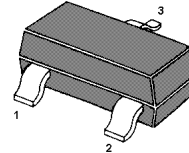


BSS138K N-Channel Enhancement Mode Power MOSFET

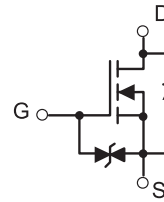
Features

- $V_{DS} = 50V, I_D = 0.22A$
 $R_{DS(ON)} < 3\Omega @ V_{GS}=5V$
 $R_{DS(ON)} < 2\Omega @ V_{GS}=10V$
ESD Rating: HBM 2300V
- High power and current handing capability
- Lead free product is acquired
- Surface mount package



1.Gate 2.Source 3.Drain
SOT-23 Plastic Package

Equivalent circuit



MARKING:J2

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	50	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	0.22	A
Drain Current-Pulsed ^(Note 1)	I_{DM}	0.88	A
Maximum Power Dissipation	P_D	0.35	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ\text{C}$

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient ^(Note 2)	$R_{\theta JA}$	350	$^\circ\text{C/W}$
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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	50	65	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =50V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±10V, V _{DS} =0V	-	±110	±500	nA
		V _{GS} =±12V, V _{DS} =0V	-	±0.3	±10	uA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	0.6	1.1	1.6	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =5V, I _D =0.2A	-	1.3	3	Ω
		V _{GS} =10V, I _D =0.22A	-	1	2	Ω
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =0.2A	0.2	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, F=1.0MHz	-	30	-	PF
Output Capacitance	C _{OSS}		-	15	-	PF
Reverse Transfer Capacitance	C _{RSS}		-	6	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =30V, I _D =0.22A V _{GS} =10V, R _{GEN} =6Ω	-	-	5	nS
Turn-on Rise Time	t _r		-	-	5	nS
Turn-Off Delay Time	t _{d(off)}		-	-	60	nS
Turn-Off Fall Time	t _f		-	-	35	nS
Total Gate Charge	Q _g	V _{DS} =25V, I _D =0.2A, V _{GS} =10V	-	-	2.4	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =0.22A	-	-	1.3	V
Diode Forward Current (Note 2)	I _S		-	-	0.22	A

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 Characteristics

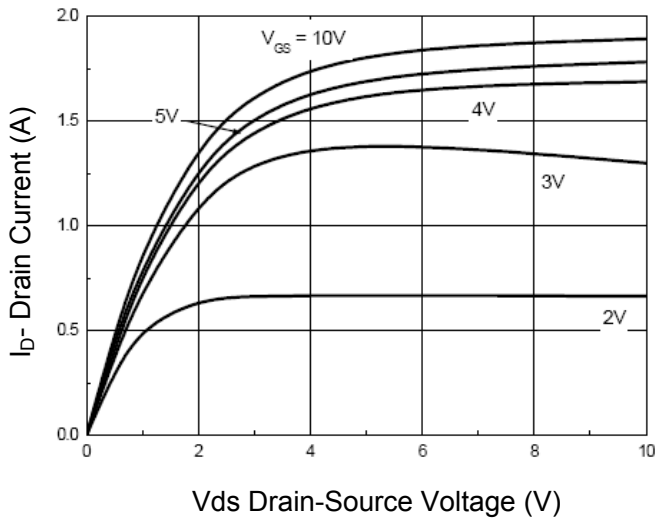


Figure 1 Output Characteristics

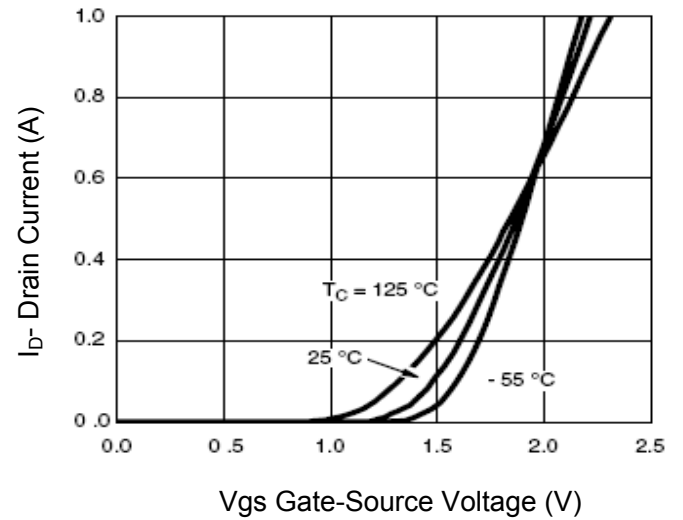


Figure 2 Transfer Characteristics

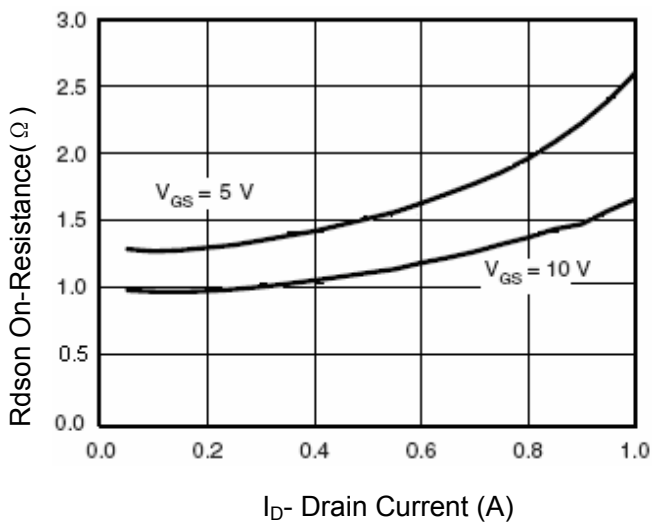


Figure 3 Drain-Source On-Resistance

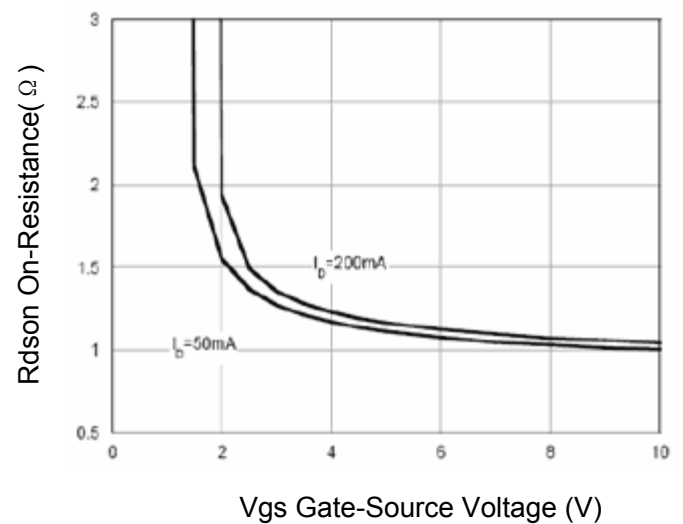


Figure 4 Rdson vs Vgs

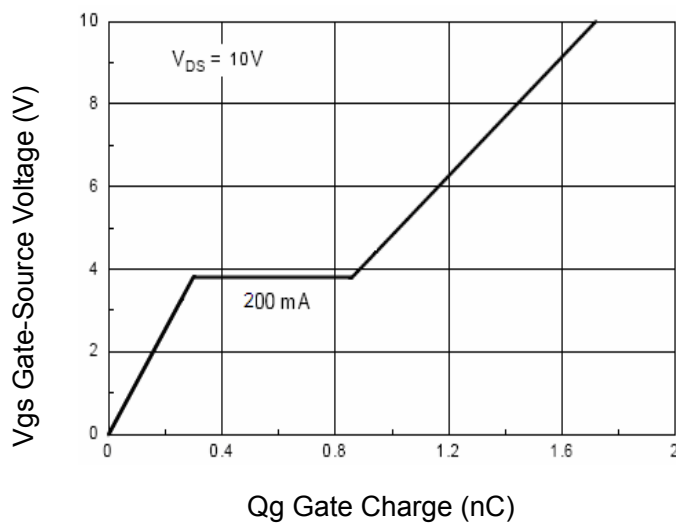


Figure 5 Gate Charge

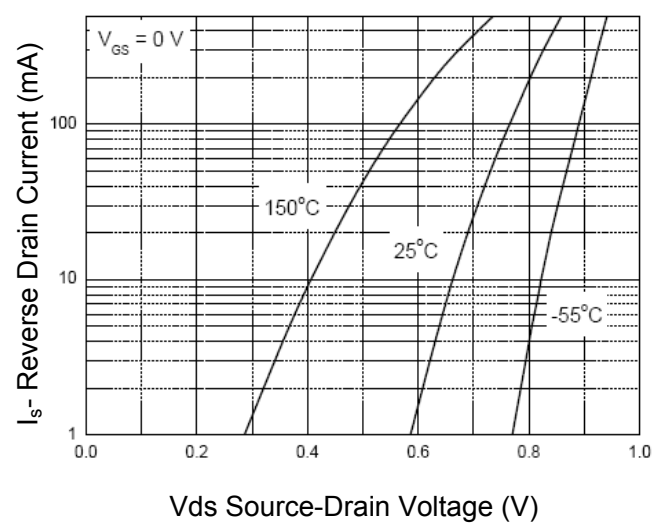


Figure 6 Source-Drain Diode Forward

Typical Characteristics

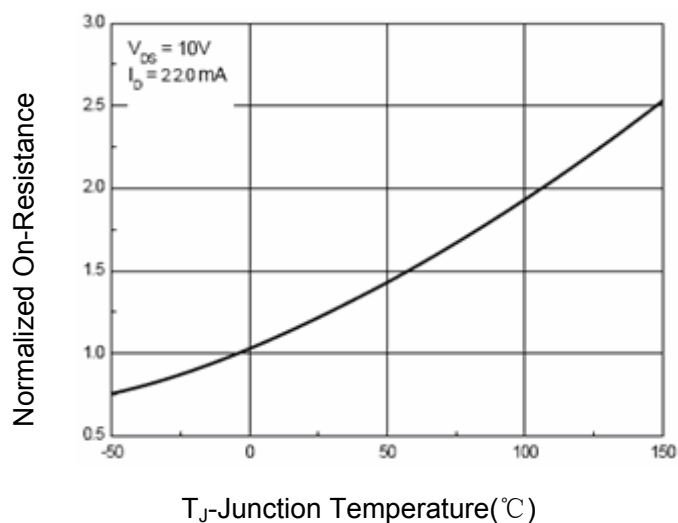


Figure 7 Drain-Source On-Resistance

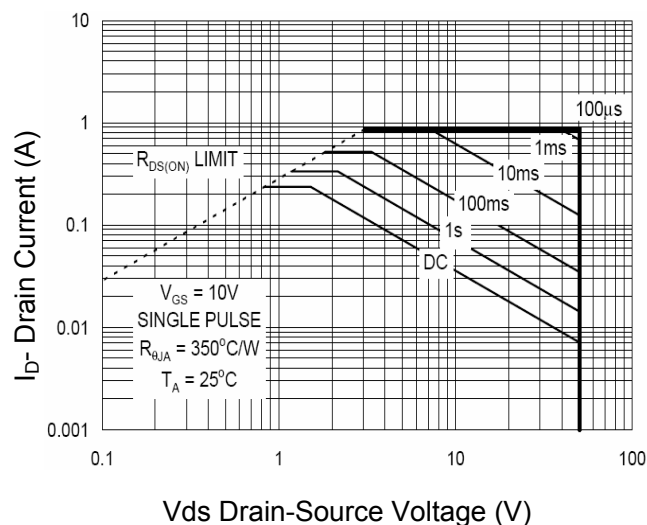


Figure 9 Safe Operation Area

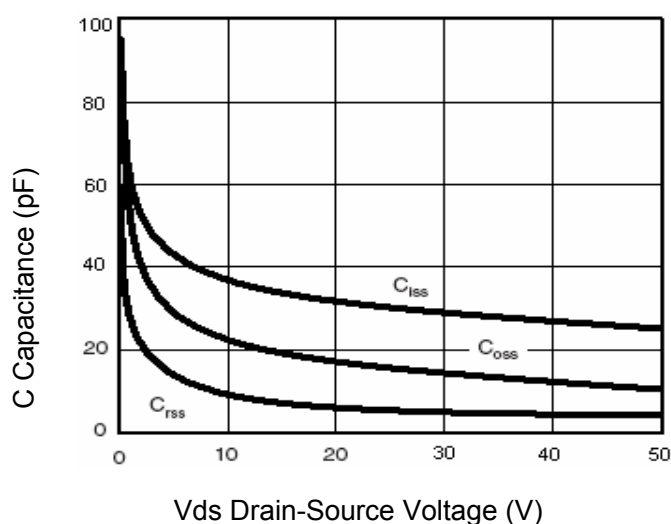


Figure 10 Capacitance vs Vds

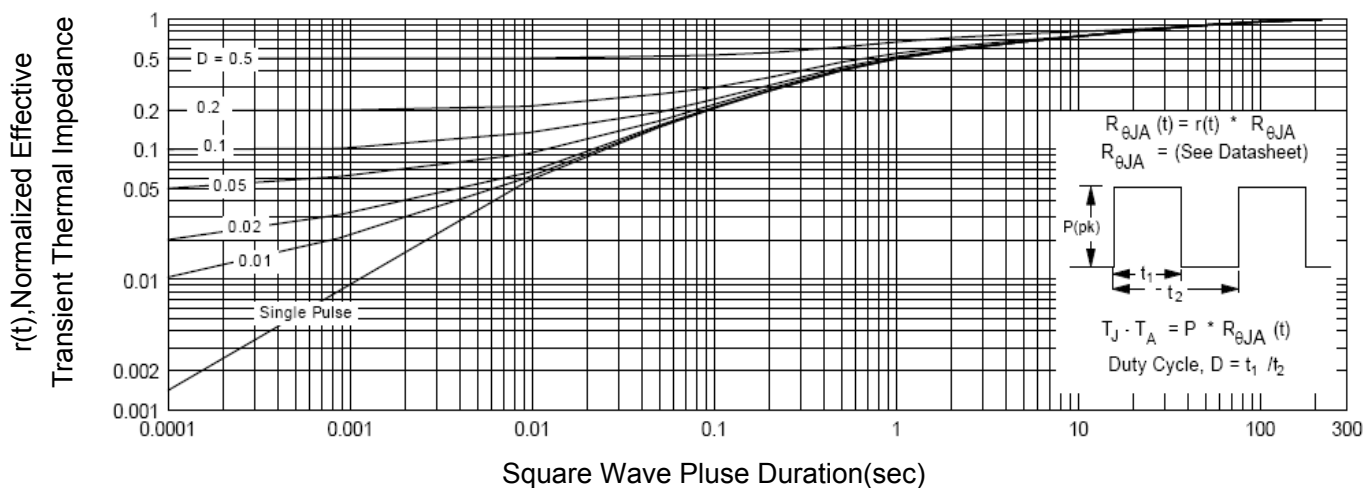
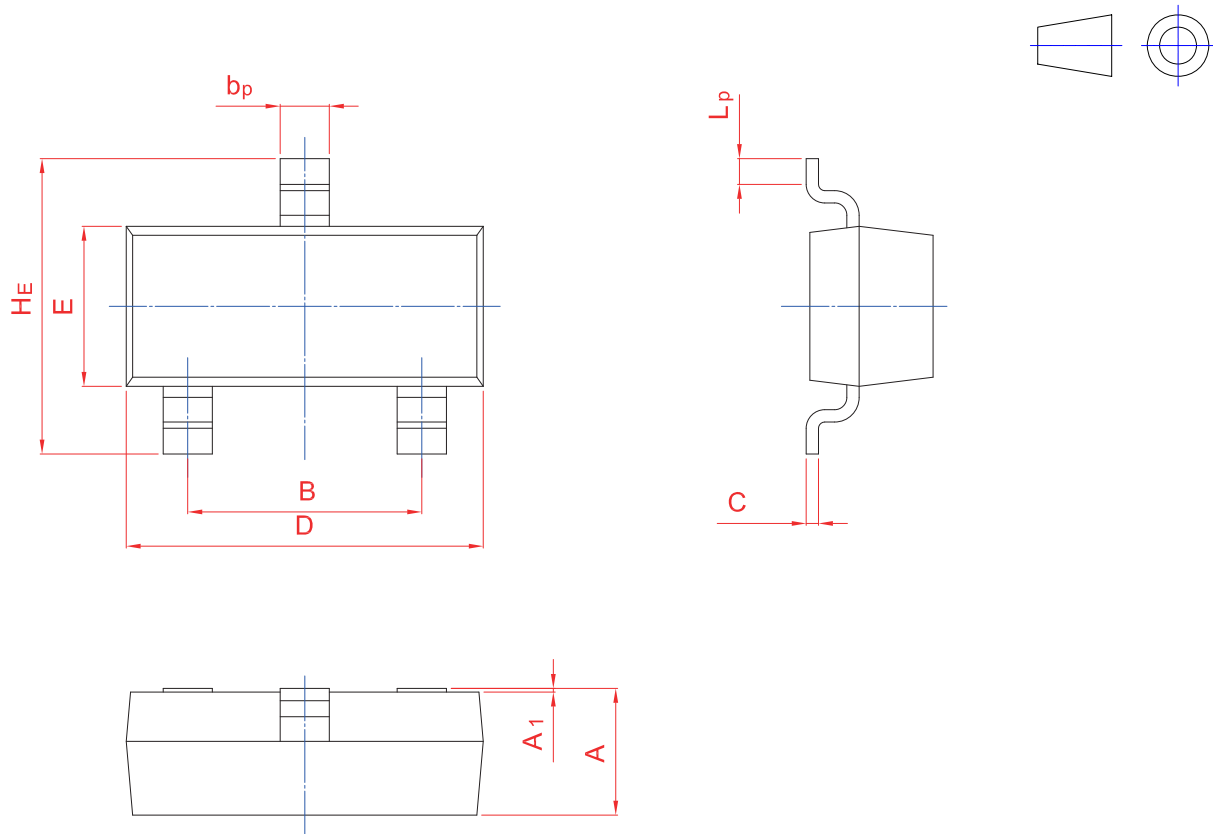


Figure 11 Normalized Maximum Transient Thermal Impedance

PACKAGE OUTLINE

SOT-23



UNIT	A	B	b _p	C	D	E	H _E	A ₁	L _p
mm	1.40 0.89	2.04 1.78	0.51 0.30	0.19 0.08	3.10 2.70	1.65 1.20	3.00 2.20	0.100 0.013	0.50 0.20