

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ max	I_D $T_A = +25^\circ C$
20V	13m Ω @ $V_{GS} = 4.5V$	9.0A
	14m Ω @ $V_{GS} = 4.0V$	8.7A
	17m Ω @ $V_{GS} = 3.1V$	8.0A
	18m Ω @ $V_{GS} = 2.5V$	6.7A
	28m Ω @ $V_{GS} = 1.8V$	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**

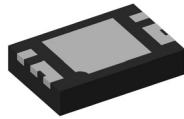
Mechanical Data

- Case: U-DFN2030-6
- 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)

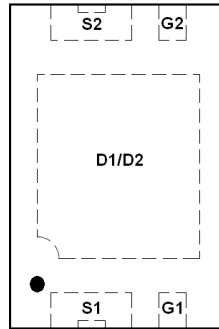


ESD PROTECTED TO 2kV

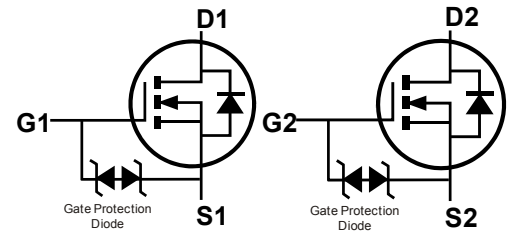
U-DFN2030-6



Bottom View



Top View



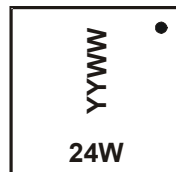
Equivalent Circuit

Ordering Information (Note 4)

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

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 - 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.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - 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 digit of year (ex: 14 for 2014)
 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}	± 12	V
Continuous Drain Current (Note 6) $V_{GS} = 4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	9.0 7.1	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	9.3 7.4	A
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)			I_{DM}	45	A

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	P_D	0.8	W
	$T_A = +70^\circ\text{C}$		0.5	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	157	$^\circ\text{C/W}$
	$t < 10\text{s}$		148	
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	P_D	1.7	W
	$T_A = +70^\circ\text{C}$		1.1	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	73.7	$^\circ\text{C/W}$
	$t < 10\text{s}$		68	
Thermal Resistance, Junction to Case		$R_{\theta JC}$	9.4	
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
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	20	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	I_{DSS}	—	—	1.0	μA	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	0.3	0.71	1.1	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	10	13	m Ω	$V_{GS} = 4.5\text{V}, I_D = 4.0\text{A}$
			11	14		$V_{GS} = 4.0\text{V}, I_D = 4.0\text{A}$
			12	17		$V_{GS} = 3.1\text{V}, I_D = 4.0\text{A}$
			13	18		$V_{GS} = 2.5\text{V}, I_D = 4.0\text{A}$
			19	28		$V_{GS} = 1.8\text{V}, I_D = 3.5\text{A}$
Forward Transfer Admittance	$ Y_{fs} $	—	25	—	S	$V_{DS} = 5\text{V}, I_D = 6\text{A}$
Diode Forward Voltage	V_{SD}	—	0.75	1.0	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	1550	—	pF	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	166	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	145	—	pF	
Gate Resistance	R_g	—	1.37	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ($V_{GS} = 2.5\text{V}$)	Q_g	—	8.4	—	nC	$V_{DS} = 10\text{V}, I_D = 6\text{A}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_g	—	16	—	nC	
Gate-Source Charge	Q_{gs}	—	2.3	—	nC	
Gate-Drain Charge	Q_{gd}	—	2.5	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	6.9	—	ns	
Turn-On Rise Time	t_r	—	15.5	—	ns	$V_{DD} = 10\text{V}, R_L = 1.7\Omega, V_{GS} = 5.0\text{V}, R_G = 3\Omega$
Turn-Off Delay Time	$t_{D(off)}$	—	40.9	—	ns	
Turn-Off Fall Time	t_f	—	12	—	ns	

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

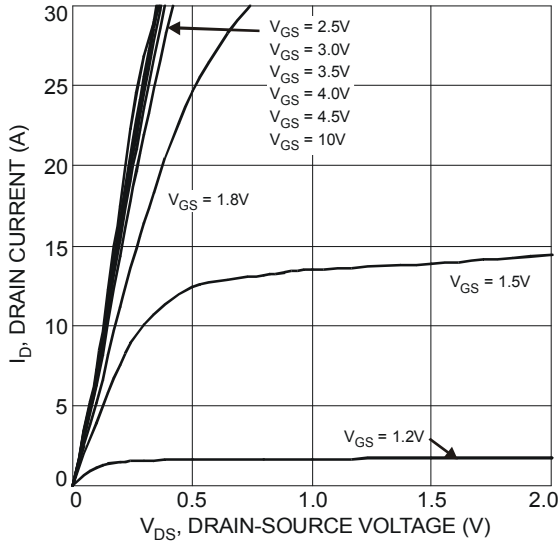


Figure 1 Typical Output Characteristic

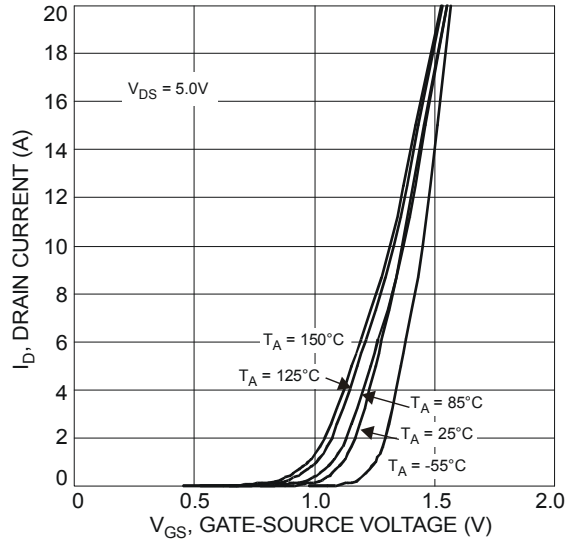


Figure 2 Typical Transfer Characteristics

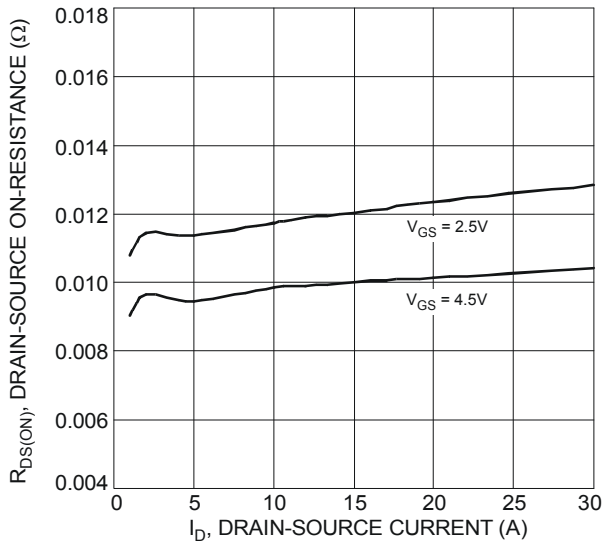


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

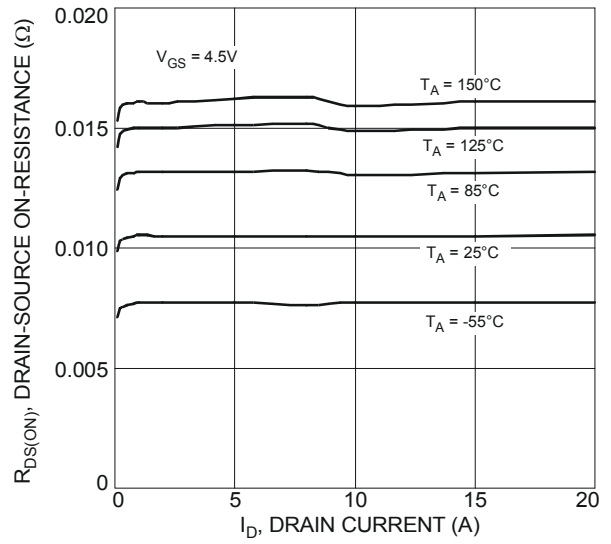


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

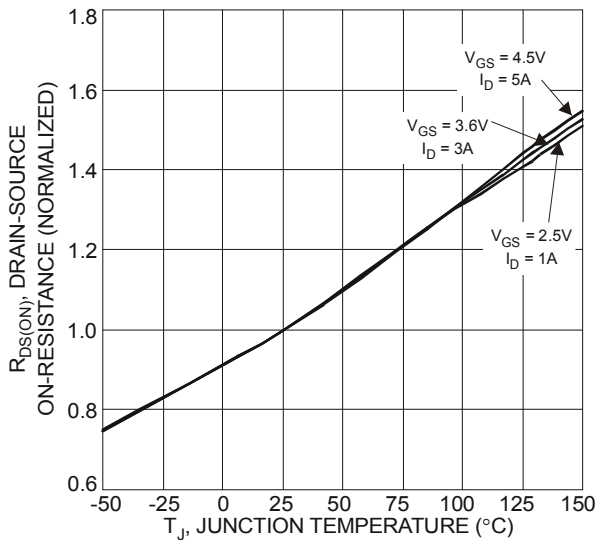


Figure 5 On-Resistance Variation with Temperature

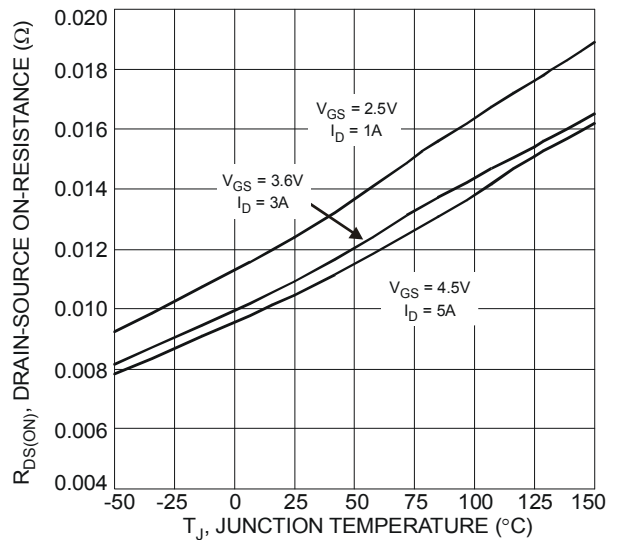


Figure 6 On-Resistance Variation with Temperature

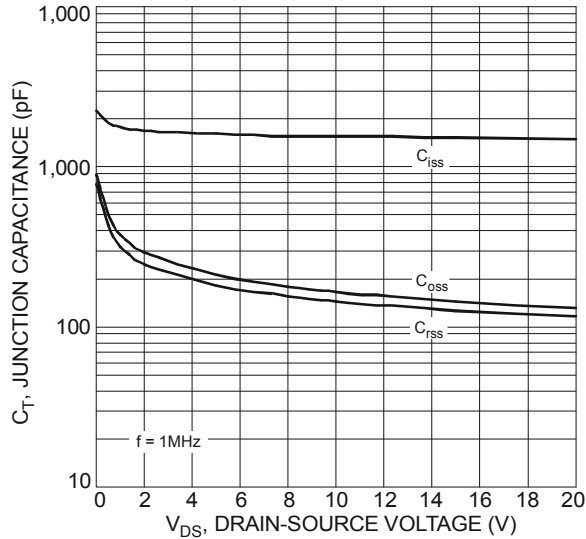


Figure 7 Typical Junction Capacitance

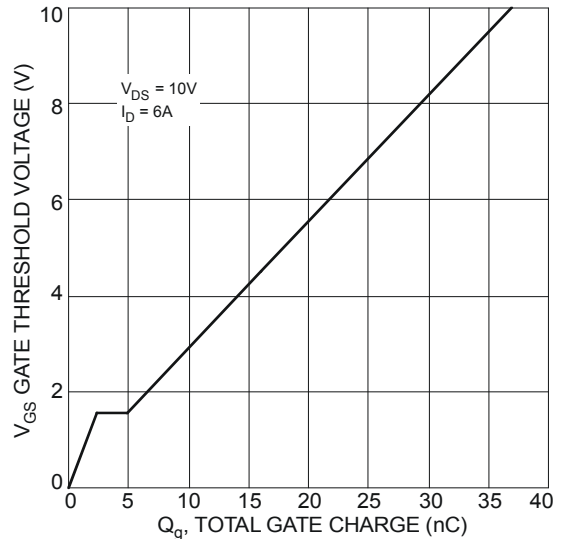


Figure 8 Gate Charge

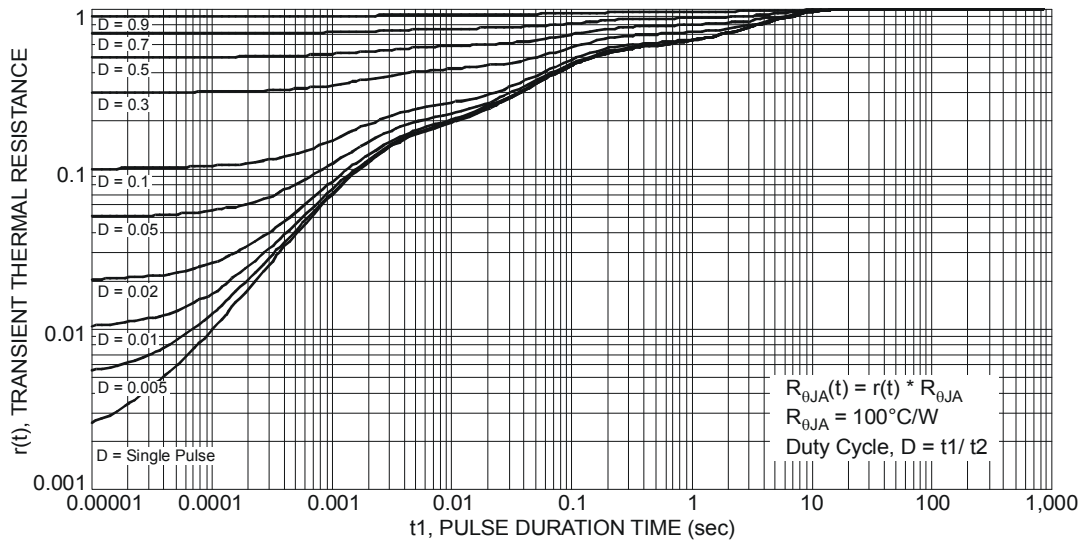
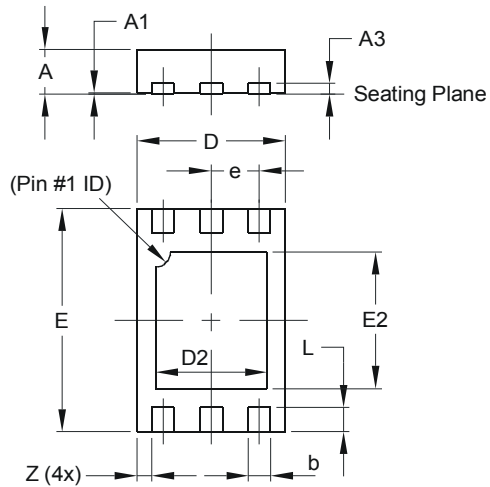


Figure 11 Transient Thermal Resistance

Package Outline Dimensions

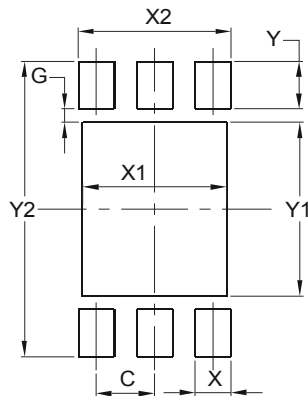
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



U-DFN2030-6 Type B			
Dim	Min	Max	Typ
A	0.55	0.65	0.60
A1	0	0.05	0.02
A3	-	-	0.15
b	0.25	0.35	0.30
D	1.95	2.05	2.00
D2	1.40	1.60	1.50
E	2.95	3.05	3.00
E2	1.74	1.94	1.84
e	-	-	0.65
L	0.28	0.38	0.33
Z	-	-	0.20
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
C	0.650
G	0.150
X	0.400
X1	1.600
X2	1.700
Y	0.530
Y1	1.940
Y2	3.300

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