



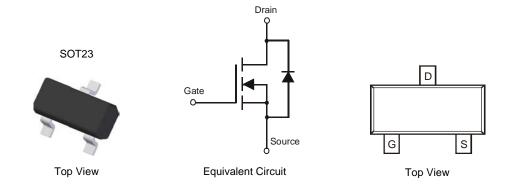
### N-CHANNEL ENHANCEMENT MODE MOSFET

### **Features**

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Notes 3 & 4)
- Qualified to AEC-Q101 Standards for High Reliability

### **Mechanical Data**

- Case: SOT23
- Case Material: Molded Plastic. 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 208
- Weight: 0.008 grams (approximate)



#### Ordering Information (Note 5)

Part Number	Case	Packaging
BS870-7-F	SOT23	3000/Tape & Reel

No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
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.

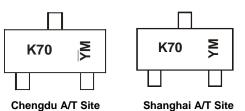
Notes:

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

5. For packaging details, go to our website at http://www.diodes.com/products/packages.html

## **Marking Information**



K70 = Product Type Marking Code YM = Date Code Marking for SAT (Shanghai Assembly/ Test site)  $\overline{YM}$  = Date Code Marking for CAT (Chengdu Assembly/ Test site) Y or  $\overline{Y}$  = Year (ex: A = 2013) M = Month (ex: 9 = September)

Date Code Key

Code	J	K	L	M	N	Р	R		Y		A	в	С		E
Month	Jan	Fe	b I	Mar	Apr	Мау	Ju	n	Jul	Aug	Sep	Oc	t I	Nov	Dec



# Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Drain-Source Voltage		V <sub>DSS</sub>	60	V
Drain-Gate Voltage $R_{GS} \le 1.0M\Omega$		V <sub>DGR</sub>	60	V
Gate-Source Voltage	Continuous	V <sub>GSS</sub>	±20	V
Drain Current (Note 6)	Continuous	I <sub>D</sub>	250	mA

# Thermal Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

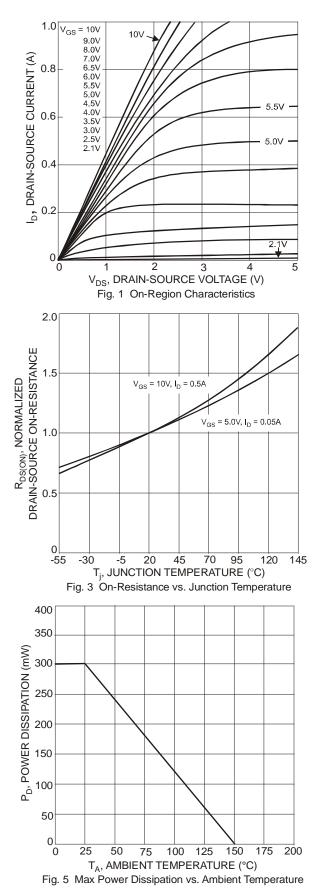
Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 6)	PD	300	mW
Thermal Resistance, Junction to Ambient	$R_{ ext{ heta}JA}$	417	°C/W
Operating and Storage Temperature Range	TJ, T <sub>STG</sub>	-55 to +150	۵°

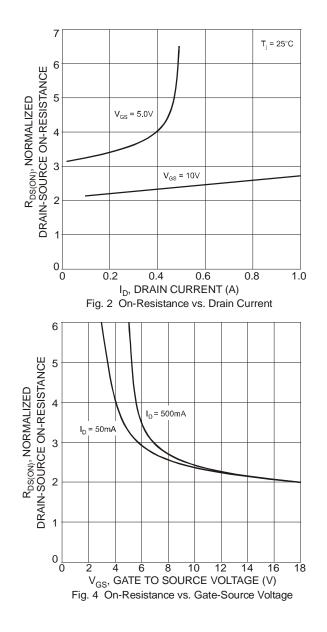
# Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	60	80		V	$V_{GS} = 0V, I_D = 100 \mu A$
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	_	_	0.5	μA	$V_{DS} = 25V, V_{GS} = 0V$
Gate-Body Leakage	I <sub>GSS</sub>	_		±10	nA	$V_{GS} = \pm 15V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.0	2.0	3.0	V	$V_{DS} = V_{GS}, I_D = 250 \mu A$
Static Drain-Source On-Resistance	R <sub>DS (ON)</sub>	_	3.5	5.0	Ω	$V_{GS} = 10V, I_D = 0.2A$
On-State Drain Current	I <sub>D(ON)</sub>	0.5	1.0	_	A	$V_{GS} = 10V, V_{DS} = 7.5V$
Forward Transconductance	<b>g</b> fs	80		_	mS	$V_{DS} = 10V, I_D = 0.2A$
DYNAMIC CHARACTERISTICS						
Input Capacitance	C <sub>iss</sub>	_	22	50	pF	
Output Capacitance	Coss	_	11	25	pF	$V_{DS} = 10V, V_{GS} = 0V$ f = 1.0MHz
Reverse Transfer Capacitance	C <sub>rss</sub>	_	2.0	5.0	pF	
SWITCHING CHARACTERISTICS	· · ·			•	-	-
Turn-On Delay Time	t <sub>D(ON)</sub>	_	2.0	20	ns	$V_{ES} = 10V, R_L = 150\Omega,$
Turn-Off Delay Time	t <sub>D(OFF)</sub>	_	5.0	20	ns	$V_{DS} = 10V, R_D = 100\Omega$

Notes: 6. Device mounted on FR-4 PCB 1.0 x 0.75 x 0.062 inch pad layout as shown on Diodes, Inc. suggested pad layout AP02001, which can be found on our website at http://www.diodes.com. 7. Short duration pulse test used to minimize self-heating effect.



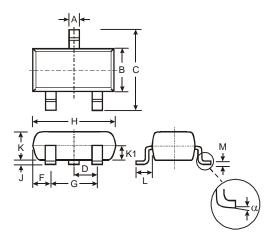






# **Package Outline Dimensions**

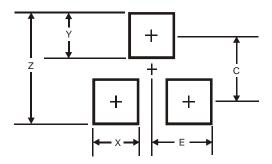
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SOT23						
Dim	Min	Max	Тур			
Α	0.37	0.51	0.40			
в	1.20	1.40	1.30			
С	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			
Н	2.80	3.00	2.90			
J	0.013	0.10	0.05			
κ	0.903	1.10	1.00			
K1	K1 -		0.400			
L	0.45	0.61	0.55			
М	0.085	0.18	0.11			
α	0°	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
Х	0.8
Y	0.9
С	2.0
Е	1.35



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**BS870**