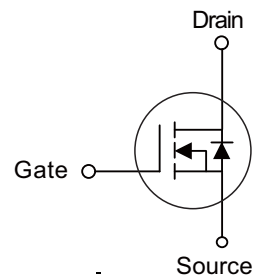
## ■ PRODUCT CHARACTERISTICS

| Symbol | Value | Unit |
|---|---|---|
| $V_{DSS}$ | 20 | V |
| $R_{DS(ON)}$-Typ@VGS=4.5V | 2.5 | mΩ |
| $R_{DS(ON)}$-Typ@VGS=2.5V | 3.2 | mΩ |
| ID | 75 | A |

Symbol




## ■ APPLICATIONS

Load Switch

PWM Application

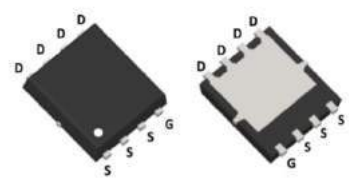
Power Management

## ■ FEATURES

Advanced Trench Technology

Excellent $R_{DS(ON)}$ and Low Gate Charge

Lead Free



PDFN5X6-8L

## ■ ORDER INFORMATION

| Order codes | | Package | Packing |
|---|---|---|---|
| Halogen-Free | Halogen | | |
| N/A | MOT2135 | PDFN5X6-8L | 5000Pieces/Reel |

## ■ ABSOLUTE MAXIMUM RATINGS (@ $T_C$ = 25°C unless otherwise specified)

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-to-Source Voltage | | $V_{DS}$ | 20 | V |
| Gate-to-Source Voltage | | $V_{GS}$ | ±12 | V |
| Continuous Drain Current | $T_C$ = 25°C | $I_D$ | 75 | A |
| | $T_C$ = 100°C | $I_D$ | 48 | A |
| Pulsed Drain Current (1) | | $I_{DM}$ | 300 | A |
| Single Pulsed Avalanche Energy (2) | | $E_{AS}$ | 156 | mJ |
| Power Dissipation | $T_C$ = 25°C | $P_D$ | 40 | W |
| Thermal Resistance, Junction to Ambient(3) | | $R_{\theta JA}$ | 33 | °C/W |
| Thermal Resistance, Junction to Case | | $R_{\theta JC}$ | 3.1 | °C/W |
| Junction & Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to 150 | °C |

■ ELECTRICAL CHARACTERISTICS ($T_C$=25℃ unless otherwise specified)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Off characteristics | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D$ = 250μA, $V_{GS}$ = 0V | 20 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 20V, $V_{GS}$ = 0V | - | - | 1.0 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{DS}$ = 0V, $V_{GS}$ = ±12V | - | - | ±100 | nA |
| On characteristics | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 0.5 | 0.8 | 1.0 | V |
| Static Drain-Source ON-Resistance(4) | $R_{DS(ON)}$ | $V_{GS}$ =4.5V, $I_D$ =30A | - | 2.5 | 3.5 | mΩ |
| | | $V_{GS}$ = 2.5V, $I_D$ =20A | - | 3.2 | 4.5 | mΩ |
| Dynamic characteristics | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 10V, f = 1MHz | - | 3476 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 528 | - | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 464 | - | pF |
| Total Gate Charge | $Q_g$ | $V_{GS}$ = 0 to 8V $V_{DS}$ = 10V, $I_D$ = 30A | - | 65 | - | nC |
| Gate Source Charge | $Q_{gs}$ | | - | 8 | - | nC |
| Gate Drain("Miller") Charge | $Q_{gd}$ | | - | 12 | - | nC |
| Switching characteristics | | | | | | |
| Turn-On DelayTime | $t_{d(on)}$ | $V_{GS}$ = 10V, $V_{DD}$ = 10V $I_D$= 30A, $R_{GEN}$ = 3Ω | - | 8 | - | ns |
| Turn-On Rise Time | $t_r$ | | - | 19 | - | ns |
| Turn-Off DelayTime | $t_{d(off)}$ | | - | 73 | - | ns |
| Turn-Off Fall Time | $t_f$ | | - | 80 | - | ns |
| Drain-source diode characteristics and max ratings | | | | | | |
| Drain to Source Diode Forward Current | $I_S$ | | - | - | 75 | A |
| Drain to Source Diode Forward Current | $I_{SM}$ | | - | - | 300 | A |
| Drain to Source Diode Forward Voltage | $V_{SD}$ | $V_{GS}$ = 0V, $I_S$ = 30A | - | - | 1.2 | V |
| Body Diode Reverse Recovery Time | trr | $I_F$ = 20A, di/dt = 100A/us | - | 16 | - | ns |
| Body Diode Reverse Recovery Charge | Qrr | | - | 5.6 | - | nC |

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

2. $E_{AS}$ condition: Starting $T_J$=25C, $V_{DD}$=10V, $V_G$=10V, $R_G$=25ohm, L=0.5mH, $I_{AS}$=25A

3. $R_{\theta JA}$ is measured with the device mounted on a 1inch$^2$ pad of 2oz copper FR4 PCB

4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

## ■ TYPICAL CHARACTERISTICS

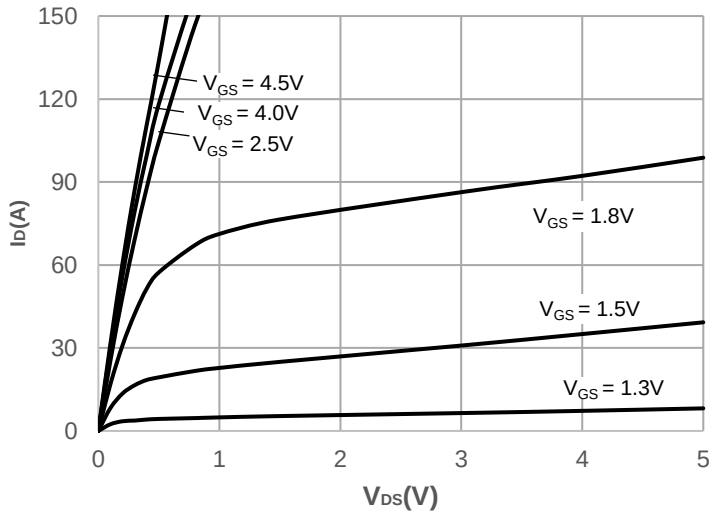



**Figure 1: Output Characteristics**

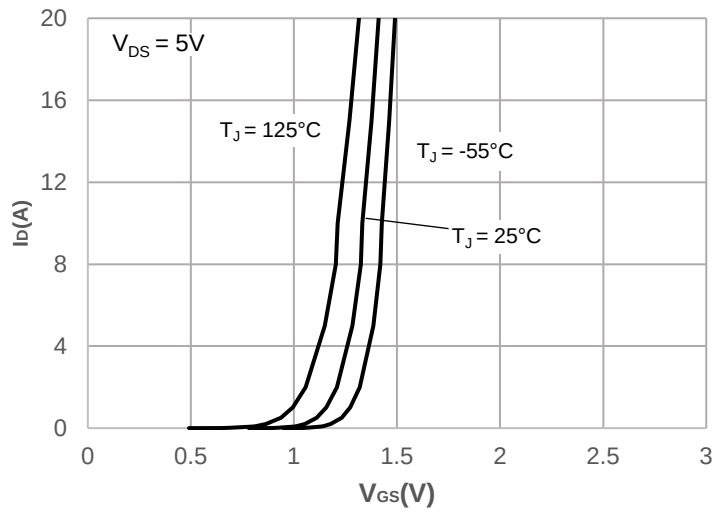



**Figure 2: Typical Transfer Characteristics**

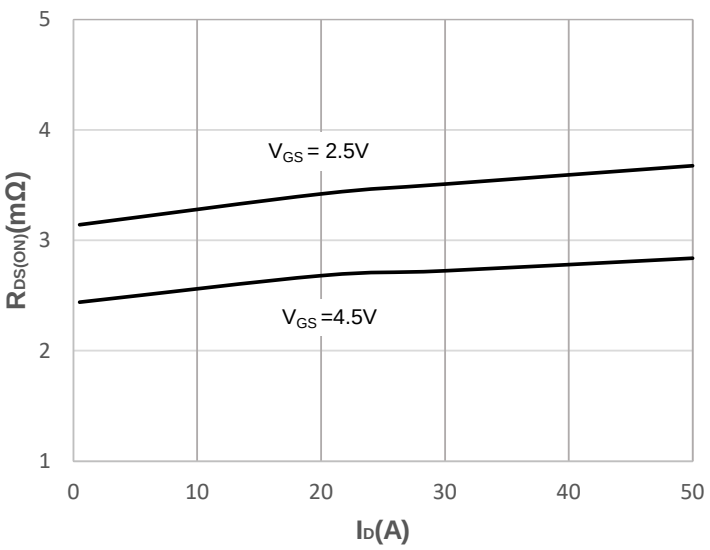



**Figure 3: On-resistance vs. Drain Current**

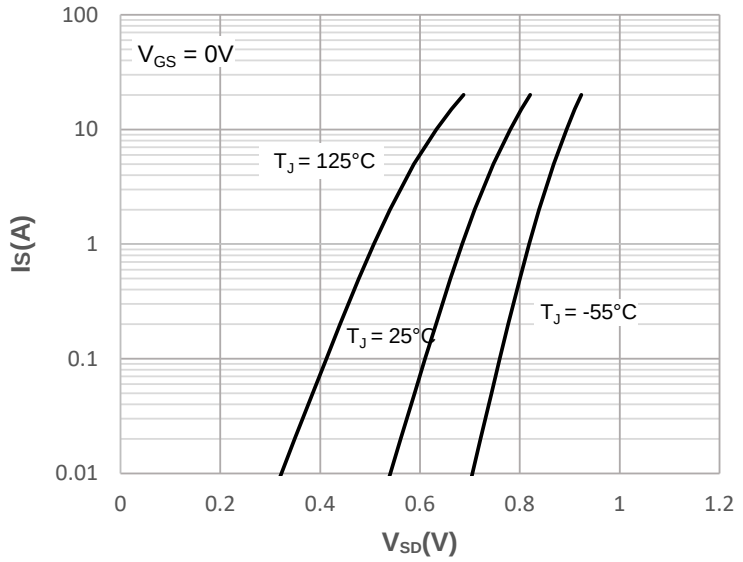



**Figure 4: Body Diode Characteristics**

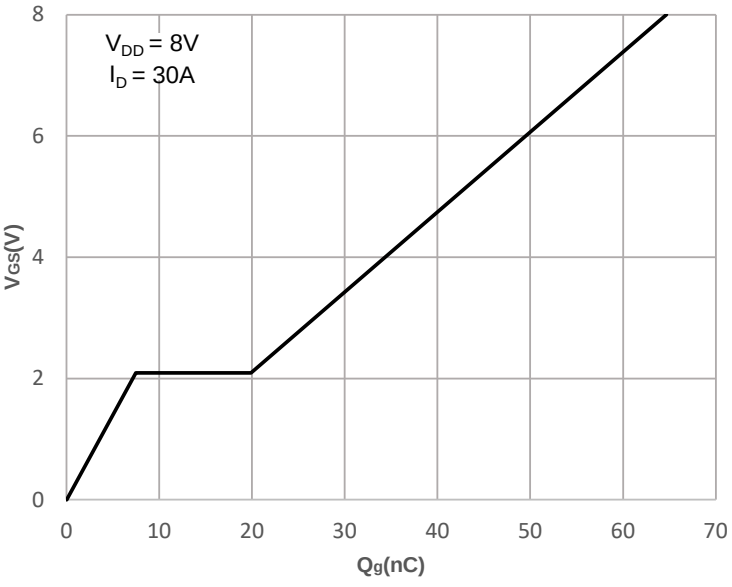



**Figure 5: Gate Charge Characteristics**

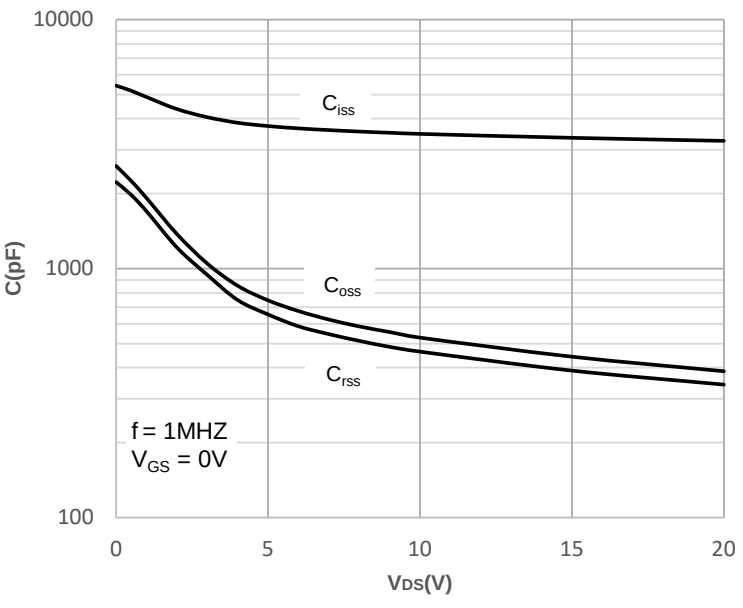



**Figure 6: Capacitance Characteristics**

■ TYPICAL CHARACTERISTICS(Cont.)

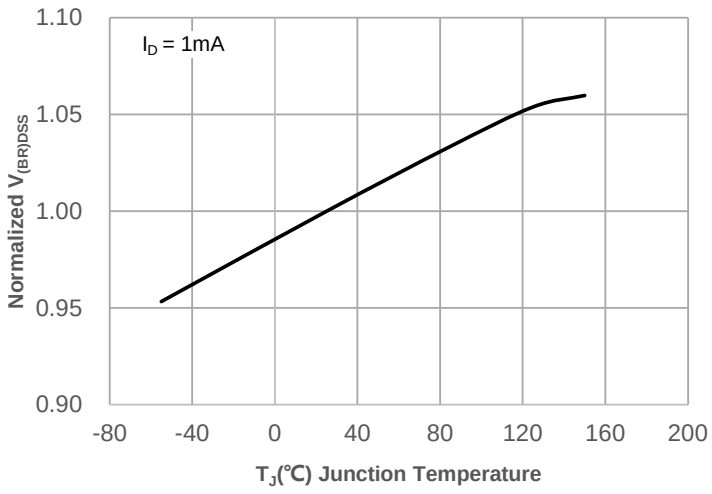



**Figure 7: Normalized Breakdown voltage vs. Junction Temperature**

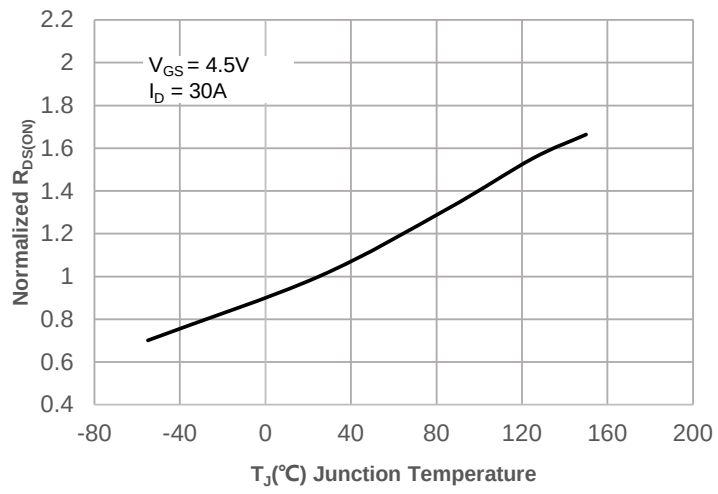



**Figure 8: Normalized on Resistance vs. Junction Temperature**

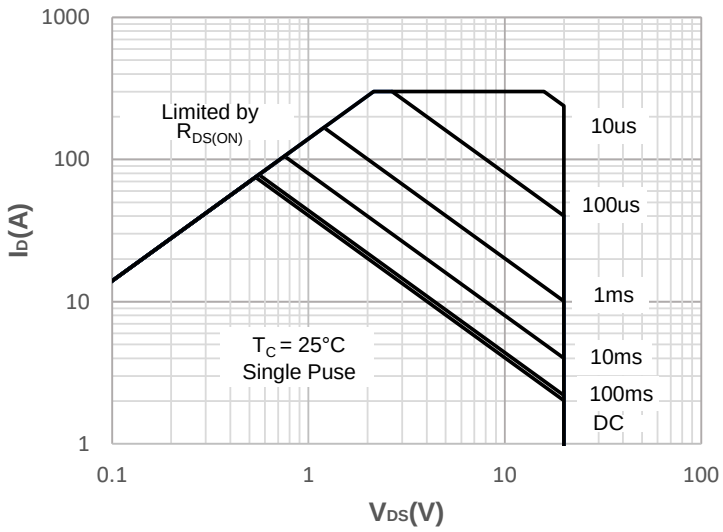



**Figure 9: Maximum Safe Operating Area**

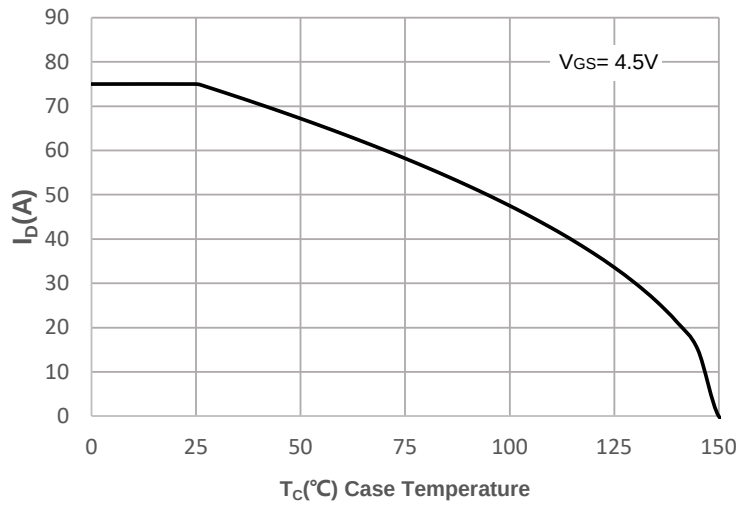



**Figure 10: Maximum Continuous Drian Current vs. Case Temperature**

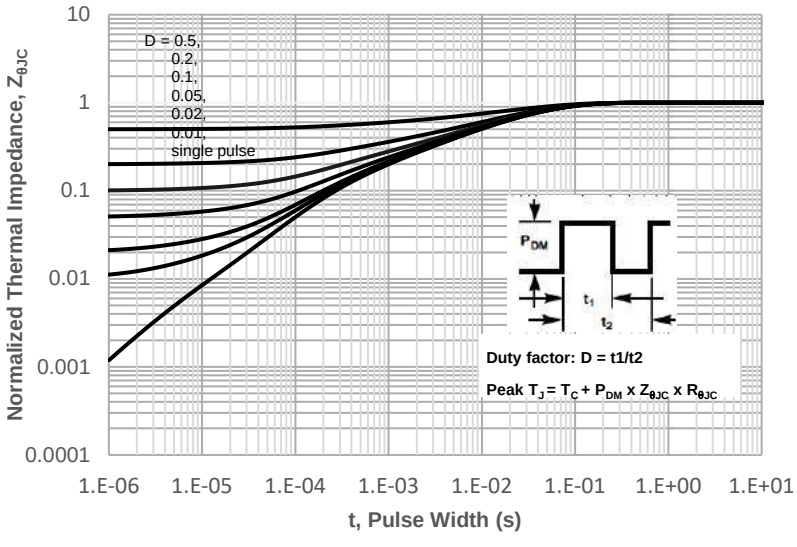



**Figure 11: Normalized Maximum Transient Thermal Impedance**

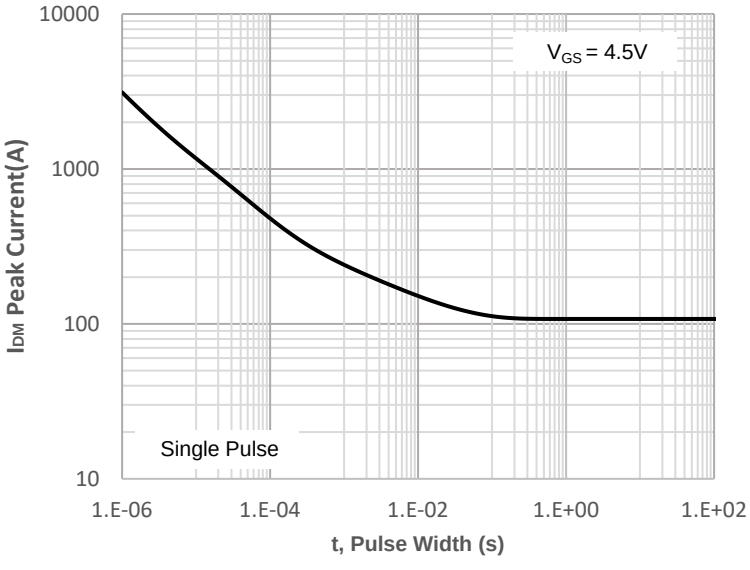
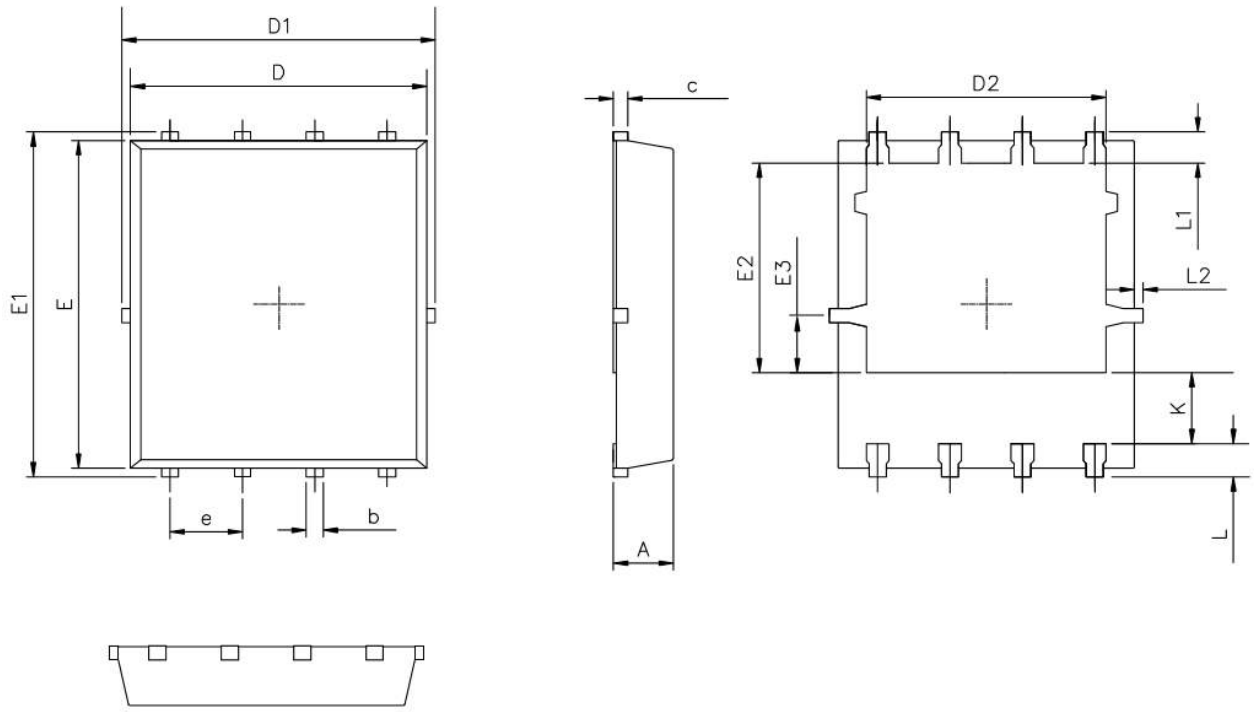
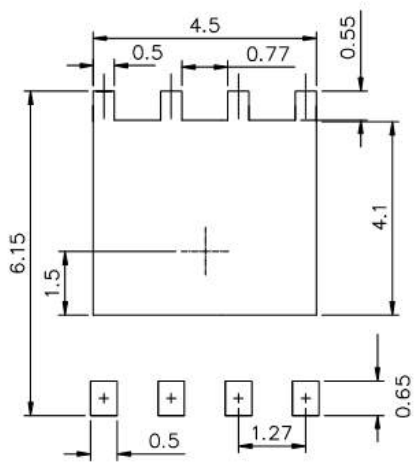



**Figure 12: Peak Current Capacity**

■ PDFN5X6-8L Package Mechanical Data




RECOMMENDED LAND PATTERN




UNIT:mm

| | MIN | NOM | MAX |
|---|---|---|---|
| A | 0.90 | 1.00 | 1.10 |
| b | 0.25 | 0.35 | 0.50 |
| c | 0.10 | 0.20 | 0.30 |
| D | 4.80 | 5.00 | 5.30 |
| D1 | 4.90 | 5.10 | 5.50 |
| D2 | 3.92 | 4.02 | 4.20 |
| E | 5.65 | 5.75 | 5.85 |
| E1 | 5.90 | 6.05 | 6.20 |
| E2 | 3.325 | 3.525 | 3.775 |
| E3 | 0.80 | 0.90 | 1.00 |
| e | | 1.27 | |
| L | 0.40 | 0.55 | 0.70 |
| L1 | | 0.65 | |
| L2 | 0.00 | | 0.15 |
| K | 1.00 | 1.30 | 1.50 |