

Product Summary

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

Description and Applications

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.

- Motor control
- Power Management Functions

SOT363



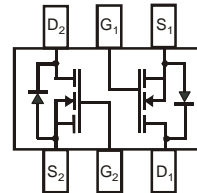
Top View

Features and Benefits

- 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 (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2 and 3)**
- **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)



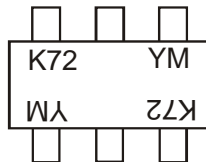
Top View
Internal Schematic

Ordering Information (Note 4)

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

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. Halogen and Antimony free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 3. 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.
 4. 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
	Pulsed	V _{GSS}	±40
Continuous Drain Current (Note 6) V _{GS} = 5V	Steady State	T _A = 25°C	0.23
		T _A = 70°C	0.18
		T _A = 100°C	0.14
Maximum Continuous Body Diode Forward Current (Note 6)	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 5)	P _D	T _A = 25°C	0.31
		T _A = 70°C	0.2
		T _A = 100°C	0.12
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	R _{θJA}	410
Total Power Dissipation (Note 6)	P _D	T _A = 25°C	0.4
		T _A = 70°C	0.25
		T _A = 100°C	0.15
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	R _{θJA}	318
Thermal Resistance, Junction to Case (Note 6)	Steady state	R _{θJC}	135
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 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	60	70	—	V	V _{GS} = 0V, I _D = 10μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1.0	μA	@ T _C = 25°C V _{DS} = 60V, V _{GS} = 0V
Gate-Body Leakage	I _{GSS}	—	—	±10	nA	@ T _C = 125°C V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(th)}	1.0	—	2.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	3.2	7.5	Ω	@ T _J = 25°C V _{GS} = 5.0V, I _D = 0.05A
			4.4	13.5		@ T _J = 125°C 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 8)						
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 8)						
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.

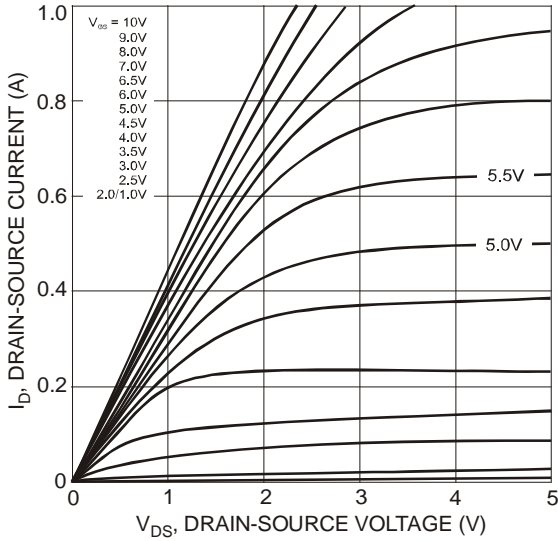


Fig. 1 On-Region Characteristics

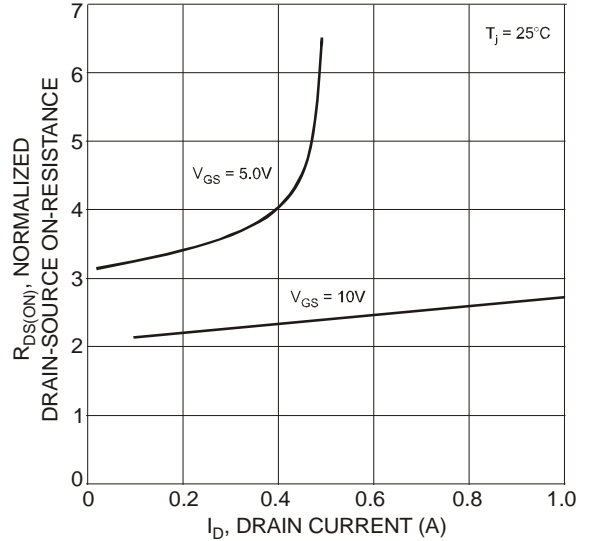


Fig. 2 On-Resistance vs. Drain Current

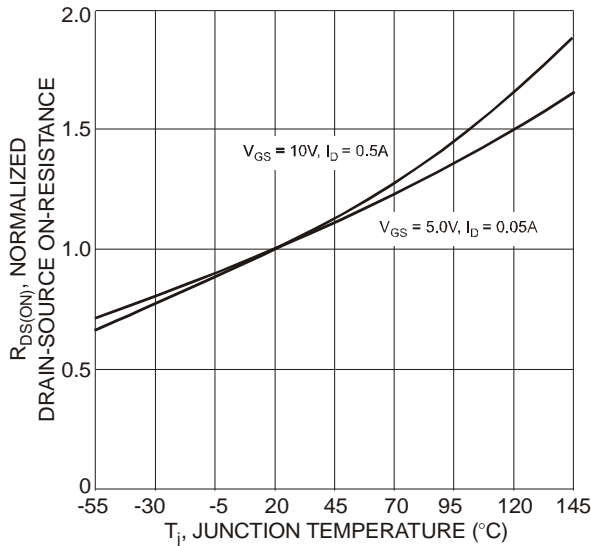


Fig. 3 On-Resistance vs. Junction Temperature

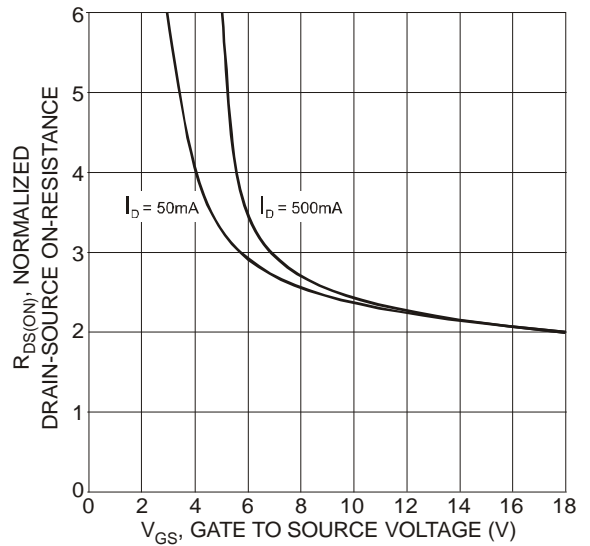
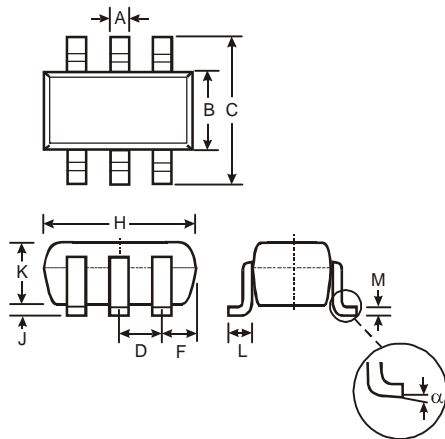


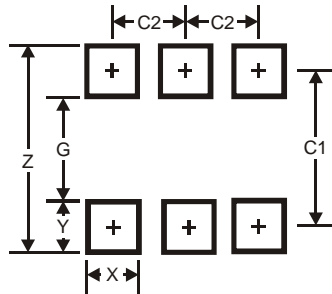
Fig. 4 On-Resistance vs. Gate-Source Voltage

Package Outline Dimensions



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



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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