

N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D $T_A = 25^\circ C$
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

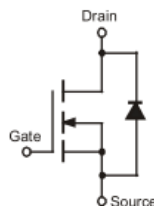
Mechanical Data

- Case: SOT-23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Marking Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.008 grams (approximate)

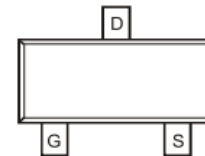
SOT-23



Top View



Equivalent Circuit



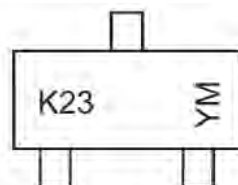
Top View

Ordering Information (Note 3)

Part Number	Qualification	Case	Packaging
BSS123-7-F	Commercial	SOT-23	3000 / Tape & Reel
BSS123Q-7-F	Automotive	SOT-23	3000 / Tape & Reel

- Notes:
1. No purposefully added lead. Halogen and Antimony Free.
 2. Product manufactured with Data 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 $Sb_2 O_3$ Fire Retardants.
 3. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>

Marking Information



K23 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year ex: T = 2006
 M = Month ex: 9 = September

Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	100	V
Drain-Gate Voltage R _{GS} ≤ 20KΩ	V _{DGR}	100	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current (Note 4) V _{GS} = 10V	I _D	170	mA
	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 _{θJA}	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 10	μA nA	V _{DS} = 100V, V _{GS} = 0V 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/datasheets/ap02001.pdf>.
5. Short duration pulse test used to minimize self-heating effect.

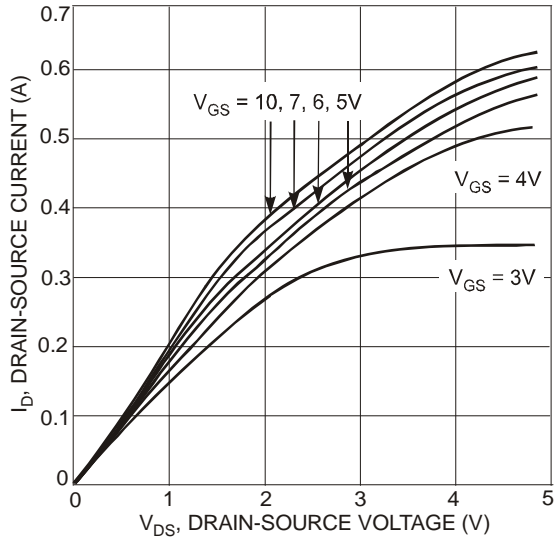


Fig. 1 On-Region Characteristics

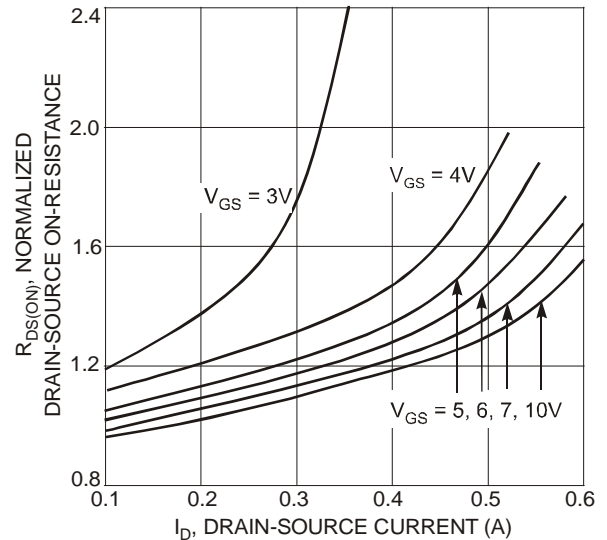


Fig. 2 On-Resistance Variation with Gate Voltage and Drain-Source Current

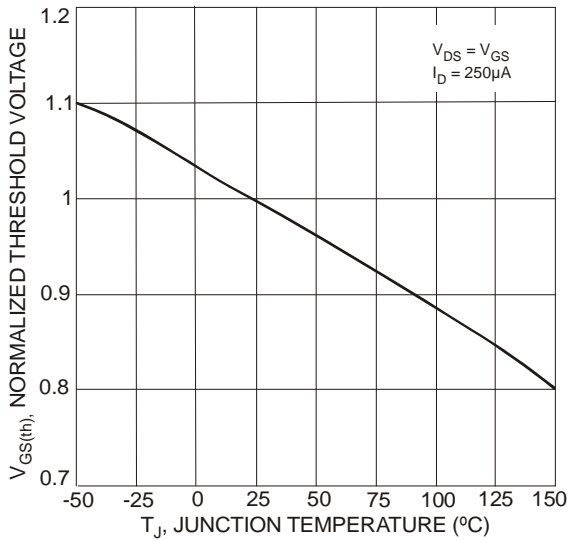


Fig. 3 Gate Threshold Variation with Temperature

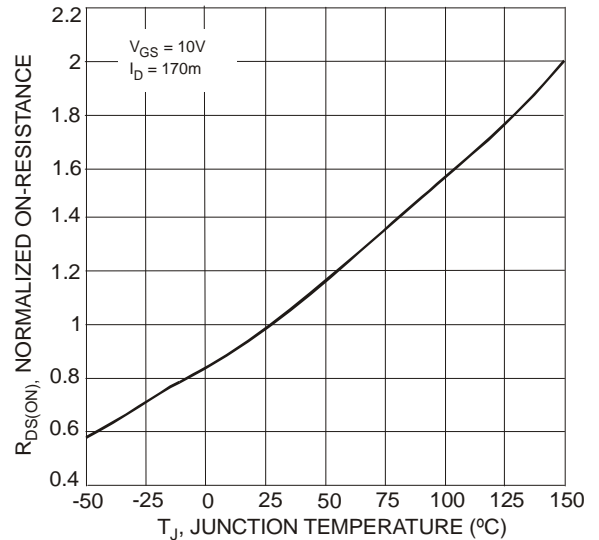


Fig. 4 On-Resistance Variation with Temperature

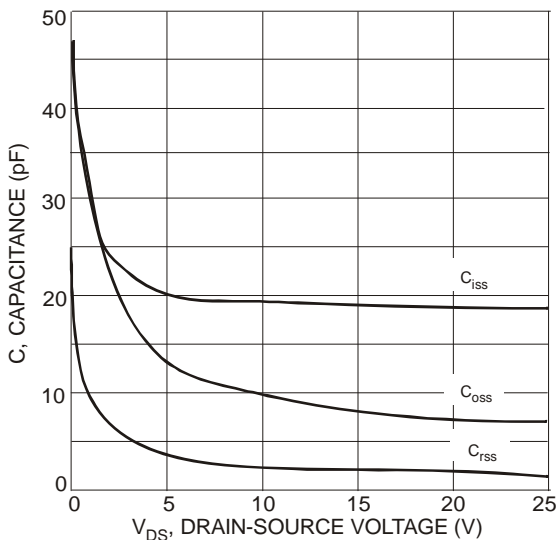
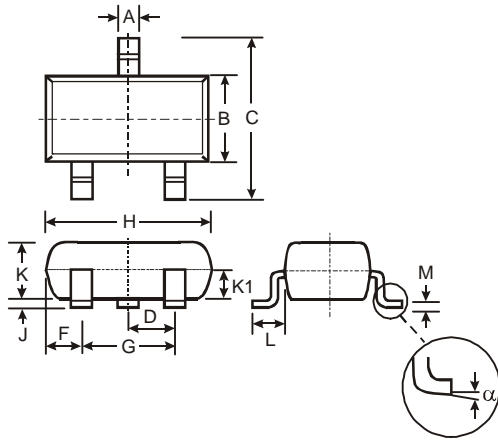


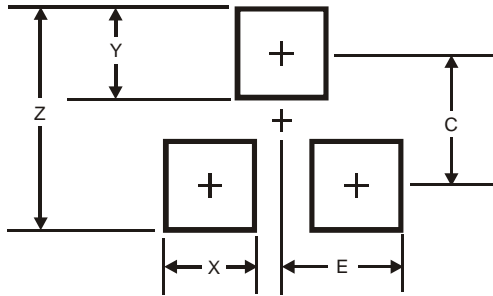
Fig. 5 Typical Capacitance

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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