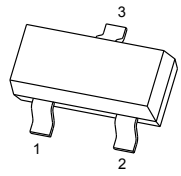
BSS138

SOT-23 Plastic-Encapsulate MOSFETS

50V N-Channel Enhancement Mode MOSFET

$V_{(BR)DSS}$	$R_{DS(on)}$MAX	I_D
50V	0.9Ω@10V	500mA
	1.1Ω@4.5V	

SOT-23



1. GATE
2. SOURCE
3. DRAIN

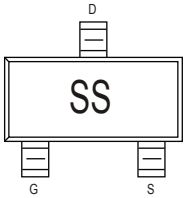
FEATURE

- High density cell design for low $R_{DS(ON)}$)
- Rugged and Relaible
- Voltage controlled small signal switch
- High saturation current capability
- HMB ESD protected (2000V)

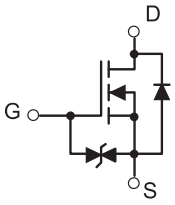
APPLICATION

- Direct Logic-Level Interface: TTL/CMOS
- Drivers: Relays, Solenoids, Lamps, Hammers, Display, Memories, Transistors, etc.
- Battery Operated Systems
- Solid-State Relays

MARKING



Equivalent circuit



PACKAGE SPECIFICATIONS

Package	Reel Size	Reel DIA. (mm)	Q'TY/Reel (pcs)	Box Size (mm)	QTY/Box (pcs)	Carton Size (mm)	Q'TY/Carton (pcs)
SOT-23	7'	178	3000	203×203×195	45000	438×438×220	180000

MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	50	V
Gate-Source Voltage		V_{GS}	±12	
Continuous Drain Current	T_A=25℃	I_D	0.5	A
	T_A=70℃		0.4	
Maximum Power Dissipation [2]	T_A=25℃	P_D	0.3	W
	T_A=70℃		0.2	
Pulsed Drain Current [1]		I_{DM}	1.8	A
Operating Junction and Storage Temperature Range		T_J	150	°C
Storage Temperature Range		T_{stg}	-50 to 150	°C
Thermal Resistance Junction-Ambient		$R_{\theta JA}$	400	°C/W

Notes
1) Pulse width limited by maximum junction temperature.
2) Surface Mounted on FR4 Board, t ≤ 5 sec.

MOSFET ELECTRICAL CHARACTERISTICS

T_a=25℃ unless otherwise specified

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Off characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D=250μA	50			V
Gate-body leakage	I_{GSS}	V_{GS}=±12V, V_{DS}=0V			±10	μA
Zero gate voltage drain current	I_{DSS}	V_{DS} =50V, V_{GS} =0V			1	μA
		V_{DS} =40V, V_{GS} =0V			100	μA
On characteristics						
Gate-threshold voltage (note 1)	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	0.60	1.0	1.5	V
Static drain-source on-resistance (note 1)	$R_{DS(on)}$	V_{GS} =10V, I_D =0.5A		0.9	2	Ω
		V_{GS} =4.5V, I_D =0.3A		1.1	2.5	
		V_{GS} =3.3V, I_D =0.2A		1.5	4	
Forward transconductance (note 1)	g_{FS}	V_{DS} =10V, I_D =0.25A	100			mS
Dynamic characteristics (note 2)						
Total Gate C harge	Q_g	V_{DS} =30V,I_D=0.5A,V_{GS} =10V		0.93		nC
Gate-Source Charge	Q_{gs}			0.18		
Gate-Drain Charge	Q_{gd}			0.31		
Input capacitance	C_{iss}	V_{DS} =30V,V_{GS} =0V, f=1MHz		23.8		pF
Output capacitance	C_{oss}			3.9		
Reverse transfer capacitance	C_{rss}			1.5		
Switching characteristics						
Turn-on delay time (note 1,2)	$t_{d(on)}$	V_{DD}=30V, V_{GS}=10V, I_D =0.3A,R_{GEN}=3.3Ω		6		ns
Rise time (note 1,2)	t_r			3.5		
Turn-off delay time (note 1,2)	$t_{d(off)}$			20		
Fall time (note 1,2)	t_f			5.9		
Drain-source body diode characteristics						
Source drain current(Body Diode)	I_{SD}				0.2	A
Body diode forward voltage (note 1)	V_{SD}	I_S=0.5A, V_{GS} = 0V		0.78	1.2	V

Notes :

1. Pulse Test : Pulse Width≤ 300μs, Duty Cycle≤ 2%.
2. These parameters have no way to verify.

Typical Characteristics

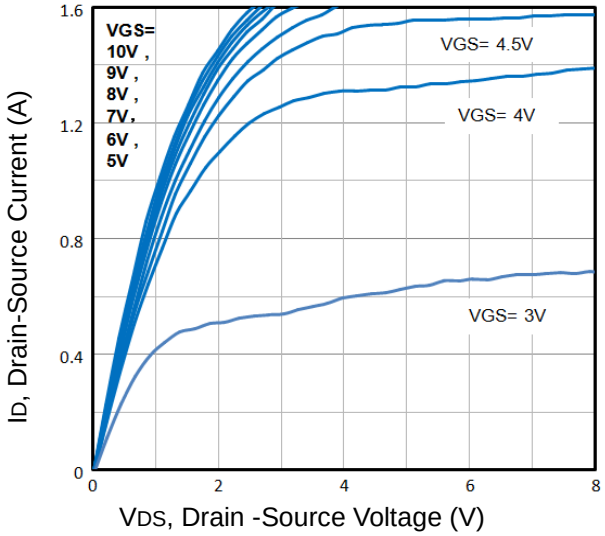


Fig1. Typical Output Characteristics

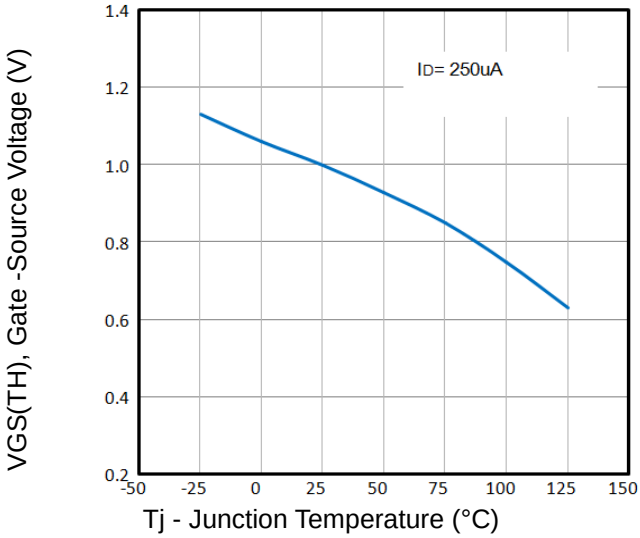


Fig2. Normalized Threshold Voltage Vs. Temperature

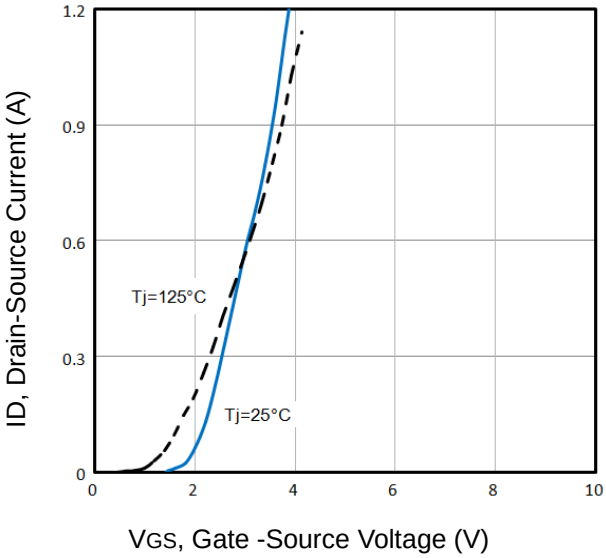


Fig3. Typical Transfer Characteristics

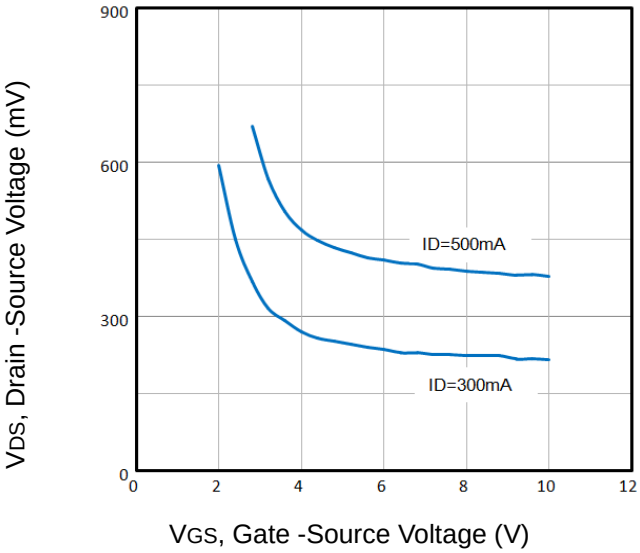


Fig4. Drain -Source Voltage vs Gate -Source Voltage

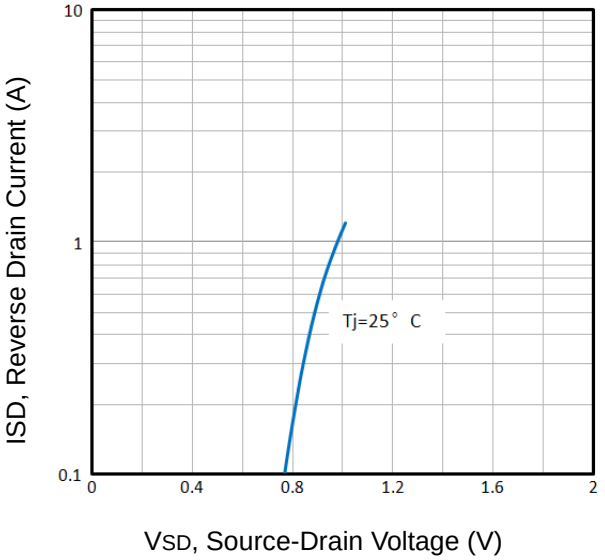


Fig5. Typical Source-Drain Diode Forward Voltage

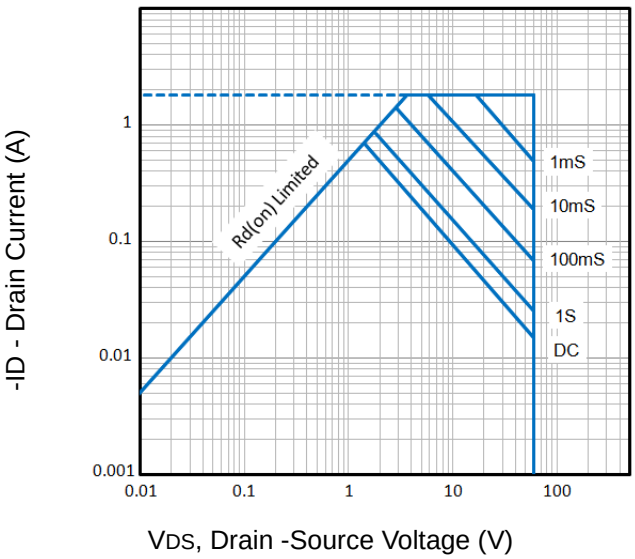


Fig6. Maximum Safe Operating Area

The curve above is for reference only.

Typical Characteristics

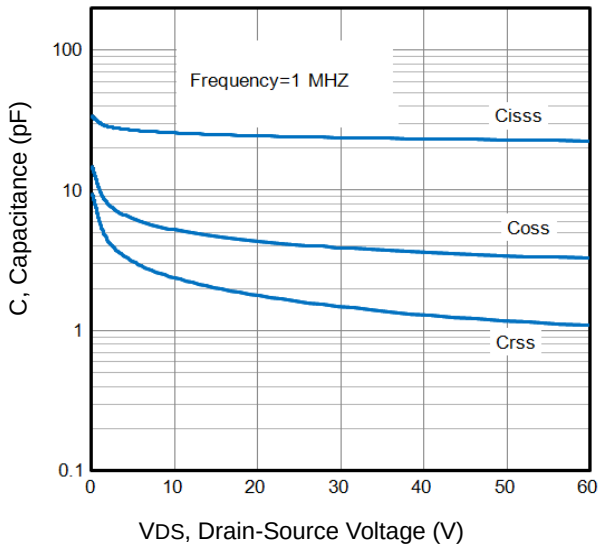


Fig7. Typical Capacitance Vs. Drain-Source Voltage

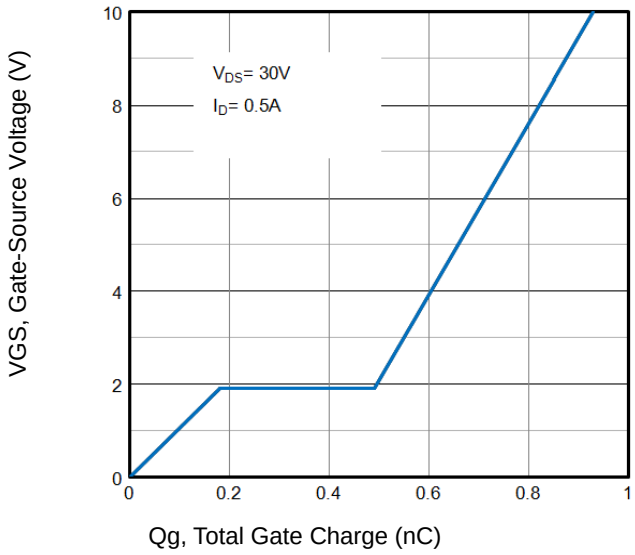


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

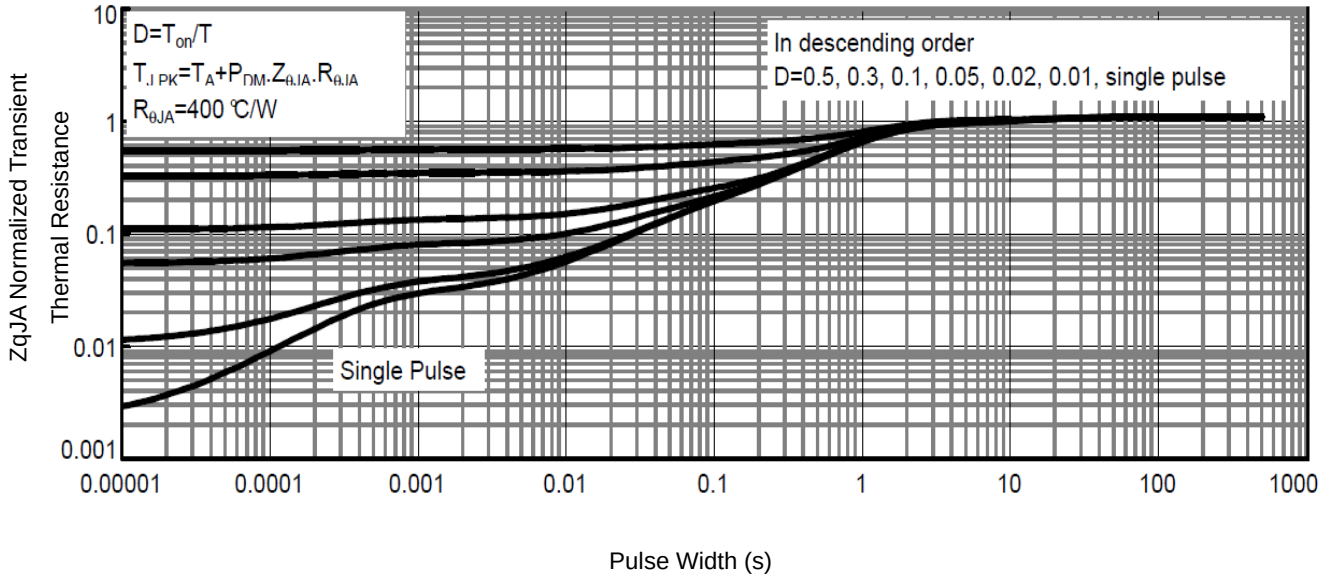


Fig9. Normalized Maximum Transient Thermal Impedance

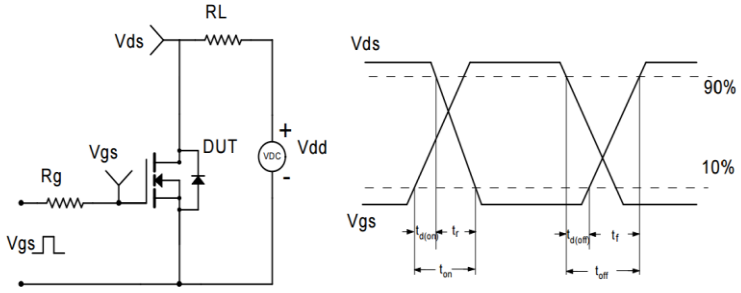
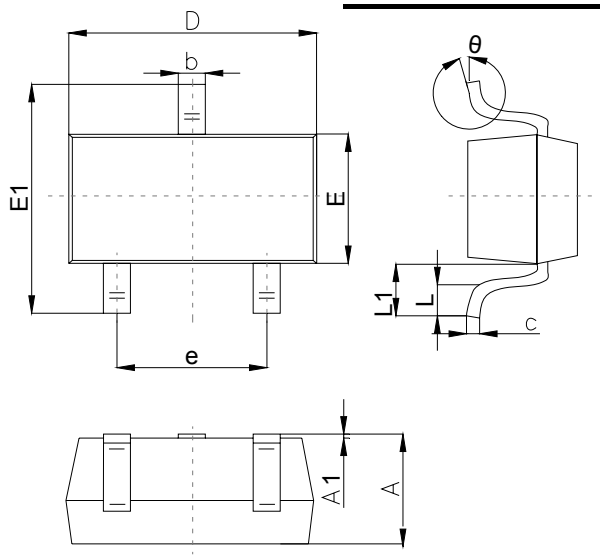


Fig10. Switching Time Test Circuit and waveforms

The curve above is for reference only.

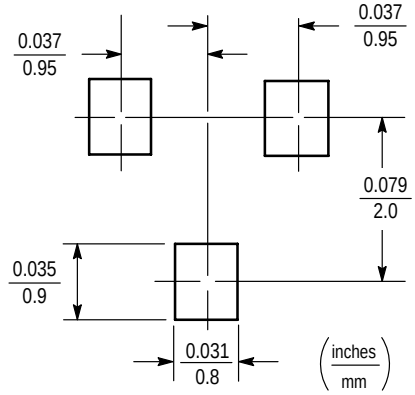
Outlitne Drawing

SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		
	Min	Typ	Max
A	0.90		1.40
A1	0.00		0.10
b	0.30		0.50
c	0.08		0.20
D	2.80	2.90	3.10
E	1.20		1.60
E1	2.25		2.80
e	1.80	1.90	2.00
L	0.10		0.50
L1	0.4		0.55
θ	0°		10°

Suggested Pad Layout



Note:
1.Controlling dimension:in/millimeters.
2.General tolerance: ±0.05mm.
3.The pad layout is for reference purposes only.