

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D $T_A = +25^\circ C$
100V	6.0Ω @ $V_{GS} = 10V$	170mA

Description

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

Applications

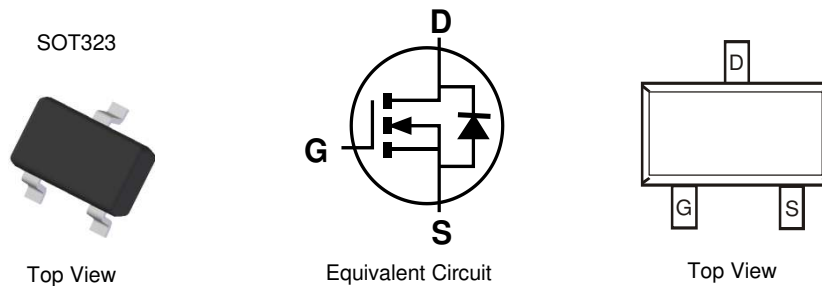
- Small Servo Motor Control
- Power MOSFET Gate Drivers
- Switching Applications

Features

- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- High Drain-Source Voltage Rating
- **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-Q101, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q101) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**

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
- Terminal Connections: See Diagram
- Terminals: Matte Tin Finish Annealed over Alloy 42 Leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208③
- Weight: 0.006 grams (Approximate)

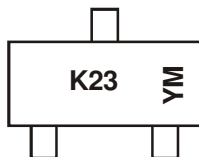


Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
BSS123W-7-F	Standard	SOT323	3000/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. 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.
 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



K23 = Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: A = 2013)
 M = Month (ex: 9 = September)

Date Code Key

Year	2002	2003	2004	2005	2006	...	2012	2013	2014	2015	2016	2017	2018	2019
Code	N	P	R	S	T	...	Z	A	B	C	D	E	F	G

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	Units
Drain-Source Voltage	V_{DS}	100	V
Drain-Gate Voltage $R_{GS} \leq 20\text{K}\Omega$	V_{DGR}	100	V
Gate-Source Voltage	V_{GSS}	± 20	V
Drain Current (Note 5)	I_D	170	mA
	I_{DM}	680	

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_D	200	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	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 6)						
Drain-Source Breakdown Voltage	BV_{DSS}	100	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1.0 10	μA nA	$V_{DS} = 100\text{V}, V_{GS} = 0\text{V}$ $V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$
Gate-Body Leakage, Forward	I_{GSSF}	—	—	50	nA	$V_{GS} = 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(th)}$	0.8	1.4	2.0	V	$V_{DS} = V_{GS}, I_D = 1\text{mA}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	—	6.0 10	Ω	$V_{GS} = 10\text{V}, I_D = 0.17\text{A}$ $V_{GS} = 4.5\text{V}, I_D = 0.17\text{A}$
Forward Transconductance	g_{FS}	80	370	—	mS	$V_{DS} = 10\text{V}, I_D = 0.17\text{A}, f = 1.0\text{KHz}$
Drain-Source Diode Forward Voltage	V_{SD}	—	0.84	1.3	V	$V_{GS} = 0\text{V}, I_S = 0.34\text{A}$
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	—	29	60	pF	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	10	15	pF	
Reverse Transfer Capacitance	C_{rss}	—	2	6	pF	
SWITCHING CHARACTERISTICS (Note 7)						
Turn-On Rise Time	t_r	—	—	8	ns	$V_{DD} = 30\text{V}, I_D = 0.28\text{A}, R_{GEN} = 6.0\Omega, V_{GS} = 10\text{V}$
Turn-Off Fall Time	t_f	—	—	16	ns	
Turn-On Delay Time	$t_{D(on)}$	—	—	8	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	—	13	ns	

Notes: 5. Part mounted on FR-4 board with recommended pad layout, which can be found on our website at <http://www.diodes.com>.
 6. Short duration pulse test used to minimize self-heating effect.
 7. Guaranteed by design. Not subject to production testing.

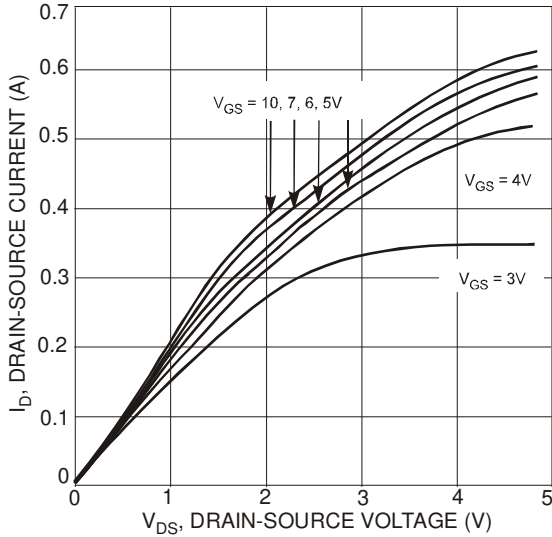


Fig. 1 On-Region Characteristics

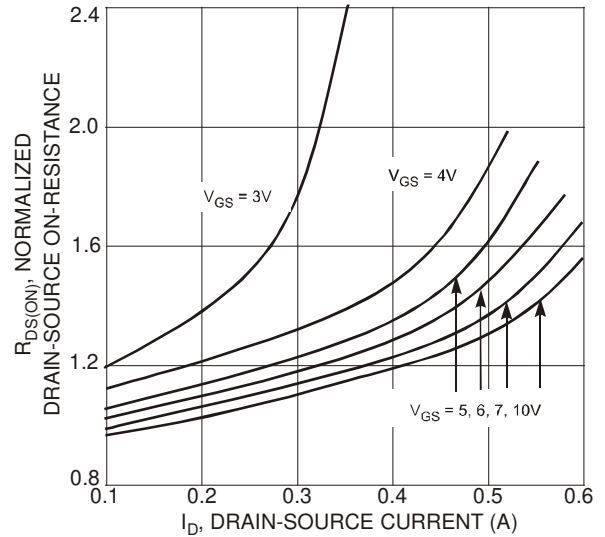


Fig. 2 On-Resistance Variation with Gate Voltage and Drain-Source Current

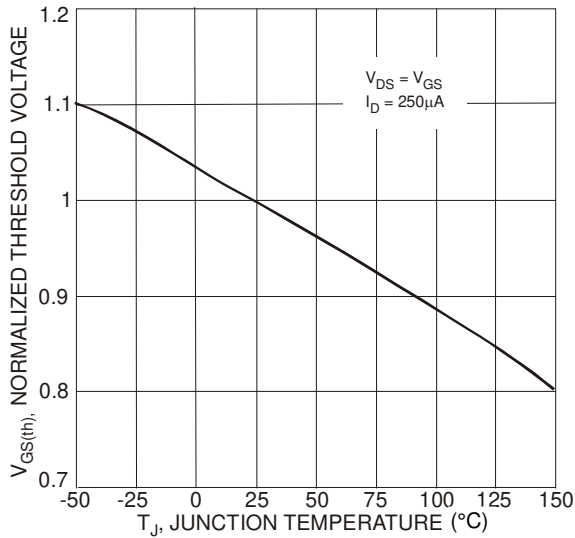


Fig. 3 Gate Threshold Variation with Temperature

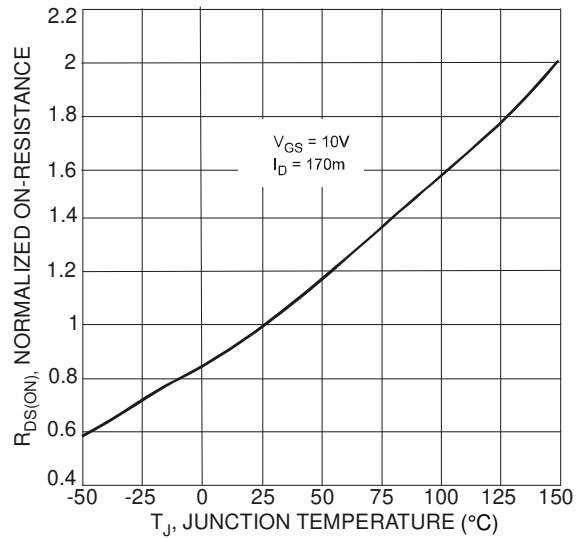


Fig. 4 On-Resistance Variation with Temperature

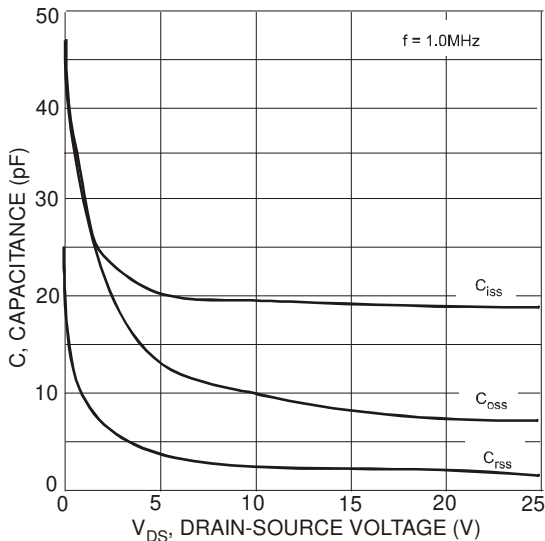


Fig. 5 Typical Capacitance

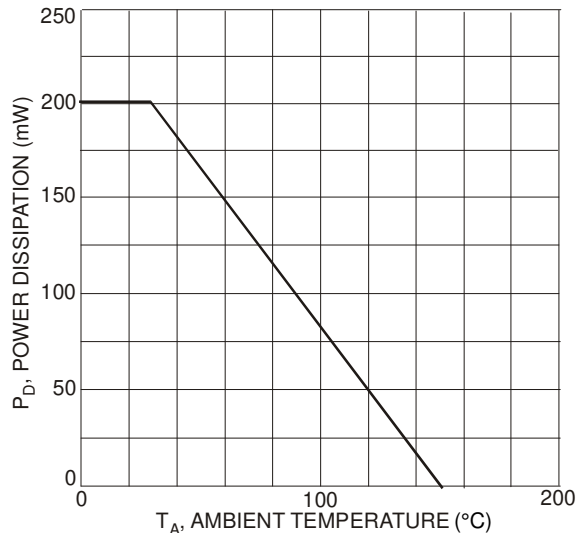
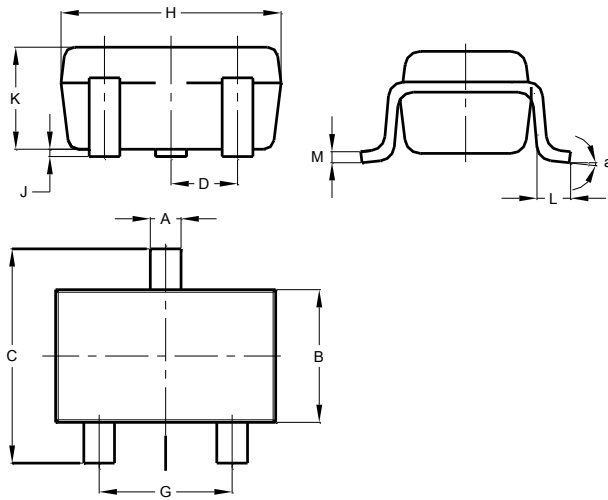


Fig. 6 Power Derating Curve, Total Package

Package Outline Dimensions

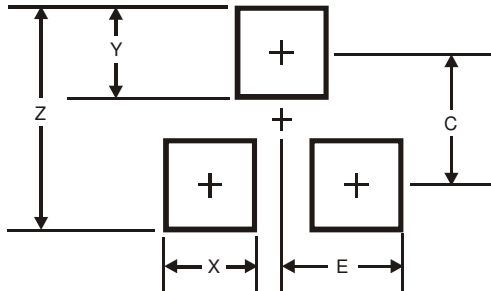
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



SOT323			
Dim	Min	Max	Typ
A	0.25	0.40	0.30
B	1.15	1.35	1.30
C	2.00	2.20	2.10
D	0.650 BSC		
F	0.375	0.475	0.425
G	1.20	1.40	1.30
H	1.80	2.20	2.15
J	0.00	0.10	0.05
K	0.90	1.00	0.95
L	0.25	0.40	0.30
M	0.10	0.18	0.11
a	8°C		
All Dimensions in mm			

Suggested Pad Layout

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



Dimensions	Value (in mm)
Z	2.8
X	0.7
Y	0.9
C	1.9
E	1.0

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