N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

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

Features and Benefits

- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- High Drain-Source Voltage Rating
- **Lead, Halogen and Antimony Free, RoHS Compliant**
- **"Green" Device (Notes 1 and 2)**

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

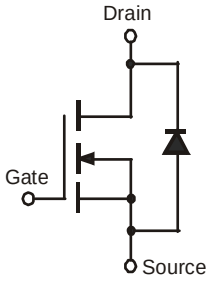
Mechanical Data

- 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
- Terminal Connections: See Diagram
- Weight: 0.008 grams (approximate)

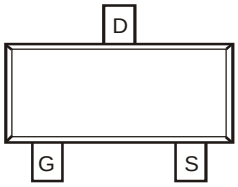
SOT23



Top View



Equivalent Circuit



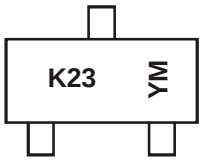
Top View

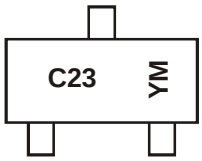
Ordering Information (Note 3)

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. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. No purposely added lead. Halogen and Antimony free.
2. Product manufactured with Date Code V9 (week 33, 2008) and newer are built with Green Molding Compound. Product manufactured prior to Date Code V9 are built with Non-Green Molding Compound and may contain Halogens or Sb_2O_3 Fire Retardants.
3. For packaging details, go to our website at http://www.diodes.com

Marking Information





K = SAT (Shanghai Assembly / Test site)
C = CAT (Chengdu Assembly / Test site)
23 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: T = 2006)
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 4) 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 4)	P_D	300	mW
Thermal Resistance, Junction to Ambient @T_A = 25°C (Note 4)	$R_{\theta JA}$	417	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics @ T_A = 25°C unless otherwise stated

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 5)						
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
		-	-	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 5)						
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						
Input Capacitance	C_{iss}	-	29	60	pF	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	10	15		
Reverse Transfer Capacitance	C_{rss}	-	2	6		
SWITCHING CHARACTERISTICS						
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: 4. Part mounted on FR-4 board with recommended pad layout, which can be found on our website at http://www.diodes.com.
5. Short duration pulse test used to minimize self-heating effect.

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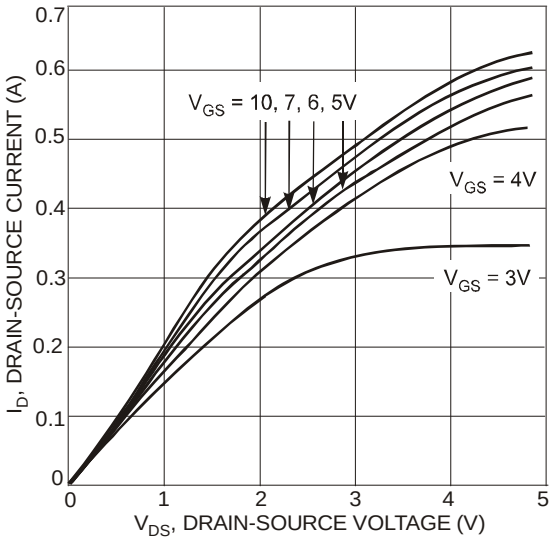


Fig. 1 On-Region Characteristics

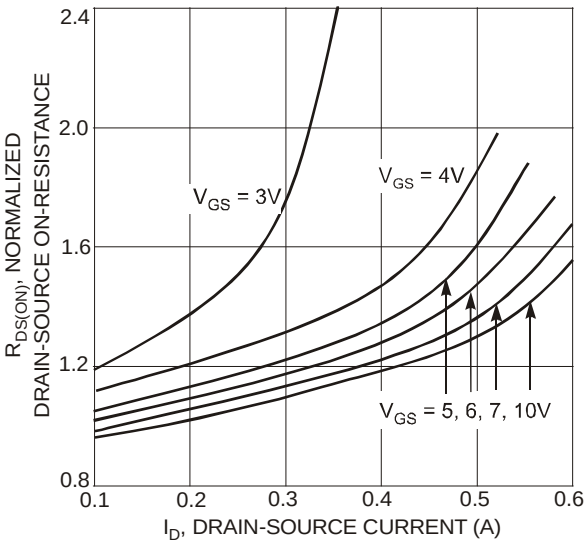


Fig. 2 On-Resistance Variation with Gate Voltage and Drain-Source Current

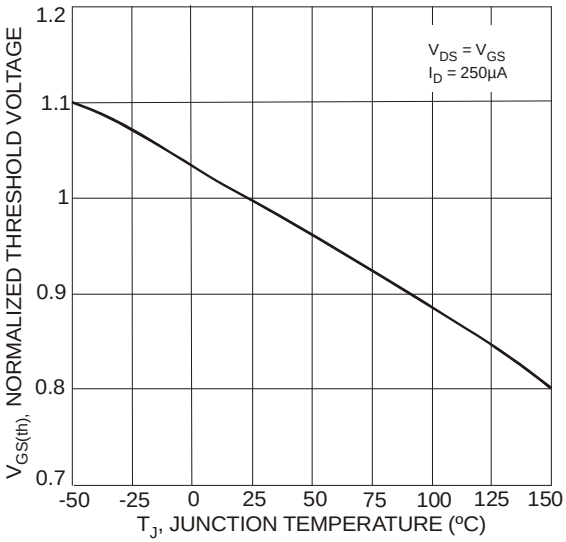


Fig. 3 Gate Threshold Variation with Temperature

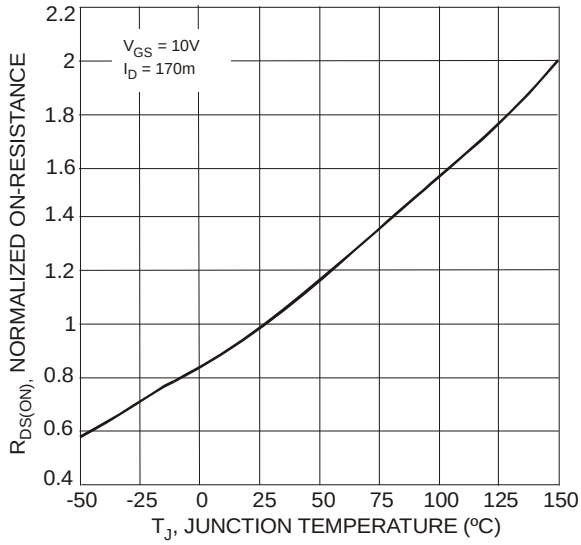


Fig. 4 On-Resistance Variation with Temperature

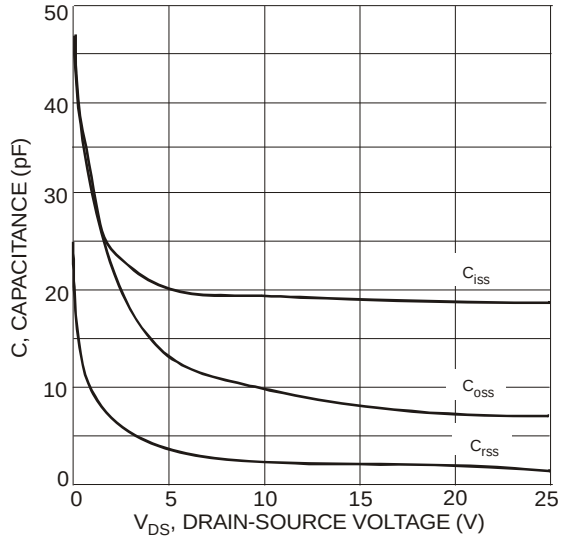
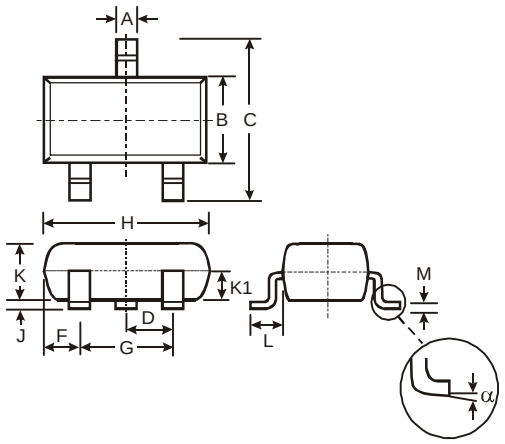


Fig. 5 Typical Capacitance

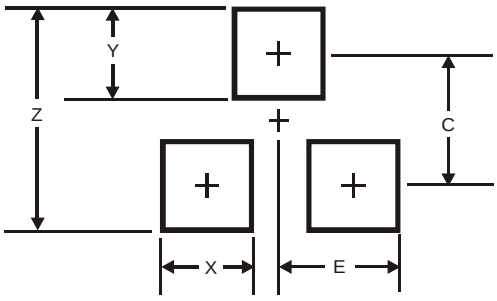
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Package Outline Dimensions



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



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

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