

**DUAL N-CANNEL ENHANCEMENT MODE MOSFET**
**Product Summary**

$BV_{DSS}$	$R_{DS(ON)}$ Max	$I_D$ $T_A = +25^\circ C$
20V	13m $\Omega$ @ $V_{GS} = 4.5V$	9.0A
	14m $\Omega$ @ $V_{GS} = 4.0V$	8.7A
	17m $\Omega$ @ $V_{GS} = 3.1V$	8.0A
	18m $\Omega$ @ $V_{GS} = 2.5V$	6.7A
	28m $\Omega$ @ $V_{GS} = 1.8V$	6.3A

**Description**

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.

**Applications**

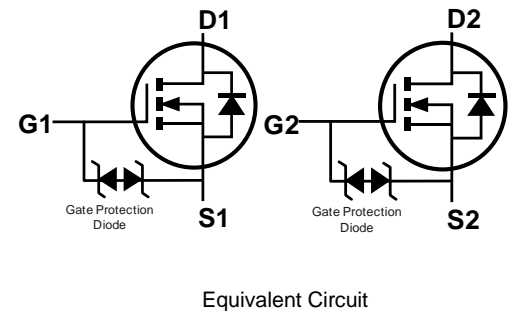
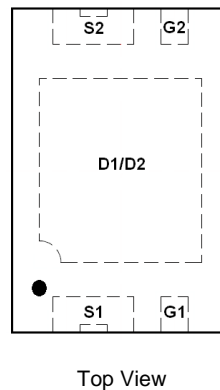
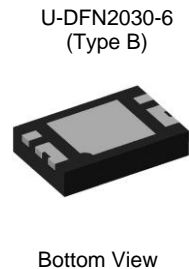
- Power Management Functions
- Battery Pack
- Load Switch

**Features**

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- ESD Protected Gate
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

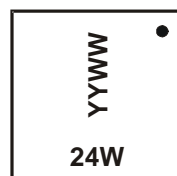
**Mechanical Data**

- Case: U-DFN2030-6 (Type B)
- 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: 0.012 grams (Approximate)


**Ordering Information** (Note 4)

Part Number	Case	Packaging
DMN2014LHAB-7	U-DFN2030-6 (Type B)	3,000 / Tape & Reel
DMN2014LHAB-13	U-DFN2030-6 (Type B)	10,000 / Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](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**


24W = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Two Digits of Year (ex: 16 for 2016)  
 WW = Week code (01 to 53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	20	V
Gate-Source Voltage			V <sub>GSS</sub>	±12	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = 4.5V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	9.0 7.1	A
	t < 10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	9.3 7.4	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1% )			I <sub>DM</sub>	45	A

**Thermal Characteristics**

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	T <sub>A</sub> = +25°C	P <sub>D</sub>	0.8	W
	T <sub>A</sub> = +70°C		0.5	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R <sub>θJA</sub>	157	°C/W
	t < 10s		148	
Total Power Dissipation (Note 6)	T <sub>A</sub> = +25°C	P <sub>D</sub>	1.7	W
	T <sub>A</sub> = +70°C		1.1	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R <sub>θJA</sub>	73.7	°C/W
	t < 10s		68	
Thermal Resistance, Junction to Case		R <sub>θJC</sub>	9.4	
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	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	20	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	—	—	1.0	µA	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±10	µA	V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.3	0.71	1.1	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	10	13	mΩ	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 4.0A
			11	14		V <sub>GS</sub> = 4.0V, I <sub>D</sub> = 4.0A
			12	17		V <sub>GS</sub> = 3.1V, I <sub>D</sub> = 4.0A
			13	18		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 4.0A
			19	28		V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 3.5A
Forward Transfer Admittance	Y <sub>fs</sub>	—	25	—	S	V <sub>DS</sub> = 5V, I <sub>D</sub> = 6A
Diode Forward Voltage	V <sub>SD</sub>	—	0.75	1.0	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	—	1550	—	pF	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	166	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	145	—	pF	
Gate Resistance	R <sub>g</sub>	—	1.37	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = 2.5V)	Q <sub>g</sub>	—	8.4	—	nC	V <sub>DS</sub> = 10V, I <sub>D</sub> = 6A
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	—	16	—	nC	
Gate-Source Charge	Q <sub>gs</sub>	—	2.3	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	2.5	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	6.9	—	ns	V <sub>DD</sub> = 10V, R <sub>L</sub> = 1.7Ω, V <sub>GS</sub> = 5.0V, R <sub>g</sub> = 3Ω
Turn-On Rise Time	t <sub>R</sub>	—	15.5	—	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	40.9	—	ns	
Turn-Off Fall Time	t <sub>F</sub>	—	12	—	ns	

- Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout
  6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad
  7. Repetitive rating, pulse width limited by junction temperature
  8. Guaranteed by design. Not subject to product testing

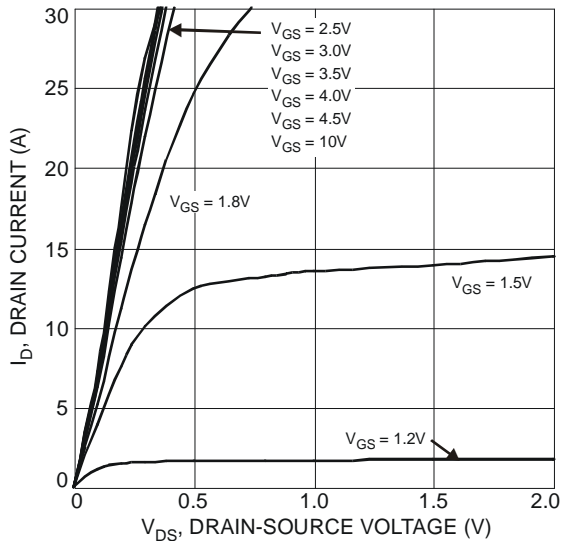


Figure 1 Typical Output Characteristic

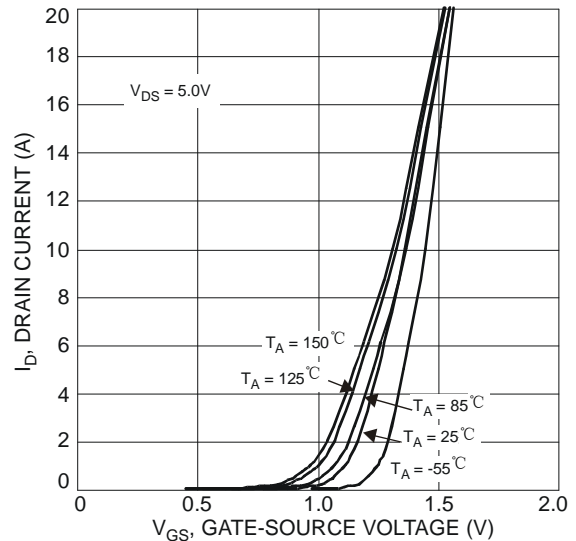


Figure 2 Typical Transfer Characteristics

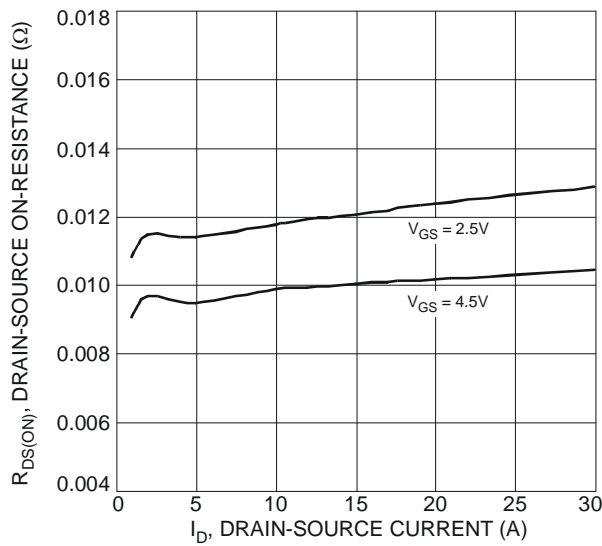


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

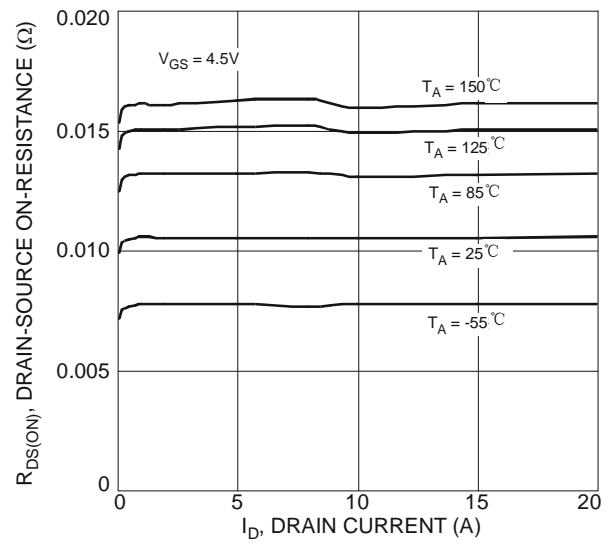


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

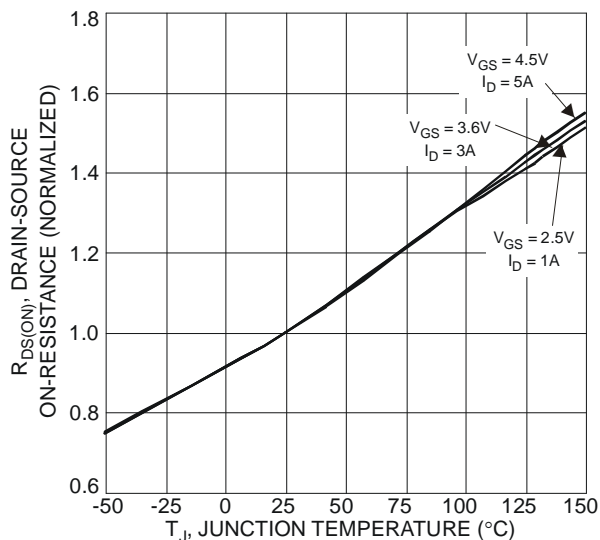


Figure 5 On-Resistance Variation with Temperature

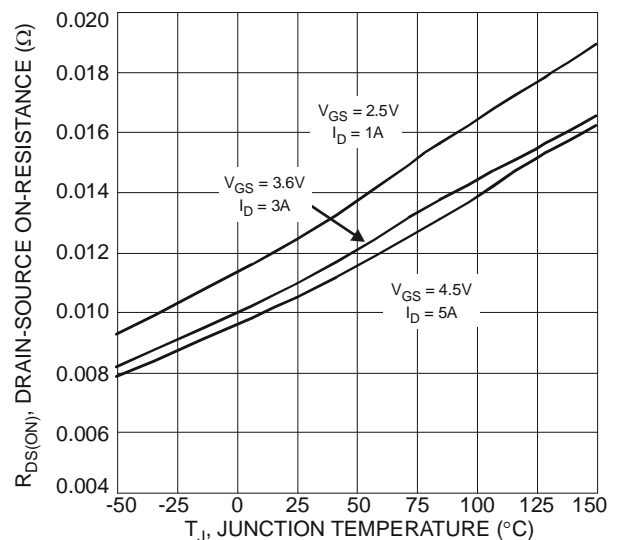
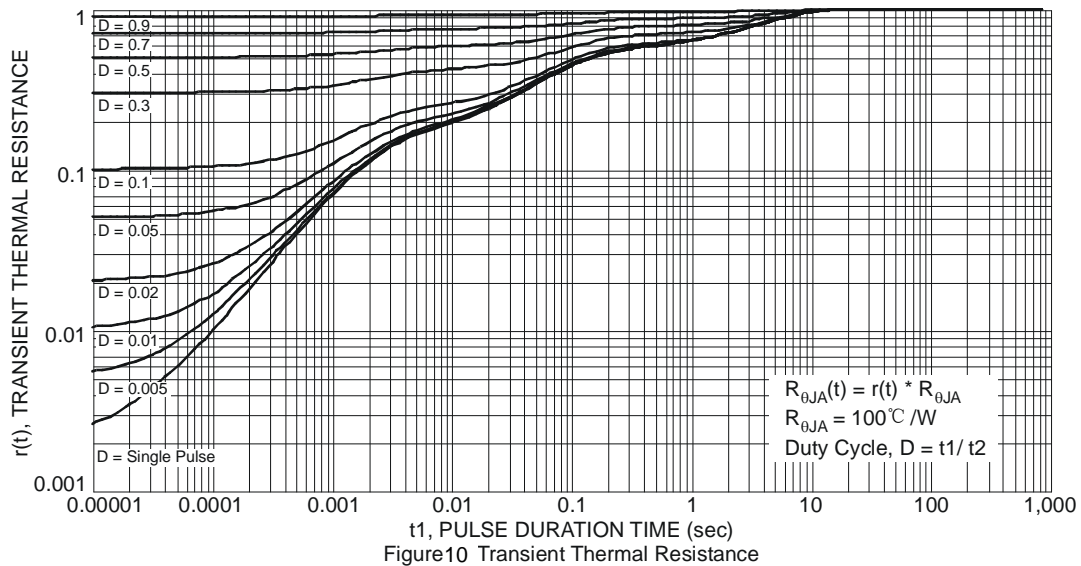
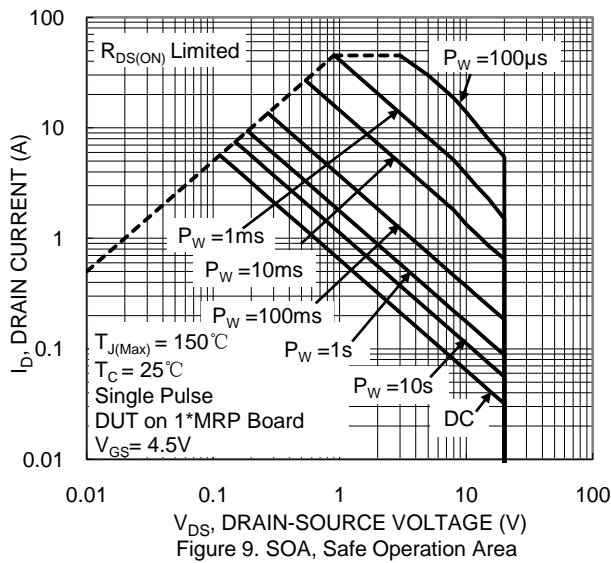
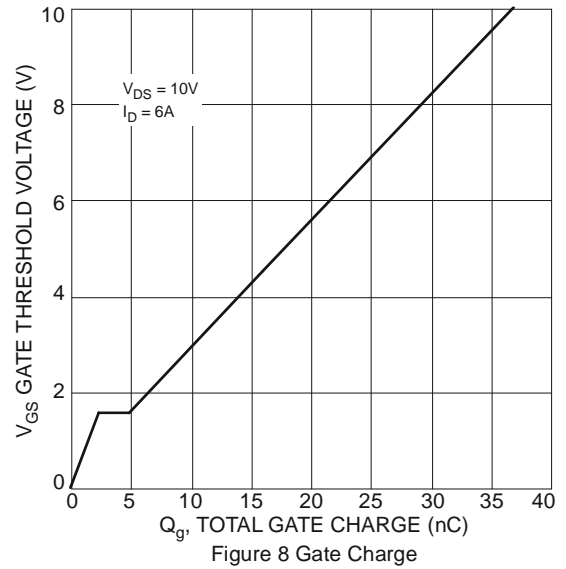
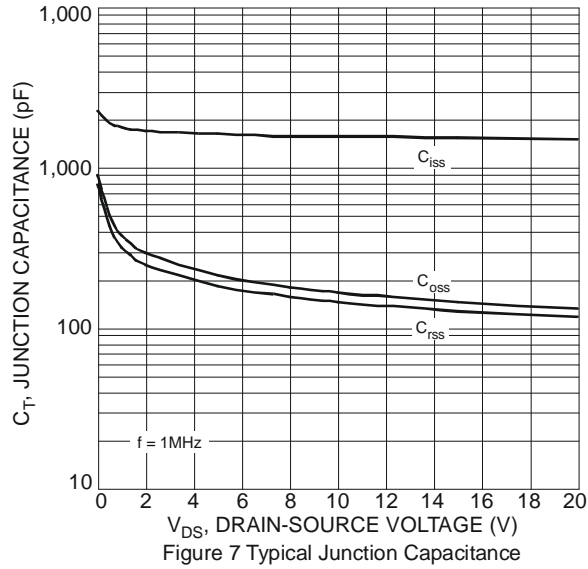


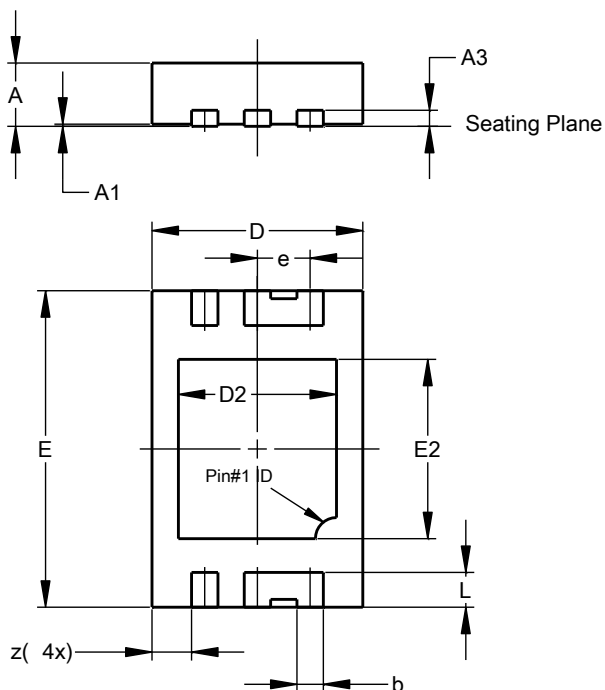
Figure 6 On-Resistance Variation with Temperature



## Package Outline Dimensions

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

**U-DFN2030-6 (Type B)**

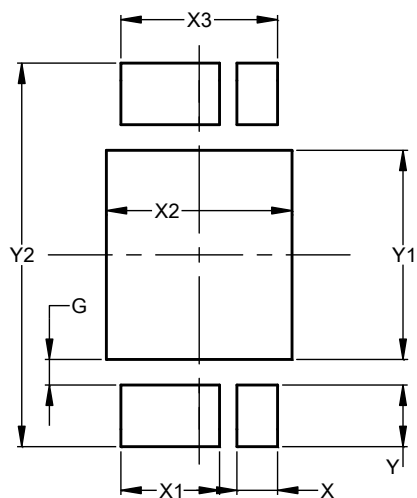


U-DFN2030-6 (Type B)			
Dim	Min	Max	Typ
A	0.55	0.65	0.60
A1	0.00	0.05	0.02
A3	--	--	0.15
b	0.20	0.30	0.25
D	1.95	2.05	2.00
D2	1.40	1.60	1.50
E	2.95	3.05	3.00
E2	1.65	1.75	1.70
e	--	--	0.50
L	0.28	0.38	0.33
z	--	--	0.375
All Dimensions in mm			

## Suggested Pad Layout

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

**U-DFN2030-6 (Type B)**



Dimensions	Value (in mm)
G	0.220
X	0.350
X1	0.850
X2	1.600
X3	1.350
Y	0.530
Y1	1.800
Y2	3.300

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