

SOT-323 Plastic-Encapsulate MOSFETS

BSS138KW N-Channel Enhancement Mode MOSFET

SOT-323

ROHS
COMPLIANT

$V_{DS} = 55V$, $I_D = 350mA$

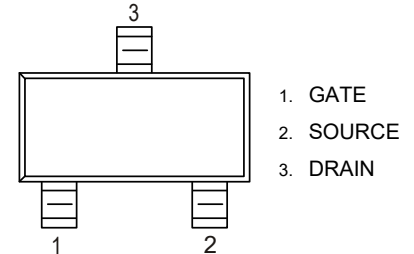
$R_{DS(ON)MAX} = 1.2\Omega @ V_{GS} = 10V$

Features

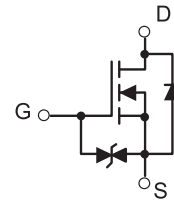
- High density cell design for extremely low $R_{DS(on)}$
- Rugged and Reliable
- Improved dv/dt capability
- Fast switching

Application

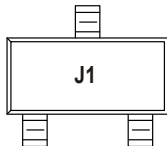
- Notebook
- Load Switch
- Battery Protection
- Hand-held Instruments



Equivalent Circuit



Marking



J1= Device code

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	55	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	350	mA
Continuous Drain Current	I_D	0.24	mA
Drain Current – Pulsed	I_{DM}	1.2	A
Power Dissipation	P_D	313	mW
Power Dissipation– Derate above 25°C	P_D	2.5	mW/°C
Operation Junction and Storage Temperature Range	T_J & T_{stg}	-55 to 150	°C
Thermal Resistance From Junction To Ambient	$R_{\theta JA}$	450	°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	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	55	-	-	V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=48V, V_{GS}=0V$	-	-	1.0	μA
		$V_{DS}=55V, V_{GS}=0V$	-	-	400	nA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 6.0	μA
On Characteristics (Note 1)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.8	1.1	1.6	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=0.3A$	-	1.2	1.5	Ω
		$V_{GS}=4.5V, I_D=0.2A$	-	1.5	2.3	Ω
Dynamic Characteristics (Note 2)						
Input Capacitance	C_{iss}	$V_{DS}=30V, V_{GS}=0V,$ $F=1.0MHz$	-	23	-	pF
Output Capacitance	C_{oss}		-	16	-	pF
Reverse Transfer Capacitance	C_{rss}		-	10	-	pF
Drain-Source Diode Characteristics						
Continuous Source Current	I_S	$V_G=V_D=0V$, Force Current	-	-	350	mA
Pulsed Source Current	I_{SM}		-	-	600	mA
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=0.44A$	-	-	1.4	V

Notes:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$
3. These parameters have no way to verify.

Typical Electrical and Thermal Characteristics

Fig.1 Continuous Drain Current vs. T_c

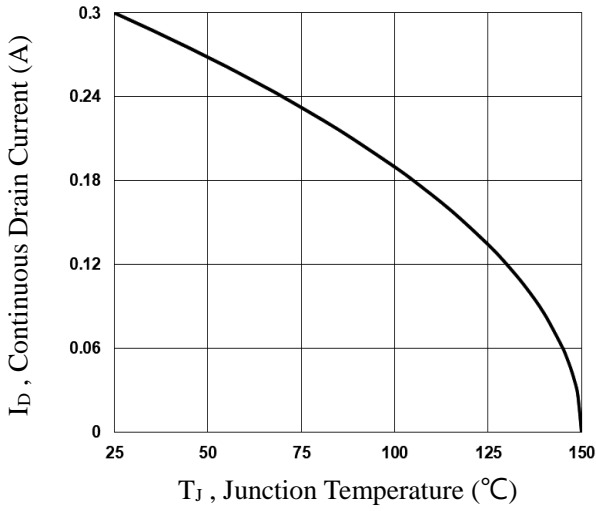


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

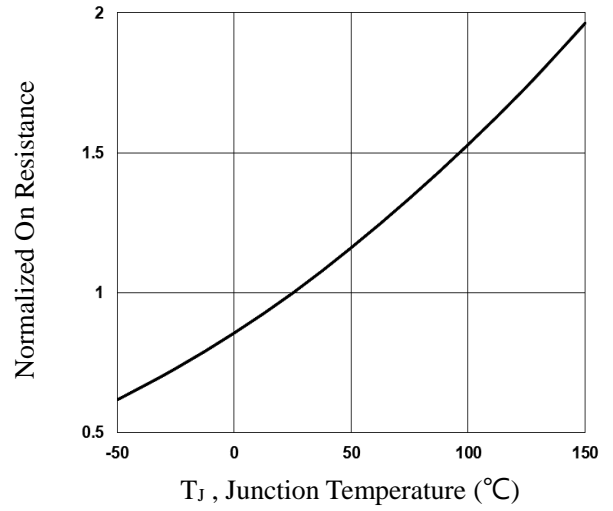


Fig.3 Normalized V_{th} vs. T_J

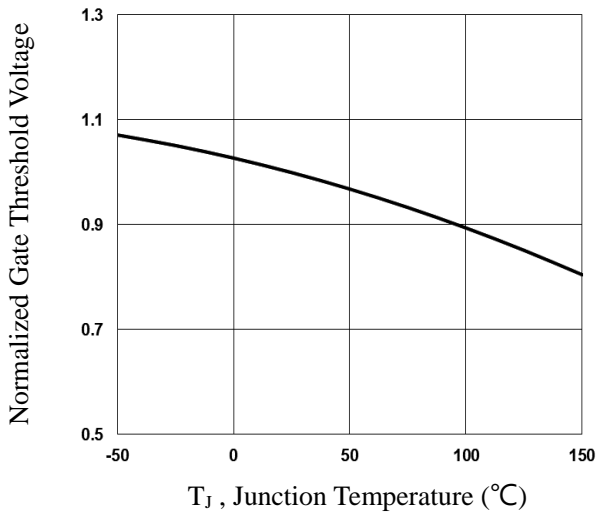


Fig.4 Capacitance Characteristics

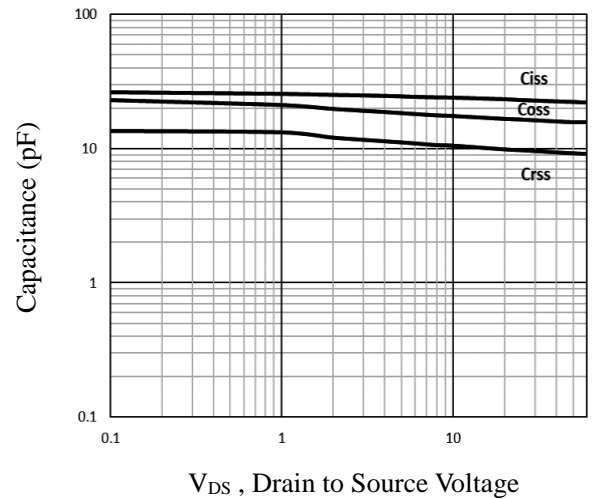


Fig.5 Normalized Transient Response

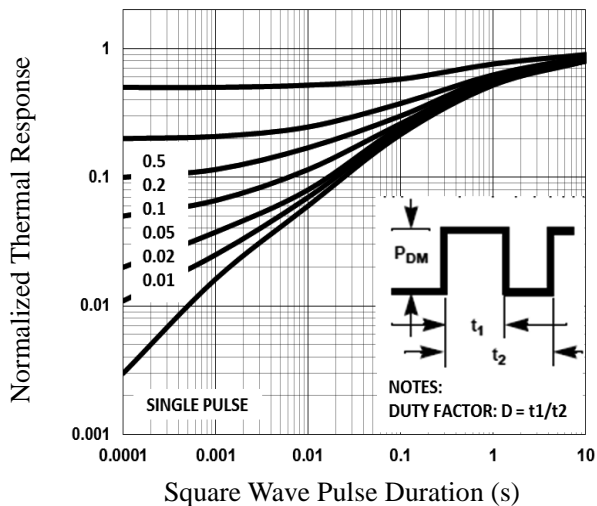
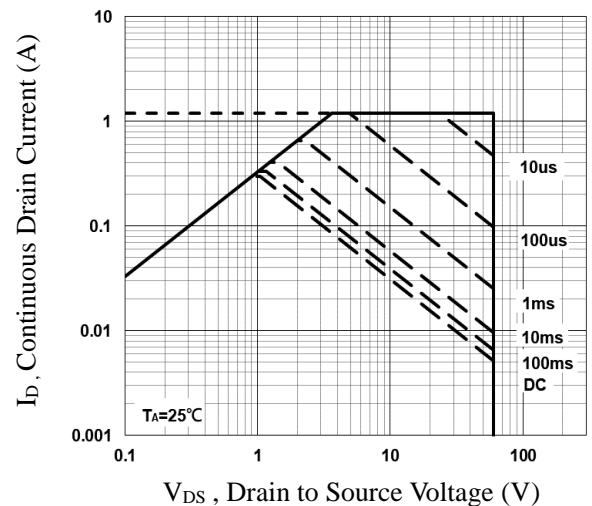
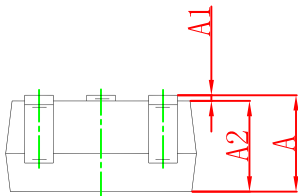
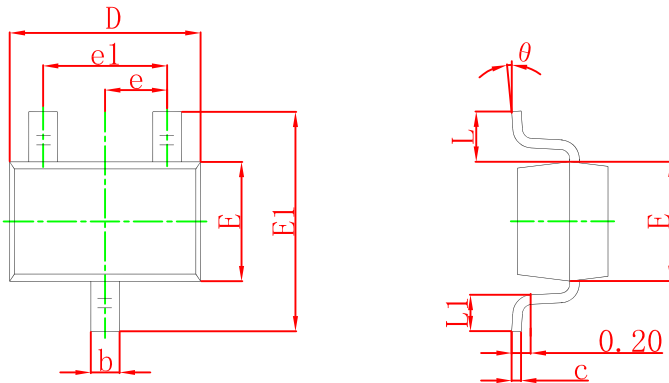


Fig.6 Maximum Safe Operation Area

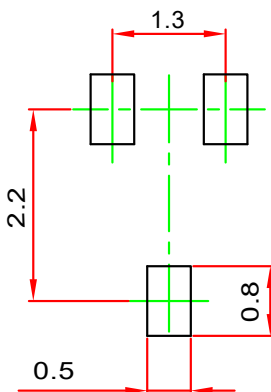


SOT-323 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.200	0.400	0.008	0.016
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
θ	0°	8°	0°	8°

SOT-323 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-323	TAPING	7"	330	3000