



2N7002DW

DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
60V	7.5Ω @ $V_{GS} = 5V$	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



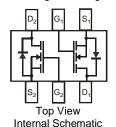
Top View

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 (Note 3)
- The 2N7002DWQ is suitable for automotive applications requiring specific change control; it is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.
- https://www.diodes.com/quality/product-definitions/

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 @3
- Terminal Connections: See Diagram
- Weight: 0.006 grams (Approximate)



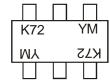
Ordering Information (Notes 4 and 5)

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

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
- 2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
- 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
- 4. 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 Sb₂O₃ Fire Retardants.
- 5. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



K72 = Product Type Marking Code YM or $\overline{Y}M$ = Date Code Marking Y or \overline{Y} = Year (ex: G = 2019) M = Month (ex: 9 = September)

Date Code Key

Year	1998	1999	2000	2001	2002	2003	2004		2017	2018	2019	2020	2021	2022	2023
Code	J	K	L	М	N	Р	R		Е	F	G	Н	_	J	K
Month	Jan	Fe	b	Mar	Apr	May	Ju	n	Jul	Aug	Sep	Oc	t I	Nov	Dec
Code	1	2		3	4	5	6		7	8	9	0		N	D



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} ≤ 1.0MΩ		V_{DGR}	60	V	
Gate-Source Voltage	Continuous		V_{GSS}	±20	V
Gate-Source voltage	Pulsed		V_{GSS}	±40	V
Continuous Drain Current (Note 7) V _{GS} = 5V			I_{D}	0.23 0.18 0.14	А
Maximum Continuous Body Diode Forward Current	(Note 7)	Is	0.53	Α	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%	6)	I _{DM}	0.8	A	

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

Characteristic		Symbol	Value	Unit
	T _A = +25°C		0.31	
Total Power Dissipation (Note 6)	T _A = +70°C	P_{D}	0.2	W
	T _A = +100°C		0.12	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	410	°C/W
	T _A = +25°C		0.4	
Total Power Dissipation (Note 7)	T _A = +70°C	P_{D}	0.25	W
	T _A = +100°C		0.15	
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	$R_{\theta JA}$	318	°C/W
Thermal Resistance, Junction to Case (Note 7)	Steady State	$R_{ heta JC}$	135	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

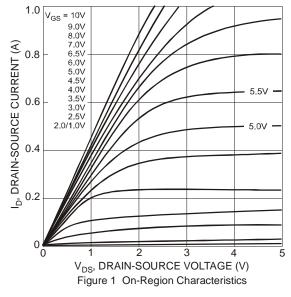
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

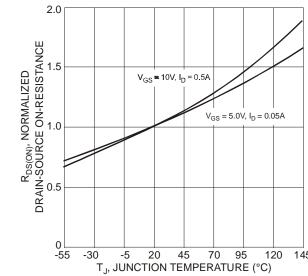
Characteristic		Symbol	Min	Тур	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)			l .		·	l .	
Drain-Source Breakdown Voltage		BV _{DSS}	60	70	_	V	$V_{GS} = 0V, I_D = 10\mu A$
Zero Gate Voltage Drain Current	@ T _C = +25°C @ T _C = +125°C	I _{DSS}		_	1.0 500	μΑ	V _{DS} = 60V, V _{GS} = 0V
Gate-Body Leakage		I _{GSS}	_	_	±10	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 8)							
Gate Threshold Voltage		V _{GS(TH)}	1.0	_	2.0	V	$V_{DS} = V_{GS}, I_D = 250 \mu A$
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	_	Α	$V_{GS} = 10V, V_{DS} = 7.5V$
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	.,
Output Capacitance		Coss	_	11	25	pF	$V_{DS} = 25V, V_{GS} = 0V$ -f = 1.0MHz
Reverse Transfer Capacitance		C _{rss}	_	2.0	5.0	pF	1 = 1.0WII IZ
SWITCHING CHARACTERISTICS (Note 9)							
Turn-On Delay Time		t _{D(ON)}		7.0	20		$V_{DD} = 30V, I_D = 0.2A,$
Turn-Off Delay Time		t _{D(OFF)}		11.0	20	ns	$R_L = 150\Omega$, $V_{GEN} = 10V$, $R_{GEN} = 25\Omega$

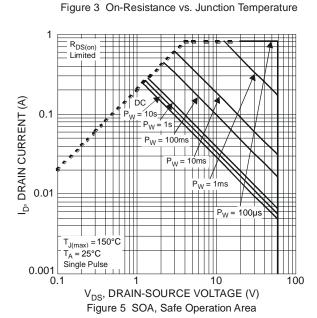
Notes:

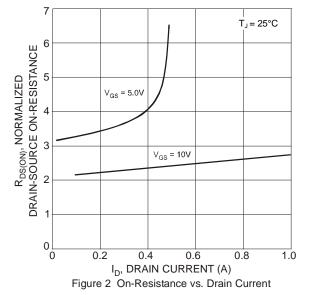
- 6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 7. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate.
 8. Short duration pulse test used to minimize self-heating effect.
 9. Guaranteed by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

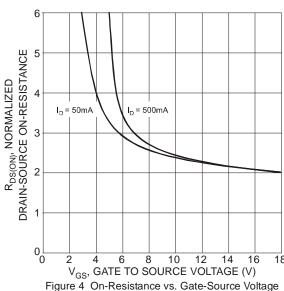










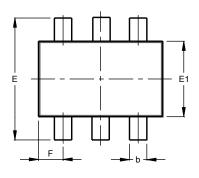


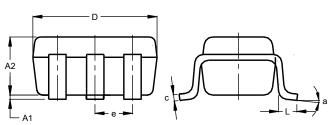


Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT363



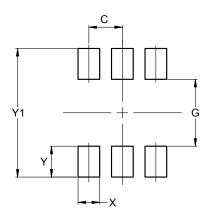


SOT363								
Dim	Min	Max	Тур					
A1	0.00	0.10	0.05					
A2	0.90	1.00	1.00					
b	0.10	0.30	0.25					
С	0.10	0.22	0.11					
D	1.80	2.20	2.15					
E	2.00	2.20	2.10					
E1	1.15	1.35	1.30					
е	().650 E	SC					
F	0.40	0.45	0.425					
L	0.25	0.40	0.30					
а	0°	8°						
All	All Dimensions in mm							

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

SOT363



Dimensions	Value (in mm)				
С	0.650				
G	1.300				
Х	0.420				
Y	0.600				
Y1	2 500				



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