

Product Summary

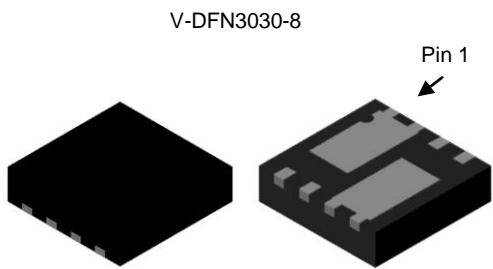
| Device | $V_{(BR)DSS}$ | $R_{DS(ON)} \text{ max}$ | $I_D \text{ MAX}$ $T_A = +25^\circ\text{C}$ |
|-----------|---------------|---------------------------------------|--|
| N-Channel | 30V | 20m Ω @ $V_{GS} = 10\text{V}$ | 7.3A |
| | | 24m Ω @ $V_{GS} = 4.5\text{V}$ | 6.7A |

Description

This MOSFET is 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.

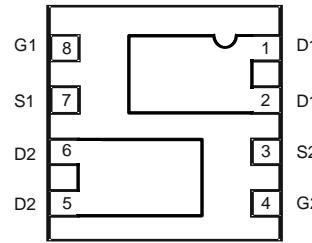
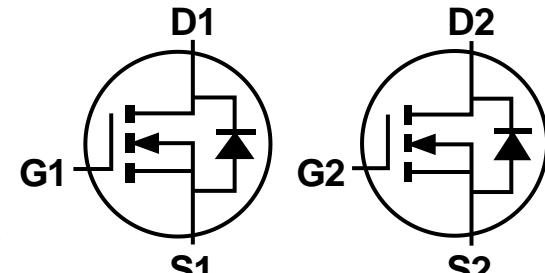
Applications

- DC Motor Control
- DC-AC Inverters



Top View

Bottom View

Pin out Configuration
(Bottom View)

Q1 N-Channel MOSFET

Q2 N-Channel MOSFET

Equivalent Circuit

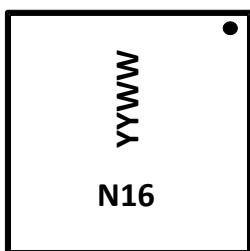
Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---------------|-------------|-------------------|
| DMN3016LDN-7 | V-DFN3030-8 | 3000/Tape & Reel |
| DMN3016LDN-13 | V-DFN3030-8 | 10000/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



N16 = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Digit of Year (ex: 13 for 2013)
 WW = Week Code (01 ~ 53)

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | | | Symbol | Value | Units |
|--|--------------|---------------------------|-----------|----------|-------------|
| Drain-Source Voltage | | | V_{DSS} | 30 | V |
| Gate-Source Voltage | | | V_{GSS} | ± 20 | V |
| Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$ | Steady State | $T_A = +25^\circ\text{C}$ | I_D | 7.3 | A |
| | | $T_A = +70^\circ\text{C}$ | | 5.8 | |
| $t < 10\text{s}$ | | $T_A = +25^\circ\text{C}$ | I_D | 9.2 | A |
| | | $T_A = +70^\circ\text{C}$ | | 7.3 | |
| Maximum Continuous Body Diode Forward Current (Note 6) | | | I_S | 2.5 | A |
| Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%) | | | I_{DM} | 45 | A |
| Avalanche Current (Note 7) $L = 0.1\text{mH}$ | | | I_{AS} | 22 | A |
| Avalanche Energy (Note 7) $L = 0.1\text{mH}$ | | | E_{AS} | 24 | mJ |

Thermal Characteristics

| Characteristic | | Symbol | Value | Units |
|--|---------------------------|-----------------|-------------|--------------------|
| Total Power Dissipation (Note 5) | $T_A = +25^\circ\text{C}$ | P_D | 1.1 | W |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State | $R_{\theta JA}$ | 119 | $^\circ\text{C/W}$ |
| | $t < 10\text{s}$ | | 75 | |
| Total Power Dissipation (Note 6) | $T_A = +25^\circ\text{C}$ | P_D | 1.6 | W |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State | $R_{\theta JA}$ | 78 | $^\circ\text{C/W}$ |
| | $t < 10\text{s}$ | | 49 | |
| Thermal Resistance, Junction to Case (Note 6) | | $R_{\theta JC}$ | 13.5 | |
| 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 8) | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | 30 | - | - | V | $V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$ |
| Zero Gate Voltage Drain Current | I_{DSS} | - | - | 1 | μA | $V_{DS} = 30\text{V}, V_{GS} = 0\text{V}$ |
| Gate-Source Leakage | I_{GSS} | - | - | ± 100 | nA | $V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$ |
| ON CHARACTERISTICS (Note 8) | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | 1.4 | - | 2.0 | V | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$ |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | - | - | 20 | $\text{m}\Omega$ | $V_{GS} = 10\text{V}, I_D = 11\text{A}$ |
| | | - | - | 24 | | $V_{GS} = 4.5\text{V}, I_D = 9\text{A}$ |
| Diode Forward Voltage | V_{SD} | - | 0.70 | 1.0 | V | $V_{GS} = 0\text{V}, I_S = 1\text{A}$ |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C_{iss} | - | 1415 | - | pF | $V_{DS} = 15\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$ |
| Output Capacitance | C_{oss} | - | 119 | - | | |
| Reverse Transfer Capacitance | C_{rss} | - | 82 | - | | |
| Gate Resistance | R_g | - | 2.6 | - | Ω | $V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$ |
| Total Gate Charge ($V_{GS} = 4.5\text{V}$) | Q_g | - | 11.3 | - | nC | $V_{DS} = 15\text{V}, I_D = 12\text{A}$ |
| Total Gate Charge ($V_{GS} = 10\text{V}$) | Q_g | - | 25.1 | - | | |
| Gate-Source Charge | Q_{gs} | - | 3.5 | - | | |
| Gate-Drain Charge | Q_{gd} | - | 3.6 | - | | |
| Turn-On Delay Time | $t_{D(ON)}$ | - | 4.8 | - | ns | $V_{DD} = 15\text{V}, V_{GS} = 10\text{V}, R_L = 1.25\Omega, R_G = 3\Omega$ |
| Turn-On Rise Time | t_R | - | 16.5 | - | | |
| Turn-Off Delay Time | $t_{D(OFF)}$ | - | 26.1 | - | | |
| Turn-Off Fall Time | t_F | - | 5.6 | - | | |
| Reverse Recovery Time | t_{RR} | - | 12.3 | - | ns | $I_F = 12\text{A}, di/dt = 500\text{A}/\mu\text{s}$ |
| Reverse Recovery Charge | Q_{rr} | - | 10.4 | - | | |

Notes:

5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1in. square copper plate.
7. I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep $T_J = +25^\circ\text{C}$.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

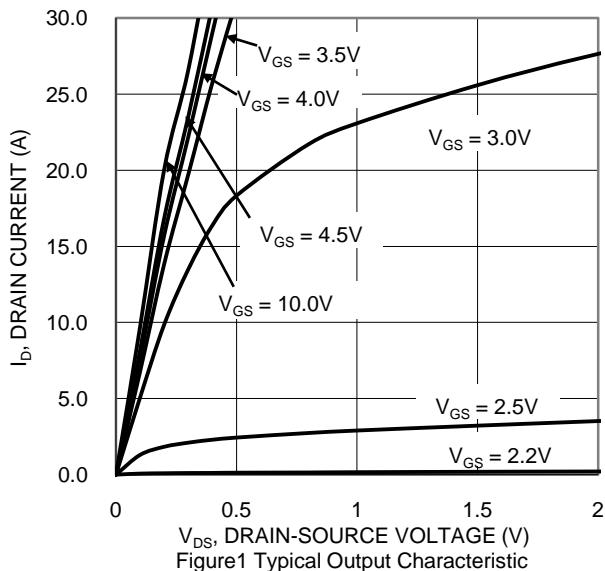


Figure 1 Typical Output Characteristic

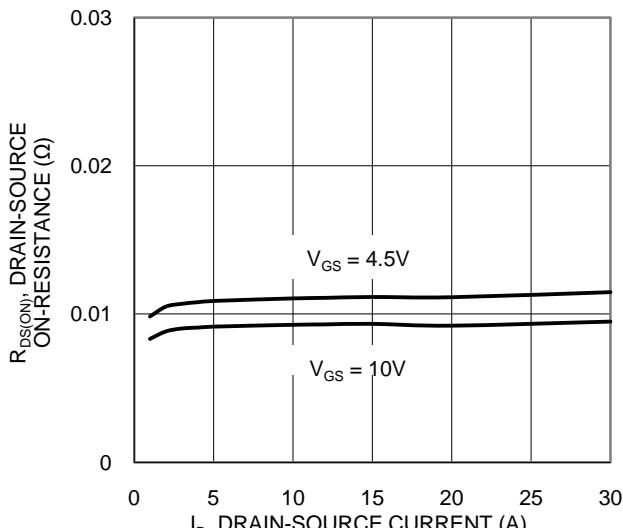


Figure 3 Typical On-Resistance vs Drain Current and Gate Voltage

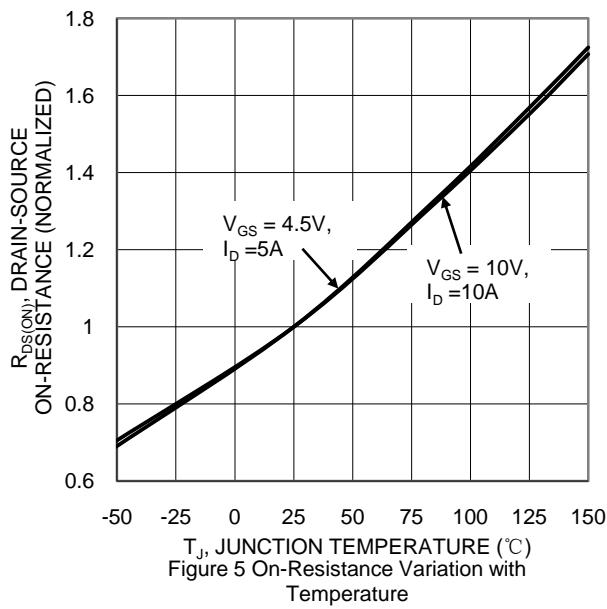


Figure 5 On-Resistance Variation with Temperature

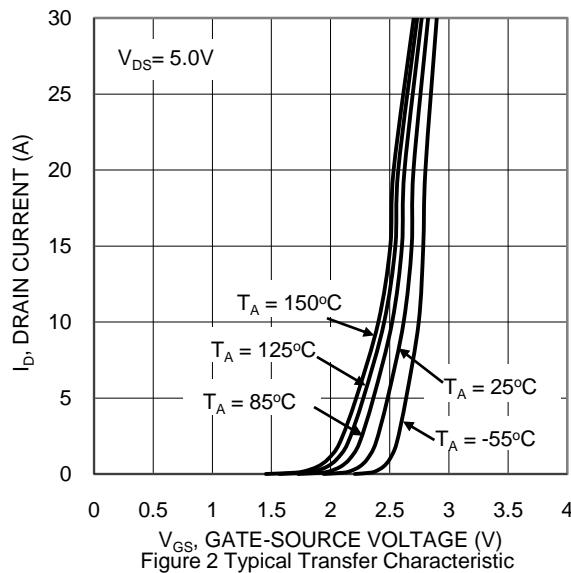


Figure 2 Typical Transfer Characteristic

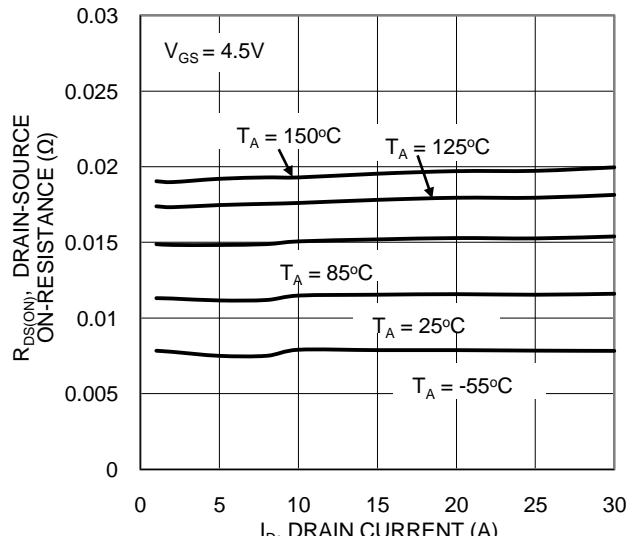


Figure 4 Typical On-Resistance vs Drain Current and Temperature

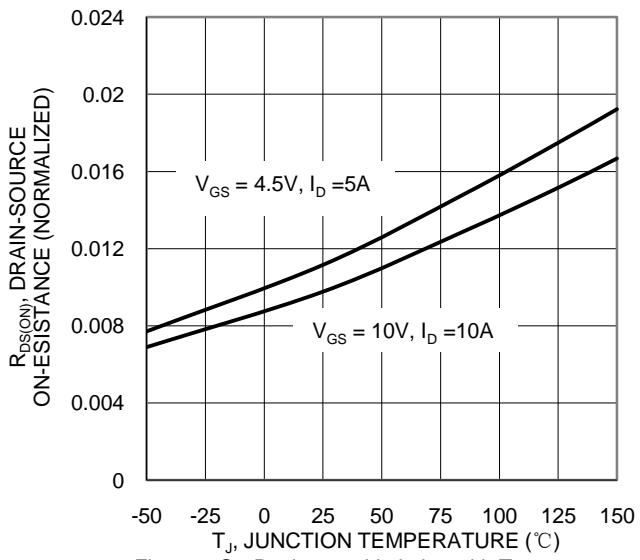
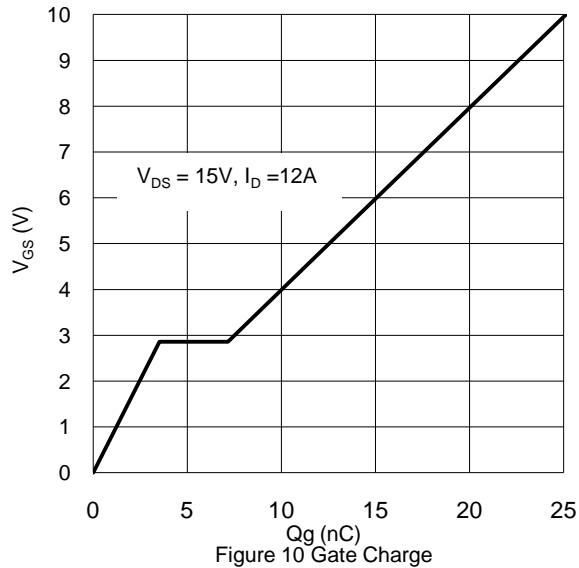
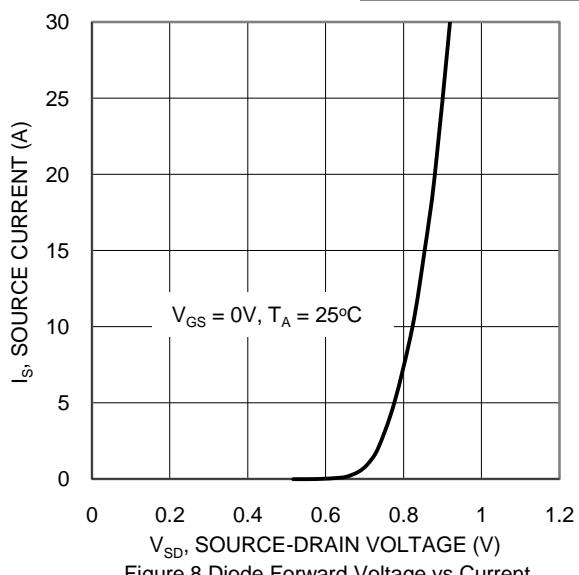
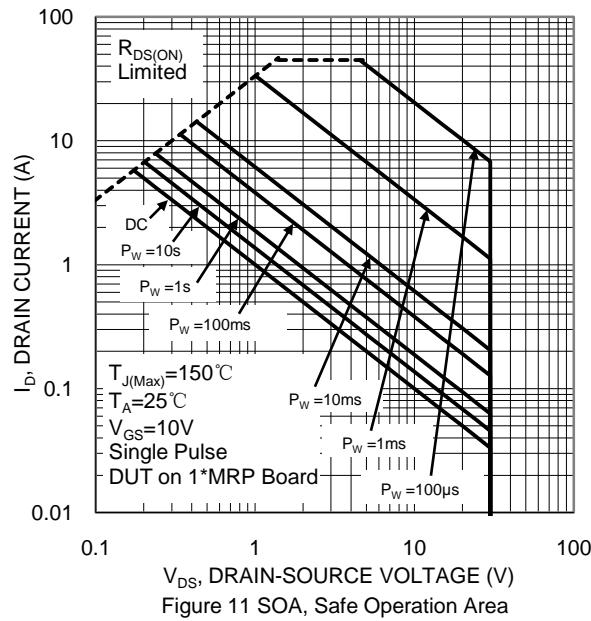
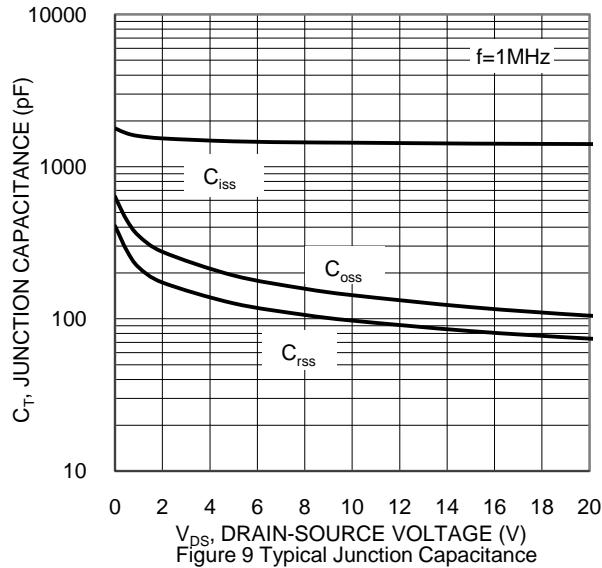
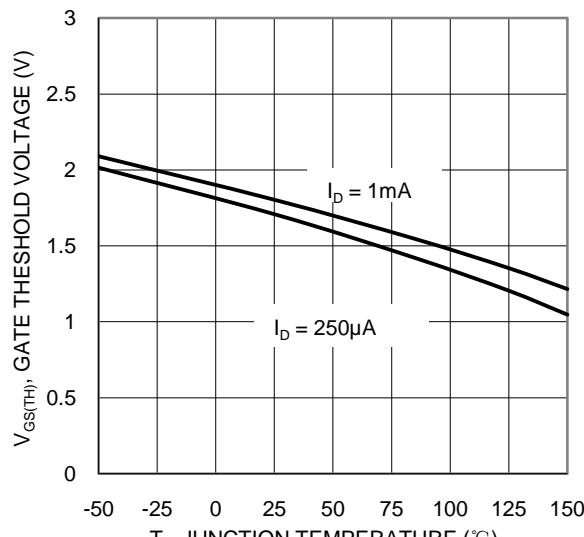


Figure 6 On-Resistance Variation with Temperature



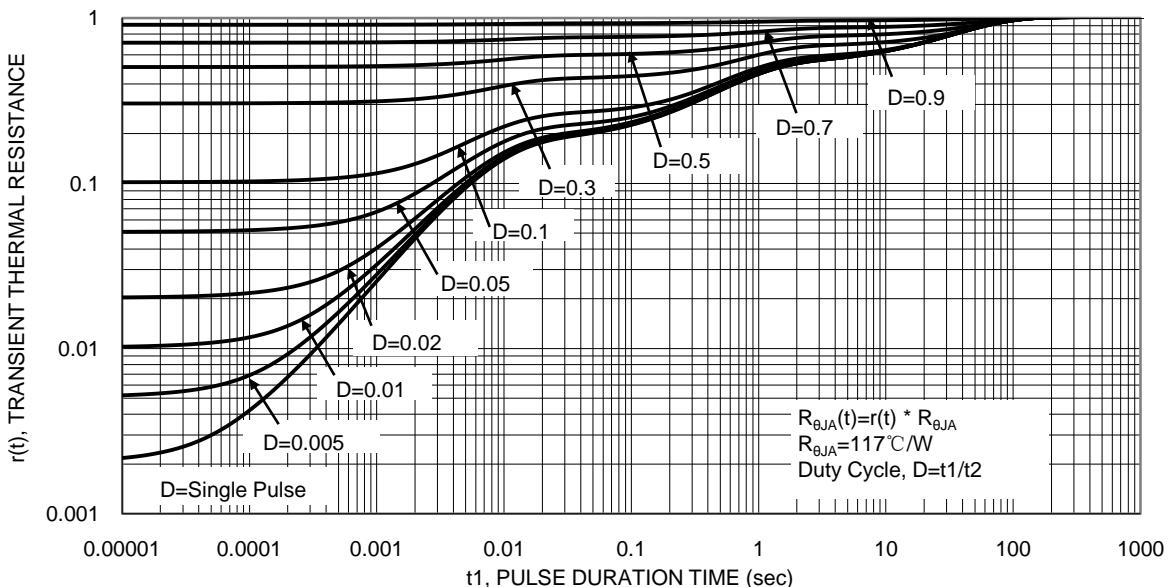
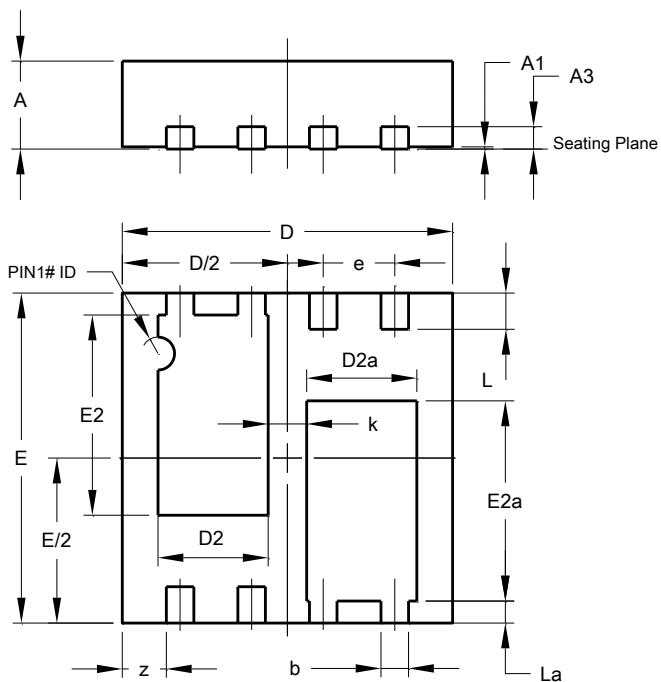


Figure 12 Transient Thermal Resistance

Package Outline Dimensions

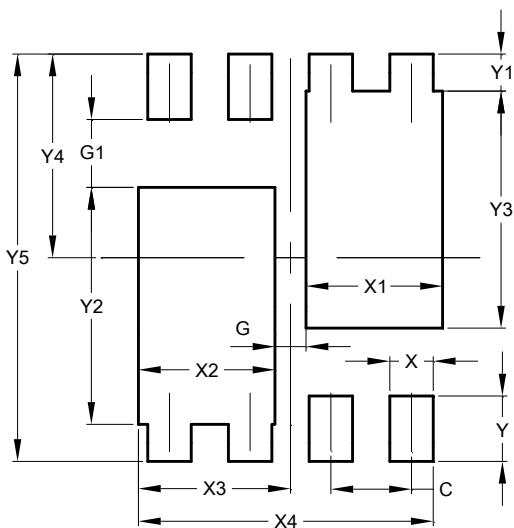
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| V-DFN3030-8 (Type J) | | | |
|-------------------------|-----------|-------|------|
| Dim | Min | Max | Typ |
| A | 0.77 | 0.83 | 0.80 |
| A1 | 0.00 | 0.05 | 0.02 |
| A3 | 0.203 BSC | | |
| b | 0.20 | 0.30 | 0.25 |
| D | 2.95 | 3.050 | 3.00 |
| D2 | 0.90 | 1.10 | 1.00 |
| D2a | 0.90 | 1.10 | 1.00 |
| E | 2.95 | 3.050 | 3.00 |
| E2 | 1.72 | 1.92 | 1.82 |
| E2a | 1.72 | 1.92 | 1.82 |
| e | 0.65BSC | | |
| L | 0.27 | 0.38 | 0.33 |
| La | 0.15 | 0.25 | 0.20 |
| k | 0.35 TYP | | |
| z | 0.40 BSC | | |
| 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 | 0.250 |
| G1 | 0.550 |
| X | 0.350 |
| X1 | 1.100 |
| X2 | 1.100 |
| X3 | 1.225 |
| X4 | 2.375 |
| Y | 0.530 |
| Y1 | 0.300 |
| Y2 | 1.920 |
| Y3 | 1.920 |
| Y4 | 1.650 |
| Y5 | 3.300 |

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