



## 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.

The BSS138W is available in SC-70 Package Type

## ORDERING INFORMATION

Package Type	Part Number
SC-70	BSS138W
Note	SPQ: 3,000pcs/Reel
AiT provides all RoHS Compliant Products	

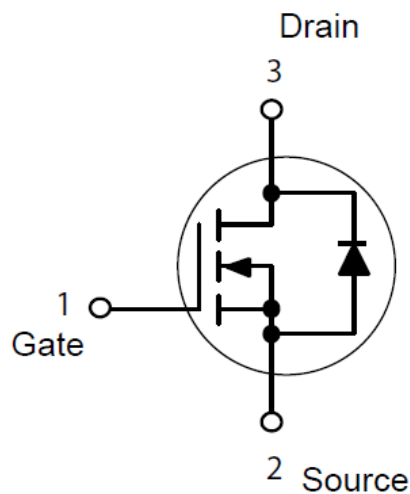
## FEATURES

- Low Threshold Voltage ( $V_{GS(th)}$ : 0.5V...1.5V) makes it ideal for low voltage applications
- Available in SC-70 Package

## APPLICATIONS

- High speed switching

## PIN DESCRIPTION





## ABSOLUTE MAXIMUM RATINGS

$T_A=25^{\circ}\text{C}$ , unless otherwise noted

$V_{DSS}$ , Drain-to-Source Voltage	50V
$V_{GS}$ , Gate-to-Source Voltage – Continuous	$\pm 20\text{V}$
$I_D$ , Drain Current– Continuous @ $T_A=25^{\circ}\text{C}$	200mA
$I_{DM}$ , Drain Current– Pulsed Drain Current ( $t_p \leq 10\mu\text{s}$ )	800mA
$P_D$ , Total Power Dissipation @ $T_A = 25^{\circ}\text{C}$	150mW
$T_J, T_{STG}$ , Operating and Storage Temperature Range	$-55^{\circ}\text{C} \sim 150^{\circ}\text{C}$
$R_{\theta JA}$ , Thermal Resistance – Junction-to-Ambient	$556^{\circ}\text{C/W}$
$T_L$ , Maximum Lead Temperature for Soldering Purposes, for 10 seconds	$260^{\circ}\text{C}$

Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



## ELECTRICAL CHARACTERISTICS

T<sub>A</sub> = 25°C, unless otherwise noted

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>OFF CHARACTERISTICS</b>						
Drain-to-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	50	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V	-	-	0.1	μA
		V <sub>DS</sub> =50V, V <sub>GS</sub> =0V	-	-	0.5	
Gate-Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±0.1	μA
<b>ON CHARACTERISTICS<sup>NOTE1</sup></b>						
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =1.0mA	0.5	-	1.5	V
Static Drain-to-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =2.75V, I <sub>D</sub> <200mA, T <sub>A</sub> =-40°C to +85°C	-	5.6	10	Ω
		V <sub>GS</sub> =5.0V, I <sub>D</sub> =200mA	-	-	3.5	
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> =25V, I <sub>D</sub> = 200mA, f=1.0kHz	100	-	-	mS
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	-	40	50	pF
Output Capacitance	C <sub>oss</sub>		-	12	25	
Transfer Capacitance	C <sub>rss</sub>		-	3.5	5.0	
<b>SWITCHING CHARACTERISTICS<sup>NOTE2</sup></b>						
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =30V, I <sub>D</sub> =0.2A	-	-	20	ns
Turn-Off Delay Time	t <sub>d(off)</sub>		-	-	20	

NOTE1: Pulse Test: Pulse Width≤300 us, Duty Cycle≤2%.

NOTE2: Switching characteristics are independent of operating junction temperature.



## TYPICAL CHARACTERISTICS

Figure 1. On-Region Characteristics

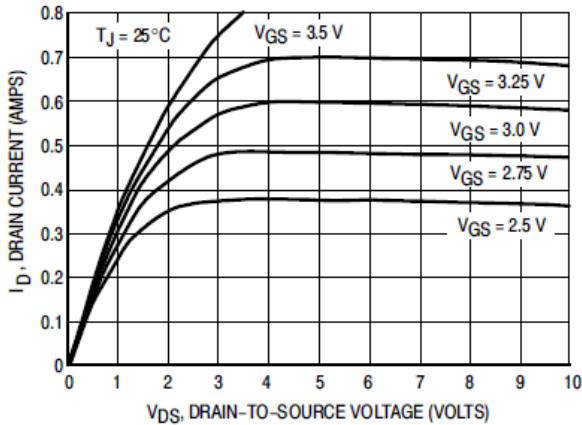


Figure 2. Transfer Characteristics

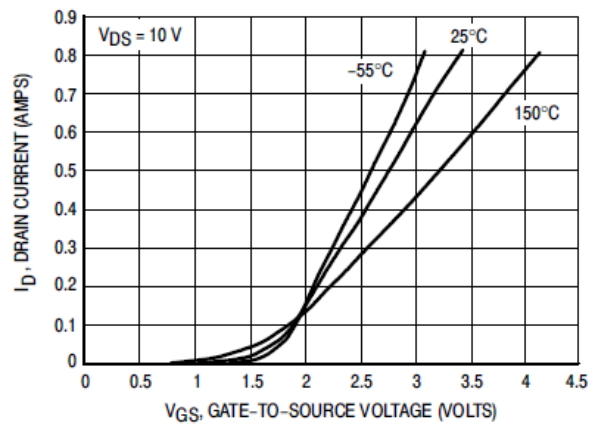


Figure 3. On-Resistance Variation with Temperature

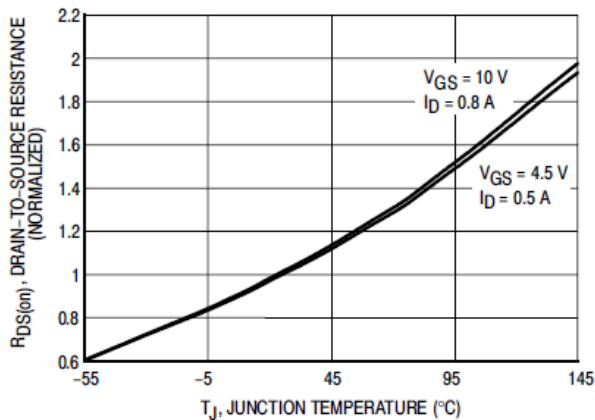


Figure 4. Threshold Voltage Variation with Temperature

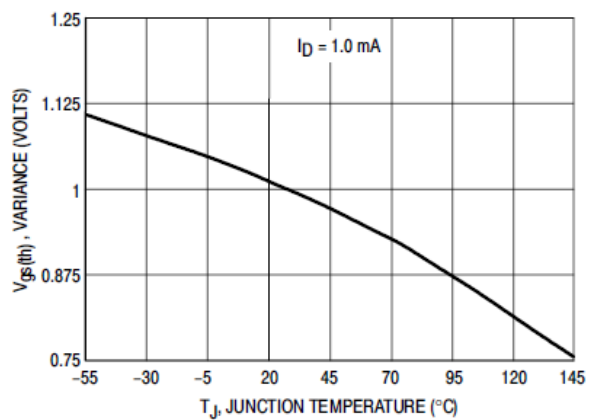


Figure 5. Gate Charge

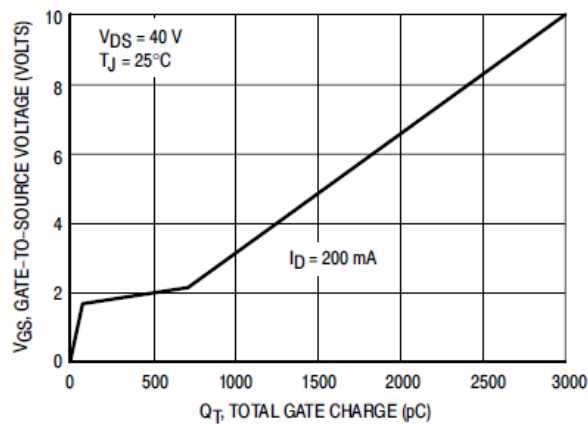


Figure 6. On-Resistance vs. Drain Current

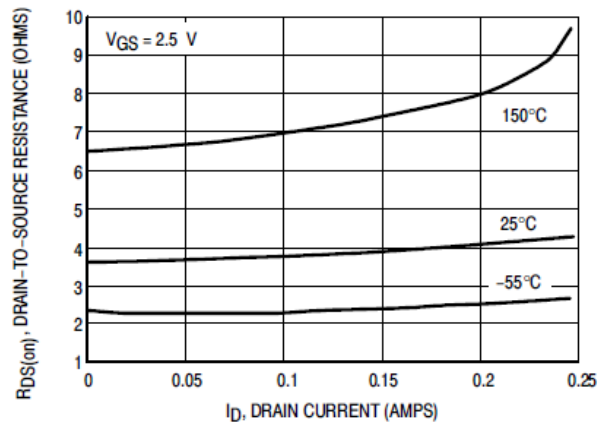




Figure 7. On-Resistance vs. Drain Current

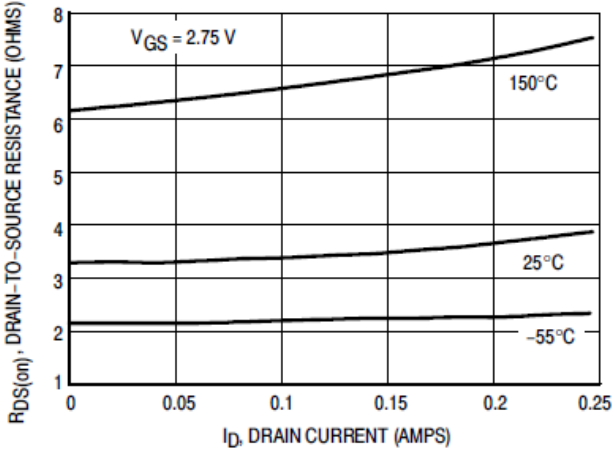


Figure 8. On-Resistance vs. Drain Current

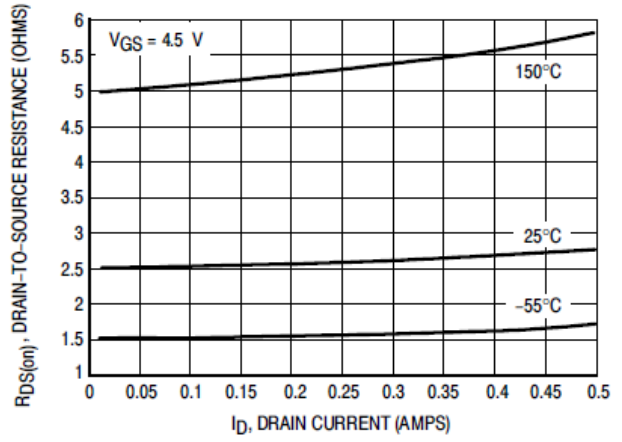


Figure 9. On-Resistance vs. Drain Current

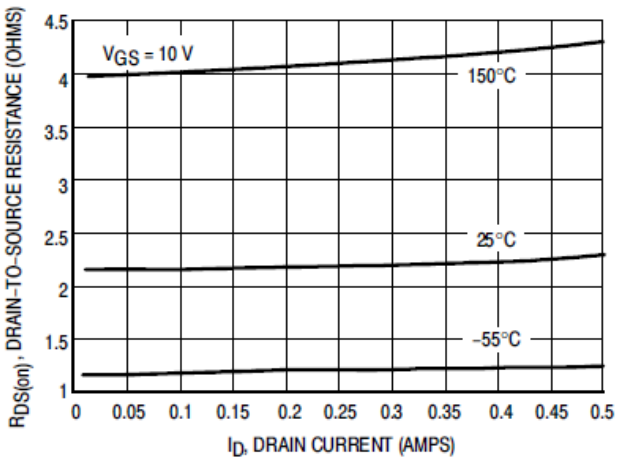


Figure 10. Body Diode Forward Voltage

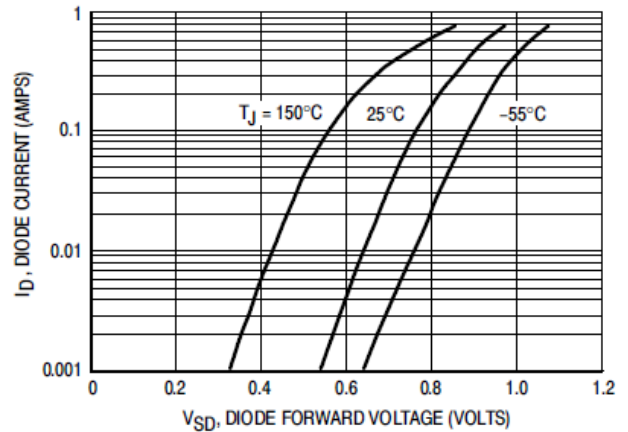
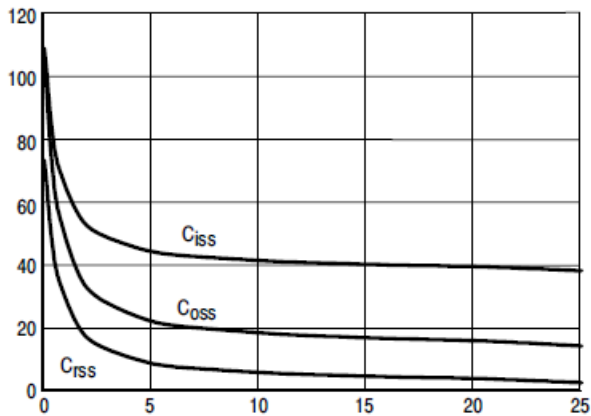


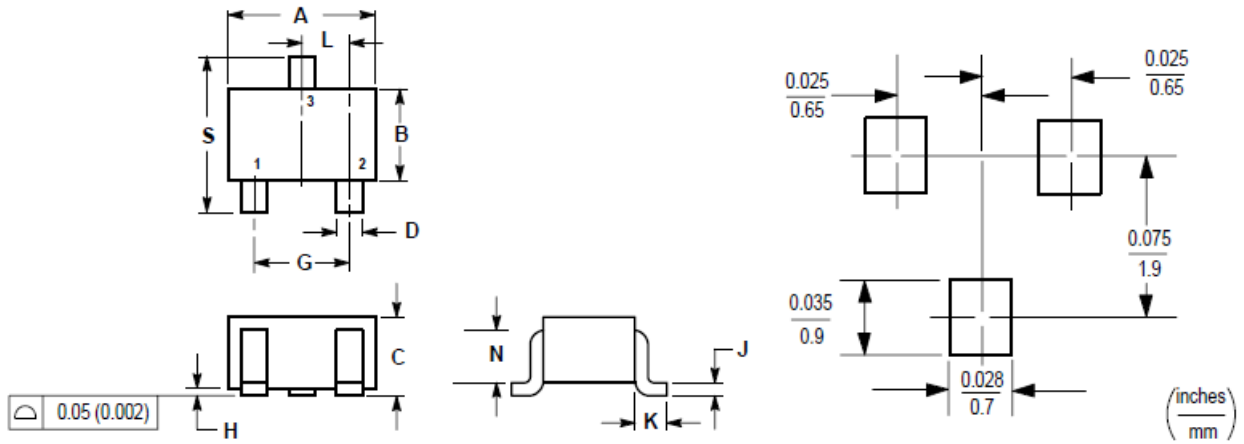
Figure 11. Capacitance





**PACKAGE INFORMATION**

Dimension in SC-70 (Unit: mm)



Symbol	Millimeter		Inches	
	Min	Max	Min	Max
A	1.80	2.20	0.071	0.087
B	1.15	1.35	0.045	0.053
C	0.80	1.00	0.032	0.040
D	0.30	0.40	0.012	0.016
G	1.20	1.40	0.047	0.055
H	0.00	0.10	0.000	0.004
J	0.10	0.25	0.004	0.010
K	0.425 REF		0.017 REF	
L	0.650 BSC		0.026 BSC	
N	0.700 REF		0.028 REF	
S	2.00	2.40	0.079	0.095



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