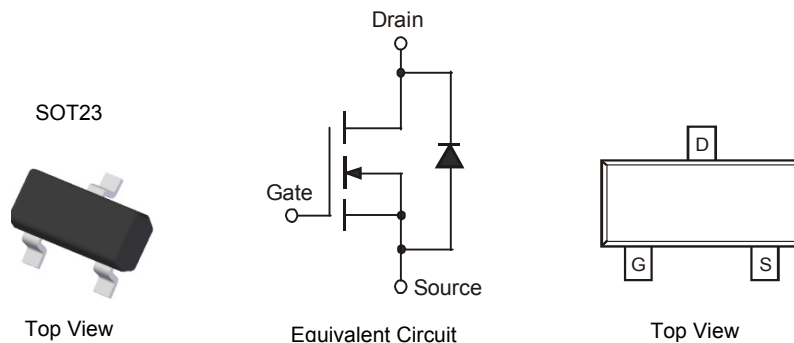


Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Alloy 42 leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Weight: 0.008 grams (approximate)

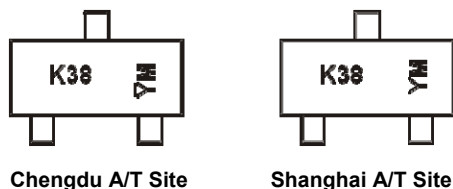


Ordering Information (Note 4)

Part Number	Qualification	Case	Packaging
BSS138-7-F	Commercial	SOT23	3000/Tape & Reel
BSS138Q-7-F	Automotive	SOT23	3000/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant
 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>

Marking Information



K38 = Product Type Marking Code
 YM = Date Code Marking for SAT (Shanghai Assembly/ Test site)
 YM = Date Code Marking for CAT (Chengdu Assembly/ Test site)
 Y or Y̅ = Year (ex: A = 2013)
 M = Month (ex: 9 = September)

Date Code Key

Year	1998	1999	2000	2001	2002	2003	2004	...	2011	2012	2013	2014	2015	2016	2017
Code	J	K	L	M	N	P	R	...	Y	Z	A	B	C	D	E

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

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V _{DSS}	50	V
Drain-Gate Voltage R _{GS} ≤ 20KΩ	V _{DGR}	50	V
Gate-Source Voltage Continuous	V _{GSS}	±20	V
Gate-Source Voltage Non repetitive, Pulse width < 50μs		±40	V
Drain Current Continuous	I _D	200	mA
Pulsed Drain Current (10μs pulse duty cycle = 1%)	I _{DM}	1	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Units
Power Dissipation (Note 5)	P _D	300	mW
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	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 6)						
Drain-Source Breakdown Voltage	BV _{DSS}	50	75	—	V	V _{GS} = 0V, I _D = 250μA
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 6)						
Gate Threshold Voltage	V _{GS(th)}	0.5	1.2	1.5	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	1.4	3.5	Ω	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} = 50Ω
Turn-Off Delay Time	t _{D(OFF)}	—	—	20	ns	

- Notes:
- 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>.
 - Short duration pulse test used to minimize self-heating effect.

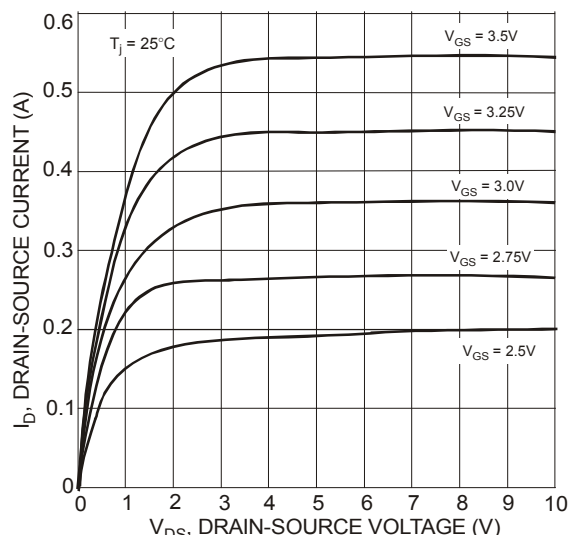


Fig. 1 Drain-Source Current vs. Drain-Source Voltage

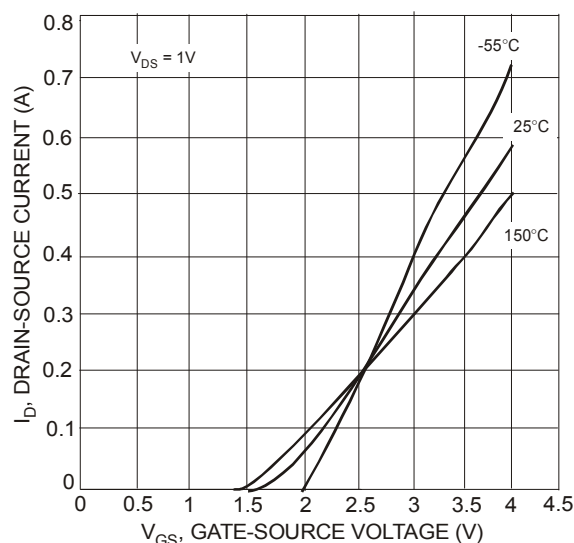


Fig. 2 Transfer Characteristics

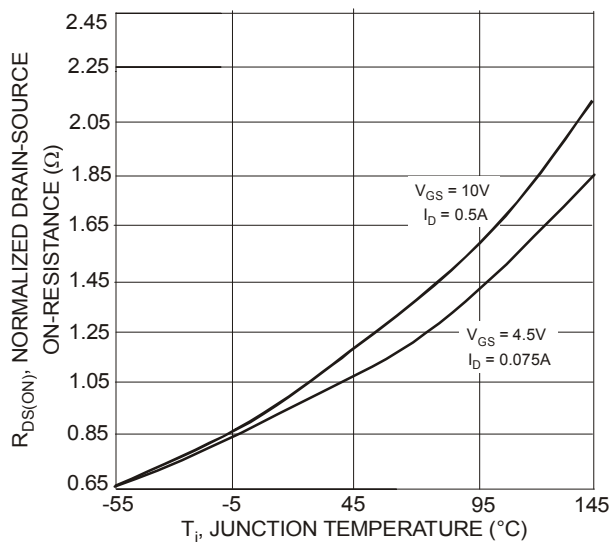


Fig. 3 Drain-Source On-Resistance vs. Junction Temperature

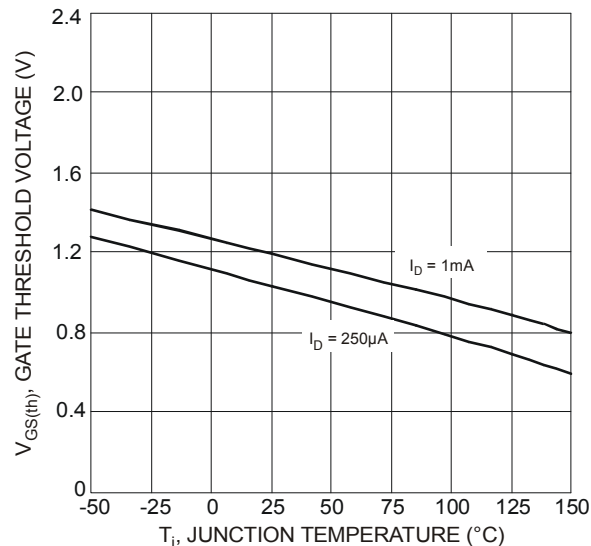


Fig. 4 Gate Threshold Variation vs. Ambient Temperature

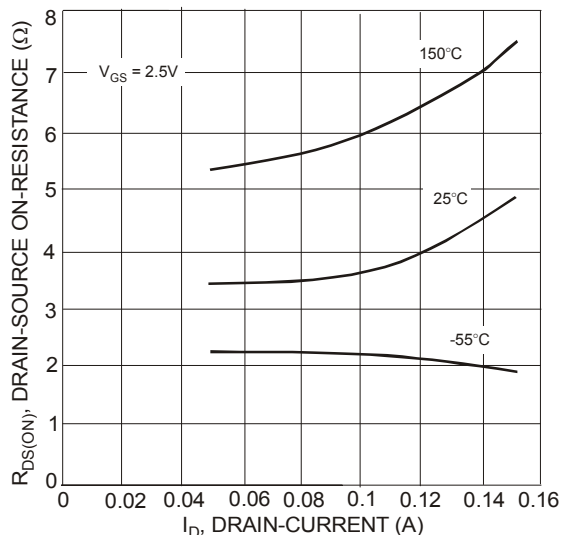


Fig. 5 Drain-Source On-Resistance vs. Drain-Current

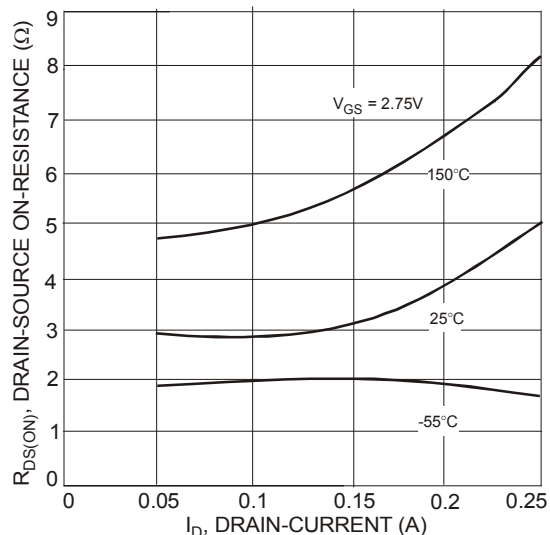


Fig. 6 Drain-Source On-Resistance vs. Drain-Current

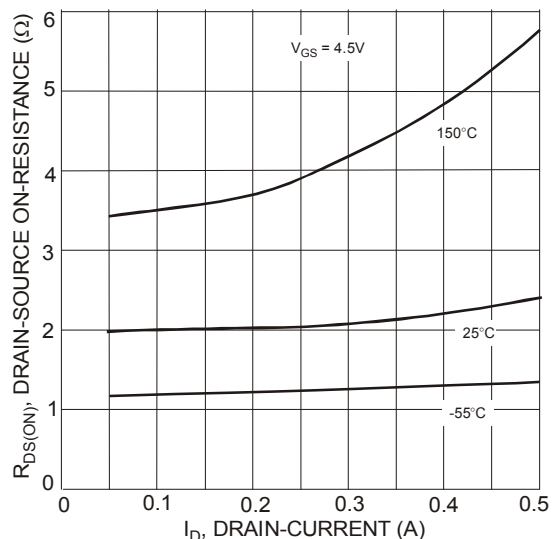


Fig. 7 Drain-Source On-Resistance vs. Drain-Current

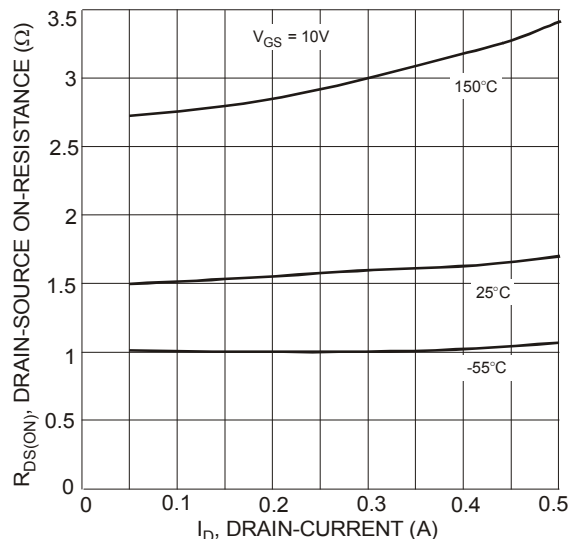


Fig. 8 Drain-Source On Resistance vs. Drain-Current

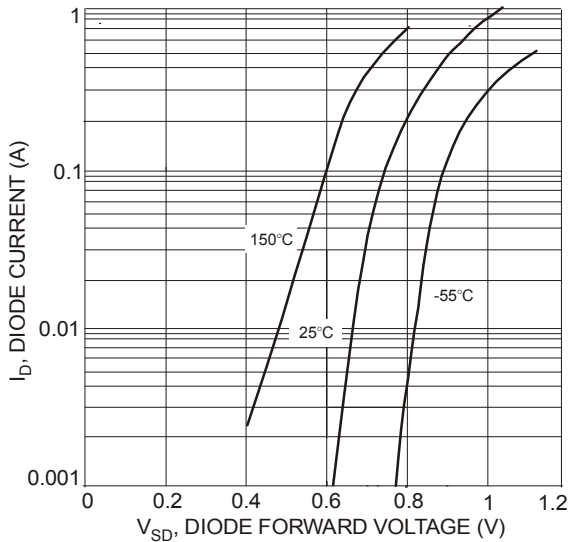


Fig. 9 Body Diode Current vs. Body Diode Voltage

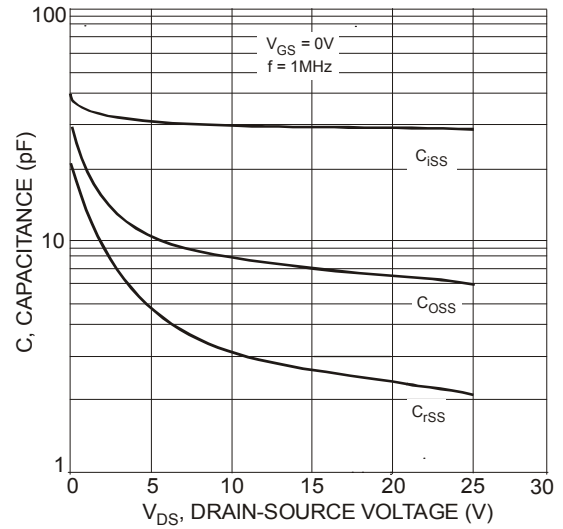
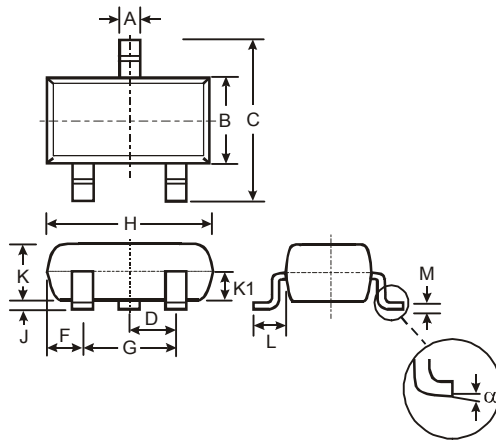


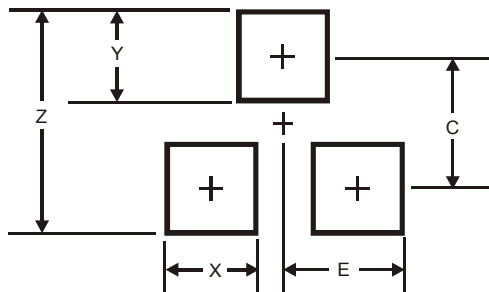
Fig. 10 Capacitance vs. Drain-Source Voltage

Package Outline Dimensions

 Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-
All Dimensions in mm			

Suggested Pad Layout

 Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.


Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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