

## PRODUCT CHARACTERISTICS

|                                            |      |
|--------------------------------------------|------|
| VDSS                                       | -40V |
| $R_{DS(on)}$ typ(@V <sub>GS</sub> =-4.5 V) | 13mΩ |
| $R_{DS(on)}$ typ(@V <sub>GS</sub> =-10 V)  | 10mΩ |
| ID                                         | -30A |

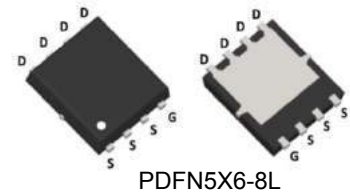
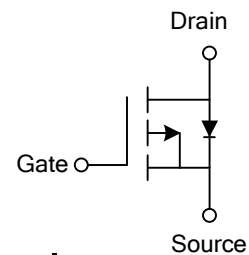
## FEATURES

Advanced Trench Technology  
Excellent  $R_{DS(ON)}$  and Low Gate Charge  
Lead free product is acquired

## APPLICATION

PWM Applications  
Load Switch  
Power Management

## Symbol



## ORDER INFORMATION

| Order codes  |          | Package    | Packing           |
|--------------|----------|------------|-------------------|
| Halogen-Free | Halogen  |            |                   |
| N/A          | MOT4712G | PDFN5X6-8L | 5000 pieces /Reel |

## ABSOLUTE MAXIMUM RATINGS (T<sub>C</sub>=25°C unless otherwise specified)

| Parameter                               | Symbol                            | Value       | Unit |
|-----------------------------------------|-----------------------------------|-------------|------|
| Drain-Source Voltage                    | V <sub>DSS</sub>                  | -40         | V    |
| Gate-Source Voltage                     | V <sub>GSS</sub>                  | ±20         | V    |
| Continuous Drain Current                | I <sub>D</sub>                    | -30         | A    |
|                                         |                                   | -20         | A    |
| Pulsed Drain Current                    | I <sub>DM</sub>                   | -120        | A    |
| Single Pulsed Avalanche Energy          | E <sub>AS</sub>                   | 110         | mJ   |
| Power Dissipation                       | P <sub>D</sub>                    | 20          | W    |
| Thermal Resistance, Junction to Case    | R <sub>θJC</sub>                  | 6.3         | °C/W |
| Operating and Storage Temperature Range | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

**■ ELECTRICAL CHARACTERISTICS** ( $T_J=25^{\circ}\text{C}$  unless otherwise specified)

| Parameter                                                | Symbol        | Conditions                                                      | Min  | Typ  | Max       | Unit       |
|----------------------------------------------------------|---------------|-----------------------------------------------------------------|------|------|-----------|------------|
| Off characteristics                                      |               |                                                                 |      |      |           |            |
| Drain-Source Breakdown Voltage                           | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D= -250\mu A$                                     | -40  | -    | -         | V          |
| Zero Gate Voltage Drain Current                          | $I_{DSS}$     | $V_{DS}= -40V, V_{GS}=0V$                                       | -    | -    | -1        | $\mu A$    |
| Gate to Body Leakage Current                             | $I_{GSS}$     | $V_{DS}=0V, V_{GS}= \pm 20V$                                    | -    | -    | $\pm 100$ | nA         |
| Gate Threshold Voltage                                   | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D= -250\mu A$                                 | -1.0 | -1.5 | -2.5      | V          |
| Static Drain-Source on-Resistance                        | $R_{DS(on)}$  | $V_{GS}= -10V, I_D= -20A$                                       | -    | 10   | 12.5      | m $\Omega$ |
|                                                          |               | $V_{GS}= -4.5V, I_D= -10A$                                      | -    | 13   | 17        |            |
| Dynamic characteristics                                  |               |                                                                 |      |      |           |            |
| Input Capacitance                                        | $C_{iss}$     | $V_{DS}= -20V, V_{GS}=0V,$<br>$f=1.0MHz$                        | -    | 3700 | -         | pF         |
| Output Capacitance                                       | $C_{oss}$     |                                                                 | -    | 340  | -         | pF         |
| Reverse Transfer Capacitance                             | $C_{rss}$     |                                                                 | -    | 290  | -         | pF         |
| Total Gate Charge                                        | $Q_g$         | $V_{DS}= -20V, I_D= -20A,$<br>$V_{GS}= -10V$                    | -    | 68   | -         | nC         |
| Gate-Source Charge                                       | $Q_{gs}$      |                                                                 | -    | 10   | -         | nC         |
| Gate-Drain(“Miller”) Charge                              | $Q_{gd}$      |                                                                 | -    | 14   | -         | nC         |
| Switching characteristics                                |               |                                                                 |      |      |           |            |
| Turn-on Delay Time                                       | $t_{d(on)}$   | $V_{DD}= -20V, I_D= -20A,$<br>$V_{GS}= -10V, R_{GEN}=2.4\Omega$ | -    | 10   | -         | ns         |
| Turn-on Rise Time                                        | $t_r$         |                                                                 | -    | 82   | -         | ns         |
| Turn-off Delay Time                                      | $t_{d(off)}$  |                                                                 | -    | 93   | -         | ns         |
| Turn-off Fall Time                                       | $t_f$         |                                                                 | -    | 74   | -         | ns         |
| Drain-source diode characteristics and maximum ratings   |               |                                                                 |      |      |           |            |
| Maximum Continuous Drain to Source Diode Forward Current | $I_S$         |                                                                 | -    | -    | -30       | A          |
| Maximum Pulsed Drain to Source Diode Forward Current     | $I_{SM}$      |                                                                 | -    | -    | -120      | A          |
| Drain to Source Diode Forward Voltage                    | $V_{SD}$      | $V_{GS}=0V, I_S= -30A$                                          | -    | -0.8 | -1.2      | V          |
| Reverse Recovery Time                                    | $t_{rr}$      | $V_{GS}=0V, I_S= -30A,$<br>$di/dt=100A/\mu s$                   | -    | 20   | -         | ns         |
| Reverse Recovery Charge                                  | $Q_{rr}$      |                                                                 | -    | 13   | -         | nC         |

■ TYPICAL CHARACTERISTICS

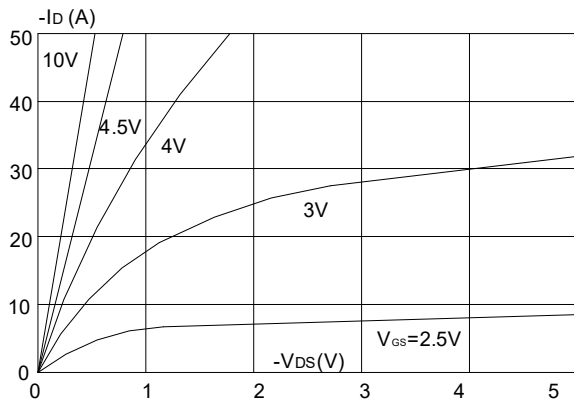


Figure1: Output Characteristics

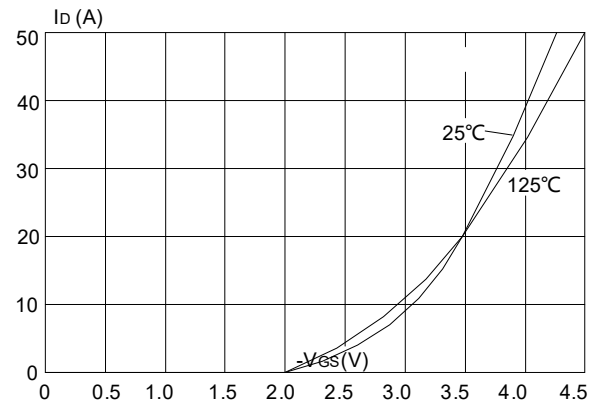


Figure2: Typical Transfer Characteristics

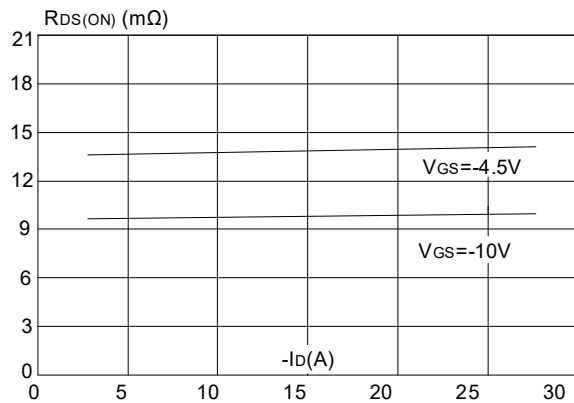


Figure3: On-resistance vs. Drain Current

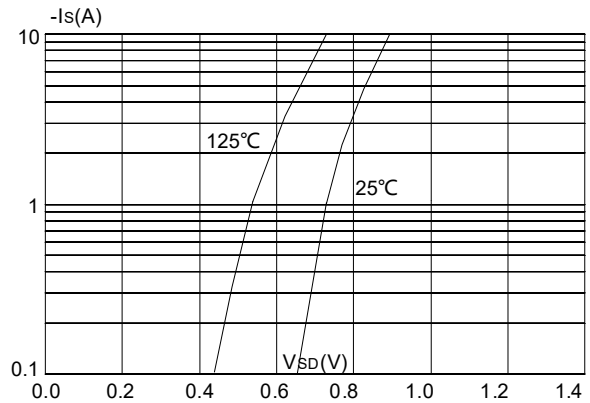


Figure4: Body Diode Characteristics

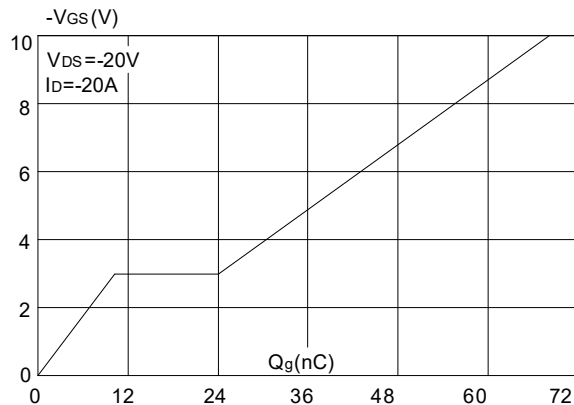


Figure5: Gate Charge Characteristics

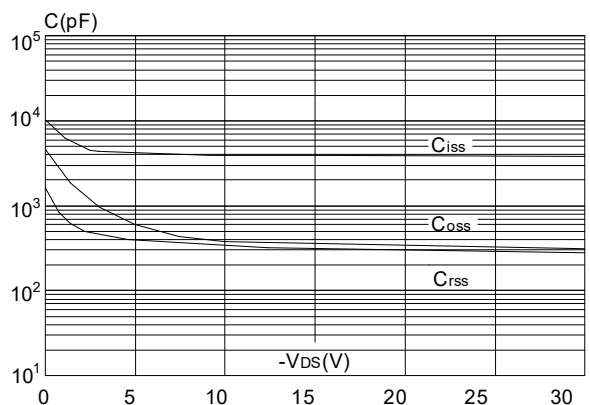


Figure6: Capacitance Characteristics

■ TYPICAL CHARACTERISTICS(Cont.)

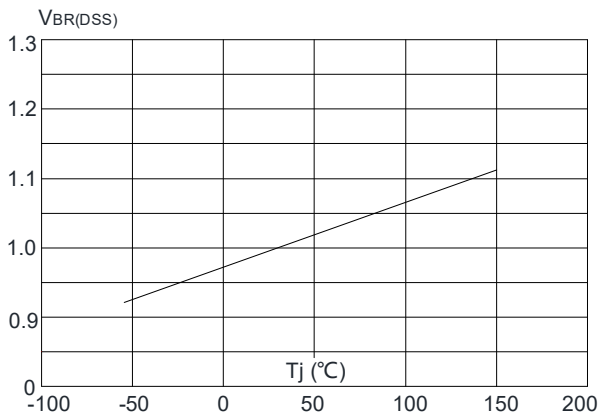


Figure7 : Normalized Breakdown Voltage vs. Junction Temperature

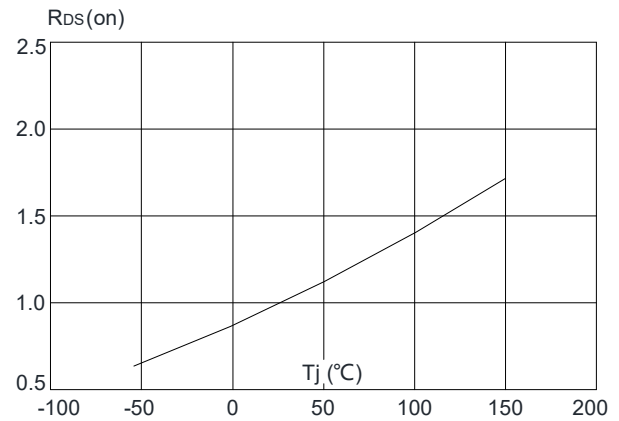


Figure8 : Normalized on Resistance vs. Junction Temperature

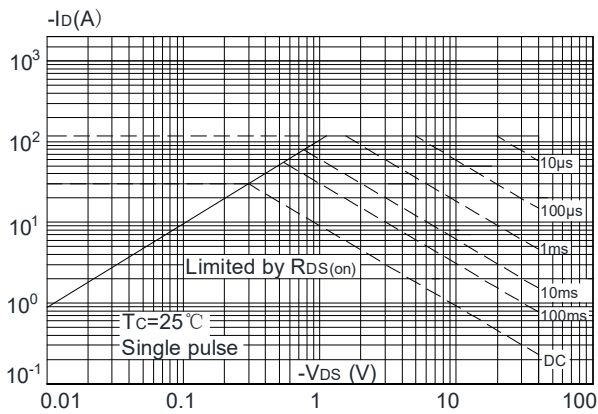


Figure9 : Maximum Safe Operating Area

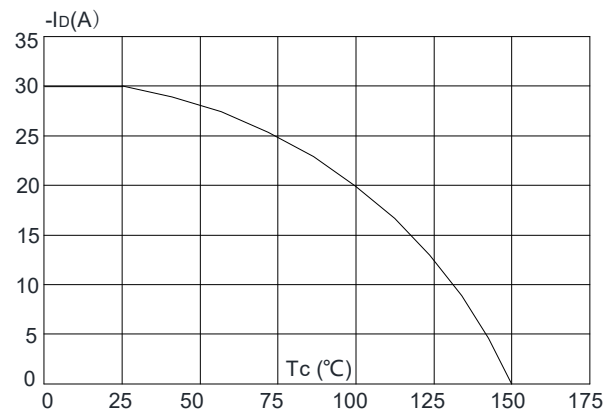


Figure10: Maximum Continuous Drain Current vs. Case Temperature

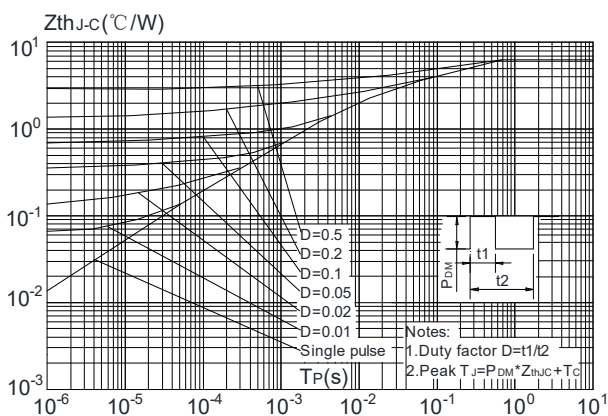
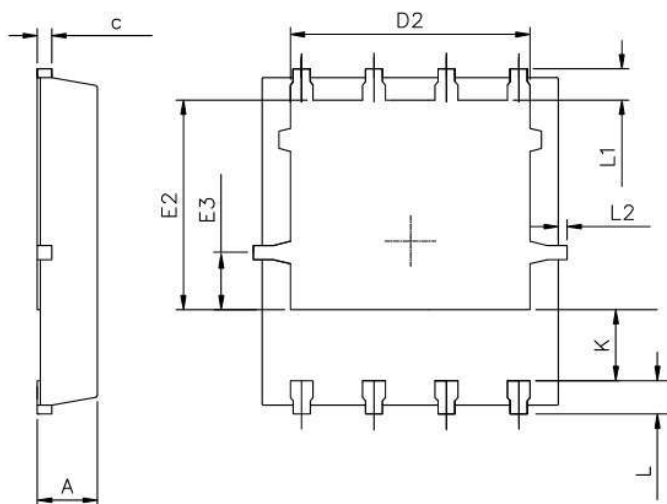
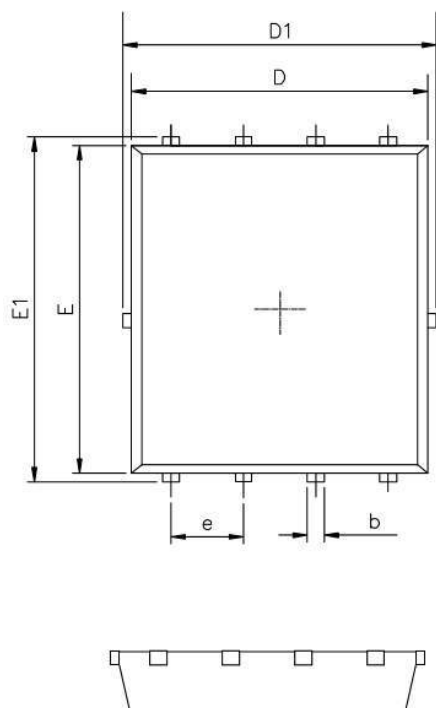
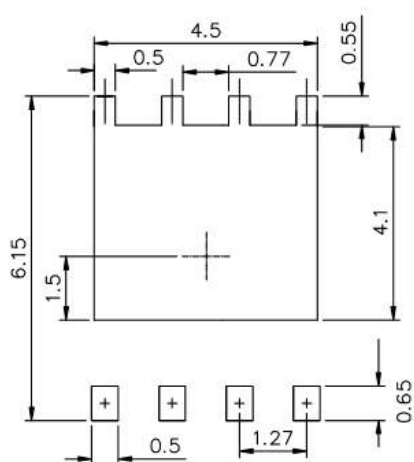


Figure11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

■ 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  |