



#### 700V N-CHANNEL ENHANCEMENT MODE MOSFET

## **Product Summary**

BV <sub>DSS</sub>	R <sub>DS(ON) Max</sub>	I <sub>D</sub> T <sub>C</sub> = +25°C
700V	1.25Ω @ V <sub>GS</sub> = 10V	3.9A

#### **Features**

- 100% Unclamped Inductive Switch (UIS) Test in Production
- Low Gate Input Resistance
- Low Input Capacitance
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

## **Description**

This new generation MOSFET is 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.

#### **Mechanical Data**

- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound.
   UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish Matte Tin Annealed over Copper Leadframe.
   Solderable per MIL-STD-202, Method 208 <sup>®</sup>
- Weight: 0.33 grams (Approximate)

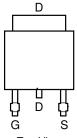
# **Applications**

Switching

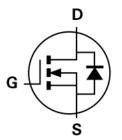




Top View



Top View



Internal Schematic

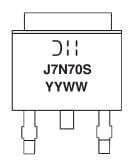
### Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
DMJ7N70SK3-13	Standard	TO252 (DPAK)	2,500/Tape & Reel

Notes:

- 1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
- 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. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

# Marking Information



☐ HManufacturer's Marking
☐ J7N70S = Product Type Marking Code
☐ YYWW = Date Code Marking
☐ YY = Last Two Digits of Year (ex: 18 = 2018)
☐ WW = Week Code (01 to 53)



# 

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	700	V
Gate-Source Voltage	$V_{GSS}$	±30	V
Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V	I <sub>D</sub>	3.9 2.5	А
Maximum Body Diode Forward Current (Note 5)	Is	3.0	Α
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	8.0	Α
Avalanche Current (Note 6)	I <sub>AR</sub>	1.5	Α
Avalanche Energy (Note 6)	E <sub>AR</sub>	67	mJ
Peak Diode Recovery dv/dt	dv/dt	11.8	V/ns

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

Characteristic	Symbol	Value	Unit	
Total Power Dissipation (Note 5)	$T_C = +25^{\circ}C$	р	28	W
Total Power Dissipation (Note 5)	$T_{C} = +100^{\circ}C$	$P_{D}$	11	
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>0JA</sub>	38	°C/W	
Thermal Resistance, Junction to Case (Note 5)	$R_{\theta JC}$	2.1	C/VV	
Operating and Storage Temperature Range	T <sub>J,</sub> T <sub>STG</sub>	-55 to +150	°C	

# **Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

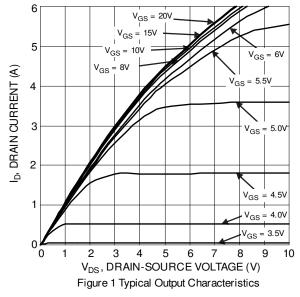
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 7)							
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	700	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	_	_	1	μΑ	$V_{DS} = 700V, V_{GS} = 0V$	
Gate-Source Leakage	I <sub>GSS</sub>	_	_	100	nA	$V_{GS} = \pm 30V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 7)							
Gate Threshold Voltage	V <sub>GS(TH)</sub>	2	2.9	4	V	$V_{DS} = V_{GS}$ , $I_D = 250\mu A$	
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>		1	1.25	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 2.5A	
Diode Forward Voltage	V <sub>SD</sub>	_	0.9	1.3	V	$V_{GS} = 0V, I_{S} = 5A$	
DYNAMIC CHARACTERISTICS (Note 8)							
Input Capacitance	C <sub>iss</sub>	_	351	_		V 50V 6 4MIL	
Output Capacitance	Coss	_	66	_	pF	$V_{DS} = 50V$ , $f = 1MHz$ , $V_{GS} = 0V$	
Reverse Transfer Capacitance	C <sub>rss</sub>	_	1.1	_			
Gate Resistance	R <sub>G</sub>	_	3.5	_	Ω	$V_{DS} = 0V$ , $V_{GS} = 0V$ , $f = 1MHz$	
Total Gate Charge	$Q_g$	_	13.9	_		$V_{DD} = 560V, I_D = 5A,$ $V_{GS} = 10V$	
Gate-Source Charge	Qgs	_	1.9	_	nC		
Gate-Drain Charge	Q <sub>gd</sub>	_	8.5	_			
Turn-On Delay Time	t <sub>D(ON)</sub>	1	8.5	_			
Turn-On Rise Time	t <sub>R</sub>		11.6	_	ns	$V_{DD} = 350V, V_{GS} = 10V,$ $R_G = 4.7\Omega, I_D = 2.5A$	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	_	24.5	_	115		
Turn-Off Fall Time	t <sub>F</sub>	_	10	_			
Body Diode Reverse Recovery Time	t <sub>RR</sub>	_	212	_	ns		
Body Diode Reverse Recovery Time (T <sub>J</sub> = +150°C)	t <sub>RR</sub>		251	_	ns	$V_{DD} = 100V, I_{S} = 5A,$	
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	_	1.8	_	μC	dI/dt = 100A/μs	
Body Diode Reverse Recovery Charge (T <sub>J</sub> = +150°C)	Q <sub>RR</sub>	_	2.3	_	μC		

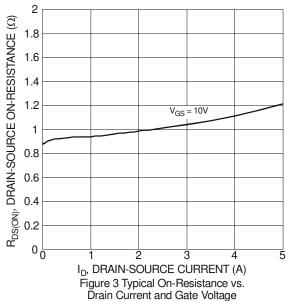
Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.

- 6. UIS in production with  $V_{DD}$  = 50V,  $V_{GS}$  = 10V, L = 60mH,  $T_J$  = +25°C.
- 7. Short duration pulse test used to minimize self-heating effect.
- 8. Guaranteed by design. Not subject to production testing.









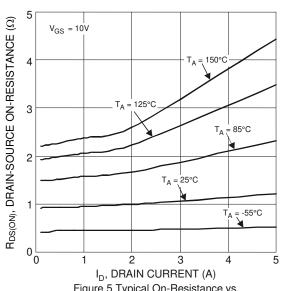
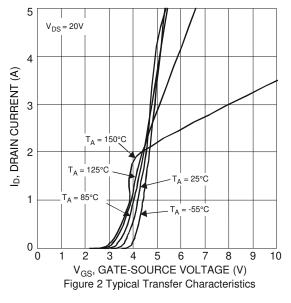
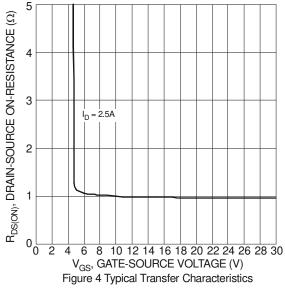


Figure 5 Typical On-Resistance vs. Drain Current and Temperature





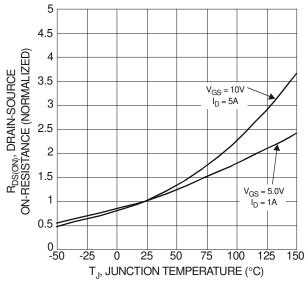
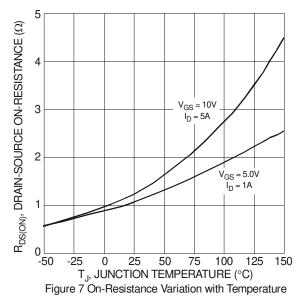
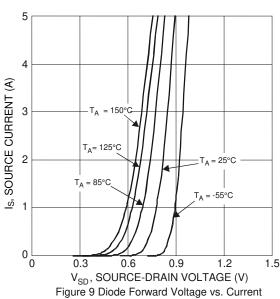
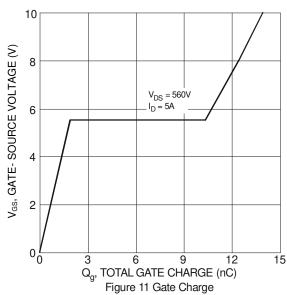


Figure 6 On-Resistance Variation with Temperature









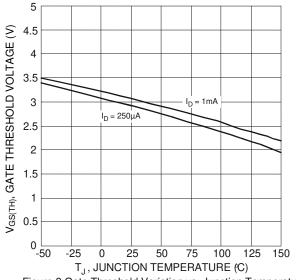
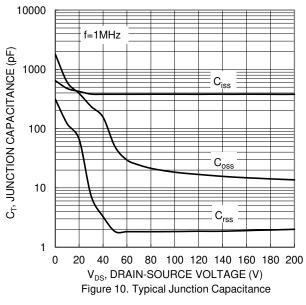
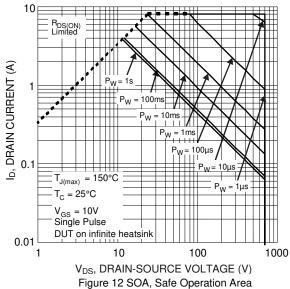
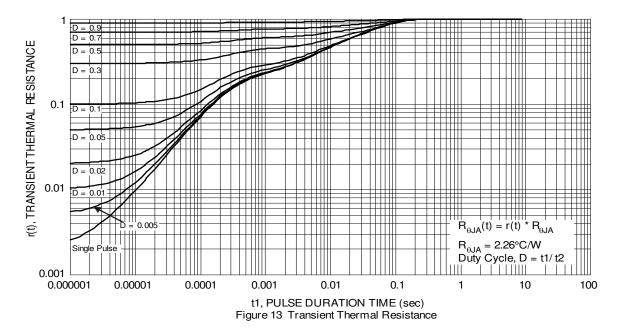


Figure 8 Gate Threshold Variation vs. Junction Temperature







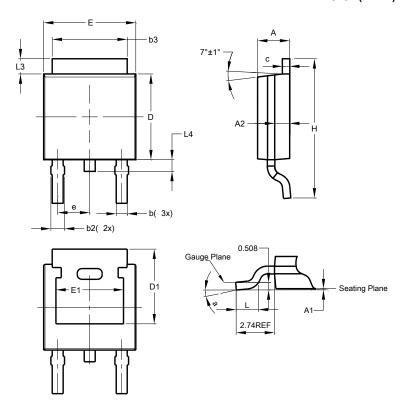




## **Package Outline Dimensions**

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

#### TO252 (DPAK)

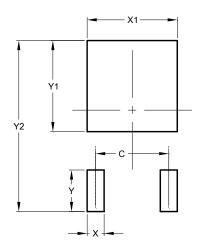


TO252 (DPAK)					
Dim	Min	Max	Тур		
Α	2.19	2.39	2.29		
A1	0.00	0.13	0.08		
A2	0.97	1.17	1.07		
b	0.64	0.88	0.783		
b2	0.76	1.14	0.95		
b3	5.21	5.46	5.33		
С	0.45	0.58	0.531		
D	6.00	6.20	6.10		
D1	5.21	-	-		
е	-	-	2.286		
Е	6.45	6.70	6.58		
E1	4.32	-	-		
Н	9.40	10.41	9.91		
L	1.40	1.78	1.59		
L3	0.88	1.27	1.08		
L4	0.64	1.02	0.83		
а	0°	10°	-		
All Dimensions in mm					

# **Suggested Pad Layout**

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

#### TO252 (DPAK)



Dimensions	Value (in mm)		
С	4.572		
Х	1.060		
X1	5.632		
Υ	2.600		
Y1	5.700		
Y2	10.700		



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