

## Description:

This N-Channel MOSFET uses advanced trench technology and

design to provide excellent  $R_{DS(on)}$  with low gate charge.

It can be used in a wide variety of applications.



## Features:

- 1)  $V_{DS}=30V, I_D=80A, R_{DS(ON)} < 5.5 m\Omega @ V_{GS}=10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra low  $R_{DS(ON)}$ .
- 5) Excellent package for good heat dissipation.



## Absolute Maximum Ratings: ( $T_C=25^\circ C$ unless otherwise noted)

| Symbol         | Parameter                                        | Ratings     | Units      |
|----------------|--------------------------------------------------|-------------|------------|
| $V_{DS}$       | Drain-Source Voltage                             | 30          | V          |
| $V_{GS}$       | Gate-Source Voltage                              | $\pm 20$    | V          |
| $I_D$          | Continuous Drain Current- $T_C=25^\circ C$       | 80          | A          |
|                | Continuous Drain Current- $T_C=100^\circ C$      | 46          |            |
|                | Pulsed Drain Current <sup>1</sup>                | 280         |            |
| $E_{AS}$       | Single Pulse Avalanche Energy <sup>2</sup>       | 56          | mJ         |
| $P_D$          | Power Dissipation, $T_C=25^\circ C$              | 46          | W          |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range | -55 to +150 | $^\circ C$ |

## Thermal Characteristics:

| Symbol          | Parameter                            | Max  | Units        |
|-----------------|--------------------------------------|------|--------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 2.72 | $^\circ C/W$ |

**Electrical Characteristics:** ( $T_c=25^{\circ}\text{C}$  unless otherwise noted)

| Symbol                             | Parameter                               | Conditions                                              | Min | Typ  | Max       | Units      |
|------------------------------------|-----------------------------------------|---------------------------------------------------------|-----|------|-----------|------------|
| Off Characteristics                |                                         |                                                         |     |      |           |            |
| $BV_{DSS}$                         | Drain-Source Breakdown Voltage          | $V_{GS}=0V, I_D=250\mu A$                               | 30  | ---  | ---       | V          |
| $I_{DSS}$                          | Zero Gate Voltage Drain Current         | $V_{GS}=0V, V_{DS}=30V$                                 | --- | ---  | 1         | $\mu A$    |
| $I_{GSS}$                          | Gate-Source Leakage Current             | $V_{GS}=\pm 20V, V_{DS}=0A$                             | --- | ---  | $\pm 100$ | nA         |
| On Characteristics                 |                                         |                                                         |     |      |           |            |
| $V_{GS(th)}$                       | GATE-Source Threshold Voltage           | $V_{GS}=V_{DS}, I_D=250\mu A$                           | 1   | 1.5  | 2.5       | V          |
| $R_{DS(ON)}$                       | Drain-Source On Resistance <sup>3</sup> | $V_{GS}=10V, I_D=30A$                                   | --- | 4.2  | 5.5       | m $\Omega$ |
|                                    |                                         | $V_{GS}=4.5V, I_D=20A$                                  | --- | 7.5  | 12        |            |
| Dynamic Characteristics            |                                         |                                                         |     |      |           |            |
| $C_{iss}$                          | Input Capacitance                       | $V_{DS}=15V, V_{GS}=0V, f=1MHz$                         | --- | 1614 | ---       | pF         |
| $C_{oss}$                          | Output Capacitance                      |                                                         | --- | 245  | ---       |            |
| $C_{rss}$                          | Reverse Transfer Capacitance            |                                                         | --- | 215  | ---       |            |
| Switching Characteristics          |                                         |                                                         |     |      |           |            |
| $t_{d(on)}$                        | Turn-On Delay Time                      | $V_{DD}=15V, I_D=30A,$<br>$V_{GS}=10V, R_{GEN}=3\Omega$ | --- | 7.5  | ---       | ns         |
| $t_r$                              | Rise Time                               |                                                         | --- | 14.5 | ---       | ns         |
| $t_{d(off)}$                       | Turn-Off Delay Time                     |                                                         | --- | 35.2 | ---       | ns         |
| $t_f$                              | Fall Time                               |                                                         | --- | 9.6  | ---       | ns         |
| $Q_g$                              | Total Gate Charge                       | $V_{GS}=10V, V_{DS}=15V,$<br>$I_D=30A$                  | --- | 33.7 | ---       | nC         |
| $Q_{gs}$                           | Gate-Source Charge                      |                                                         | --- | 8.5  | ---       | nC         |
| $Q_{gd}$                           | Gate-Drain “Miller” Charge              |                                                         | --- | 7.5  | ---       | nC         |
| Drain-Source Diode Characteristics |                                         |                                                         |     |      |           |            |
| $V_{SD}$                           | Source-Drain Diode Forward Voltage      | $V_{GS}=0V, I_S=30A$                                    | --- | ---  | 1.2       | V          |
| $I_S$                              | Continuous Source Current               | ---                                                     | --- | ---  | 80        | A          |
| $I_{sm}$                           | Pulsed Source Current                   |                                                         | --- | --   | 280       | A          |

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature  
 2. EAS condition:  $T_J=25^{\circ}\text{C}, V_{DD}=15V, V_G=10V, R_G=25\Omega, L=0.5mH, I_{AS}=15A$   
 3. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 0.5\%$

Typical Characteristics: ( $T_c=25^\circ\text{C}$  unless otherwise noted)

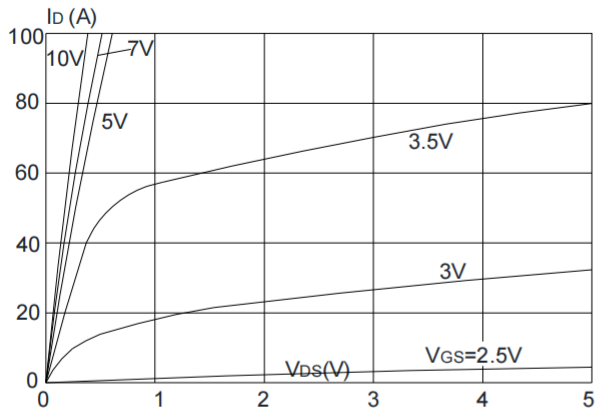


Figure1: Output Characteristics

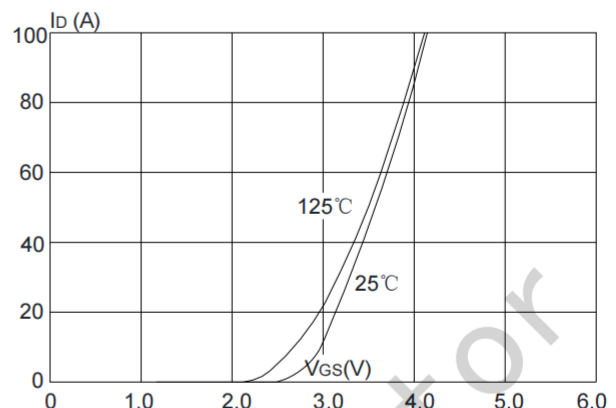


Figure 2: Typical Transfer Characteristics

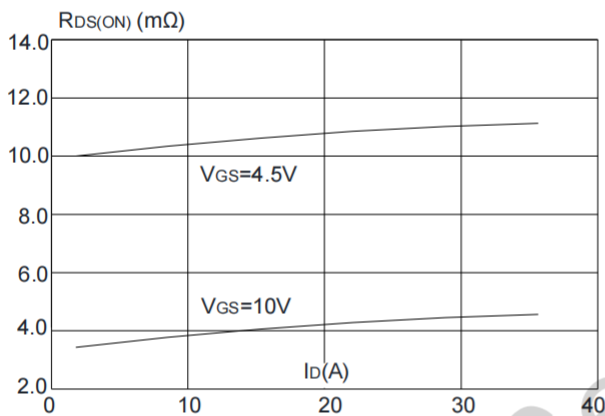


Figure 3: On-resistance vs. Drain Current

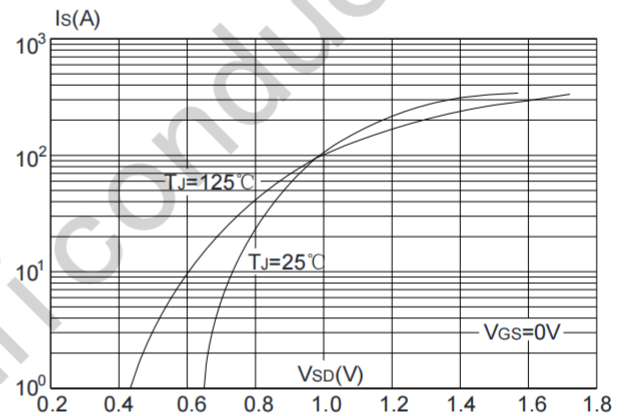


Figure 4: Body Diode Characteristics

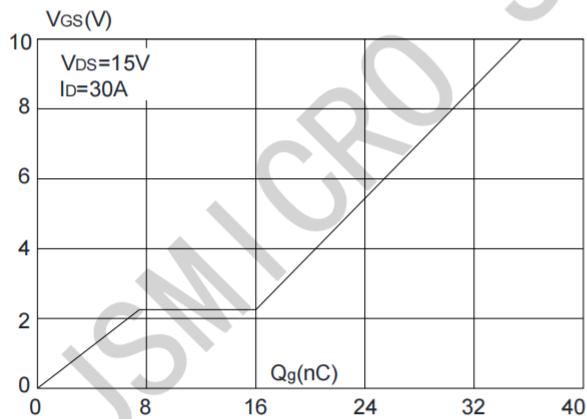


Figure 5: Gate Charge Characteristics

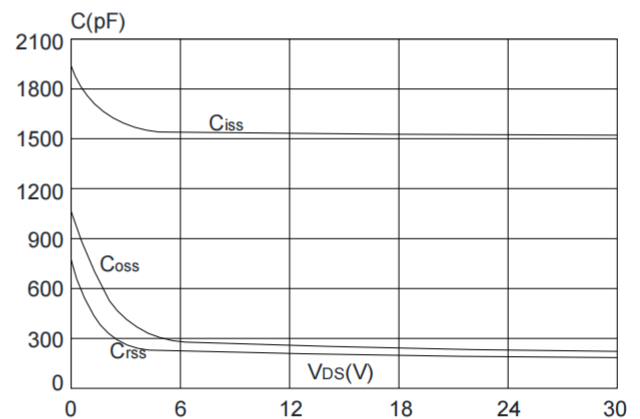


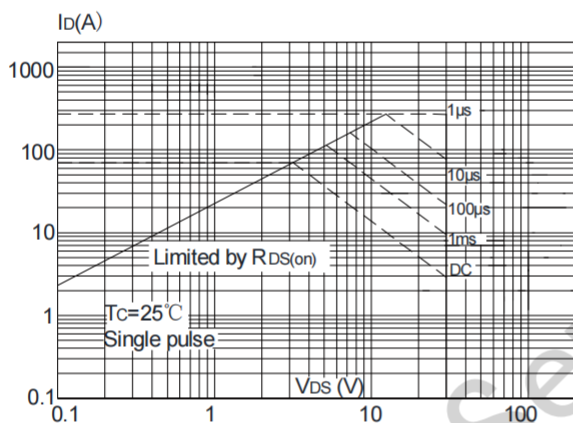
Figure 6: Capacitance Characteristics



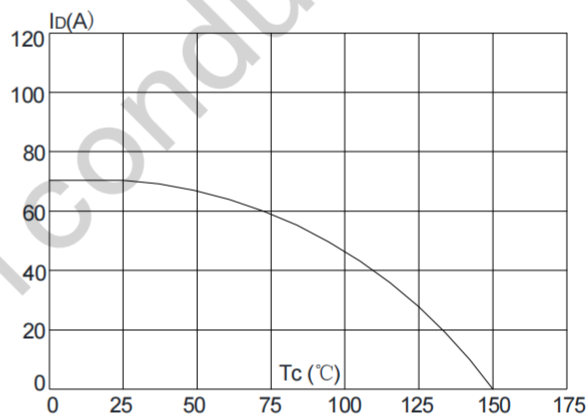
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



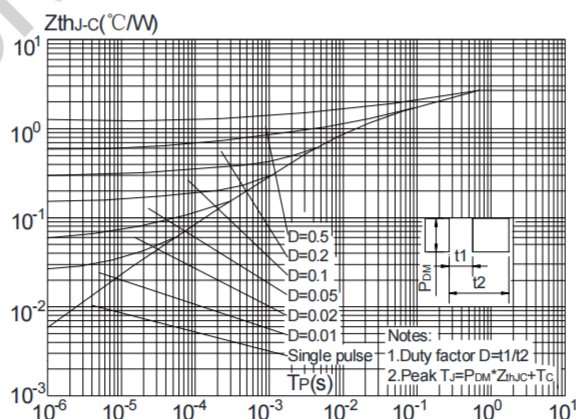
**Figure 8:** Normalized on Resistance vs. Junction Temperature



**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Case

## Package Information

TO-252



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 6.30                      | 6.90  | 0.248                | 0.272 |
| A1     | 0.00                      | 0.16  | 0.000                | 0.006 |
| B      | 5.70                      | 6.30  | 0.224                | 0.248 |
| C      | 2.10                      | 2.50  | 0.083                | 0.098 |
| D      | 0.30                      | 0.70  | 0.012                | 0.028 |
| E1     | 0.60                      | 0.90  | 0.024                | 0.035 |
| E2     | 0.70                      | 1.00  | 0.028                | 0.039 |
| F      | 0.30                      | 0.60  | 0.012                | 0.024 |
| G      | 0.70                      | 1.20  | 0.028                | 0.047 |
| L1     | 9.60                      | 10.50 | 0.378                | 0.413 |
| L2     | 2.70                      | 3.10  | 0.106                | 0.122 |
| H      | 0.40                      | 1.00  | 0.016                | 0.039 |
| M      | 5.10                      | 5.50  | 0.201                | 0.217 |
| N      | 2.09                      | 2.49  | 0.082                | 0.098 |
| R      | 0.30                      |       | 0.012                |       |
| T      | 1.40                      | 1.60  | 0.055                | 0.063 |
| Y      | 5.10                      | 6.30  | 0.201                | 0.248 |