



#### 30V N-CHANNEL ENHANCEMENT MODE MOSFET

#### **Product Summary**

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> max	I <sub>D</sub> max T <sub>C</sub> = +25°C
30V	$5.5 \text{m}\Omega @ V_{GS} = 10V$	80A
	$9.0 \text{m}\Omega @ V_{GS} = 4.5 \text{V}$	60A

#### **Features**

- Low On-Resistance
- Low Input Capacitance
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

### **Description and Applications**

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.

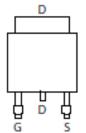
- Power Management Functions
- DC-DC Converters
- Industrial

#### **Mechanical Data**

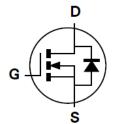
- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Weight: 0.33 grams (Approximate)



Top View



Pin Out Top View



**Equivalent Circuit** 

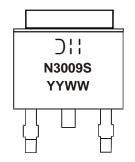
### **Ordering Information** (Note 4)

Part Number	Case	Packaging
DMN3009SK3-13	TO252 (DPAK)	2,500/Tape & Reel

Notes:

- 1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
- 2. See http://www.diodes.com/quality/lead\_free.html 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 http://www.diodes.com/products/packages.html.

## **Marking Information**



Oll = Manufacturer's Marking
N3009S = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 17 = 2017)
WW = Week Code (01 to 53)



# **Maximum Ratings** ( $@T_A = +25^{\circ}C$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit	
Drain-Source Voltage	$V_{DSS}$	30	V	
Gate-Source Voltage	$V_{GSS}$	±20	V	
Continuous Drain Current, V <sub>GS</sub> = 10V (Note 7)	$T_C = +25$ °C $T_C = +70$ °C	ΙD	80 60	А
Continuous Drain Current, V <sub>GS</sub> = 10V (Note 6)	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	Ι <sub>D</sub>	20 16	А
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	100	Α	
Maximum Continuous Body Diode Forward Current (Note 6)	I <sub>S</sub>	20	Α	
Pulsed Continuous Body Diode Forward Current (10µs Pulse, Duty C	I <sub>SM</sub>	100	Α	
Avalanche Current, L = 0.1mH (Note 8)	I <sub>AS</sub>	33	Α	
Avalanche Energy, L = 0.1mH (Note 8)	E <sub>AS</sub>	55	mJ	

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

Characteristic	Symbol	Value	Unit	
Total Power Dissipation (Note 5)	$T_A = +25^{\circ}C$	$P_D$	1.6	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	78	°C/W
Total Power Dissipation (Note 6)	T <sub>A</sub> = +25°C	$P_{D}$	3.4	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	37	°C/W
Total Power Dissipation (Note 7) $T_C = +25$		$P_{D}$	44	W
Thermal Resistance, Junction to Case (Note 7)	$R_{ heta JC}$	2.8	°C/W	
Operating and Storage Temperature Range	$T_{J_{i}}T_{STG}$	-55 to +150	°C	

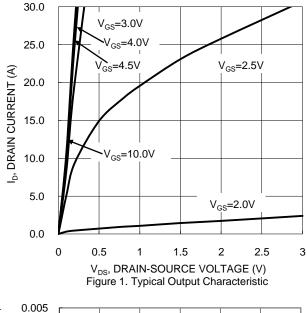
### Electrical Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

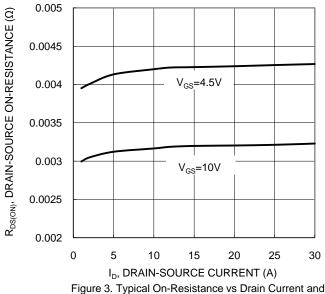
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 9)							
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	30	-	-	V	$V_{GS} = 0V, I_D = 250\mu A$	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	-	-	1	μΑ	$V_{DS} = 24V, V_{GS} = 0V$	
Gate-Source Leakage	I <sub>GSS</sub>	-	-	±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 9)							
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1	-	2.5	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	
Static Drain-Source On-Resistance		-	2.5	5.5	mΩ	$V_{GS} = 10V, I_D = 30A$	
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	-	4.0	9.0		$V_{GS} = 4.5V, I_D = 15A$	
Diode Forward Voltage	V <sub>SD</sub>	-	0.7	1	٧	$V_{GS} = 0V$ , $I_S = 1A$	
DYNAMIC CHARACTERISTICS (Note 10)							
Input Capacitance	C <sub>iss</sub>	-	2000	-	pF		
Output Capacitance	Coss	-	315	-	pF	$V_{DS} = 15V, V_{GS} = 0V,$ - f = 1MHz	
Reverse Transfer Capacitance	C <sub>rss</sub>	-	247	-	рF		
Gate Resistance	Rg	-	2.2	-	Ω	$V_{DS} = 0V$ , $V_{GS} = 0V$ , $f = 1MHz$	
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Qg	-	20	-	nC		
Total Gate Charge (V <sub>GS</sub> = 10V)	$Q_{g}$	-	42	-	nC	\/ 4E\/  - 4E^	
Gate-Source Charge	Q <sub>gs</sub>	-	4.7	-	nC	$V_{DS} = 15V, I_{D} = 15A$	
Gate-Drain Charge	$Q_{gd}$	-	7.4	-	nC		
Turn-On Delay Time	t <sub>D(ON)</sub>	-	3.9	-	ns	V <sub>DD</sub> = 15V, V <sub>GS</sub> = 10V,	
Turn-On Rise Time	t <sub>R</sub>	-	4.1	-	ns		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	-	31	-	ns	$R_G = 3.3\Omega$ , , $I_D = 15A$	
Turn-Off Fall Time	t <sub>F</sub>	-	15	-	ns	7	
Reverse Recovery Time	t <sub>RR</sub>	-	15	-	ns	1 454 4:/-14 4004/	
Reverse Recovery Charge	Qrr	-	6.0	-	nC	$I_F = 15A$ , di/dt = 100A/ $\mu$ s	

5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided. Notes:

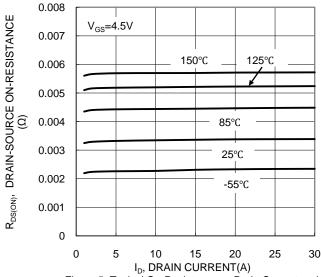
- 6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
- 7. Thermal resistance from junction to soldering point (on the exposed drain pad). 8.  $I_{AS}$  and  $E_{AS}$  ratings are based on low frequency and duty cycles to keep  $T_J = +25^{\circ}C$ .
- 9. Short duration pulse test used to minimize self-heating effect.
- 10. Guaranteed by design. Not subject to product testing.

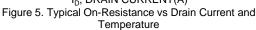


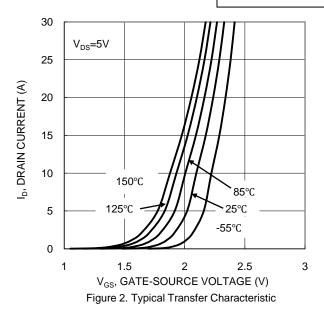


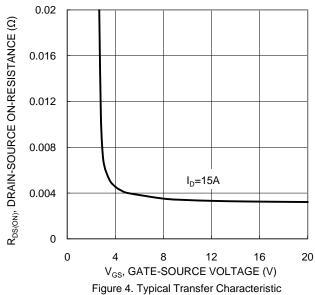


Gate Voltage









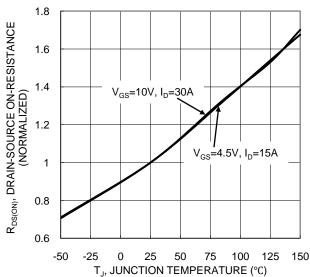


Figure 6. On-Resistance Variation with Temperature



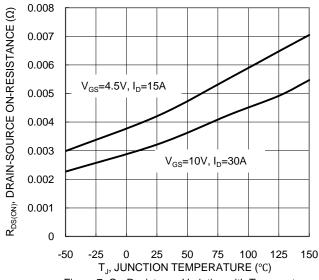


Figure 7. On-Resistance Variation with Temperature

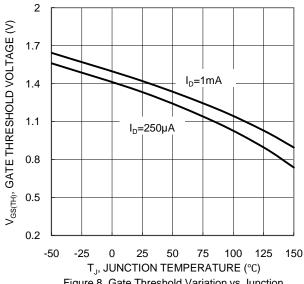


Figure 8. Gate Threshold Variation vs Junction Temperature

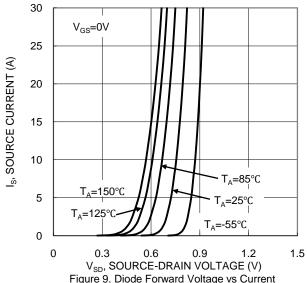
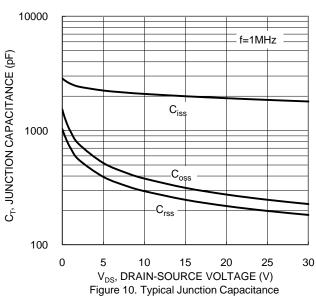
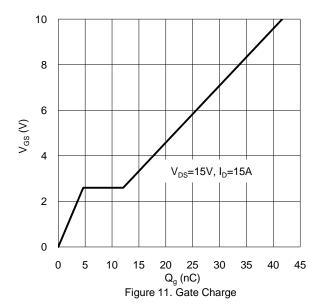
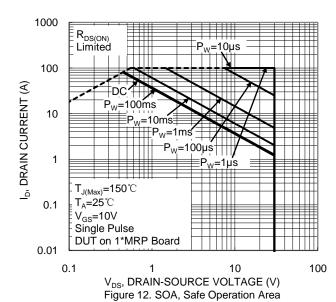


Figure 9. Diode Forward Voltage vs Current









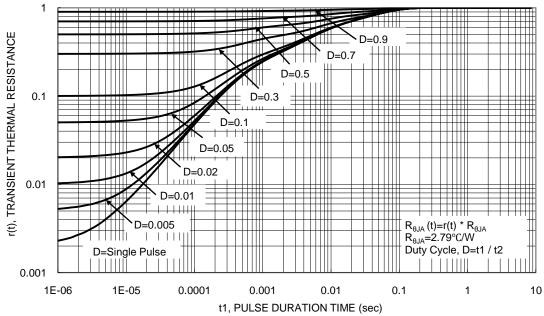
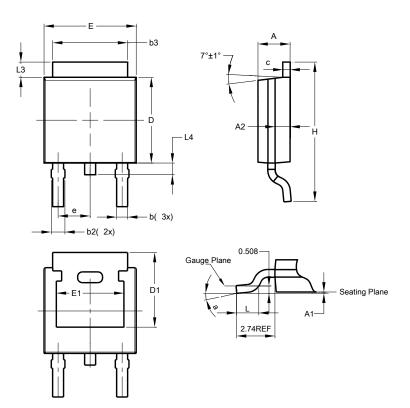


Figure 13. Transient Thermal Resistance



# **Package Outline Dimensions**

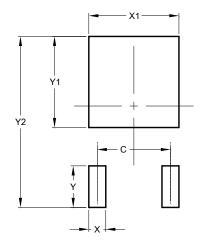
Please see http://www.diodes.com/package-outlines.html for the latest version.



TO252 (DPAK)					
Dim	Min	Max	Тур		
Α	2.19	2.39	2.29		
<b>A</b> 1	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		
Г	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.



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



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многоканальный

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