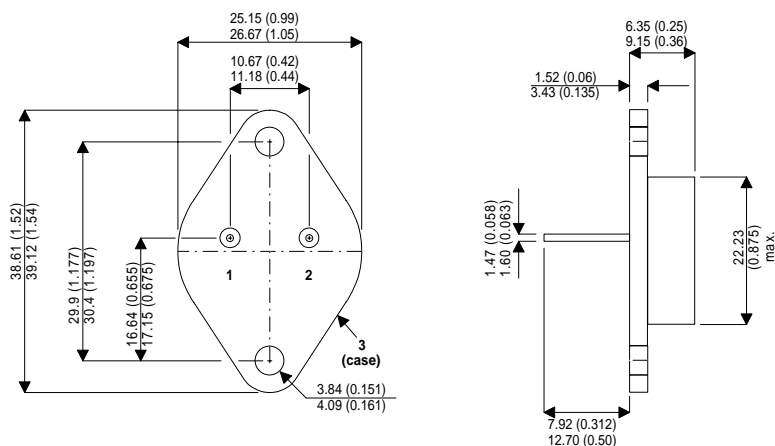


TO-3 Package Outline.  
Dimensions in mm (inches)



Pin 1 – Gate

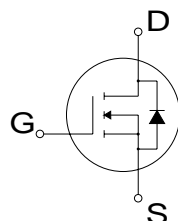
Pin 2 – Source

Case – Drain

**N-CHANNEL  
ENHANCEMENT MODE  
HIGH VOLTAGE  
POWER MOSFETS**

**$V_{DSS}$  300V**  
 **$I_{D(cont)}$  33A**  
 **$R_{DS(on)}$  0.090Ω**

- **Faster Switching**
- **Lower Leakage**
- **TO-3 Hermetic Package**



StarMOS is a new generation of high voltage N-Channel enhancement mode power MOSFETs. This new technology minimises the JFET effect, increases packing density and reduces the on-resistance. StarMOS also achieves faster switching speeds through optimised gate layout.

**ABSOLUTE MAXIMUM RATINGS** ( $T_{case} = 25^{\circ}C$  unless otherwise stated)

|                |  |            |      |
|----------------|--|------------|------|
| $V_{DSS}$      | Drain – Source Voltage   | 300        | V    |
| $I_D$          | Continuous Drain Current                                       | 33         | A    |
| $I_{DM}$       | Pulsed Drain Current <sup>1</sup>                              | 132        | A    |
| $V_{GS}$       | Gate – Source Voltage  | ±30        | V    |
| $V_{GSM}$      | Gate – Source Voltage Transient                                | ±40        |      |
| $P_D$          | Total Power Dissipation @ $T_{case} = 25^{\circ}C$             | 235        | W    |
|                | Derate Linearly  | 1.88       | W/°C |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range               | -55 to 150 | °C   |
| $T_L$          | Lead Temperature : 0.063" from Case for 10 Sec.                | 300        |      |
| $I_{AR}$       | Avalanche Current <sup>1</sup> (Repetitive and Non-Repetitive) | 33         | A    |
| $E_{AR}$       | Repetitive Avalanche Energy <sup>1</sup>                       | 30         | mJ   |
| $E_{AS}$       | Single Pulse Avalanche Energy <sup>2</sup>                     | 1300       |      |

1) Repetitive Rating: Pulse Width limited by maximum junction temperature.

2) Starting  $T_J = 25^{\circ}C$ ,  $L = 2.39mH$ ,  $R_G = 25\Omega$ , Peak  $I_L = 33A$

**STATIC ELECTRICAL RATINGS** ( $T_{case} = 25^{\circ}C$  unless otherwise stated)

|              | Characteristic                                       | Test Conditions  | Min. | Typ. | Max.      | Unit     |
|--------------|--|--|------|------|-----------|----------|
| $BV_{DSS}$   | Drain – Source Breakdown Voltage                     | $V_{GS} = 0V, I_D = 250\mu A$                                | 300  |      |           | V        |
| $I_{DSS}$    | Zero Gate Voltage Drain Current<br>( $V_{GS} = 0V$ ) | $V_{DS} = V_{DSS}$   |      |      | 25        | $\mu A$  |
|              |  | $V_{DS} = 0.8V_{DSS}, T_C = 125^{\circ}C$                    |      |      | 250       |          |
| $I_{GSS}$    | Gate – Source Leakage Current                        | $V_{GS} = \pm 30V, V_{DS} = 0V$                              |      |      | $\pm 100$ | nA       |
| $V_{GS(TH)}$ | Gate Threshold Voltage                               | $V_{DS} = V_{GS}, I_D = 1.0mA$                               | 2    |      | 4         | V        |
| $I_{D(ON)}$  | On State Drain Current <sup>2</sup>                  | $V_{DS} > I_{D(ON)} \times R_{DS(ON)}$ Max<br>$V_{GS} = 10V$ | 33   |      |           | A        |
| $R_{DS(ON)}$ | Drain – Source On State Resistance <sup>2</sup>      | $V_{GS} = 10V, I_D = 0.5 I_D [Cont.]$                        |      |      | 0.090     | $\Omega$ |

**DYNAMIC CHARACTERISTICS**

|              | Characteristic                 | Test Conditions                   | Min. | Typ. | Max. | Unit |
|--------------|--------------------------------|-----------------------------------|------|------|------|------|
| $C_{iss}$    | Input Capacitance              | $V_{GS} = 0V$                     |      | 4100 | 4950 | pF   |
| $C_{oss}$    | Output Capacitance             | $V_{DS} = 25V$                    |      | 700  | 980  |      |
| $C_{rss}$    | Reverse Transfer Capacitance   | $f = 1MHz$                        |      | 200  | 300  |      |
| $Q_g$        | Total Gate Charge <sup>3</sup> | $V_{GS} = 10V$                    |      | 130  | 195  | nC   |
| $Q_{gs}$     | Gate – Source Charge           | $V_{DD} = 0.5 V_{DSS}$            |      | 25   | 37   |      |
| $Q_{gd}$     | Gate – Drain (“Miller”) Charge | $I_D = I_D [Cont.] @ 25^{\circ}C$ |      | 55   | 77   |      |
| $t_{d(on)}$  | Turn-on Delay Time             | $V_{GS} = 15V$                    |      | 12   | 24   | ns   |
| $t_r$        | Rise Time                      | $V_{DD} = 0.5 V_{DSS}$            |      | 10   | 20   |      |
| $t_{d(off)}$ | Turn-off Delay Time            | $I_D = I_D [Cont.] @ 25^{\circ}C$ |      | 43   | 65   |      |
| $t_f$        | Fall Time                      | $R_G = 1.6\Omega$                 |      | 7    | 14   |      |

**SOURCE – DRAIN DIODE RATINGS AND CHARACTERISTICS**

|          | Characteristic                     | Test Conditions                              | Min. | Typ. | Max. | Unit    |
|----------|------------------------------------|--|------|------|------|---------|
| $I_S$    | Continuous Source Current          | (Body Diode)                                 |      |      | 33   | A       |
| $I_{SM}$ | Pulsed Source Current <sup>1</sup> | (Body Diode)                                 |      |      | 132  |         |
| $V_{SD}$ | Diode Forward Voltage <sup>2</sup> | $V_{GS} = 0V, I_S = -I_D [Cont.]$            |      |      | 1.3  | V       |
| $t_{rr}$ | Reverse Recovery Time              | $I_S = -I_D [Cont.], di_S / dt = 100A/\mu s$ |      | 390  |      | ns      |
| $Q_{rr}$ | Reverse Recovery Charge            | $I_S = -I_D [Cont.], di_S / dt = 100A/\mu s$ |      | 6    |      | $\mu C$ |

**THERMAL CHARACTERISTICS**

|                 | Characteristic      | Min. | Typ. | Max. | Unit          |
|-----------------|---------------------|------|------|------|---------------|
| $R_{\theta JC}$ | Junction to Case    |      |      | 0.53 | $^{\circ}C/W$ |
| $R_{\theta JA}$ | Junction to Ambient |      |      | 30   |               |

1) Repetitive Rating: Pulse Width limited by maximum junction temperature.

2) Pulse Test: Pulse Width < 380 $\mu s$ , Duty Cycle < 2%

3) See MIL-STD-750 Method 3471



CAUTION — Electrostatic Sensitive Devices. Anti-Static Procedures Must Be Followed.