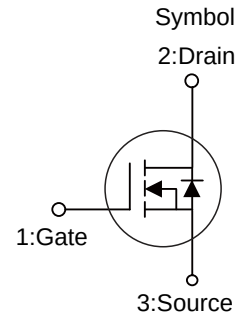


# PRODUCT CHARACTERISTICS

|                                   |               |
|-----------------------------------|---------------|
| $V_{DS}$                          | 85V           |
| $R_{DS(ON)}$ Typ(@ $V_{GS}=10V$ ) | 7.6m $\Omega$ |
| Qg@typ                            | 55nC          |
| $I_D$                             | 120A          |



# APPLICATIONS

- \* High efficiency switch mode power supplies
- \* Electronic lamp ballasts based on half bridge
- \* LED power supplies

# FEATURE

- \* High Switching Speed
- \* Improved dv/dt capability

# ORDER INFORMATION

| Order Codes  |            | Package | Packing        |
|--------------|------------|---------|----------------|
| Halogen-Free | Halogen    |         |                |
| N/A          | MOT120N85A | TO-220  | 50 pieces/Tube |



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

| Parameter                                                  | Symbol    | Ratings   | Unit        |
|------------------------------------------------------------|-----------|-----------|-------------|
| Drain-Source Voltage                                       | $V_{DS}$  | 85        | V           |
| Gate-Source Voltage                                        | $V_{GS}$  | $\pm 20$  | V           |
| Drain Current Continuous(@ $V_{GS}=10V, T_A=25^{\circ}C$ ) | $I_D$     | 120       | A           |
| Drain Current Pulsed                                       | $I_{DM}$  | 480       | A           |
| Avalanche Energy *                                         | $E_{AS}$  | 462       | mJ          |
| Power Dissipation                                          | $P_D$     | 174       | 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 | $R_{thJC}$ | 0.72 | $^{\circ}C/W$ |

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

**■ 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                                               | 85  | -    | -    | V    |
| Drain to Source Leakage Current       | I <sub>DSS</sub>    | V <sub>DS</sub> =85V, 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                                                | -   | 7.6  | 8.2  | mΩ   |
| Gate Threshold Voltage                | V <sub>GS(TH)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                 | 2   | -    | 4    | V    |
| Dynamic characteristics               |                     |                                                                                          |     |      |      |      |
| Gate capacitance                      | R <sub>g</sub>      | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V ,f=1.0MHz                                       | -   | 1.3  | -    | Ω    |
| Forward Transconductance              | g <sub>fs</sub>     | V <sub>DS</sub> =10V, I <sub>D</sub> =3A                                                 | 10  | -    | -    | S    |
| Input Capacitance                     | C <sub>iss</sub>    | V <sub>DS</sub> =30V, V <sub>GS</sub> =0V<br>f=1.0MHz                                    | -   | 3400 | -    | pF   |
| Output Capacitance                    | C <sub>oss</sub>    |                                                                                          | -   | 1100 | -    | pF   |
| Reverse Transfer Capacitance          | C <sub>rss</sub>    |                                                                                          | -   | 64   | -    | pF   |
| Resistive Switching Characteristics   |                     |                                                                                          |     |      |      |      |
| Turn-on Delay Time                    | t <sub>d(ON)</sub>  | I <sub>D</sub> =50 A, V <sub>DS</sub> =40V<br>R <sub>G</sub> =3 Ω , V <sub>GS</sub> =10V | -   | 20.1 | -    | ns   |
| Rise Time                             | t <sub>r</sub>      |                                                                                          | -   | 38.9 | -    | ns   |
| Turn-off Delay Time                   | t <sub>d(OFF)</sub> |                                                                                          | -   | 45.1 | -    | ns   |
| Fall Time                             | t <sub>f</sub>      |                                                                                          | -   | 22.8 | -    | ns   |
| Total Gate Charge                     | Q <sub>g</sub>      | I <sub>D</sub> =50 A, V <sub>DS</sub> =40V<br>V <sub>GS</sub> =10V                       | -   | 55   | -    | nC   |
| Gate to Source Charge                 | Q <sub>gs</sub>     |                                                                                          | -   | 15   | -    | 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>      |                                                                                          | -   | -    | 120  | A    |
| Maximum Pulsed Current(Body Diode)    | I <sub>SM</sub>     |                                                                                          | -   | -    | 480  | A    |
| Diode Forward Voltage                 | V <sub>SD</sub>     | I <sub>SD</sub> =1A, V <sub>GS</sub> =0V                                                 | -   | 0.7  | 1.2  | V    |
| Reverse Recovery Time                 | t <sub>rr</sub>     | I <sub>SD</sub> =50A, T <sub>J</sub> =25 °C<br>dI/dt=100A/μs                             | -   | 33   | -    | ns   |
| Reverse Recovery Charge               | Q <sub>rr</sub>     |                                                                                          | -   | 54   | -    | nC   |

## ■ TYPICAL CHARACTERISTICS

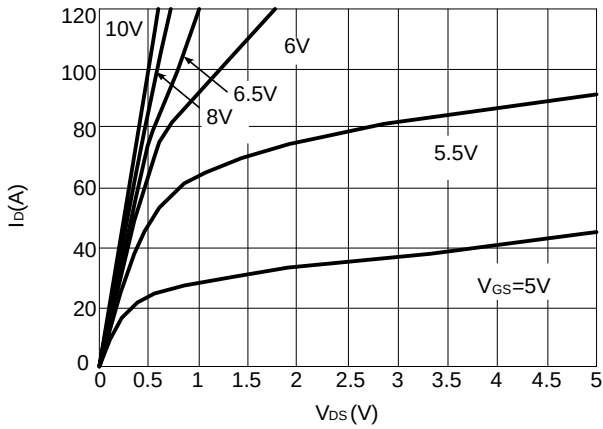


Figure 1: Output characteristics

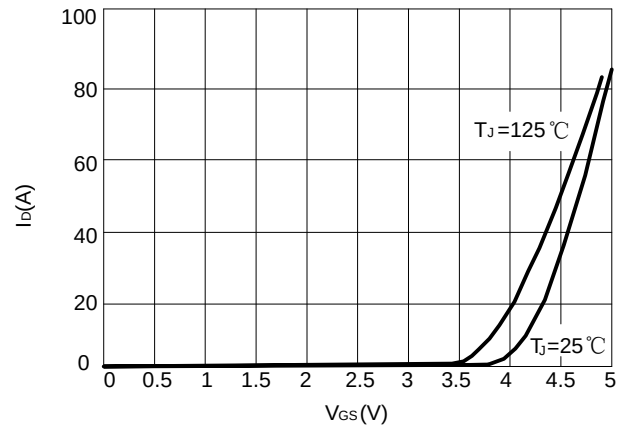


Figure 2: Transfer characteristics

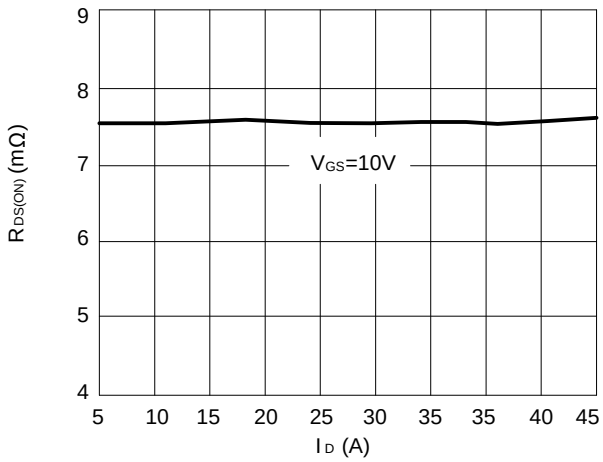


Figure 3: Rds(on) vs drain current and gate voltage

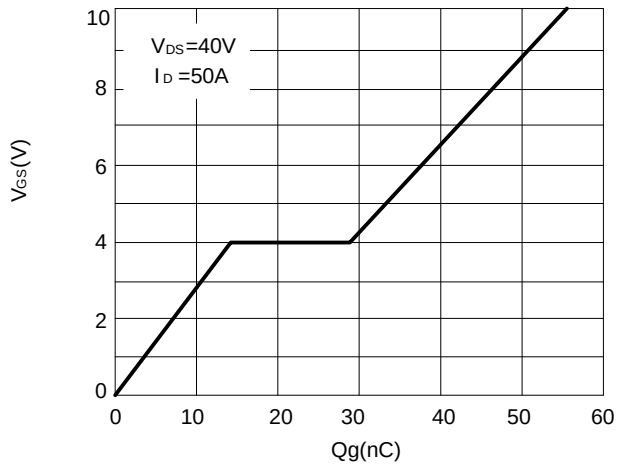


Figure 4: Gate charge characteristics

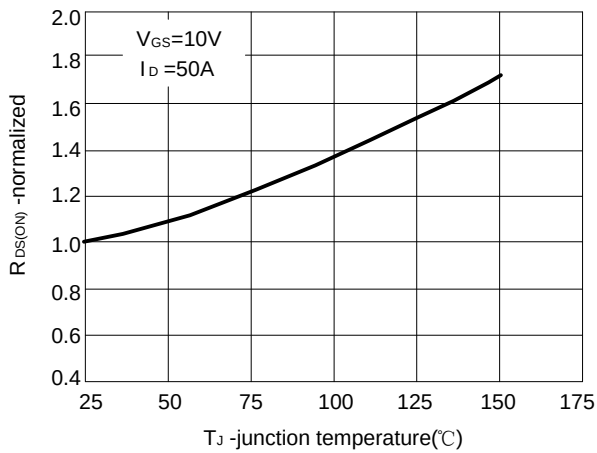


Figure 5: Rds(on) vs temperature

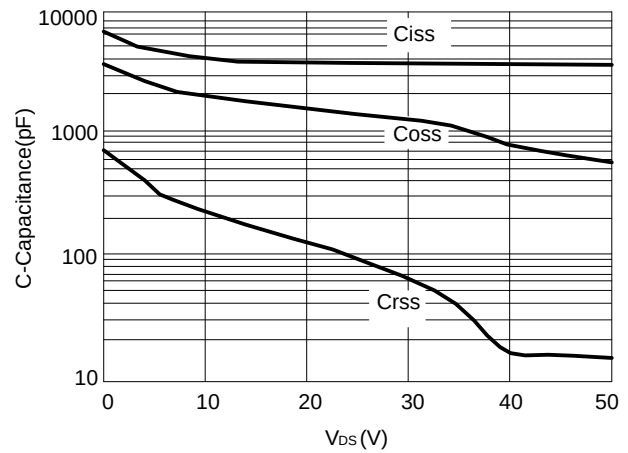


Figure 6: Capacitance characteristics

■ TYPICAL CHARACTERISTICS(Cont.)

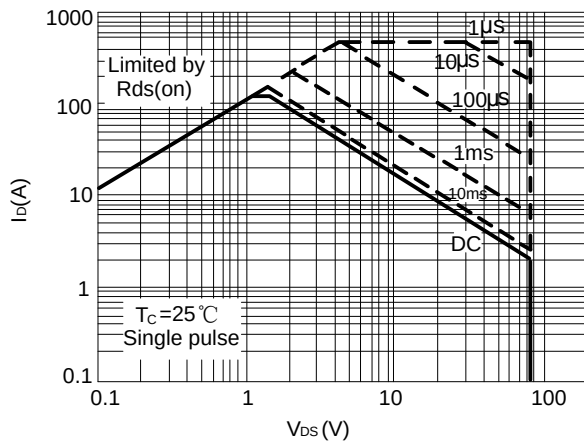


Figure 7: Safe operating area

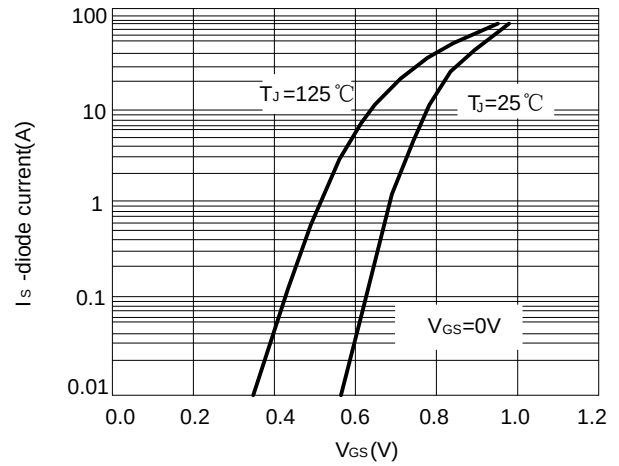


Figure 8: Body-diode forward characteristics

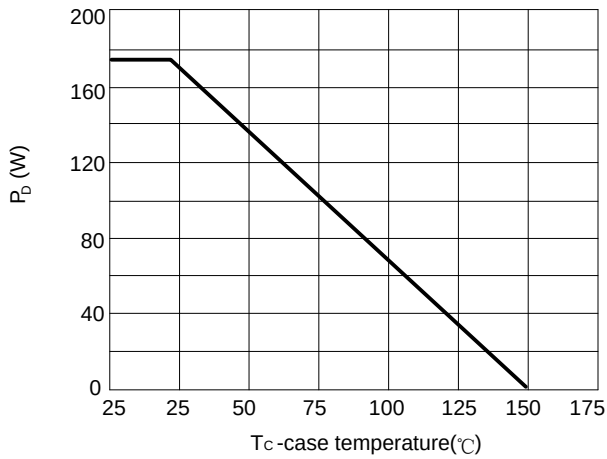


Figure 9: Power dissipation

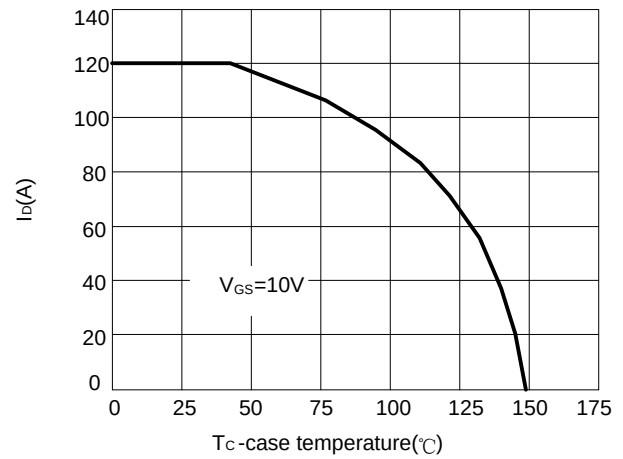


Figure 10: Drain current derating

■ TO-220 PACKAGE OUTLINE DIMENSIONS

