N-Channel 50V (D-S) Power MOSFET

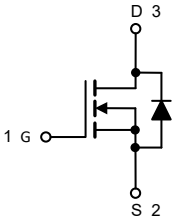
Features

- 100% Avalanche Tested
- Halogen Free, Pb-Free
- RoHS Compliant

SOT-23

Applications

- Relay driver
- Switching circuits
- High-side load switch
- High-speed line driver



Absolute Maximum Ratings (T_A=25°C unless otherwise noted)				
Parameter		**Symbol**	**Value**	**Unit**
Drain Source Voltage		V_{DS}	50	V
Gate Source Voltage		V_{GS}	±20	V
Drain Current, Continuous V_{GS}=10V	T_C=25°C	I_D	0.22	A
Drain Current, Pulsed *(Note 1)*		I_{DM}	0.88	A
Power Dissipation	T_C=25°C	P_D	0.43	W
Operating Junction/ Storage Temperature Range		T_J/ T_{STG}	-55 to +150	°C

Note 1: Single pulse; $t_p \leq 1us$.

Thermal Characteristics			
Parameter	**Symbol**	**Max**	**Unit**
Thermal Resistance Junction to Ambient *(Note 2)*	R_{thJA}	350	°C/W

Note 2: Device mounted on 1 square inch FR4 PCB board, with 2oz single-sided copper, in a 25°C still air environment.

Electrical Characteristics (T_A =25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	50	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=50V, V_{GS}=0V	--	--	1	uA
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_{DS}=250uA	0.5	--	1.6	V
Gate Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	--	--	±10	uA
Drain-Source On-state Resistance *(Note 3)*	$R_{DS(on)}$	V_{GS}=10V, I_D=0.22A	--	--	3.5	Ω
		V_{GS}=4.5V, I_D=0.22A	--	--	6	
Total Gate Charge	Q_g	$V_{GS(off)}$=0V, $V_{GS(on)}$=10V, V_{DS}=25V, I_D=0.22A	--	1.7	--	nC
Gate-Source Charge	Q_{gs}		--	0.1	--	
Gate-Drain Charge	Q_{gd}		--	0.4	--	
Turn-on Delay Time	$t_{d(on)}$	V_{GS}=10V, V_{DD}=30V, R_G=6Ω, I_D=0.22A	--	2.6	--	ns
Turn-on Rise Time	t_r		--	9	--	
Turn-off Delay Time	$t_{d(off)}$		--	20	--	
Turn-off Fall Time	t_f		--	6	--	
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V, f=1MHz	--	30	--	pF
Output Capacitance	C_{oss}		--	15	--	
Reverse Transfer Capacitance	C_{rss}		--	6	--	

Reverse Diode Characteristics (T_A =25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Forward Current, Continuous	I_{SD}	T_C=25°C	--	--	0.22	A
Diode Forward Voltage *(Note 3)*	V_{SD}	I_F=1A, V_{GS}=0V	--	--	1.4	V

Note 3: Pulse test; pulse width ≤ 380μs, duty cycle ≤ 1%.

Typical Characteristics Curves (T_A = 25℃ unless otherwise noted)

Fig.1 - Output Characteristics

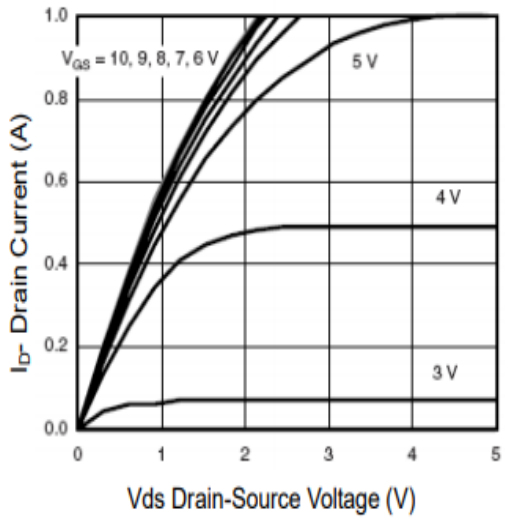


Fig.2 - Transfer Characteristics

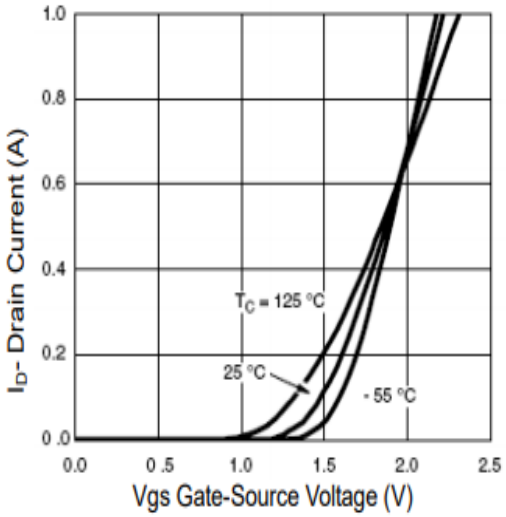


Fig.3 - Drain-Source On-Resistance

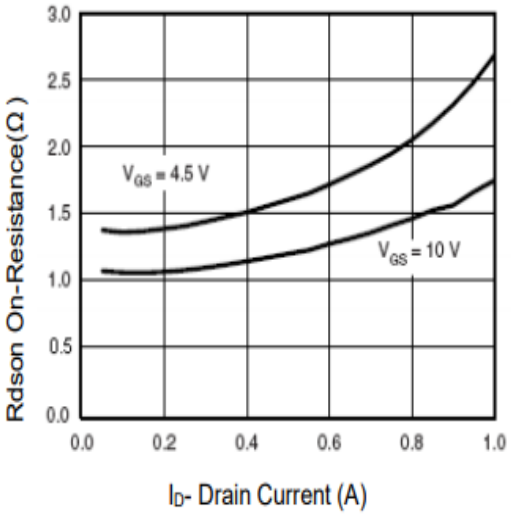


Fig.4 - Normalized On-Resistance

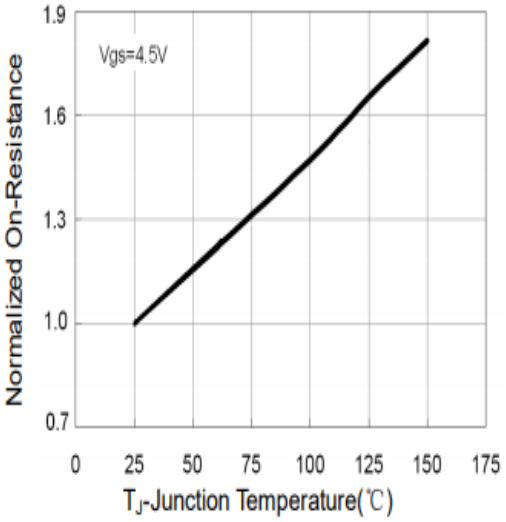


Fig.5 - Capacitance

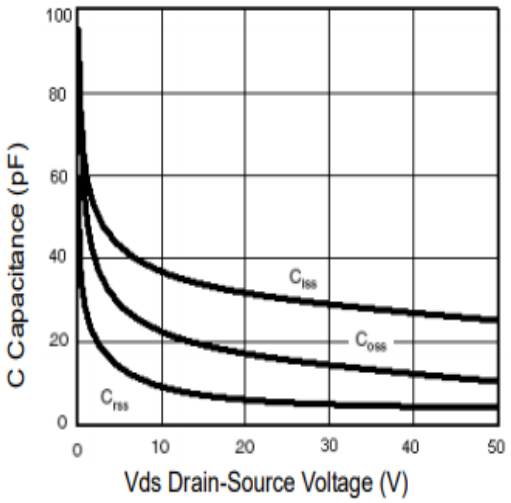
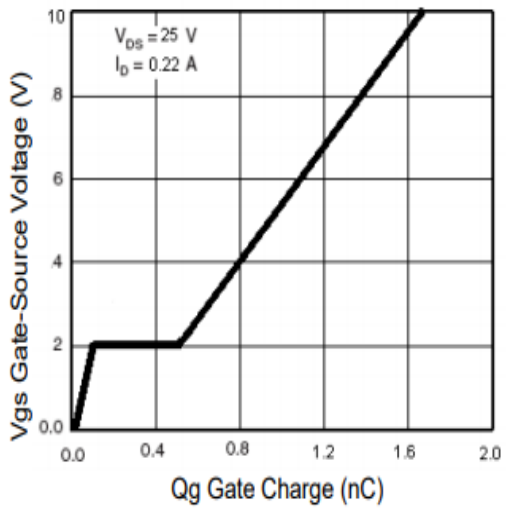


Fig.6 - Gate charge



Package Outline Dimensions (Unit: millimeters)

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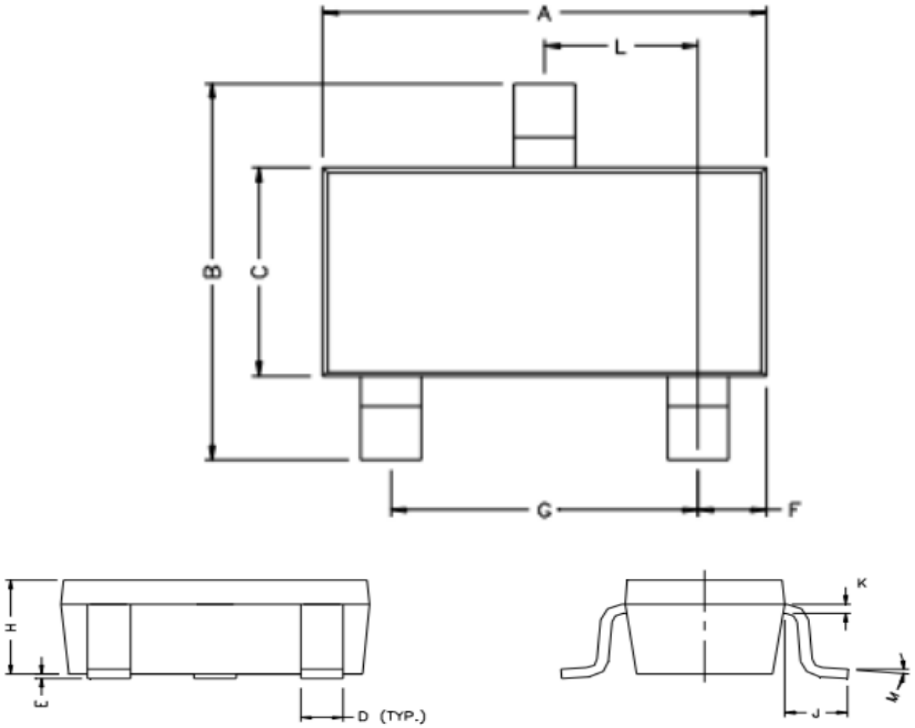
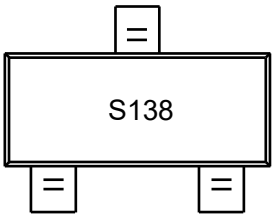


REF.	Millimeter		REF.	Millimete	
	Min.	Max.		Min.	Max.
A	2.80	3.00	G	1.80	2.00
B	2.30	2.50	H	0.90	1.1
C	1.20	1.40	K	0.10	0.20
D	0.30	0.50	J	0.35	0.70
E	0	0.10	L	0.92	0.98

Marking Outline



Part Name: BSS138

1. P/N Mark: S138

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