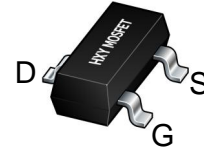




## Description

The BSS131 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

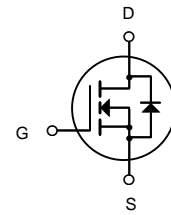


**SOT-23**

## General Features

$V_{DS} = 240V$   $I_D = 0.1A$

$R_{DS(ON)} < 14\Omega @ V_{GS}=10V$



N-Channel MOSFET

## Application

Battery protection

Load switch

Uninterruptible power supply

## Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
BSS131	SOT-23	SR	3000

## Absolute Maximum Ratings ( $T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Limit	Unit	
$V_{DS}$	Drain-Source Voltage	240	V	
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V	
$I_D$	Continuous Drain Current ( $T_J = 150^\circ\text{C}$ )	$T_A = 25^\circ\text{C}$	0.1	A
		$T_A = 100^\circ\text{C}$	0.09	
$I_{DM}$	Drain Current-Pulsed (Note 1)	0.4	A	
$P_D$	Maximum Power Dissipation	0.36	W	
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 To 150	$^\circ\text{C}$	
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 2)	200	$^\circ\text{C}/\text{W}$	



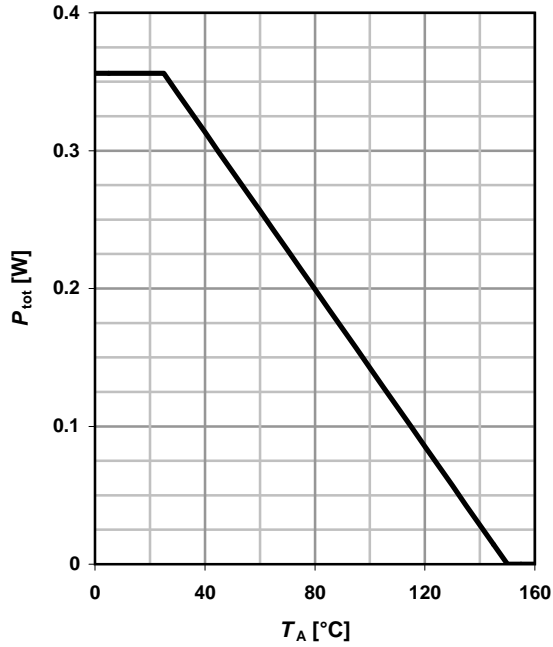
**Electrical Characteristics ( $T_A=25^\circ\text{C}$  unless otherwise noted)**

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal resistance, junction - minimal footprint	$R_{thJA}$		-	-	350	K/W
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}, I_D=250\ \mu\text{A}$	240	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=0\text{ V}, I_D=56\ \mu\text{A}$	0.8	1.4	1.8	
Drain-source leakage current	$I_{D(off)}$	$V_{DS}=240\text{ V}, V_{GS}=0\text{ V}, T_j=25\ ^\circ\text{C}$	-	-	0.01	$\mu\text{A}$
		$V_{DS}=240\text{ V}, V_{GS}=0\text{ V}, T_j=150\ ^\circ\text{C}$	-	-	5	
Gate-source leakage current	$I_{GSS}$	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$	-	-	10	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=4.5\text{ V}, I_D=0.09\text{ A}$	-	9.07	20	$\Omega$
		$V_{GS}=10\text{ V}, I_D=0.1\text{ A}$	-	7.7	14	
Transconductance	$g_{fs}$	$ V_{DS} >2 I_D R_{DS(on)max}, I_D=0.08\text{ A}$	0.06	0.13	-	S
Input capacitance	$C_{iss}$	$V_{GS}=0\text{ V}, V_{DS}=25\text{ V}, f=1\text{ MHz}$	-	58	77	pF
Output capacitance	$C_{oss}$		-	7.3	10	
Reverse transfer capacitance	$C_{rss}$		-	2.8	4.2	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=120\text{ V}, V_{GS}=10\text{ V}, I_D=0.1\text{ A}, R_G=6\ \Omega$	-	3.3	5.0	ns
Rise time	$t_r$		-	3.1	4.6	
Turn-off delay time	$t_{d(off)}$		-	13.7	20	
Fall time	$t_f$		-	64.5	97	
Gate to source charge	$Q_{gs}$	$V_{DD}=192\text{ V}, I_D=0.1\text{ A}, V_{GS}=0\text{ to }10\text{ V}$	-	0.16	0.22	nC
Gate to drain charge	$Q_{gd}$		-	0.8	1.2	
Gate charge total	$Q_g$		-	2.1	3.1	
Gate plateau voltage	$V_{plateau}$		-	2.90	-	
Diode continuous forward current	$I_S$	$T_A=25\ ^\circ\text{C}$	-	-	0.11	A
Diode pulse current	$I_{S,pulse}$		-	-	0.43	
Diode forward voltage	$V_{SD}$	$V_{GS}=0\text{ V}, I_F=0.1\text{ A}, T_j=25\ ^\circ\text{C}$	-	0.81	1.2	V
Reverse recovery time	$t_{rr}$	$V_R=120\text{ V}, I_F=0.1\text{ A}, di_F/dt=100\text{ A}/\mu\text{s}$	-	42.9	64.3	ns
Reverse recovery charge	$Q_{rr}$		-	22.6	34	



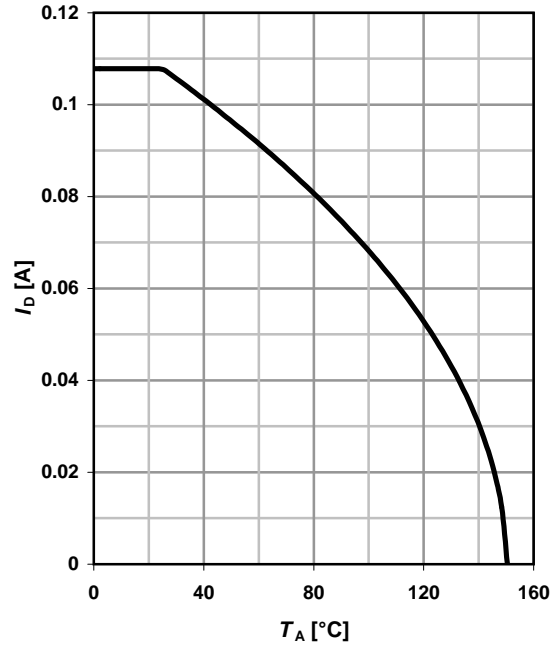
### 1 Power dissipation

$$P_{tot}=f(T_A)$$



### 2 Drain current

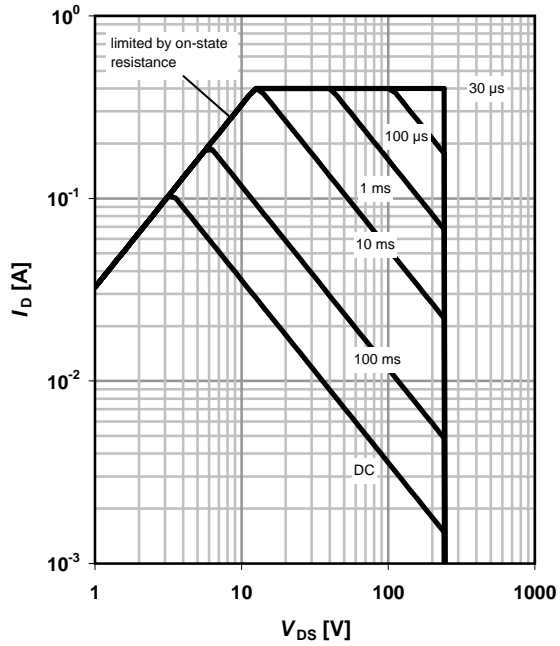
$$I_D=f(T_A); V_{GS}\geq 10\text{ V}$$



### 3 Safe operating area

$$I_D=f(V_{DS}); T_A=25\text{ °C}; D=0$$

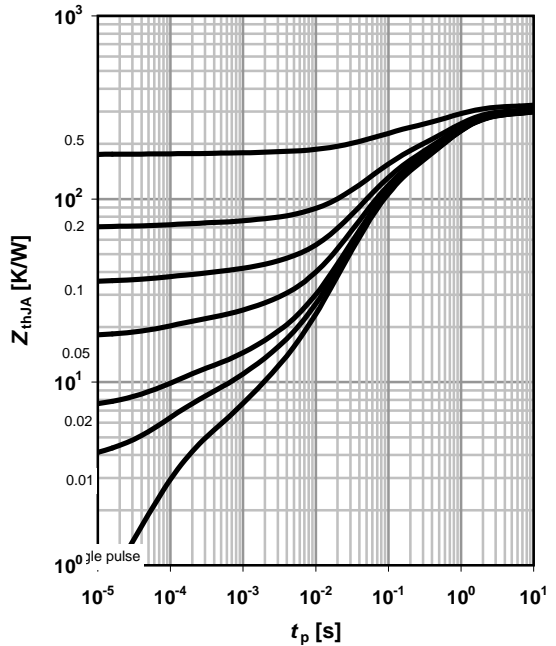
parameter:  $t_p$



### 4 Max. transient thermal impedance

$$Z_{thJA}=f(t_p)$$

parameter:  $D=t_p/T$

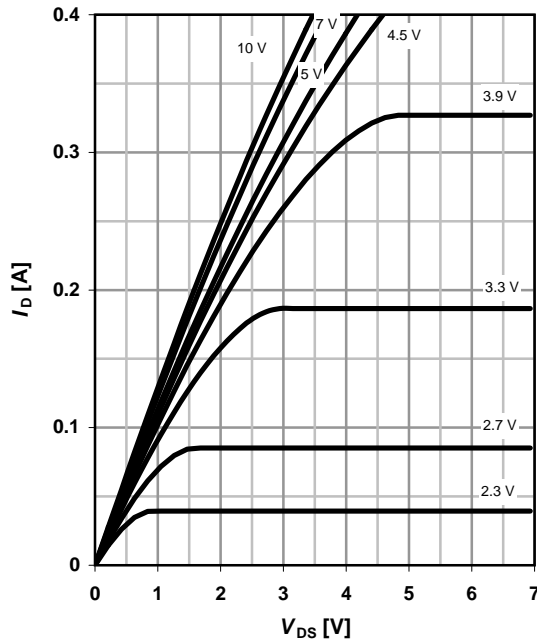




### 5 Typ. output characteristics

$$I_D = f(V_{DS}); T_j = 25^\circ\text{C}$$

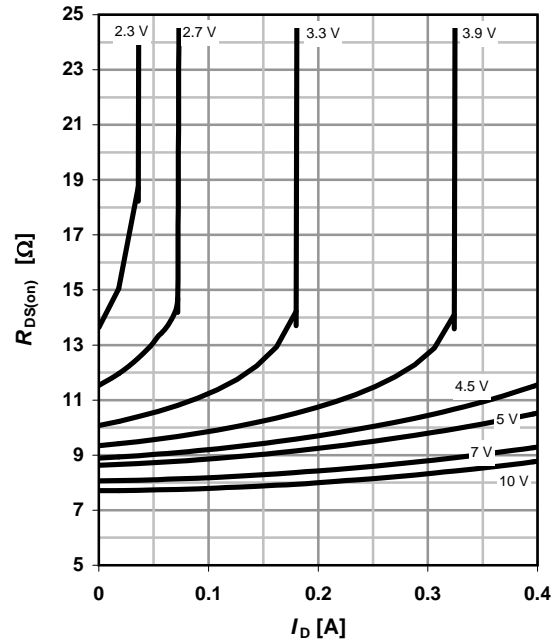
parameter:  $V_{GS}$



### 6 Typ. drain-source on resistance

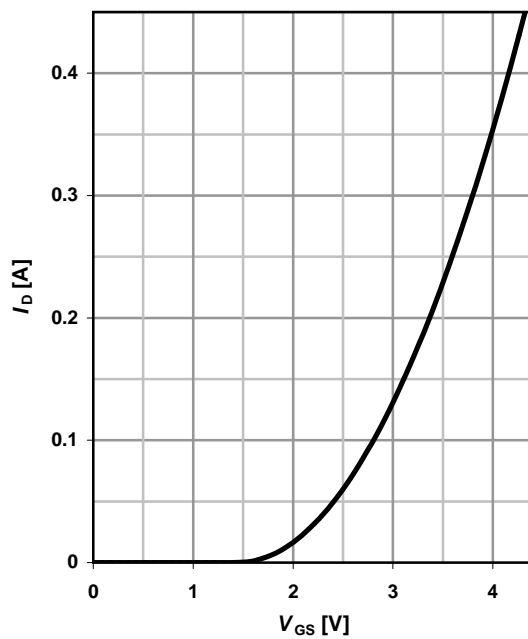
$$R_{DS(on)} = f(I_D); T_j = 25^\circ\text{C}$$

parameter:  $V_{GS}$



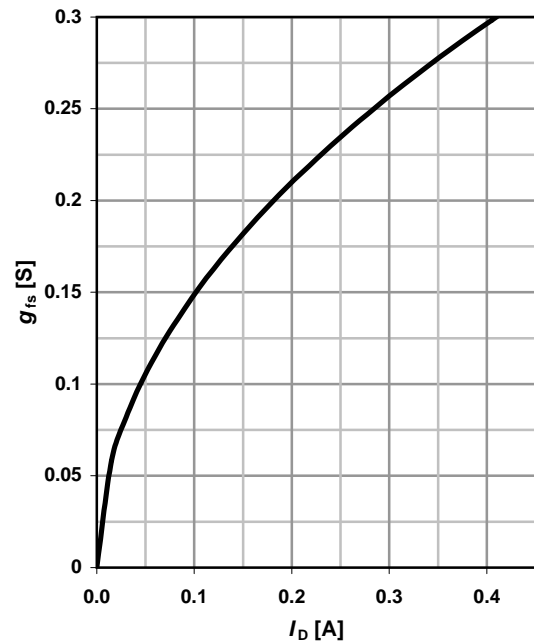
### 7 Typ. transfer characteristics

$$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$$



### 8 Typ. forward transconductance

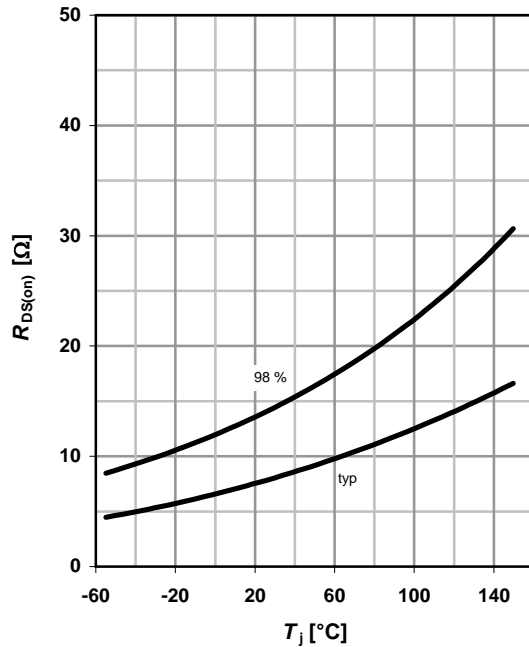
$$g_{fs} = f(I_D); T_j = 25^\circ\text{C}$$





### 9 Drain-source on-state resistance

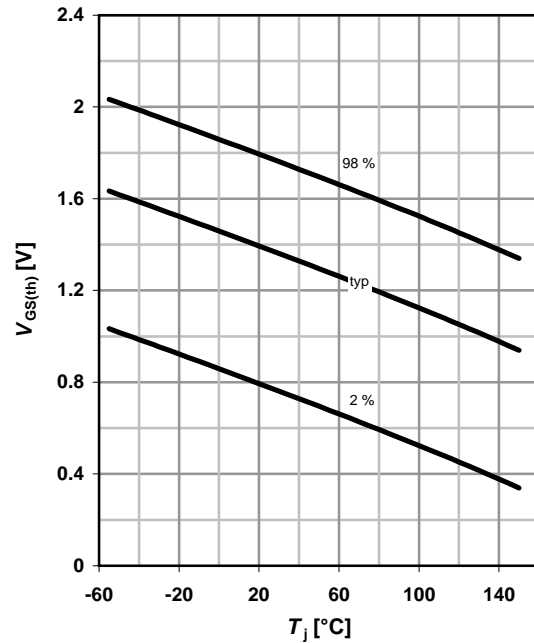
$$R_{DS(on)} = f(T_j); I_D = 0.1 \text{ A}; V_{GS} = 10 \text{ V}$$



### 10 Typ. gate threshold voltage

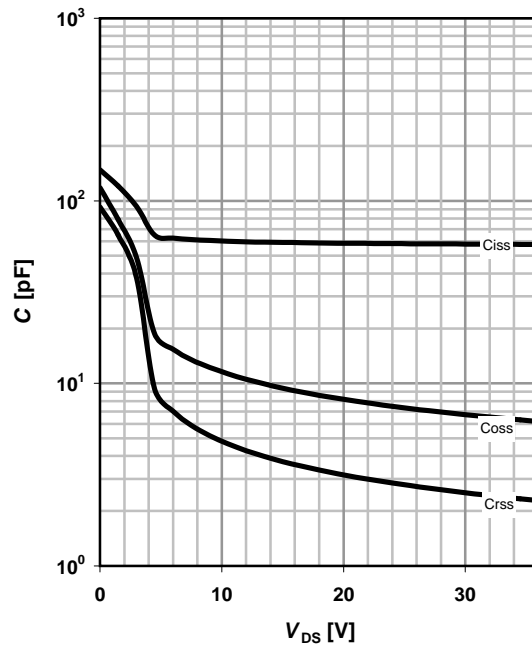
$$V_{GS(th)} = f(T_j); V_{DS} = V_{GS}; I_D = 56 \mu\text{A}$$

parameter:  $I_D$



### 11 Typ. capacitances

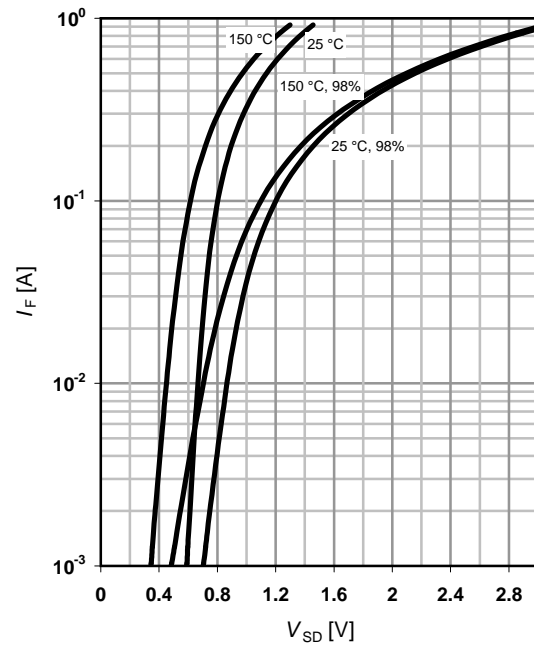
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}; T_j = 25^\circ\text{C}$$



### 12 Forward characteristics of reverse diode

$$I_F = f(V_{SD})$$

parameter:  $T_j$

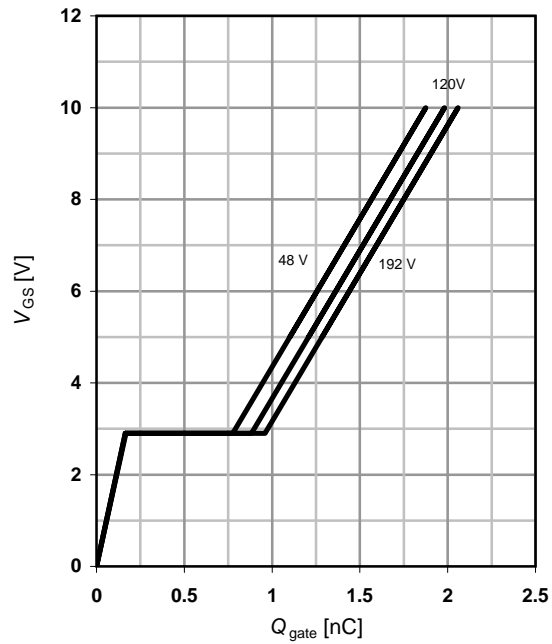




### 13 Typ. gate charge

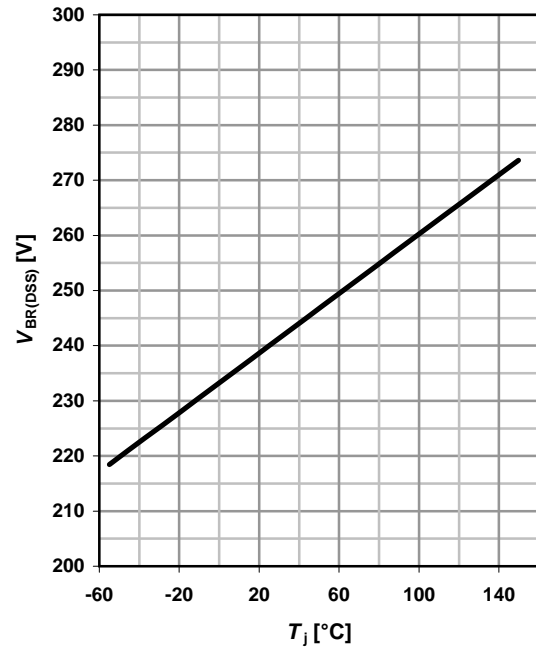
$V_{GS}=f(Q_{gate}); I_D=0.1$  A pulsed

parameter:  $V_{DD}$



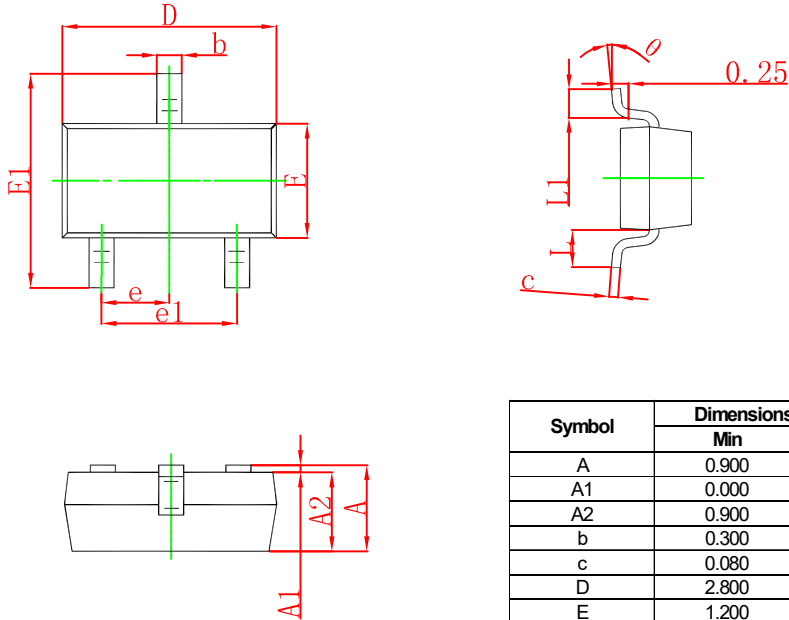
### 14 Drain-source breakdown voltage

$V_{BR(DSS)}=f(T_j); I_D=250$   $\mu$ A



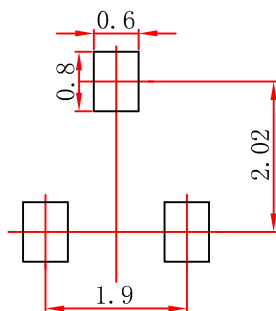


### SOT-23 Package Outline Dimensions



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-23 Suggested Pad Layout



- Note:
1. Controlling dimension: in millimeters.
  2. General tolerance:  $\pm 0.05\text{mm}$ .
  3. The pad layout is for reference purposes only.



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