 1Ω			60		mA
ΔV _{OUT} /(Δta*V _{OUT})	Temperature coefficient	I _{OUT} =1mA, 0≤Ta≤120℃			90		ppm/℃
PSRR	Power Supply Rejection Rate	V _{IN} =5V _{DC} +0.5V _{P-P} F=10KHz, I _{OUT} =1mA			70		dB
T _{SD}	Thermal Shutdown Protection (OTP)	V _{IN} = V _{OUT} + 2 V, I _{OUT} = 20 mA			150		℃
T _{SD_HYS}	OTP Hysteresis				20		℃

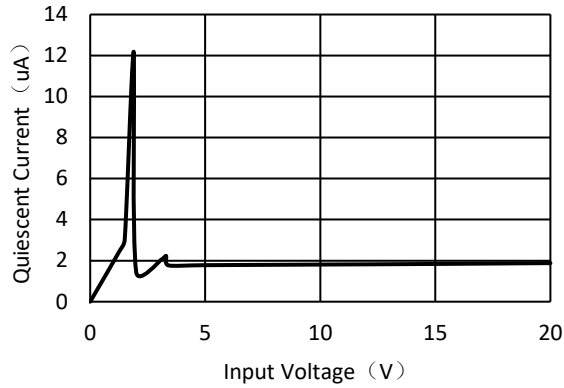
BLOCK DIAGRAM



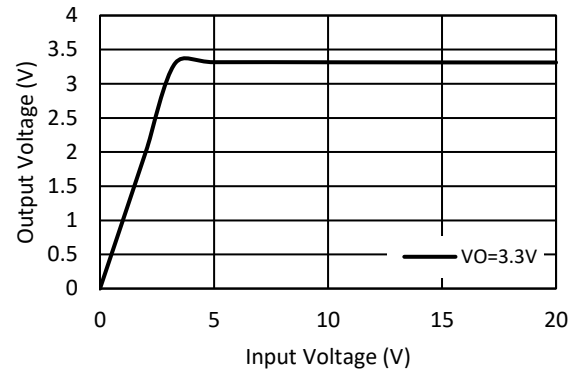
TYPICAL PERFORMANCE CHARACTERISTICS

$C_{IN}=1\mu F$, $C_{OUT}=10\mu F$, $T_{OPT}=25^{\circ}C$, $V_{IN}=5V$, $V_{OUT}=3.3V$, unless specified otherwise.

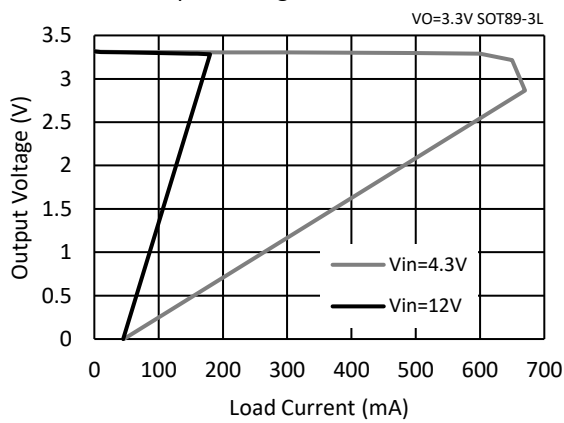
Quiescent Current vs. Input Voltage



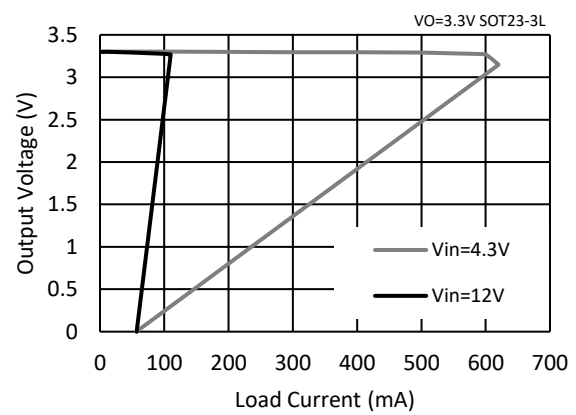
Output Voltage vs. Input Voltage



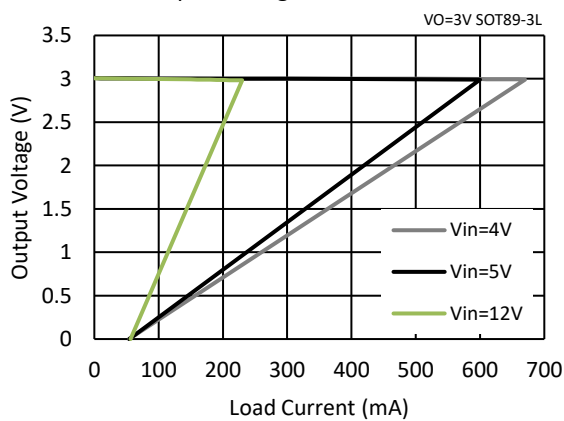
Output Voltage vs. Load Current



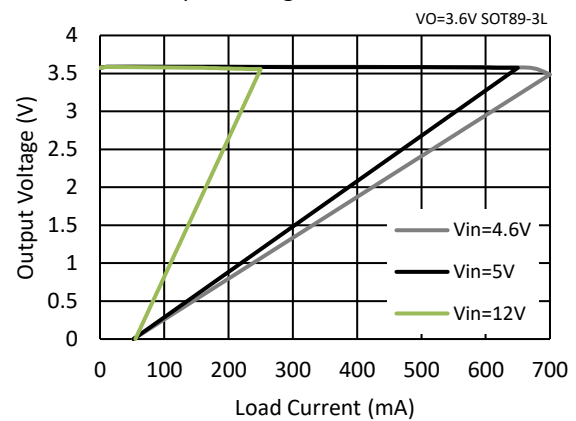
Output Voltage vs. Load Current

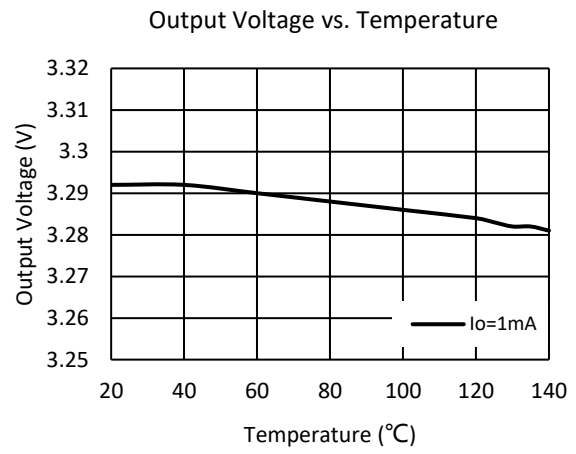
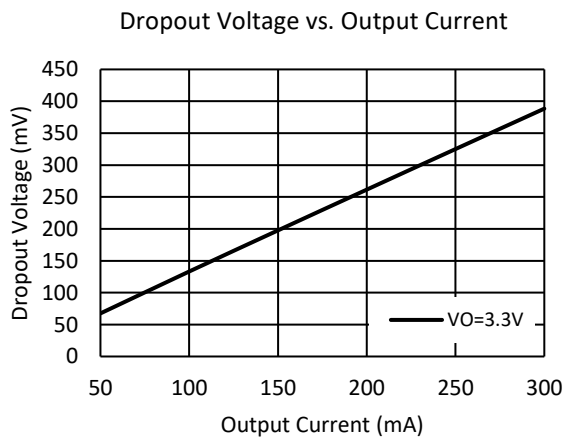
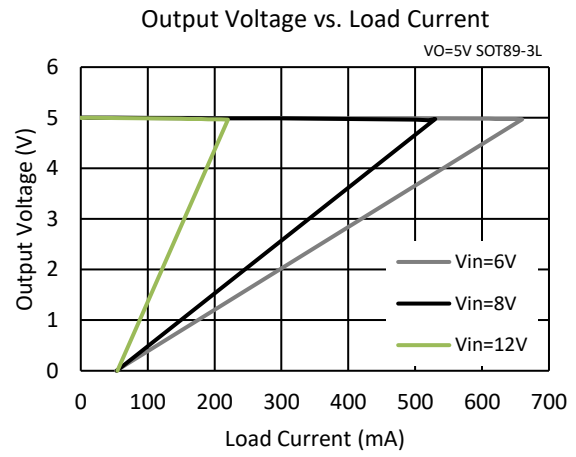
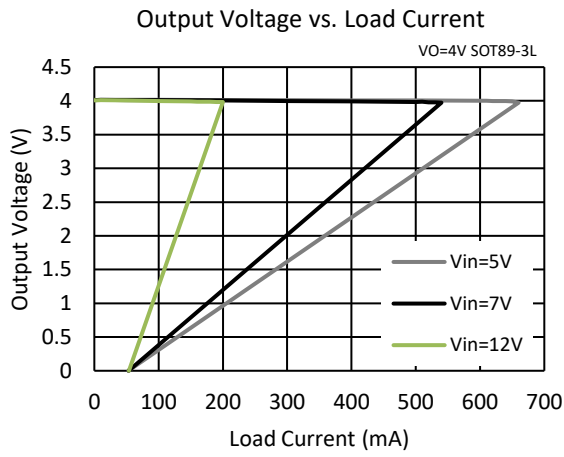


Output Voltage vs. Load Current

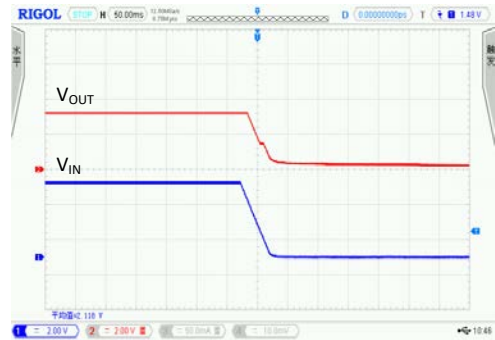
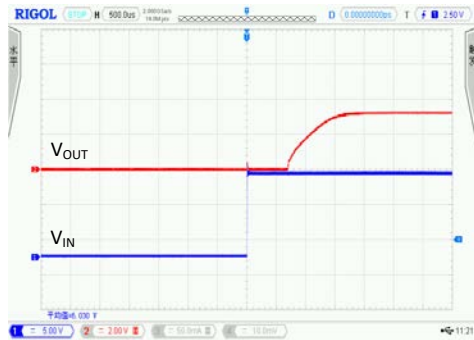


Output Voltage vs. Load Current





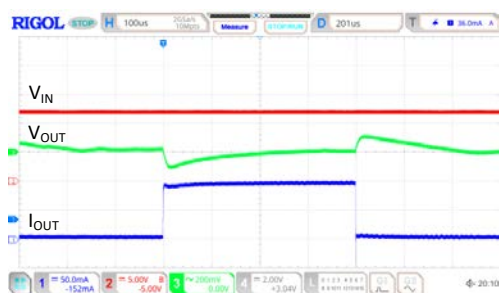
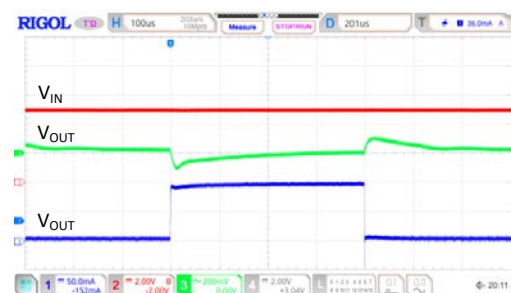
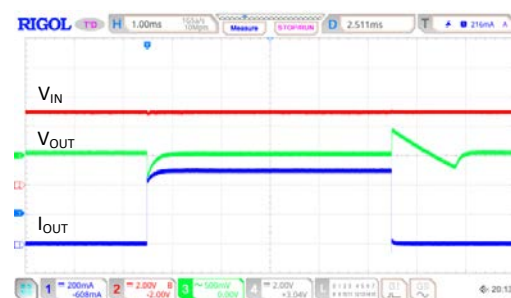
Power ON/OFF

CH1: V_{IN} CH2: V_{OUT} 

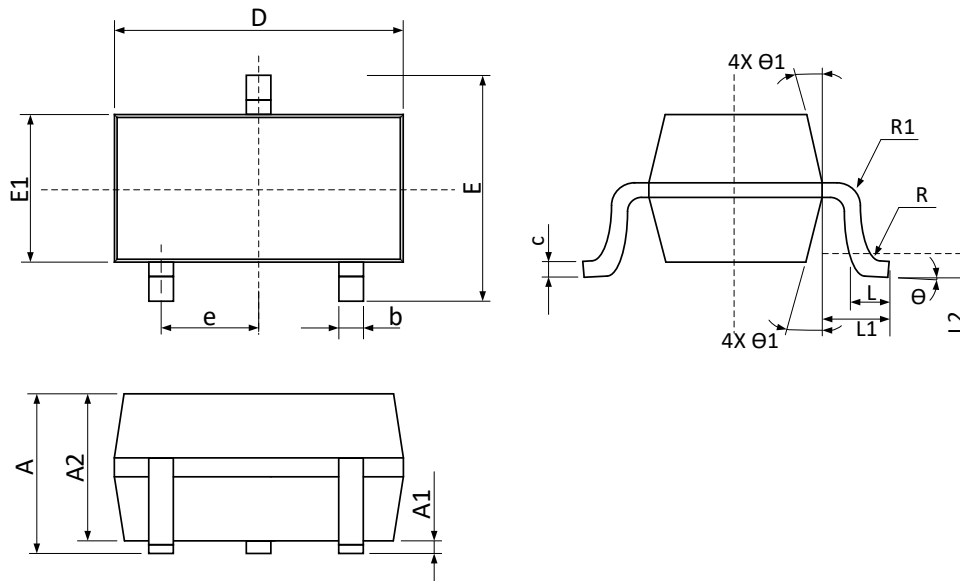
Line Transient

CH1: V_{IN} CH2: V_{OUT} $V_{IN}=5V$ to $12V$ $I_O=0A$  $V_{IN}=5V$ to $12V$ $I_O=10mA$ 

Load Transient

CH1: I_{OUT} CH2: V_{IN} CH3: V_{OUT} $V_{IN}=12V$, $V_{OUT}=3.3V$, $C_{IN}=1\mu F$, $C_O=10\mu F$ $I_O=3mA$ to $100mA$  $V_{IN}=5V$, $V_{OUT}=3.3V$, $C_{IN}=1\mu F$, $C_O=10\mu F$ $I_O=3mA$ to $100mA$  $V_{IN}=7V$, $V_{OUT}=3.3V$, $C_{IN}=1\mu F$, $C_O=10\mu F$ $I_O=3mA$ to $500mA$  $V_{IN}=5V$, $V_{OUT}=3.3V$, $C_{IN}=1\mu F$, $C_O=10\mu F$ $I_O=3mA$ to $500mA$ 

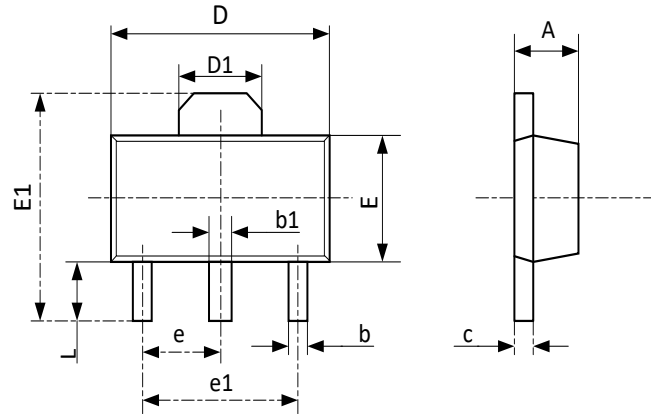
PACKAGE DIMENSIONS: SOT23-3L



Unit:mm

Dimensions In Millimeters			
Symbol	Min	Nom	Max
A	-	-	1.35
A1	0.00	-	0.15
A2	1.00	1.10	1.20
b	0.35 REF		
c	0.1	-	0.2
D	2.82	2.92	3.02
E	2.60	2.80	3.00
E1	1.50	1.60	1.726
e	0.95 REF		
e1	1.90 REF		
L	0.30	0.45	0.60
L1	0.60 REF		
L2	0.25 REF		
R	0.10	-	-
R1	0.10	-	0.25
Θ	0°	4°	8°
Θ1	5°	10°	15°

PACKAGE DIMENSIONS: SOT89-3L



Unit:mm

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.350	0.520	0.013	0.197
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF		0.061 REF	
E	2.350	2.550	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP		0.060 TYP	
e1	3.000 TYP		0.118 TYP	
L	0.900	1.100	0.035	0.047