

## Enhancement Mode Field Effect Transistor

### Product Summary

$V_{DS}$	100V
$I_D$	200mA
$R_{DS(ON)}$ ( at $V_{GS}=10V$ )	3.4
$R_{DS(ON)}$ ( at $V_{GS}=4.5V$ )	3.6

### 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 ( $T_A=25$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		$V_{DS}$	100	V
Gate-source Voltage		$V_{GS}$	$\pm 20$	V
Drain Current	$T_A=25^\circ\text{C}$	$I_D$	200	mA
	$T_A=100^\circ\text{C}$		125	
Pulsed Drain Current <sup>A</sup>		$I_{DM}$	700	mA
Total Power Dissipation <sup>B</sup>	$T_A=25^\circ\text{C}$	$P_D$	350	mW
	$T_A=100^\circ\text{C}$		140	
Junction and Storage Temperature Range		$T_J, T_{STG}$	-55 +150	$^\circ\text{C}$

### Thermal resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient <sup>C</sup>	Steady-State	$R_{JA}$	280	350	$^\circ\text{C/W}$

### Ordering Information (Example)



# BSS123E

## Electrical Characteristics ( $T_J=25$ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>Static Parameter</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=100V, V_{GS}=0V$	-	-	1	$\mu A$
		$V_{DS}=100V, V_{GS}=0V, T_J=150^\circ C$	-	-	100	
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.8	2.5	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=200mA$	-	2.6	3.4	
		$V_{GS}=4.5V, I_D=200mA$	-	2.8	3.6	
Diode Forward Voltage	$V_{SD}$	$I_S=200mA, V_{GS}=0V$	-	0.9	1.2	V
Gate resistance	$R_G$	$f=1MHz, \text{Open drain}$	-	5.5	-	
Maximum Body-Diode Continuous Current	$I_S$		-	-	200	mA
<b>Dynamic Parameters</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=50V, V_{GS}=0V, f=1MHz$	-	33	-	$pF$
Output Capacitance	$C_{oss}$		-	3.5	-	
Reverse Transfer Capacitance	$C_{rss}$		-	1	-	
<b>Switching Parameters</b>						
Total Gate Charge	$Q_g$	$V_{GS}=10V, V_{DS}=50V, I_D=0.2A$	-	1.8	-	nC
Gate-Source Charge	$Q_{gs}$		-	0.6	-	
Gate-Drain Charge	$Q_{gd}$		-	0.3	-	
Reverse Recovery Charge	$Q_{rr}$	$I_F=0.2A, di/dt=100A/us$	-	6	-	nC
Reverse Recovery Time	$t_{rr}$		-	20	-	ns
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=10V, V_{DD}=50V, I_D=0.2A$ $R_{GEN}=3$	-	4	-	ns
Turn-on Rise Time	$t_r$		-	20	-	
Turn-off Delay Time	$t_{D(off)}$		-	7	-	
Turn-off fall Time	$t_f$		-	31	-	

A. Repetitive rating; pulse width limited by max. junction temperature.

B.  $P_d$  is based on max. junction temperature, using junction-case thermal resistance.

C. The value of  $R_{JA}$  is measured with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in the still air environment with  $T_A=25^\circ C$ . The maximum allowed junction temperature of  $150^\circ C$ . The value in any given application depends on the user's specific board design.

## Typical Electrical and Thermal Characteristics Diagrams

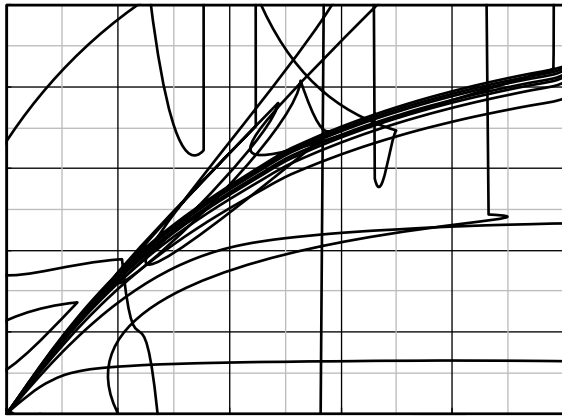


Figure 1. Output Characteristics

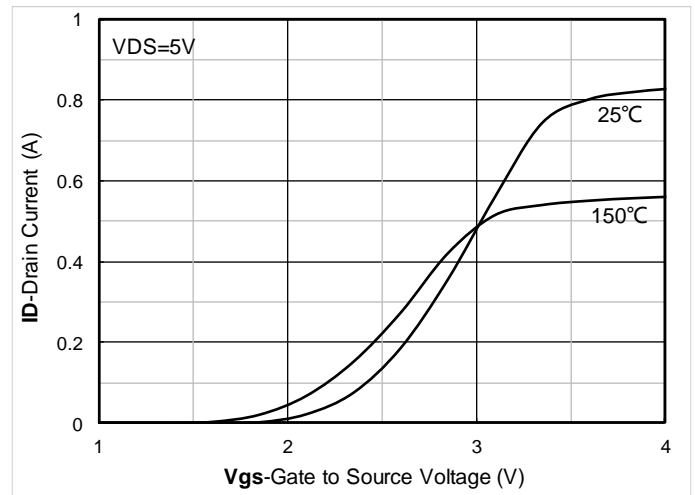


Figure 2. Transfer Characteristics

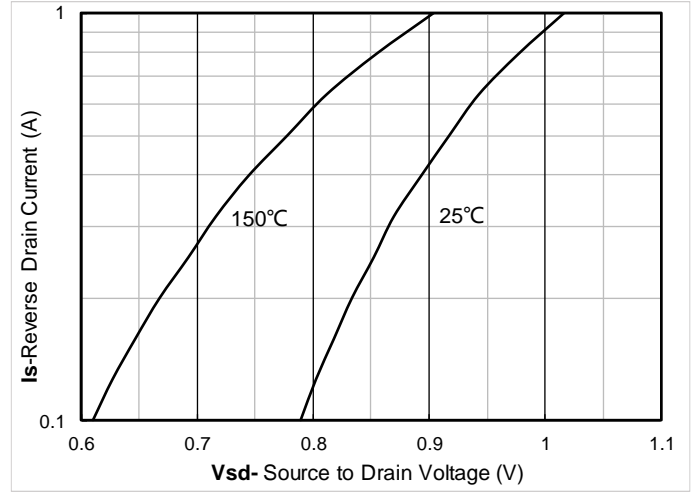


Figure 8. Forward characteristics of reverse diode

Figure 7.  $R_{DS(on)}$  VS Drain Current

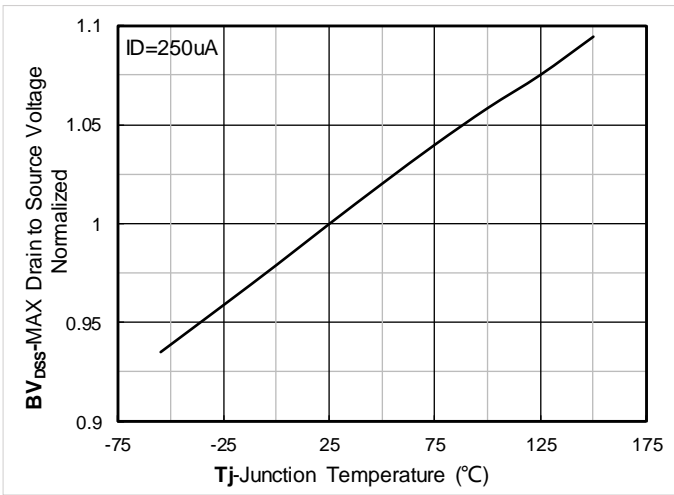


Figure 9. Normalized breakdown voltage

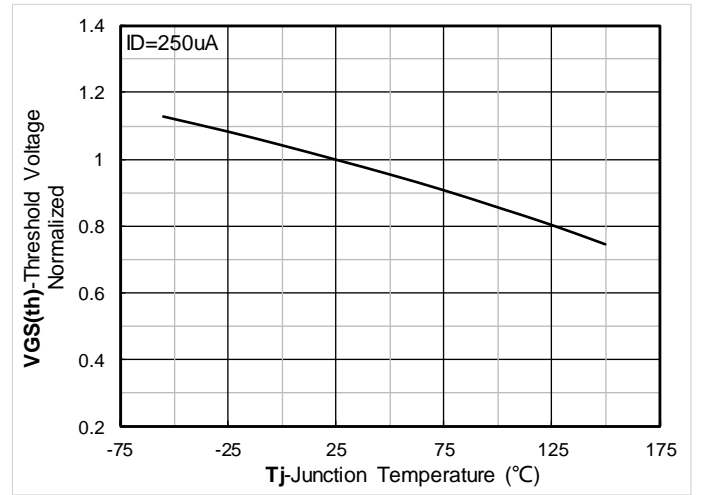


Figure 10. Normalized Threshold voltage

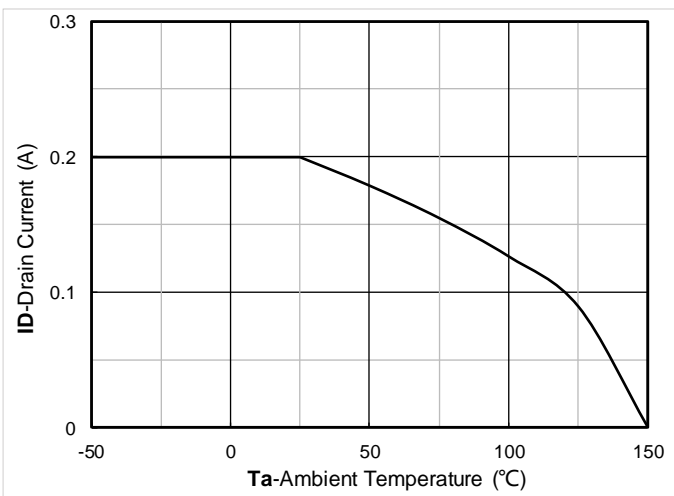


Figure 11. Current dissipation

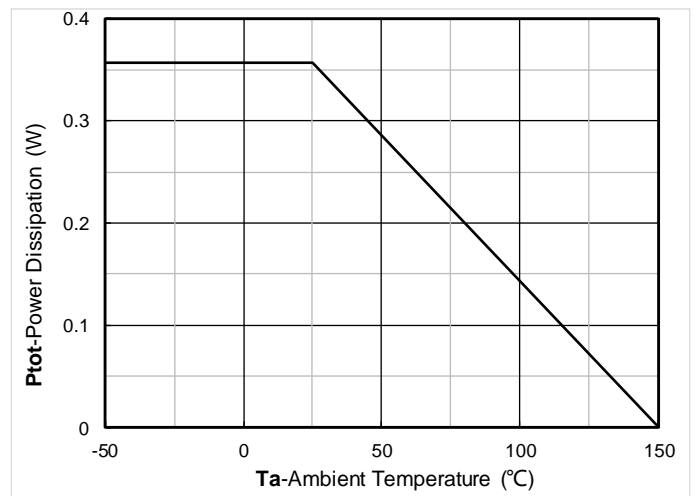


Figure 12. Power dissipation

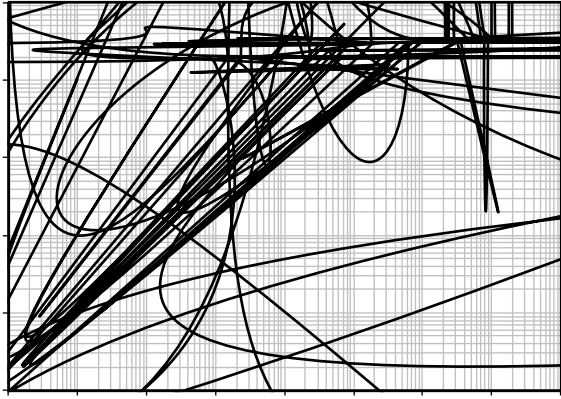


Figure 13. Maximum Transient Thermal Impedance

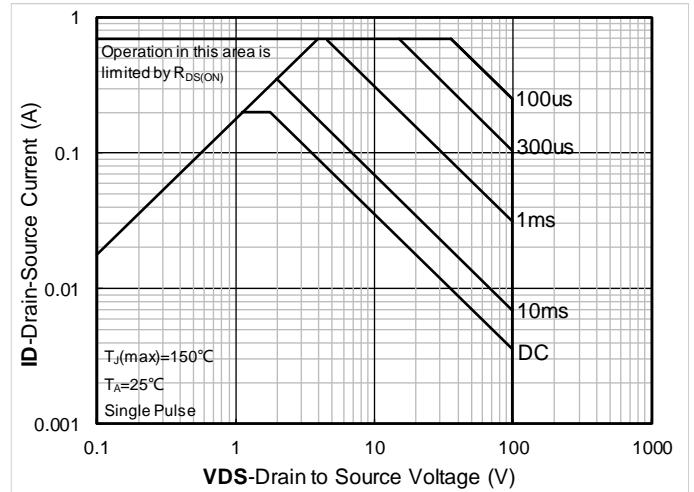


Figure 14. Safe Operation Area

## Test Circuits & Waveforms

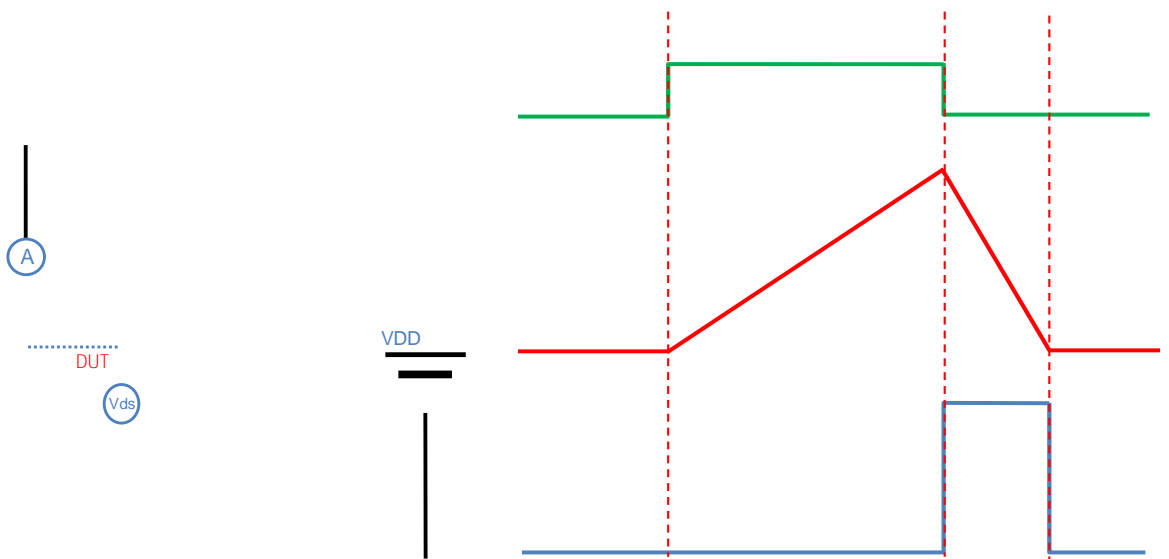


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

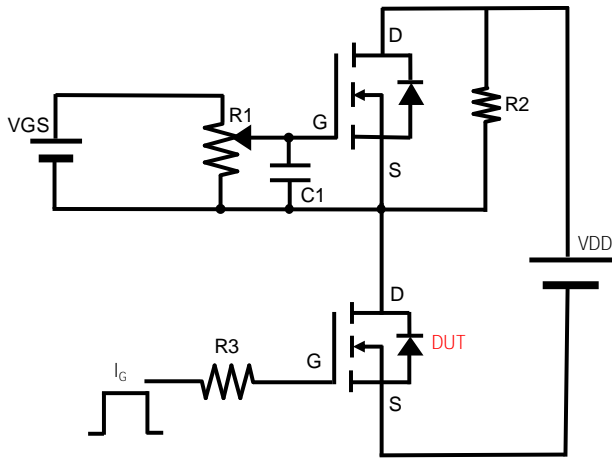


Figure B. Gate Charge Test Circuit & Waveform

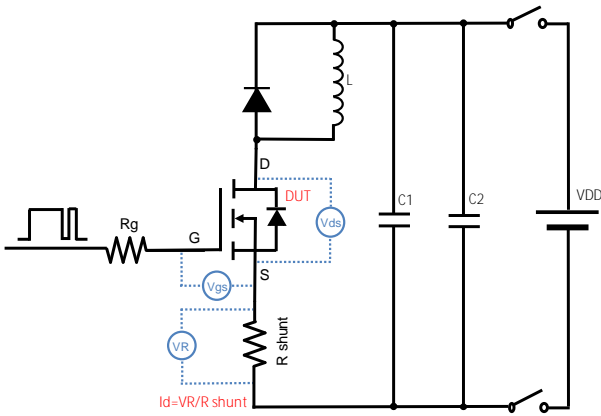


Figure C. Resistive Switching Test Circuit & Waveform

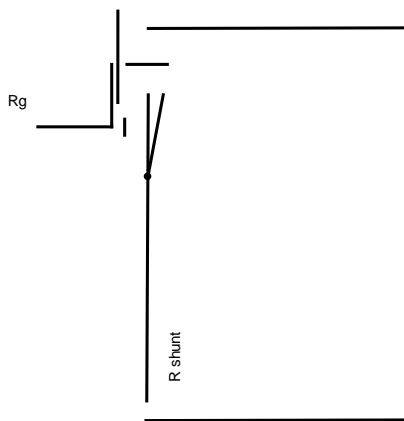
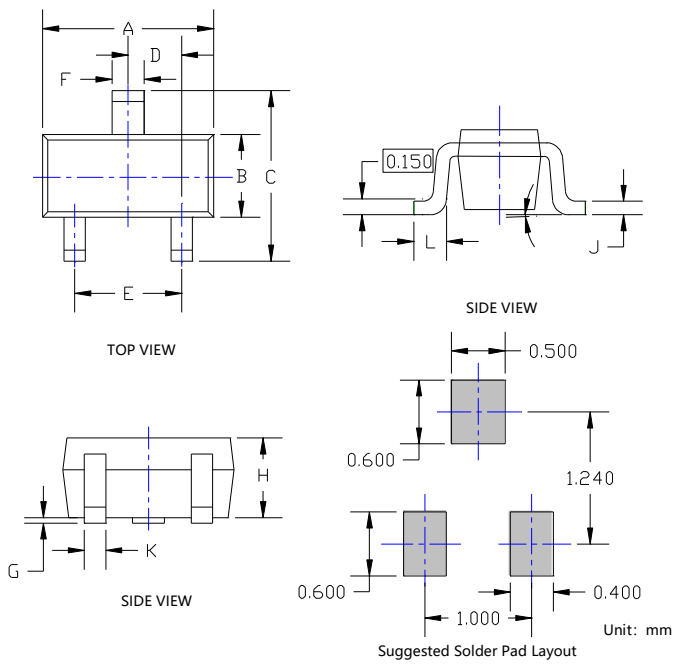


Figure D. Diode Recovery Test Circuit & Waveform



# BSS123E

## SOT-523 Package information



SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.059	0.067	1.500	1.700
B	0.030	0.033	0.750	0.850
C	0.057	0.069	1.450	1.750
D	0.020TYP		0.500TYP	
E	0.035	0.043	0.900	1.100
F	0.010	0.018	0.250	0.450
G	0.000	0.004	0.000	0.100
H	0.024	0.031	0.600	0.800
J	0.004	0.008	0.100	0.200
K	0.006	0.014	0.150	0.350
L	0.010	0.018	0.260	0.460
	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.



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