

SOT-23 Plastic-Encapsulate MOSFETS

BSS131 N-Channel Enhancement Mode MOSFET

SOT-23



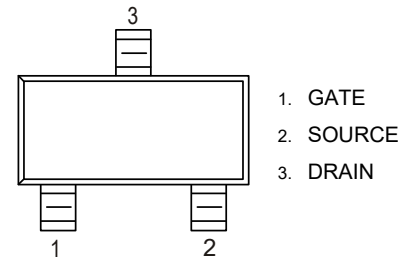
$V_{DS} = 240V$ $I_D = 0.1A$
 $R_{DS(ON)} < 14\Omega @ V_{GS} = 10V$

Features

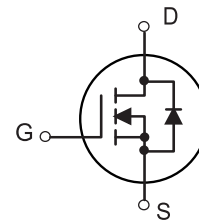
- Improved dv/dt capability
- Fast switching
- Green Device Available

Application

- Motor Drive
- Power Tools
- LED Lighting



Equivalent circuit



Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	240	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_A = 25^\circ C$	I_D	0.1	A
	$T_A = 100^\circ C$		0.09	A
Drain Current-Pulsed		I_{DM}	0.4	A
Maximum Power Dissipation		P_D	350	mW
Junction Temperature and Storage Temperature		T_J & T_{stg}	-55 to 150	$^\circ C$
Thermal Resistance From Junction To Ambient ($t \leq 5s$)		$R_{\theta JA}$	350	$^\circ C/W$

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	240		-	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =240V,V _{GS} =0V,T _J =25℃	-	-	0.05	μA
		V _{DS} =240V,V _{GS} =0V,T _J =150℃	-	-	5	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V	-	-	±10	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =0V,I _D =56μA	0.8	1.4	1.8	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =0.09A		9.07	20	Ω
		V _{GS} =10V, I _D =0.1A		7.7	14	Ω
Forward Transconductance	g _{FS}	V _{DS} =10V,I _D =0.08A	-	0.14	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C _{iss}	V _{DS} =25V,V _{GS} =0V, F=1.0MHz	-	58	77	pF
Output Capacitance	C _{oss}		-	7.7	10	pF
Reverse Transfer Capacitance	C _{rss}		-	2.8	4.2	pF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =120V, I _D =0.1A V _{GS} =10V,R _G =6Ω	-	3.3	5.0	nS
Turn-on Rise Time	t _r		-	3.1	4.6	nS
Turn-Off Delay Time	t _{d(off)}		-	13.7	20	nS
Turn-Off Fall Time	t _f		-	64.5	97	nS
Total Gate Charge	Q _g	V _{DS} =190V,I _D =0.1A, V _{GS} =0~10V	-	2.1	3.1	nC
Gate-Source Charge	Q _{gs}		-	0.16	0.22	nC
Gate-Drain Charge	Q _{gd}		-	0.8	1.2	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V,I _S =0.1A	-	0.81	1.2	V
Diode continous forward current	I _S	V _G =V _D =0V , Force Current	-	-	0.11	A
Diode pulse current	I _{SM}		-	-	0.43	A
Reverse recovery time	t _{rr}	V _R =120 V,I _F =0.1 A. di _F /dt=100A/μs	-	42.9	64.3	nS
Reverse recovery charge	Q _{rr}		-	22.6	34	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics

Figure 1: Power dissipation

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

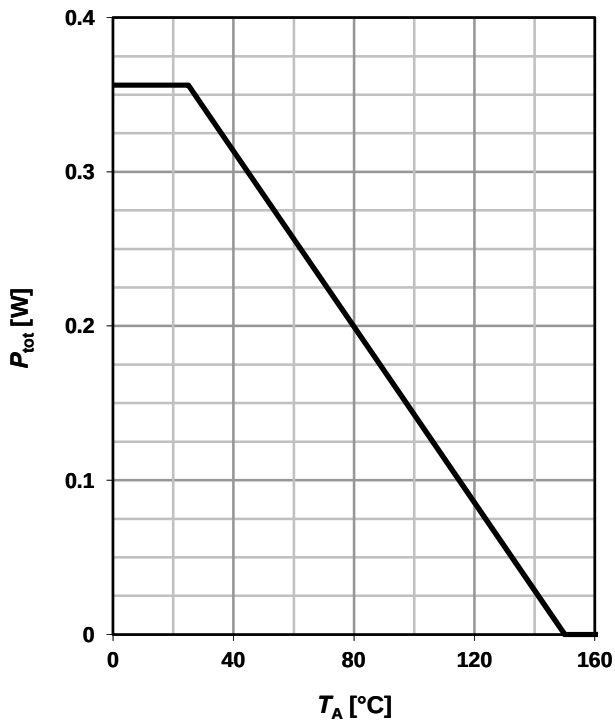


Figure 2: Drain current

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

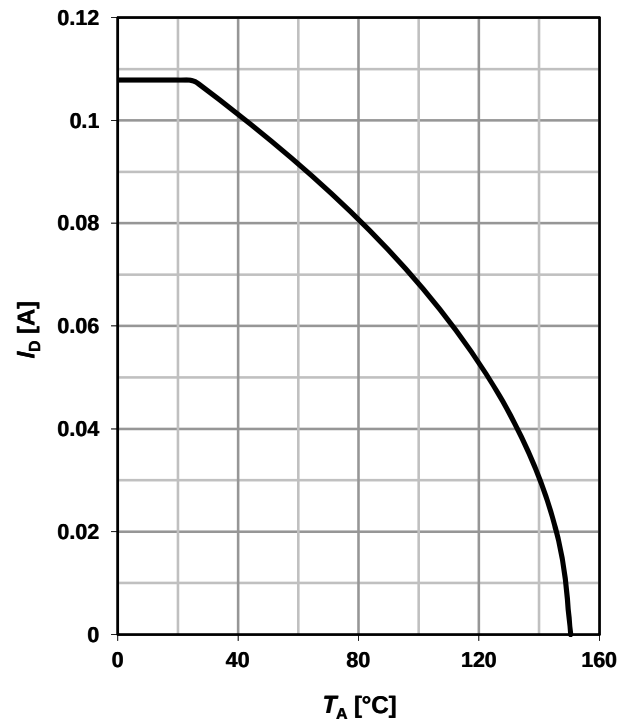


Figure 3: Safe operating area

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

parameter: t_p

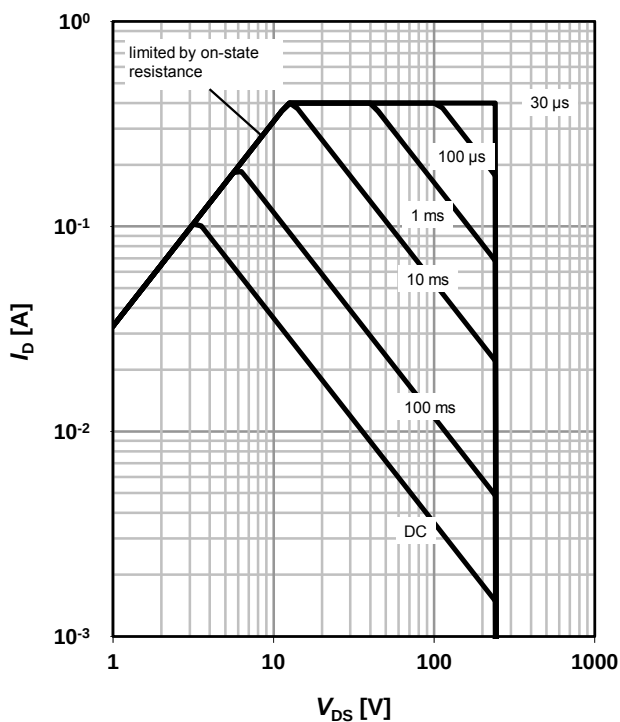
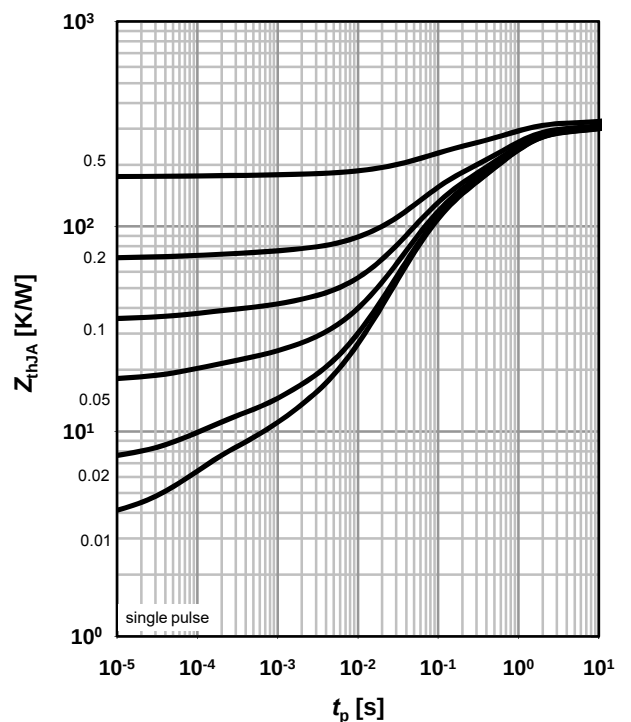


Figure 4: Max. transient thermal impedance

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

parameter: $D = t_p/T$



Typical Electrical and Thermal Characteristics

Figure 5: Typ. output characteristics

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

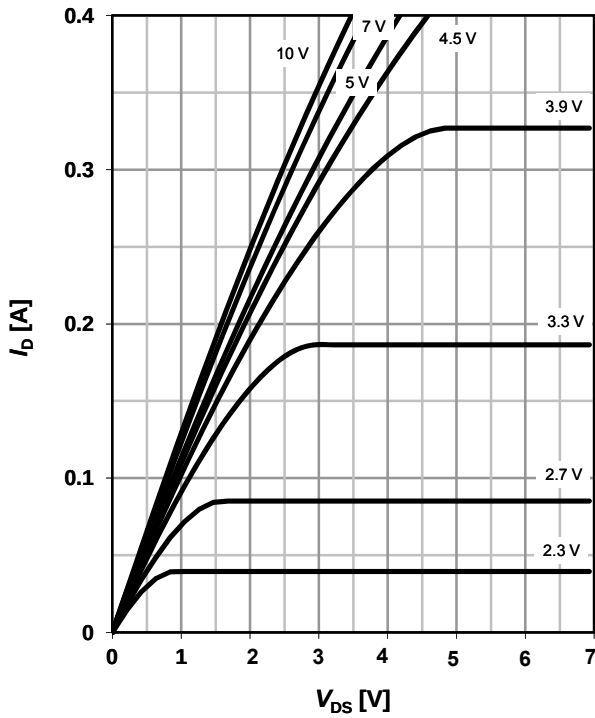


Figure 6: Typ. drain-source on resistance

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

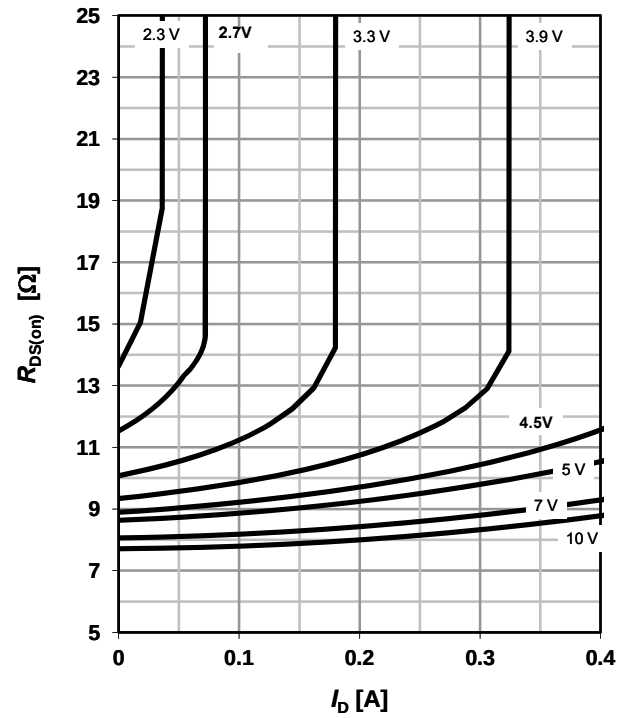


Figure 7: Typ. transfer characteristics

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

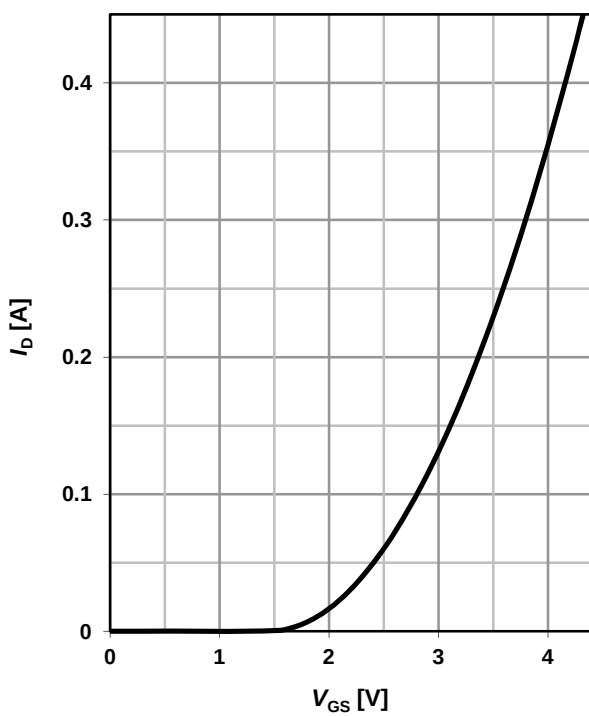
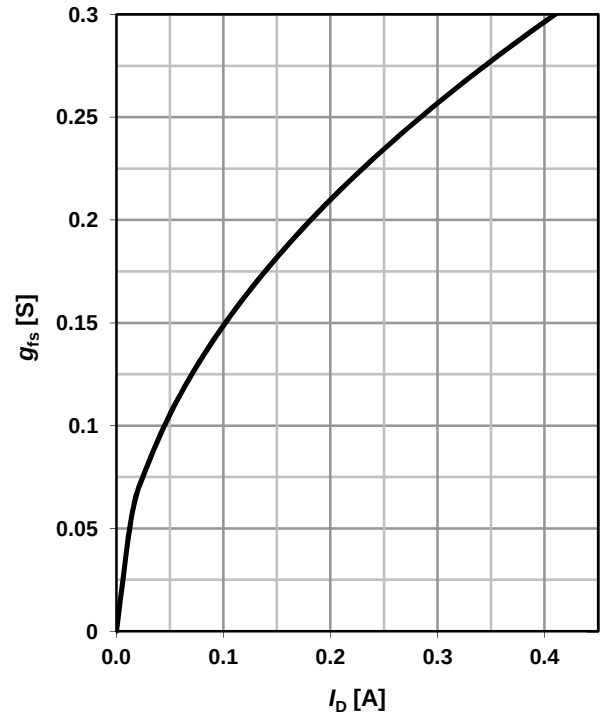


Figure 8: Typ. forward transconductance

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



Typical Electrical and Thermal Characteristics

Figure 9: Drain-source on-state resistance

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

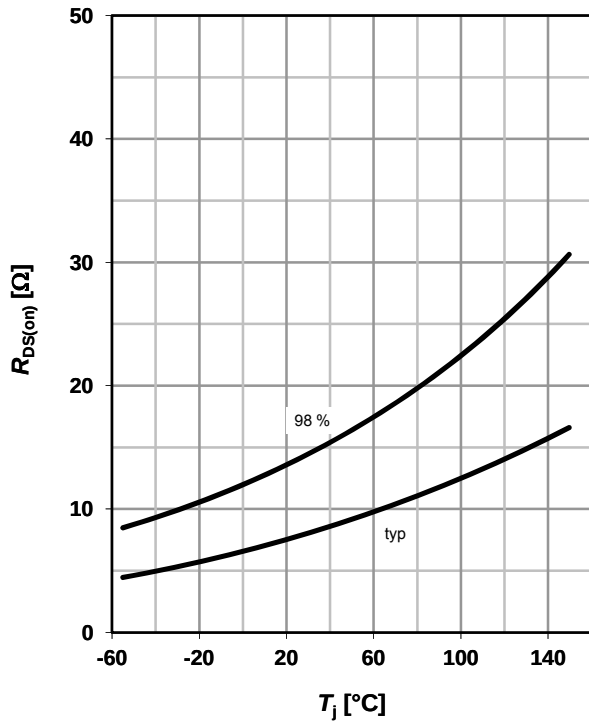


Figure 10: Typ. gate threshold voltage

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

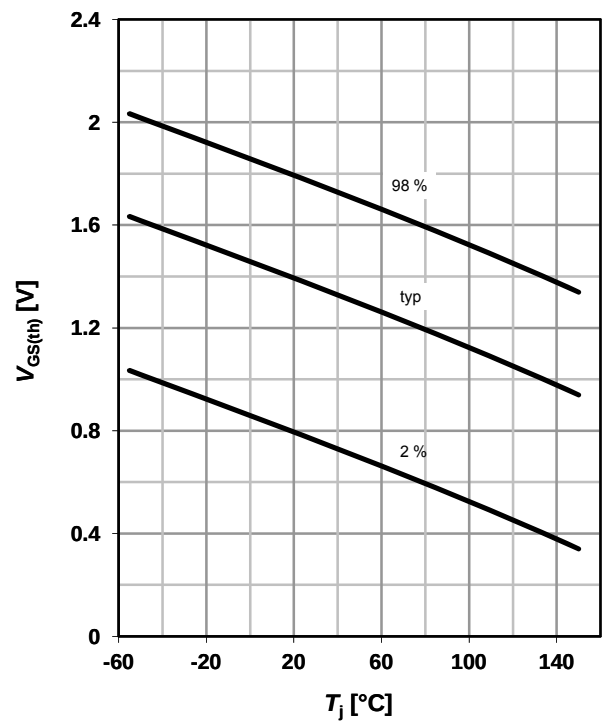


Figure 11: Typ. capacitances

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

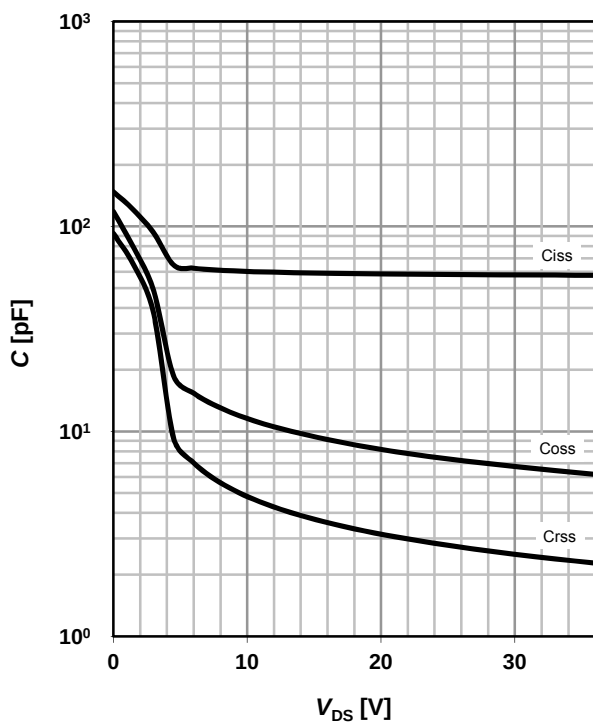
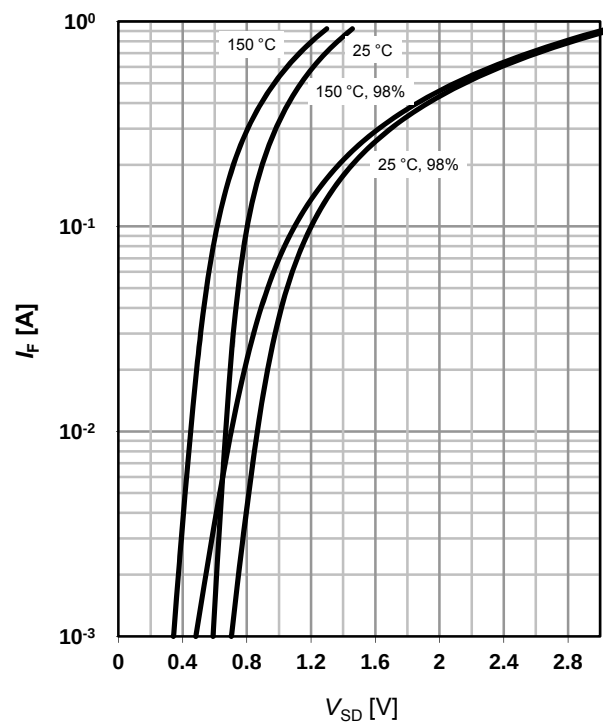


Figure 12: Forward characteristics of reverse diode

$$I_F = f(V_{SD}) \text{ parameter: } T_j$$



Typical Electrical and Thermal Characteristics

Figure 13: Typ. gate charge

$V_{GS}=f(Q_{gate})$; $I_D=0.1\text{ A}$ pulsed, parameter: V_{DD}

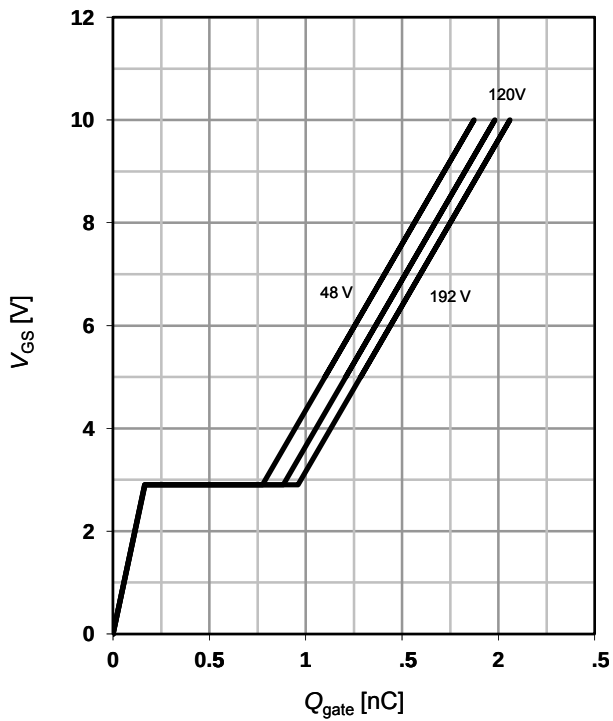
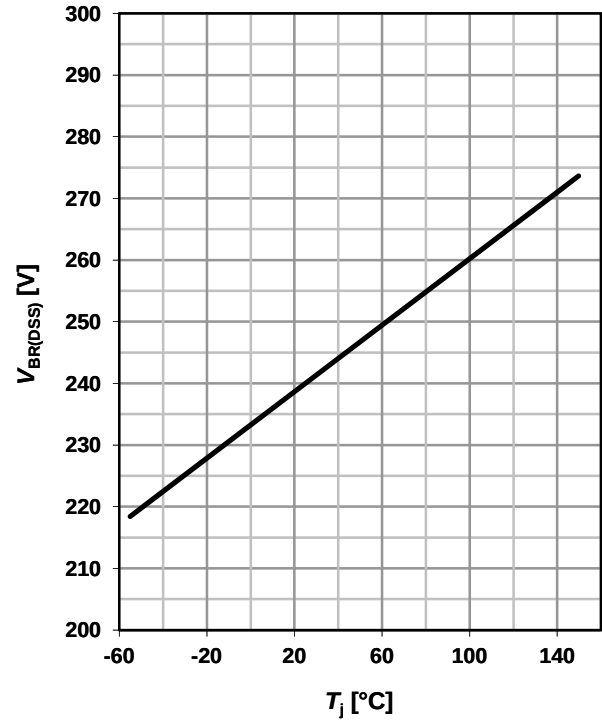
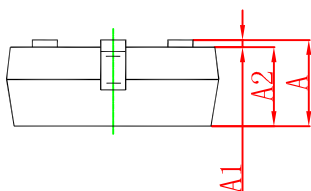
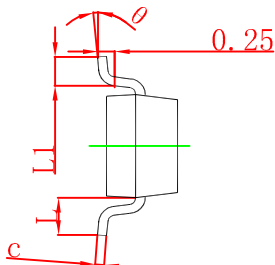
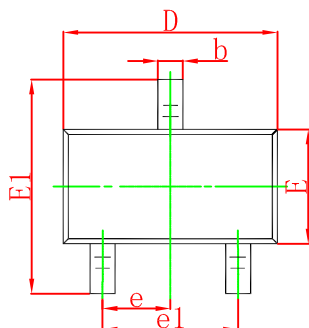


Figure 14: Drain-source breakdown voltage

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

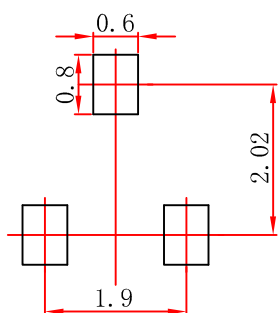


SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.400	0.035	0.055
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.

Package and Ordering Information

Package	Outline	Reel Size	Reel DIA. (mm)	Q'TY/Reel (pcs)
SOT-23	TAPING	7"	330	3000