



DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

| V _{(BR)DSS} | R _{DS(on)max} | I _D T _A = +25°C |
|----------------------|---------------------------------|--|
| 20V | 15.5mΩ @ V_{GS} = 4.5 V | 7.5A |
| | 16.5mΩ @ V _{GS} = 4.0V | 7.3A |
| | 19mΩ @ V _{GS} = 3.1V | 6.9A |
| | 20mΩ @ V _{GS} = 2.5V | 6.7A |
| | 30mΩ @ V _{GS} = 1.8V | 5.4A |

Description

This new generation MOSFET has been designed to minimize the onstate resistance $(R_{DS(ON)})$ and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

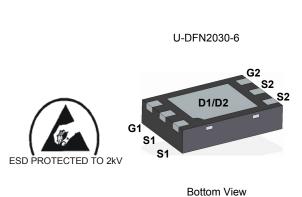
- Power Management Functions
- Battery Pack
- Load Switch

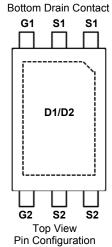
Features

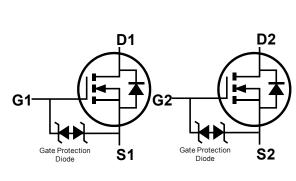
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- ESD Protected Gate
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

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
- Terminals: Finish NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208 (4)
- Weight: 0.012 grams (approximate)







Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---------------|-------------|---------------------|
| DMN2016LHAB-7 | U-DFN2030-6 | 3,000 / 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 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



26W = Product Type Marking Code YYWW = Date Code Marking YY = Last digit of year (ex: 12 for 2012) WW = Week code (01 to 53)



| Characte | Symbol | Value | Unit | | |
|--|------------------|--|-----------------|------------|---|
| Drain-Source Voltage | | | V_{DSS} | 20 | V |
| Gate-Source Voltage | V _{GSS} | ±12 | V | | |
| Continuous Drain Current (Nata C) V - 4.5V | Steady State | $T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$ | I _D | 7.5 5.8 | А |
| Continuous Drain Current (Note 6) V _{GS} = 4.5V | t < 10s | $T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$ | I _D | 7.7 6.0 | А |
| Pulsed Drain Current (10µs pulse, duty cycle = 1%) | | | I _{DM} | 45 | А |

Thermal Characteristics

| Characteristic | Symbol | Value | Units | | |
|--|------------------------|----------------------------------|------------|------|--|
| Total Dawar Dissination (Note 5) | T _A = +25°C | Б | 1.2 | W | |
| Total Power Dissipation (Note 5) | T _A = +70°C | P _D | 0.75 | VV | |
| Thermal Peciatones Junction to Ambient (Note 5) | Steady State | D | 106 | °C/W | |
| Thermal Resistance, Junction to Ambient (Note 5) | t < 10s | $R_{\theta JA}$ | 100 | C/VV | |
| Total Dowar Dissination (Note 6) | T _A = +25°C | D | 1.65 | W | |
| Total Power Dissipation (Note 6) | T _A = +70°C | P _D | 1 | VV | |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State | D | 78 | | |
| Thermal Resistance, Junction to Ambient (Note 6) | t < 10s | $R_{\theta JA}$ | 72 | °C/W | |
| Thermal Resistance, Junction to Case | $R_{	heta JC}$ | 11.4 | | | |
| Operating and Storage Temperature Range | | T _{J.} T _{STG} | -55 to 150 | °C | |

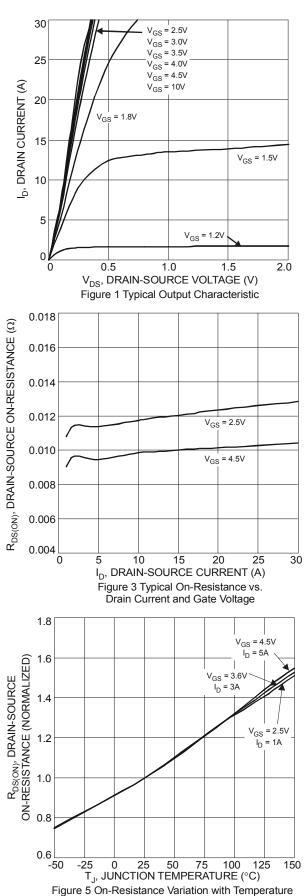
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

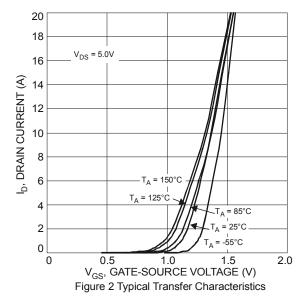
| <u> </u> | · · · | | | | | | |
|--|---------------------|-----|------|------|------|--|--|
| Characteristic | Symbol | Min | Тур | Max | Unit | Test Condition | |
| OFF CHARACTERISTICS (Note 7) | | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 20 | _ | _ | V | $V_{GS} = 0V, I_{D} = 250\mu A$ | |
| Zero Gate Voltage Drain Current T _J = +25°C | I _{DSS} | _ | _ | 1.0 | μΑ | V_{DS} = 20V, V_{GS} = 0V | |
| Gate-Source Leakage | I _{GSS} | 1 | | ±10 | μΑ | $V_{GS} = \pm 8V$, $V_{DS} = 0V$ | |
| ON CHARACTERISTICS (Note 7) | _ | _ | _ | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 0.5 | 0.71 | 1.1 | ٧ | $V_{DS} = V_{GS}, I_{D} = 250 \mu A$ | |
| | | | 13 | 15.5 | mΩ | $V_{GS} = 4.5V, I_D = 4.0A$ | |
| | | | 13.5 | 16.5 | | $V_{GS} = 4.0V, I_D = 4.0A$ | |
| Static Drain-Source On-Resistance | R _{DS(ON)} | _ | 14 | 19 | | $V_{GS} = 3.1V, I_D = 4.0A$ | |
| | , , | | 15 | 20 | | $V_{GS} = 2.5V, I_D = 4.0A$ | |
| | | | 21 | 30 | | $V_{GS} = 1.8V, I_D = 3.5A$ | |
| 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 8) | | | | | | • | |
| Input Capacitance | C _{iss} | _ | 1550 | _ | pF | | |
| Output Capacitance | Coss | _ | 166 | _ | pF | $V_{DS} = 10V, V_{GS} = 0V,$ - f = 1.0MHz | |
| Reverse Transfer Capacitance | Crss | _ | 145 | _ | pF | 1 = 1.0WHZ | |
| Gate Resistance | Rq | _ | 1.37 | _ | Ω | $V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$ | |
| Total Gate Charge (V _{GS} = 2.5V) | Qq | _ | 8.4 | _ | nC | | |
| Total Gate Charge (V _{GS} = 4.5V) | Qg | _ | 16 | _ | nC |)/ - 10\/ - 0A | |
| Gate-Source Charge | Q _{qs} | _ | 2.3 | _ | nC | $V_{DS} = 10V, I_{D} = 6A$ | |
| 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 | $V_{DD} = 10V, R_L = 1.7\Omega,$ | |
| Turn-Off Delay Time | t _{D(off)} | _ | 40.9 | _ | ns | $V_{GS} = 5.0V$, $R_G = 3\Omega$ | |
| Turn-Off Fall Time | t _f | _ | 12 | _ | ns | 1 | |

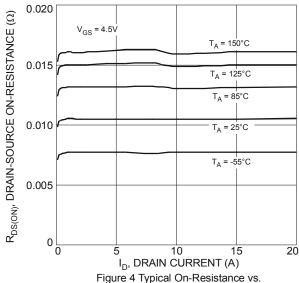
Notes:

- 5. 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 1 limital recommended p
 Repetitive rating, pulse width limited by junction temperature
 Guaranteed by design. Not subject to product testing





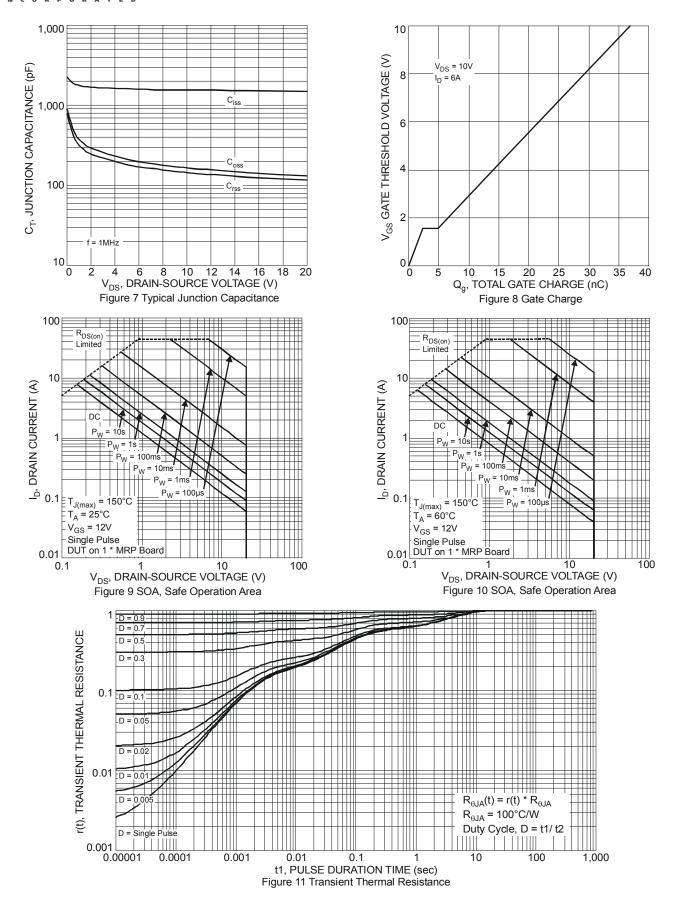




Drain Current and Temperature

0.020 $R_{DS(ON)}$, DRAIN-SOURCE ON-RESISTANCE (Ω) 0.018 $V_{GS} = 2.5V$ I_D = 1A 0.016 V_{GS} = 3.6V 0.014 I_D = 3A 0.012 V_{GS} = 4.5V I_D = 5A 0.010 0.008 0.006 0.004 100 25 50 75 T_J, JUNCTION TEMPERATURE (°C)

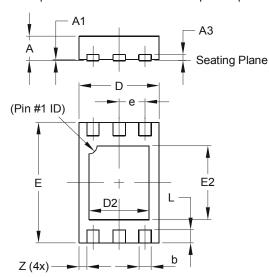






Package Outline Dimensions

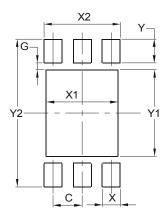
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



| U-DFN2030-6 | | | | | | |
|----------------------|------|------|------|--|--|--|
| Type B | | | | | | |
| Dim | Min | Max | Тур | | | |
| Α | 0.55 | 0.65 | 0.60 | | | |
| A 1 | 0 | 0.05 | 0.02 | | | |
| A3 | 1 | 1 | 0.15 | | | |
| b | 0.25 | 0.35 | 0.30 | | | |
| D | 1.95 | 2.05 | 2.00 | | | |
| D2 | 1.40 | 1.60 | 1.50 | | | |
| Е | 2.95 | 3.05 | 3.00 | | | |
| E2 | 1.74 | 1.94 | 1.84 | | | |
| е | - | - | 0.65 | | | |
| L | 0.28 | 0.38 | 0.33 | | | |
| Ζ | - | - | 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 | | |
|-------------|---------|--|--|
| Illiensions | (in mm) | | |
| С | 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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