

## PRODUCT CHARACTERISTICS

|                                   |              |
|-----------------------------------|--------------|
| $V_{DSS}$                         | 650V         |
| $R_{DS(ON)}$ Typ(@ $V_{GS}=10V$ ) | 81m $\Omega$ |
| Qg@typ                            | 70nC         |
| $I_D$                             | 40A          |

## 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          | MOT65R099KN | TO-247  | 30 pieces/Tube |

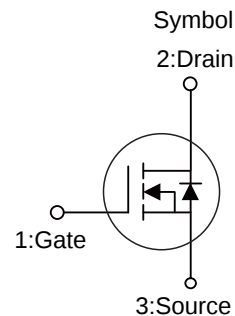
## ABSOLUTE MAXIMUM RATINGS( $T_A=25^{\circ}C$ , unless otherwise specified)

| Parameter                                                     | Symbol    | Ratings   | Unit        |
|---------------------------------------------------------------|-----------|-----------|-------------|
| Drain-Source Voltage                                          | $V_{DSS}$ | 650       | V           |
| Gate-Source Voltage                                           | $V_{GSS}$ | $\pm 30$  | V           |
| Drain Current Continuous(@ $V_{GS}=10V$ , $T_A=25^{\circ}C$ ) | $I_D$     | 40        | A           |
| Drain Current Pulsed                                          | $I_{DM}$  | 160       | A           |
| Avalanche Energy *                                            | $E_{AS}$  | 890       | mJ          |
| Power Dissipation                                             | $P_D$     | 357       | 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 | $R_{thJC}$ | 0.35 | $^{\circ}C/W$ |

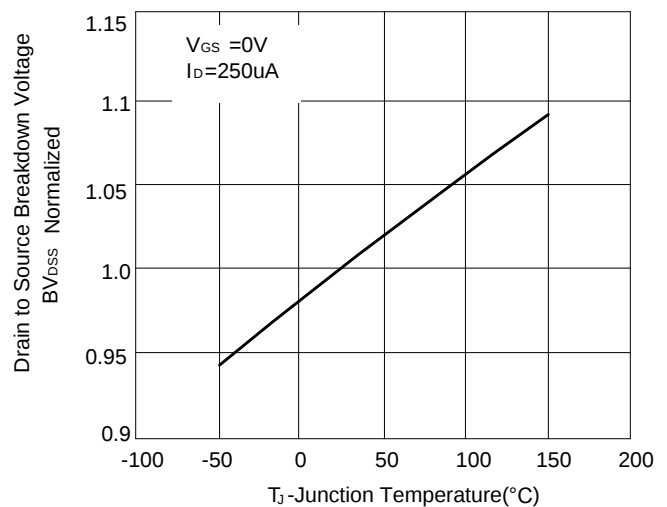
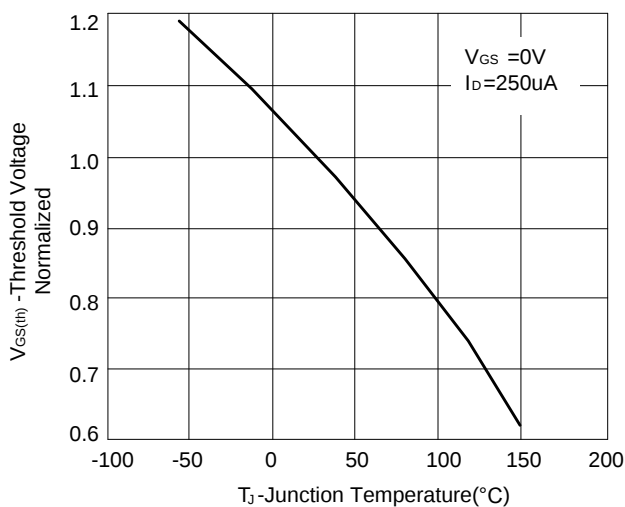
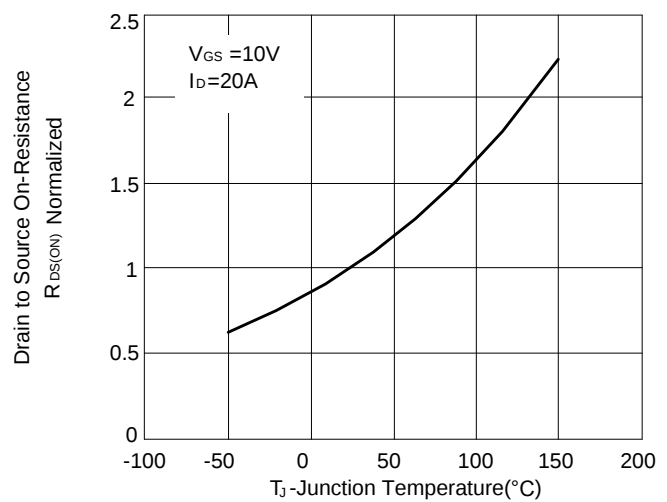
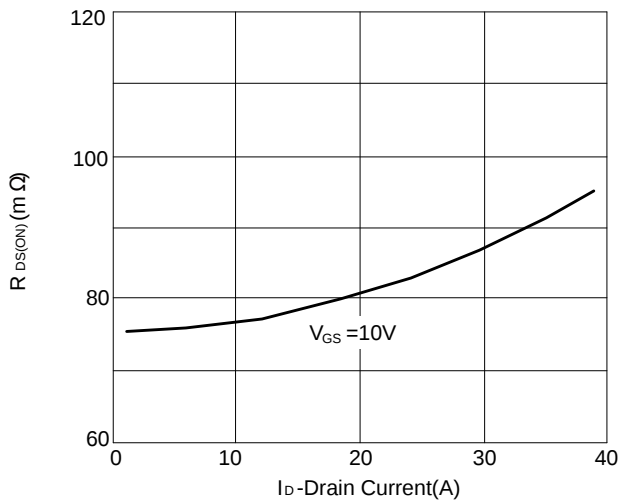
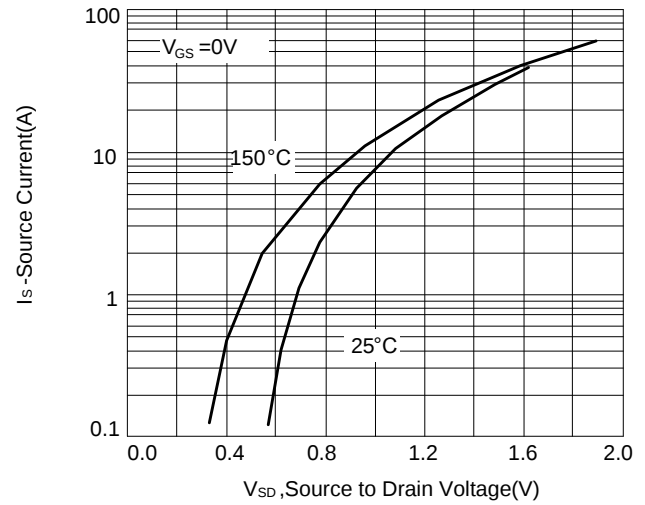
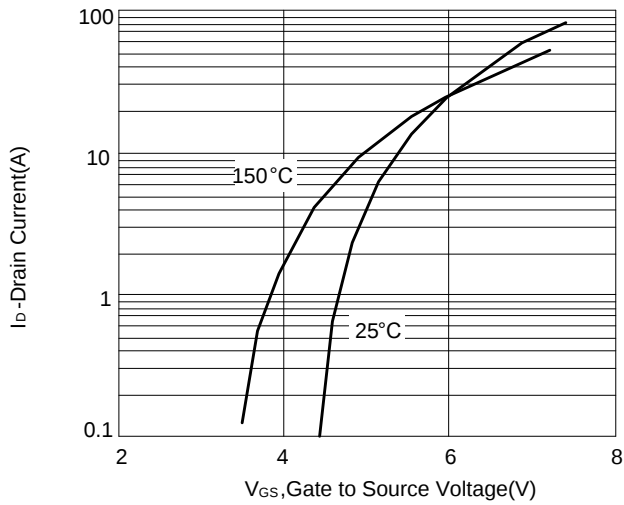
Note: \* EAS condition:  $T_J=25^{\circ}C$ ,  $V_{DD}=50V$ ,  $V_G=10V$ ,  $L=10mH$ ,  $R_g=25\Omega$



**■ 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                                                   | 650 | -    | -    | V    |
| Drain to Source Leakage Current       | I <sub>DSS</sub>    | V <sub>DS</sub> =650V, 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> =+30V                                                   | -   | -    | 100  | nA   |
| Gate to Source Reverse Leakage        | I <sub>GSS(R)</sub> | V <sub>DS</sub> =0V, V <sub>GS</sub> =-30V                                                   | -   | -    | -100 | nA   |
| On characteristics                    |                     |                                                                                              |     |      |      |      |
| Drain to Source On-Resistance         | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =20A                                                    | -   | 81   | 99   | mΩ   |
| Gate Threshold Voltage                | V <sub>GS(TH)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                     | 2   | 3.9  | 4.5  | V    |
| Dynamic characteristics               |                     |                                                                                              |     |      |      |      |
| Gate capacitance                      | R <sub>g</sub>      | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V ,f=1.0MHz                                           | -   | 1.1  | -    | Ω    |
| Forward Transconductance              | g <sub>fs</sub>     | V <sub>DS</sub> =10V, I <sub>D</sub> =5A                                                     | -   | 8.4  | -    | S    |
| Input Capacitance                     | C <sub>iss</sub>    | V <sub>DS</sub> =40V, V <sub>GS</sub> =0V<br>f=1.0MHz                                        | -   | 2000 | -    | pF   |
| Output Capacitance                    | C <sub>oss</sub>    |                                                                                              | -   | 1400 | -    | pF   |
| Reverse Transfer Capacitance          | C <sub>rss</sub>    |                                                                                              | -   | 115  | -    | pF   |
| Resistive Switching Characteristics   |                     |                                                                                              |     |      |      |      |
| Turn-on Delay Time                    | t <sub>d(ON)</sub>  | I <sub>D</sub> =20 A, V <sub>DS</sub> =325V<br><br>R <sub>G</sub> =10Ω ,V <sub>GS</sub> =10V | -   | 31   | -    | ns   |
| Rise Time                             | t <sub>r</sub>      |                                                                                              | -   | 43   | -    | ns   |
| Turn-off Delay Time                   | t <sub>d(OFF)</sub> |                                                                                              | -   | 151  | -    | ns   |
| Fall Time                             | t <sub>f</sub>      |                                                                                              | -   | 12   | -    | ns   |
| Total Gate Charge                     | Q <sub>g</sub>      | I <sub>D</sub> =20 A, V <sub>DS</sub> =325V<br>V <sub>GS</sub> =10V                          | -   | 70   | -    | nC   |
| Gate to Source Charge                 | Q <sub>gs</sub>     |                                                                                              | -   | 17   | -    | nC   |
| Gate to Drain("Miller") Charge        | Q <sub>gd</sub>     |                                                                                              | -   | 32   | -    | nC   |
| Source-Drain Diode Characteristics    |                     |                                                                                              |     |      |      |      |
| Continuous Source Current(Body Diode) | I <sub>s</sub>      |                                                                                              | -   | -    | 40   | A    |
| Maximum Pulsed Current(Body Diode)    | I <sub>SM</sub>     |                                                                                              | -   | -    | 160  | A    |
| Diode Forward Voltage                 | V <sub>SD</sub>     | I <sub>SD</sub> =1A, V <sub>GS</sub> =0V                                                     | -   | 0.74 | 1.2  | V    |
| Reverse Recovery Time                 | t <sub>rr</sub>     | I <sub>SD</sub> =20 A, T <sub>J</sub> =25 °C                                                 | -   | 198  | -    | ns   |
| Reverse Recovery Charge               | Q <sub>rr</sub>     | dI /dt=100A/μs                                                                               | -   | 3100 | -    | nC   |

## ■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS(Cont.)

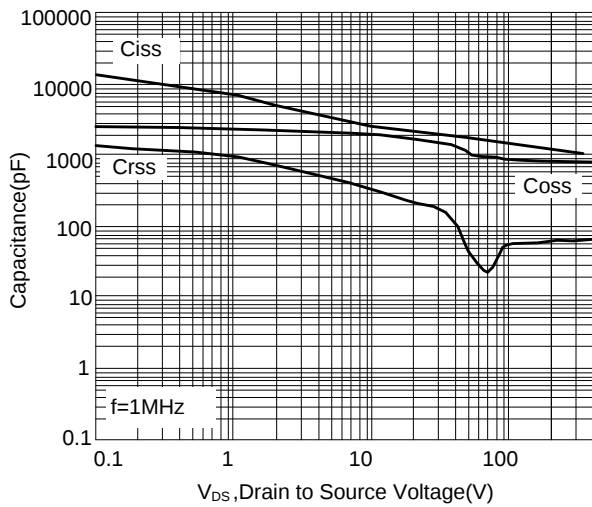


Figure 7: Capacitance vs Drain to Source Voltage

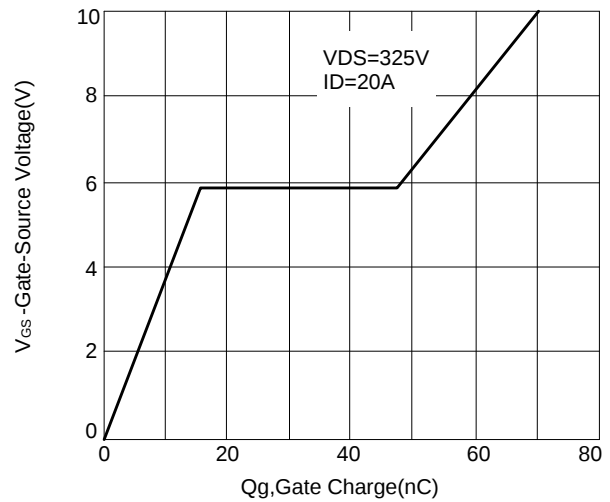


Figure 8: Gate Charge vs Gate to Source Voltage

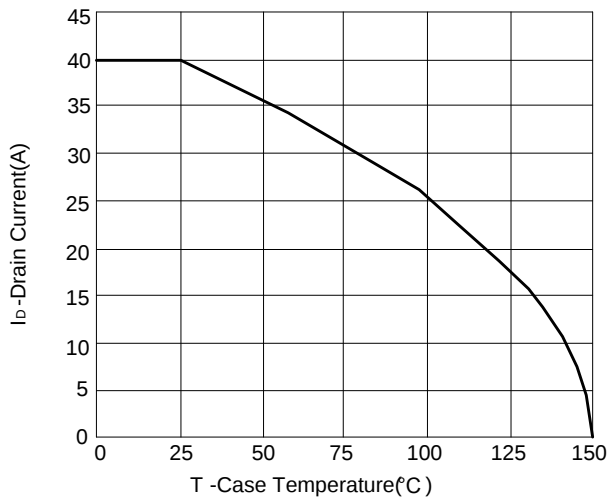


Figure 9: Continuous Drain vs Case Temperature

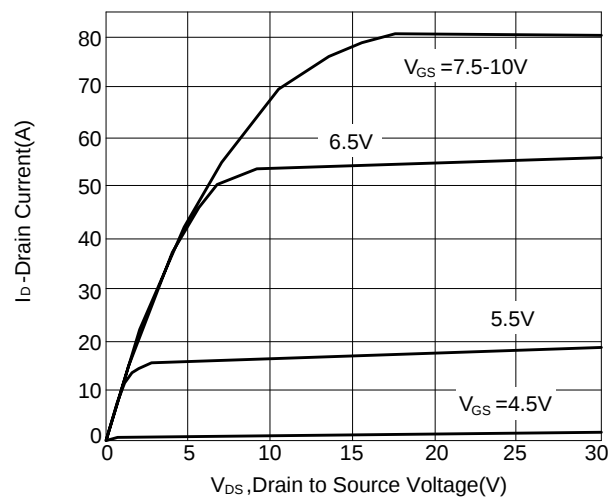


Figure 10: Output Characteristics

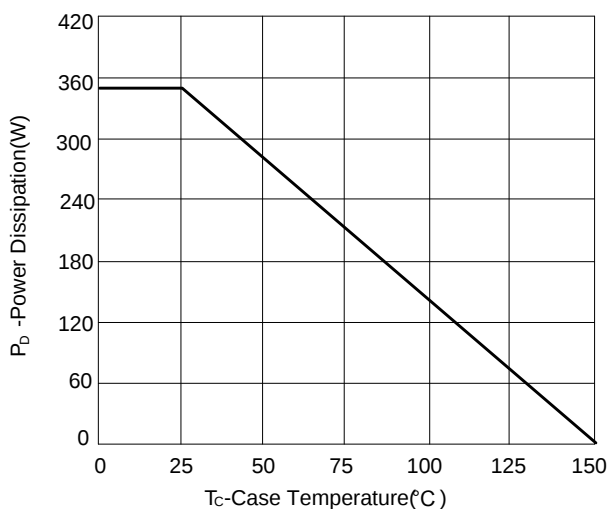


Figure 11: Power Dissipation vs Case Temperature

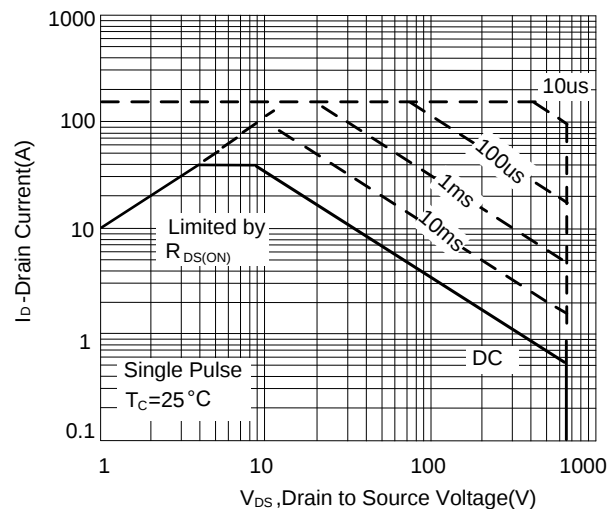


Figure 12: Safe operating Area

■ TO-247 PACKAGE OUTLINE DIMENSIONS

