N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)}$	I_D T_A = +25°C
100V	6.0Ω @ V_{GS} = 10V	0.17A

Features and Benefits

- 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)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Description and Applications

These N-Channel enhancement mode field effect transistors are produced using DIODES proprietary, high density, uses advanced trench technology. These products have been designed to minimize on-state resistance while provide rugged, reliable, and fast switching performance. These products are particularly suited for low voltage, low current applications such as:

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

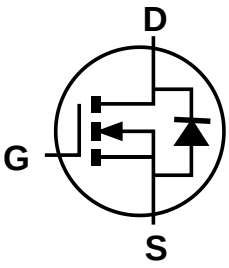
Mechanical Data

- 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 e3
- Terminal Connections: See Diagram
- Weight: 0.008 grams (Approximate)

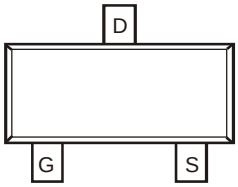
SOT23



Top View



Equivalent Circuit



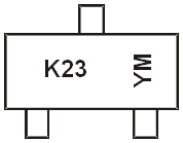
Top View

Ordering Information (Note 4)

Part Number	Qualification	Case	Packaging
BSS123-7-F	Commercial	SOT23	3,000 / Tape & Reel
BSS123Q-13	Automotive	SOT23	10,000 / Tape & Reel
BSS123Q-7	Automotive	SOT23	3,000 / 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



K23 = Product Type Marking Code
YM = Date Code Marking
Y or Y□ = Year (ex: C = 2015)
M = Month (ex: 9 = September)

Date Code Key

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Code	T	U	V	W	X	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

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

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage	Continuous	V_{GSS}	±20	V
Continuous Drain Current (Note 5) V_{GS} = 10V	Continuous	I_D	170	mA
	Pulsed	I_{DM}	680	

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

Characteristic	Symbol	Max	Unit
Power Dissipation (Note 5)	P_D	300	mW
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 5)	$R_{\theta JA}$	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 6)						
Drain-Source Breakdown Voltage	BV_{DSS}	100	-	-	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current	I_{DSS}	-	-	0.1	μA	V_{DS} = 100V, V_{GS} = 0V
		-	-	30	μA	V_{DS} = 100V, V_{GS} = 0V @ T_A = 150°C (Note 7)
		-	-	10	nA	V_{DS} = 20V, V_{GS} = 0V
Gate-Source Leakage , Forward	I_{GSSF}	-	-	50	nA	V_{GS} = 20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.8	1.4	2.0	V	V_{DS} = V_{GS}, I_D = 1mA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	-	-	6.0	Ω	V_{GS} = 10V, I_D = 0.17A
		-	-	10		V_{GS} = 4.5V, I_D = 0.17A
Forward Transfer Admittance	g_{FS}	80	370	-	mS	V_{DS} =10V, I_D = 0.17A, f = 1.0KHz
Diode Forward Voltage	V_{SD}	-	0.84	1.3	V	V_{GS} = 0V, I_S = 0.34A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	-	22	60	pF	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	3.5	15		
Reverse Transfer Capacitance	C_{rss}	-	2.0	6		
SWITCHING CHARACTERISTICS (Note 7)						
Turn-On Delay Time	$t_{D(ON)}$	-	-	8	ns	V_{GS} = 10V, V_{DD} = 30V, I_D = 0.28A, R_{GEN} = 50Ω
Turn-On Rise Time	t_R	-	-	8	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	-	-	13	ns	
Turn-Off Fall Time	t_F	-	-	16	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.

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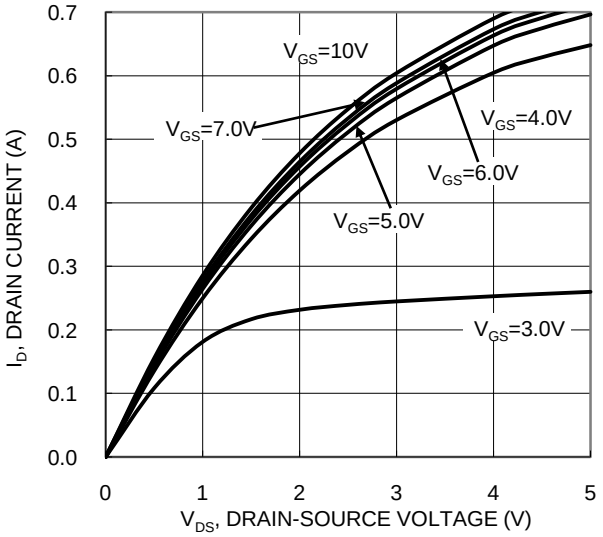


Figure 1. Typical Output Characteristic

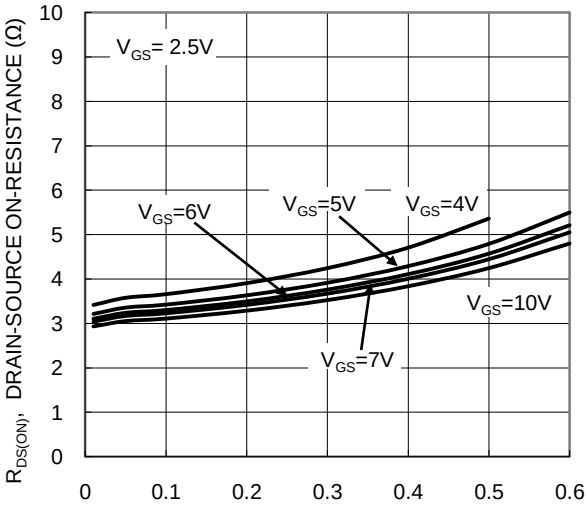


Figure 2. Typical On-Resistance vs. Drain Current and Temperature

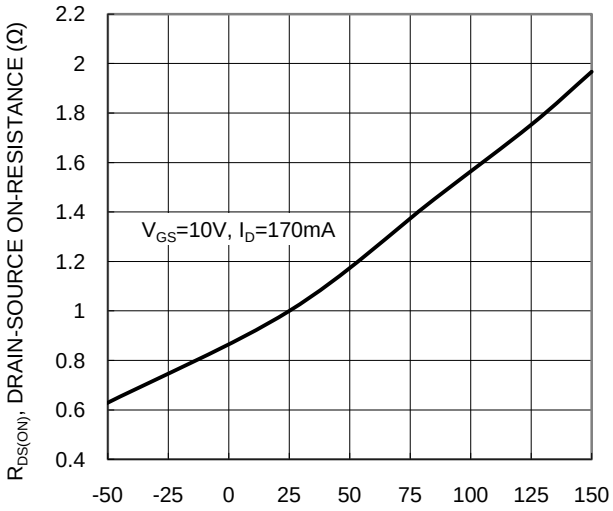


Figure 3. On-Resistance Variation with Junction Temperature

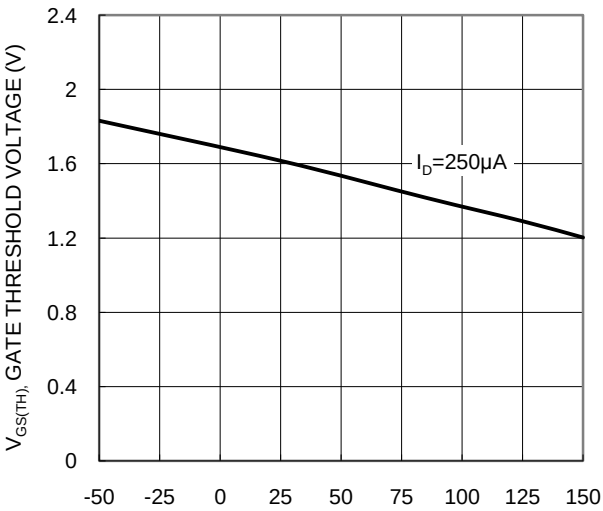


Figure 4. Gate Threshold Variation vs. Junction Temperature

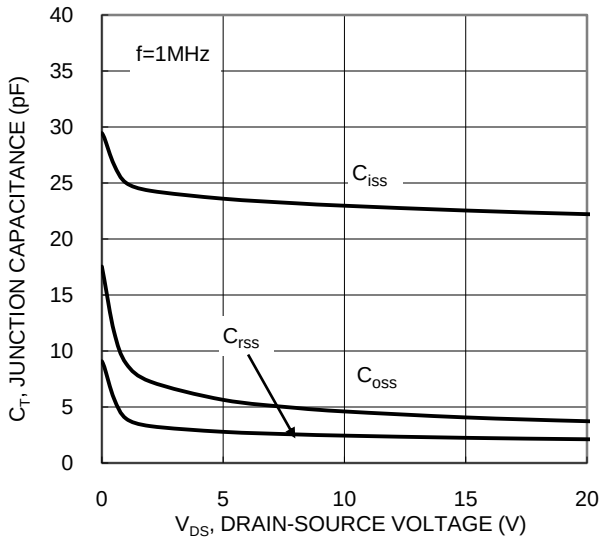
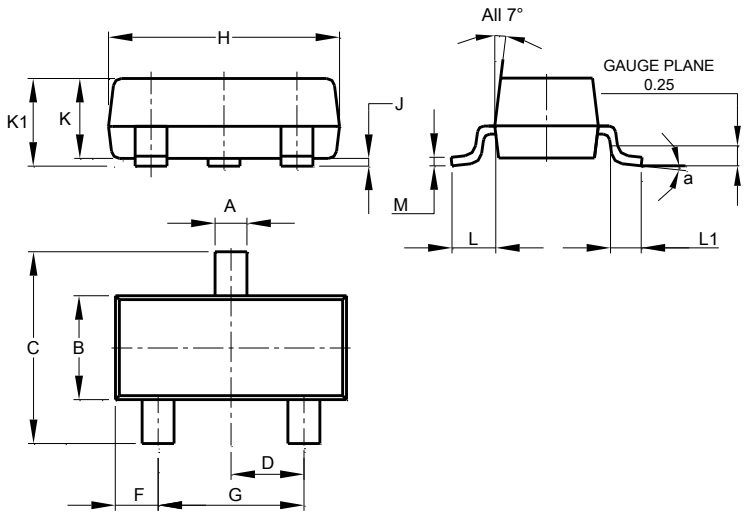


Figure 5. Typical Junction Capacitance

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Package Outline Dimensions

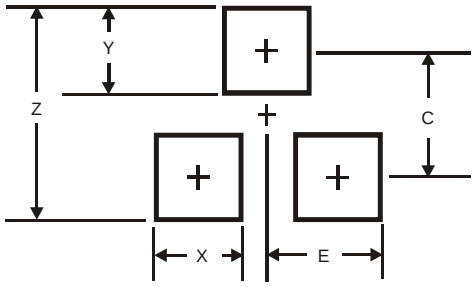
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



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	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	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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