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Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)} \text{ Max}$	$I_D \text{ Max}$ $T_A = +25^\circ\text{C}$
50V	3.5Ω @ $V_{GS} = 10\text{V}$	200mA

Description

This MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$), yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

- Load Switch

Features

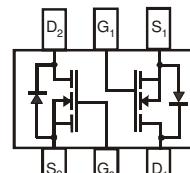
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Notes 3)**
- Qualified to AEC-Q101 Standards for High Reliability**
- PPAP Capable (Note 4)**

Mechanical Data

- Case: SOT-363
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Alloy 42 Leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Weight: 0.006 grams (Approximate)



Top View

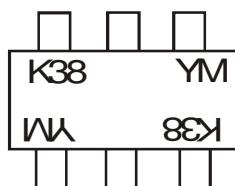

 Top View
 Internal Schematic

Ordering Information (Note 5)

Part Number	Case	Packaging
BSS138DWQ-7	SOT363	3,000/Tape & Reel
BSS138DWQ-13	SOT363	10,000/Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 - 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.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/quality/product_compliance_definitions/.
 - 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

Y or = Year (ex: D = 2016)

M = Month (ex: 9 = September)

Date Code Key

Year	2005	2006	...	2016	2017	2018	2019	2020	2021	2022	2023	
Code	S	T	...	D	E	F	G	H	I	J	K	
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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	BSS138DW	Units
Drain-Source Voltage	V_{DSS}	50	V
Drain-Gate Voltage (Note 8)	V_{DGR}	50	V
Gate-Source Voltage	Continuous	± 20	V
Drain Current (Note 6)	Continuous	I_D	mA

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	BSS138DW	Units
Total Power Dissipation (Note 6)	P_D	200	mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	625	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	50	75	—	V	$V_{GS} = 0\text{V}$, $I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	0.5	μA	$V_{DS} = 50\text{V}$, $V_{GS} = 0\text{V}$
Gate-Body Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.5	1.2	1.5	V	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	1.4	3.5	Ω	$V_{GS} = 10\text{V}$, $I_D = 0.22\text{A}$
Forward Transconductance	g_{FS}	100	—	—	mS	$V_{DS} = 25\text{V}$, $I_D = 0.2\text{A}$, $f = 1.0\text{KHz}$
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	—	—	50	pF	$V_{DS} = 10\text{V}$, $V_{GS} = 0\text{V}$, $f = 1.0\text{MHz}$
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	$V_{DD} = 30\text{V}$, $I_D = 0.2\text{A}$, $R_{GEN} = 50\Omega$
Turn-Off Delay Time	$t_{D(OFF)}$	—	—	20	ns	

Notes:

6. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown at <http://www.diodes.com/package-outlines.html>.
7. Short duration pulse test used to minimize self-heating effect.
8. $R_{GS} \leq 20\text{K}\Omega$.

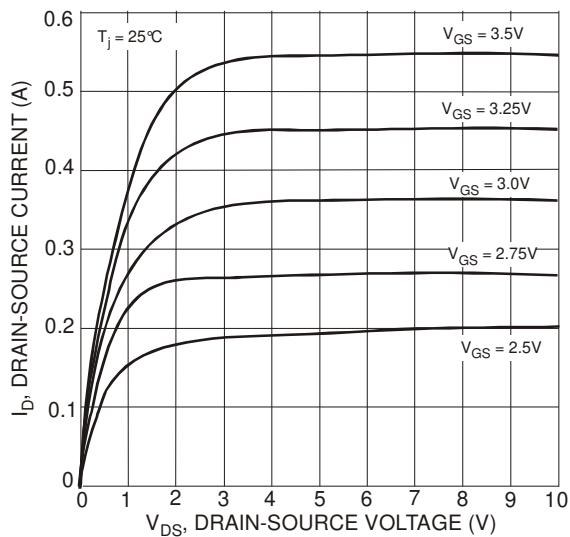


Fig. 1 Drain-Source Current vs. Drain-Source Voltage

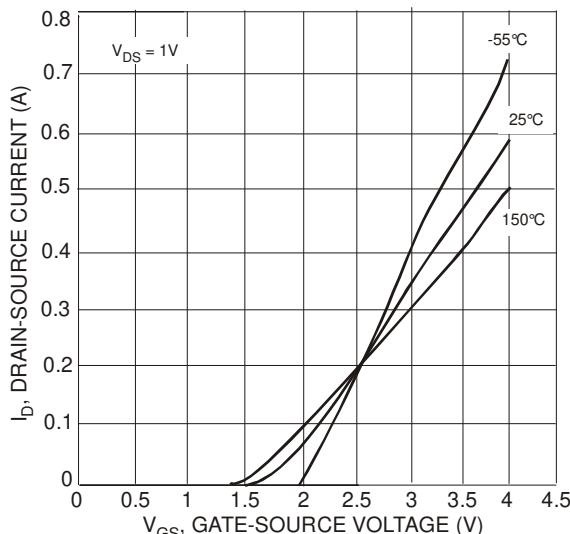


Fig. 2 Transfer Characteristics

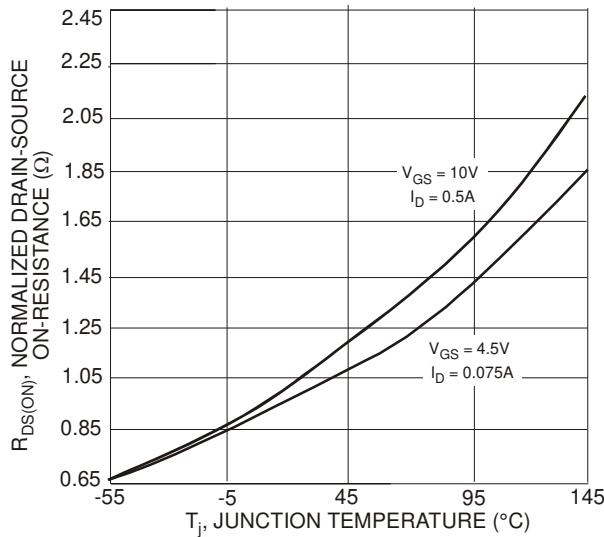


Fig. 3 Drain-Source On Resistance vs. Junction Temperature

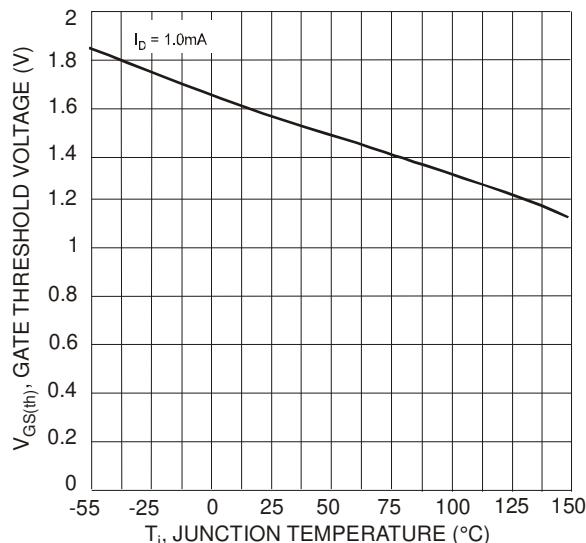


Fig. 4 Gate Threshold Voltage vs. Junction Temperature

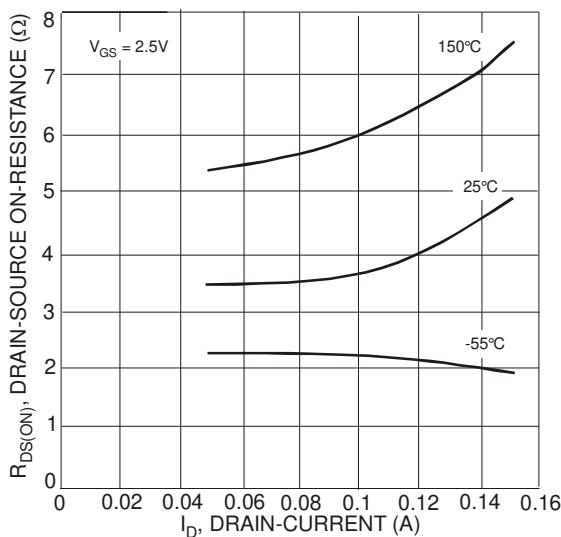


Fig. 5 Drain-Source On-Resistance vs. Drain-Current

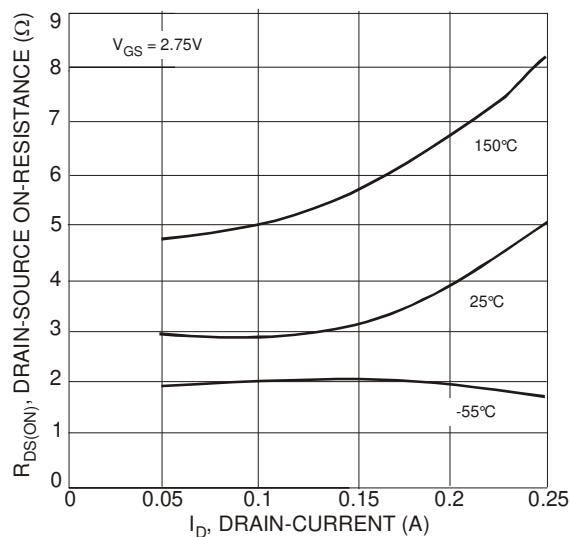


Fig. 6 Drain-Source On-Resistance vs. Drain-Current

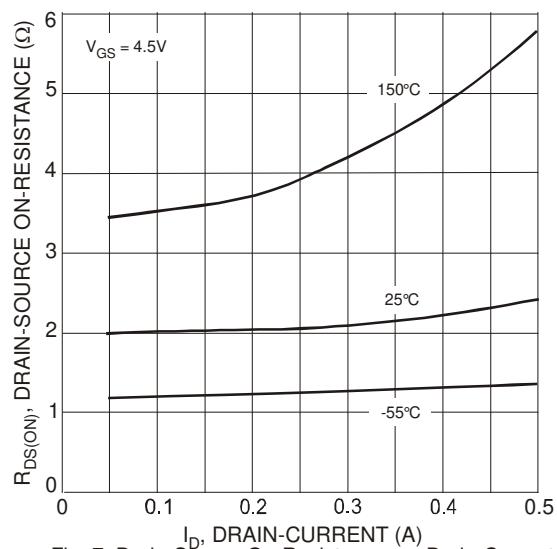


Fig. 7 Drain-Source On-Resistance vs. Drain-Current

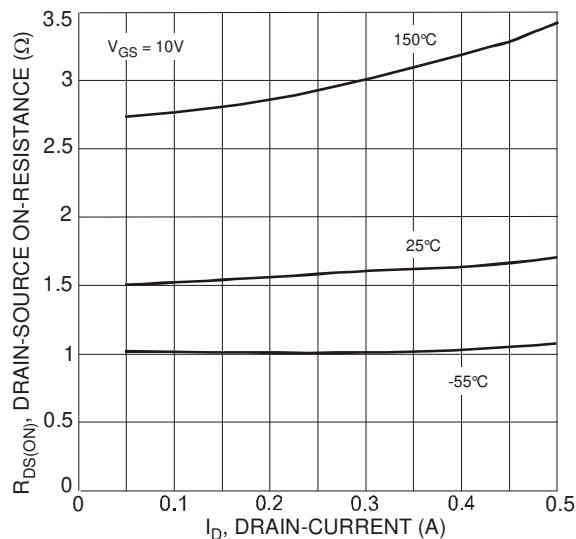


Fig. 8 Drain-Source On-Resistance vs. Drain-Current

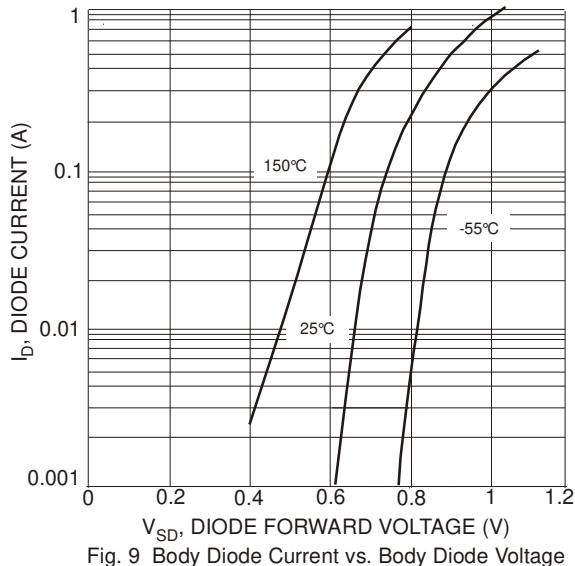


Fig. 9 Body Diode Current vs. Body Diode Voltage

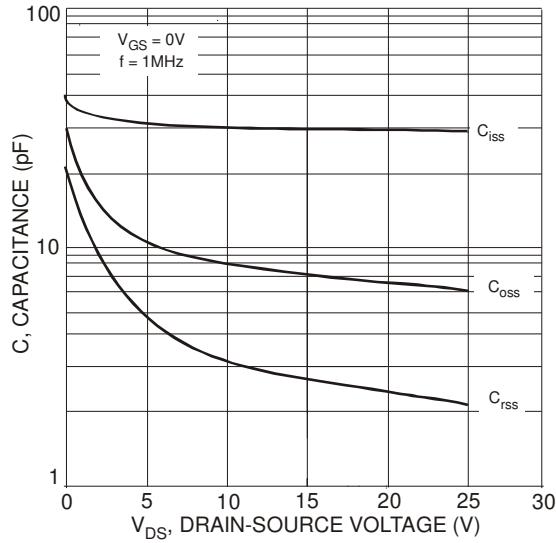
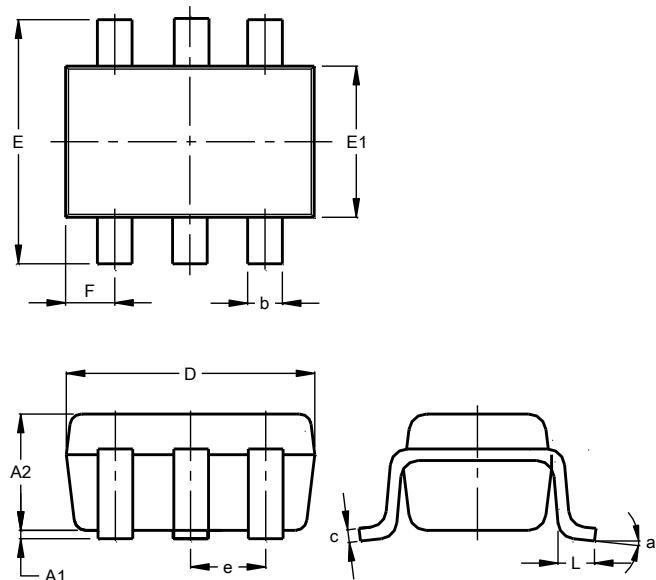


Fig. 10 Capacitance vs. Drain-Source Voltage

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT363



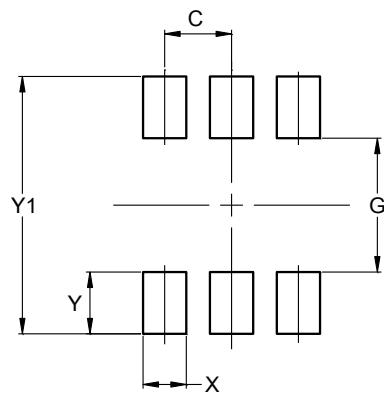
SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	1.00
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	—

All Dimensions in mm

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT363



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500

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