

BSS138W-7-F Datasheet



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DiGi Electronics Part Number	BSS138W-7-F-DG
Manufacturer	Diodes Incorporated
Manufacturer Product Number	BSS138W-7-F
Description	MOSFET N-CH 50V 200MA SOT323
Detailed Description	N-Channel 50 V 200mA (Ta) 200mW (Ta) Surface Mount SOT-323



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DiGi is a global authorized distributor of electronic components.

Purchase and inquiry

Manufacturer Product Number:

BSS138W-7-F

Series:

-

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

50 V

Drive Voltage (Max Rds On, Min Rds On):

10V

Vgs(th) (Max) @ Id:

1.5V @ 250µA

Input Capacitance (Ciss) (Max) @ Vds:

50 pF @ 10 V

Power Dissipation (Max):

200mW (Ta)

Mounting Type:

Surface Mount

Package / Case:

SC-70, SOT-323

Manufacturer:

Diodes Incorporated

Product Status:

Active

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

200mA (Ta)

Rds On (Max) @ Id, Vgs:

3.5Ohm @ 220mA, 10V

Vgs (Max):

±20V

FET Feature:

-

Operating Temperature:

-55°C ~ 150°C (TJ)

Supplier Device Package:

SOT-323

Base Product Number:

BSS138

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.21.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

Product Summary

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

Description and Applications

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

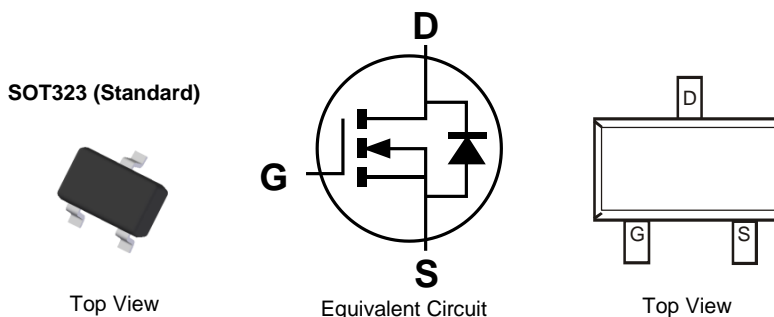
- Load Switch

Features and Benefits

- 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 (Note 3)**
- For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](#) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**
- An Automotive-Compliant Part is Available Under Separate Datasheet ([BSS138WQ](#))**

Mechanical Data

- Case: SOT323
- 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 (Lead Free Plating). Solderable per MIL-STD-202, Method 208③
- Terminal Connections: See Diagram
- Weight: 0.006 grams (Approximate)

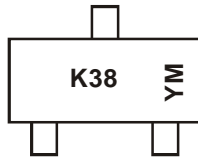


Ordering Information (Note 4)

Part Number	Case	Packaging
BSS138W-7-F	SOT323 (Standard)	3000/Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 - See <https://www.diodes.com/quality/lead-free/> 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.
 - For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



K38 = Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: I = 2021)
 M or \bar{M} = Month (ex: 9 = September)

Date Code Key

Year	2003	...	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	P	...	I	J	K	L	M	N	O	P	R	S

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	Value	Unit
Drain-Source Voltage	V_{DS}	50	V
Drain-Gate Voltage (Note 5)	V_{DGR}	50	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current (Note 6)	I_D	200	mA

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

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

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_{DS}	50	75	—	V	$V_{GS} = 0V, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	0.5	μA	$V_{DS} = 50V, V_{GS} = 0V$
Gate-Body Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
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	$V_{GS} = 10V, I_D = 0.22A$
Forward Transconductance	g_{FS}	100	—	—	mS	$V_{DS} = 25V, I_D = 0.2A, f = 1.0\text{kHz}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	—	50	pF	$V_{DS} = 10V, V_{GS} = 0V, f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	—	25	pF	
Reverse Transfer Capacitance	C_{rss}	—	—	8.0	pF	
Turn-On Delay Time	$t_{D(ON)}$	—	—	20	ns	$V_{DD} = 30V, I_D = 0.2A, R_{GEN} = 50\Omega$
Turn-Off Delay Time	$t_{D(OFF)}$	—	—	20	ns	

- Notes:
- $R_{GS} \leq 20k\Omega$.
 - Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on Diodes Incorporated's suggested pad layout document, which can be found on our website at <http://www.diodes.com/package-outlines.html>.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.



BSS138W

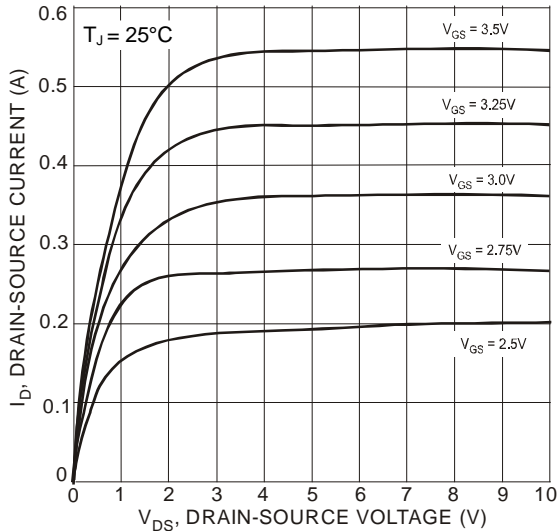


Fig. 1 Drain-Source Current vs. Drain-Source Voltage

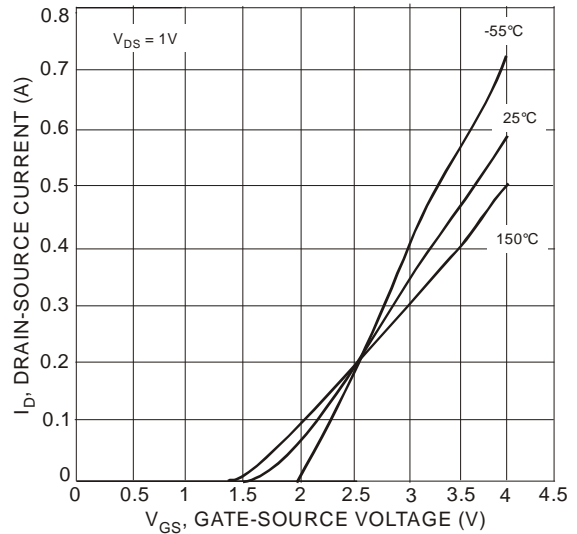


Fig. 2 Transfer Characteristics

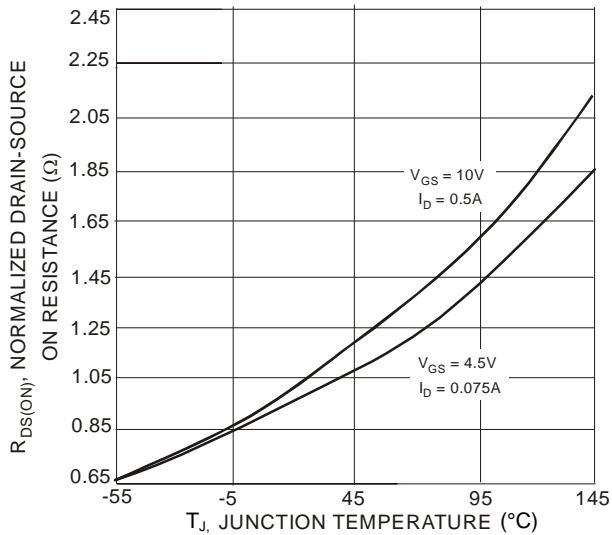


Fig. 3 Drain-Source On Resistance vs. Junction Temperature

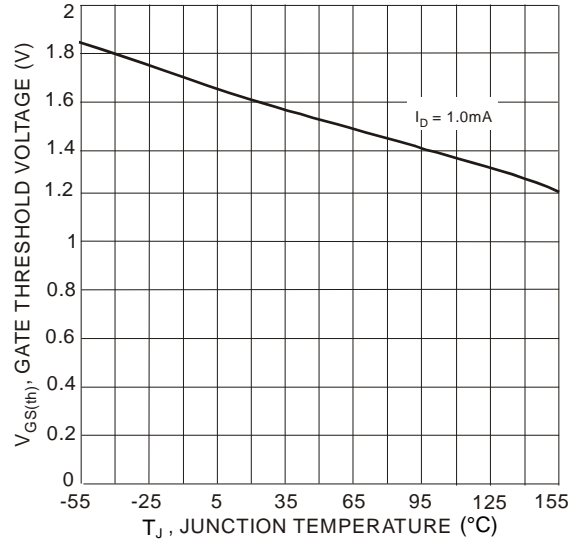


Fig. 4 Gate Threshold Voltage vs. Junction Temperature

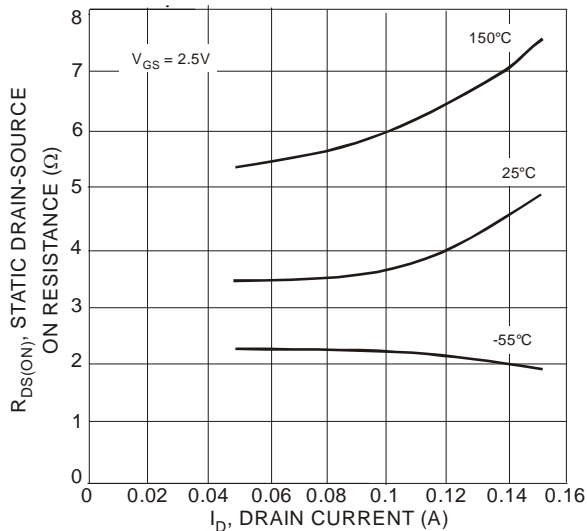


Fig. 5 Drain-Source On Resistance vs. Drain Current

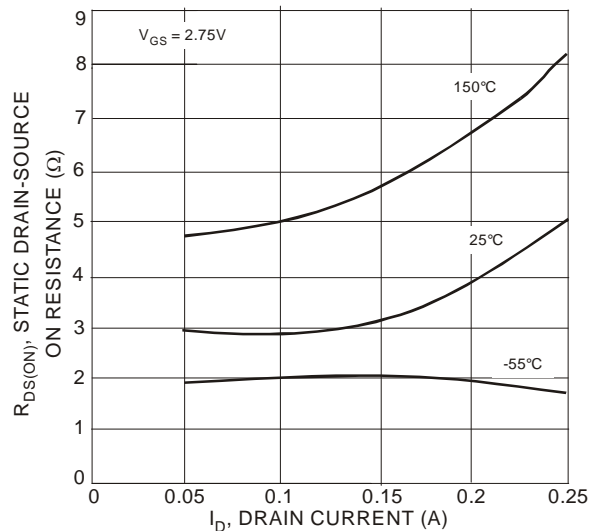


Fig. 6 Drain-Source On Resistance vs. Drain Current



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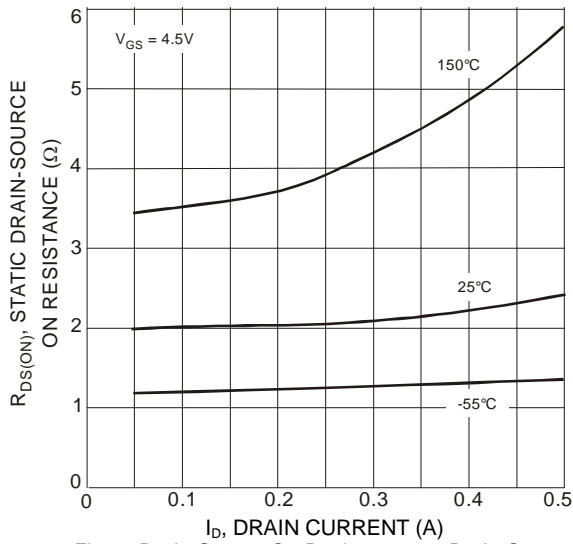


Fig. 7 Drain-Source On Resistance vs. Drain Current

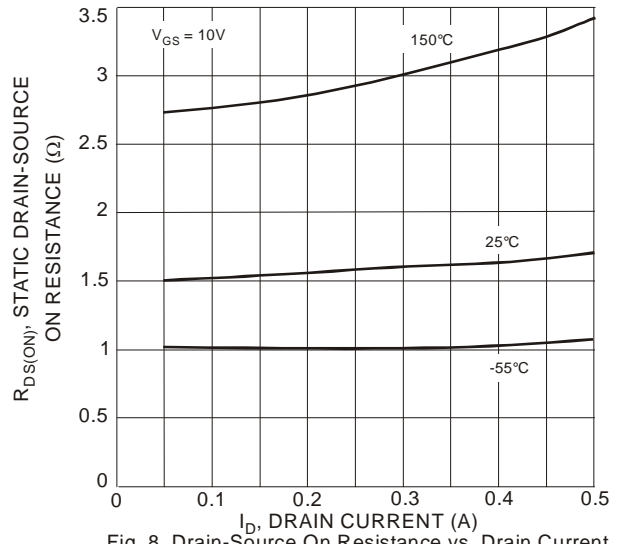


Fig. 8 Drain-Source On Resistance vs. Drain Current

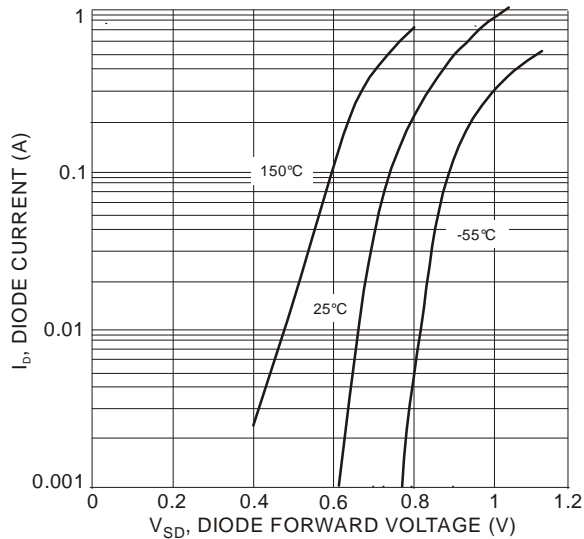


Fig. 9 Body Diode Current vs. Body Diode Voltage

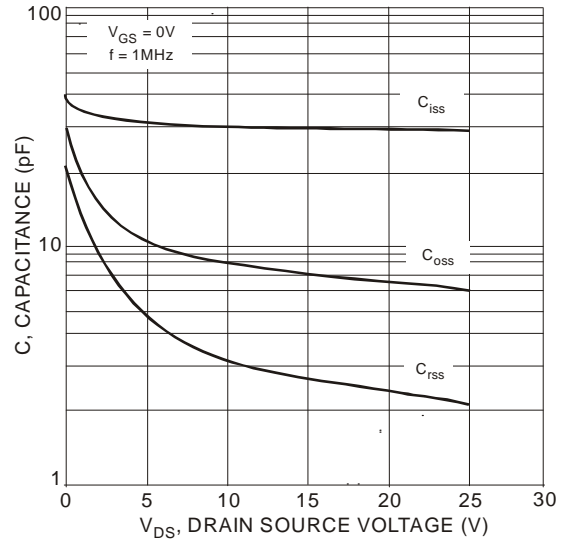
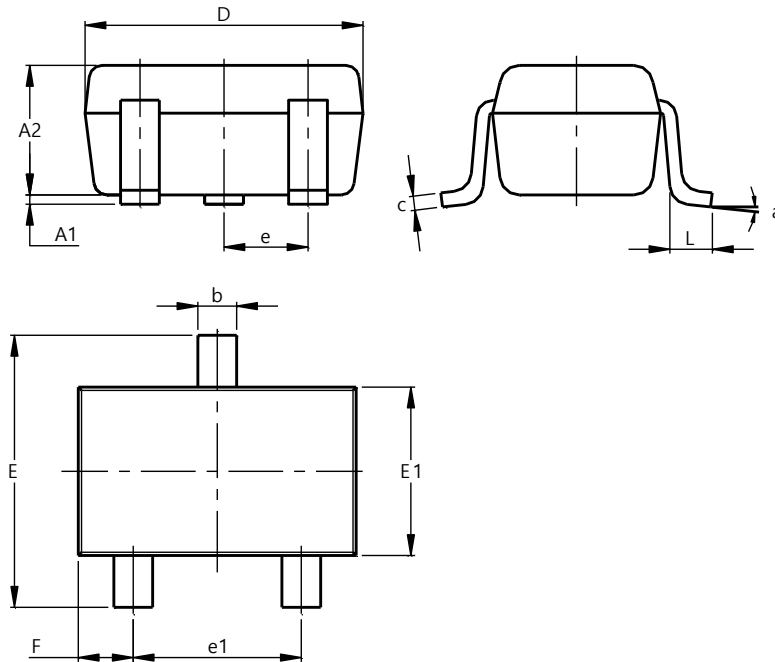


Fig. 10 Capacitance vs. Drain Source Voltage

Package Outline Dimensions

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

SOT323 (Standard)

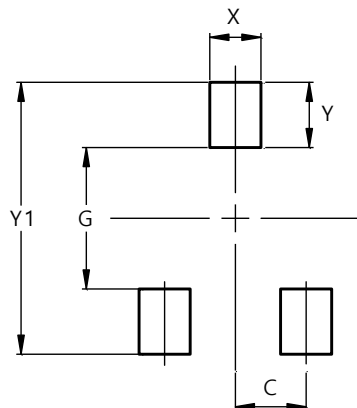


SOT323 (Standard)			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.80	1.00	0.90
b	0.20	0.40	0.30
c	0.08	0.18	0.13
D	1.80	2.20	2.00
E	2.00	2.45	2.225
E1	1.15	1.35	1.25
e	--	--	0.65
e1	1.20	1.40	1.30
F	0.25	0.475	0.3625
L	0.25	0.46	0.355
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT323 (Standard)



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.470
Y	0.600
Y1	2.500

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