



Product Summary

- ◆ V_{DS} 50V
- ◆ I_D 340mA
- ◆ $R_{DS(ON)}$ (at $V_{GS}=10V$) < 2.5ohm
- ◆ $R_{DS(ON)}$ (at $V_{GS}=4.5V$) < 3.0ohm

General Description

- ◆ Trench Power MV MOSFET technology
- ◆ Voltage controlled small signal switch
- ◆ Low input Capacitance
- ◆ Fast Switching Speed
- ◆ Low Input / Output Leakage

Applications

- ◆ Battery operated systems
- ◆ Solid-state relays
- ◆ Direct logic-level interface : TTL/CMOS

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

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	50	V
Gate-source Voltage		V_{GS}	± 20	V
Drain Current	$T_A=25^\circ C$ @ Steady State	I_D	340	mA
	$T_A=70^\circ C$ @ Steady State		272	
Pulsed Drain Current A		I_{DM}	1.5	A
Total Power Dissipation @ $T_A=25^\circ C$		P_D	350	mW
Thermal Resistance Junction-to-Ambient @ Steady State B		$R_{\theta JA}$	357	$^\circ C / W$
Junction and Storage Temperature Range		T_J, T_{STG}	-55~+150	$^\circ C$

Ordering Information (Example)

PREFERRED P/N	PACKING CODE	Marking	MINIMUM PACKAGE (pcs)	INNER BOX QUANTITY (pcs)	OUTER CART ON QUANTITY (pcs)	DELIVERY MODE
BSS138-HF	F2	SS.	3000	30000	120000	7" reel

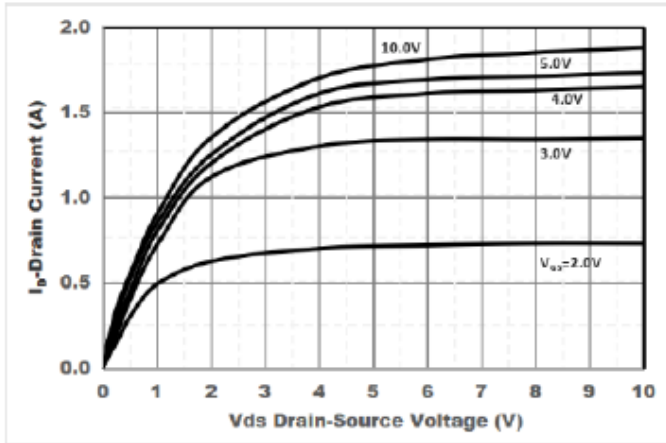
**Electrical Characteristics** ($T_J=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	50			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=50V, V_{GS}=0V$			1	μA
Gate-Body Leakage Current	I_{GSS1}	$V_{GS}=\pm 20V, V_{DS}=0V$			± 100	nA
	I_{GSS2}	$V_{GS}=\pm 10V, V_{DS}=0V$			± 50	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.8	1.2	1.6	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=-300mA$		1.1	2.5	Ω
		$V_{GS}=4.5V, I_D=200mA$		1.2	3.0	
Diode Forward Voltage	V_{SD}	$I_S=300mA, V_{GS}=0V$			1.2	V
Maximum Body-Diode Continuous Current	I_S				340	mA
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, f=1MHz$		17.5		pF
Output Capacitance	C_{oss}			11.5		
Reverse Transfer Capacitance	C_{rss}			6.5		
Switching Parameters						
Total Gate Charge	Q_g	$V_{GS}=10V, V_{DS}=25V, I_D=0.3A$		1.7	2.4	nC
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=10V, V_{DD}=25V, I_D=300mA, R_{GEN}=6\Omega$		5		ns
Turn-off Delay Time	$t_{D(off)}$			17		
Reverse recovery Time	t_{rr}	$V_{GS}=0V, I_S=300mA, V_R=25V, dI_S/dt=-100A/\mu s$		30		ns

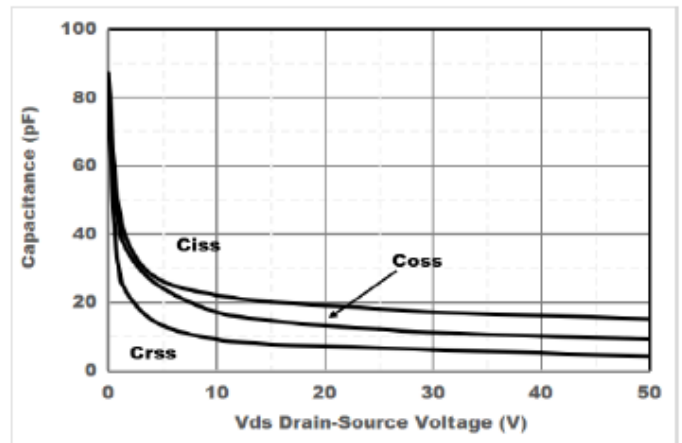
A. Pulse Test: Pulse Width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

B. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

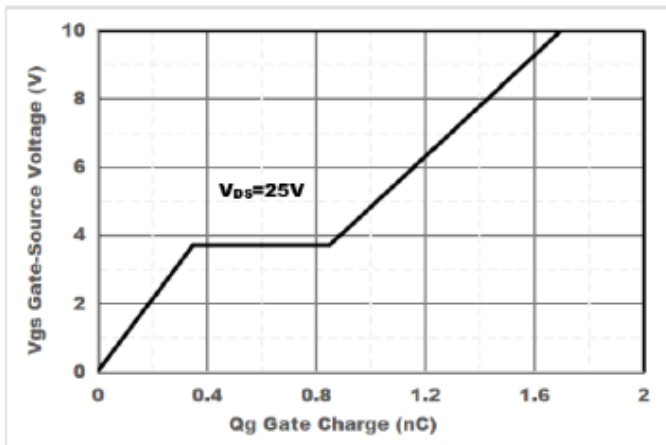
Typical Performance Characteristics



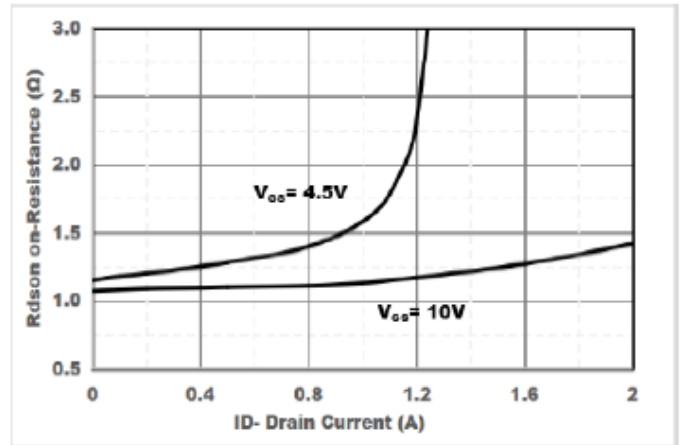
Output Characteristics



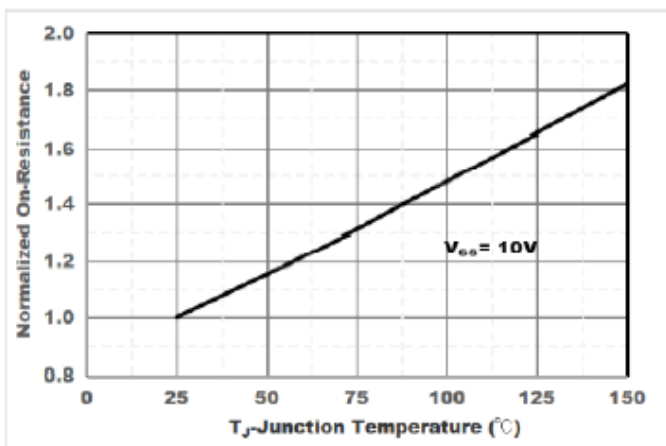
Capacitance Characteristics



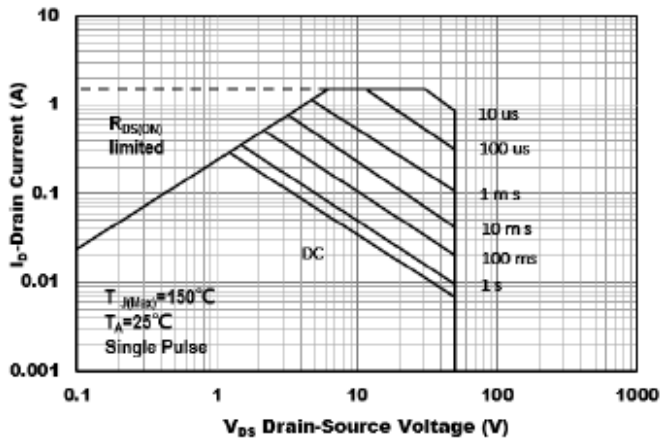
Gate Charge



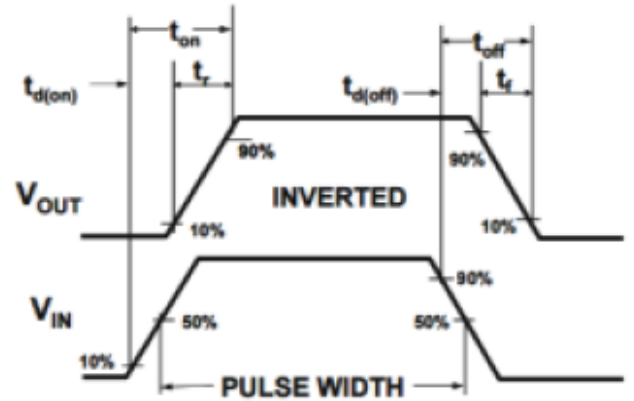
Drain-Source on Resistance



Drain-Source on Resistance



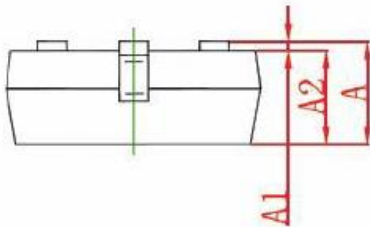
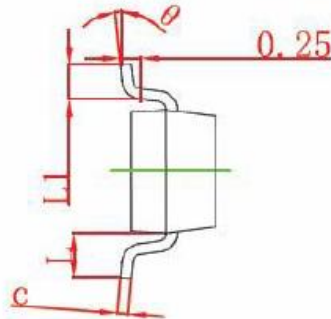
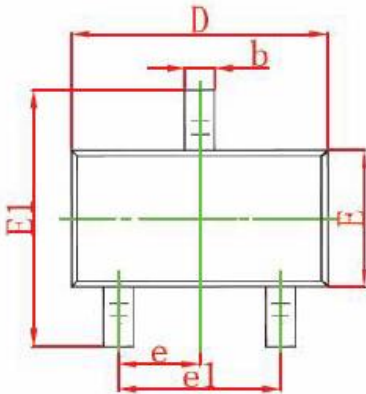
Safe Operation Area



Switching wave

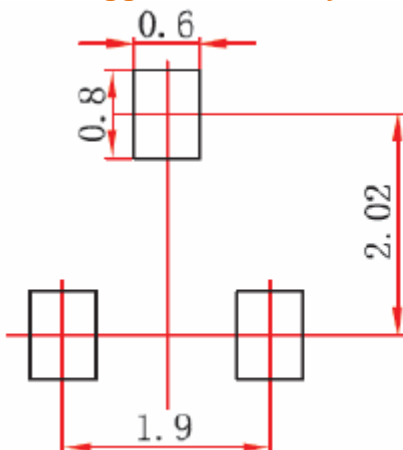
Package information

SOT23



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
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.