

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)} \text{ max}$	$I_D \text{ max}$ $T_A = 25^\circ\text{C}$
60V	$7.5\Omega @ V_{GS} = 5V$	0.23A

Description

This MOSFET has been designed to minimize the on-state resistance ($R_{DS(on)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

- Motor control
- Power Management Functions

SOT363



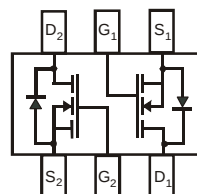
Top View

Features

- Dual N-Channel MOSFET
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface Mount Package
- 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: SOT363
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish annealed over Alloy 42 leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208 
- Terminal Connections: See Diagram
- Weight: 0.006 grams (approximate)



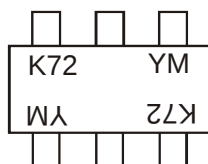
Top View
Internal Schematic

Ordering Information (Note 5)

Part Number	Qualification	Case	Packaging
2N7002DW-7-F	Commercial	SOT363	3,000/Tape & Reel
2N7002DWQ-7-F	Automotive	SOT363	3,000/Tape & Reel
2N7002DW-13-F	Commercial	SOT363	10,000/Tape & Reel
2N7002DWQ-13-F	Automotive	SOT363	10,000/Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 - See <http://www.diodes.com> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - Product manufactured with Date Code UO (week 40, 2007) and newer are built with Green Molding Compound. Product manufactured prior to Date Code UO are built with Non-Green Molding Compound and may contain Halogens or Sb_2O_3 Fire Retardants.
 - For packaging details, go to our website at <http://www.diodes.com>.

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	...	2011	2012	2013	2014	2015	2016	2017
Code	J	K	L	M	N	P	R	...	Y	Z	A	B	C	D	E

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

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DSS}	60	V
Drain-Gate Voltage R _{GS} ≤ 1.0MΩ			V _{DGR}	60	V
Gate-Source Voltage	Continuous		V _{GSS}	±20	V
	Pulsed		V _{GSS}	±40	V
Continuous Drain Current (Note 7) V _{GS} = 5V	Steady State	T _A = +25°C	I _D	0.23	A
		T _A = +70°C		0.18	
		T _A = +100°C		0.14	
Maximum Continuous Body Diode Forward Current (Note 7)			I _S	0.53	A
Pulsed Drain Current (10μs pulse, duty cycle = 1%)			I _{DM}	0.8	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	0.31	W
	T _A = +70°C		0.2	
	T _A = +100°C		0.12	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	R _{θJA}	410	°C/W
Total Power Dissipation (Note 7)	T _A = +25°C	P _D	0.4	W
	T _A = +70°C		0.25	
	T _A = +100°C		0.15	
Thermal Resistance, Junction to Ambient (Note 7)	Steady state	R _{θJA}	318	°C/W
Thermal Resistance, Junction to Case (Note 7)	Steady state	R _{θJC}	135	°C/W
Operating and Storage Temperature Range		T _J T _{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
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 8)						
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)}	—	3.2 4.4	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
Diode Forward Voltage	V _{SD}	—	0.78	1.5	V	V _{GS} = 0V, I _S = 115mA
DYNAMIC CHARACTERISTICS (Note 9)						
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 (Note 9)						
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)}	—	11.0	20		

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout
 - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

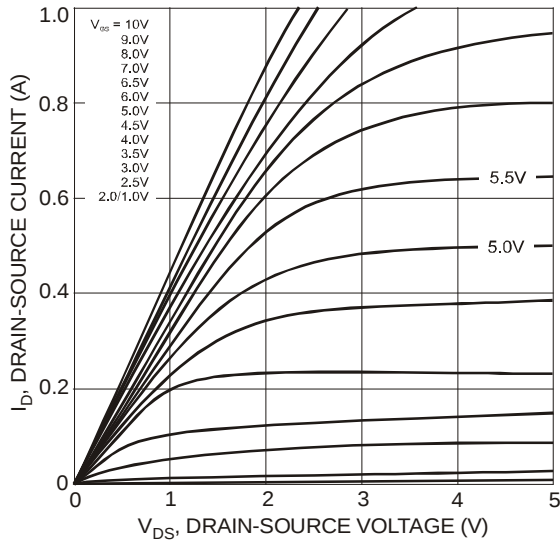


Fig. 1 On-Region Characteristics

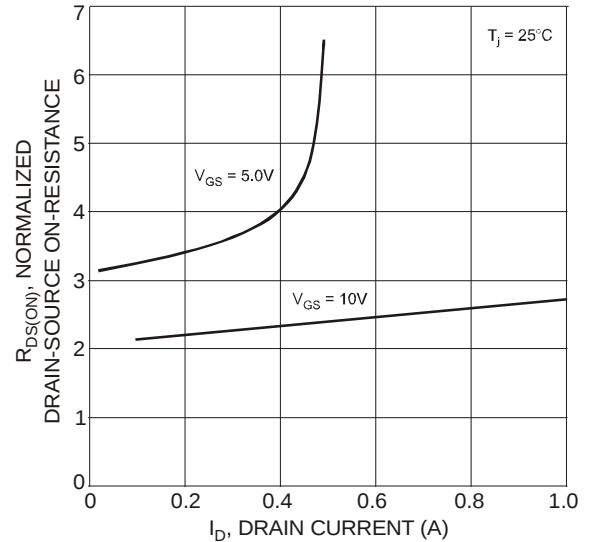


Fig. 2 On-Resistance vs. Drain Current

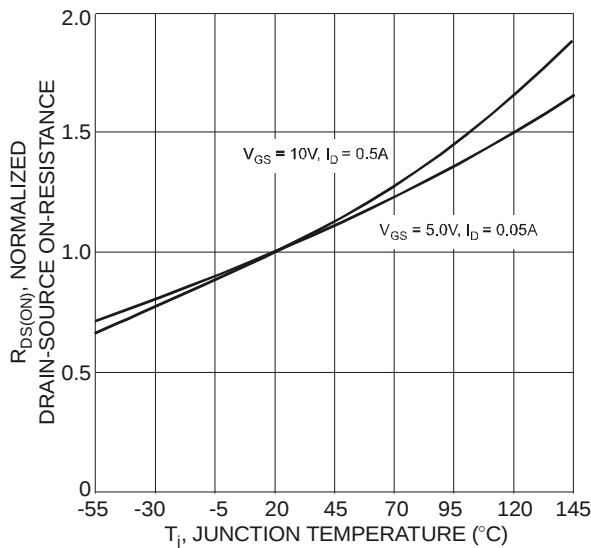


Fig. 3 On-Resistance vs. Junction Temperature

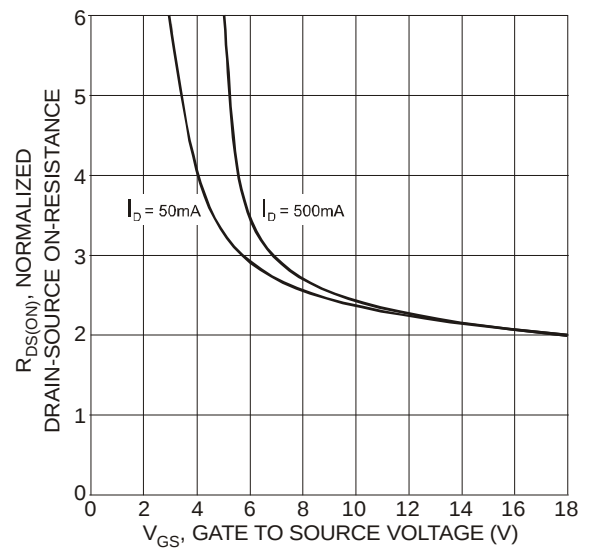
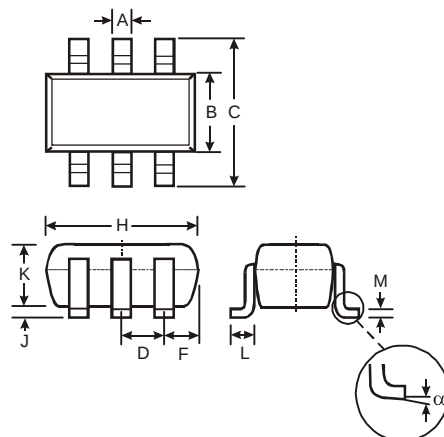


Fig. 4 On-Resistance vs. Gate-Source Voltage

Package Outline Dimensions

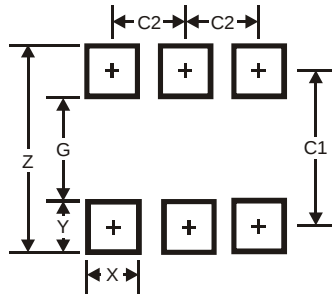
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT363		
Dim	Min	Max
A	0.10	0.30
B	1.15	1.35
C	2.00	2.20
D	0.65 Typ	
F	0.40	0.45
H	1.80	2.20
J	0	0.10
K	0.90	1.00
L	0.25	0.40
M	0.10	0.22
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	2.5
G	1.3
X	0.42
Y	0.6
C1	1.9
C2	0.65

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«Трейд Электроникс»

Шишлаков Евгений

8 (495)668-30-28 доб 169

manager28@tradeelectronics.ru

<http://www.tradeelectronics.ru/>