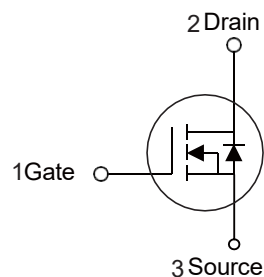


## PRODUCT CHARACTERISTICS

|                              |      |
|------------------------------|------|
| VDSS                         | 100V |
| $R_{DS(on)Typ}(V_{GS}=10V)$  | 32mΩ |
| $R_{DS(on)Typ}(V_{GS}=4.5V)$ | 34mΩ |
| ID                           | 30A  |

## Symbol

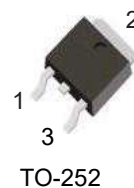


## APPLICATIONS

- Power Management in Telecom, Industrial Automation
- Current Switching in DC/DC & AC/DC (SR) Sub-systems
- Motor Driving In Power Tool, E-vehicle, Robotics

## FEATURES

- Low Gate Charge
- High Current Capability
- 100% UIS Tested, 100%  $R_g$  Tested



## ORDER INFORMATION

| Order codes  |            | Package | Packing           |
|--------------|------------|---------|-------------------|
| Halogen-Free | Halogen    |         |                   |
| N/A          | MOT30N10BD | TO-252  | 2500 pieces /Reel |

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

| Parameter                                                 | Symbol    | Value      | Unit        |
|-----------------------------------------------------------|-----------|------------|-------------|
| Drain-Source Voltage                                      | $V_{DS}$  | 100        | V           |
| Gate-Source Voltage                                       | $V_{GS}$  | $\pm 20$   | V           |
| Drain Current-Continuous( $V_{GS}=10V, T_A=25^{\circ}C$ ) | $I_D$     | 30         | A           |
| Drain Current-Continuous( $T_A=100^{\circ}C$ )            | $I_D$     | 22         | A           |
| Pulsed Drain Current                                      | $I_{DM}$  | 120        | A           |
| Maximum Power Dissipation                                 | $P_D$     | 54         | W           |
| Single pulse avalanche energy                             | $E_{AS}$  | 90         | mJ          |
| Junction Temperature                                      | $T_J$     | +150       | $^{\circ}C$ |
| Storage Temperature                                       | $T_{STG}$ | -55 ~ +150 | $^{\circ}C$ |

## THERMAL CHARACTERISTICS

| Parameter        | Symbol     | Typ  | Unit          |
|------------------|------------|------|---------------|
| Junction to Case | $R_{thJC}$ | 2.31 | $^{\circ}C/W$ |

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

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

| Parameter                          | Symbol              | Test condition                                                                        | Min | Typ  | Max  | Unit |
|------------------------------------|---------------------|---------------------------------------------------------------------------------------|-----|------|------|------|
| Off characteristics                |                     |                                                                                       |     |      |      |      |
| Drain-Source Breakdown Voltage     | V <sub>DSS</sub>    | V <sub>GS</sub> =0V I <sub>D</sub> =250μ                                              | 100 | -    | -    | V    |
| Zero Gate Voltage Drain Current    | I <sub>DSS</sub>    | V <sub>DS</sub> =100V, V <sub>GS</sub> =0V                                            | -   | -    | 1    | μA   |
| Gate-Body Leakage Current          | I <sub>GSS</sub>    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                            | -   | -    | ±100 | nA   |
| On characteristics                 |                     |                                                                                       |     |      |      |      |
| Gate Threshold Voltage             | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                              | 1   | 1.45 | 2.5  | V    |
| Drain-Source On-State Resistance   | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =20A                                             | -   | 32   | 40   | mΩ   |
|                                    |                     | V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A                                            | -   | 34   | 42   | mΩ   |
| Dynamic characteristics            |                     |                                                                                       |     |      |      |      |
| Gate Resistance                    | R <sub>g</sub>      | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V ,f=1.0MHz                                    | -   | 1.6  | -    | Ω    |
| Forward Transconductance           | g <sub>FS</sub>     | V <sub>DS</sub> =10V, I <sub>D</sub> = 5A                                             | -   | 12   | -    | S    |
| Input Capacitance                  | C <sub>iss</sub>    | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, F=1.0MHz                                   | -   | 2400 | -    | PF   |
| Output Capacitance                 | C <sub>oss</sub>    |                                                                                       | -   | 90   | -    | PF   |
| Reverse Transfer Capacitance       | C <sub>rss</sub>    |                                                                                       | -   | 80   | -    | PF   |
| Switching characteristics          |                     |                                                                                       |     |      |      |      |
| Turn-on Delay Time                 | t <sub>d(on)</sub>  | V <sub>DS</sub> =50V, I <sub>D</sub> =15A<br>V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω | -   | 13   | -    | nS   |
| Turn-on Rise Time                  | t <sub>r</sub>      |                                                                                       | -   | 15   | -    | nS   |
| Turn-Off Delay Time                | t <sub>d(off)</sub> |                                                                                       | -   | 22   | -    | nS   |
| Turn-Off Fall Time                 | t <sub>f</sub>      |                                                                                       | -   | 6    | -    | nS   |
| Total Gate Charge                  | Q <sub>g</sub>      | V <sub>DS</sub> =50V, I <sub>D</sub> =15A, V <sub>GS</sub> =10V                       | -   | 25   | -    | nC   |
| Gate-Source Charge                 | Q <sub>gs</sub>     |                                                                                       | -   | 5    | -    | nC   |
| Gate-Drain Charge                  | Q <sub>gd</sub>     |                                                                                       | -   | 6    | -    | nC   |
| Drain-source diode characteristics |                     |                                                                                       |     |      |      |      |
| Diode Forward Voltage              | V <sub>SD</sub>     | V <sub>GS</sub> =0V, I <sub>SD</sub> =1A                                              | -   | 0.72 | 1.2  | V    |
| Diode Forward Current              | I <sub>s</sub>      |                                                                                       | -   | -    | 30   | A    |
| Maximum Pulsed Current             | I <sub>SM</sub>     |                                                                                       | -   | -    | 120  | A    |
| Reverse Recovery Time              | t <sub>rr</sub>     | T <sub>J</sub> = 25°C, I <sub>SD</sub> = 15A<br>dI/dt = 100A/μs                       | -   | 35   | -    | nS   |
| Reverse Recovery Charge            | Q <sub>rr</sub>     |                                                                                       | -   | 75   | -    | nS   |

■ TYPICAL CHARACTERISTICS

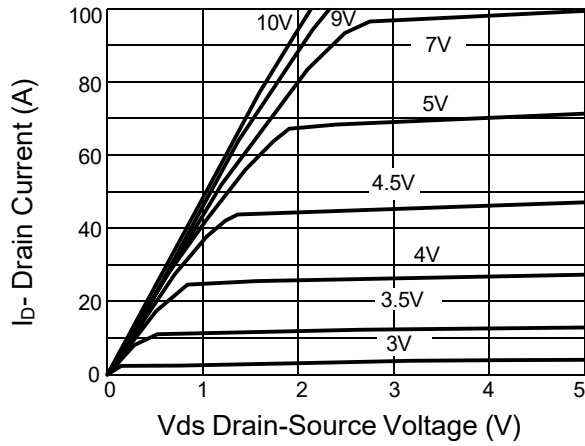


Figure 1: Output characteristics

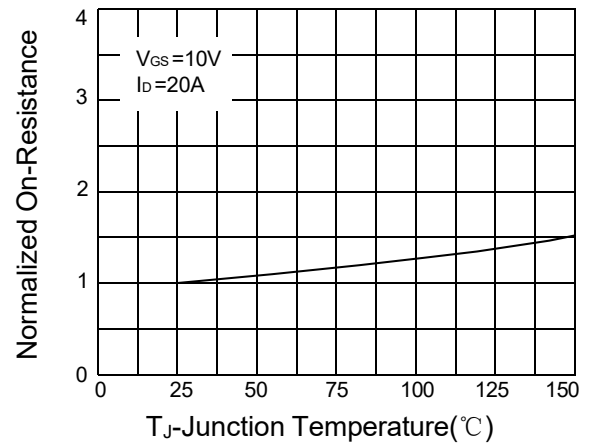


Figure 2: Rdson-junction temperature

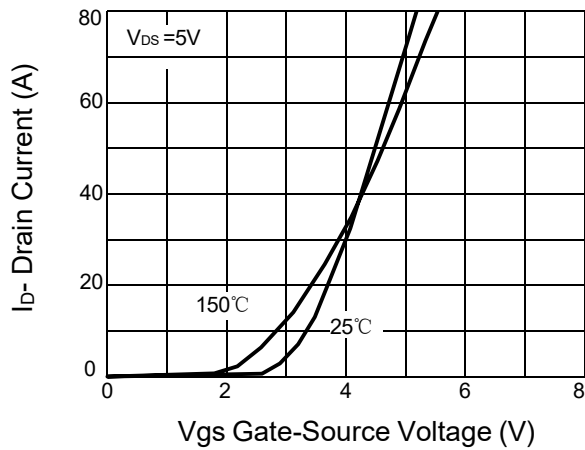


Figure 3: Transfer characteristics

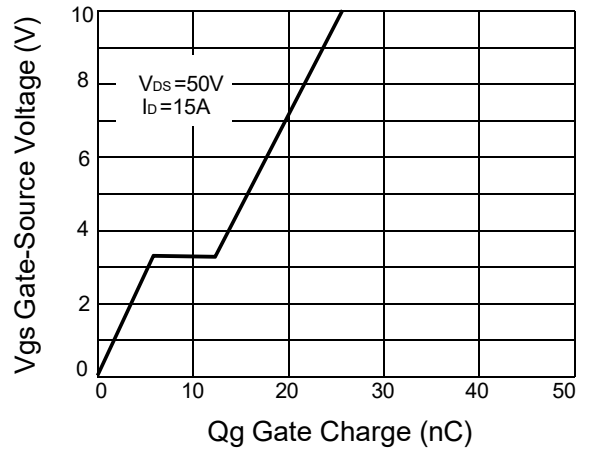


Figure 4: Gate charge

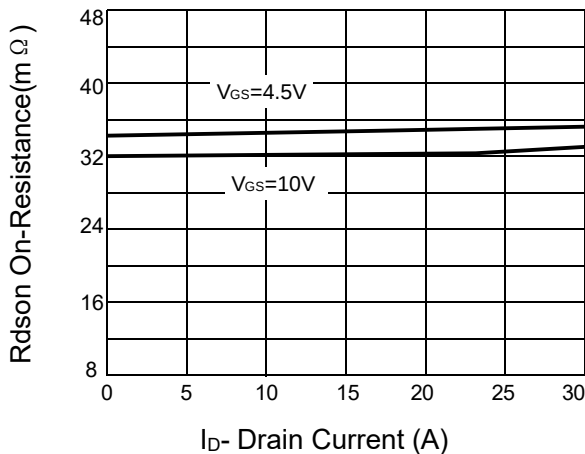


Figure 5: Rdson-drain current

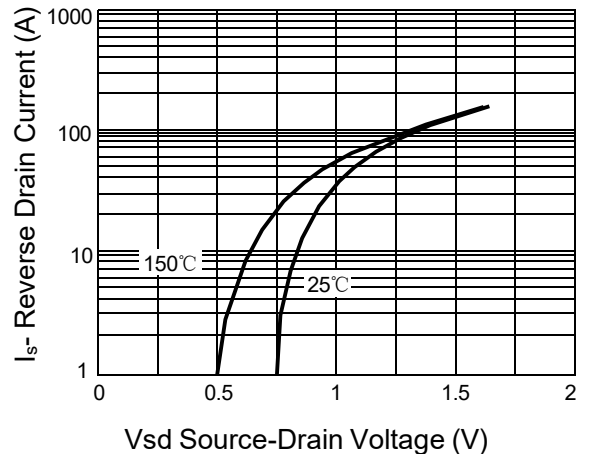


Figure 6: Source-drain diode forward

■ TYPICAL CHARACTERISTICS(Cont.)

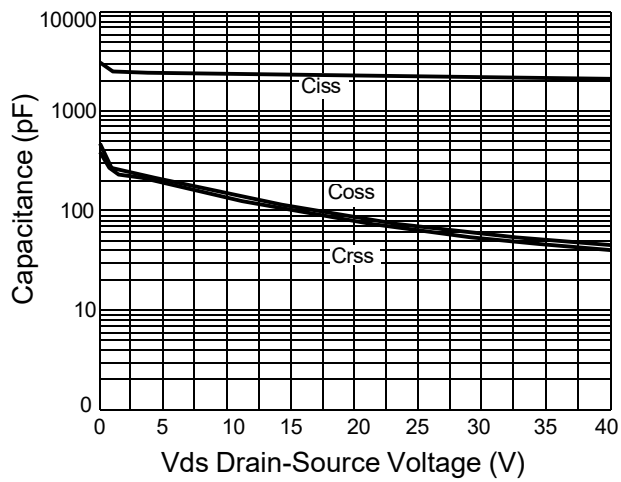


Figure 7: Capacitance vs. vds

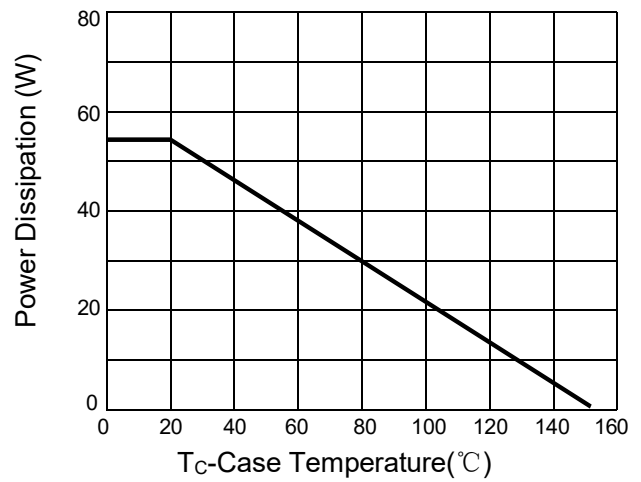


Figure 8: Power de-rating

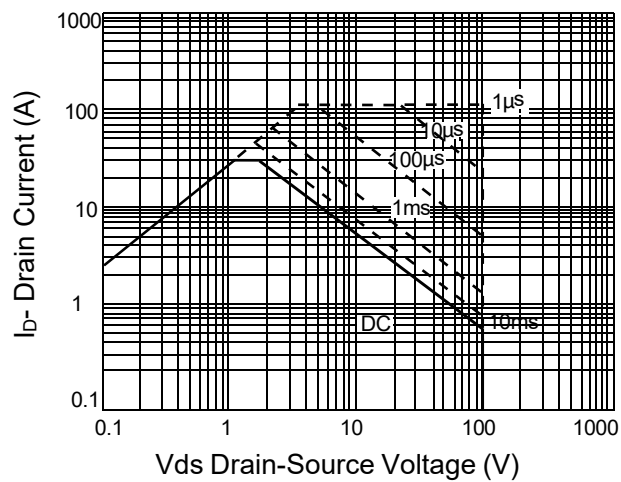


Figure 9: Safe operation area

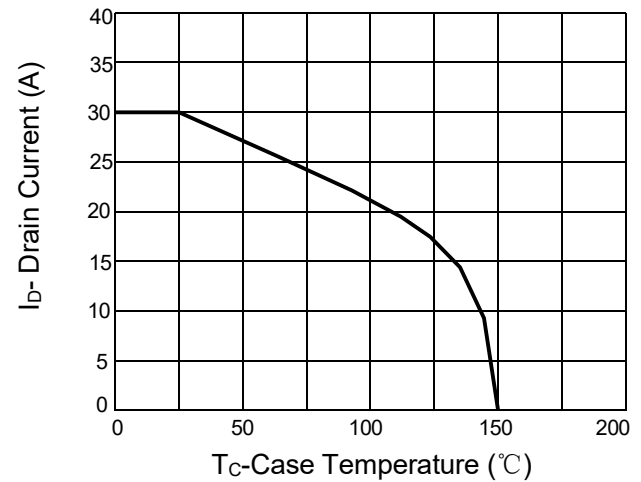


Figure 10: Current de-rating

■ TO-252 PACKAGE OUTLINE DIMENSIONS

