DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

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

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**

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.

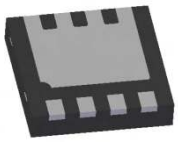
- Power management functions
- Battery Pack
- Load Switch

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)

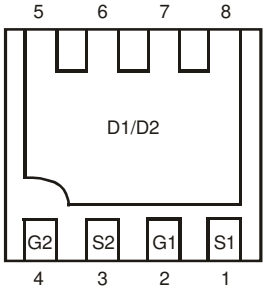
U-DFN3030-8

ESD PROTECTED TO 2kV

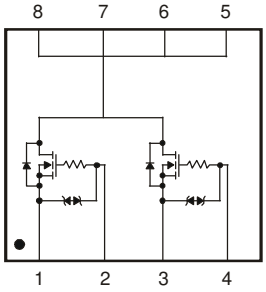


Top View

Bottom View



Bottom View
Pin Configuration



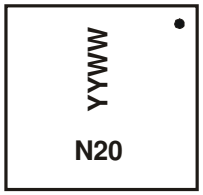
Top View
Equivalent Circuit

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)

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Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	20	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current (Note 4)	Steady State	T_A = 25°C T_A = 70°C	I_D	5.2 4.1	A
Pulsed Drain Current (10µs 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°C (Note 4)	$R_{\theta JA}$	169	°C/W
Thermal Resistance, Junction to Case @T_A = 25°C (Note 4)	$R_{\theta JC}$	15.8	°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	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 5)						
Drain-Source Breakdown Voltage	BV_{DSS}	20	-	-	V	V_{GS} = 0V, I_D = 250µA
Gate-Source Breakdown Voltage	BV_{GSO}	±8	-	-	V	V_{DS} = 0V, I_G = ±250µA
Zero Gate Voltage Drain Current T_J = 25°C	I_{DSS}	-	-	1.0	µA	V_{DS} = 20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	±10	µA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 5)						
Gate Threshold Voltage	$V_{GS(th)}$	0.4	0.71	1.1	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	-	13	18	mΩ	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
DYNAMIC CHARACTERISTICS (Note 6)						
Input Capacitance	C_{iss}	-	1472	-	pF	V_{DS} = 10V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	311	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	141	-	pF	
Gate Resistance	R_g	-	1.46	-	Ω	V_{DS} =0V, V_{GS} = 0V, f = 1MHz
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} = 3Ω, R_L = 1.7Ω
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: 4. Device mounted on FR-4 PCB, with minimum recommended pad layout.
5. Repetitive rating, pulse width limited by junction temperature
6. Guaranteed by design. Not subject to product testing

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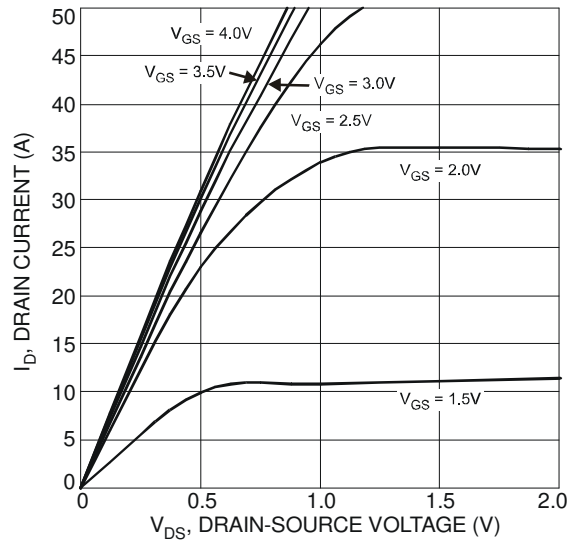

Fig.1 Typical Output Characteristic

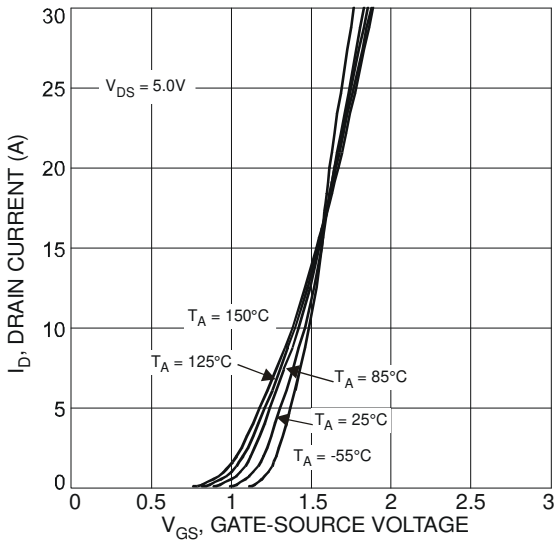

Fig.2 Typical Transfer Characteristics

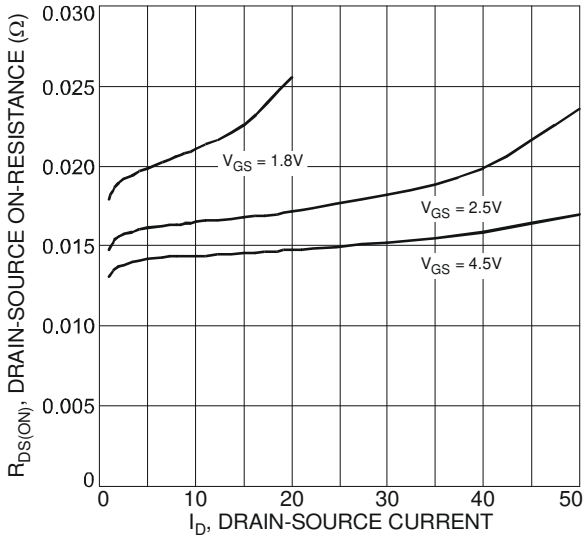

Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

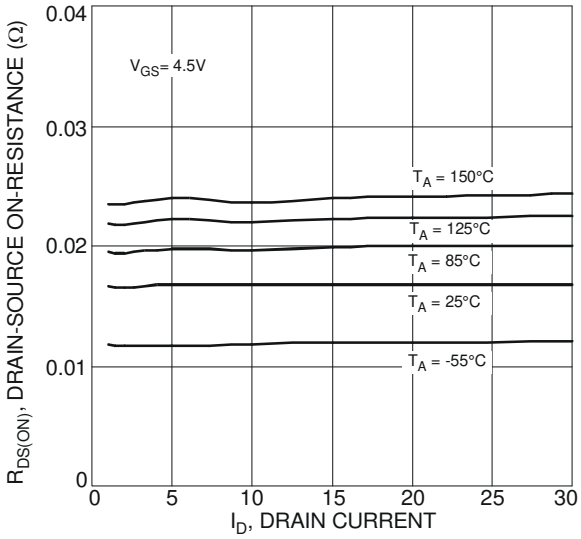

Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

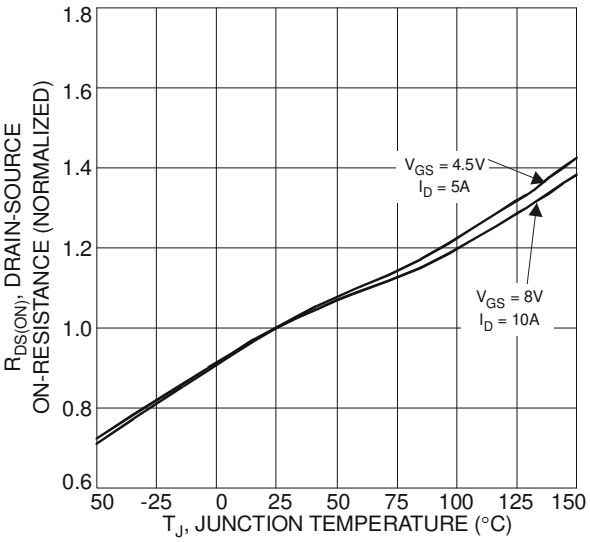

Fig. 5 On-Resistance Variation with Temperature

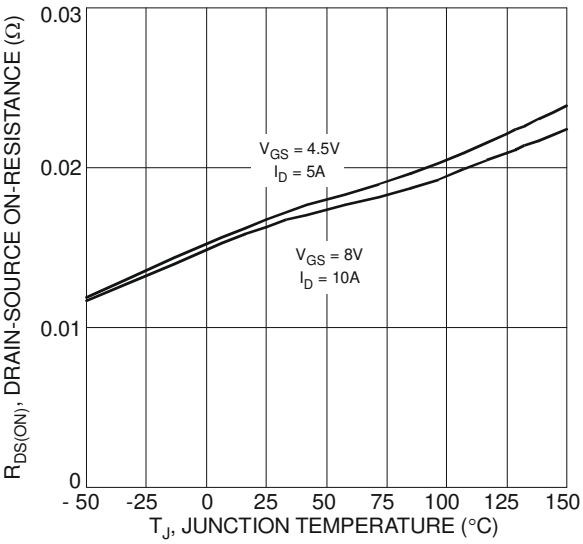

Fig. 6 On-Resistance Variation with Temperature

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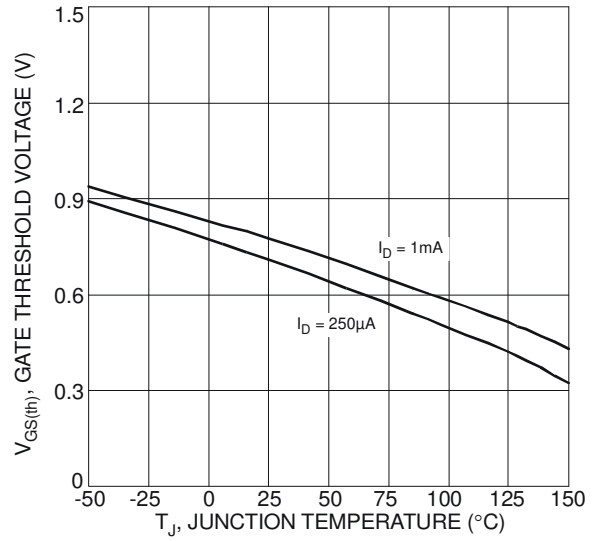

Fig. 7 Gate Threshold Variation vs. Ambient Temperature

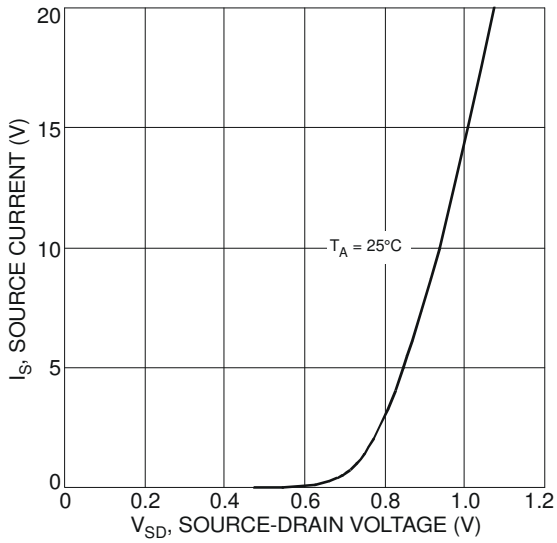

Fig. 8 Diode Forward Voltage vs. Current

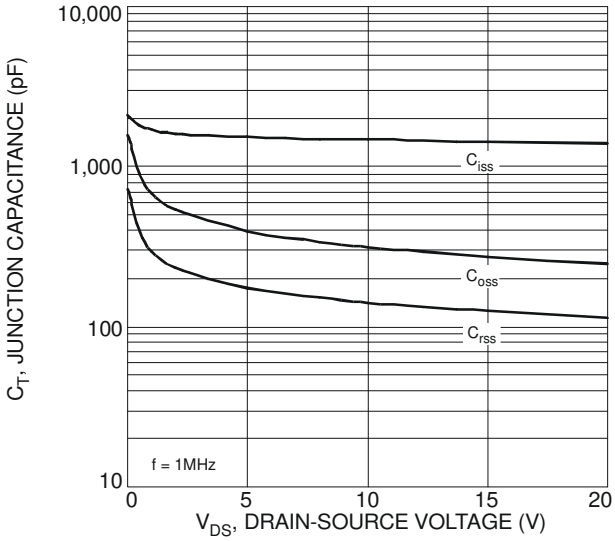

Fig. 9 Typical Junction Capacitance

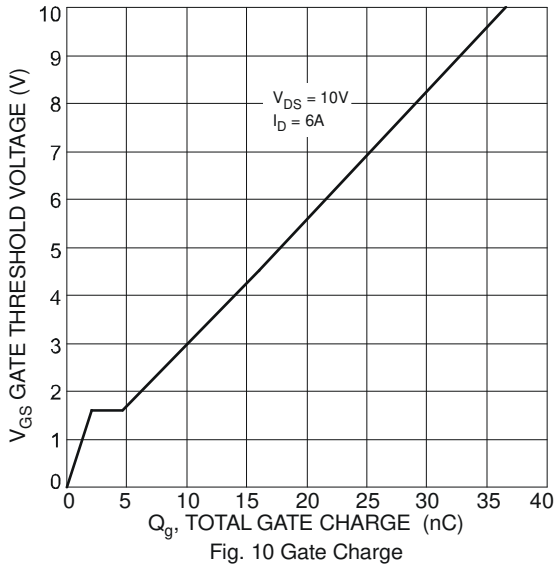

Fig. 10 Gate Charge

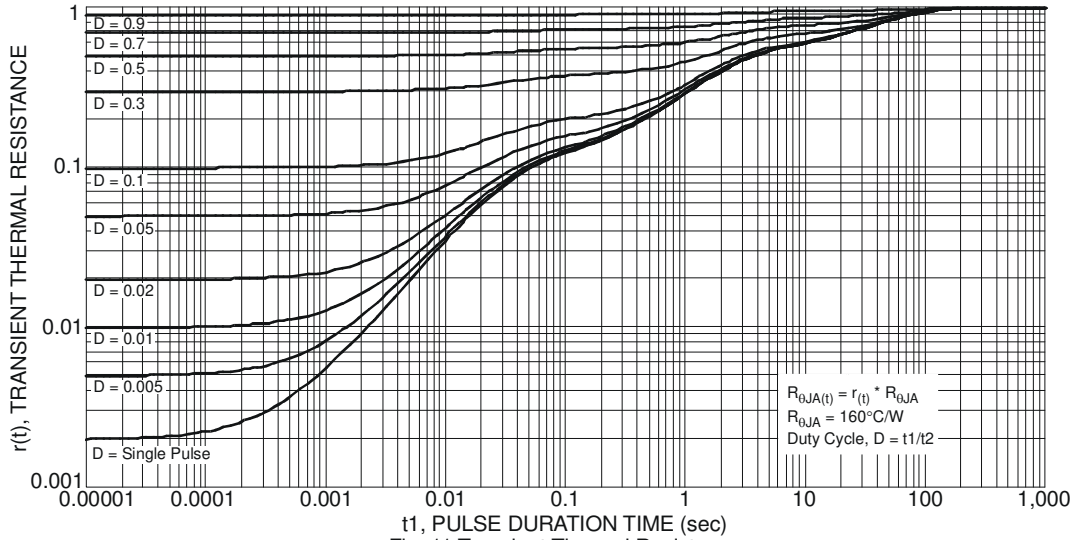

Fig. 11 Transient Thermal Resistance

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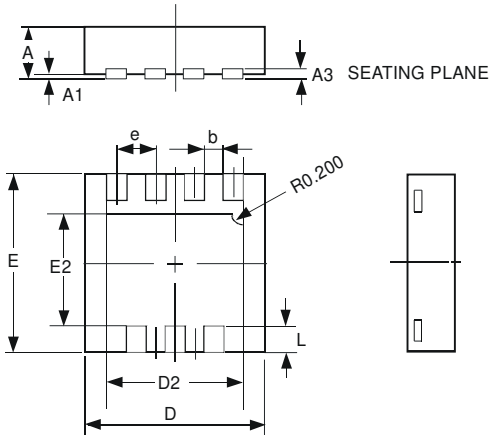
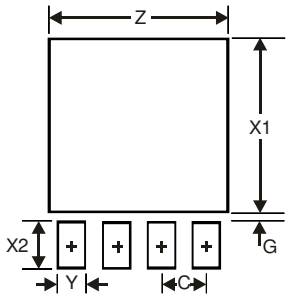
Package Outline Dimensions



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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