BSS138

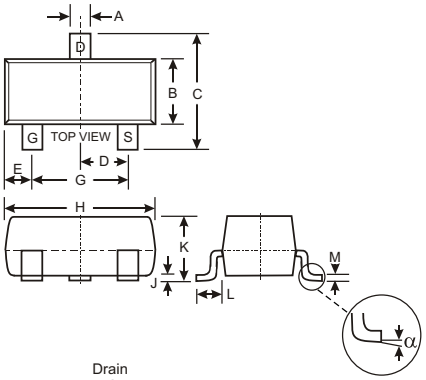
N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

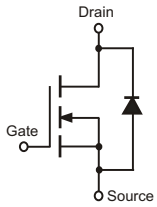
Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Lead Free/RoHS Compliant (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: SOT-23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Marking (See Page 2): K38
- Ordering & Date Code Information: See Page 2
- Weight: 0.008 grams (approximate)





SOT-23		
Dim	**Min**	**Max**
A	0.37	0.51
B	1.20	1.40
C	2.30	2.50
D	0.89	1.03
E	0.45	0.60
G	1.78	2.05
H	2.80	3.00
J	0.013	0.10
K	0.903	1.10
L	0.45	0.61
M	0.085	0.180
	0	8
All Dimensions in mm		

Maximum Ratings @ T_A = 25 C unless otherwise specified

Characteristic		Symbol	BSS138	Units
Drain-Source Voltage		V_{DSS}	50	V
Drain-Gate Voltage R_{GS} 20K		V_{DGR}	50	V
Gate-Source Voltage	Continuous	V_{GSS}	20	V
Drain Current	Continuous	I_D	200	mA
Power Dissipation (Note 1)		P_d	300	mW
Thermal Resistance, Junction to Ambient (Note 1)		R_{JA}	417	C/W
Operating and Storage Temperature Range		T_j, T_{STG}	-55 to +150	C

Electrical Characteristics @ T_A = 25 C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 2)						
Drain-Source Breakdown Voltage	BV_{DSS}	50	75		V	V_{GS} = 0V, I_D = 250 A
Zero Gate Voltage Drain Current	I_{DSS}			0.5	µA	V_{DS} = 50V, V_{GS} = 0V
Gate-Body Leakage	I_{GSS}			100	nA	V_{GS} = 20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 2)						
Gate Threshold Voltage	$V_{GS(th)}$	0.5	1.2	1.5	V	V_{DS} = V_{GS}, I_D = 250 A
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$		1.4	3.5		V_{GS} = 10V, I_D = 0.22A
Forward Transconductance	g_{FS}	100			mS	V_{DS} = 25V, I_D = 0.2A, f = 1.0KHz
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}			50	pF	V_{DS} = 10V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}			25	pF	
Reverse Transfer Capacitance	C_{rss}			8.0	pF	
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{D(ON)}$			20	ns	V_{DD} = 30V, I_D = 0.2A, R_{GEN} = 50
Turn-Off Delay Time	$t_{D(OFF)}$			20	ns	

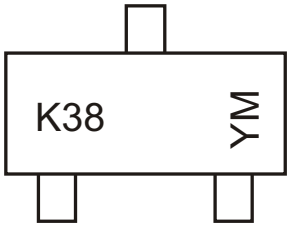
Notes:
1. Device mounted on FR-5 PCB 1.0 x 0.75 x 0.062 inch pad layout as shown on Diodes, Inc. suggested pad layout AP02001, which can be found on our website at http://www.diodes.com/datasheets/ap02001.pdf.
2. Short duration test pulse used to minimize self-heating effect.
3. No purposefully added lead.

Ordering Information (Note 4)

Device	Packaging	Shipping
BSS138-7-F	SOT-23	3000/Tape & Reel

Notes: 4. For Packaging Details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

Marking Information



K38 = Product Type Marking Code
YM = Date Code Marking
Y = Year ex: N = 2002
M = Month ex: 9 = September

Date Code Key

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Code	J	K	L	M	N	P	R	S	T	U	V	W

Month	Jan	Feb	March	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

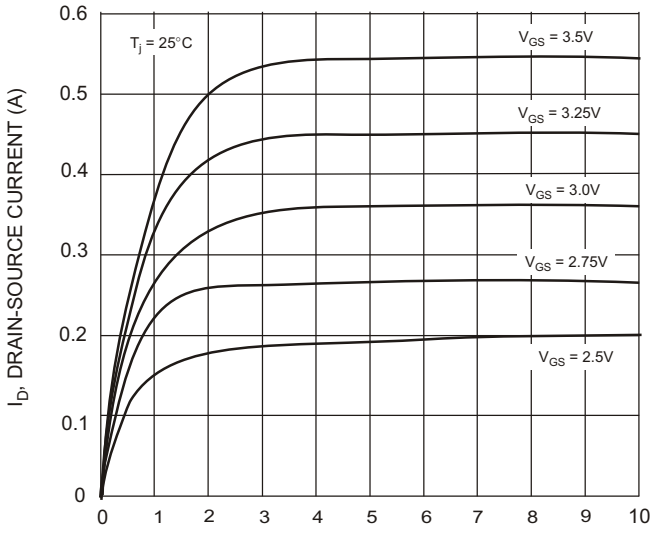


Fig. 1 Drain-Source Current vs. Drain-Source Voltage

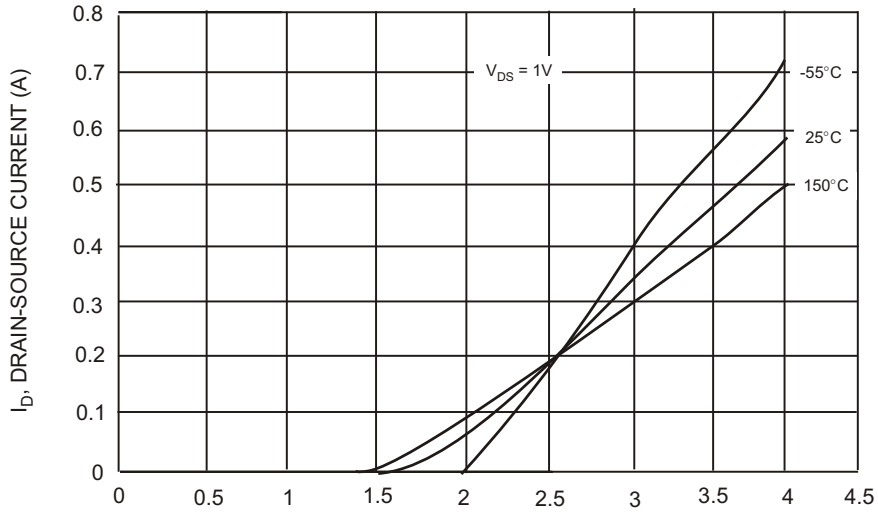


Fig. 2 Transfer Characteristics

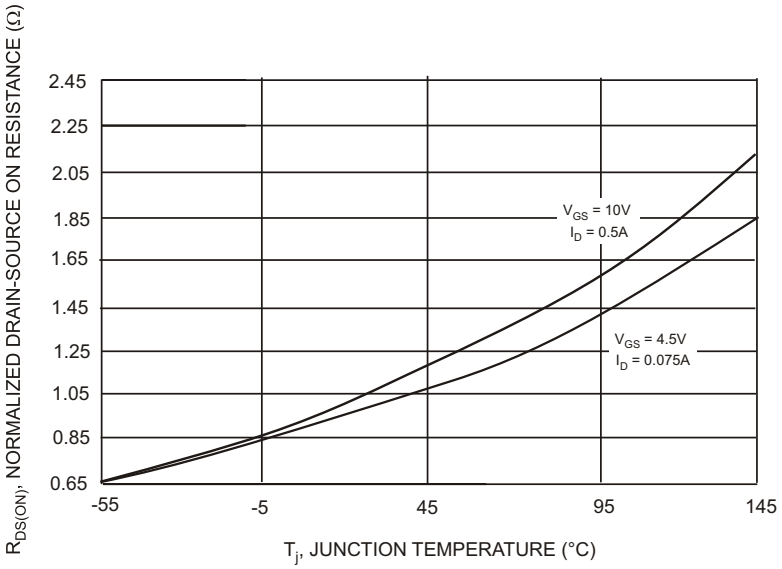


Fig. 3 Drain-Source On Resistance vs. Junction Temperature

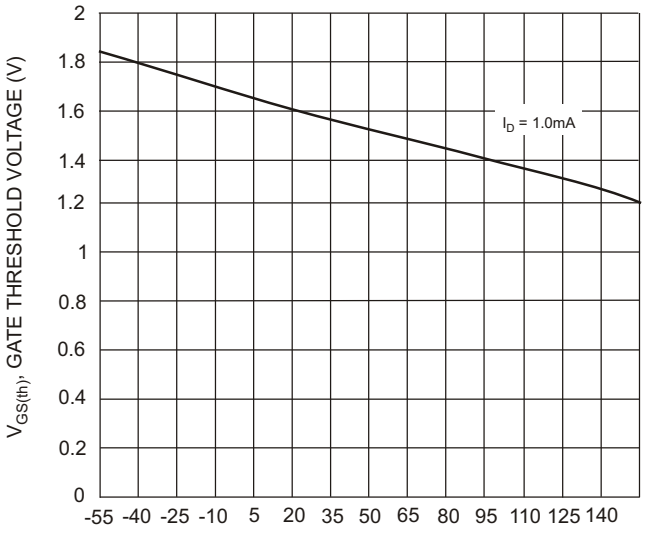


Fig. 4 Gate Threshold Voltage vs. Junction Temperature

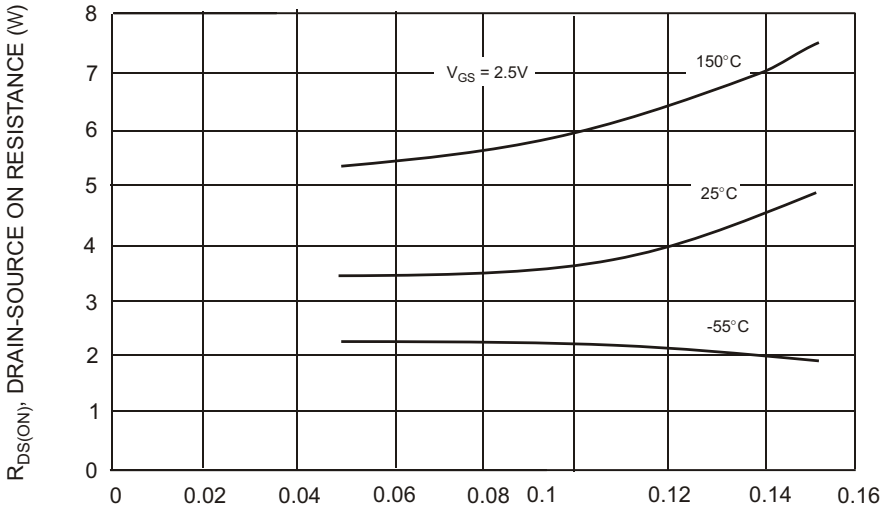


Fig. 5 Drain-Source On Resistance vs. Drain Current

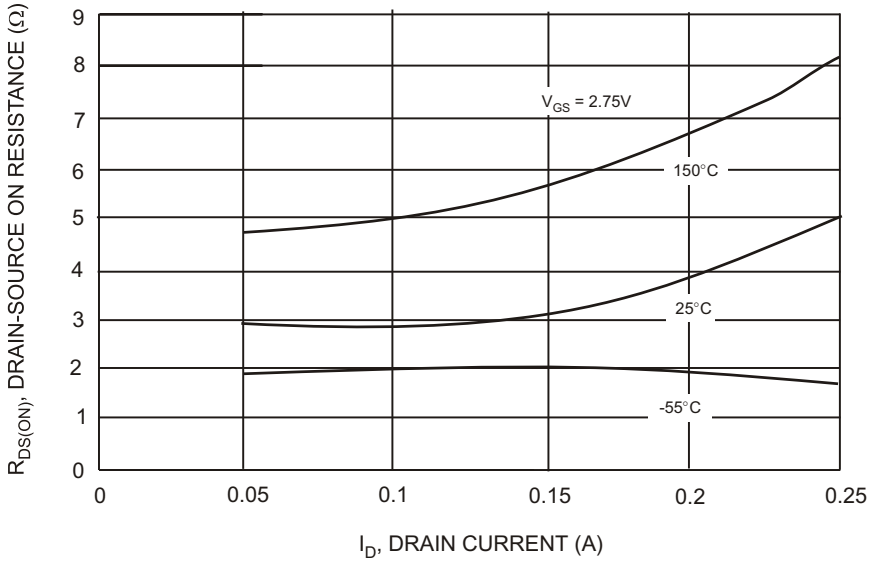


Fig. 6 Drain-Source On Resistance vs. Drain Current

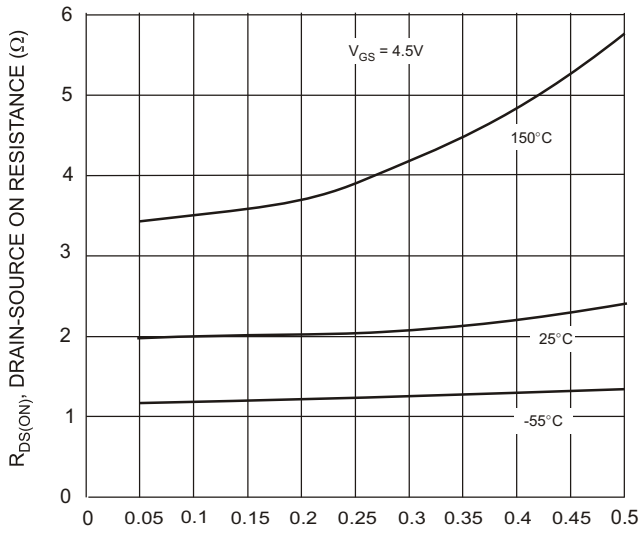


Fig. 7 Drain-Source On Resistance vs. Drain Current

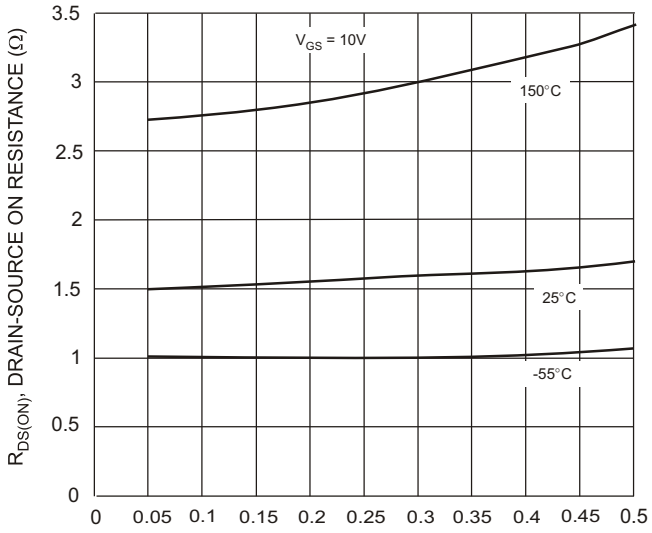


Fig. 8 Drain-Source On Resistance vs. Drain Current

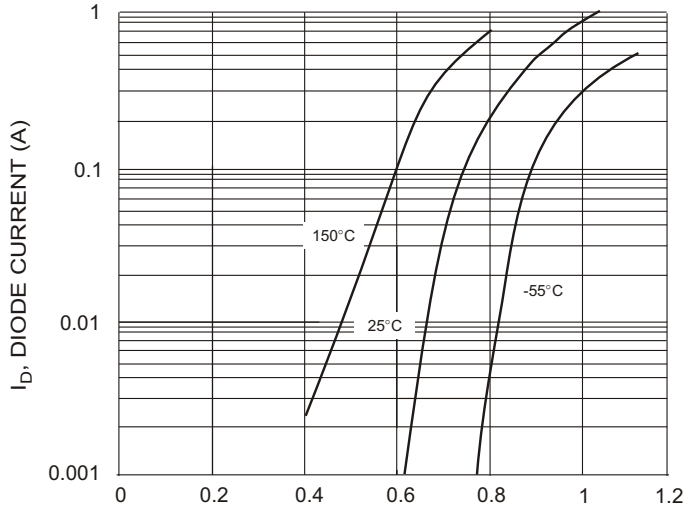


Fig. 9 Body Diode Current vs. Body Diode Voltage

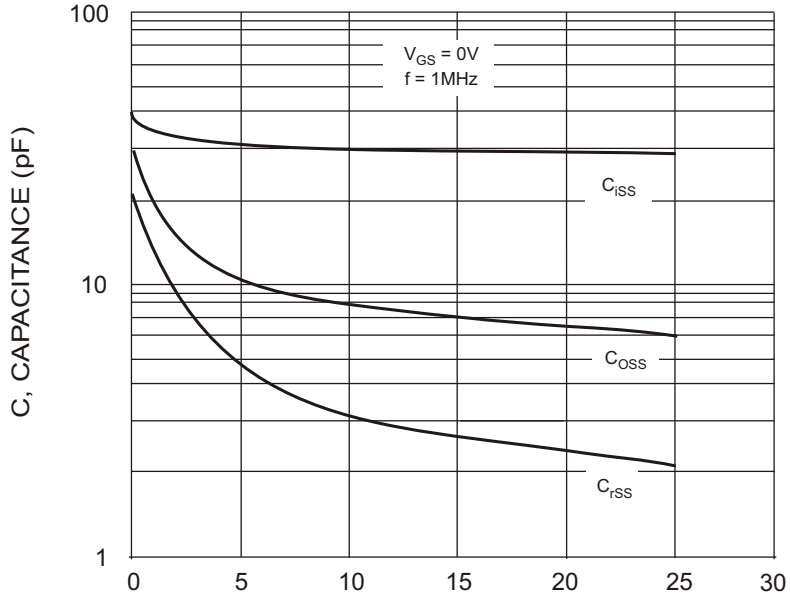


Fig. 10 Capacitance vs. Drain Source Voltage