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.

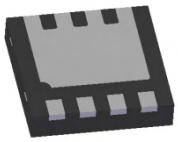
- Power management functions
- Battery Pack
- Load Switch

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)

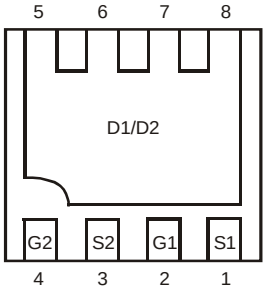
U-DFN3030-8

ESD PROTECTED TO 2kV

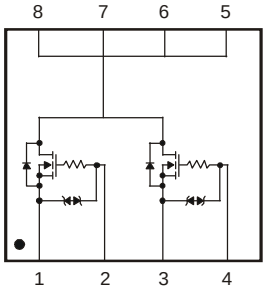


Top View

Bottom View



Bottom View
Pin Configuration



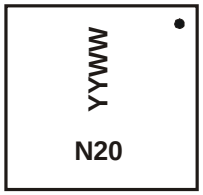
Top View
Equivalent Circuit

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)

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

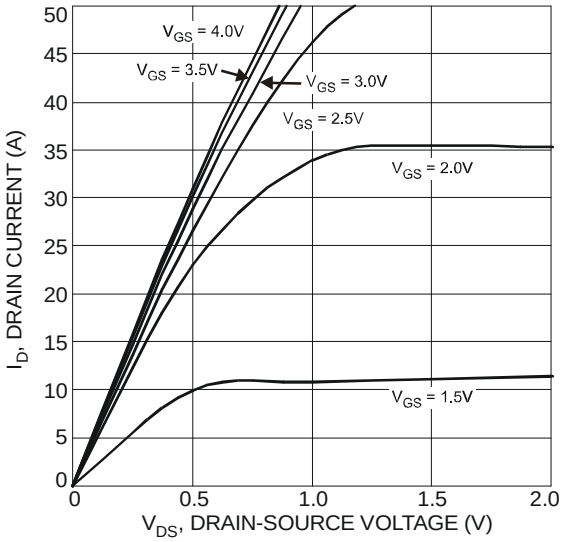


Fig.1 Typical Output Characteristic

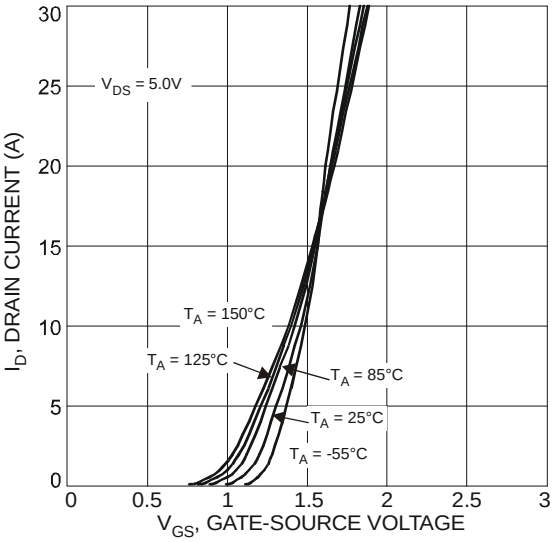


Fig.2 Typical Transfer Characteristics

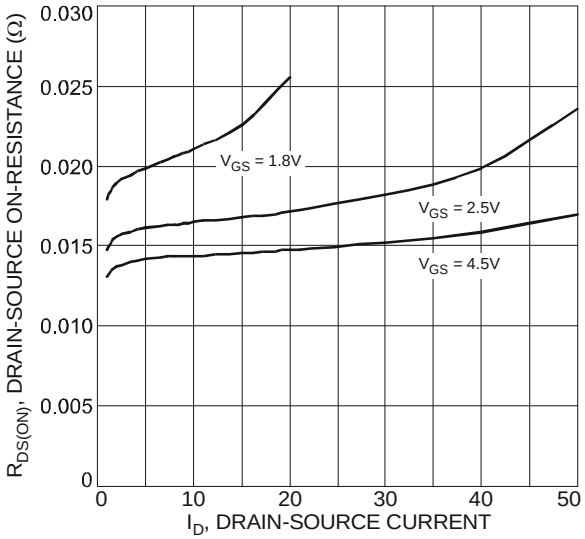


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

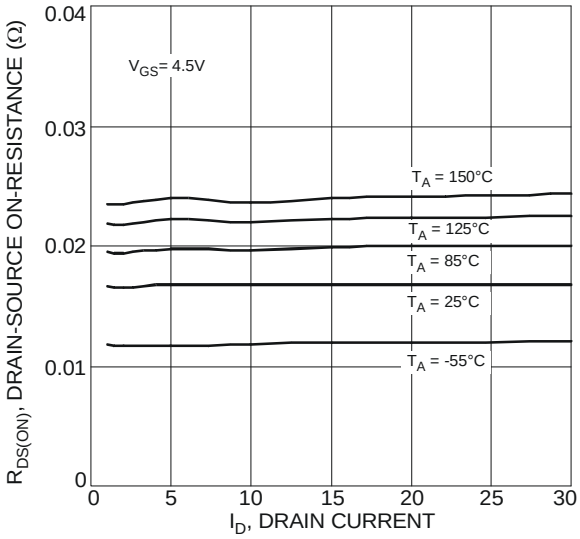


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

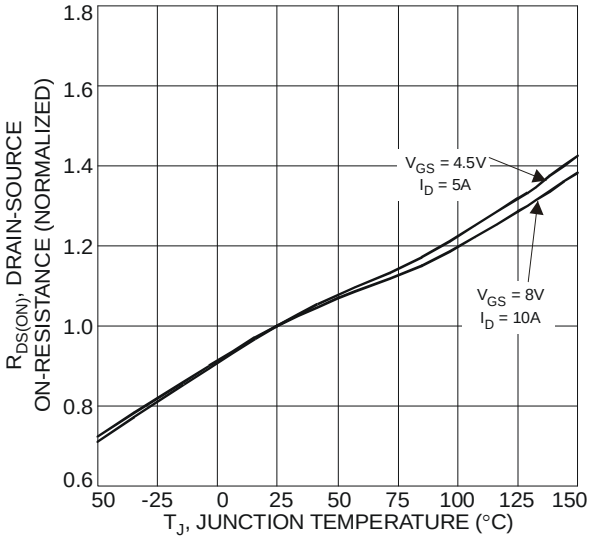


Fig. 5 On-Resistance Variation with Temperature

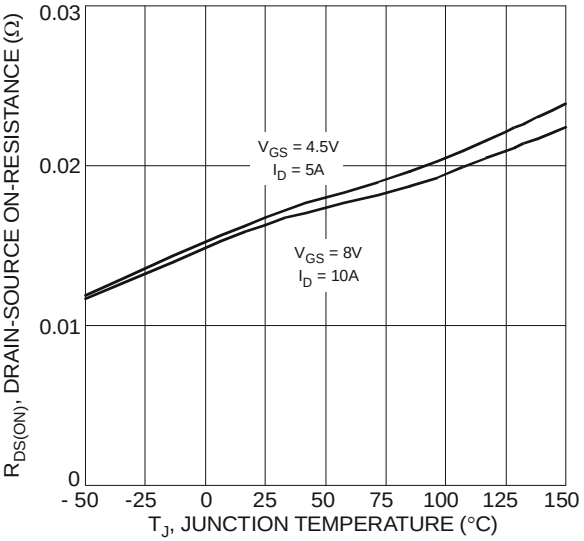


Fig. 6 On-Resistance Variation with Temperature

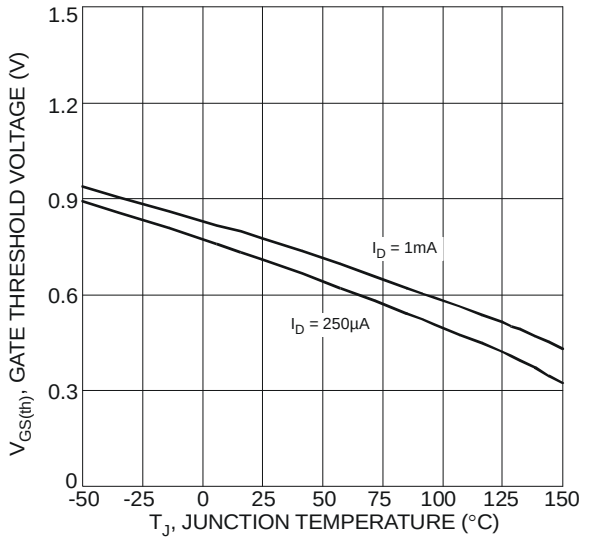


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

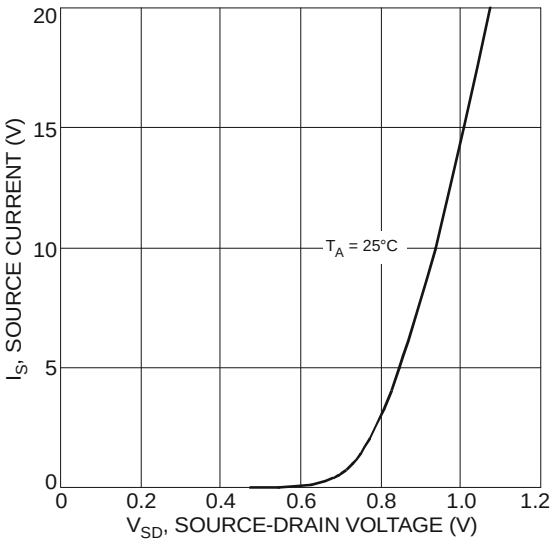


Fig. 8 Diode Forward Voltage vs. Current

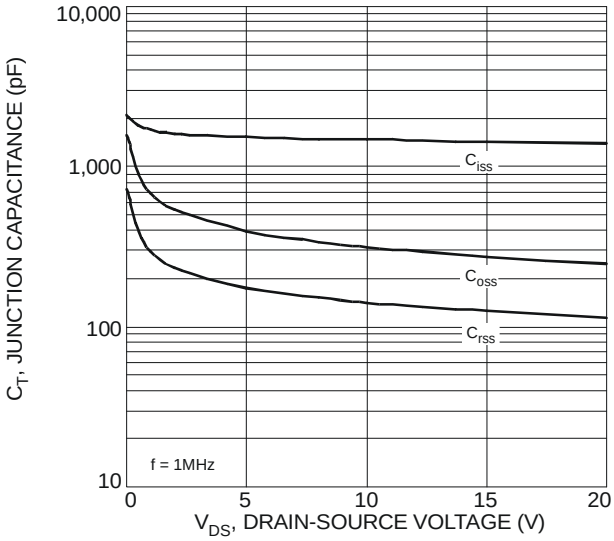


Fig. 9 Typical Junction Capacitance

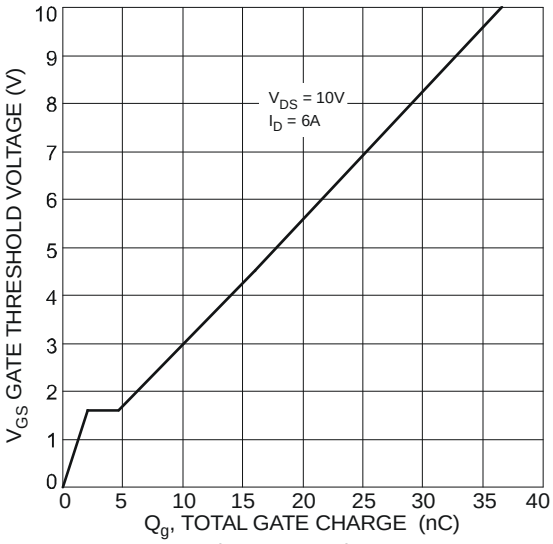


Fig. 10 Gate Charge

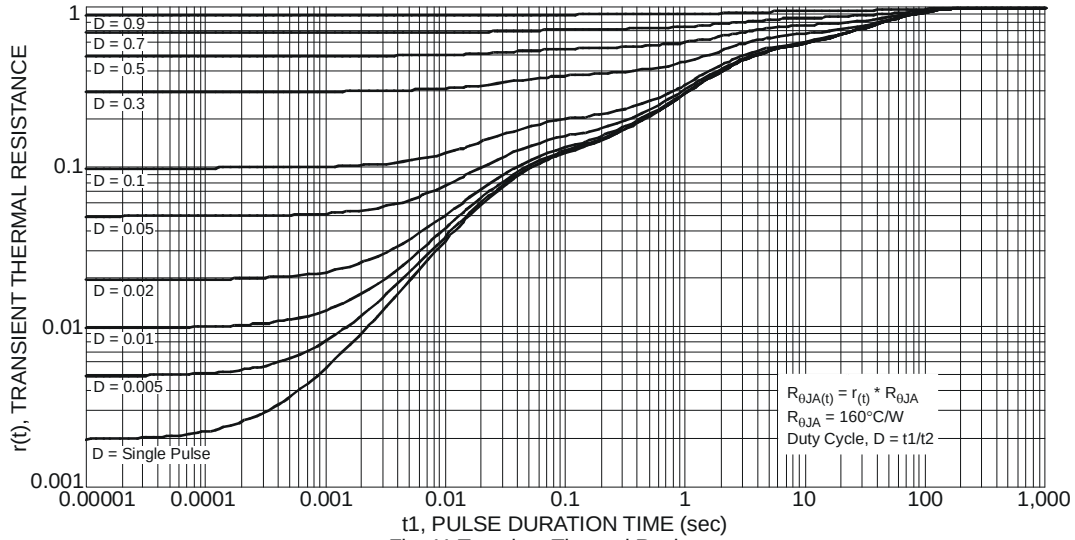
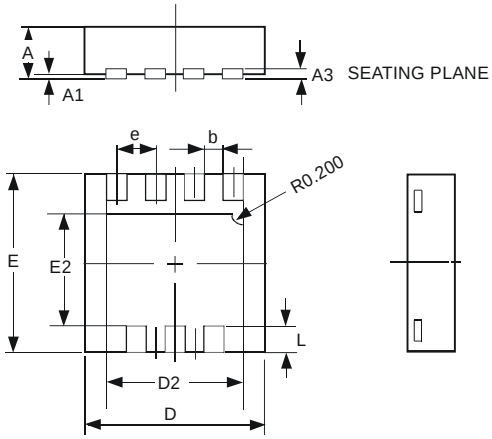


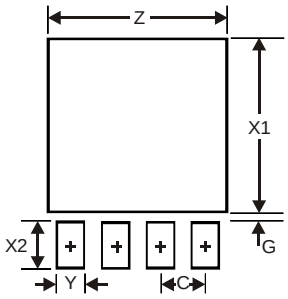
Fig. 11 Transient Thermal Resistance

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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