



### N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

### Features

- 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 2 and 4)

### **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)







Equivalent Circuit

TOP VIEW

## **Maximum Ratings** $@T_A = 25^{\circ}C$ unless otherwise specified

Charact	eristic	Symbol	Value	Units	
Drain-Source Voltage		V <sub>DSS</sub>	100	V	
Drain-Gate Voltage $R_{GS} \le 20 K\Omega$		V <sub>DGR</sub>	100	V	
Gate-Source Voltage	Continuous	V <sub>GSS</sub>	±20	V	
Drain Current (Note 1)	Continuous Pulsed	I <sub>D</sub> I <sub>DM</sub>	170 680	mA	

# Thermal Characteristics @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Units		
Total Power Dissipation (Note 1)	Pd	300	mW		
Thermal Resistance, Junction to Ambient (Note 1)	R <sub>0</sub> JA	417	°C/W		
Operating and Storage Temperature Range	Tj, T <sub>STG</sub>	-55 to +150	°C		

### **Electrical Characteristics** $@T_A = 25^{\circ}C$ unless otherwise specified

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition		
OFF CHARACTERISTICS (Note 3)	- <b>- ,</b>		. 71-					
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	100		_	V	$V_{GS} = 0V, I_D = 250 \mu A$		
Zara Cata Valtaga Drain Current			_	1.0	μA	$V_{DS} = 100V, V_{GS} = 0V$		
Zero Gate Voltage Drain Current	IDSS			10	nA	$V_{DS} = 20V, V_{GS} = 0V$		
Gate-Body Leakage, Forward	I <sub>GSSF</sub>	_		50	nA	$V_{GS} = 20V, V_{DS} = 0V$		
ON CHARACTERISTICS (Note 3)								
Gate Threshold Voltage	V <sub>GS(th)</sub>	0.8	1.4	2.0	V	$V_{DS} = V_{GS}, I_D = 1mA$		
Static Drain-Source On-Resistance	Proven			6.0	Ω	$V_{GS} = 10V, I_D = 0.17A$		
Static Drain-Source On-Resistance	R <sub>DS (ON)</sub>	_	—	10	52	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 0.17A		
Forward Transconductance	<b>g</b> fs	80	370		mS	V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.17A, f = 1.0KHz		
Drain-Source Diode Forward Voltage	V <sub>SD</sub>		0.84	1.3	V	$V_{GS} = 0V, I_{S} = 0.34A$		
DYNAMIC CHARACTERISTICS								
Input Capacitance	Ciss		29	60	pF			
Output Capacitance	C <sub>oss</sub>		10	15	pF	$V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz$		
Reverse Transfer Capacitance	Crss		2	6	pF	1		
SWITCHING CHARACTERISTICS								
Turn-On Rise Time	t <sub>r</sub>			8	ns			
Turn-Off Fall Time	t <sub>f</sub>			16	ns	$V_{DD} = 30V, I_D = 0.28A,$		
Turn-On Delay Time	t <sub>D(ON)</sub>			8	ns	$R_{GEN} = 50\Omega$ , $V_{GS} = 10V$		
Turn-Off Delay Time	t <sub>D(OFF)</sub>			13	ns			

Notes: 1. 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. 2. No purposefully added lead. Halogen and Antimony Free.

3. Short duration pulse test used to minimize self-heating effect.

 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<sub>2</sub>O<sub>3</sub> Fire Retardants.

**BSS123** 



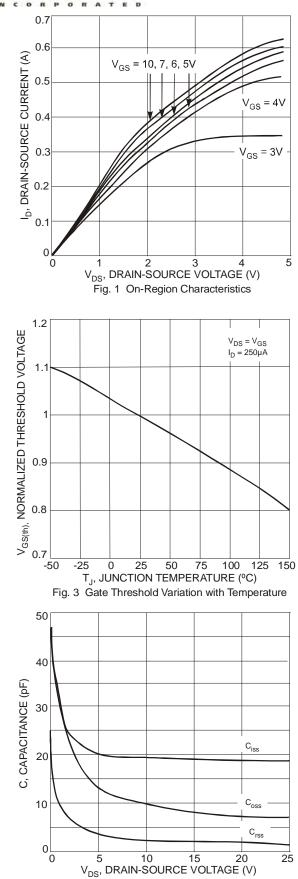
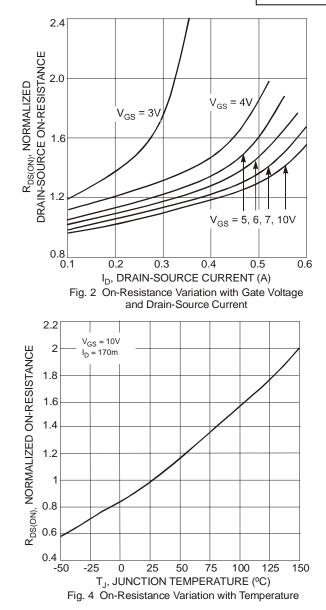


Fig. 5 Typical Capacitance



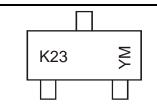


#### Ordering Information (Note 5)

Part Number	Case	Packaging
BSS123-7-F	SOT-23	3000/Tape & Reel

Notes: 5. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

### Marking Information

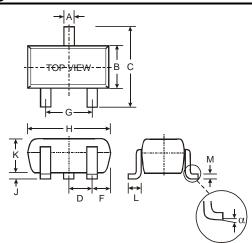


 $\begin{array}{l} \mathsf{K23} = \mathsf{Product} \ \mathsf{Type} \ \mathsf{Marking} \ \mathsf{Code} \\ \mathsf{YM} = \mathsf{Date} \ \mathsf{Code} \ \mathsf{Marking} \\ \mathsf{Y} = \mathsf{Year} \ \mathsf{ex:} \ \mathsf{T} = 2006 \\ \mathsf{M} = \mathsf{Month} \ \mathsf{ex:} \ \mathsf{9} = \mathsf{September} \end{array}$ 

Date Code Key

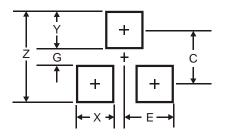
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Year	200	6	2007		2008	20	09	2010		2011	2	2012
Code	Т		U		V	V	N	Х		Y		Z
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	0	Ν	D

## **Package Outline Dimensions**



SOT-23						
Dim	Dim Min Max					
Α	0.37	0.51				
в	1.20	1.40				
C	2.30	2.50				
D	0.89	1.03				
F	0.45	0.60				
G	1.78	2.05				
Н	2.80	3.00				
J	0.013	0.10				
K	0.903	1.10				
L	0.45	0.61				
М	0.085	0.180				
α	0°	8°				
All Dir	All Dimensions in mm					

## Suggested Pad Layout



Dimensions	Value (in mm)
Z	3.4
G	0.7
Х	0.9
Y	1.4
С	2.0
E	0.9

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