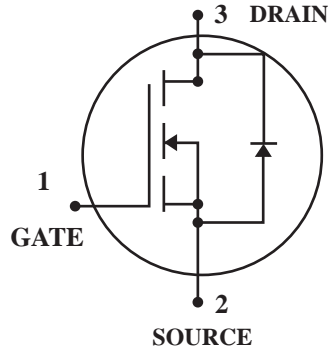


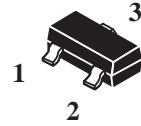
## Small Signal MOSFET N-Channel

### Features:

- \*Low On-Resistance : 3.5Ω
- \*Low Input Capacitance: 40PF
- \*Low Out put Capacitance : 12PF
- \*Low Threshold : 1.5V
- \*Fast Switching Speed : 20ns



### SOT-23



### Application:

- \* DC to DC Converter
- \* Cellular & PCMCIA Card
- \* Cordless Telephone
- \* Power Management in Portable and Battery etc.

### Maximum Ratings (TA=25°C Unless Otherwise Specified)

Rating	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	50	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current (TA=25°C)	I <sub>D</sub>	200	mA
Pulsed Drain Current(tp≤10us)	I <sub>DM</sub>	800	mA
Power Dissipation (TA=25°C)	P <sub>D</sub>	225	mW
Maximax Junction-to-Ambient	R <sub>θJA</sub>	556	°C/W
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to 150	°C

### Device Marking

BSS138=J1

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

Characteristic	Symbol	Min	Typ	Max	Unit
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**Static**<sup>(1)</sup>

Drain-Source Breakdown Voltage $V_{GS}=0V, I_D=250\mu A$	$V_{(BR)DSS}$	50	-	-	V
Gate-Source Threshold Voltage $V_{DS}=V_{GS}, I_D=1.0mA$	$V_{GS(th)}$	0.5	-	1.5	V
Gate-Source Leakage Current $V_{DS}=0V, V_{GS}=\pm 20V$	$I_{GSS}$	-	-	$\pm 0.1$	$\mu A$
Zero Gate Voltage Drain Current $V_{DS}=25V, V_{GS}=0V$ $V_{DS}=50V, V_{GS}=0V$	$I_{DSS}$	-	-	0.1 0.5	$\mu A$
Drain-Source On-Resistance $V_{GS}=2.75V, I_D < 200mA, T_A=-40^\circ C$ to $+85^\circ C$ $V_{GS}=5.0V, I_D=200mA$	$r_{DS(on)}$	-	5.6 -	10 3.5	$\Omega$
Forward Transconductance $V_{DS}=25V, I_D=200mA, f=1.0KHZ$	$g_{fs}$	100	-	-	mS

**Dynamic**

Input Capacitance $V_{DS}=25V, V_{GS}=0V, f=1MHz$	$C_{iss}$	-	40	50	PF
Output Capacitance $V_{DS}=25V, V_{GS}=0V, f=1MHz$	$C_{oss}$	-	12	25	
Reverse Transfer Capacitance $V_{DS}=25V, V_{GS}=0V, f=1MHz$	$C_{rss}$	-	3.5	5.0	

**Switching** (2)

Turn-On Time $V_{DD}=30V, I_D=200mA$	$t_{d(on)}$	-	-	20	nS
Turn-Off Time $V_{DD}=30V, I_D=100mA$	$t_{d(off)}$	-	-	20	

Note: 1. Pulse Test :  $PW \leq 300\mu s$ , Duty Cycle  $\leq 2\%$   
 2. Switching Time is Essentially Independent of Operating Temperature .

## TYPICAL ELECTRICAL CHARACTERISTICS

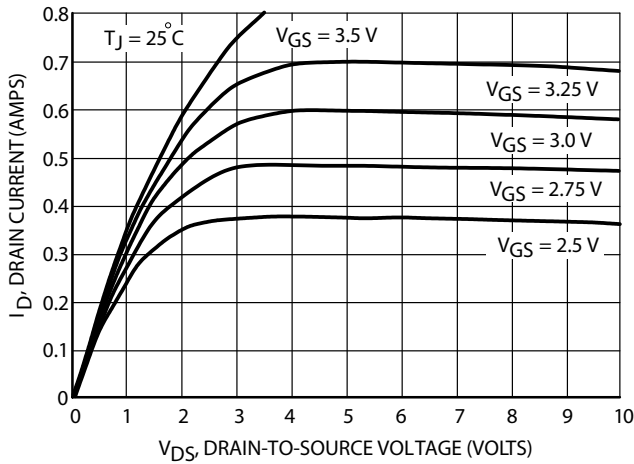


Figure 1. On-Region Characteristics

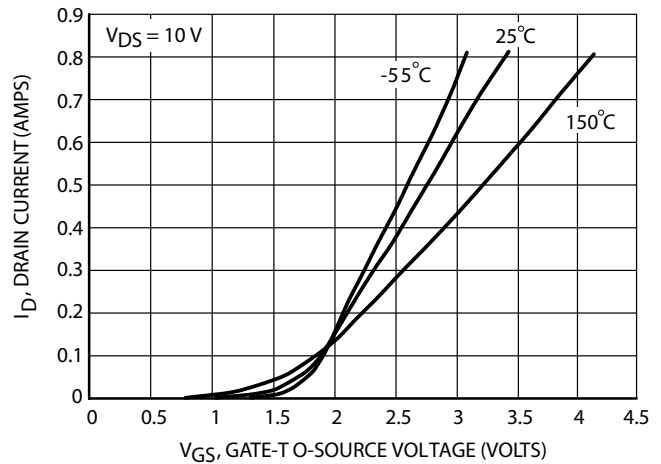


Figure 2. Transfer Characteristics

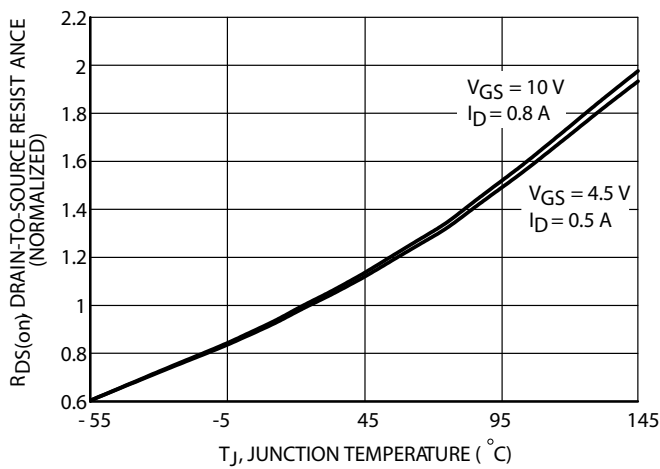


Figure 3. On-Resistance Variation with Temperature

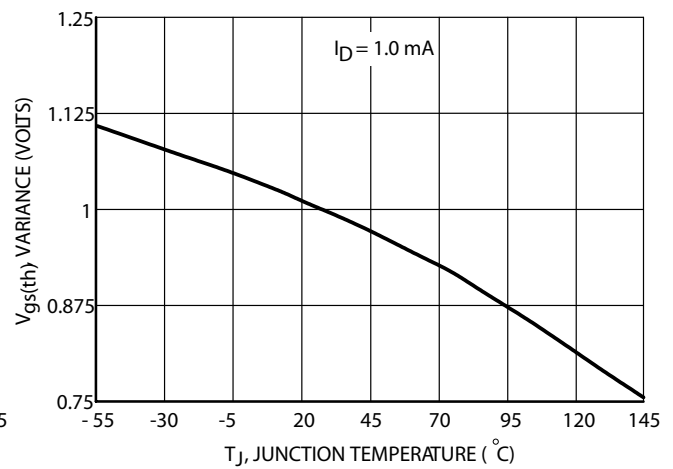


Figure 4. Threshold Voltage Variation with Temperature

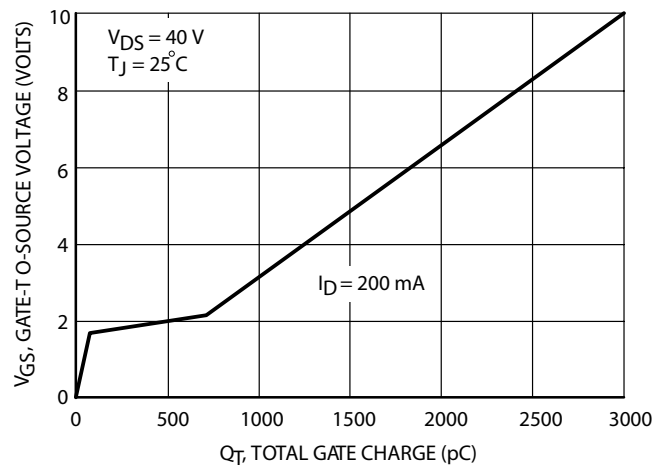


Figure 5. Gate Charge

## TYPICAL ELECTRICAL CHARACTERISTICS

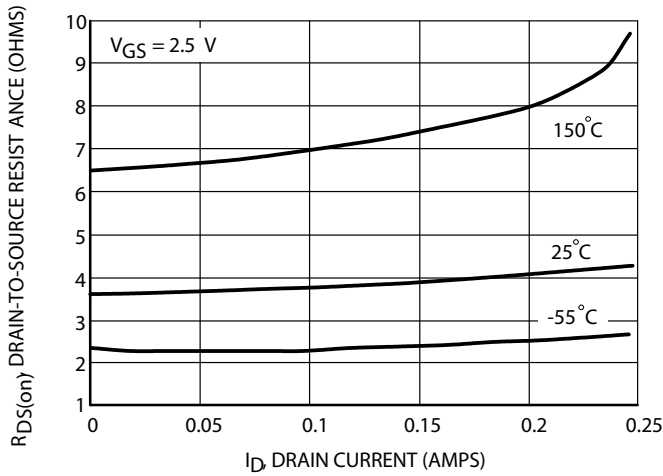


Figure 6. On-Resistance versus Drain Current

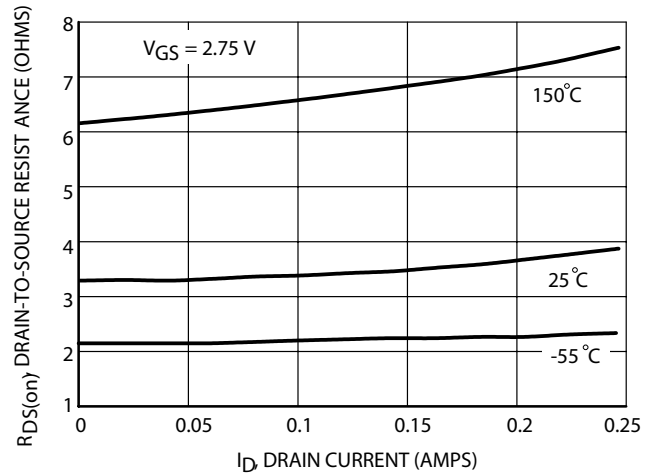


Figure 7. On-Resistance versus Drain Current

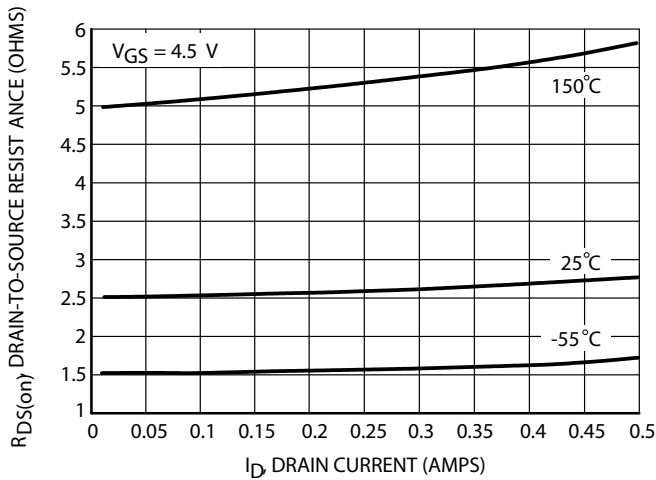


Figure 8. On-Resistance versus Drain Current

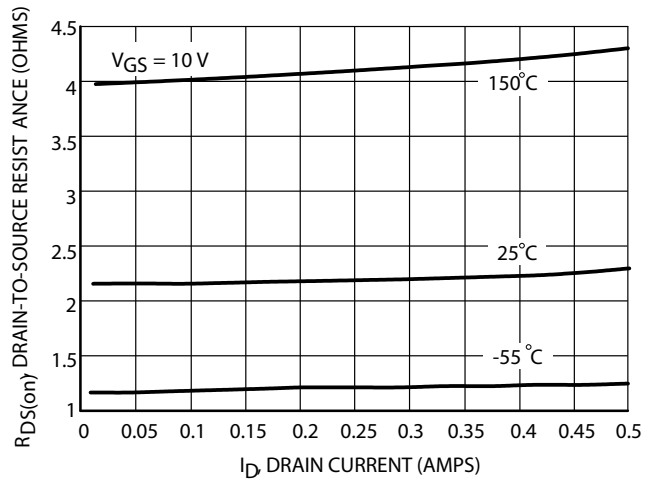


Figure 9. On-Resistance versus Drain Current

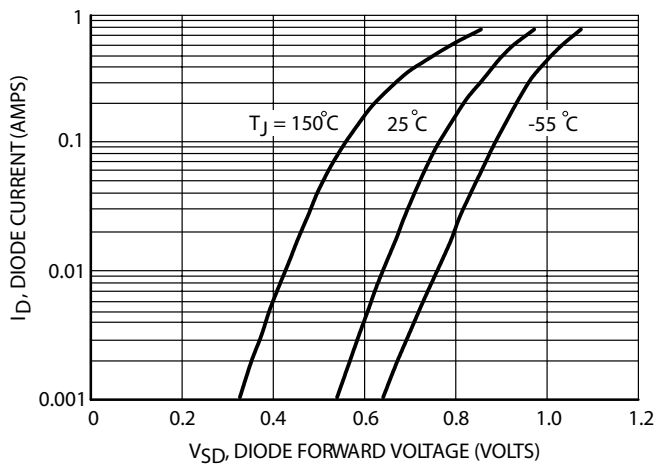


Figure 10. Body Diode Forward Voltage

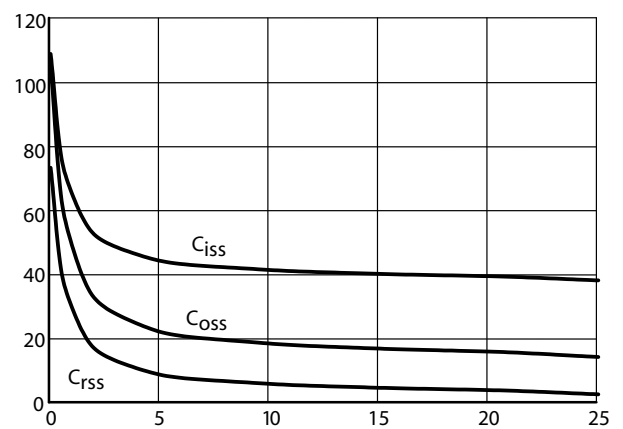


Figure 11. Capacitance