



# BSS138W

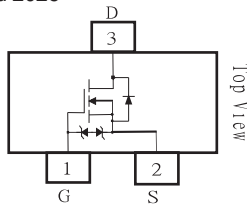
## 50V N-Channel Enhancement Mode MOSFET - ESD Protected

### FEATURES

- $R_{DS(ON)}$ ,  $V_{GS}$  @ 10V,  $I_{DS}$  @ 500mA = 3Ω
- $R_{DS(ON)}$ ,  $V_{GS}$  @ 4.5V,  $I_{DS}$  @ 200mA = 4Ω
- $R_{DS(ON)}$ ,  $V_{GS}$  @ 2.5V,  $I_{DS}$  @ 100mA = 6Ω
- Advanced Trench Process Technology
- High Density Cell Design For Ultra Low On-Resistance
- Very Low Leakage Current In Off Condition
- Specially Designed for Battery Operated Systems, Solid-State Relays Drivers : Relays, Displays, Lamps, Solenoids, Memories, etc.
- ESD Protected

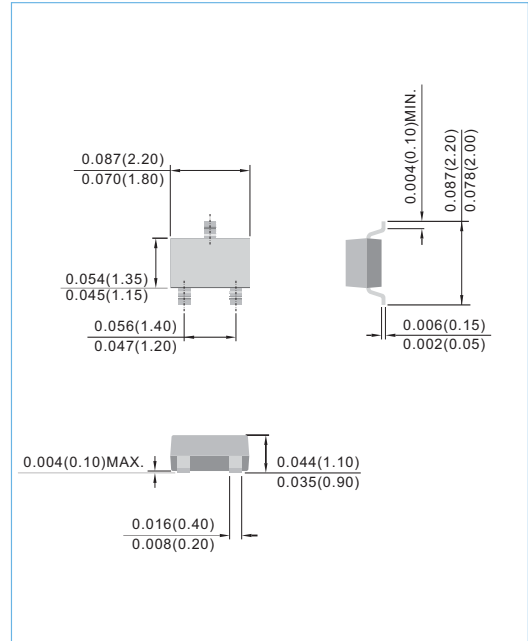
### MECHANICAL DATA

- Case: SOT-323 Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Marking : 38W
- Apporx. Weight: 0.000Gounce•, 0.005 gram•



### SOT-323

Unit : inch(mm)



### Maximum Ratings and Thermal Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

PARAMETER	Symbol	Limit	Units
Drain-Source Voltage	$V_{DS}$	50	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	300	mA
Pulsed Drain Current <sup>1)</sup>	$I_{DM}$	2000	mA
Maximum Power Dissipation	$P_D$	$T_A=25^\circ\text{C}$ 350 $T_A=75^\circ\text{C}$ 210	mW
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to + 150	$^\circ\text{C}$
Junction-to Ambient Thermal Resistance(PCB mounted) <sup>2</sup>	$R_{\theta JA}$	357	$^\circ\text{C/W}$

Note: 1. Maximum DC current limited by the package  
2. Surface mounted on FR4 board,  $t < 5$  sec

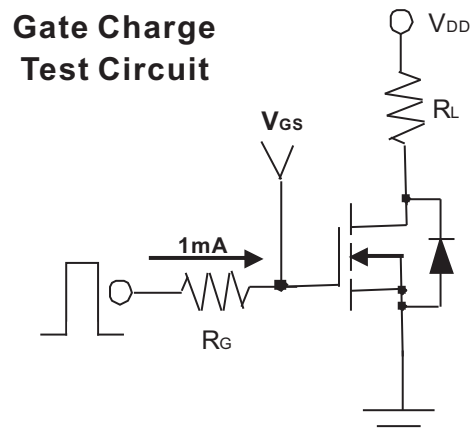
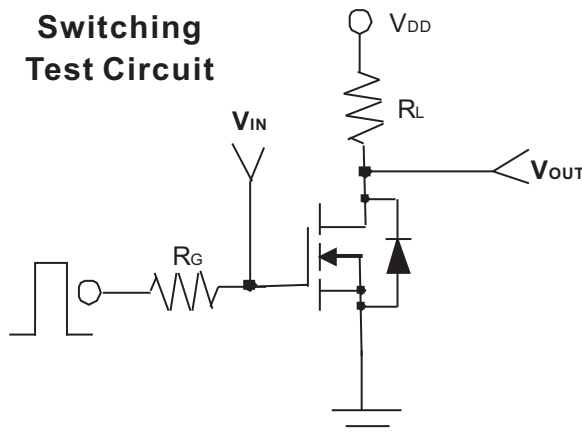
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## ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Units
<b>Static</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=10\mu A$	50	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.8	-	1.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=2.5V, I_D=100mA$	-	2.8	6.0	Ω
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=200mA$	-	1.8	4.0	
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=500mA$	-	1.6	3.0	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=50V, V_{GS}=0V$	-	-	1	μA
Gate Body Leakage	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	±10	μA
Forward Transconductance	$g_{fs}$	$V_{DS}=10V, I_D=250mA$	100	-	-	mS
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	$V_{DS}=25V, I_D=250mA$ $V_{GS}=4.5V$	-	-	1.0	nC
Turn-On Time	$t_{on}$	$V_{DD}=30V, R_L=100\Omega$ $I_D=300mA, V_{GEN}=10V$ $R_G=6\Omega$	-	-	40	ns
Turn-Off Time	$t_{off}$		-	-	150	
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V$ $f=1.0MHz$	-	-	50	pF
Output Capacitance	$C_{oss}$		-	-	10	
Reverse Transfer Capacitance	$C_{rss}$		-	-	5	
<b>Source-Drain Diode</b>						
Diode Forward Voltage	$V_{SD}$	$I_S=250mA, V_{GS}=0V$	-	0.82	1.2	V
Continuous Diode Forward Current	$I_S$	-	-	-	300	mA
Pulse Diode Forward Current	$I_{SM}$	-	-	-	2000	mA





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

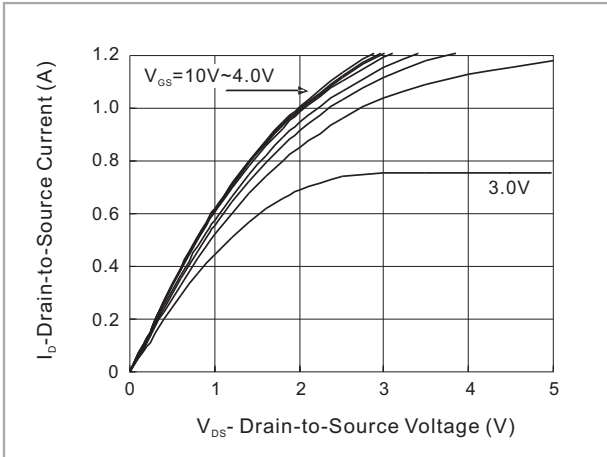


FIG.1- Output Characteristic

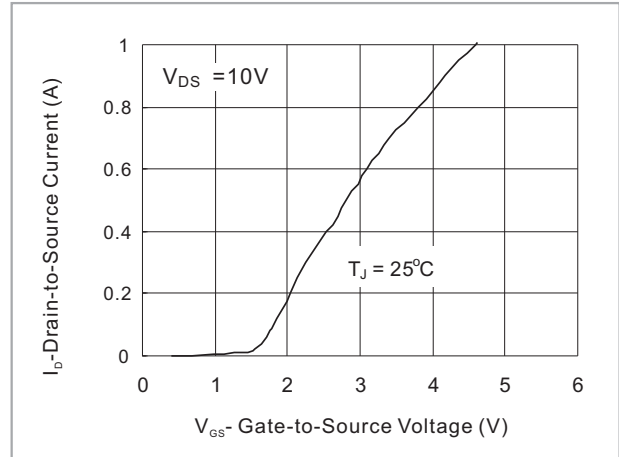


FIG.2- Transfer Characteristic

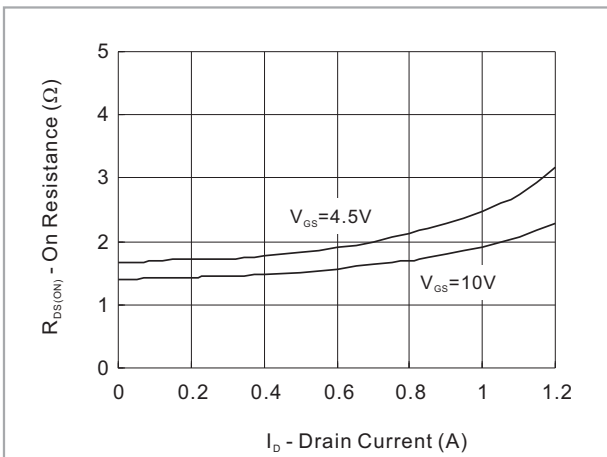


FIG.3- On Resistance vs Drain Current

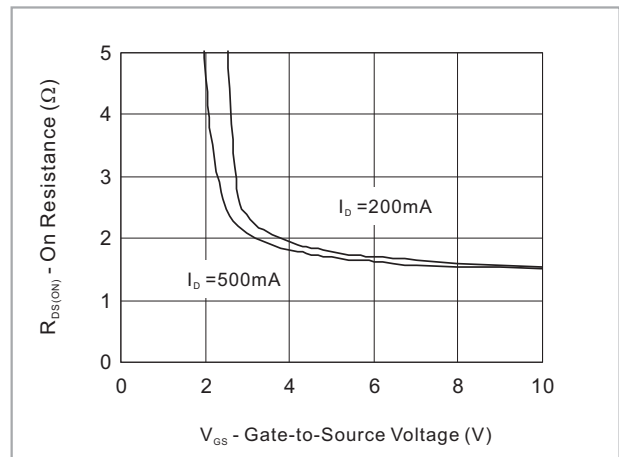


FIG.4- On Resistance vs Gate to Source Voltage

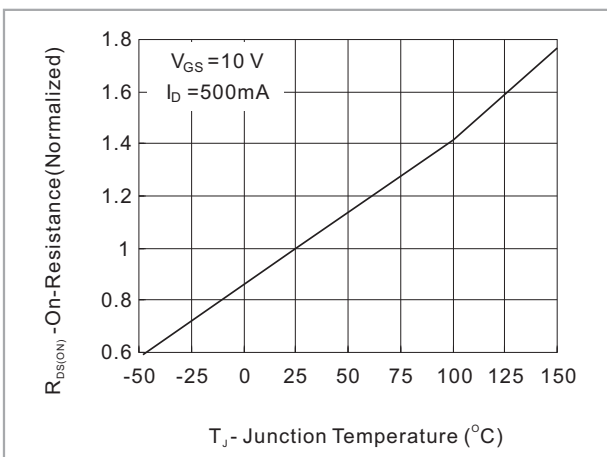
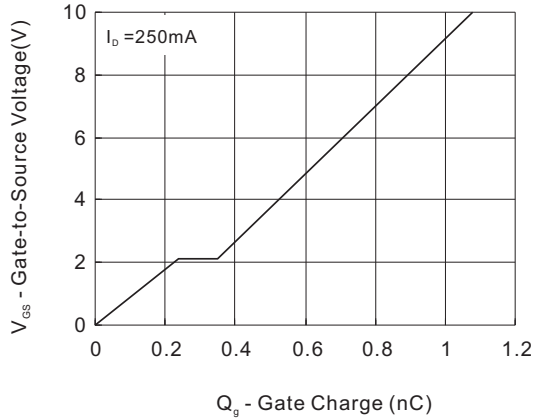


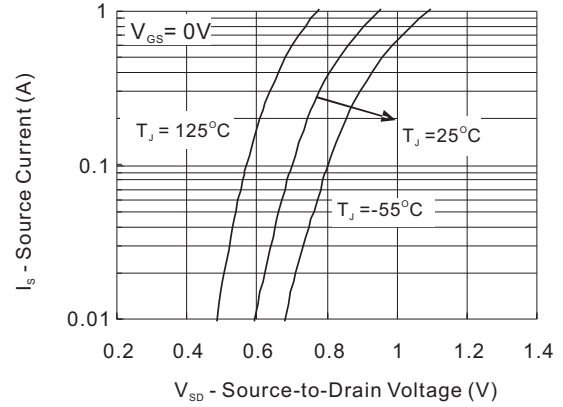
FIG.5- On Resistance vs Junction Temperature



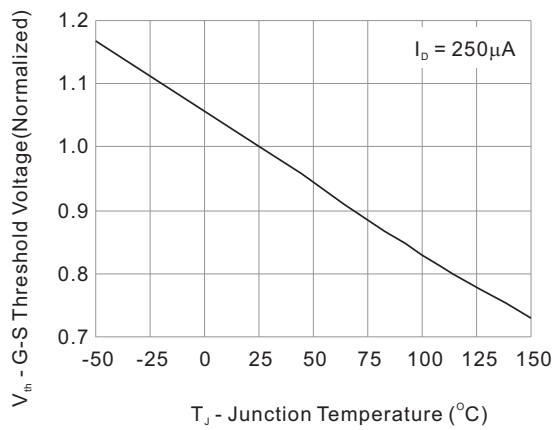
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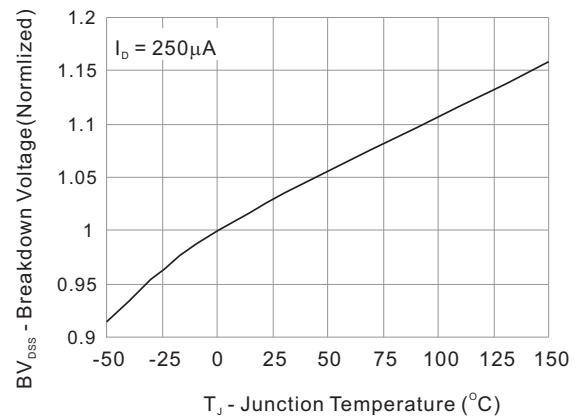
**Fig.6 - Gate Charge Waveform**



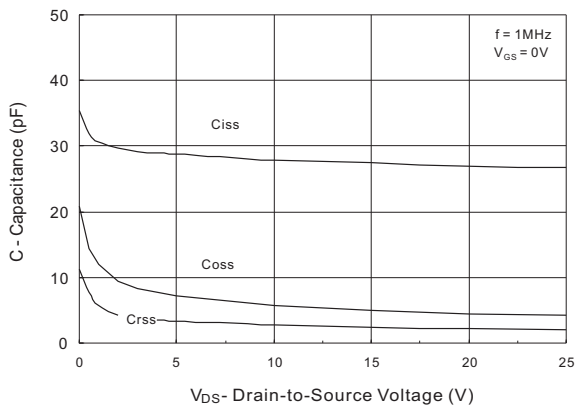
**Fig.7 Source-Drain Diode Forward Voltage**



**Fig.8 - Threshold Voltage vs Temperature**



**Fig.9 - Breakdown Voltage vs Junction Temperature**

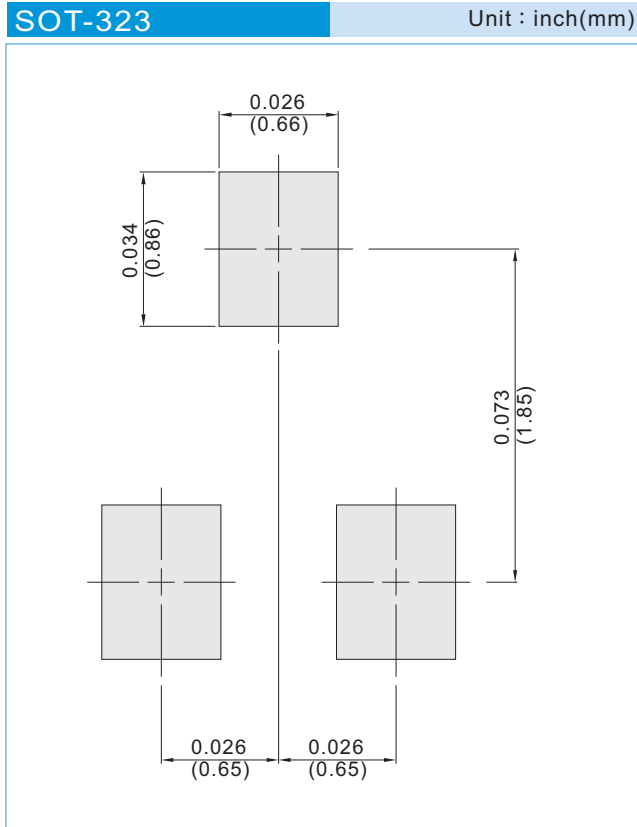


**Fig.10 - Capacitance vs Drain to Source Voltage**



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## MOUNTING PAD LAYOUT



## ORDER INFORMATION

- Packing information  
T/R - 12K per 13" plastic Reel  
T/R - 3K per 7" plastic Reel



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## Part No\_packing code\_Version

BSS138W\_R1\_00001

BSS138W\_R2\_00001

For example :

**RB500V-40\_R2\_00001**



Packing Code <b>XX</b>				Version Code <b>XXXXX</b>		
Packing type	1 <sup>st</sup> Code	Packing size code	2 <sup>nd</sup> Code	HF or RoHS	1 <sup>st</sup> Code	2 <sup>nd</sup> ~5 <sup>th</sup> Code
Tape and Ammunition Box (T/B)	<b>A</b>	N/A	<b>0</b>	<b>HF</b>	<b>0</b>	serial number
Tape and Reel (T/R)	<b>R</b>	7"	<b>1</b>	<b>RoHS</b>	<b>1</b>	serial number
Bulk Packing (B/P)	<b>B</b>	13"	<b>2</b>			
Tube Packing (T/P)	<b>T</b>	26mm	<b>X</b>			
Tape and Reel (Right Oriented) (TRR)	<b>S</b>	52mm	<b>Y</b>			
Tape and Reel (Left Oriented) (TRL)	<b>L</b>	PANASERT T/B CATHODE UP (PBCU)	<b>U</b>			
FORMING	<b>F</b>	PANASERT T/B CATHODE DOWN (PBCD)	<b>D</b>			



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