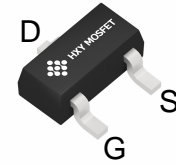




### Description

The BSS138K 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.

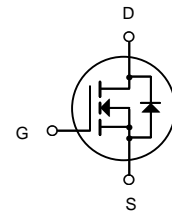


**SOT-23**

### General Features

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

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



N-Channel MOSFET

### Application

Battery protection

Load switch

Uninterruptible power supply

### Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
BSS138K	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	$\pm 20$	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	$^\circ\text{C/W}$	



**Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
<b>Off characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	50			V
Gate-body leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V			±100	nA
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V			0.5	μA
		V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V			100	nA
<b>On characteristics</b>						
Gate-threshold voltage (note 1)	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1mA	0.8		1.5	V
Static drain-source on-resistance (note 1)	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 0.22A		1.1	2.0	Ω
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 0.22A		1.5	3	
Forward transconductance (note 1)	g <sub>FS</sub>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.22A	0.12			S
<b>Dynamic characteristics (note 2)</b>						
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1MHz		27		pF
Output capacitance	C <sub>oss</sub>			13		
Reverse transfer capacitance	C <sub>rss</sub>			6		
<b>Switching characteristics</b>						
Turn-on delay time (note 1,2)	t <sub>d(on)</sub>	V <sub>DD</sub> = 30V, V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.29A, R <sub>GEN</sub> = 6Ω			5	ns
Rise time (note 1,2)	t <sub>r</sub>				18	
Turn-off delay time (note 1,2)	t <sub>d(off)</sub>				36	
Fall time (note 1,2)	t <sub>f</sub>				14	
<b>Drain-source body diode characteristics</b>						
Body diode forward voltage (note 1)	V <sub>SD</sub>	I <sub>S</sub> = 0.44A, V <sub>GS</sub> = 0V			1.4	V

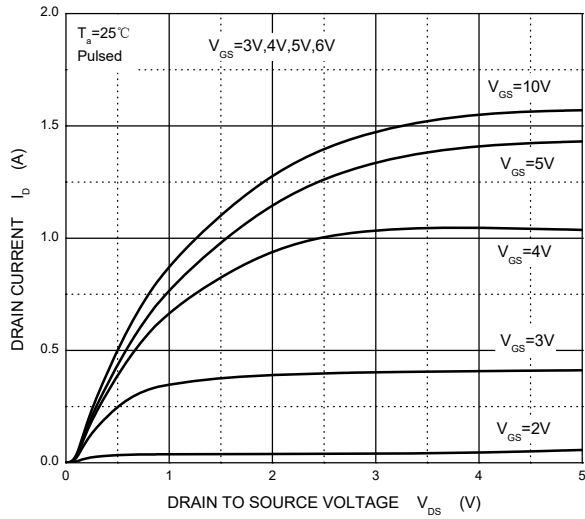
**Notes:**

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

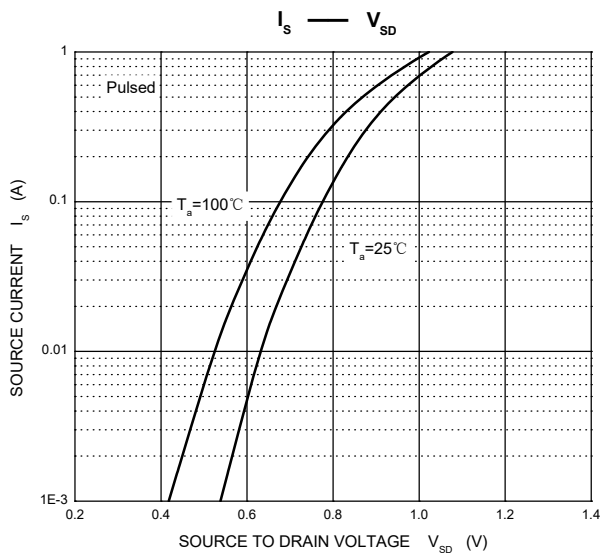
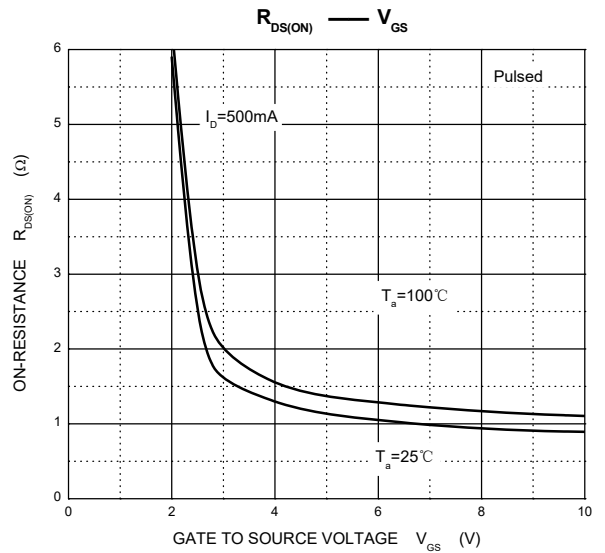
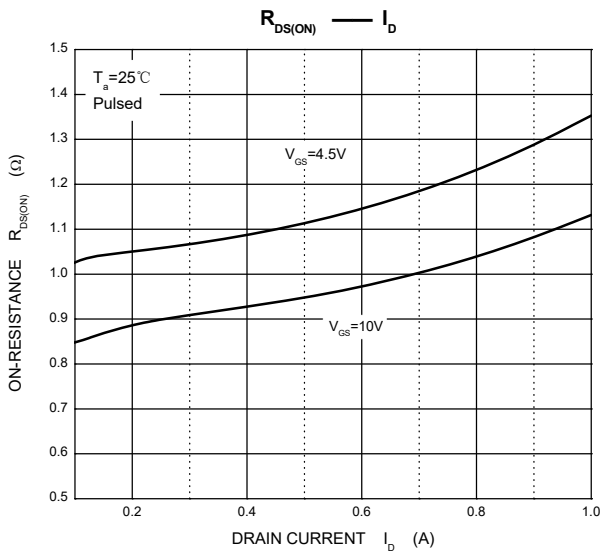
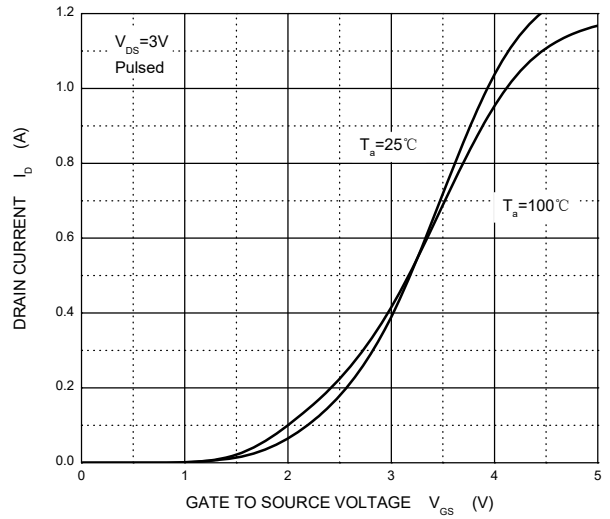


### Typical Characteristics

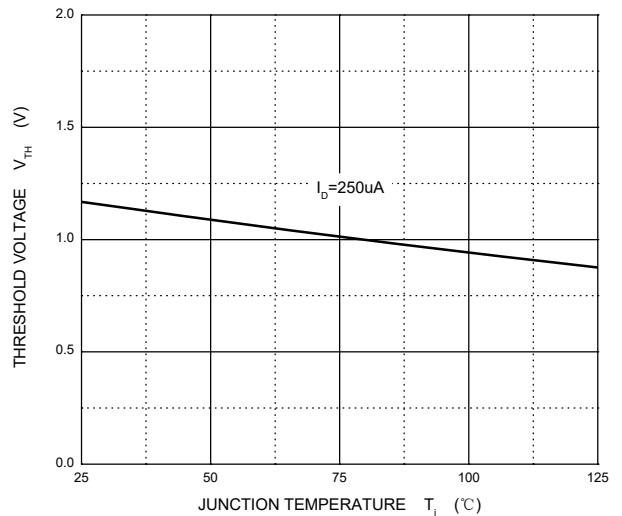
#### Output Characteristics



#### Transfer Characteristics

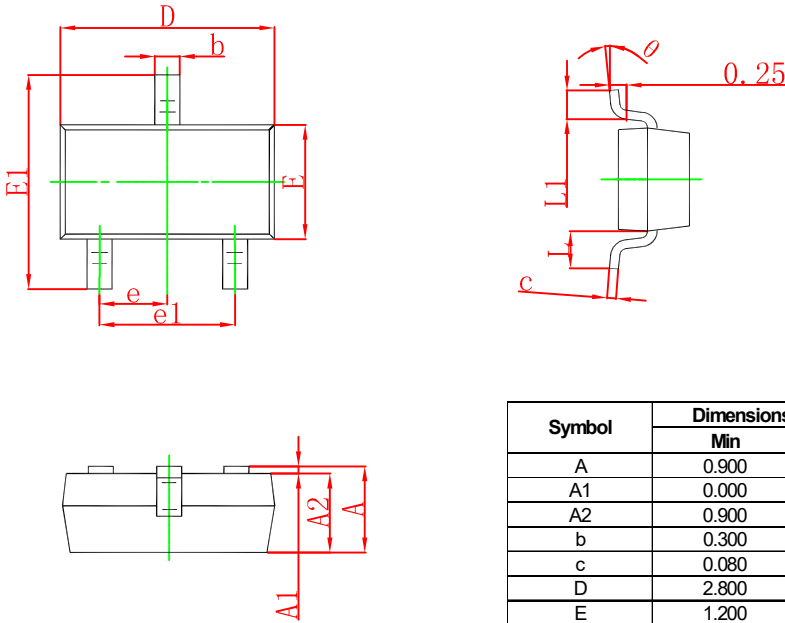


#### Threshold Voltage



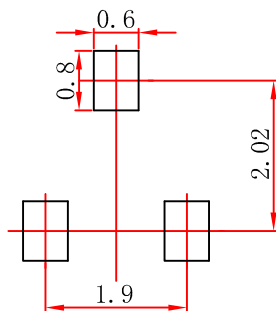


### SOT-23 Package Outline Dimensions



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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