

**DUAL N-CANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

$V_{(BR)DSS}$	$R_{DS(on) max}$	$I_D$ $T_A = 25^\circ C$
20V	18mΩ @ $V_{GS} = 4.5V$	5.2A
	30mΩ @ $V_{GS} = 1.8V$	4.0A

**Description and Applications**

This new generation 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.

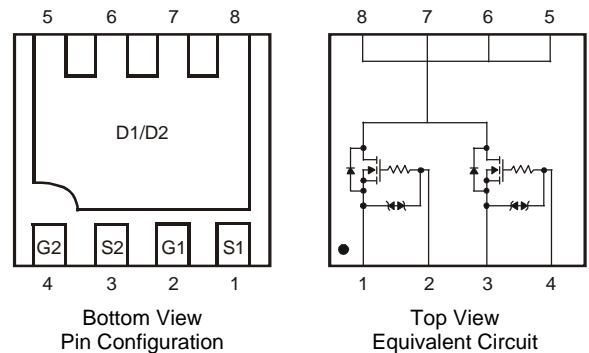
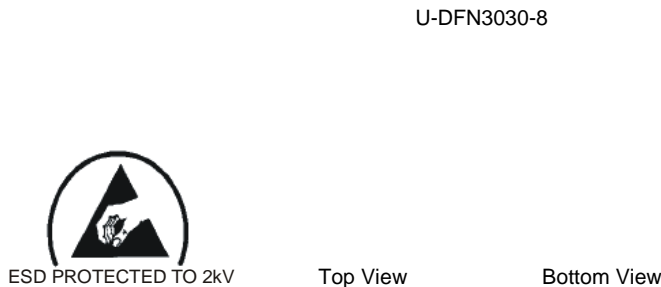
- Power management functions
- Battery Pack
- Load Switch

**Features and Benefits**

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- **ESD Protected Gate**
- **Lead, Halogen, and Antimony Free, RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**Mechanical Data**

- Case: U-DFN3030-8
- 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 Below
- Weight: 0.0172 grams (approximate)

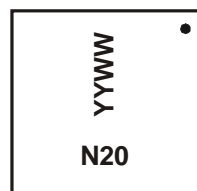


**Ordering Information** (Note 6)

Part Number	Case	Packaging
DMN2016LFG-7	U-DFN3030-8	3000 / Tape & Reel

- Notes:
1. No purposefully added lead. Halogen and Antimony Free.
  2. Diodes Inc.'s "Green" policy can be found on our website at <http://www.diodes.com>.
  3. For packaging details, go to our website at <http://www.diodes.com>

**Marking Information**



N20 = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last digit of year (ex: 09 for 2009)  
 WW = Week code (01 to 53)

**Maximum Ratings** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			$V_{DSS}$	20	V
Gate-Source Voltage			$V_{GSS}$	$\pm 8$	V
Continuous Drain Current (Note 4)	Steady State	$T_A = 25^\circ\text{C}$	$I_D$	5.2	A
		$T_A = 70^\circ\text{C}$		4.1	
Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle = 1% )			$I_{DM}$	30	A

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	$P_D$	0.77	W
Thermal Resistance, Junction to Ambient @ $T_A = 25^\circ\text{C}$ (Note 4)	$R_{\theta JA}$	169	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case @ $T_A = 25^\circ\text{C}$ (Note 4)	$R_{\theta JC}$	15.8	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

**Electrical Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 5)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	20	-	-	V	$V_{GS} = 0V, I_D = 250\mu\text{A}$
Gate-Source Breakdown Voltage	$BV_{GSO}$	$\pm 8$	-	-	V	$V_{DS} = 0V, I_G = \pm 250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = 25^\circ\text{C}$	$I_{DSS}$	-	-	1.0	$\mu\text{A}$	$V_{DS} = 20V, V_{GS} = 0V$
Gate-Source Leakage	$I_{GSS}$	-	-	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 8V, V_{DS} = 0V$
<b>ON CHARACTERISTICS (Note 5)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	0.4	0.71	1.1	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	-	13	18	m $\Omega$	$V_{GS} = 4.5V, I_D = 6A$
			13.5	19		$V_{GS} = 4.0V, I_D = 6A$
			14	20.5		$V_{GS} = 3.1V, I_D = 6A$
			15	22		$V_{GS} = 2.5V, I_D = 6A$
			21	30		$V_{GS} = 1.8V, I_D = 6A$
Forward Transfer Admittance	$ Y_{fs} $	-	25	-	S	$V_{DS} = 5V, I_D = 6A$
Diode Forward Voltage	$V_{SD}$	-	0.75	1.0	V	$V_{GS} = 0V, I_S = 1A$
<b>DYNAMIC CHARACTERISTICS (Note 6)</b>						
Input Capacitance	$C_{iss}$	-	1472	-	pF	$V_{DS} = 10V, V_{GS} = 0V,$ $f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	-	311	-	pF	
Reverse Transfer Capacitance	$C_{rss}$	-	141	-	pF	
Gate Resistance	$R_g$	-	1.46	-	$\Omega$	$V_{DS} = 0V, V_{GS} = 0V, f = 1\text{MHz}$
Total Gate Charge	$Q_g$	-	16.0	-	nC	$V_{GS} = 4.5V, V_{DS} = 10V,$ $I_D = 6A$
Gate-Source Charge	$Q_{gs}$	-	36.6	-	nC	
Gate-Drain Charge	$Q_{gd}$	-	2.1	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	2.6	-	ns	$V_{DD} = 10V, V_{GS} = 5V,$ $R_{GEN} = 3\Omega, R_L = 1.7\Omega$
Turn-On Rise Time	$t_r$	-	13.2	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	84.5	-	ns	
Turn-Off Fall Time	$t_f$	-	46.8	-	ns	

- Notes:
- Device mounted on FR-4 PCB, with minimum recommended pad layout.
  - Repetitive rating, pulse width limited by junction temperature
  - Guaranteed by design. Not subject to product testing

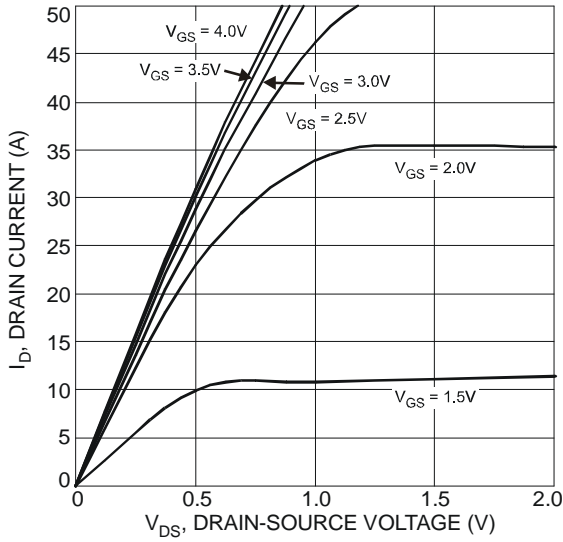


Fig. 1 Typical Output Characteristic

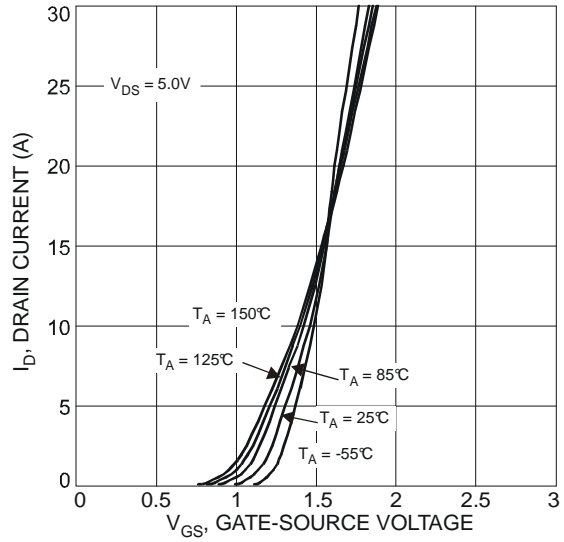


Fig. 2 Typical Transfer Characteristics

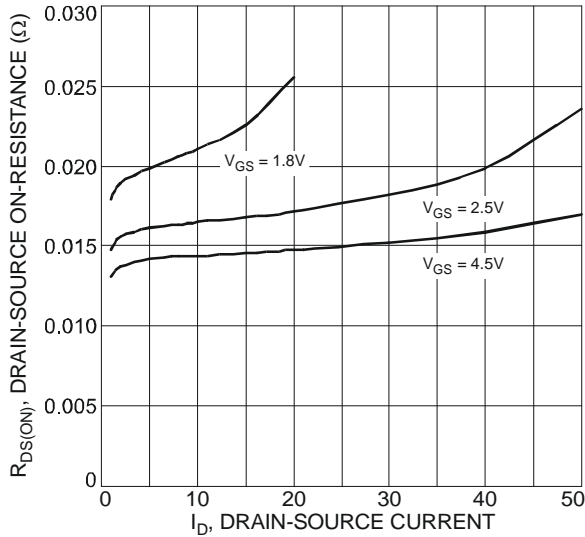


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

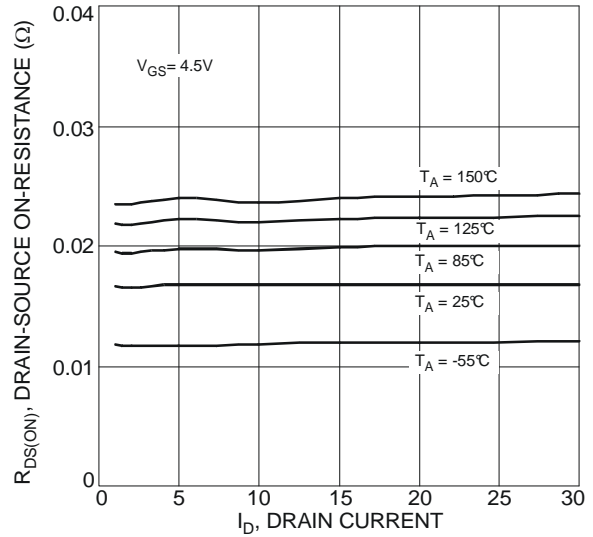


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

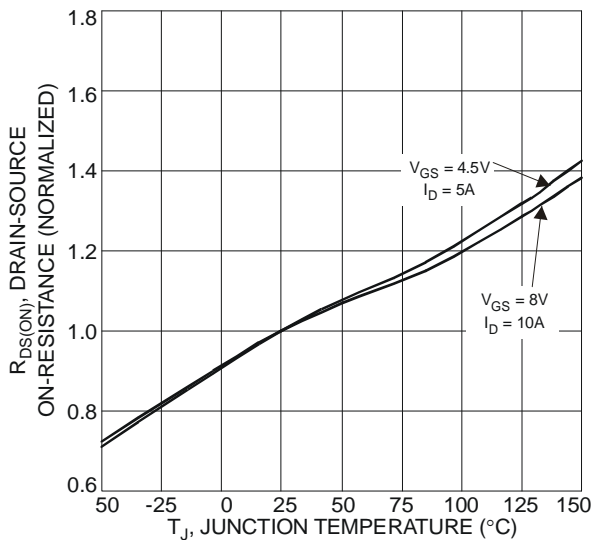


Fig. 5 On-Resistance Variation with Temperature

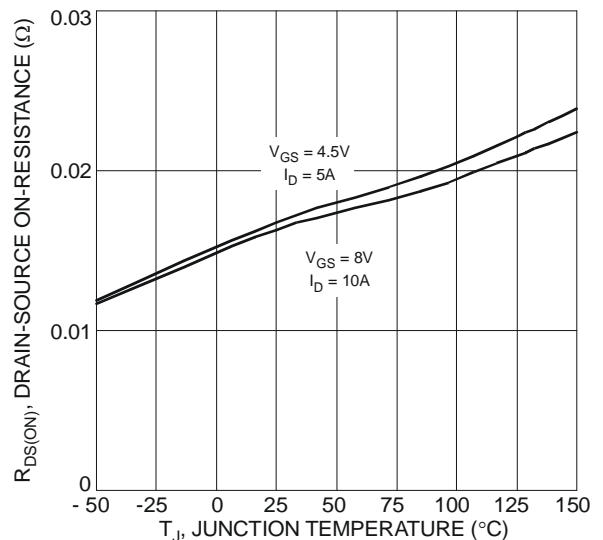


Fig. 6 On-Resistance Variation with Temperature

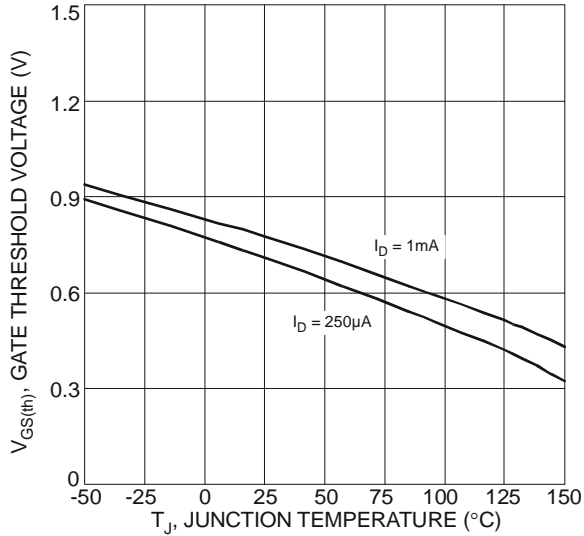


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

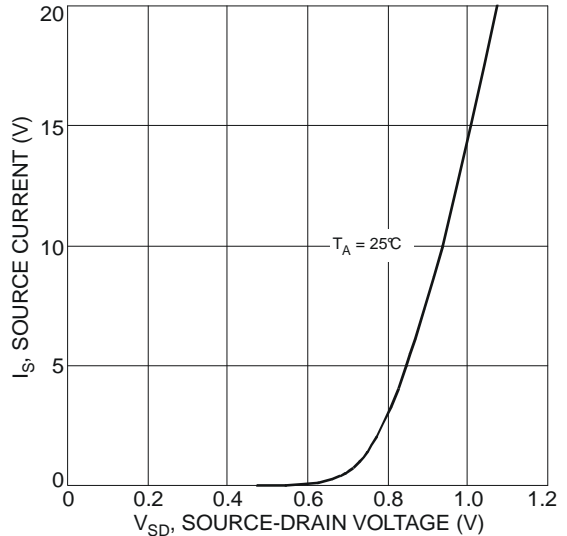


Fig. 8 Diode Forward Voltage vs. Current

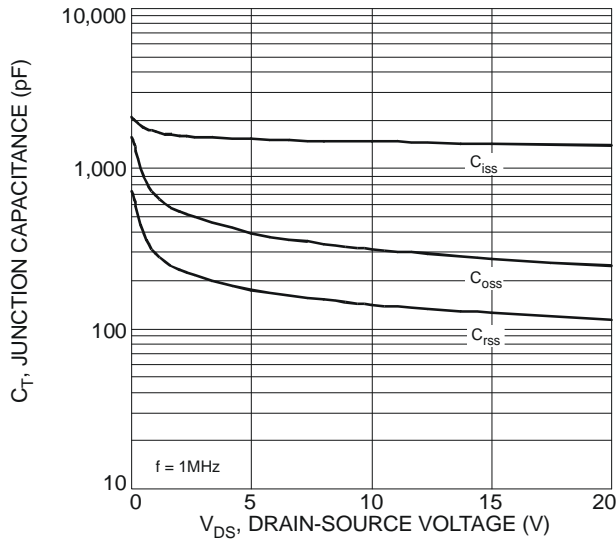


Fig. 9 Typical Junction Capacitance

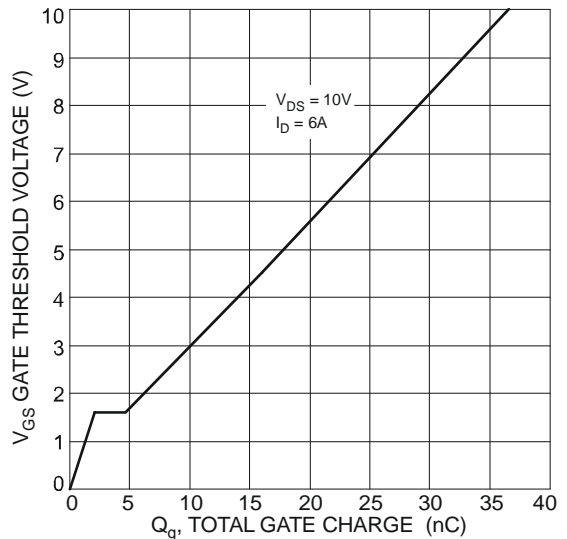


Fig. 10 Gate Charge

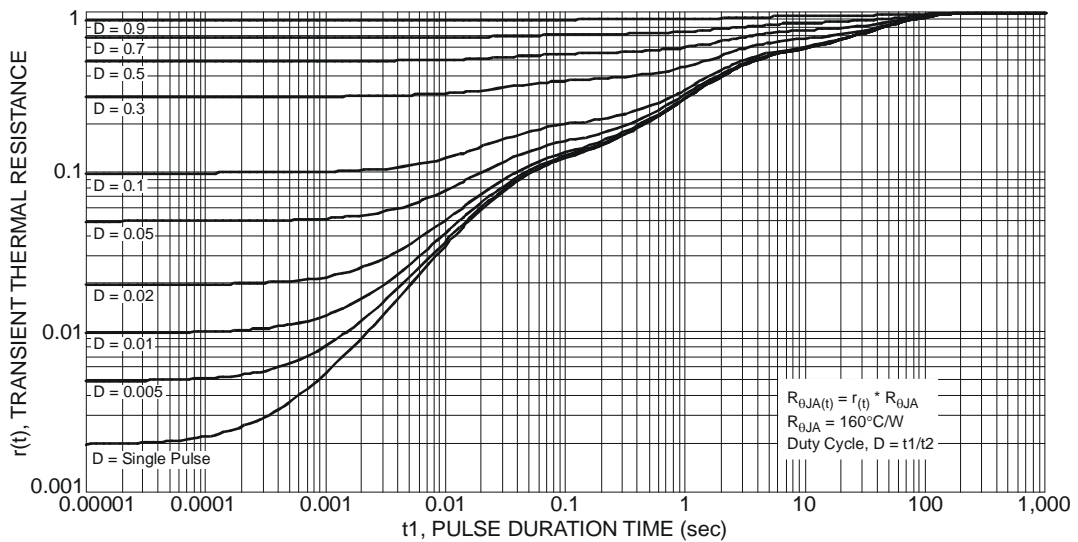
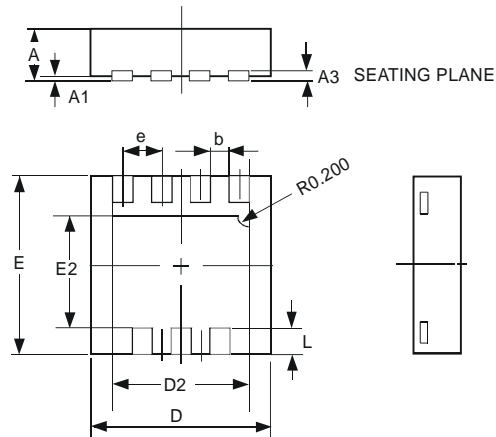


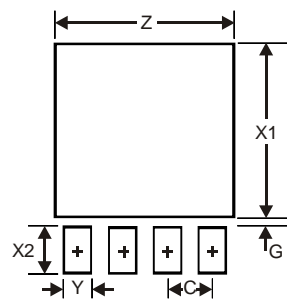
Fig. 11 Transient Thermal Resistance

**Package Outline Dimensions**



U-DFN3030-8			
Dim	Min	Max	Typ
A	0.57	0.63	0.60
A1	0	0.05	0.02
A3	—	—	0.15
b	0.29	0.39	0.34
D	2.90	3.10	3.00
D2	2.19	2.39	2.29
e	—	—	0.65
E	2.90	3.10	3.00
E2	1.64	1.84	1.74
L	0.30	0.60	0.45
All Dimensions in mm			

**Suggested Pad Layout**



Dimensions	Value (in mm)
Z	2.59
G	0.11
X1	2.49
X2	0.65
Y	0.39
C	0.65

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