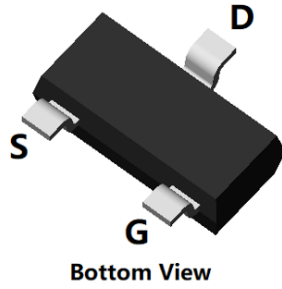
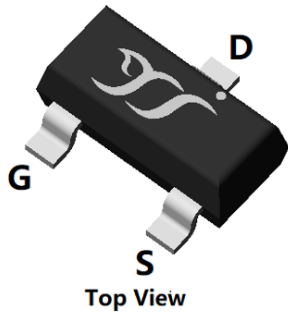
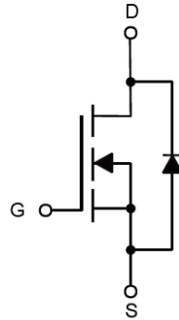


N-Channel Enhancement Mode Field Effect Transistor



SOT-23



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
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

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

■ 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	I_D	$T_A=25^\circ\text{C}$ @ Steady State	340
		$T_A=70^\circ\text{C}$ @ Steady State	272
Pulsed Drain Current ^A	I_{DM}	1.5	A
Total Power Dissipation @ $T_A=25^\circ\text{C}$	P_D	350	mW
Thermal Resistance Junction-to-Ambient @ Steady State ^B	$R_{\theta JA}$	357	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	T_J, T_{STG}	-55~+150	$^\circ\text{C}$

■ Ordering Information (Example)

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



BSS138

■ 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}	$V_{DS}=50V, V_{GS}=0V$			0.5	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}	$V_{DS}=25V, V_{GS}=0V, f=1MHz$		28.5		pF
Output Capacitance	C_{oss}			2.7		
Reverse Transfer Capacitance	C_{rss}			1.78		
Switching Parameters						
Total Gate Charge	Q_g	$V_{GS}=10V, V_{DS}=25V, I_D=0.3A$		1.7		nC
Gate-Source Charge	Q_{gs}			0.4		
Gate-Drain Charge	Q_{gd}			0.24		
Reverse Recovery Charge	Q_{rr}	$I_F=0.3A, di/dt=-100A/us$		2.65		ns
Reverse Recovery Time	t_{rr}			12.2		
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=10V, V_{DD}=25V, I_D=300mA, R_{GEN}=6\Omega$		2.6		ns
Turn-on Rise Time	t_r			18.8		
Turn-off Delay Time	$t_{D(off)}$			9.7		
Turn-off fall Time	t_f			47		

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

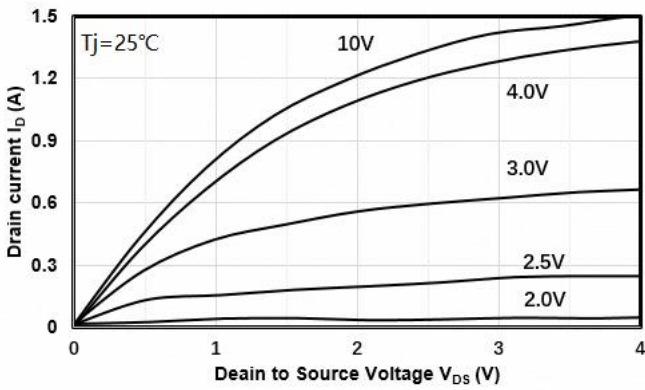


Figure1. Output Characteristics

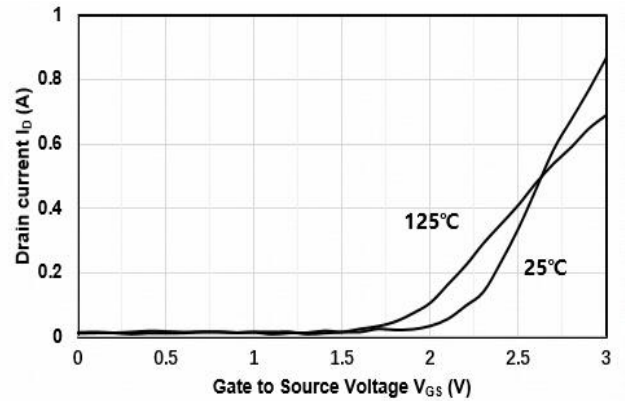


Figure2. Transfer Characteristics

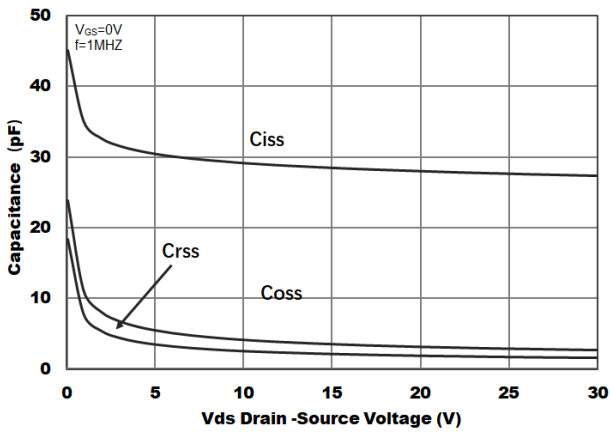


Figure3. Capacitance Characteristics

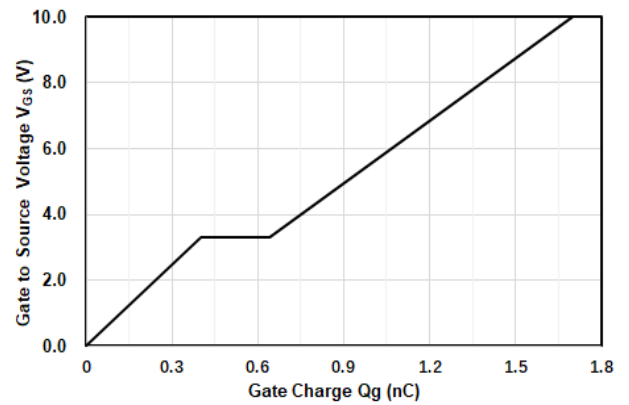


Figure4. Gate Charge

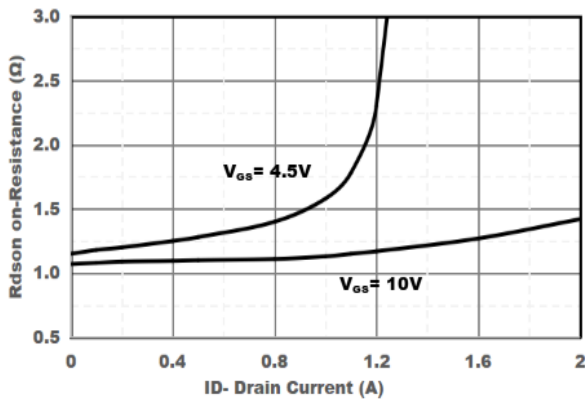


Figure5. Drain-Source on Resistance

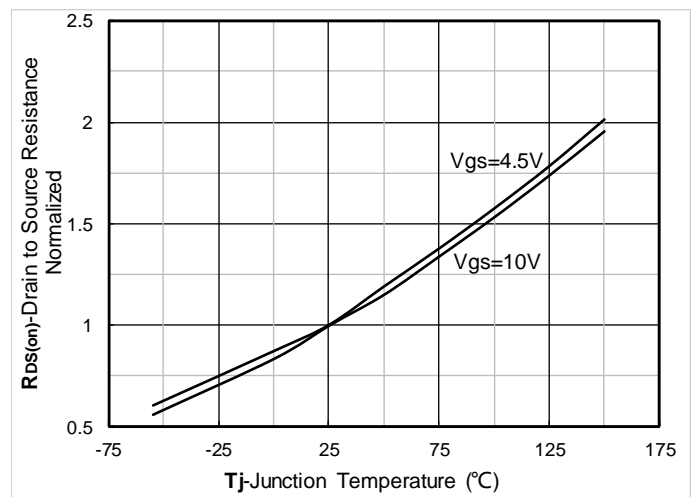


Figure6. Drain-Source on Resistance

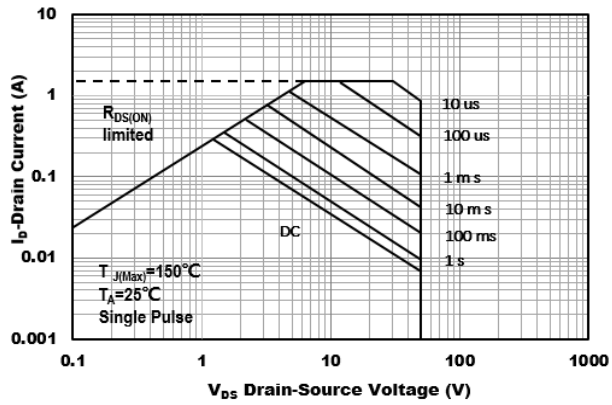


Figure7. Safe Operation Area

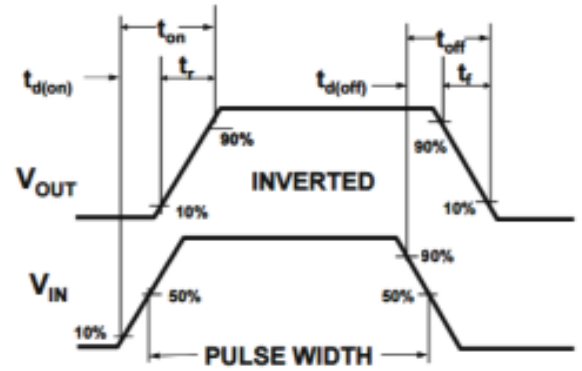


Figure8. Switching wave

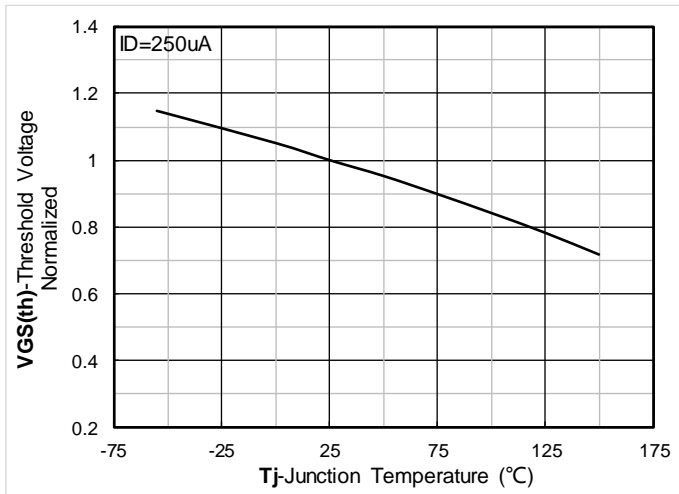


Figure 9. Normalized Threshold voltage

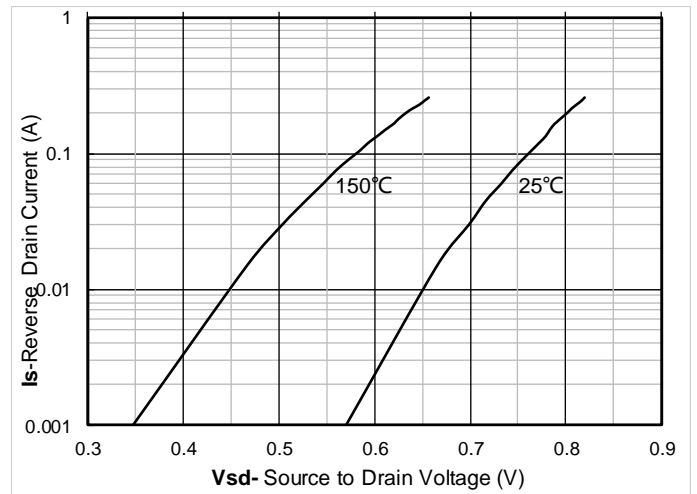
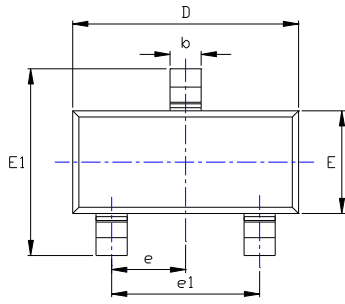
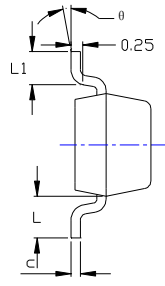


Figure 10. Forward characteristics of reverse diode

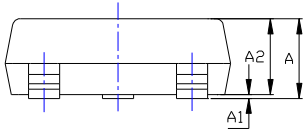
■ SOT-23 Package information



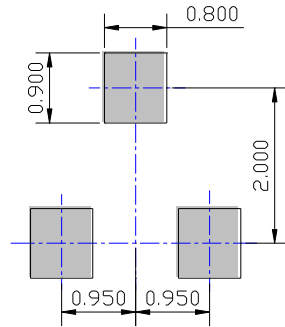
TOP VIEW



SIDE VIEW



SIDE VIEW



UNIT: mm

SUGGESTED SOLDER PAD LAYOUT

SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.035	0.045	0.900	1.150
A1	0.000	0.004	0.000	0.100
A2	0.035	0.041	0.900	1.050
b	0.012	0.020	0.300	0.500
c	0.004	0.008	0.100	0.200
D	0.110	0.118	2.800	3.000
E	0.047	0.055	1.200	1.400
E1	0.089	0.100	2.250	2.550
e	0.037TYP		0.950TYP	
e1	0.071	0.079	1.800	2.000
L	0.022REF		0.550REF	
L1	0.012	0.200	0.300	0.500
θ	0°	8°	0°	8°

NOTE:

- 1.PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
- 2.TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
- 3.THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.



BSS138

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