

#### 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
- Ultra-Small Surface Mount Package
- Lead Free/RoHS Compliant (Note 2)

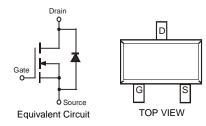
### **Mechanical Data**

- Case: SOT-323
- Case Material: Molded Plastic, "Green" Molding Compound, Note 4. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Finish Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Marking Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.006 grams (approximate)

SOT-323







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

Characterist	tic	Symbol	Value	Unit
Drain-Source Voltage		$V_{DSS}$	60	V
Drain-Gate Voltage R <sub>GS</sub> ≤ 1.0MΩ		$V_{DGR}$	60	V
Gain-Source Voltage	Continuous Pulsed	$V_{GSS}$	±20 ±40	V
Drain Current (Note 1)	Continuous Continuous @ 100°C Pulsed	I <sub>D</sub>	115 73 800	mA

## Thermal Characteristics @TA = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 1)	D	200	mW
Derating above T <sub>A</sub> = 25°C	$P_{D}$	1.60	mW
Thermal Resistance, Junction to Ambient	$R_{ hetaJA}$	625	°C /W
Operating and Storage Temperature Range	$T_J$ , $T_{STG}$	-55 to +150	°C

Notes:

- 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/datasheets/ap02001.pdf.

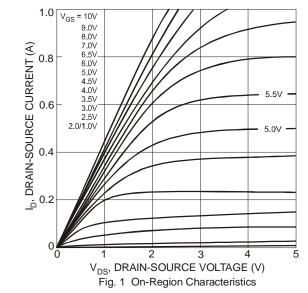
  2. No purposefully added lead.

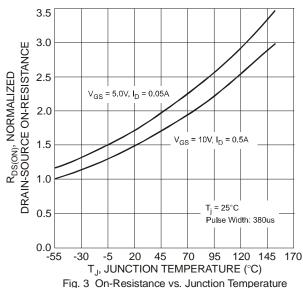


# **Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic		Symbol	Min	Тур	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 3)							
Drain-Source Breakdown Voltage		BV <sub>DSS</sub>	60	70	_	V	$V_{GS} = 0V, I_{D} = 10\mu A$
Zero Gate Voltage Drain Current @ T <sub>C</sub>	= 25°C	Inno			1.0	μА	$V_{DS} = 60V, V_{GS} = 0V$
@ T <sub>C</sub> = 125°C		I <sub>DSS</sub>			500	μΛ	VDS = 00 V, VGS = 0 V
Gate-Body Leakage		IGSS	_		±10	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 3)		•					•
Gate Threshold Voltage		V <sub>GS(th)</sub>	1.0	_	2.0	V	$V_{DS} = V_{GS}$ , $I_D = 250\mu A$
Static Drain-Source On-Resistance @ TJ	@ $T_J = 25^{\circ}C$			1.8	7.5	Ω	$V_{GS} = 5.0V, I_D = 0.05A$
@ T <sub>j</sub> = 125°C		R <sub>DS(ON)</sub>		2.6	13.5		$V_{GS} = 10V, I_D = 0.5A$
On-State Drain Current		I <sub>D(ON)</sub>	0.5	1.0		Α	$V_{GS} = 10V, V_{DS} = 7.5V$
Forward Transconductance		g <sub>FS</sub>	80	_		mS	$V_{DS} = 10V, I_D = 0.2A$
DYNAMIC CHARACTERISTICS				a.			
Input Capacitance		C <sub>iss</sub>	_	22	50	pF	V 25V V 0V
Output Capacitance		Coss	_	11	25	pF	$V_{DS} = 25V, V_{GS} = 0V$ f = 1.0MHz
Reverse Transfer Capacitance		C <sub>rss</sub>	_	2.0	5.0	pF	1 = 1.00012
SWITCHING CHARACTERISTICS			,				
Turn-On Delay Time		t <sub>D(ON)</sub>	_	7.0	20	ns	$V_{DD} = 30V, I_D = 0.2A,$
Turn-Off Delay Time		t <sub>D(OFF)</sub>	_	11	20	ns	$R_L = 150\Omega$ , $V_{GEN} = 10V$ , $R_{GEN} = 25\Omega$

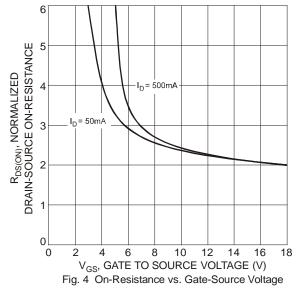
Notes: 3. Short duration pulse test used to minimize self-heating effect.





 $T_j = 25^{\circ}C$ DRAIN-SOURCE ON-RESISTANCE R<sub>DS(ON)</sub>, NORMALIZED V<sub>GS</sub> = 5.0V V<sub>GS</sub> = 10V 0 0 0.2 0.4 0.6 8.0 1.0 I<sub>D</sub>, DRAIN CURRENT (A)

Fig. 2 On-Resistance vs. Drain Current



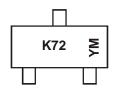


### Ordering Information (Notes 4)

Part Number	Case	Packaging
2N7002W-7-F	SOT-323	3000/Tape & Reel

Notes: 4. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

### **Marking Information**



K72 = Product Type Marking Code

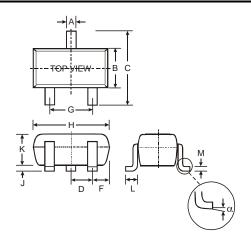
YM = Date Code Marking Y = Year ex: N = 2002

M = Month ex: 9 = September

Date Code Key

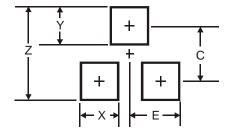
Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Code	J	K	L	М	N	Р	R	S	Т	U	V	W	Х	Υ	Z
Month	Jan	Fel	b	Mar	Apr	May	Ju	n	Jul	Aug	Sep	Ос	t	Nov	Dec
Code	1	2		3	4	5	6		7	8	9	0		N	D

# **Package Outline Dimensions**



SOT-323					
Dim	Min	Max			
Α	0.25	0.40			
В	1.15	1.35			
С	2.00	2.20			
D	0.65 N	ominal			
F	0.30	0.40			
G	1.20	1.40			
Н	1.80	2.20			
J	0.0	0.10			
K	0.90	1.00			
L	0.25	0.40			
M	0.10	0.18			
α	0°	8°			
All Dimensions in mm					

# **Suggested Pad Layout**



Dimensions	Value (in mm)
Z	2.8
Х	0.7
Y	0.9
С	1.9
E	1.0

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