

## Features

- $V_{DS} = 60V, I_D = 53A$
- $R_{DS(ON)} \leq 12m\Omega @ V_{GS} = 10V$
- $R_{DS(ON)} \leq 17m\Omega @ V_{GS} = 4.5V$

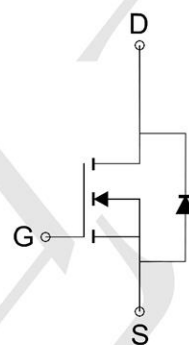
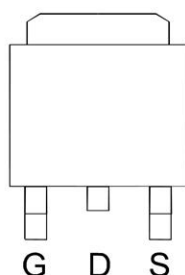
## Application

- Load Switch
- PWM Application
- Power management

## Package and Pin Configuration

(TO-252-3L)

Top View



N-Channel MOSFET

## Marking:



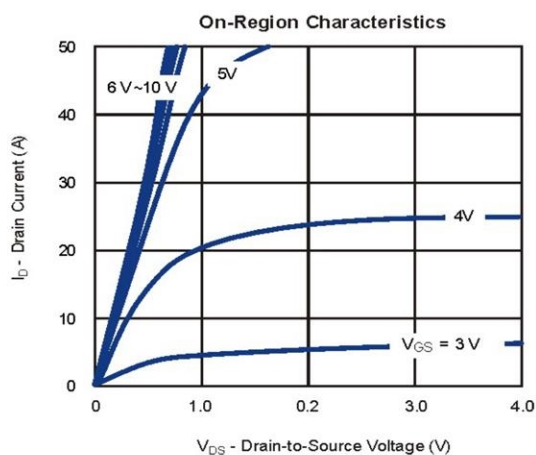
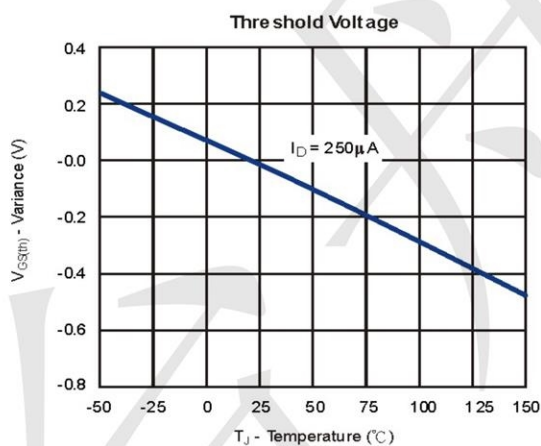
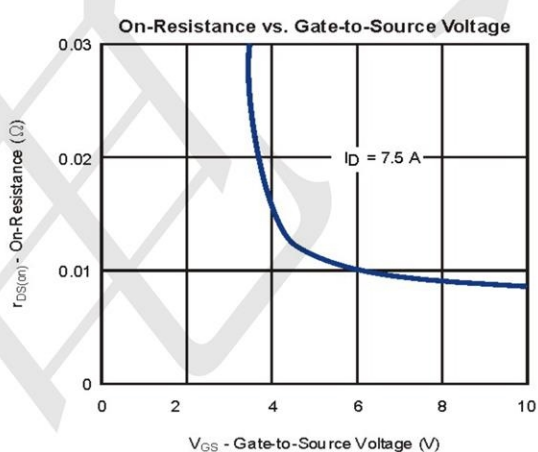
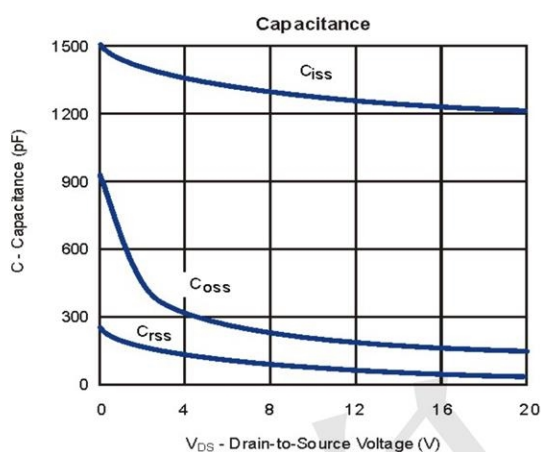
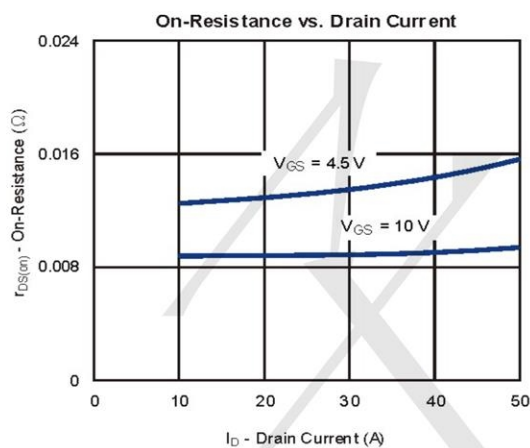
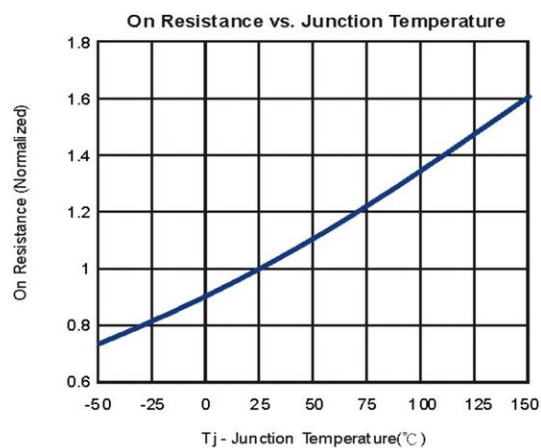
## Absolute Maximum Ratings (TA=25°C Unless Otherwise Noted)

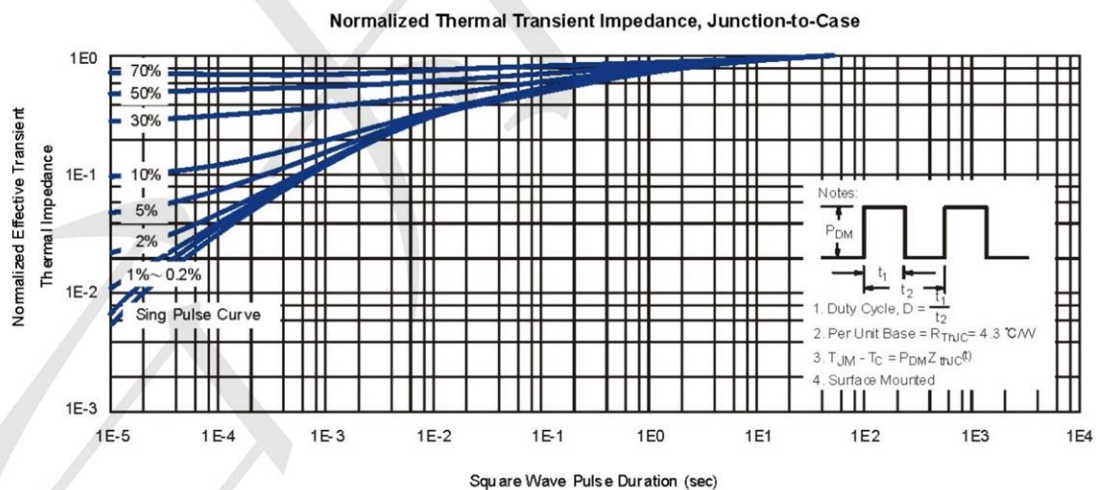
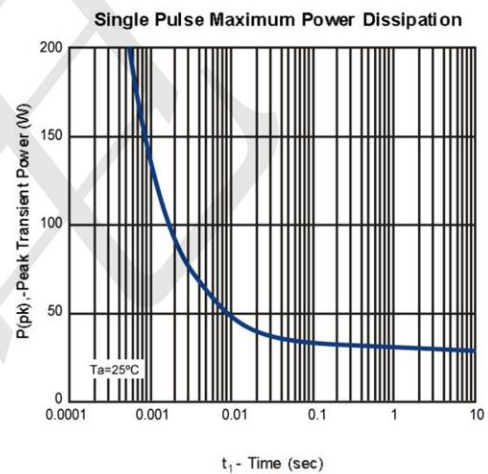
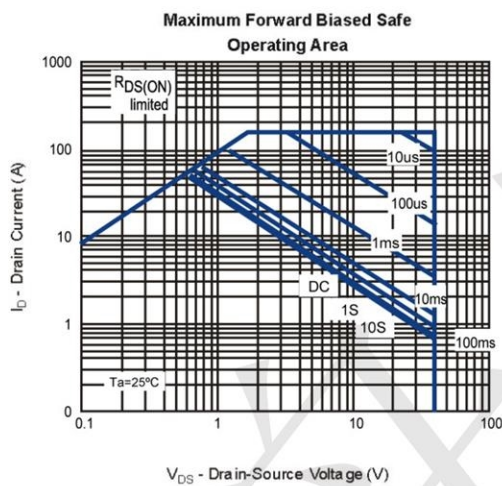
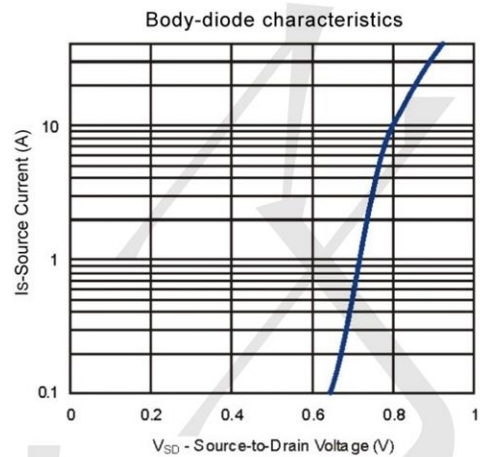
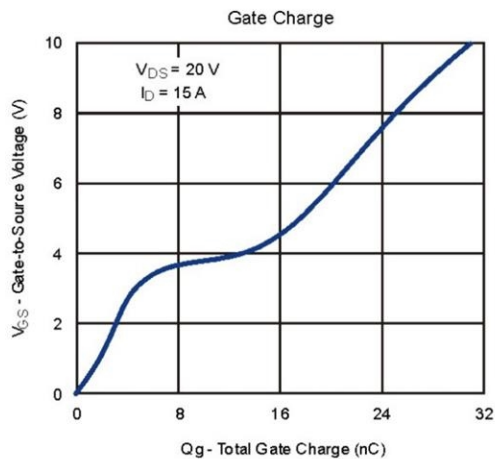
| Parameter                                                  |         | Symbol          | Steady     | Unit |
|------------------------------------------------------------|---------|-----------------|------------|------|
| Drain-Source Voltage                                       |         | $V_{DSS}$       | 40         | V    |
| Gate-Source Voltage                                        |         | $V_{GSS}$       | $\pm 20$   | V    |
| Continuous Drain Current<br>(Tj=150°C, limited by package) | Tc=25°C | $I_D$           | 53         | A    |
|                                                            | Tc=70°C |                 | 31         |      |
| Pulsed Drain Current                                       |         | $I_{DM}$        | 156        | A    |
| Maximum Power Dissipation<br>(Note A)                      | Tc=25°C | $P_D$           | 30         | W    |
|                                                            | Tc=70°C |                 | 18.5       |      |
| Operating Junction Temperature                             |         | $T_J$           | -55 to 150 | °C   |
| Thermal Resistance-Junction to Ambient(Note A)             |         | $R_{\theta JA}$ | 42         | °C/W |
| Thermal Resistance-Junction to Case(Note A)                |         | $R_{\theta JC}$ | 4.3        | °C/W |

**Electrical Characteristics** (TA=25°C Unless Otherwise Specified)

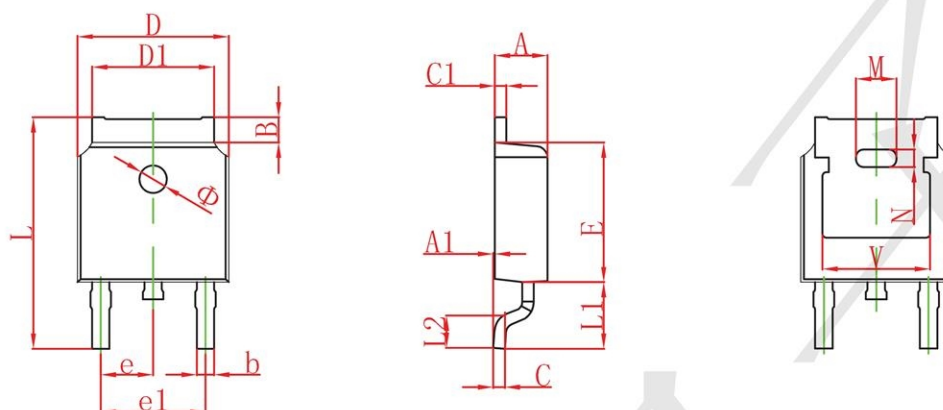
| Symbol               | Parameter                                     | Conditions                                                                                     | Min | Typ  | Max       | Unit       |
|----------------------|-----------------------------------------------|------------------------------------------------------------------------------------------------|-----|------|-----------|------------|
| <b>STATIC</b>        |                                               |                                                                                                |     |      |           |            |
| V <sub>(BR)DSS</sub> | Drain-Source Breakdown Voltage                | V <sub>GS</sub> =0V, I <sub>D</sub> =250 $\mu$ A                                               | 40  |      |           | V          |
| V <sub>GS(th)</sub>  | Gate Threshold Voltage                        | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250 $\mu$ A                                 | 1   | 1.5  | 3         | V          |
| I <sub>GSS</sub>     | Gate Leakage Current                          | V <sub>DS</sub> =0V, V <sub>GS</sub> = $\pm$ 20V                                               |     |      | $\pm$ 100 | nA         |
| I <sub>DSS</sub>     | Zero Gate Voltage Drain Current               | V <sub>DS</sub> =40V, V <sub>GS</sub> =0V                                                      |     |      | 1         | $\mu$ A    |
| R <sub>DS(on)</sub>  | Drain-Source On-State Resistance <sup>a</sup> | V <sub>GS</sub> =10V, I <sub>D</sub> =15A                                                      |     | 8.8  | 12        | m $\Omega$ |
|                      |                                               | V <sub>GS</sub> =4.5V, I <sub>D</sub> =13A                                                     |     | 12   | 17        |            |
| V <sub>SD</sub>      | Diode Forward Voltage                         | I <sub>S</sub> =15A, V <sub>GS</sub> =0V                                                       |     | 0.8  | 1.2       | V          |
| <b>DYNAMIC</b>       |                                               |                                                                                                |     |      |           |            |
| Q <sub>g</sub> (TOT) | Total Gate Charge, V <sub>GS</sub> =10V       | V <sub>DS</sub> =20V, I <sub>D</sub> =15A                                                      |     | 31   | 36        | nC         |
| Q <sub>g</sub>       | Total Gate Charge, V <sub>GS</sub> =4.5V      |                                                                                                |     | 16   | 18        |            |
| Q <sub>gs</sub>      | Gate-Source Charge                            |                                                                                                |     | 6.5  |           |            |
| Q <sub>gd</sub>      | Gate-Drain Charge                             |                                                                                                |     | 8.3  |           |            |
| R <sub>g</sub>       | Gate Resistance                               | V <sub>GS</sub> =V <sub>DS</sub> =0V, f=1MHz                                                   |     | 1.6  |           | $\Omega$   |
| C <sub>iss</sub>     | Input capacitance                             | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, f=1MHz                                              |     | 1240 | 1500      | pF         |
| C <sub>oss</sub>     | Output Capacitance                            |                                                                                                |     | 170  |           |            |
| C <sub>rss</sub>     | Reverse Transfer Capacitance                  |                                                                                                |     | 60   |           |            |
| t <sub>d(on)</sub>   | Turn-On Delay Time                            | V <sub>DD</sub> =20V, I <sub>D</sub> =1A<br>V <sub>GS</sub> =10V, R <sub>GEN</sub> =6 $\Omega$ |     | 16   | 20        | ns         |
| t <sub>r</sub>       | Turn-On Rise Time                             |                                                                                                |     | 13   | 17        |            |
| t <sub>d(off)</sub>  | Turn-Off Delay Time                           |                                                                                                |     | 60   | 75        |            |
| t <sub>f</sub>       | Turn-On Fall Time                             |                                                                                                |     | 7    | 10        |            |

## Typical Electrical and Thermal Characteristic Curves





**TO252 Package Information**



| Symbol | Dimensions In Millimeters |        | Dimensions In Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min.                      | Max.   | Min.                 | Max.  |
| A      | 2.200                     | 2.380  | 0.087                | 0.094 |
| A1     | 0.000                     | 0.100  | 0.000                | 0.004 |
| B      | 0.800                     | 1.400  | 0.031                | 0.055 |
| b      | 0.710                     | 0.810  | 0.028                | 0.032 |
| c      | 0.460                     | 0.560  | 0.018                | 0.022 |
| c1     | 0.460                     | 0.560  | 0.018                | 0.022 |
| D      | 6.500                     | 6.700  | 0.256                | 0.264 |
| D1     | 5.130                     | 5.460  | 0.202                | 0.215 |
| E      | 6.000                     | 6.200  | 0.236                | 0.244 |
| e      | 2.286 TYP.                |        | 0.090 TYP.           |       |
| e1     | 4.327                     | 4.727  | 0.170                | 0.186 |
| M      | 1.778 REF.                |        | 0.070 REF.           |       |
| N      | 0.762 REF.                |        | 0.018 REF.           |       |
| L      | 9.800                     | 10.400 | 0.386                | 0.409 |
| L1     | 2.9 REF.                  |        | 0.114 REF.           |       |
| L2     | 1.400                     | 1.700  | 0.055                | 0.067 |
| V      | 4.830 REF.                |        | 0.190 REF.           |       |
| Φ      | 1.100                     | 1.300  | 0.043                | 0.051 |