

■ PRODUCT CHARACTERISTICS

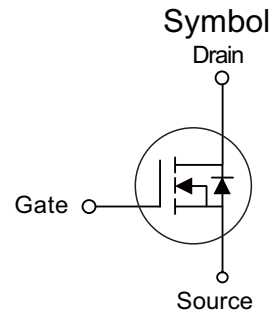
| | |
|--|--------|
| V _{DSS} | 100V |
| R _{DS(on)typ} (@V _{GS} =10 V) | 11.6mΩ |
| R _{DS(on)typ} (@V _{GS} =4.5 V) | 16.5mΩ |
| I _D | 38A |

■ APPLICATIONS

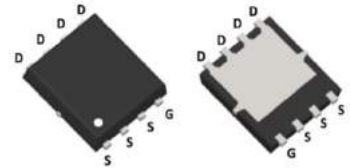
- * Power management in computing
- * Load switching,quick/wireless charging
- * Motor driving

■ FEATURES

- * Ultra low Rdson
- * Low gate charge
- * Pb-free lead plating



PDFN3X3-8L



■ ORDER INFORMATION

| Order codes | | Package | Packing |
|---------------|----------|---------|------------------|
| Halogen- Free | Halogen | | |
| N/A | MOT1514J | PDFN3X3 | 5000 pieces/Reel |

■ ABSOLUTE MAXIMUM RATINGS (T_J=25°C Unless Otherwise Noted)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|----------------------------------|---------------------------|-----------------|------|
| Drain-Source Voltage | V _{DSS} | 100 | V |
| Gate-Source Voltage | V _{GSS} | ±20 | V |
| Drain Current | Continuous ⁽¹⁾ | I _D | 38 |
| | Pulsed ⁽²⁾ | I _{DM} | 154 |
| Avalanche Energy ⁽³⁾ | E _{AS} | 45 | mJ |
| Power Dissipation ⁽⁴⁾ | P _D | 32 | W |
| Operating Junction Temperature | T _J | -55-150 | °C |

■ THERMAL CHARACTERISTICS

| PARAMETER | SYMBOL | RATINGS | UNIT |
|--|-----------------|---------|------|
| Thermal resistance junction to ambient | θ _{JA} | 3.9 | °C/W |

■ ELECTRICAL CHARACTERISTICS (T_c=25°C unless otherwise specified)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|--|----------------------|--|---|------|------|------|
| Static characteristics | | | | | | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | I _D = 250μA, V _{GS} = 0V | 100 | - | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 80V, V _{GS} = 0V T _J = 55°C | - | - | 1.0 | μA |
| | | | - | - | 5.0 | |
| Gate-Body Leakage Current | I _{GSS} | V _{DS} = 0V, V _{GS} = ±20V | - | - | ±100 | nA |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D = 250μA | 1.2 | 1.9 | 2.5 | V |
| Static Drain-Source ON-Resistance | R _{DS(ON)} | V _{GS} = 10V, I _D = 20A | - | 11.6 | 14 | mΩ |
| | | V _{GS} = 4.5V, I _D = 15A | - | 16.5 | 22 | mΩ |
| Forward Transconductance | g _{FS} | V _{DS} = 5V, I _D = 20A | - | 57 | - | S |
| Diode Forward Voltage | V _{SD} | I _S = 1A, V _{GS} = 0V | - | 0.70 | 1.0 | V |
| Diode Continuous Current | I _S | T _C = 25°C | - | - | 32 | A |
| Dynamic characteristics⁽⁵⁾ | | | | | | |
| Input Capacitance | C _{iSS} | V _{GS} = 0V, V _{DS} = 50V, f = 1MHz | - | 1535 | - | pF |
| Output Capacitance | C _{oss} | | - | 335 | - | pF |
| Reverse Transfer Capacitance | C _{rss} | | - | 8.2 | - | pF |
| Gate Resistance | R _g | V _{GS} = 0V, V _{DS} = 0V, f = 1MHz | - | 1.9 | - | Ω |
| Switching characteristics⁽⁵⁾ | | | | | | |
| Total Gate Charge (@ V _{GS} = 10V) | Q _g | V _{GS} = 0 to 10V V _{DS} = 50V, I _D = 20A | - | 26 | - | nC |
| Total Gate Charge (@ V _{GS} = 4.5V) | Q _g | | - | 14.0 | - | nC |
| Gate Source Charge | Q _{gs} | | - | 4.3 | - | nC |
| Gate Drain Charge | Q _{gd} | | - | 6.8 | - | nC |
| Turn-On DelayTime | t _{D(on)} | V _{GS} = 10V, V _{DS} = 50V R _L = 2.5Ω, R _{GEN} = 6Ω | - | 7.5 | - | ns |
| Turn-On Rise Time | t _r | | - | 15.8 | - | ns |
| Turn-Off DelayTime | t _{D(off)} | | - | 31 | - | ns |
| Turn-Off Fall Time | t _f | | - | 28 | - | ns |
| Body Diode Reverse Recovery Time | t _{rr} | | I _F = 15A, dI _F /dt = 100A/μs | - | 43 | - |
| Body Diode Reverse Recovery Charge | Q _{rr} | I _F = 15A, dI _F /dt = 100A/μs | - | 35 | - | nC |

Notes:

1. Computed continuous current assumes the condition of T_{J,Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under T_{J,Max} = 150°C.
3. This single-pulse measurement was taken under the following condition [L = 100μH, V_{GS} = 10V, V_{DS} = 30V] while its value is limited by T_{J,Max} = 150°C.
4. The power dissipation P_D is based on T_{J,Max} = 150°C.
5. This value is guaranteed by design hence it is not included in the production test.

■ TYPICAL CHARACTERISTICS

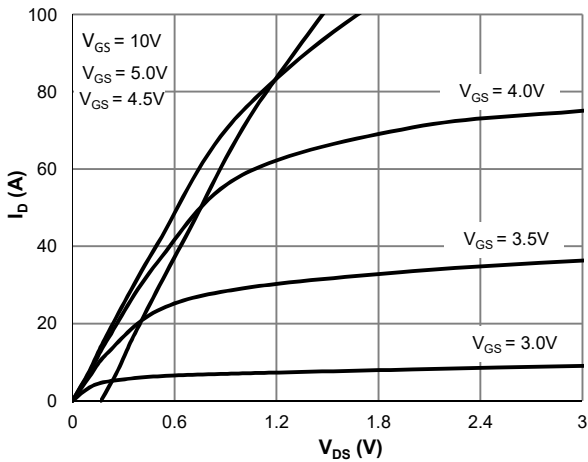


Figure 1: Saturation Characteristics

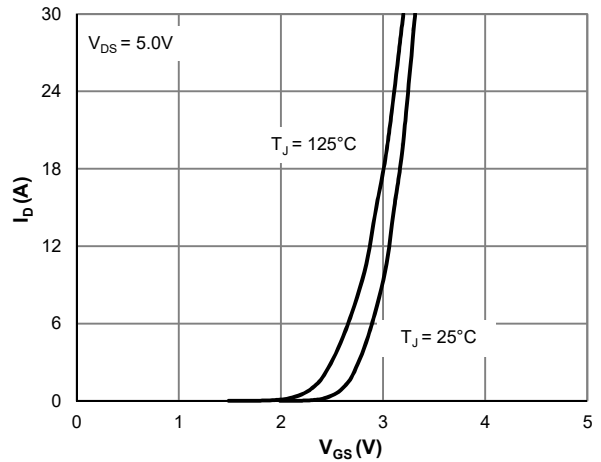


Figure 2: Transfer Characteristics

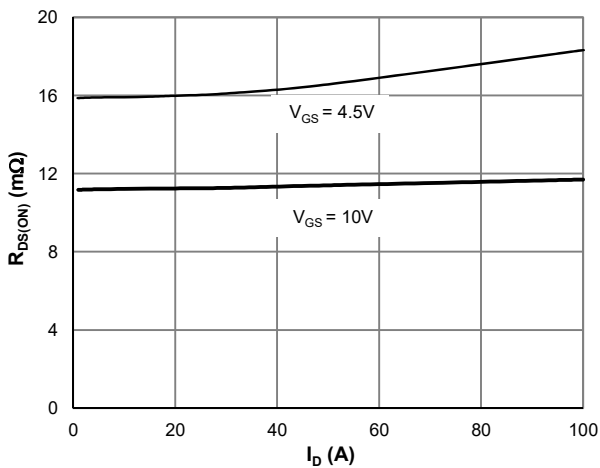


Figure 3: $R_{DS(ON)}$ vs. Drain Current

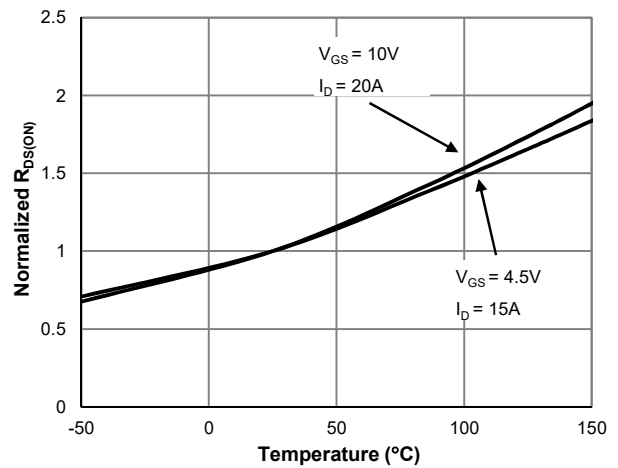


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

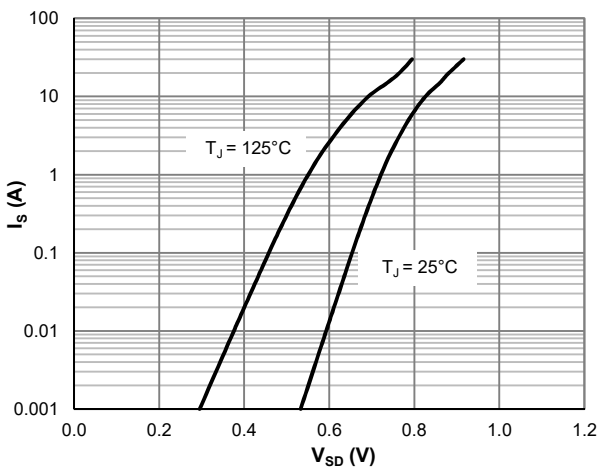


Figure 5: Body-Diode Characteristics

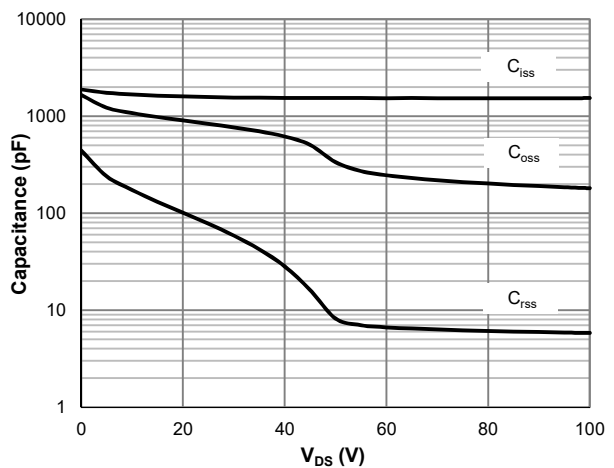


Figure 6: Capacitance Characteristics

■ TYPICAL CHARACTERISTICS(Cont.)

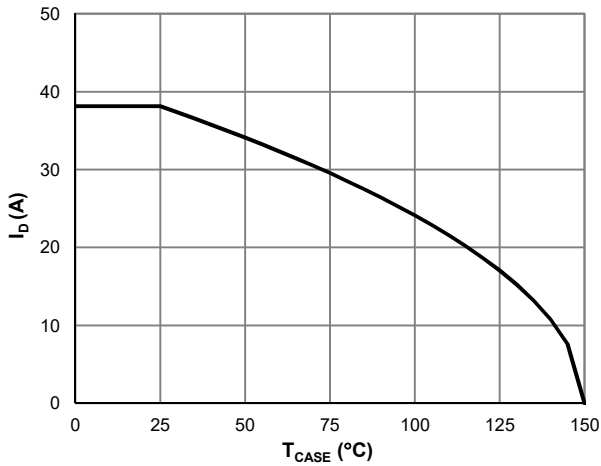


Figure 7: Current De-rating

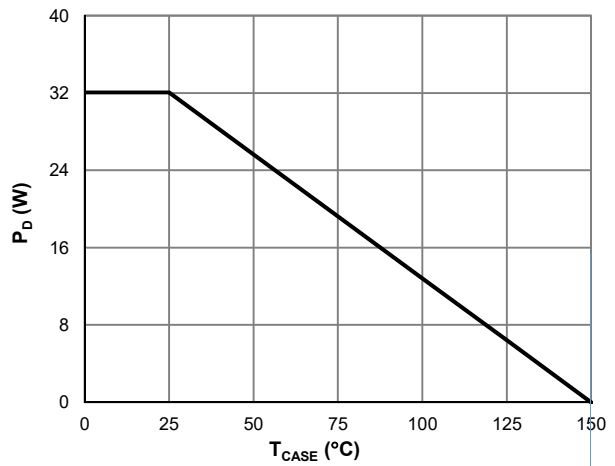


Figure 8: Power De-rating

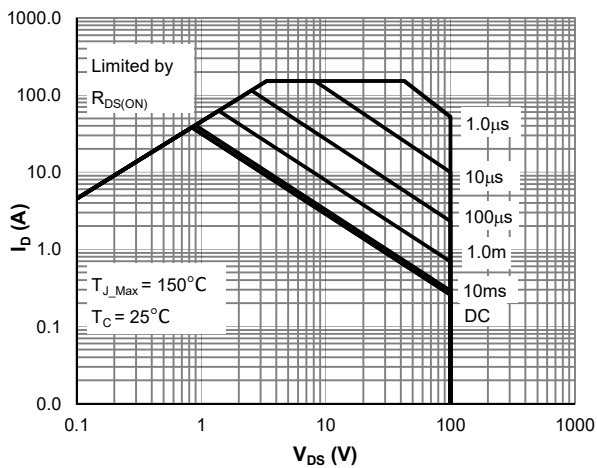


Figure 9: Maximum Safe Operating Area

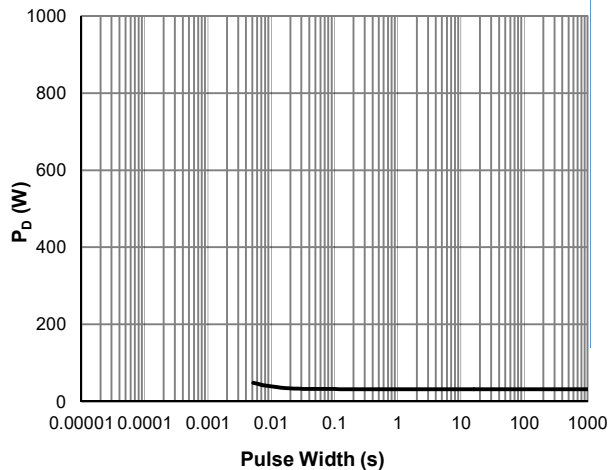


Figure 10: Single Pulse Power Rating, Junction-to-Case

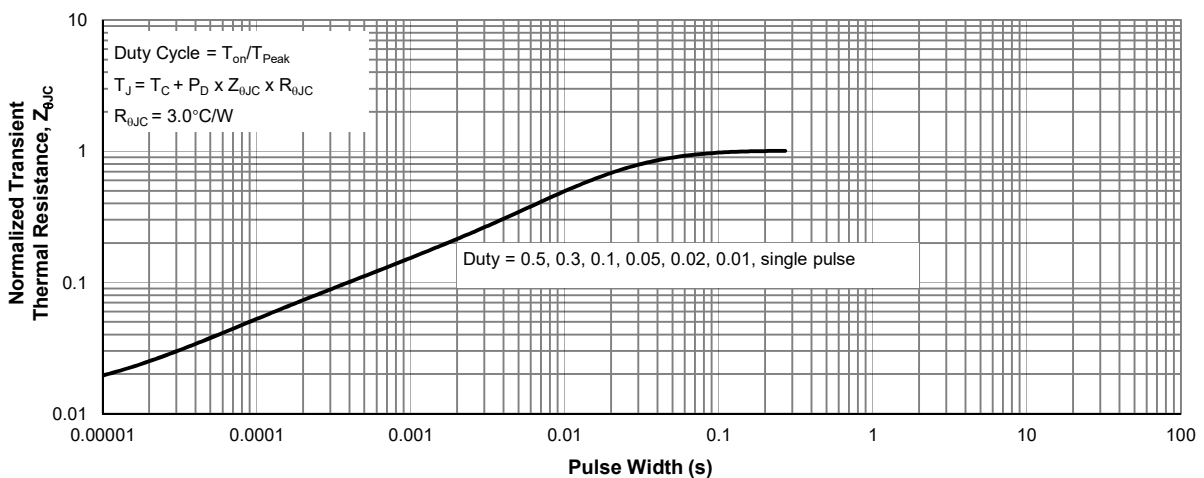
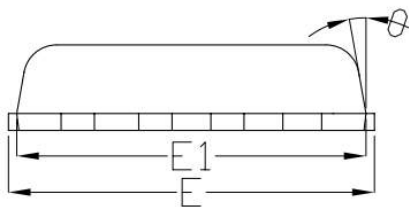
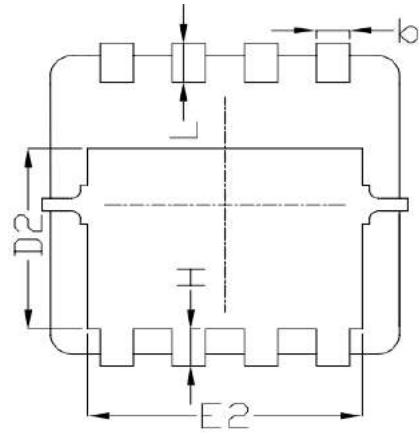
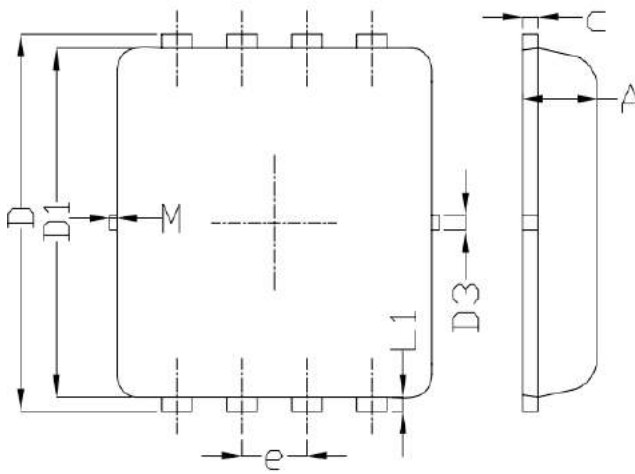
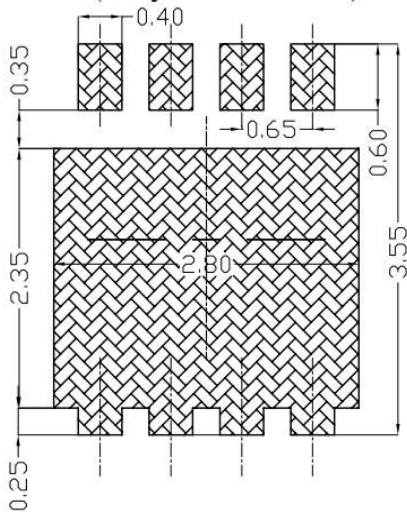


Figure 11: Normalized Maximum Transient Thermal Impedance

■ PDFN3X3-8L Package Mechanical Data



Land Pattern
(Only for Reference)



| SYMBOL | DIMENSIONAL REOMTS | | |
|-----------------|--------------------|------|------|
| | MIN | NOM | MAX |
| A | 0.70 | 0.75 | 0.80 |
| b | 0.25 | 0.30 | 0.35 |
| c | 0.10 | 0.15 | 0.25 |
| D | 3.25 | 3.35 | 3.45 |
| D1 | 3.00 | 3.10 | 3.20 |
| D2 | 1.78 | 1.88 | 1.98 |
| D3 | --- | 0.13 | --- |
| E | 3.20 | 3.30 | 3.40 |
| E1 | 3.00 | 3.15 | 3.20 |
| E2 | 2.39 | 2.49 | 2.59 |
| e | 0.65BSC | | |
| H | 0.30 | 0.39 | 0.50 |
| L | 0.30 | 0.40 | 0.50 |
| L1 | --- | 0.13 | --- |
| θ | --- | 10° | 12° |
| M | * | * | 0.15 |
| * Not specified | | | |

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