

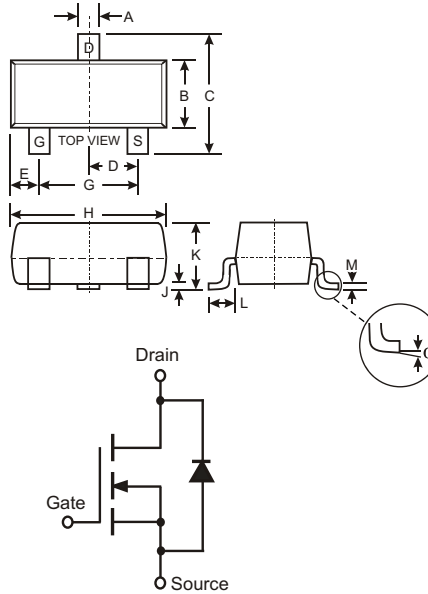
## N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

### Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Lead Free/RoHS Compliant (Note 2)**

### Mechanical Data

- Case: SOT-23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminal Connections: See Diagram
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Marking (See Page 2): K70
- Ordering & Date Code Information: See Page 2
- Weight: 0.008 grams (approximate)



SOT-23		
Dim	Min	Max
A	0.37	0.51
B	1.20	1.40
C	2.30	2.50
D	0.89	1.03
E	0.45	0.60
G	1.78	2.05
H	2.80	3.00
J	0.013	0.10
K	0.903	1.10
L	0.45	0.61
M	0.085	0.180
	0	8
<b>All Dimensions in mm</b>		

### Maximum Ratings @ T<sub>A</sub> = 25 C unless otherwise specified

Characteristic	Symbol	BS870	Units
Drain-Source Voltage	V <sub>DSS</sub>	60	V
Drain-Gate Voltage R <sub>GS</sub> 1.0M	V <sub>DGR</sub>	60	V
Gate-Source Voltage	V <sub>GSS</sub>	20	V
Drain Current (Note 1)	I <sub>D</sub>	250	mA
Total Power Dissipation (Note 1)	P <sub>d</sub>	300	mW
Thermal Resistance, Junction to Ambient	R <sub>JA</sub>	417	K/W
Operating and Storage Temperature Range	T <sub>j</sub> , T <sub>STG</sub>	-55 to +150	C

- Note: 1. Device mounted on FR-5 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/datasheets/ap02001.pdf>.
2. No purposefully added lead.

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

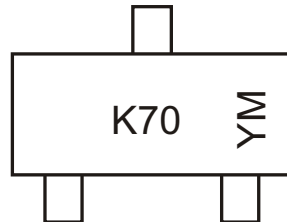
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 3)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	60	80		V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 100 A
Zero Gate Voltage Drain Current	I <sub>DSS</sub>			0.5	μA	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V
Gate-Body Leakage	I <sub>GSS</sub>			10	nA	V <sub>GS</sub> = 15V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 3)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.0	2.0	3.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 A
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>		3.5	5.0		V <sub>GS</sub> = 10V, I <sub>D</sub> = 0.2A
On-State Drain Current	I <sub>D(ON)</sub>		1.0	0.5	A	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 7.5V
Forward Transconductance	g <sub>FS</sub>	80			mS	V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.2A
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	C <sub>iSS</sub>		22	50	pF	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oSS</sub>		11	25	pF	
Reverse Transfer Capacitance	C <sub>rSS</sub>		2.0	5.0	pF	
<b>SWITCHING CHARACTERISTICS</b>						
Turn-On Delay Time	t <sub>D(ON)</sub>		2.0	20	ns	V <sub>ES</sub> = 10V, R <sub>L</sub> = 150 Ω V <sub>DS</sub> = 10V, R <sub>D</sub> = 100 Ω
Turn-Off Delay Time	t <sub>D(OFF)</sub>		5.0	20	ns	

## Ordering Information (Note 4)

Device	Packaging	Shipping
BS870-7-F	SOT-23	3000/Tape & Reel

- Notes: 3. Short duration test pulse used to minimize self-heating effect.  
4. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

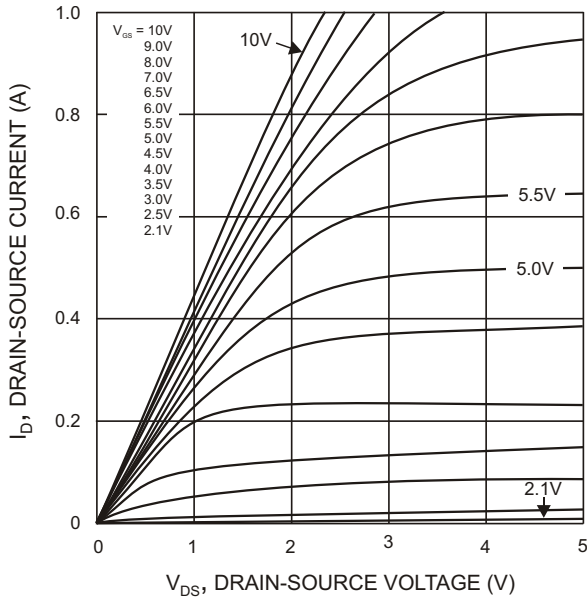
## Marking Information



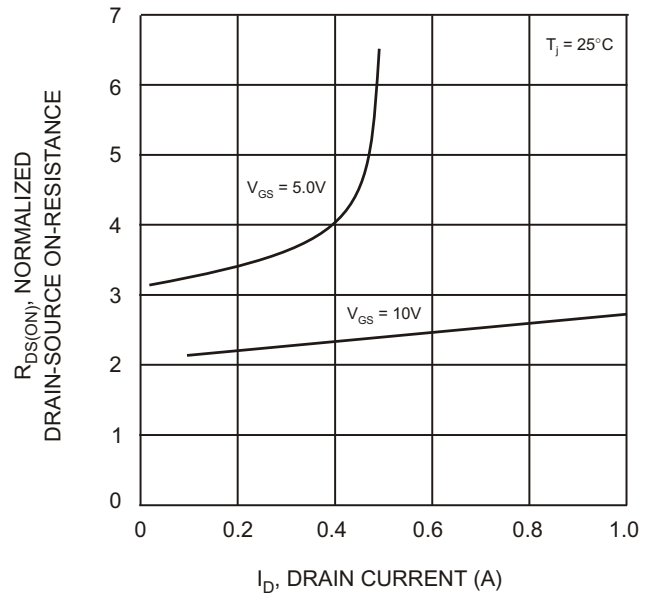
K70 = Product Type Marking Code  
YM = Date Code Marking  
Y = Year ex: N = 2002  
M = Month ex: 9 = September

### Date Code Key

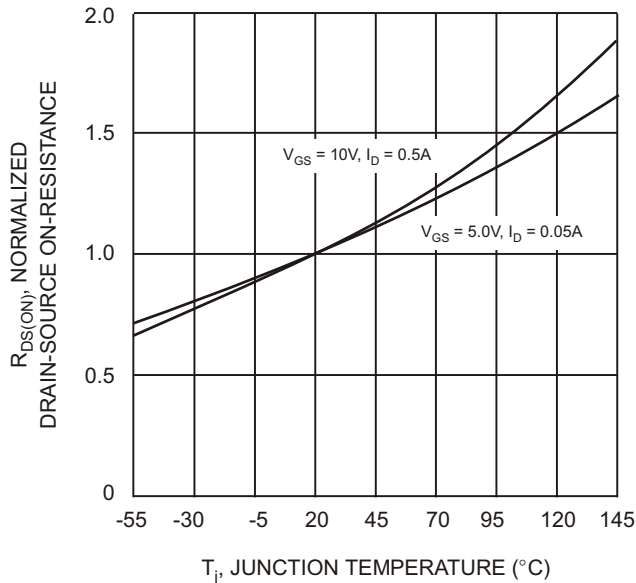
<b>Year</b>	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>Code</b>	J	K	L	M	N	P	R	S	T	U	V	W
<b>Month</b>	Jan	Feb	March	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Code</b>	1	2	3	4	5	6	7	8	9	O	N	D



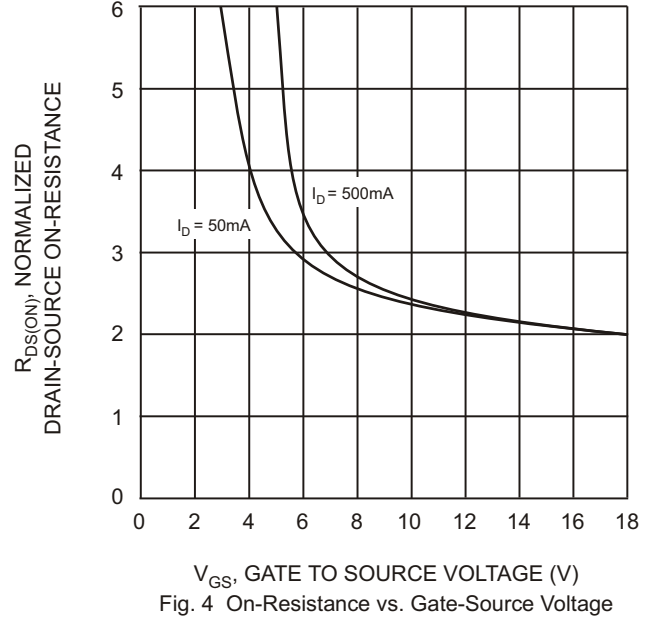
$V_{DS}$ , DRAIN-SOURCE VOLTAGE (V)  
Fig. 1 On-Region Characteristics



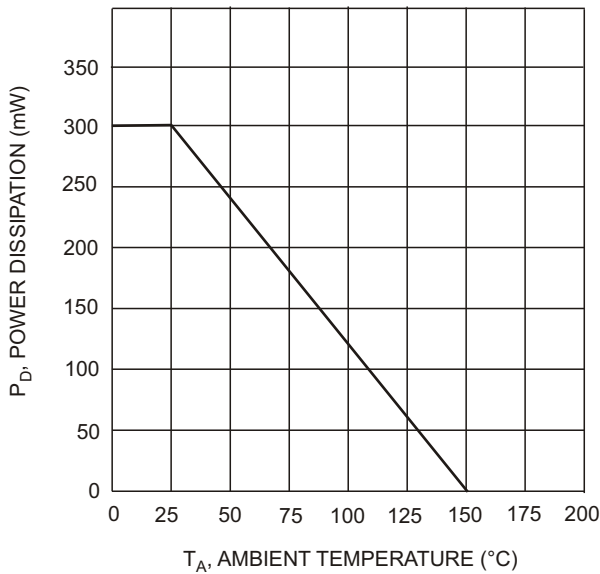
$I_D$ , DRAIN CURRENT (A)  
Fig. 2 On-Resistance vs Drain Current



$T_J$ , JUNCTION TEMPERATURE ( $^\circ C$ )  
Fig. 3 On-Resistance vs Junction Temperature



$V_{GS}$ , GATE TO SOURCE VOLTAGE (V)  
Fig. 4 On-Resistance vs. Gate-Source Voltage



$T_A$ , AMBIENT TEMPERATURE ( $^\circ C$ )  
Fig. 5, Max Power Dissipation vs Ambient Temperature

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