N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

Features

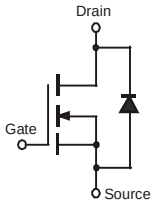
- Low-On Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- **Lead Free/RoHS Compliant (Note 2)**

Mechanical Data

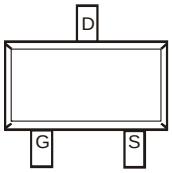
- Case: SOT-323
- Case Material: Molded Plastic, "Green" Molding Compound, Note 4. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Finish - Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: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

SOT-323

TOP VIEW



Equivalent Circuit



TOP VIEW

Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	60	V
Drain-Gate Voltage $R_{GS} \leq 1.0M\Omega$	V_{DGR}	60	V
Gain-Source Voltage — Continuous Pulsed	V_{GSS}	±20 ±40	V
Drain Current (Note 1) — Continuous Continuous @ 100°C Pulsed	I_D	115 73 800	mA

Thermal Characteristics @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 1) Derating above T_A = 25°C	P_D	200 1.60	mW mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	625	°C /W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes:
1. 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_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 3)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	70	—	V	V_{GS} = 0V, I_D = 10μA
Zero Gate Voltage Drain Current @ T_C = 25°C @ T_C = 125°C	I_{DSS}	—	—	1.0 500	μA	V_{DS} = 60V, V_{GS} = 0V
Gate-Body Leakage	I_{GSS}	—	—	±10	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	—	2.0	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance @ T_J = 25°C @ T_j = 125°C	$R_{DS(ON)}$	—	1.8 2.6	7.5 13.5	Ω	V_{GS} = 5.0V, I_D = 0.05A V_{GS} = 10V, I_D = 0.5A
On-State Drain Current	$I_{D(ON)}$	0.5	1.0	—	A	V_{GS} = 10V, V_{DS} = 7.5V
Forward Transconductance	g_{FS}	80	—	—	mS	V_{DS} = 10V, I_D = 0.2A
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{iss}	—	22	50	pF	V_{DS} = 25V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	11	25	pF	
Reverse Transfer Capacitance	C_{rss}	—	2.0	5.0	pF	
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{D(ON)}$	—	7.0	20	ns	V_{DD} = 30V, I_D = 0.2A, R_L = 150Ω, V_{GEN} = 10V, R_{GEN} = 25Ω
Turn-Off Delay Time	$t_{D(OFF)}$	—	11	20	ns	

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

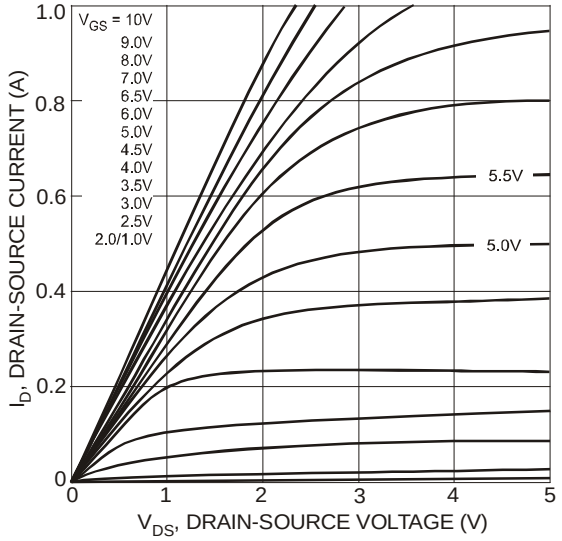


Fig. 1 On-Region Characteristics

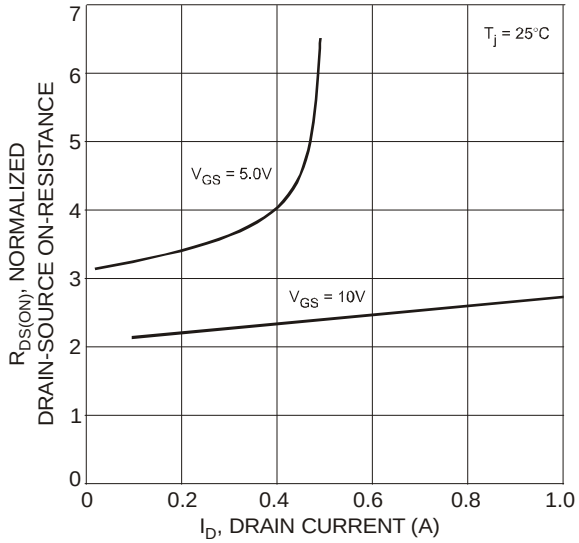


Fig. 2 On-Resistance vs. Drain Current

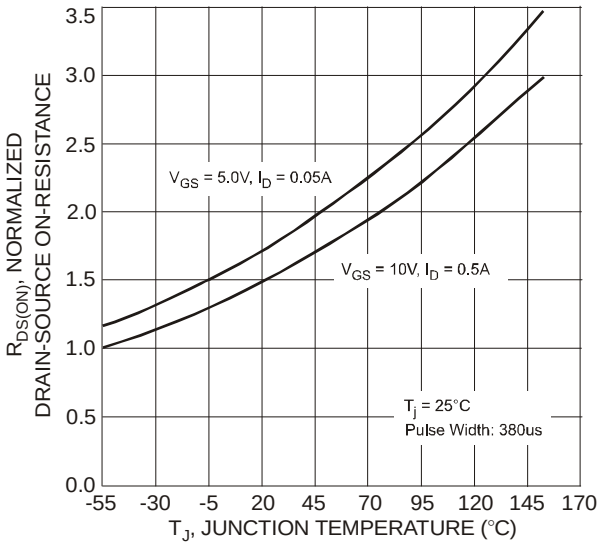


Fig. 3 On-Resistance vs. Junction Temperature

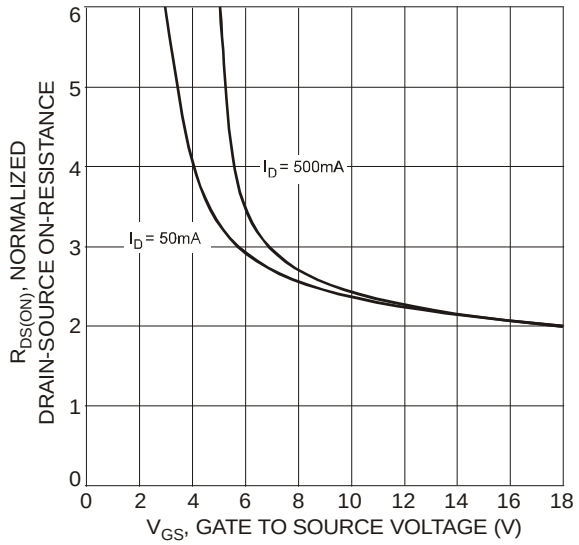


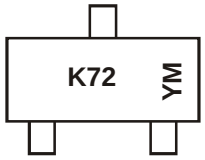
Fig. 4 On-Resistance vs. Gate-Source Voltage

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



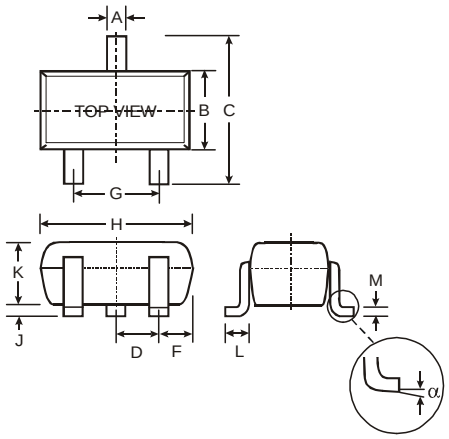
K72 = Product Type Marking Code
YM = Date Code Marking
Y = Year ex: N = 2002
M = Month ex: 9 = September

Date Code Key

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Code	J	K	L	M	N	P	R	S	T	U	V	W	X	Y	Z

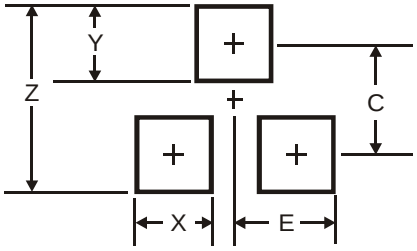
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Package Outline Dimensions



SOT-323		
Dim	Min	Max
A	0.25	0.40
B	1.15	1.35
C	2.00	2.20
D	0.65 Nominal	
F	0.30	0.40
G	1.20	1.40
H	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
X	0.7
Y	0.9
C	1.9
E	1.0