

## Description:

This N-Channel MOSFET uses advanced trench technology and design to provide excellent  $R_{DS(on)}$  with low gate charge.

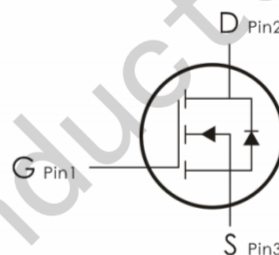
It can be used in a wide variety of applications.



TO-252

## Features:

- 1)  $V_{DS}=100V, I_D=15A, R_{DS(ON)} < 100 m\Omega @ V_{GS}=10V$
- 2) Low gate charge.
- 3) Green device available.
- 4) Advanced high cell density trench technology for ultra  $R_{DS(ON)}$ .
- 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                             | 100         | V          |
| $V_{GS}$       | Gate-Source Voltage                              | $\pm 20$    | V          |
| $I_D$          | Continuous Drain Current- $T_C=25^\circ C$       | 15          | A          |
|                | Continuous Drain Current- $T_C=70^\circ C$       | 12          |            |
|                | Pulsed Drain Current <sup>1</sup>                | 60          |            |
| $E_{AS}$       | Single Pulse Avalanche Energy                    | 16          | mJ         |
| $P_D$          | Power Dissipation, $T_C=25^\circ C$              | 50          | 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    | 3   | $^\circ C/W$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | --- |              |

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

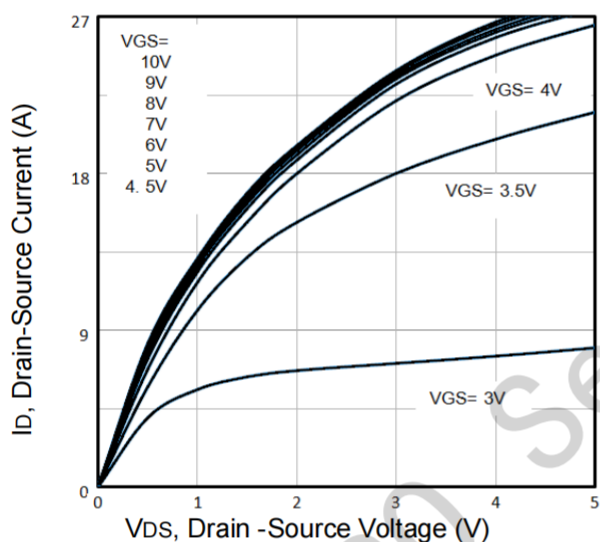
| Symbol                             | Parameter                                       | Conditions                                             | Min | Typ  | Max       | Units          |
|------------------------------------|-------------------------------------------------|--------------------------------------------------------|-----|------|-----------|----------------|
| Off Characteristics                |                                                 |                                                        |     |      |           |                |
| $BV_{DSS}$                         | Drain-Source Breakdown Voltage                  | $V_{GS}=0V, I_D=250\text{ }\mu\text{ A}$               | 100 | ---  | ---       | V              |
| $I_{DSS}$                          | Zero Gate Voltage Drain Current                 | $V_{GS}=0V, V_{DS}=80V$                                | --- | ---  | 1         | $\mu\text{ A}$ |
| $I_{GSS}$                          | Gate-Source Leakage Current                     | $V_{GS}=\pm 20V, V_{DS}=0A$                            | --- | ---  | $\pm 100$ | nA             |
| On Characteristics                 |                                                 |                                                        |     |      |           |                |
| $V_{GS(th)}$                       | GATE-Source Threshold Voltage                   | $V_{GS}=V_{DS}, I_D=250\text{ }\mu\text{ A}$           | 1   | 2    | 3         | V              |
| $R_{DS(ON)}$                       | Drain-Source On Resistance <sup>3</sup>         | $V_{GS}=10V, I_D=10A$                                  | --- | 75   | 100       | m $\Omega$     |
|                                    |                                                 | $V_{GS}=4.5V, I_D=8A$                                  | --- | 100  | 115       |                |
| $G_{FS}$                           | Forward Transconductance                        | $V_{DS}=0V, I_D=0A$                                    | --- | ---  | ---       | S              |
| Dynamic Characteristics            |                                                 |                                                        |     |      |           |                |
| $C_{iss}$                          | Input Capacitance                               | $V_{DS}=25V, V_{GS}=0V, f=1MHz$                        | --- | 890  | ---       | pF             |
| $C_{oss}$                          | Output Capacitance                              |                                                        | --- | 60   | ---       |                |
| $C_{rss}$                          | Reverse Transfer Capacitance                    |                                                        | --- | 25   | ---       |                |
| Switching Characteristics          |                                                 |                                                        |     |      |           |                |
| $t_{d(on)}$                        | Turn-On Delay Time <sup>3</sup>                 | $V_{DD}=25V, I_D=8A,$<br>$V_{GS}=10V, R_{GEN}=1\Omega$ | --- | 14.2 | ---       | ns             |
| $t_r$                              | Rise Time <sup>2,3</sup>                        |                                                        | --- | 34   | ---       | ns             |
| $t_{d(off)}$                       | Turn-Off Delay Time                             |                                                        | --- | 40.4 | ---       | ns             |
| $t_f$                              | Fall Time <sup>2,3</sup>                        |                                                        | --- | 6    | ---       | ns             |
| $Q_g$                              | Total Gate Charge <sup>3</sup>                  | $V_{GS}=10V, V_{DS}=80V,$<br>$I_D=10A$                 | --- | 24   | ---       | nC             |
| $Q_{gs}$                           | Gate-Source Charge                              |                                                        | --- | 5    | ---       | nC             |
| $Q_{gd}$                           | Gate-Drain “Miller” Charge                      |                                                        | --- | 8    | ---       | nC             |
| Drain-Source Diode Characteristics |                                                 |                                                        |     |      |           |                |
| $V_{SD}$                           | Source-Drain Diode Forward Voltage <sup>3</sup> | $V_{GS}=0V, I_S=8A$                                    | --- | 0.8  | 1.2       | V              |

|            |                         |                                              |     |     |     |    |
|------------|-------------------------|----------------------------------------------|-----|-----|-----|----|
| <b>Trr</b> | Reverse Recovery Time   | $I_{SD}=8A, V_{GS}=0V$<br>$di/dt=100A/\mu s$ | --- | 35  | --- | Ns |
| <b>qrr</b> | Reverse Recovery Charge |                                              | --- | 121 | --- | nc |

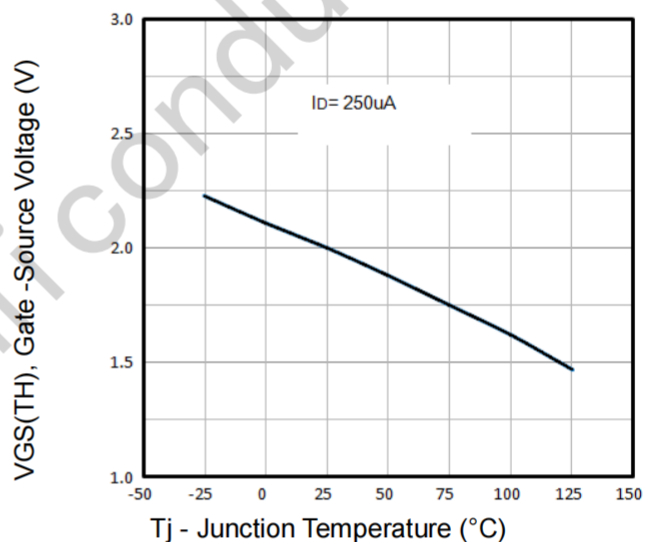
### Notes:

- ① Pulse width limited by maximum allowable junction temperature
- ② Limited by  $T_{Jmax}$ , starting  $T_J = 25^\circ C$ ,  $L = 0.1mH$ ,  $R_G = 25\Omega$ ,  $I_{AS} = 18A$ ,  $V_{GS} = 10V$ . Part not recommended for use above this value
- ③ Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .

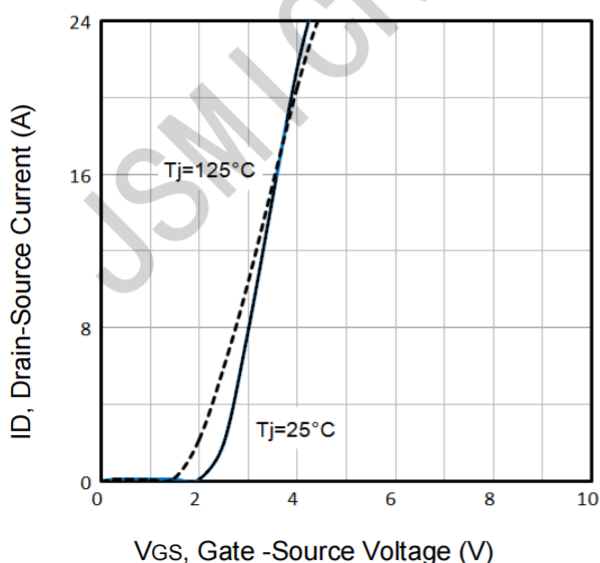
### Typical Characteristics: ( $T_c=25^\circ C$ unless otherwise noted)



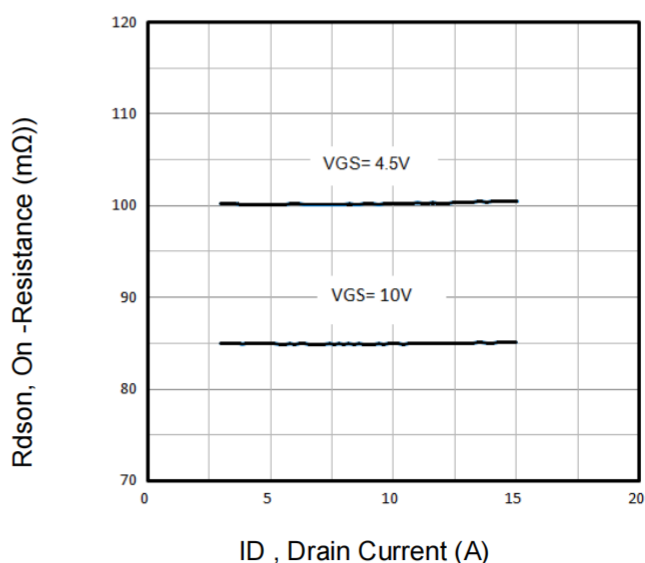
**Fig1.** Typical Output Characteristics



**Fig2.** VGS(TH) 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 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 |