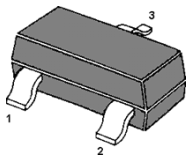
BSS138K N-Channel Enhancement Mode Power MOSFET

Features

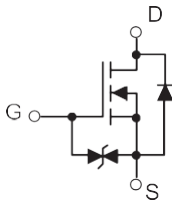
- V_{DS} = 50V,I_D = 0.22A
  $R_{DS(ON)}$ < 3Ω @ V_{GS}=5V
  $R_{DS(ON)}$ < 2Ω @ V_{GS}=10V
  ESD Rating：HBM 2300V
- High power and current handing capability
- Lead free product is acquired
- Surface mount package



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

MARKING:138K

Equivalent circuit



Absolute Maximum Ratings (T_A=25℃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	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	350	℃/W

Electrical Characteristics (T_A=25℃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_{lss}	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 ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

Typical Characteristics

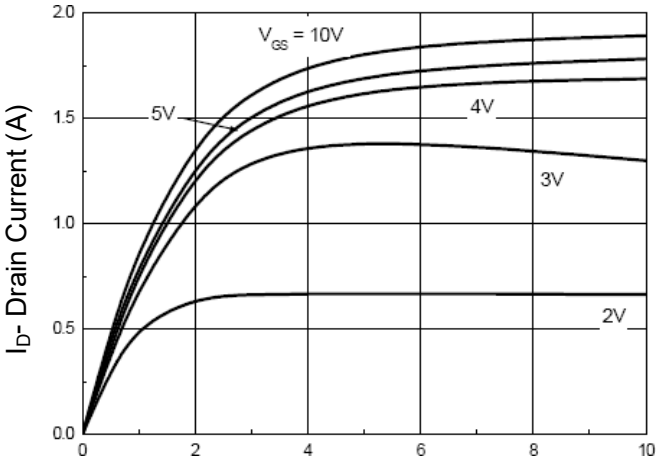


Figure 1 Output Characteristics

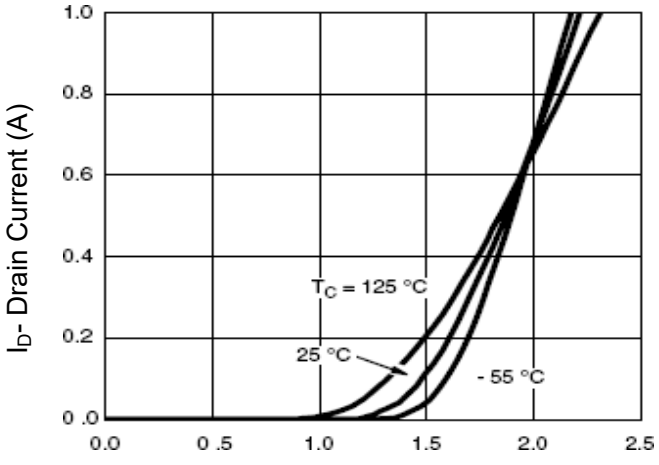


Figure 2 Transfer Characteristics

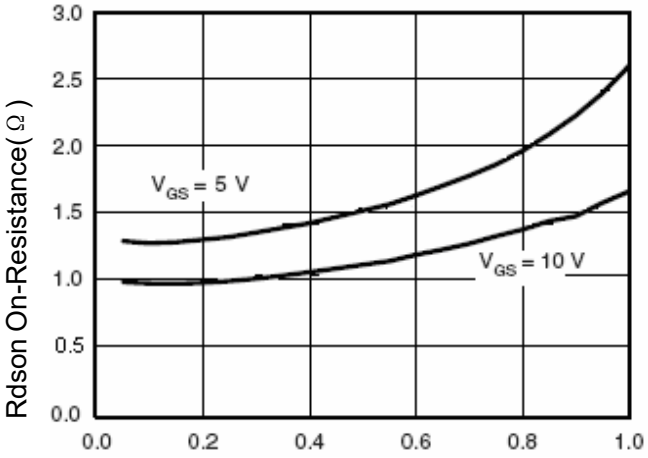


Figure 3 Drain-Source On-Resistance

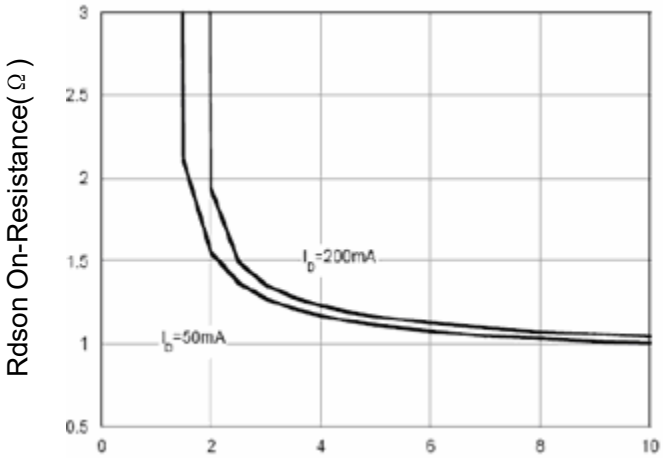


Figure 4 Rdson vs Vgs

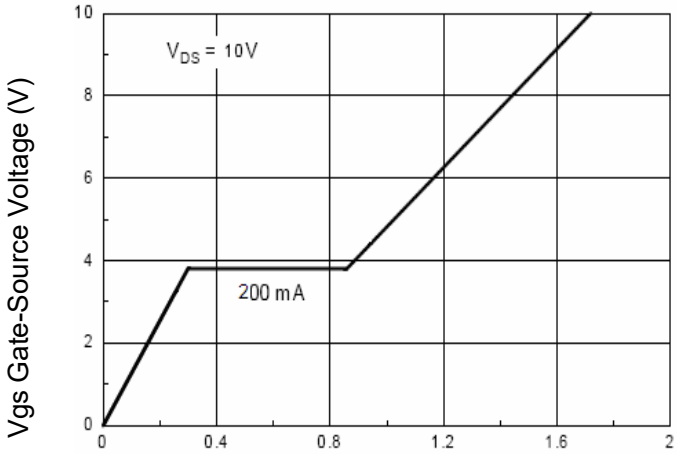


Figure 5 Gate Charge

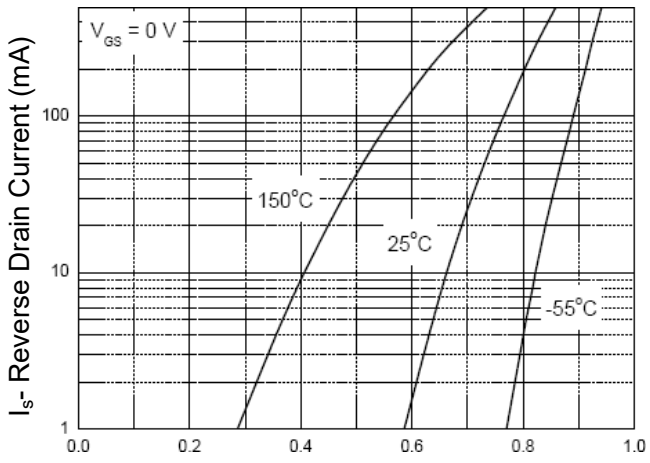
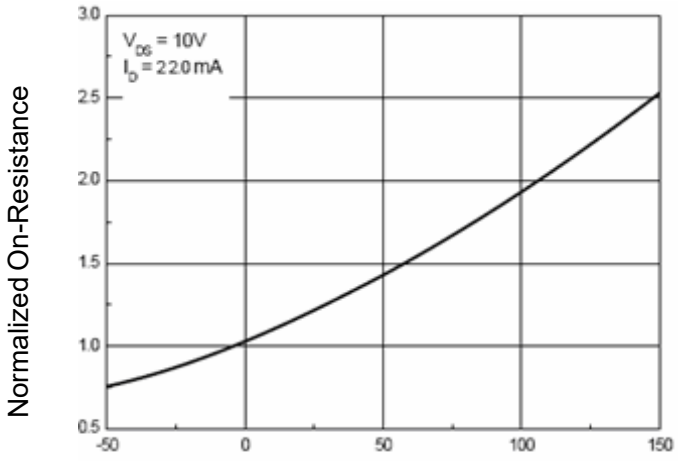


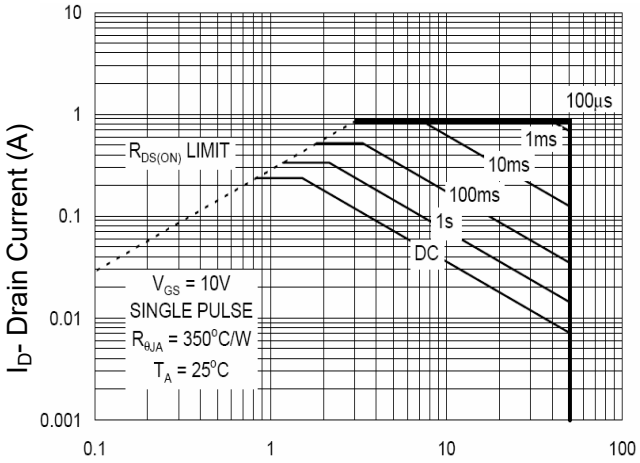
Figure 6 Source-DrainDiode Forward

Typical Characteristics



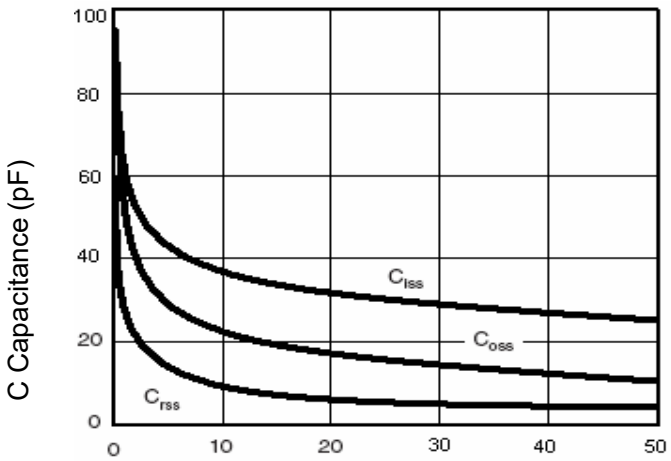
T_J-Junction Temperature(℃)

Figure 7 Drain-Source On-Resistance



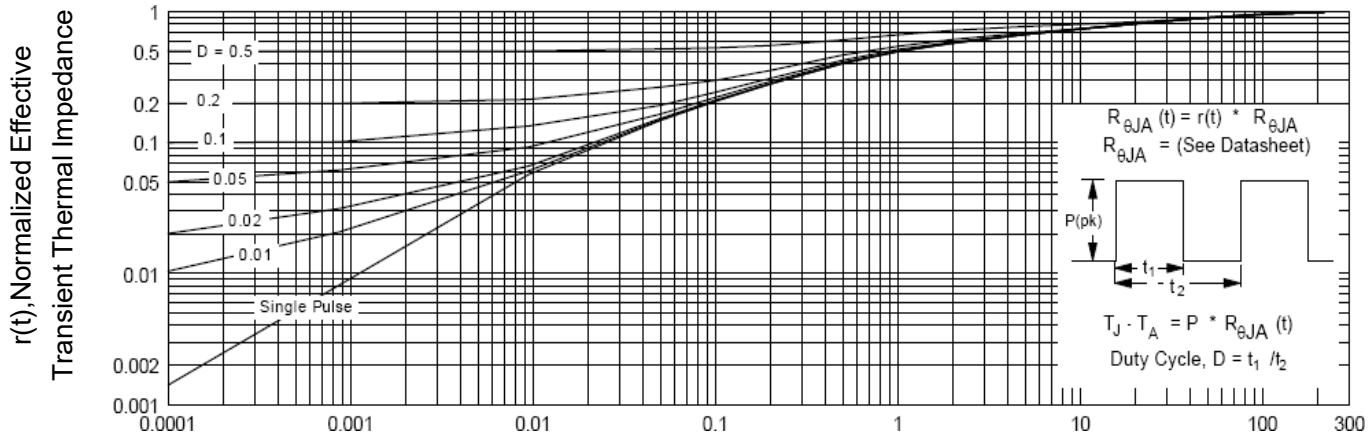
Vds Drain-Source Voltage (V)

Figure 9 Safe Operation Area



Vds Drain-Source Voltage (V)

Figure 10 Capacitance vs Vds

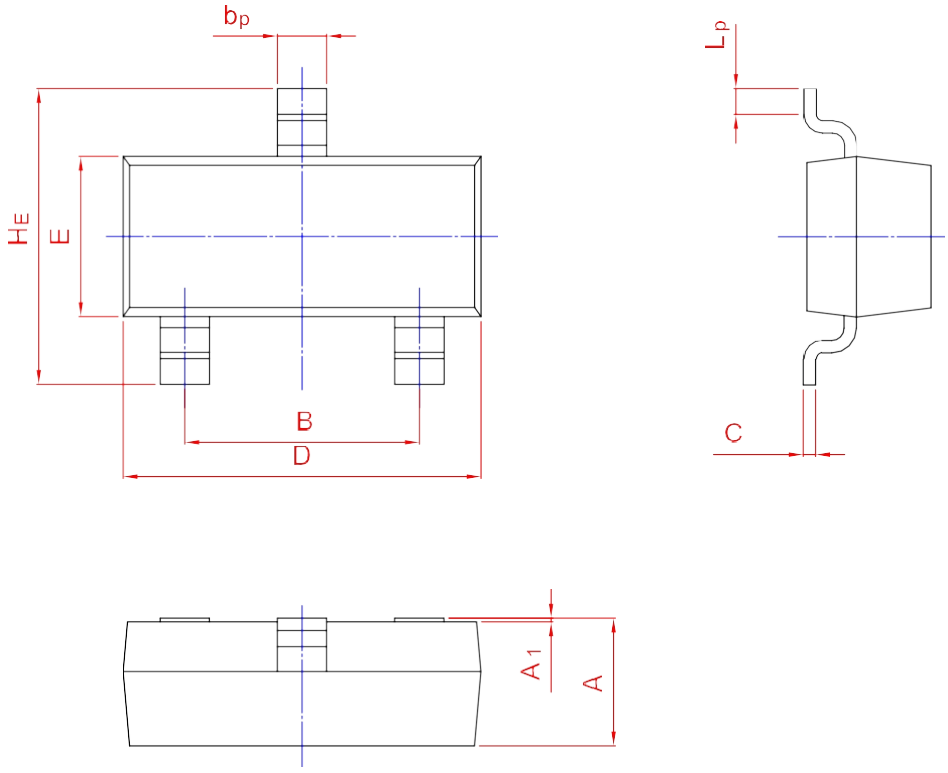


Square Wave Pluse Duration(sec)

Figure 11 Normalized Maximum Transient Thermal Impedance

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads **SOT-23**



UNIT	A	B	bp	C	D	E	HE	A1	Lp
mm	1.40 0.95	2.04 1.78	0.50 0.35	0.19 0.08	3.10 2.70	1.65 1.20	3.00 2.20	0.100 0.013	0.50 0.20