

## PRODUCT CHARACTERISTICS

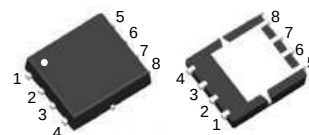
|                                   |               |
|-----------------------------------|---------------|
| $V_{DSS}$                         | 40V           |
| $R_{DS(ON)}$ Typ(@ $V_{GS}=10V$ ) | 0.9m $\Omega$ |
| $I_D$                             | 265A          |

## APPLICATIONS

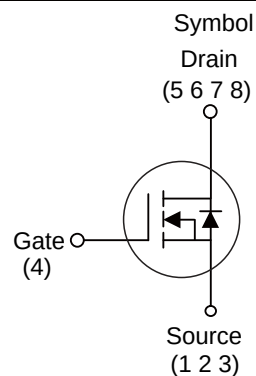
- \* Motor Control
- \* High Performance SMPS
- \* DC/DC Converter

## FEATURE

- \* Low Gate Charge
- \* Ultra-low  $R_{DS(ON)}$



PDFN5X6



## ORDER INFORMATION

| Order Codes  |           | Package | Packing          |
|--------------|-----------|---------|------------------|
| Halogen-Free | Halogen   |         |                  |
| N/A          | MOT4582HG | PDFN5X6 | 5000 pieces/Reel |

## ABSOLUTE MAXIMUM RATINGS( $T_A=25^{\circ}C$ , unless otherwise specified)

| Parameter                                                     | Symbol    | Ratings   | Unit        |
|---------------------------------------------------------------|-----------|-----------|-------------|
| Drain-Source Voltage                                          | $V_{DSS}$ | 40        | V           |
| Gate-Source Voltage                                           | $V_{GSS}$ | $\pm 20$  | V           |
| Drain Current Continuous(@ $V_{GS}=10V$ , $T_A=25^{\circ}C$ ) | $I_D$     | 265       | A           |
| Drain Current Pulsed                                          | $I_{DM}$  | 1060      | A           |
| Avalanche Energy *                                            | $E_{AS}$  | 625       | mJ          |
| Power Dissipation                                             | $P_D$     | 150       | W           |
| Junction Temperature                                          | $T_J$     | +150      | $^{\circ}C$ |
| Storage Temperature                                           | $T_{STG}$ | -55~ +150 | $^{\circ}C$ |

## THERMAL CHARACTERISTICS

| Parameter        | Symbol     | Typ  | Unit          |
|------------------|------------|------|---------------|
| Junction to Case | $R_{thJC}$ | 0.83 | $^{\circ}C/W$ |

Note: \* EAS Test condition:  $T_J=25^{\circ}C$ ,  $V_{DD}=30V$ ,  $V_G=10V$ ,  $I_D=50A$ ,  $L=0.5mH$ ,  $R_g=25\Omega$

**■ ELECTRICAL CHARACTERISTICS** ( $T_C=25^{\circ}\text{C}$ , unless otherwise noted)

| Parameter                             | Symbol              | Test Conditions                                                                       | Min | Typ  | Max  | Unit |
|---------------------------------------|---------------------|---------------------------------------------------------------------------------------|-----|------|------|------|
| Off characteristics                   |                     |                                                                                       |     |      |      |      |
| Drain to Source Breakdown Voltage     | V <sub>DSS</sub>    | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA                                            | 40  | -    | -    | V    |
| Drain to Source Leakage Current       | I <sub>DSS</sub>    | V <sub>DS</sub> =40V, V <sub>GS</sub> =0V                                             | -   | -    | 1    | μA   |
| Gate to Source Forward Leakage        | I <sub>GSS(F)</sub> | V <sub>DS</sub> =0V, V <sub>GS</sub> =+20V                                            | -   | -    | 100  | nA   |
| Gate to Source Reverse Leakage        | I <sub>GSS(R)</sub> | V <sub>DS</sub> =0V, V <sub>GS</sub> =-20V                                            | -   | -    | -100 | nA   |
| On characteristics                    |                     |                                                                                       |     |      |      |      |
| Drain to Source On-Resistance         | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =20A                                             | -   | 0.9  | 1.3  | mΩ   |
| Gate Threshold Voltage                | V <sub>GS(TH)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                              | 1   | 2.6  | 3.5  | V    |
| Dynamic characteristics               |                     |                                                                                       |     |      |      |      |
| Gate Resistance                       | R <sub>g</sub>      | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V ,f=1.0MHz                                    | -   | 2.7  | -    | Ω    |
| Forward Transconductance              | g <sub>fs</sub>     | V <sub>DS</sub> =10V, I <sub>D</sub> =5 A                                             | -   | 16   | -    | S    |
| Input Capacitance                     | C <sub>iss</sub>    | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V<br>f=1.0MHz                                 | -   | 6020 | -    | pF   |
| Output Capacitance                    | C <sub>oss</sub>    |                                                                                       | -   | 2850 | -    | pF   |
| Reverse Transfer Capacitance          | C <sub>rss</sub>    |                                                                                       | -   | 118  | -    | pF   |
| Resistive Switching Characteristics   |                     |                                                                                       |     |      |      |      |
| Turn-on Delay Time                    | t <sub>d(ON)</sub>  | I <sub>D</sub> =20A, V <sub>DS</sub> =20V<br>R <sub>G</sub> =6Ω ,V <sub>GS</sub> =10V | -   | 27   | -    | ns   |
| Rise Time                             | t <sub>r</sub>      |                                                                                       | -   | 88   | -    | ns   |
| Turn-off Delay Time                   | t <sub>d(OFF)</sub> |                                                                                       | -   | 68   | -    | ns   |
| Fall Time                             | t <sub>f</sub>      |                                                                                       | -   | 90   | -    | ns   |
| Total Gate Charge                     | Q <sub>g</sub>      | I <sub>D</sub> =20A, V <sub>DS</sub> =20V<br>V <sub>GS</sub> =10V                     | -   | 68   | -    | nC   |
| Gate to Source Charge                 | Q <sub>gs</sub>     |                                                                                       | -   | 21   | -    | nC   |
| Gate to Drain("Miller") Charge        | Q <sub>gd</sub>     |                                                                                       | -   | 13   | -    | nC   |
| Source-Drain Diode Characteristics    |                     |                                                                                       |     |      |      |      |
| Continuous Source Current(Body Diode) | I <sub>s</sub>      |                                                                                       | -   | -    | 265  | A    |
| Maximum Pulsed Current(Body Diode)    | I <sub>SM</sub>     |                                                                                       | -   | -    | 1060 | A    |
| Diode Forward Voltage                 | V <sub>SD</sub>     | I <sub>SD</sub> =1A, V <sub>GS</sub> =0V                                              | -   | 0.66 | 1.2  | V    |
| Reverse Recovery Time                 | t <sub>rr</sub>     | I <sub>SD</sub> =20A, T <sub>j</sub> =25 °C                                           | -   | 70   | -    | ns   |
| Reverse Recovery Charge               | Q <sub>rr</sub>     | dl /dt=100A/μs                                                                        | -   | 89   | -    | nC   |
|                                       |                     |                                                                                       |     |      |      |      |

## ■ TYPICAL CHARACTERISTICS

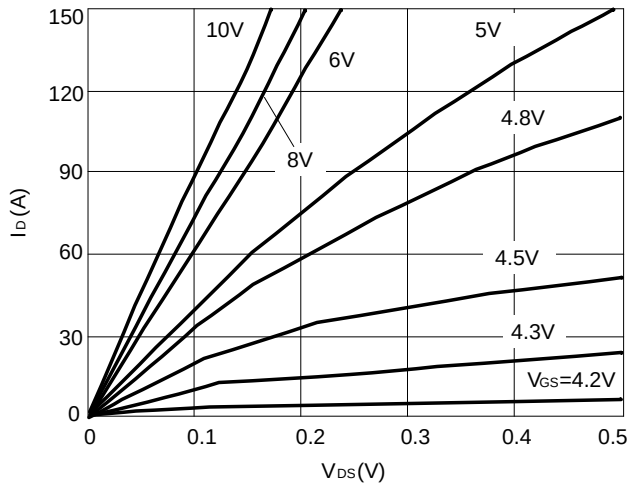


Figure 1: Output Characteristics

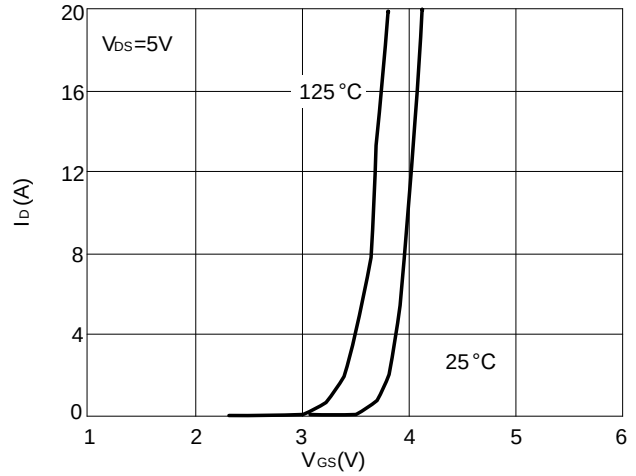


Figure 2: Typical Transfer Characteristics

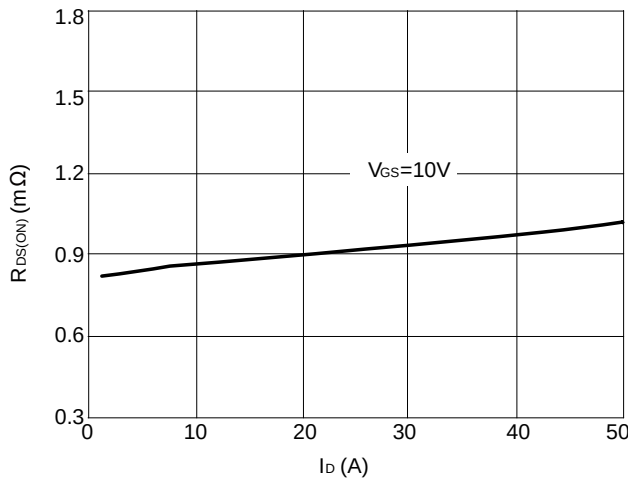


Figure 3:  $R_{DS(ON)}$  vs. Drain Current

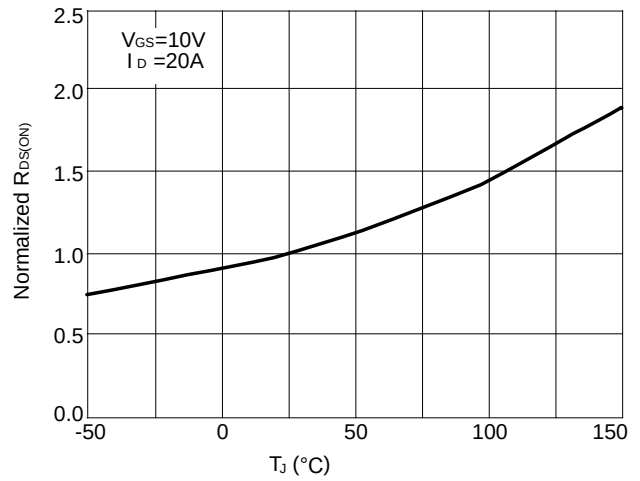


Figure 4:  $R_{DS(ON)}$  vs. Junction Temperature

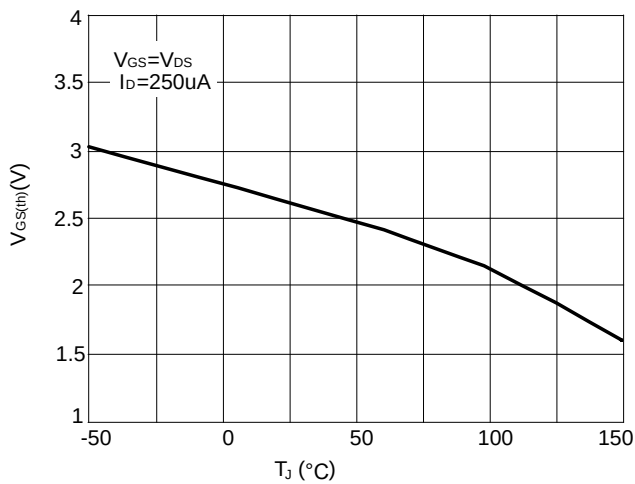


Figure 5:  $V_{GS(th)}$  vs. Junction Temperature

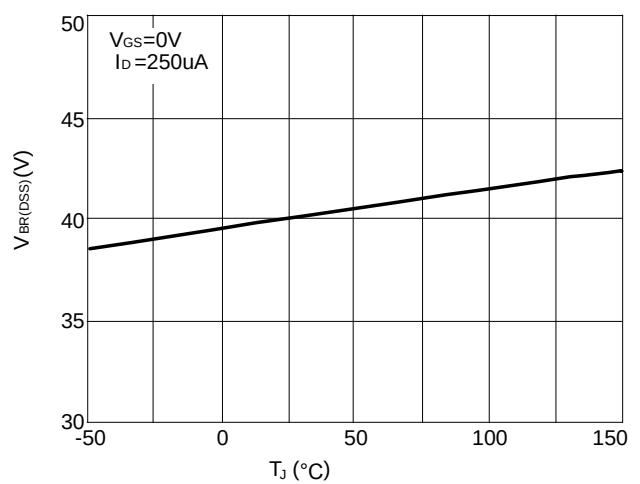


Figure 6:  $V_{BR(DSS)}$  vs. Junction Temperature

■ TYPICAL CHARACTERISTICS(Cont.)

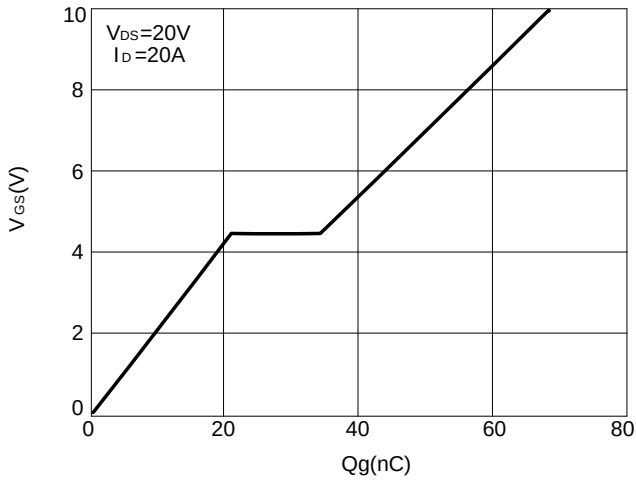


Figure 7: Gate Charge Characteristics

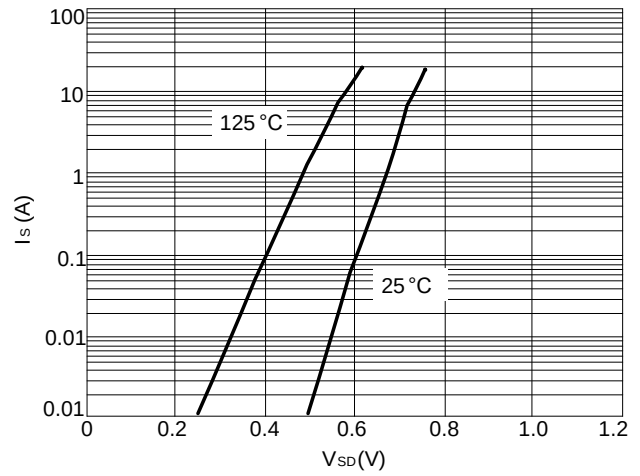


Figure 8: Body Diode Characteristics

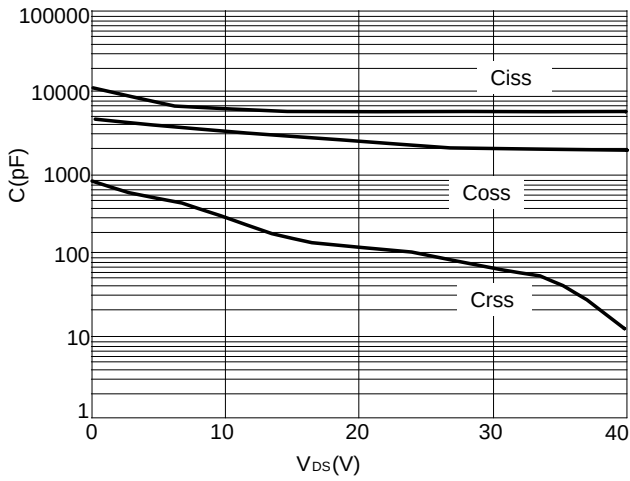


Figure 9: Capacitance Characteristics

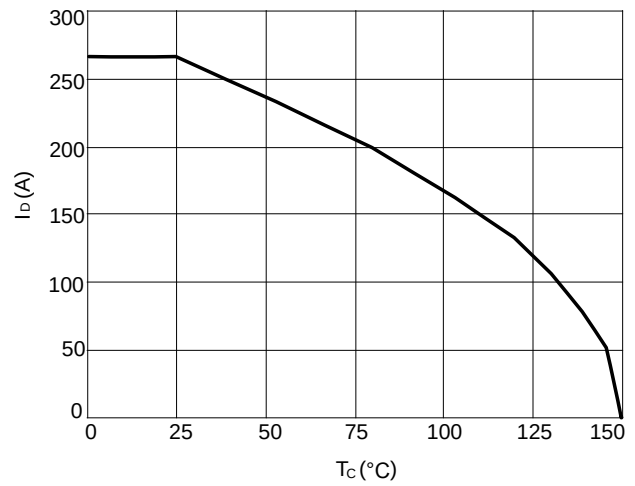


Figure 10: Current De-rating

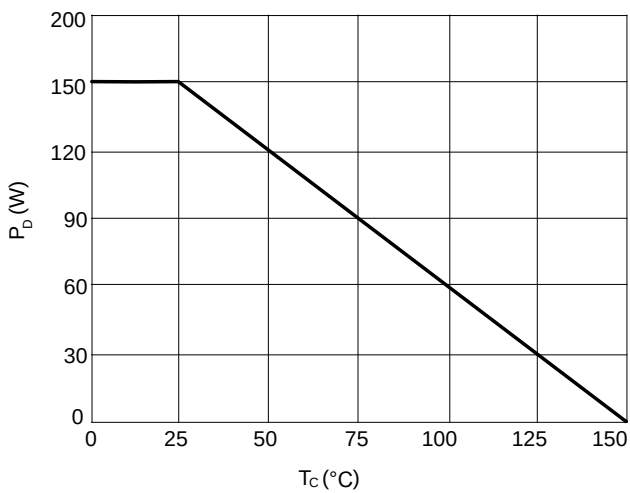


Figure 11: Power De-rating

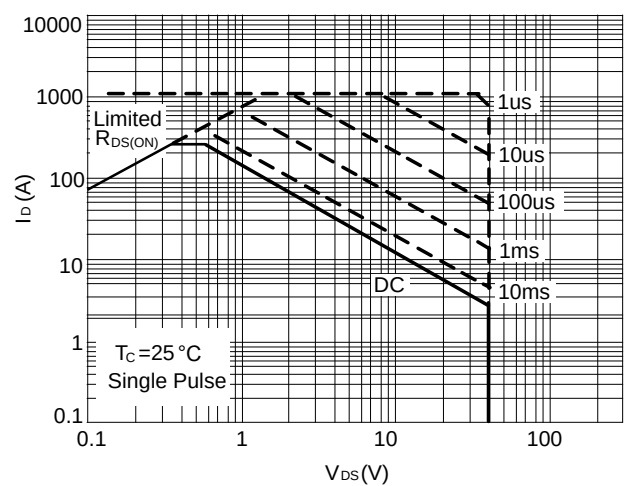
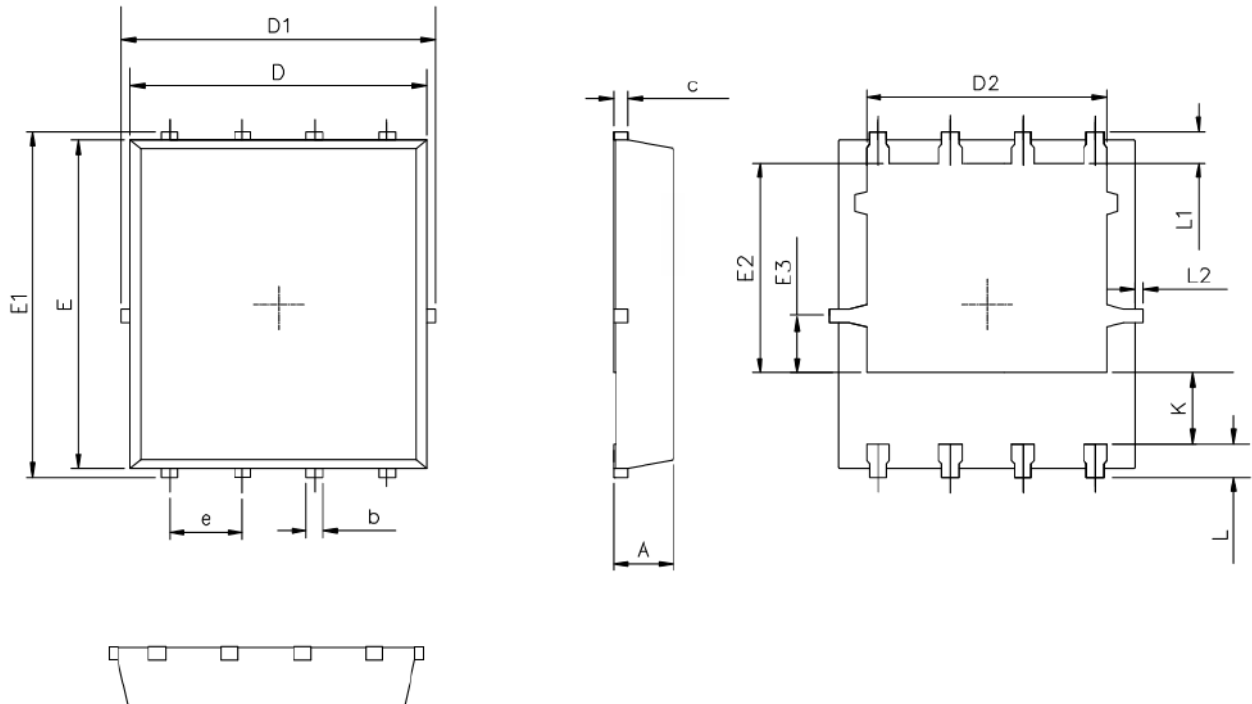
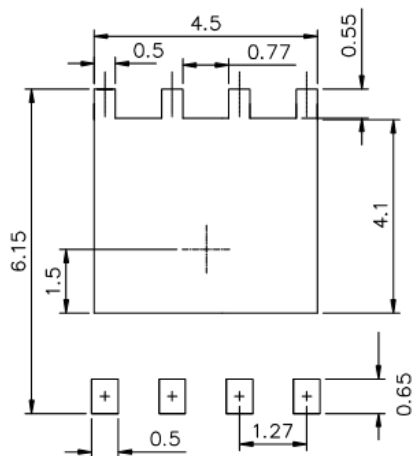


Figure 12: Maximum Safe Operating Area

■ PDFN5X6 PACKAGE OUTLINE DIMENSIONS



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  |