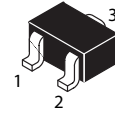
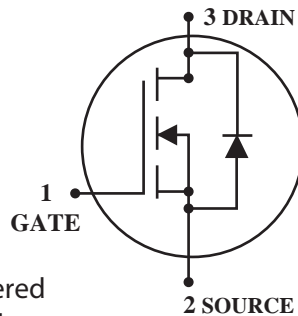


### N-Channel POWER MOSFET

**(Pb)** Lead(Pb)-Free

#### Description:

\* Typical applications are dc-dc converters, power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.



**SOT-323(SC-70)**

#### Features:

- \* Simple Drive Requirement
- \* Small Package Outline

### Maximum Ratings (T<sub>A</sub>=25°C Unless Otherwise Specified)

Rating	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DS</sub>	50	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current V <sub>GS</sub> = (T <sub>A</sub> =25°C)	I <sub>D</sub>	200	mA
Pulsed Drain Current (tp ≤ 10μs)	I <sub>DM</sub>	800	mA
Power Dissipation (T <sub>A</sub> =25°C)	P <sub>D</sub>	150	mW
Maximax Junction-to-Ambient	R <sub>θJA</sub>	556	°C/W
Operating Junction Temperature Range	T <sub>J</sub>	+150	°C
Storage Temperature Range	T <sub>stg</sub>	-55 to +150	°C
Maximum Lead Temperature for Soldering Purposes, for 10 seconds	T <sub>L</sub>	260	°C

### Device Marking

BSS138W = J1

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

Characteristic	Symbol	Min	Typ	Max	Unit
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### Static

Drain-Source Breakdown Voltage V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	V <sub>(BR)DSS</sub>	50	-	-	V
Gate-Threshold Voltage V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =1.0mA	V <sub>GS(th)</sub>	0.5	-	1.5	V
Gate-Source Leakage Current V <sub>GS</sub> =±20V	I <sub>GSS</sub>	-	-	±0.1	μA
Drain-Source Leakage Current V <sub>DS</sub> =25V, V <sub>GS</sub> =0 V <sub>DS</sub> =50V, V <sub>GS</sub> =0	I <sub>DSS</sub>	- -	- -	0.1 0.5	μA
Static Drain-Source On-Resistance V <sub>GS</sub> =2.75V, I <sub>D</sub> < 200mA, T <sub>A</sub> = -40°C to +85°C V <sub>GS</sub> =5.0V, I <sub>D</sub> =200mA	R <sub>DS(on)</sub>	- -	5.6 -	10 3.5	Ω
Forward Transconductance V <sub>DS</sub> =25V, I <sub>D</sub> =200mA, f = 1.0kHz	g <sub>fs</sub>	100	-	-	mS

### Dynamic

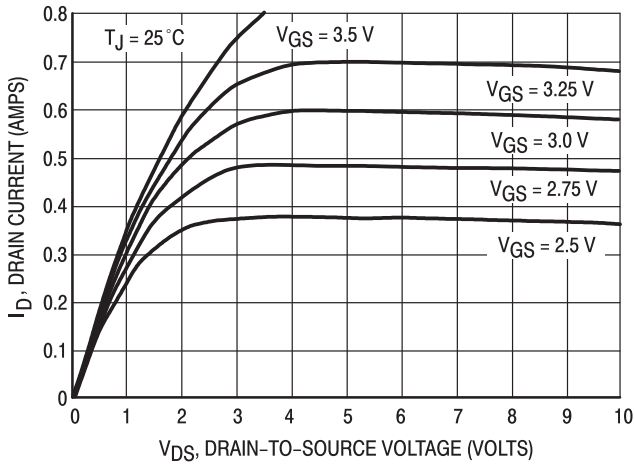
Input Capacitance V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz	C <sub>iss</sub>	-	40	50	pF
Output Capacitance V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz	C <sub>oss</sub>	-	12	25	
Reverse Transfer Capacitance V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1.0MHz	C <sub>rss</sub>	-	3.5	5.0	

### Switching<sup>2</sup>

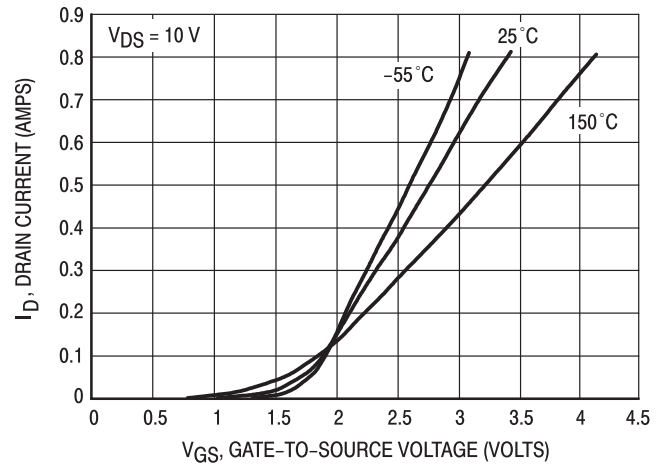
Turn-On Time V <sub>DD</sub> =30V, I <sub>D</sub> =200mA	t <sub>d(on)</sub>	-	-	20	ns
Turn-Off Time V <sub>DD</sub> =30V, I <sub>D</sub> =200mA	t <sub>d(off)</sub>	-	-	20	

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
2. Switching characteristics are independent of operating junction temperature.

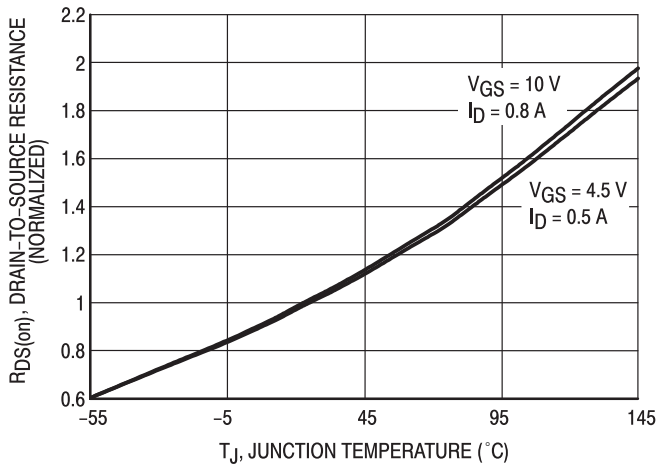
## Characteristics Curve



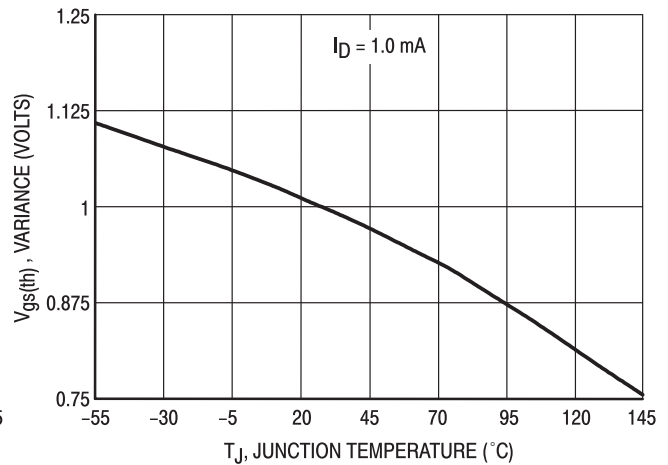
**Fig.1 On-Region Characteristics**



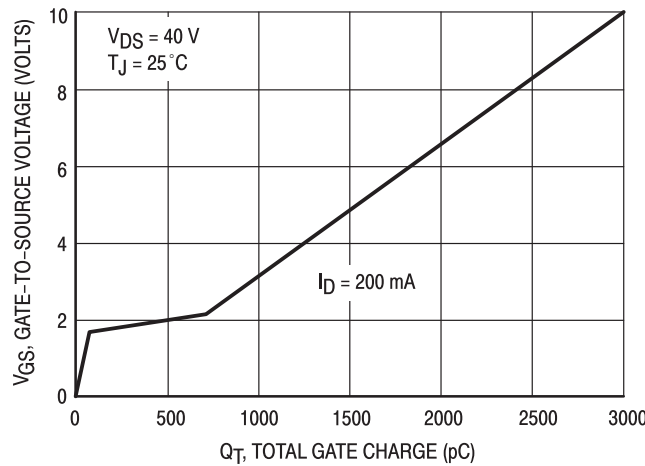
**Fig.2 Transfer Characteristics**



**Fig.3 On-Resistance Variation with Temperature**

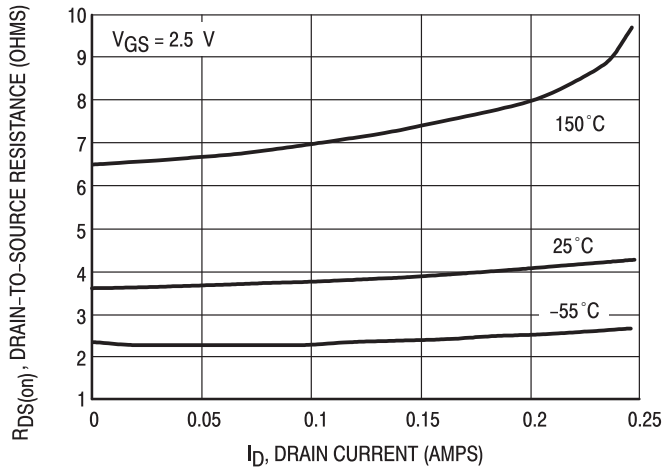


**Fig.4 Threshold Voltage Variation with Temperature**

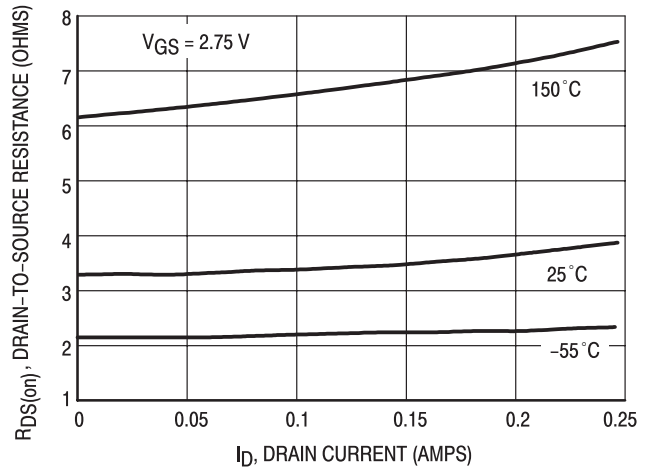


**Fig.5 Gate Charge**

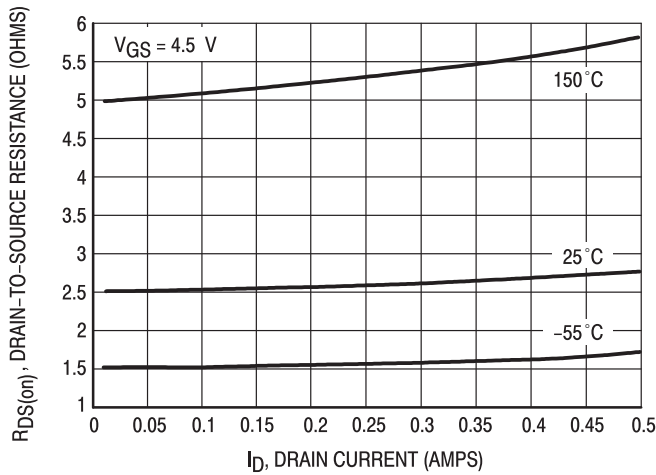
## Characteristics Curve



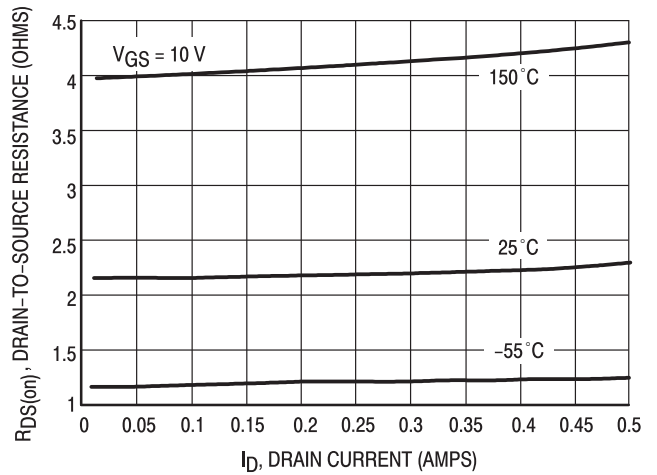
**Fig.6 On-Resistance versus Drain Current**



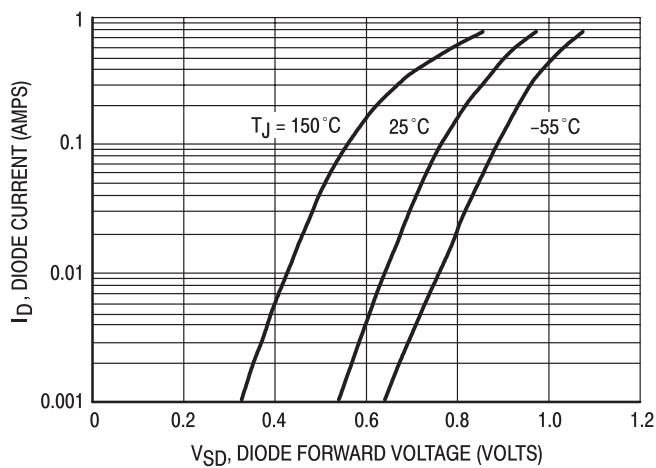
**Fig.7 On-Resistance versus Drain Current**



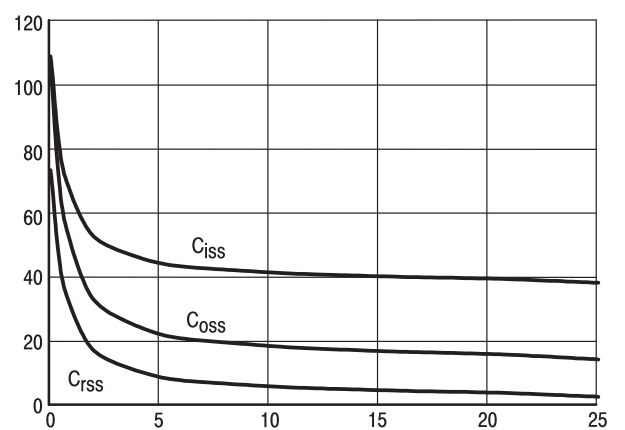
**Fig.8 On-Resistance versus Drain Current**



**Fig.9 On-Resistance versus Drain Current**



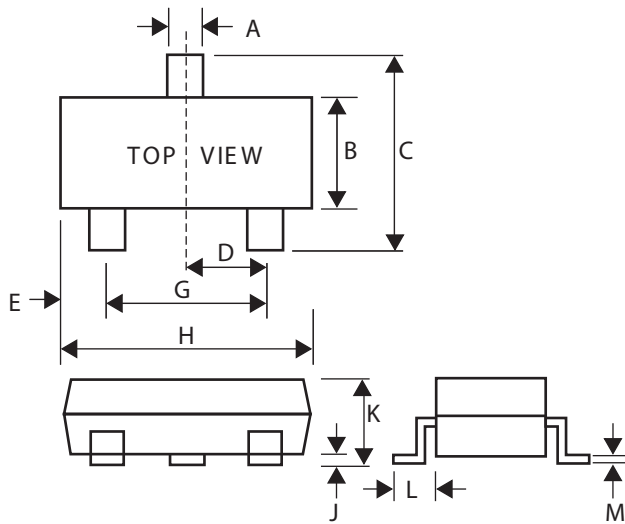
**Fig.10 Body Diode Forward Voltage**



**Fig.11 Capacitance**

**SOT-323 Outline Demensions**

Unit:mm



<b>SOT-323</b>		
<b>Dim</b>	<b>Min</b>	<b>Max</b>
<b>A</b>	0.30	0.40
<b>B</b>	1.15	1.35
<b>C</b>	2.00	2.40
<b>D</b>	-	0.65
<b>E</b>	0.30	0.40
<b>G</b>	1.20	1.40
<b>H</b>	1.80	2.20
<b>J</b>	0.00	0.10
<b>K</b>	0.80	1.00
<b>L</b>	0.42	0.53
<b>M</b>	0.10	0.25