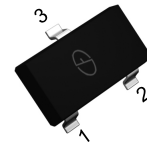


## N-Channel 50V (D-S) Power MOSFET

### Features

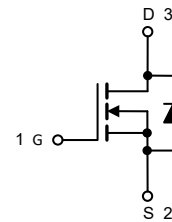
- 100% Avalanche Tested
- Halogen Free, Pb-Free
- RoHS Compliant



SOT-23

### Applications

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



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

Note 1: Single pulse;  $t_p \leq 1\mu\text{s}$ .

<b>Thermal Characteristics</b>			
Parameter	Symbol	Max	Unit
Thermal Resistance Junction to Ambient (Note 2)	$R_{thJA}$	350	$^\circ\text{C}/\text{W}$

Note 2: Device mounted on 1 square inch FR4 PCB board, with 2oz single-sided copper, in a  $25^\circ\text{C}$  still air environment.

Electrical Characteristics (T <sub>A</sub> =25°C unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	50	--	--	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V	--	--	1	uA
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250uA	0.5	--	1.6	V
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	--	--	±10	uA
Drain-Source On-state Resistance (Note 3)	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =0.22A	--	--	3.5	Ω
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =0.22A	--	--	6	
Total Gate Charge	Q <sub>g</sub>	V <sub>GS(off)</sub> =0V, V <sub>GS(on)</sub> =10V, V <sub>DS</sub> =25V, I <sub>D</sub> =0.22A	--	1.7	--	nC
Gate-Source Charge	Q <sub>gs</sub>		--	0.1	--	
Gate-Drain Charge	Q <sub>gd</sub>		--	0.4	--	
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>GS</sub> =10V, V <sub>DD</sub> =30V, R <sub>G</sub> =6Ω, I <sub>D</sub> =0.22A	--	2.6	--	ns
Turn-on Rise Time	t <sub>r</sub>		--	9	--	
Turn-off Delay Time	t <sub>d(off)</sub>		--	20	--	
Turn-off Fall Time	t <sub>f</sub>		--	6	--	
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1MHz	--	30	--	pF
Output Capacitance	C <sub>oss</sub>		--	15	--	
Reverse Transfer Capacitance	C <sub>rss</sub>		--	6	--	

Reverse Diode Characteristics (T <sub>A</sub> =25°C unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Forward Current, Continuous	I <sub>SD</sub>	T <sub>C</sub> =25°C	--	--	0.22	A
Diode Forward Voltage (Note 3)	V <sub>SD</sub>	I <sub>F</sub> =1A, V <sub>GS</sub> =0V	--	--	1.4	V

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

## Typical Characteristics Curves ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Fig.1 - Output Characteristics

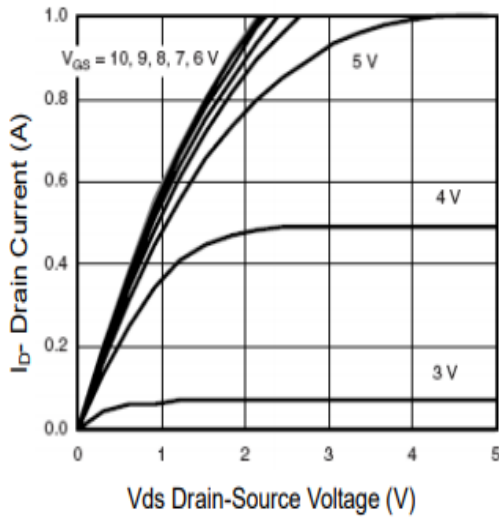


Fig.2 - Transfer Characteristics

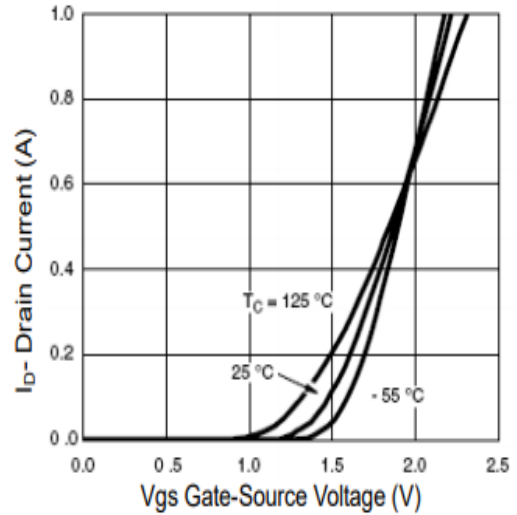


Fig.3 - Drain-Source On-Resistance

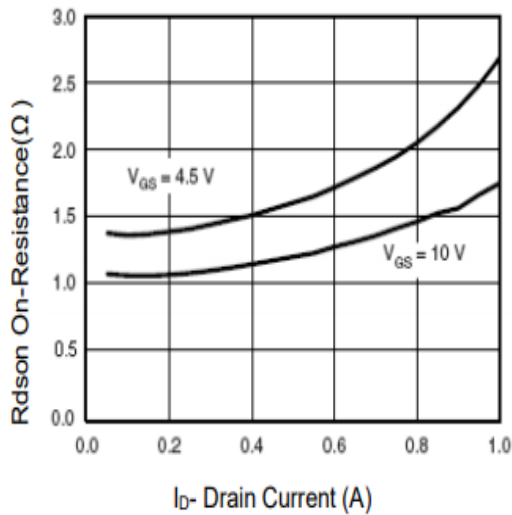


Fig.4 - Normalized On-Resistance

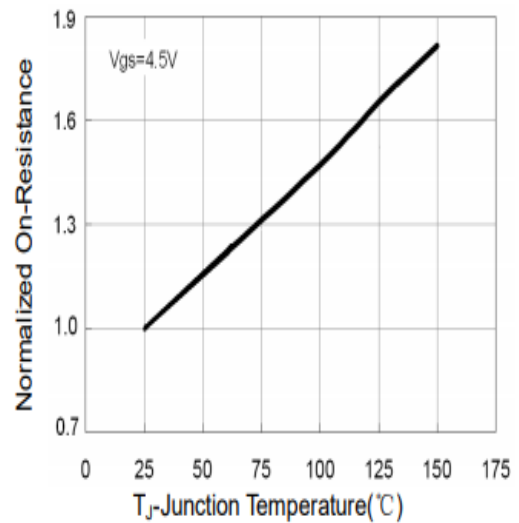


Fig.5 - Capacitance

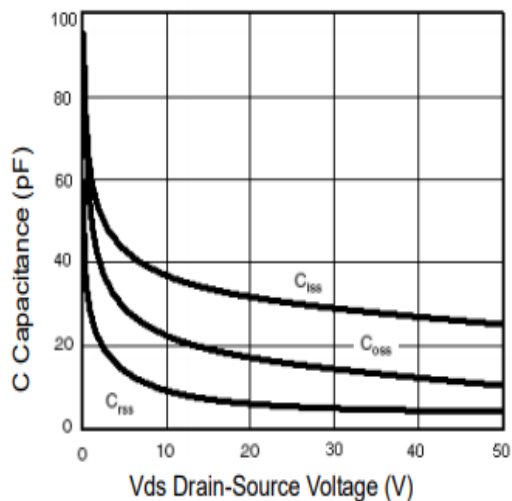
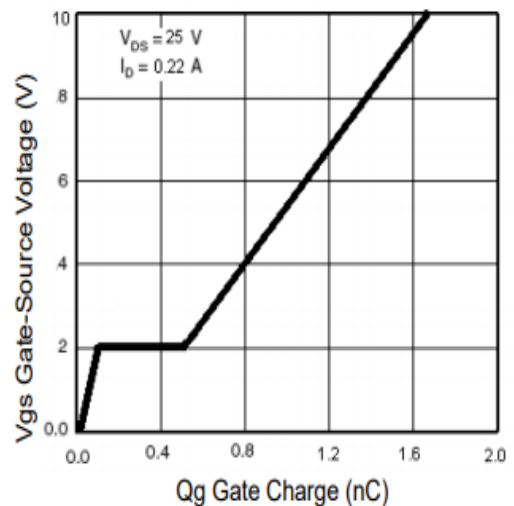
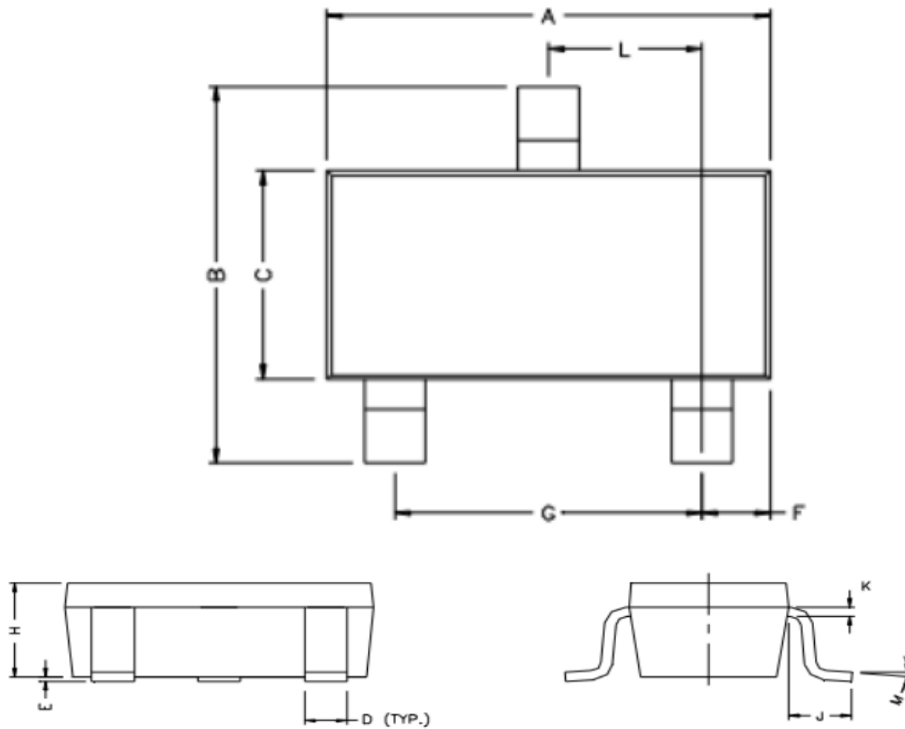


Fig.6 - Gate charge



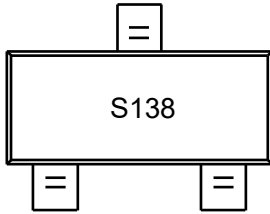
**Package Outline Dimensions** (Unit: millimeters)

**SOT-23**



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: GMNBSS138

1. P/N Mark: S138

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