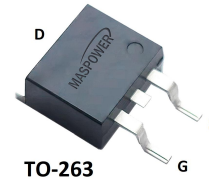


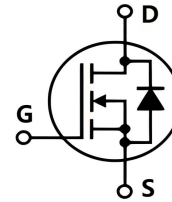
## Features

- $V_{DS}=60V, I_D=150A$   
 $R_{DS(on), Typ.}=3.8m\Omega @ V_{GS}=10V$
- Fast Switching
- Low Gate Charge and  $R_{dson}$
- Low Reverse Transfer Capacitances
- 100% Single Pulse Avalanche Energy Test



## Applications

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply



## Absolute Ratings ( $T_C=25^\circ C$ )

| Parameter                                               | Symbol                 | Limit         | Unit       |
|---------------------------------------------------------|------------------------|---------------|------------|
| Drain-Source Voltage                                    | $V_{DSS}$              | 60            | V          |
| Transient Gate-Source Voltage                           | $V_{GSM}$              | $\pm 30$      | V          |
| Continuous Gate-Source Voltage                          | $V_{GSS}$              | $\pm 20$      | V          |
| Drain Current-continuous                                | $I_D$                  | 150           | A          |
| Drain Current-continuous<br>( $T_C=100^\circ C$ )       | $I_D(T_C=100^\circ C)$ | 105           | A          |
| Drain Current-pulse <sup>1</sup>                        | $I_{DM}$               | 600           | A          |
| Continuous pulse avalanche current                      | $I_{AR}$               | 70            | A          |
| Single Pulsed Avalanche Energy <sup>2</sup>             | $E_{AS}$               | 342           | mJ         |
| Maximum Power Dissipation <sup>3</sup>                  | $P_D, T_C=25^\circ C$  | 208           | W          |
| Operating and Storage<br>Temperature Range <sup>4</sup> | $T_J, T_{STG}$         | 150, -55~+150 | $^\circ C$ |
| Maximum Lead Temperature for<br>Soldering Purpose       | $T_L$                  | 300           | $^\circ C$ |

## Electrical Characteristics( $T_{CASE}=25^\circ C$ unless otherwise specified)

| Parameter                             | Symbol                | Tests conditions          | Min | Typ | Max | Units         |
|---------------------------------------|-----------------------|---------------------------|-----|-----|-----|---------------|
| Drain-Source Voltage                  | $BV_{DSS}$            | $I_D=250\mu A, V_{GS}=0V$ | 60  | -   | -   | V             |
| $BV_{DSS}$ Temperature<br>Coefficient | $BV_{DSS}/\Delta T_J$ |                           | -   | 0.1 | -   | V/ $^\circ C$ |
| Zero Gate Voltage Drain               | $I_{DSS}$             | $V_{DS}=100V, V_{GS}=0V$  | -   | -   | 1   | $\mu A$       |

|                                                |              |                                                |     |      |           |    |
|------------------------------------------------|--------------|------------------------------------------------|-----|------|-----------|----|
| Current                                        |              | $V_{DS}=48V, V_{GS}=0V,$<br>$T_a=125^{\circ}C$ | -   | -    | 250       |    |
| Gate-Body Leakage Current                      | $I_{GSS}$    | $V_{GS}=\pm 20V, V_{DS}=0V$                    | -   | -    | $\pm 100$ | nA |
| On-Characteristics                             |              |                                                |     |      |           |    |
| Gate Threshold Voltage                         | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$                 | 2.0 | 3.0  | 4.0       | V  |
| Static Drain-Source On-Resistance <sup>1</sup> | $R_{DS(ON)}$ | $V_{DS}=10V, I_D=50A$                          | -   | 3.8  | 5.0       | mΩ |
|                                                |              | $V_{DS}=6V, I_D=20A$                           | -   | 5.0  | 7.5       | mΩ |
| Dynamic Characteristics                        |              |                                                |     |      |           |    |
| Input capacitance                              | $C_{iss}$    | $V_{DS}=50V, V_{GS}=0V,$<br>$f=1.0MHz$         | -   | 5180 | -         | pF |
| Output capacitance                             | $C_{oss}$    |                                                | -   | 800  | -         | pF |
| Reverse transfer capacitance                   | $C_{rss}$    |                                                | -   | 6.5  | -         | pF |

**Electrical Characteristics**( $T_{CASE}=25^{\circ}C$  unless otherwise specified)

| Parameter                                              | Symbol              | Tests conditions                                                                                    | Min | Typ  | Max | Units |
|--------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------|-----|------|-----|-------|
| Switching-Characteristics                              |                     |                                                                                                     |     |      |     |       |
| Turn-On delay time                                     | t <sub>d(on)</sub>  | V <sub>DS</sub> =50V,I <sub>D</sub> =5A,<br>R <sub>G</sub> =3.3Ω V <sub>GS</sub> =10V<br>(note 4,5) | -   | 19   | -   | ns    |
| Turn-On rise time                                      | t <sub>r</sub>      |                                                                                                     | -   | 9.5  | -   | ns    |
| Turn-Off delay time                                    | t <sub>d(Off)</sub> |                                                                                                     | -   | 39   | -   | ns    |
| Turn-Off rise time                                     | t <sub>f</sub>      |                                                                                                     | -   | 8.2  | -   | ns    |
| Total Gate Charge                                      | Q <sub>g</sub>      | V <sub>DS</sub> =50V,I <sub>D</sub> =30A,<br>V <sub>GS</sub> =10V<br>(note 4,5)                     | -   | 65   | -   | nC    |
| Gate-Source charge                                     | Q <sub>gs</sub>     |                                                                                                     | -   | 18   | -   | nC    |
| Gate-Drain charge                                      | Q <sub>gd</sub>     |                                                                                                     | -   | 9.7  | -   | nC    |
| Drain-Source Diode Characteristics and Maximum Ratings |                     |                                                                                                     |     |      |     |       |
| Body Diode Forward Voltage                             | V <sub>SD</sub>     | V <sub>GS</sub> =0V,I <sub>S</sub> =50A                                                             | -   | 0.88 | 1.2 | V     |
| Continuous Source Current                              | I <sub>S</sub>      |                                                                                                     | -   | -    | 150 | A     |
| Maximum Diode Forward Current                          | I <sub>SM</sub>     |                                                                                                     | -   | -    | 600 | A     |
| Reverse recovery time                                  | t <sub>rr</sub>     | V <sub>GS</sub> =0V,I <sub>S</sub> =20A<br>dI <sub>F</sub> /dt=500A/μs<br>(note 4)                  | -   | 50   | -   | ns    |
| Reverse recovery charge                                | Q <sub>rr</sub>     |                                                                                                     | -   | 68   | -   | nC    |
| Reverse recovery Current                               | I <sub>RM</sub>     |                                                                                                     | -   | 16.6 | -   | A     |

## Thermal Characteristics

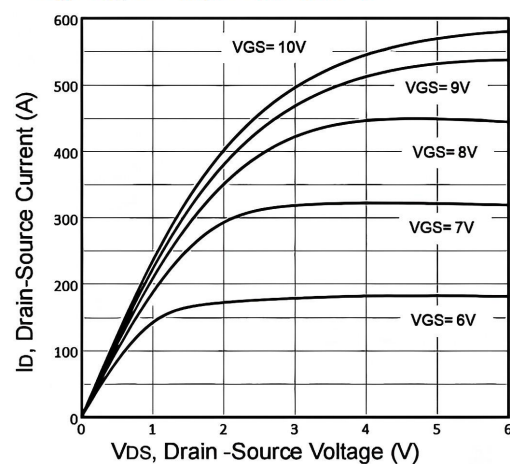
| Parameter                                         | Symbol        | Value | Unit                 |
|---------------------------------------------------|---------------|-------|----------------------|
| Thermal Resistance, junction to Case <sup>5</sup> | $R_{th(J-C)}$ | 0.6   | $^{\circ}\text{C/W}$ |
| Thermal Resistance, junction to Ambient           | $R_{th(J-A)}$ | 60    | $^{\circ}\text{C/W}$ |

Notes:

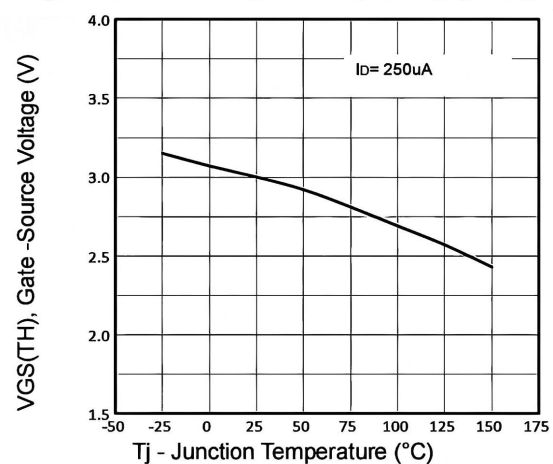
1. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$
2. E<sub>AS</sub> condition:  $T_j=25^{\circ}\text{C}$ ,  $V_{DS}=30\text{V}$ ,  $V_{GS}=10\text{V}$ ,  $I_{AS}=37\text{A}$ ,  $L=0.5\text{mH}$ ,  $R_g=25\Omega$
3. Repetitive Rating: Pulse width limited by maximum junction temperature.
4. Guaranteed by design, not subject to production
5. Surface Mounted on FR4 Board,  $t \leq 10$  sec.

## Typical characteristic curves

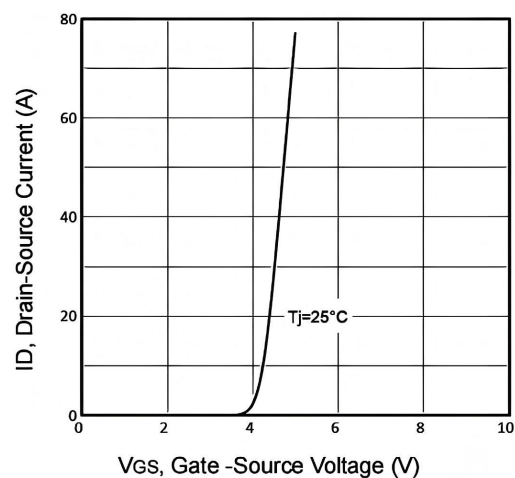
**Fig1.** Typical Output Characteristics



**Fig2.** Normalized Threshold Voltage Vs. Temperature



**Fig3.** Typical Transfer Characteristics



**Fig4.** On-Resistance vs. Drain Current and Gate Voltage

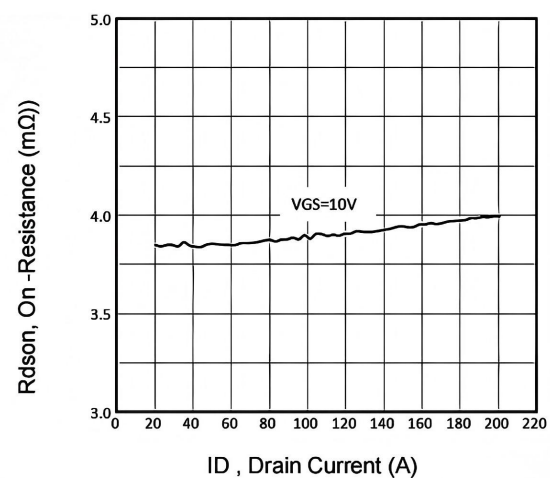


Fig5. Typical Source-Drain Diode Forward Voltage

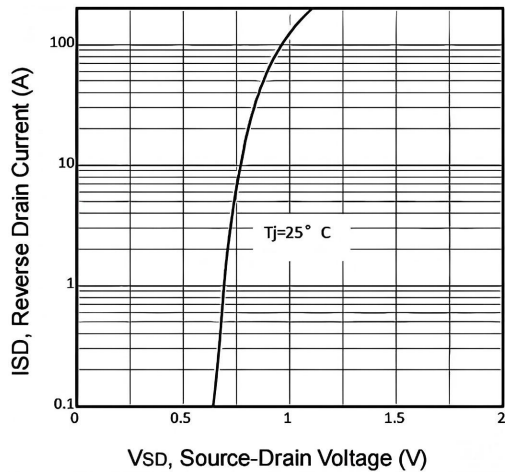


Fig6. Maximum Safe Operating Area

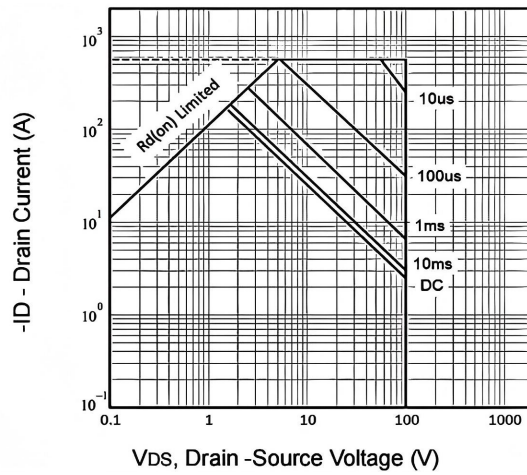


Fig7. Typical Capacitance Vs. Drain-Source Voltage

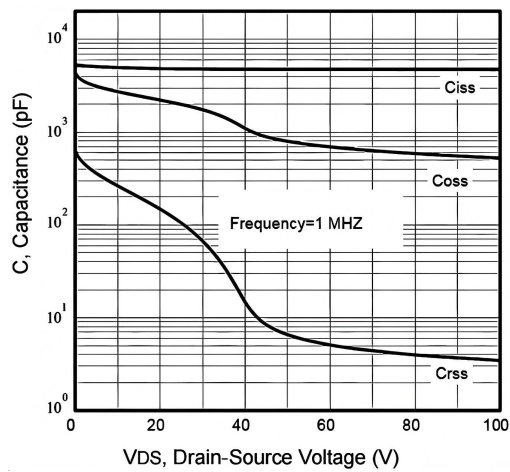


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

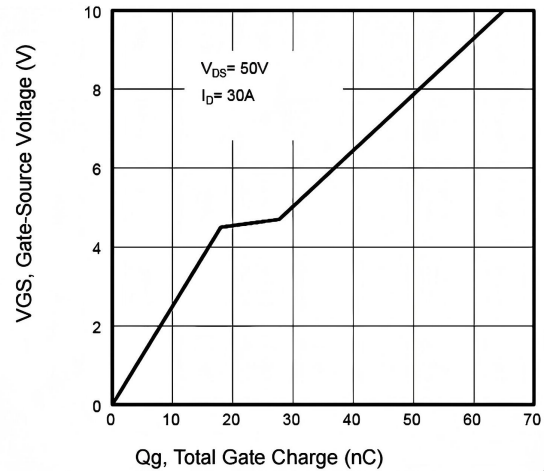
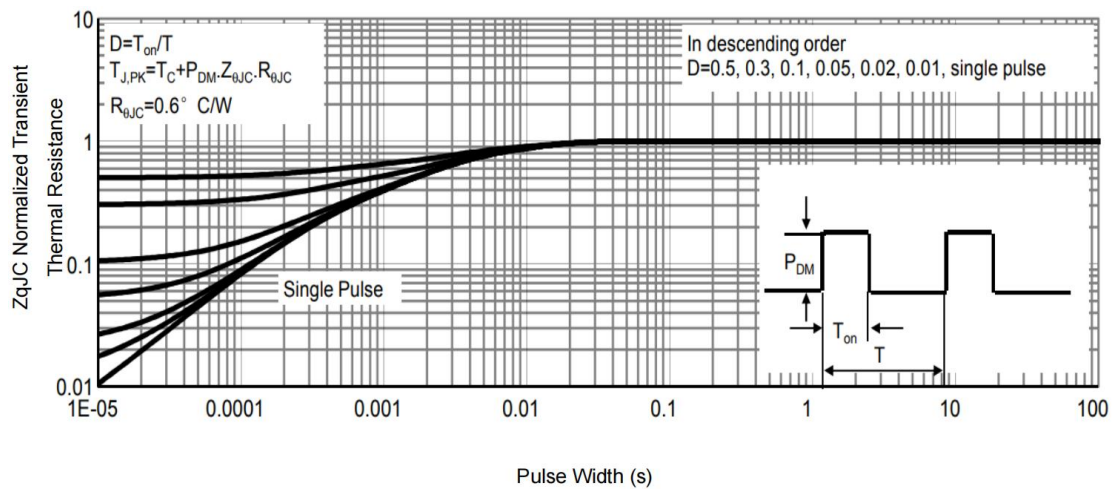
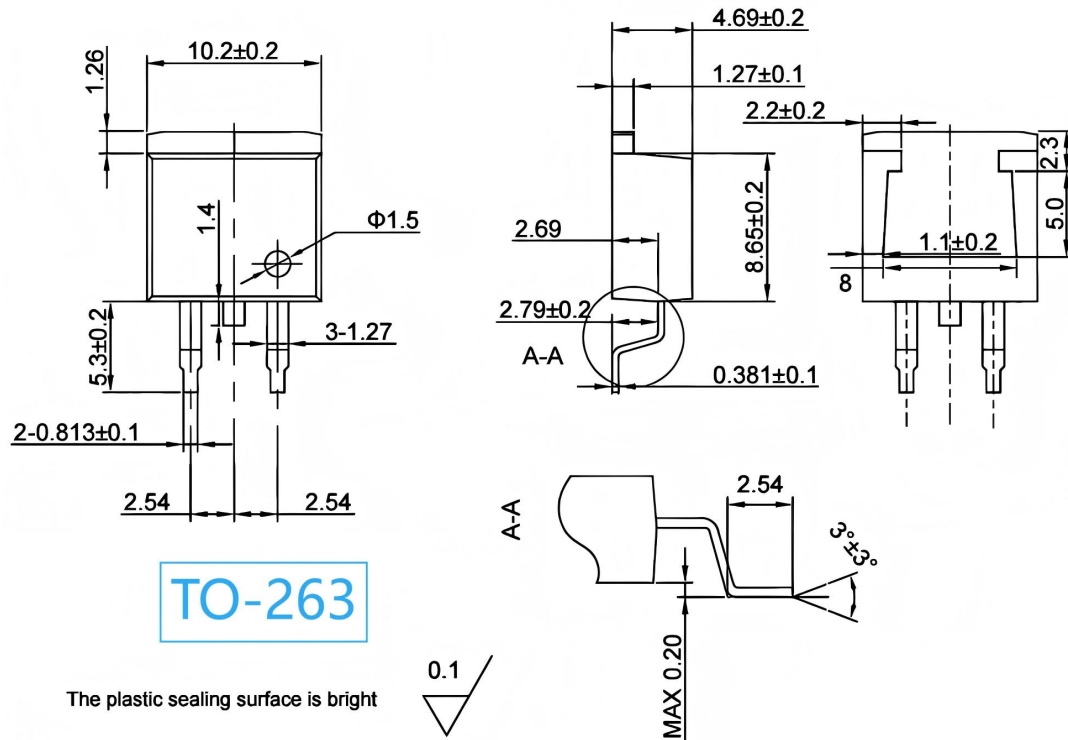


Fig9. Normalized Maximum Transient Thermal Impedance



# Package Mechanical DATA



## Notes:

1. Unmarked tolerance  $\pm 0.15$ mm; unmarked R  $< 0.15$ mm
2. The resin body is not allowed to have defects, shrinkage holes, cracks, bubbles and other harmful defects
3. The drawing indicates that the leg has reinforcement
4. Unit : mm