



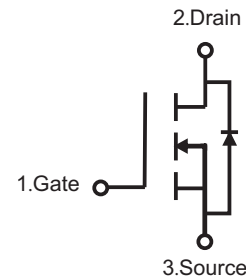
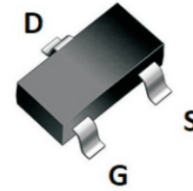
DESCRIPTION

N-CHANNEL MOSFET

FEATURES

- 50V, 0.22A
 $R_{DS(ON)}=3.5\Omega @V_{GS}=10V$
 $R_{DS(ON)}=6.0\Omega @V_{GS}=4.5V$
- Rugged and Reliable
- High Density Cell Design for Extremely $R_{DS(ON)}$
- Compact Industry Standard SOT-23 Surface Mount Package
- This Device is Pb-Free and Halogen Free

SOT-23



Absolute Maximum Ratings (TA=25°C, unless otherwise specified)

Parameter	Symbols	Ratings	Units
Drain-Source Voltage	V_{DSS}	50	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current	I_D	0.22	A
Pulsed Drain Current		0.88	A
Power Dissipation	P_D	0.36	W
Thermal Resistance - Junction to Case ⁽¹⁾	$R_{\theta JA}$	350	°C/W
Operation Junction Temperature and Storage Temperature	T_j, T_{stg}	-55~+150	°C

Notes:

1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance, where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design, while $R_{\theta JA}$ is determined by the board design. The maximum rating presented here is based on mounting on a 1 in 2 pad of 2oz copper.



Electrical Characteristics (TA=25°C, unless otherwise specified)

Parameter	Symbols	Text conditions	Min	Typ	Max	Units
Off Characteristics						
Drain-Source Breakdown Voltage	B_{VDSS}	$V_{GS}=0V, I_D=250\mu A$	50			V
Gate-Body Leakage	I_{GSS}	$V_{GS} = \pm 20V, V_{DS}=0V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=50V, V_{GS}=0V$			0.5	μA
		$V_{DS}=30V, V_{GS}=0V$			100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=1mA$	0.8	1.3	1.5	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=0.22A$		0.7	3.5	Ω
		$V_{GS}=4.5V, I_D=0.22A$		1.0	6.0	Ω
On-State Drain Current	$I_{D(on)}$	$V_{GS}=10V, V_{DS}=5V$	0.2			A
Forward Transconductance	g_{FS}	$V_{GS}=10V, I_D=0.22A$	0.12	0.5		S
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, f=1.0MHz$		27		pF
Output Capacitance	C_{oss}			13		pF
Reverse Transfer Capacitance	C_{rss}			6		pF
Gate Resistance	R_G	$V_{GS}=15mV, f=1.0MHz$		9		Ω
Switching Characteristics						
Total Gate Charge	Q_g	$V_{DS}=25V, V_{GS}=10V, I_D=0.22A$		1.7	2.4	nC
Gate-Source Charge	Q_{gs}			0.1		nC
Gate-Drain Charge	Q_{gd}			0.4		nC
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=30V, R_{GEN}=6\Omega, V_{GS}=10V, I_D=0.29A$		2.5	5	ns
Turn-On Rise Time	t_r			9	18	ns
Turn-Off Delay Time	$t_{d(off)}$			20	36	ns
Turn-Off Fall Time	t_f			7	14	ns
Source-Drain Diode Characteristics						
Maximum Continuous Drain-Source Forward Current	I_S				0.22	A
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=0.44A$		0.8	1.4	V



Typical Performance Characteristics

Figure1: On-Region Characteristics

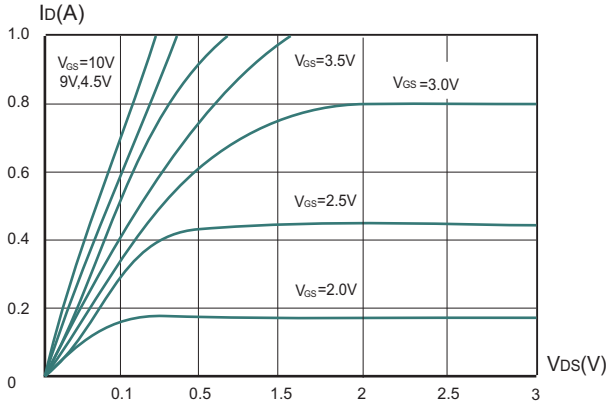


Figure 2: On-Resistance Variation with Drain Current and Gate Voltage

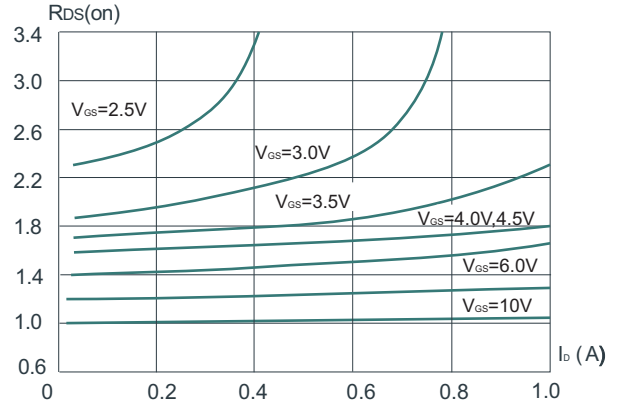


Figure 3: On-Resistance Variation with Temperature

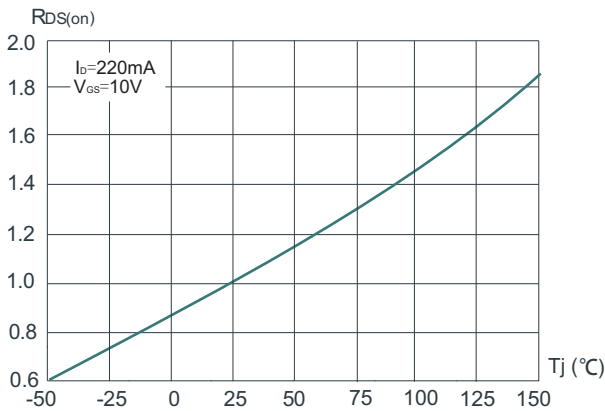


Figure 4: On-resistance variation with Gate-to-Source voltage

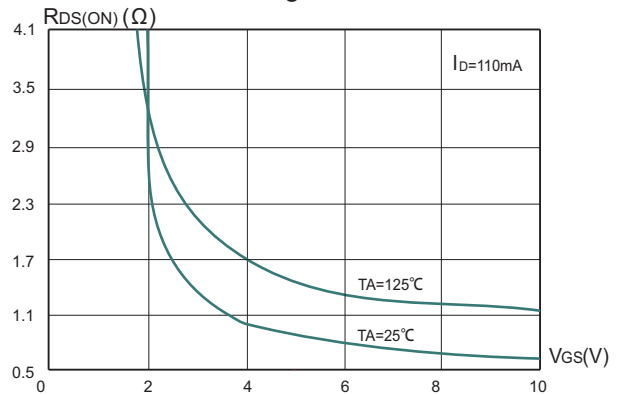


Figure5: Transfer Characteristics

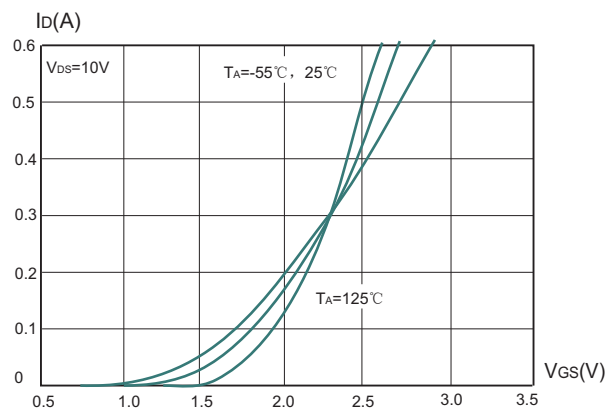


Figure6: Body Diode Forward Voltage Variation with Source Current and Temperature

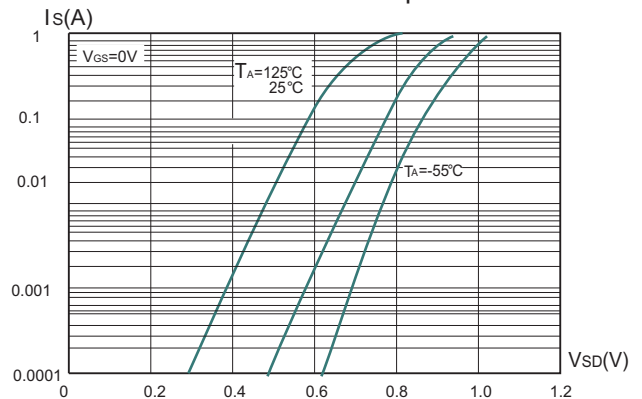




Figure 7: Gate Charge Characteristics

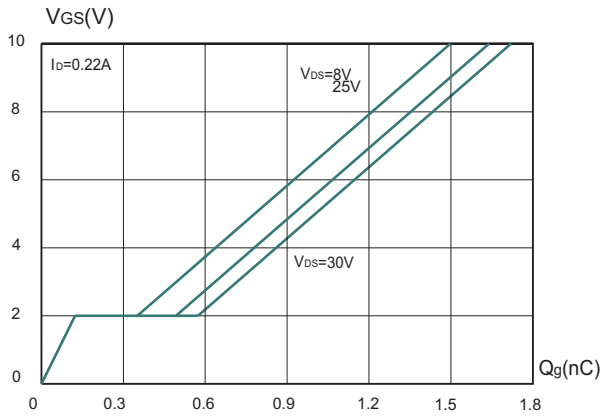


Figure 8: Capacitance Characteristics

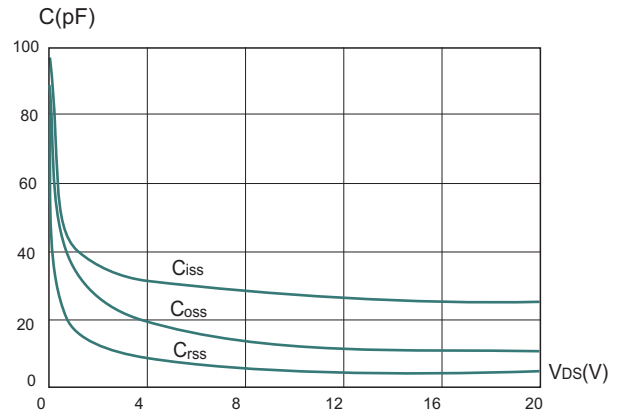


Figure 9: Maximum Safe Operating Area

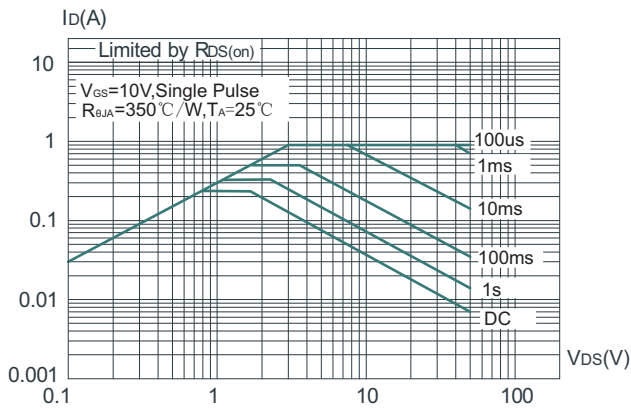
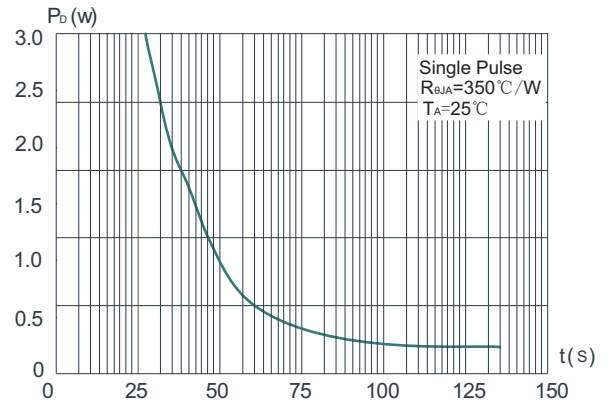
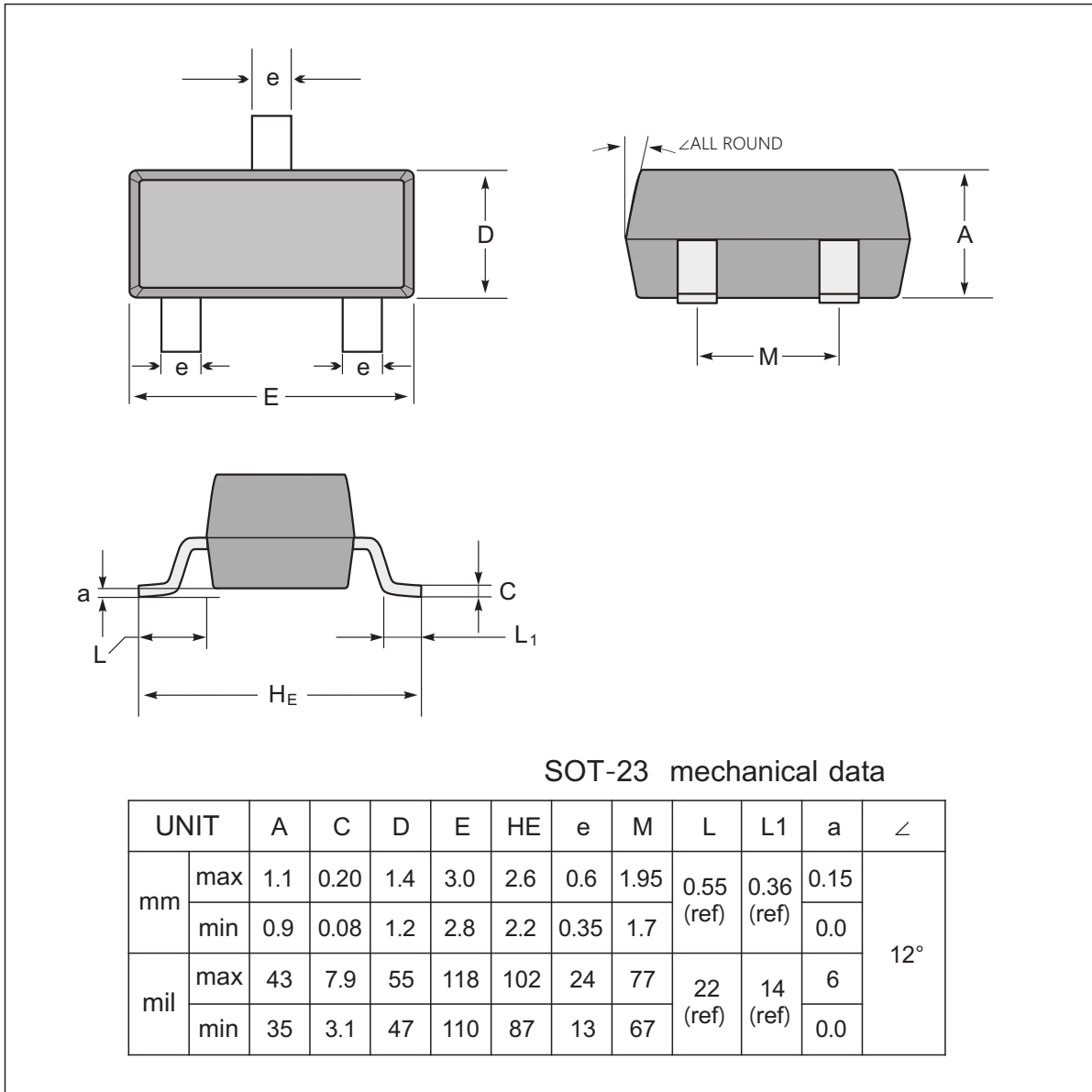


Figure 10: Single Pulse Maximum Power Dissipation

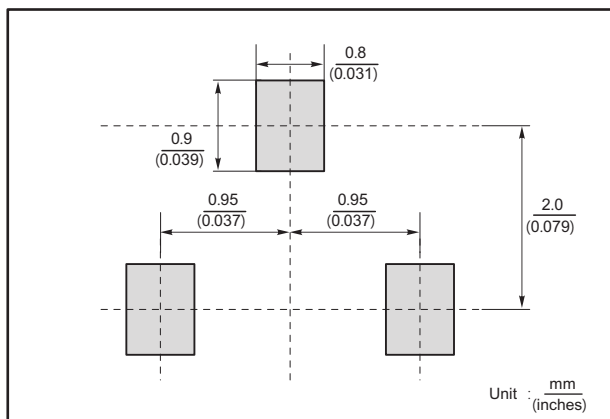




SOT-23 Package Outline Dimensions



The recommended mounting pad size



Marking

Type number	Marking code
BSS138	SS138