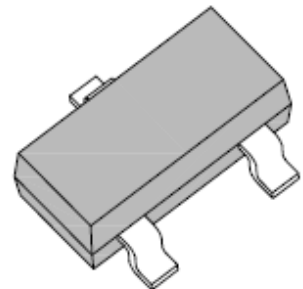


## SMD Power MOSFET Transistor (N-Channel)

### Features

- Low On-Resistance:3.5Ω
- Low input capacitance:40pF
- Low output capacitance:12pF
- Low threshold:1.5V
- Fast switching speed:20nS
- RoHS Compliance



SOT-23



### Application

- DC to DC converter
- Cellular & PCMCIA card
- Cordless telephone
- Power management in portable and battery etc.

### Mechanical Data

<b>Case:</b>	SOT-23, Plastic Package
<b>Terminals:</b>	Solderable per MIL-STD-202G, Method 208
<b>Weight:</b>	0.008 gram

### Maximum Ratings ( $T_{Ambient}=25^{\circ}C$ unless noted otherwise)

Symbol	Description	BSS138	Unit	Conditions
	Marking Code	J1		
<b>V<sub>DSS</sub></b>	Drain-Source Voltage	50	V	
<b>V<sub>GS</sub></b>	Gate-Source Voltage	± 20	V	
<b>I<sub>D</sub></b>	Drain Current Continuous	200	mA	TA=25° C
<b>I<sub>DM</sub></b>	Drain Current Pulsed (tp≤10μS)	800	mA	
<b>P<sub>D</sub></b>	Drain Power Dissipation	225	mW	TA=25° C
<b>R<sub>thJA</sub></b>	Thermal Resistance, Junction to Ambient	556	° C/W	
<b>T<sub>J</sub>, T<sub>STG</sub></b>	Storage Temperature Range	-55 to +150	° C	

# SMD Power MOSFET Transistor (N-Channel)

## BSS138

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

Symbol	Description	Min.	Typ.	Max.	Unit	Conditions
<b>V<sub>(BR)DSS</sub></b>	Drain-Source Breakdown Voltage	50	-	-	V	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA
<b>V<sub>GS(th)</sub></b>	Gate-Source Threshold Voltage	0.5	-	1.5	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =1mA
<b>I<sub>GSS</sub></b>	Gate-Source Leakage Current	-	-	± 0.1	μA	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V
<b>I<sub>DSS</sub></b>	Zero Gate Voltage Drain Current	-	-	0.1	μA	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V
		-	-	0.5	μA	V <sub>DS</sub> =50V, V <sub>GS</sub> =0V
<b>R<sub>DS(ON)</sub></b>	Drain-Source On-Resistance	-	5.6	10	Ω	V <sub>GS</sub> =2.75V, I <sub>D</sub> <200mA, T <sub>A</sub> =-40 to +85 ° C
		-	-	3.5	Ω	V <sub>GS</sub> =5.0V, I <sub>D</sub> =200mA
<b>g<sub>FS</sub></b>	Forward Transconductance	100	-	-	mS	V <sub>DS</sub> =25V, I <sub>D</sub> =200mA, f=1.0KHz

### Dynamic Characteristics ( $T_{Ambient}=25^{\circ}\text{C}$ unless noted otherwise)

Symbol	Description	Min.	Typ.	Max.	Unit	Conditions
<b>C<sub>iss</sub></b>	Input Capacitance	-	40	50	pF	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz
<b>C<sub>rss</sub></b>	Reverse Transfer Capacitance	-	3.5	5.0		
<b>C<sub>oss</sub></b>	Output Capacitance	-	12	25		
<b>t<sub>on</sub></b>	Switching Time Turn-On Time	-	-	20	nS	V <sub>DD</sub> =30V, I <sub>D</sub> =200mA
<b>t<sub>off</sub></b>	Switching Time Turn-Off Time	-	-	20		

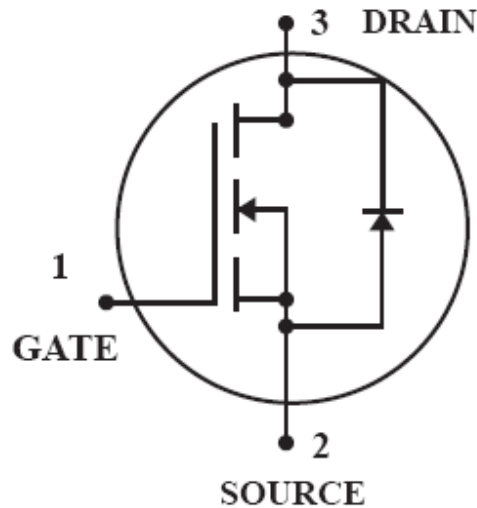
**Note:** (1) Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

(2) Switching Time is Essentially Independent of Operating Temperature.

# SMD Power MOSFET Transistor (N-Channel)

BSS138

## Switching Time Test Circuit



## Typical Characteristics Curves

Fig.1- On-Region Characteristics

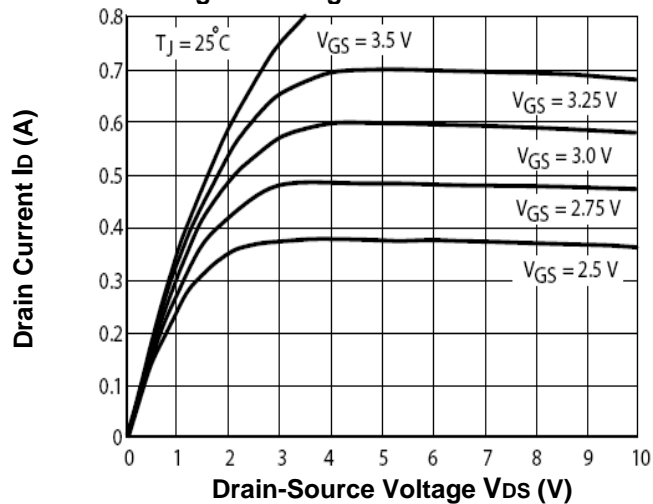
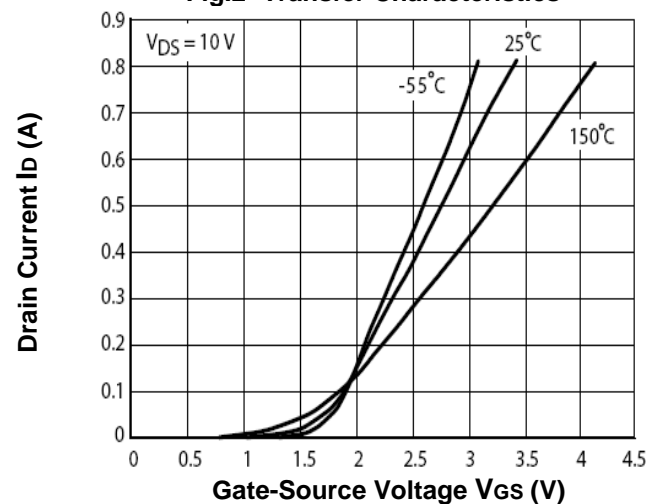


Fig.2- Transfer Characteristics



# SMD Power MOSFET Transistor (N-Channel)

BSS138

Fig.3- On-Resistance Variation with Temperature

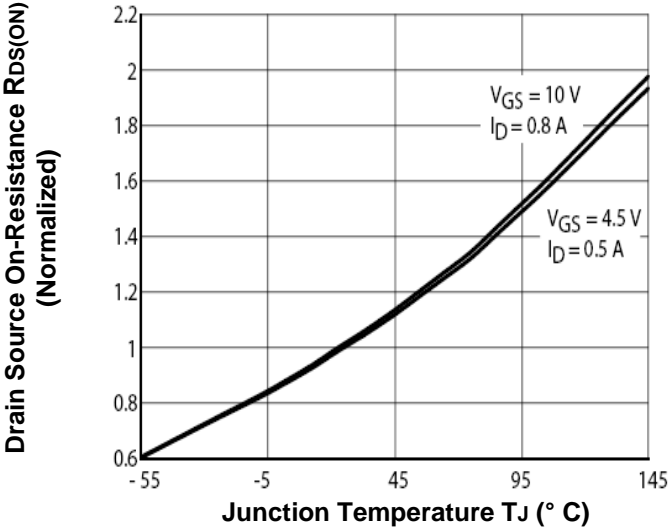


Fig.4- Threshold Voltage Variation with Temperature

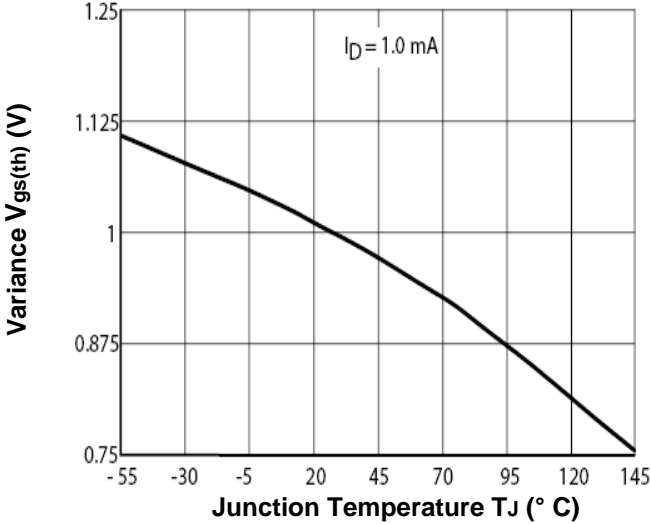


Fig.5- Gate Charge

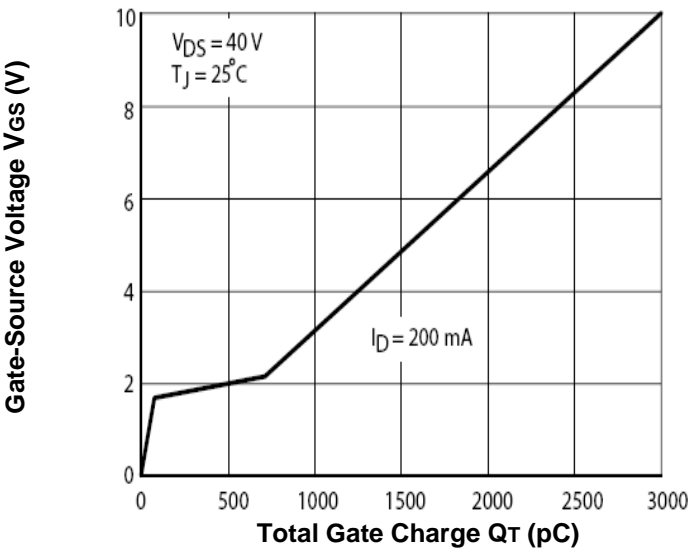
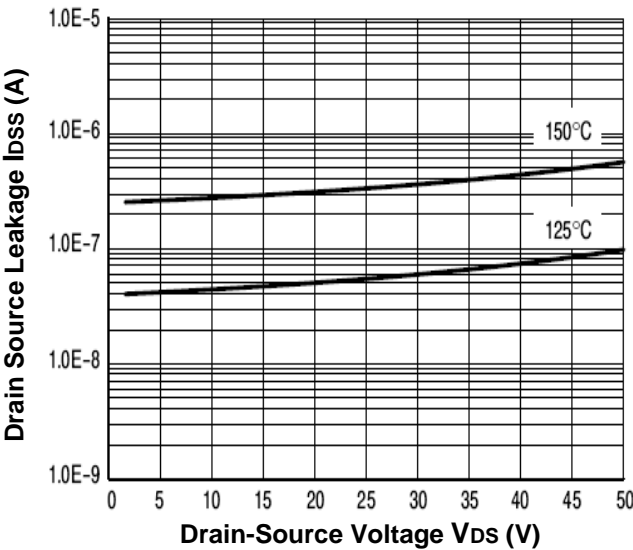


Fig.6- IDSS

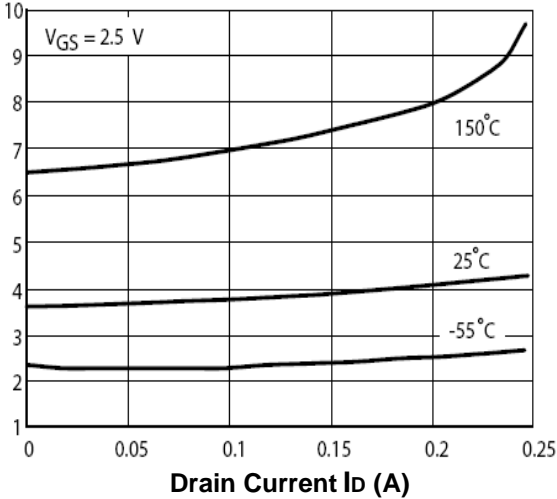


# SMD Power MOSFET Transistor (N-Channel)

BSS138

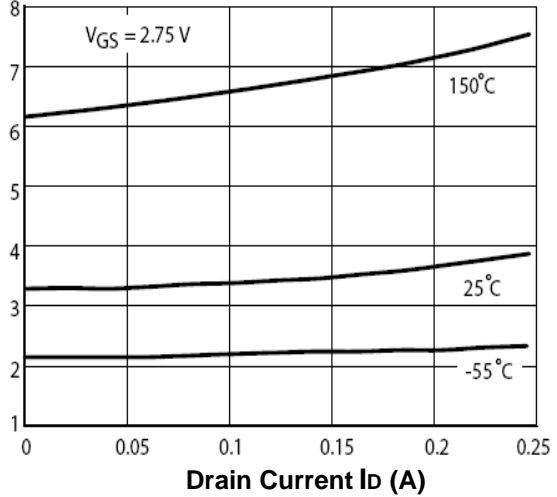
Drain Source On-Resistance  $R_{DS(on)}$  (OHMS)

Fig.7- On-Resistance vs. Drain Current



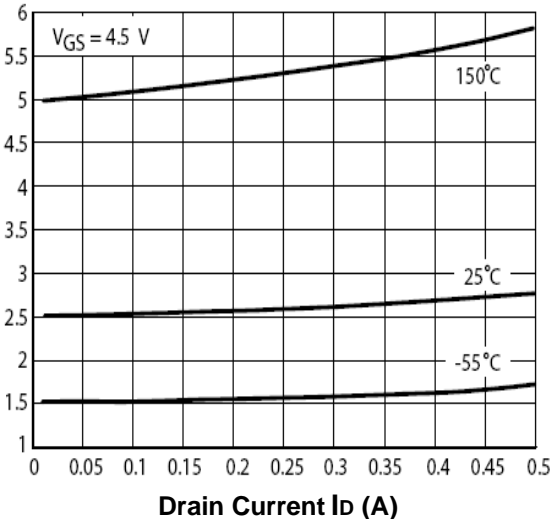
Drain Source On-Resistance  $R_{DS(on)}$  (OHMS)

Fig.8- On-Resistance vs. Drain Current



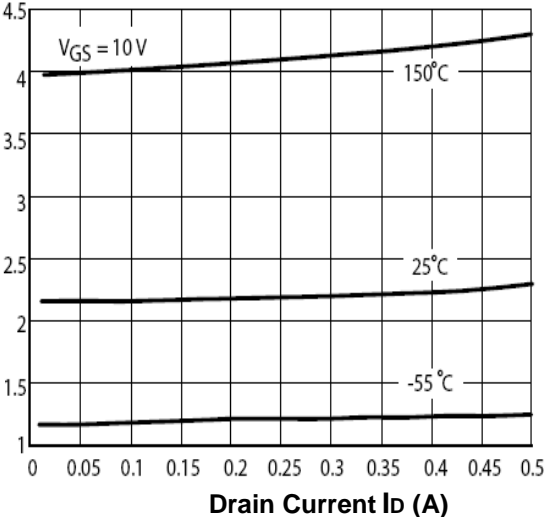
Drain Source On-Resistance  $R_{DS(on)}$  (OHMS)

Fig.9- On-Resistance vs. Drain Current



Drain Source On-Resistance  $R_{DS(on)}$  (OHMS)

Fig.10- On-Resistance vs. Drain Current



# SMD Power MOSFET Transistor (N-Channel)

BSS138

Fig.11- Body Diode Forward Voltage

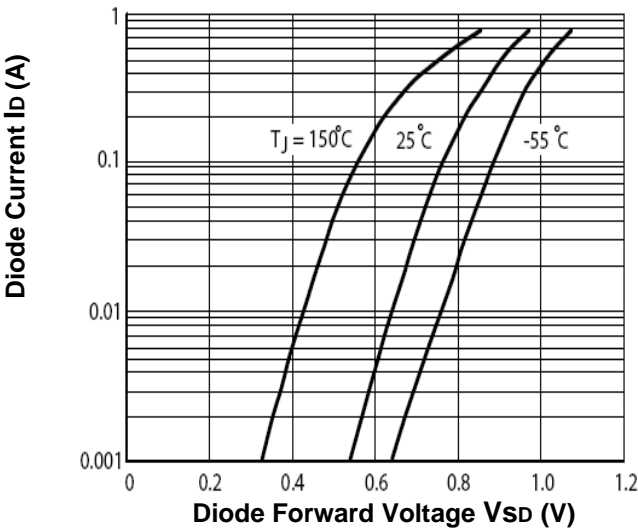
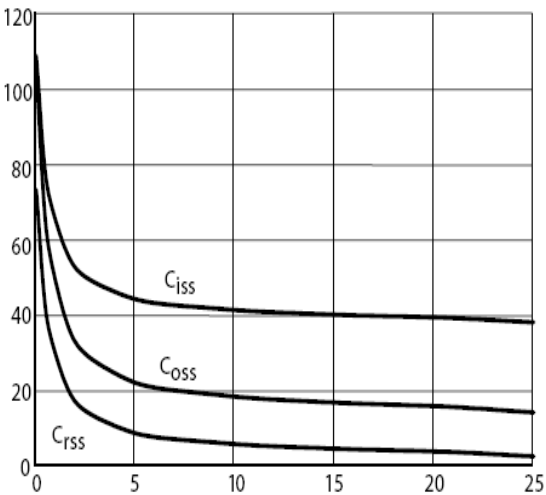
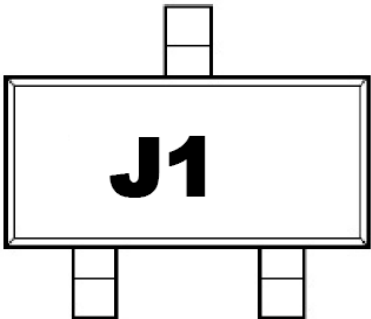


Fig.12- Capacitance



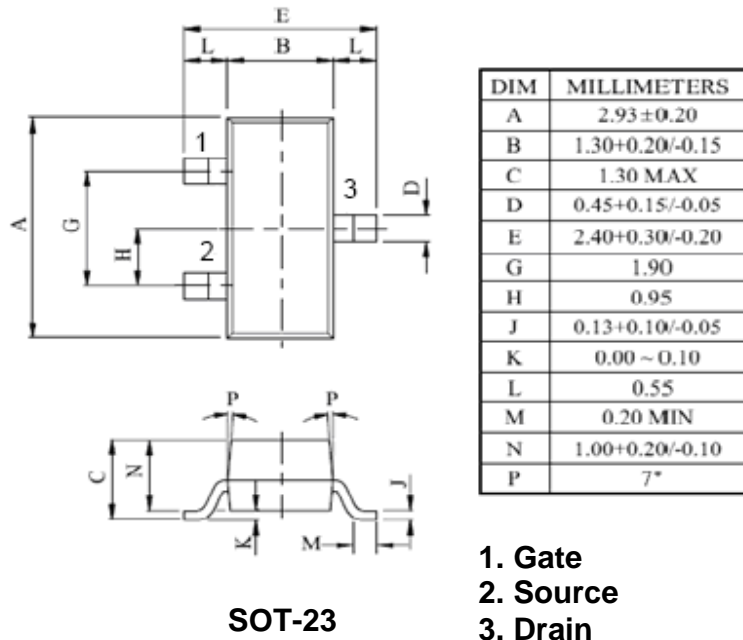
## Marking Information:



# SMD Power MOSFET Transistor (N-Channel)

**BSS138**

## Dimensions in mm



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