

P-Channel Enhancement Mode Field Effect Transistor

General Description

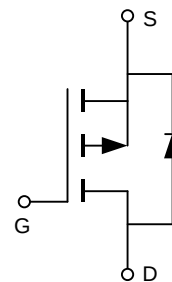
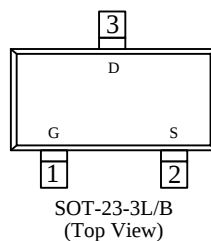
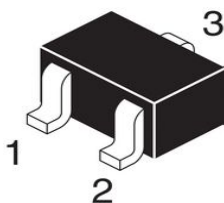
Product Summary		
V_{DS}	I_D	$R_{DS(ON)}(m\Omega)TYP$
-30V	-4.4A	52 @ $V_{GS}=-10V$
		65 @ $V_{GS}=-4.5V$

Features

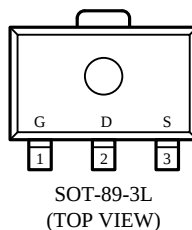
- Super high dense cell design for low $R_{DS(ON)}$
- Rugged and reliable
- Simple drive requirement
- SOT-23-3L/B package

Package

- SOT-23-3L/B



- SOT-89-3L



Ordering Information

Part Number	Storage Temperature	Package	Devices Per Reel
LN2311	-55°C to +150°C	SOT-23-3L/B	3000
	-55°C to +150°C	SOT-89-3L	3000

Absolute Maximum Ratings

(TA=25°C unless otherwise noted)

parameter	symbol	limit	unit
Drain-source voltage	V_{DS}	-30	V
Gate-source voltage	V_{GS}	±20	V
Drain current-continuous ^a @Tj=125°C -pulse ^b	I_D	-4.4	A
	I_{DM}	-30	A
Maximum power dissipation	P_D	1.25	W
Operating junction Temperature range	Tj	-55—150	°C

Electrical Characteristics

(TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF Characteristics						
Drain-source breakdown voltage	BV _{DSS}	V _{GS} =0V, I _D =-250μA	-30			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =-24V, V _{GS} =0V			-1	μA
Gate-body leakage	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
ON Characteristics						
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250μA	-0.7	-1	-1.5	V
Drain-source on-state resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-4.2A		45	52	mΩ
		V _{GS} =-4.5V, I _D =-4A		58	65	
Forward transconductance	g _{fs}	V _{GS} =-5V, I _D =-5A		10		S
Dynamic Characteristics						
Input capacitance	C _{ISS}	V _{DS} =-15V ,V _{GS} =0V f=1.0MHz		950		pF
Output capacitance	C _{OSS}			115		
Reverse transfer capacitance	C _{RSS}			75		
Switching Characteristics						
Turn-on delay time	t _{D(ON)}	V _{DD} =-15V I _D =-3.2A V _{GEN} =-10V R _{GEN} =60hm		7		ns
Rise time	tr			3		
Turn-off delay time	t _{D(OFF)}			30		
Fall time	tf			12		
Total gate charge	Qg	V _{DS} =-15V,I _D =-4A V _{GS} =-4.5V		9.5		nC
Gate-source charge	Qgs			2		
Gate-drain charge	Qgd			3		
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode forward voltage	V _{SD}	V _{GS} =0V,I _S =-1A		-0.81	-1.2	V

Notes:

- surface mounted on FR4 board, $t_s \leq 10\text{sec}$
- pulse test: pulse width $\leq 300\mu\text{s}$, duty $\leq 2\%$
- guaranteed by design, not subject to production testing

Thermal Characteristics

Thermal Resistance junction-to ambient	$R_{th JA}$	100	$^{\circ}\text{C/W}$
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Typical Performance Characteristics

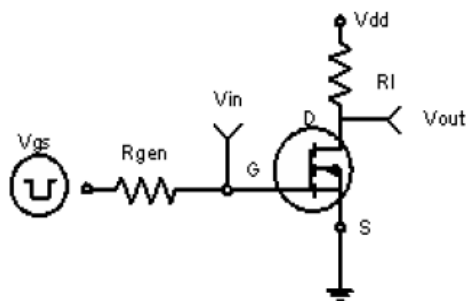


Figure 1: Switching Test Circuit

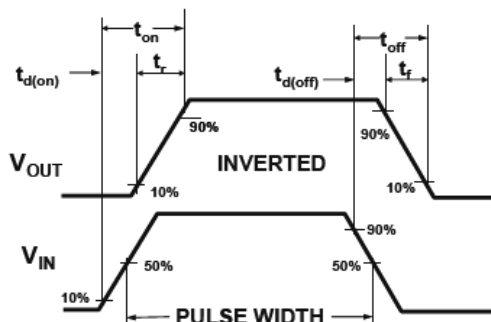


Figure 2: Switching Waveforms

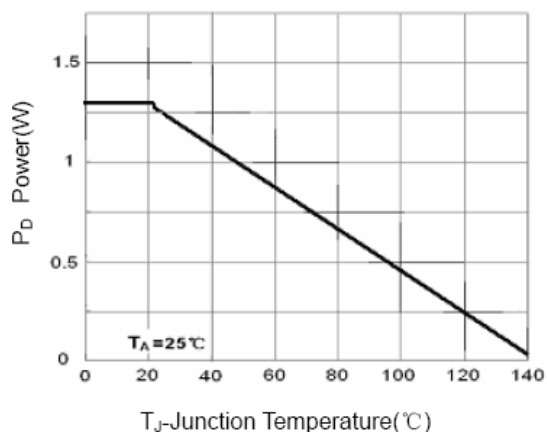


Figure 3 Power Dissipation

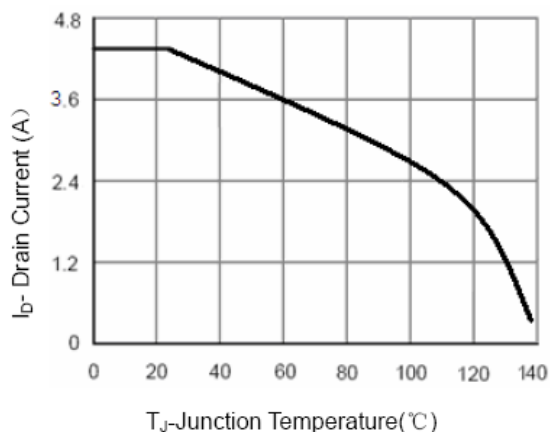


Figure 4 Drain Current

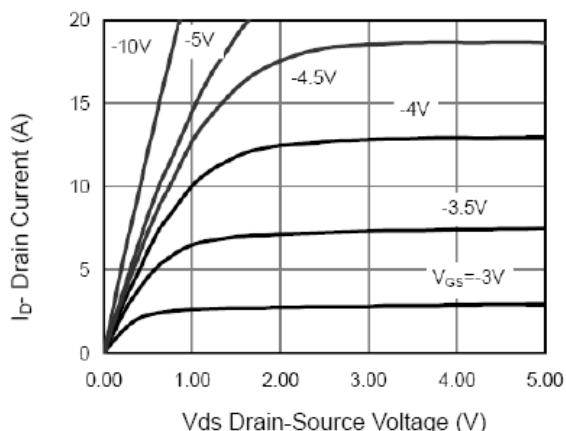


Figure 5 Output CHARACTERISTICS

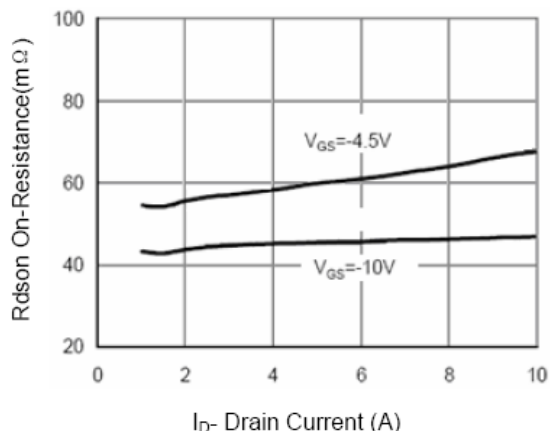


Figure 6 Drain-Source On-Resistance

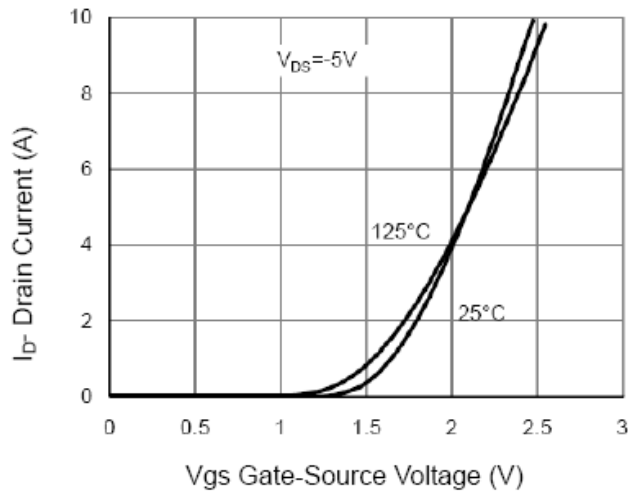


Figure 7 Transfer Characteristics

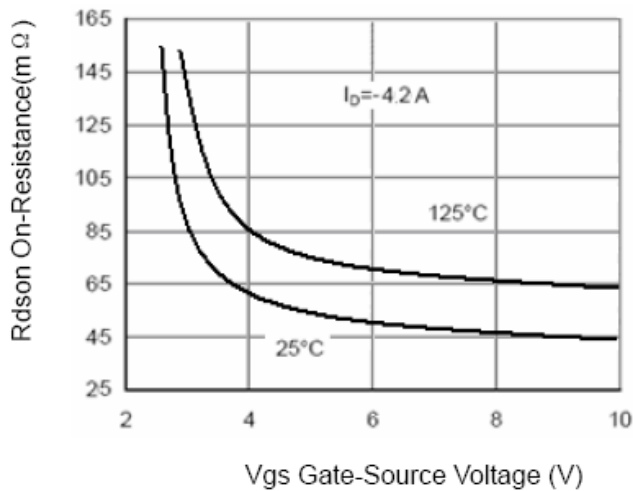


Figure 9 $R_{DS(on)}$ vs V_{GS}

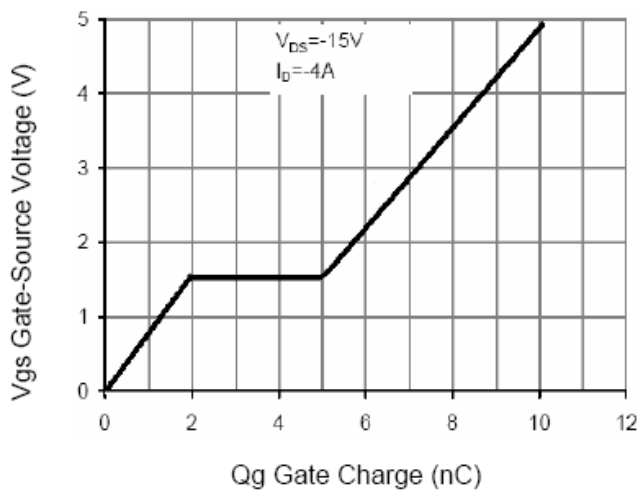


Figure 11 Gate Charge

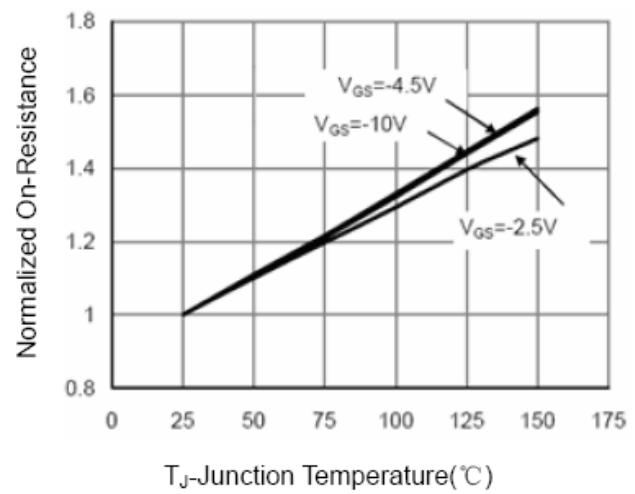


Figure 8 Drain-Source On-Resistance

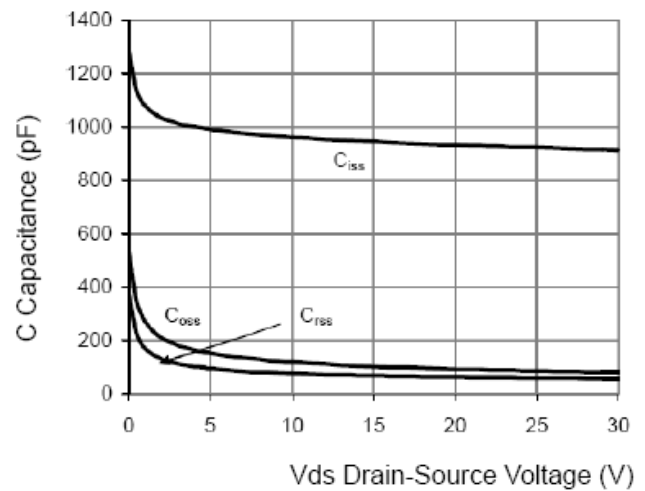


Figure 10 Capacitance vs V_{DS}

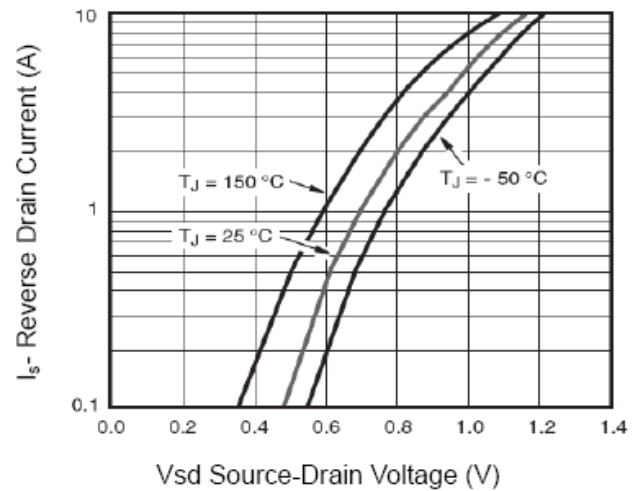


Figure 12 Source- Drain Diode Forward

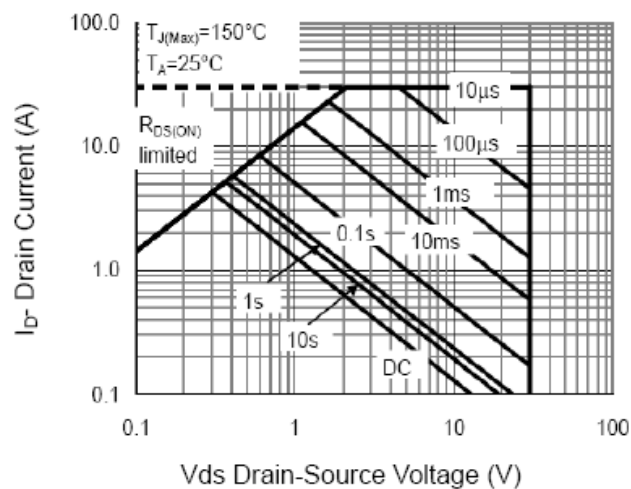


Figure 13 Safe Operation Area

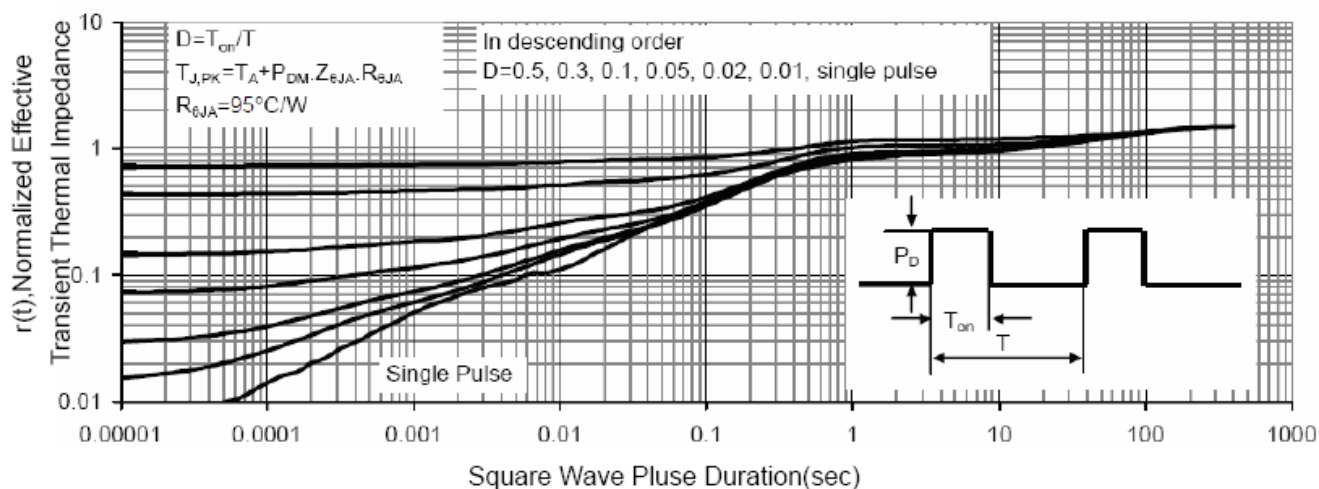
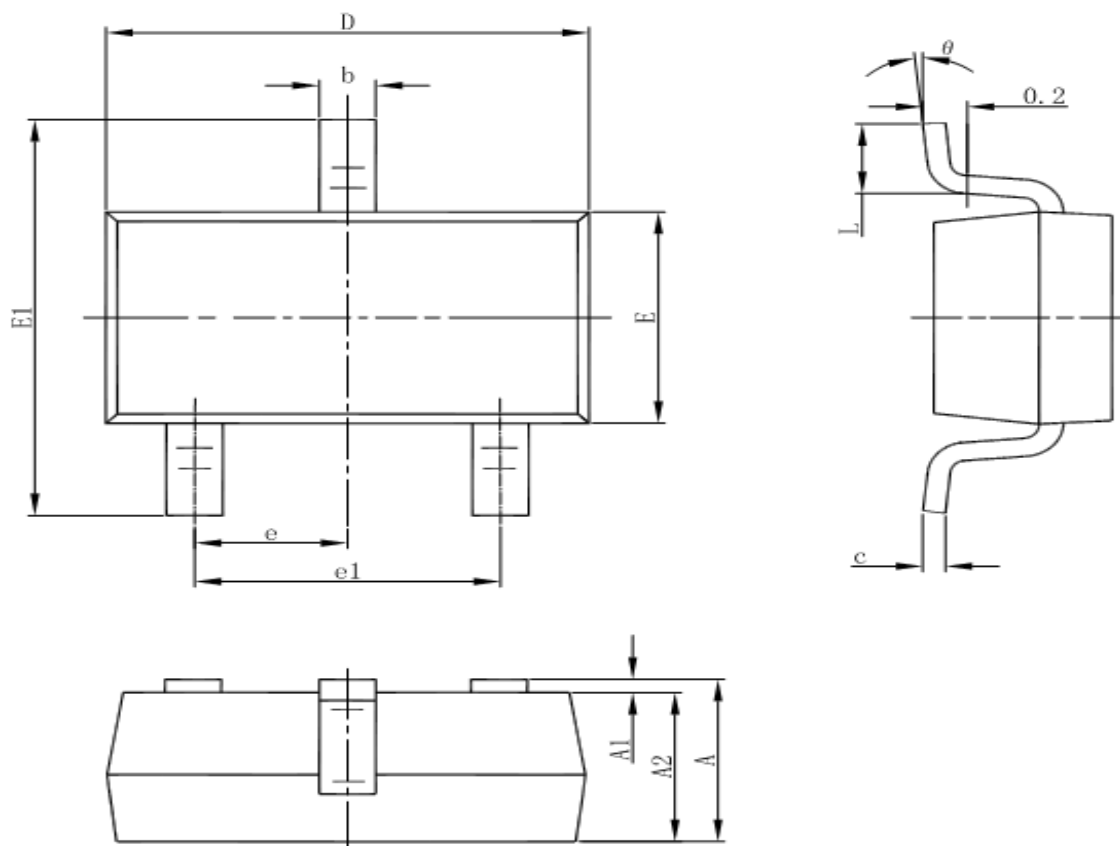


Figure 14 Normalized Maximum Transient Thermal Impedance

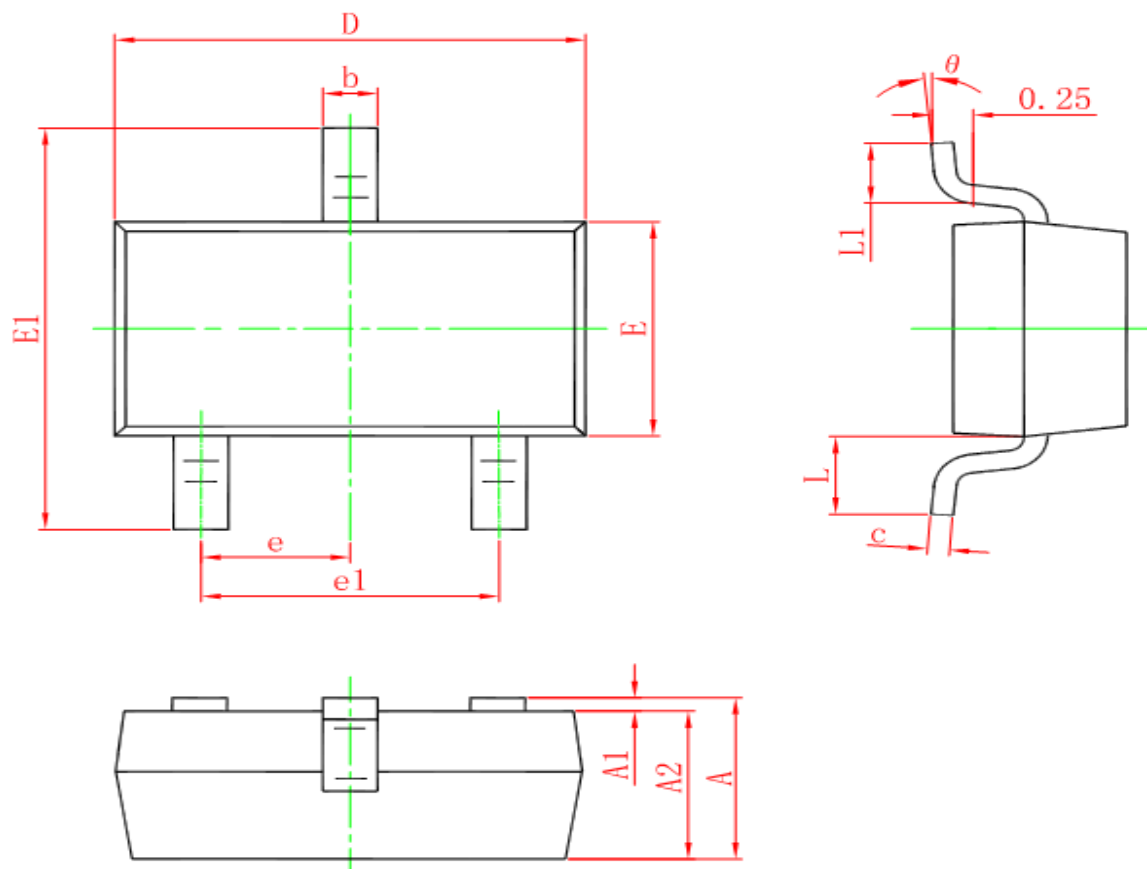
Package Information

- SOT-23-3L



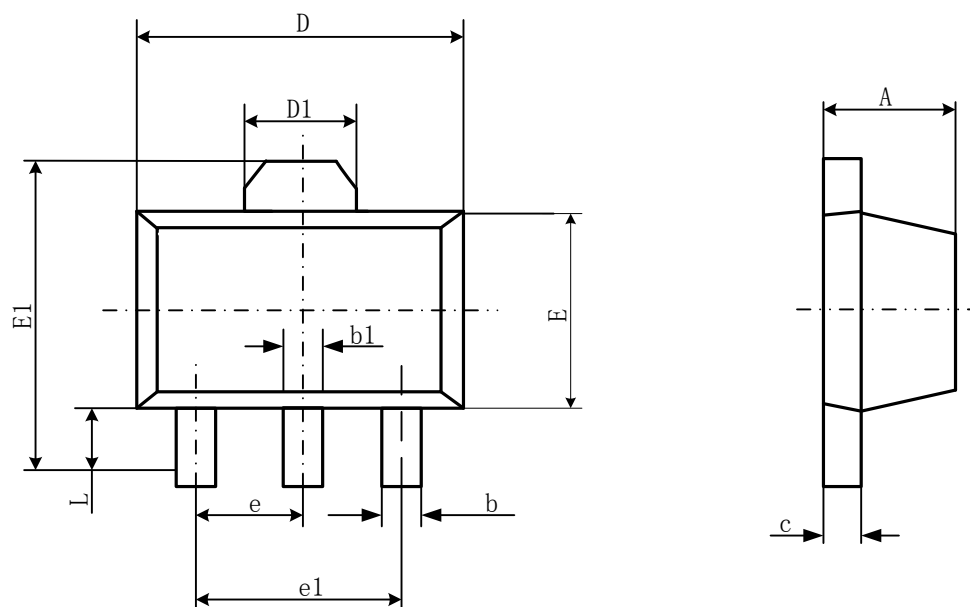
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

● SOT-23-3B



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 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

● SOT-89-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.400	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550REF.		0.061REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500TYP		0.060TYP	
e1	3.000TYP		0.118TYP	
L	0.900	1.200	0.035	0.047