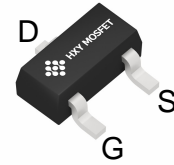


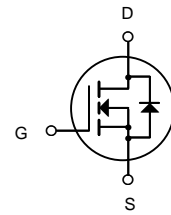


Description

The BSS138 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



SOT-23



N-Channel MOSFET

General Features

$V_{DS} = 50V$ $I_D = 0.22A$

$R_{DS(ON)} < 2.0\Omega @ V_{GS}=10V$

Application

Battery protection

Load switch

Uninterruptible power supply

Ordering Information

Product ID	Pack	Marking	Qty(PCS)
BSS138	SOT-23	SS	3000

Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Limit	Unit	
V_{DS}	Drain-Source Voltage	50	V	
V_{GS}	Gate-Source Voltage	± 20	V	
I_D	Continuous Drain Current ($T_J = 150^\circ\text{C}$)	$T_A = 25^\circ\text{C}$	0.22	A
		$T_A = 100^\circ\text{C}$	0.13	
I_{DM}	Drain Current-Pulsed (Note 1)	0.88	A	
P_D	Maximum Power Dissipation	0.35	W	
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	$^\circ\text{C}$	
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 2)	357	$^\circ\text{C}/\text{W}$	



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

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Off characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	50			V
Gate-body leakage	I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$			± 100	nA
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 50V, V_{GS} = 0V$			0.5	μA
		$V_{DS} = 30V, V_{GS} = 0V$			100	nA
On characteristics						
Gate-threshold voltage (note 1)	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 1mA$	0.8		1.5	V
Static drain-source on-resistance (note 1)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 0.22A$		1.1	2.0	Ω
		$V_{GS} = 4.5V, I_D = 0.22A$		1.5	3	
Forward transconductance (note 1)	g_{FS}	$V_{DS} = 10V, I_D = 0.22A$	0.12			S
Dynamic characteristics (note 2)						
Input capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V, f = 1MHz$		27		pF
Output capacitance	C_{oss}			13		
Reverse transfer capacitance	C_{rss}			6		
Switching characteristics						
Turn-on delay time (note 1,2)	$t_{d(on)}$	$V_{DD} = 30V, V_{DS} = 10V,$ $I_D = 0.29A, R_{GEN} = 6\Omega$			5	ns
Rise time (note 1,2)	t_r				18	
Turn-off delay time (note 1,2)	$t_{d(off)}$				36	
Fall time (note 1,2)	t_f				14	
Drain-source body diode characteristics						
Body diode forward voltage (note 1)	V_{SD}	$I_S = 0.44A, V_{GS} = 0V$			1.4	V

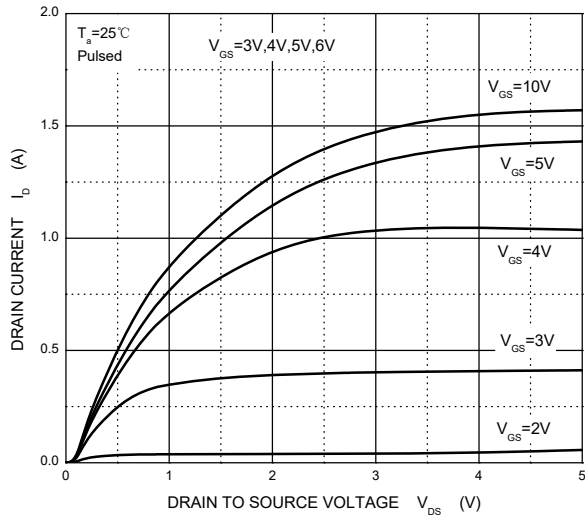
Notes:

1. Pulse Test ; Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
2. These parameters have no way to verify.

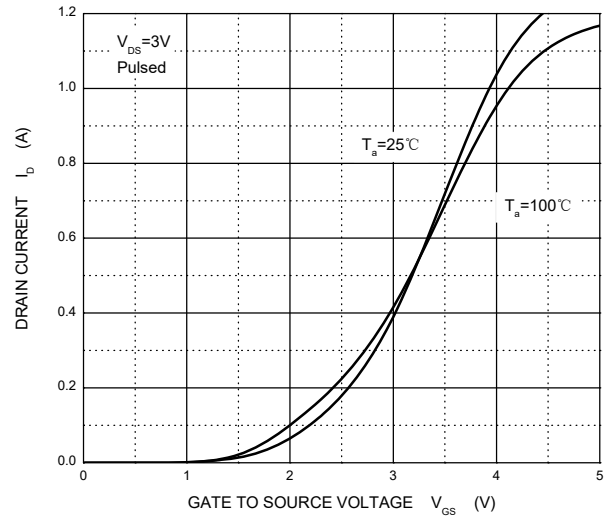


Typical Characteristics

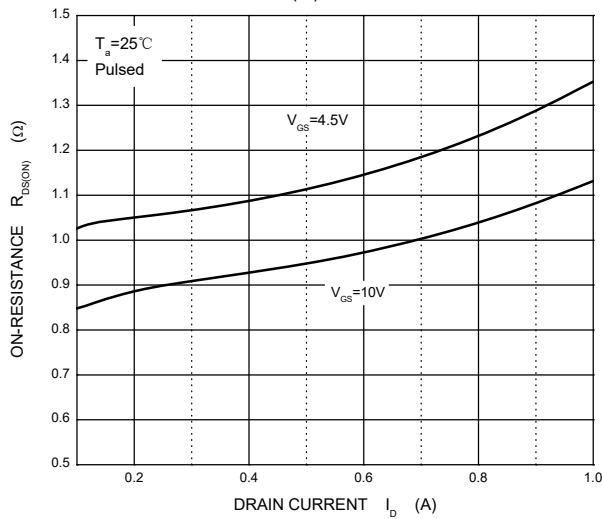
Output Characteristics



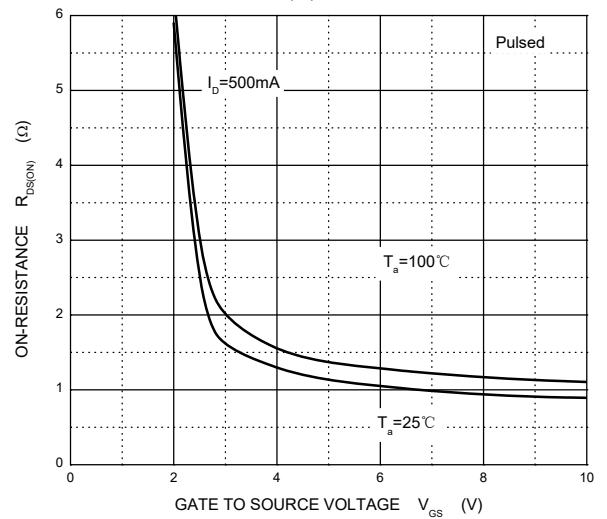
Transfer Characteristics



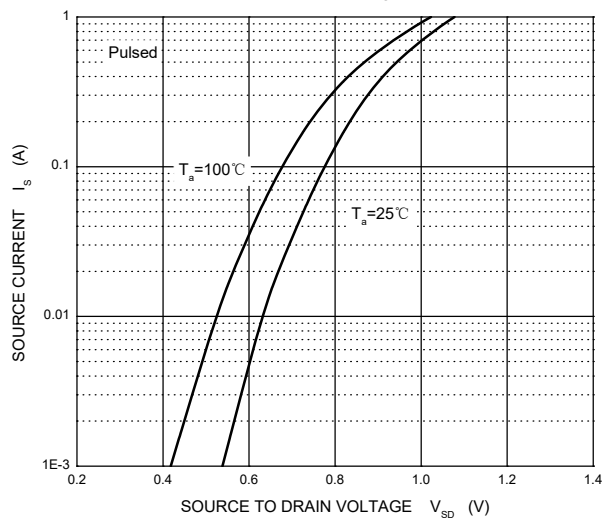
$R_{DS(ON)}$ — I_D



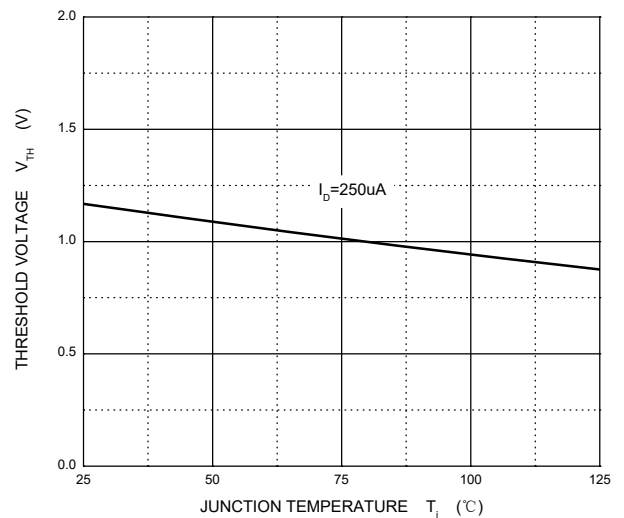
$R_{DS(ON)}$ — V_{GS}



I_S — V_{SD}

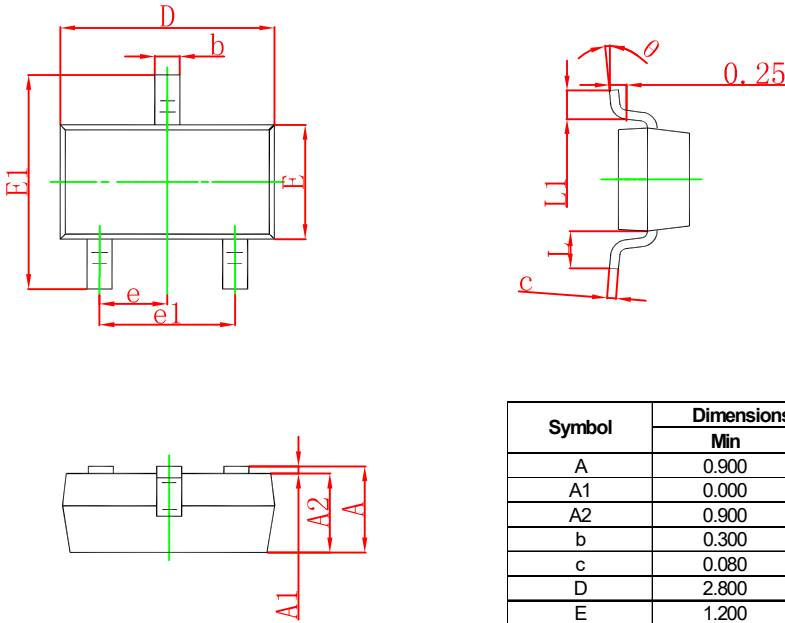


Threshold Voltage



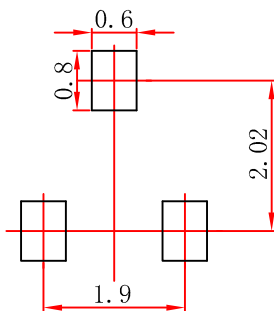


SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

SOT-23 Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.



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