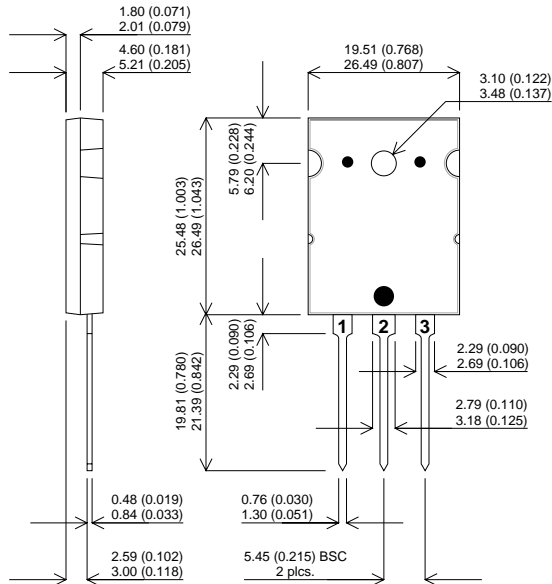
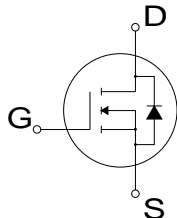


TO-264AA Package Outline.  
Dimensions in mm (inches)



Pin 1 – Gate      Pin 2 – Drain      Pin 3 – Source



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

**$V_{DSS}$       500V**  
 **$I_{D(cont)}$       44A**  
 **$R_{DS(on)}$       0.100 $\Omega$**

- **Faster Switching**
- **Lower Leakage**
- **100% Avalanche Tested**
- **Popular TO-264 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   | 500        | V              |
| $I_D$          | Continuous Drain Current                                       | 47         | A              |
| $I_{DM}$       | Pulsed Drain Current <sup>1</sup>                              | 188        | A              |
| $V_{GS}$       | Gate – Source Voltage  | $\pm 30$   | V              |
| $V_{GSM}$      | Gate – Source Voltage Transient                                | $\pm 40$   |                |
| $P_D$          | Total Power Dissipation @ $T_{case} = 25^{\circ}C$             | 520        | W              |
|                | Derate Linearly  | 4.16       | W/ $^{\circ}C$ |
| $T_J, T_{STG}$ | Operating and Storage Junction Temperature Range               | -55 to 150 | $^{\circ}C$    |
| $T_L$          | Lead Temperature : 0.063" from Case for 10 Sec.                | 300        |                |
| $I_{AR}$       | Avalanche Current <sup>1</sup> (Repetitive and Non-Repetitive) | 47         | A              |
| $E_{AR}$       | Repetitive Avalanche Energy <sup>1</sup>                       | 50         | mJ             |
| $E_{AS}$       | Single Pulse Avalanche Energy <sup>2</sup>                     | 2500       |                |

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

2) Starting  $T_J = 25^{\circ}C$ ,  $L = 2.26mH$ ,  $R_G = 25\Omega$ , Peak  $I_L = 47A$

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

|              | Characteristic                                       | Test Conditions  | Min. | Typ. | Max.      | Unit     |
|--------------|--|--|------|------|-----------|----------|
| $BV_{DSS}$   | Drain – Source Breakdown Voltage                     | $V_{GS} = 0V, I_D = 250\mu A$  | 500  |      |           | V        |
| $I_{DSS}$    | Zero Gate Voltage Drain Current<br>( $V_{GS} = 0V$ ) | $V_{DS} = V_{DSS}$   |      |      | 250       | $\mu A$  |
|              |  | $V_{DS} = 0.8V_{DSS}, T_C = 125^{\circ}C$                            |      |      | 1000      |          |
| $I_{GSS}$    | Gate – Source Leakage Current                        | $V_{GS} = \pm 30V, V_{DS} = 0V$                                      |      |      | $\pm 100$ | nA       |
| $V_{GS(TH)}$ | Gate Threshold Voltage                               | $V_{DS} = V_{GS}, I_D = 2.5mA$                                       | 2    |      | 4         | V        |
| $I_{D(ON)}$  | On State Drain Current <sup>2</sup>                  | $V_{DS} > I_{D(ON)} \times R_{DS(ON)} \text{ Max}$<br>$V_{GS} = 10V$ | 47   |      |           | A        |
| $R_{DS(ON)}$ | Drain – Source On State Resistance <sup>2</sup>      | $V_{GS} = 10V, I_D = 0.5 I_D [\text{Cont.}]$                         |      |      | 0.100     | $\Omega$ |

**DYNAMIC CHARACTERISTICS**

|              | Characteristic                 | Test Conditions                          | Min. | Typ. | Max. | Unit |
|--------------|--------------------------------|--|------|------|------|------|
| $C_{iss}$    | Input Capacitance              | $V_{GS} = 0V$                            |      | 7400 | 8900 | pF   |
| $C_{oss}$    | Output Capacitance             | $V_{DS} = 25V$                           |      | 1000 | 1400 |      |
| $C_{riss}$   | Reverse Transfer Capacitance   | $f = 1MHz$                               |      | 380  | 570  |      |
| $Q_g$        | Total Gate Charge <sup>3</sup> | $V_{GS} = 10V$                           |      | 312  | 470  | nC   |
| $Q_{gs}$     | Gate – Source Charge           | $V_{DD} = 0.5 V_{DSS}$                   |      | 50   | 75   |      |
| $Q_{gd}$     | Gate – Drain (“Miller”) Charge | $I_D = I_D [\text{Cont.}] @ 25^{\circ}C$ |      | 127  | 190  |      |
| $t_{d(on)}$  | Turn-on Delay Time             | $V_{GS} = 15V$                           |      | 14   | 30   | ns   |
| $t_r$        | Rise Time                      | $V_{DD} = 0.5 V_{DSS}$                   |      | 16   | 32   |      |
| $t_{d(off)}$ | Turn-off Delay Time            | $I_D = I_D [\text{Cont.}] @ 25^{\circ}C$ |      | 54   | 80   |      |
| $t_f$        | Fall Time                      | $R_G = 0.6\Omega$                        |      | 5    | 10   |      |

**SOURCE – DRAIN DIODE RATINGS AND CHARACTERISTICS**

|           | Characteristic                     | Test Conditions  | Min.                 | Typ. | Max. | Unit    |
|-----------|------------------------------------|--|----------------------|------|------|---------|
| $I_S$     | Continuous Source Current          | (Body Diode)   |                      |      | 47   | A       |
| $I_{SM}$  | Pulsed Source Current <sup>1</sup> | (Body Diode)   |                      |      | 188  |         |
| $V_{SD}$  | Diode Forward Voltage <sup>2</sup> | $V_{GS} = 0V, I_S = -I_D [\text{Cont.}]$   |                      |      | 1.3  | V       |
| $dv / dt$ | Peak Diode Recovery                | $I_S \leq I_D [\text{cont}]$<br>$V_{DD} \leq V_{DSS}$<br>$T_J \leq 150^{\circ}C$ |                      |      | 5    | V/ns    |
| $t_{rr}$  | Reverse Recovery Time              | $I_S = -I_D [\text{Cont.}]$<br>$dl / dt = 100A/\mu s$                            | $T_J = 25^{\circ}C$  |      | 250  | ns      |
|           |                                    |  | $T_J = 125^{\circ}C$ |      | 500  |         |
| $Q_{rr}$  | Reverse Recovery Charge            | $I_S = -I_D [\text{Cont.}]$<br>$dl / dt = 100A/\mu s$                            | $T_J = 25^{\circ}C$  | 1.6  |      | $\mu C$ |
|           |                                    |  | $T_J = 125^{\circ}C$ | 5.5  |      |         |
| $I_{rrm}$ | Peak Recovery Current              | $I_S = -I_D [\text{Cont.}]$<br>$dl / dt = 100A/\mu s$                            | $T_J = 25^{\circ}C$  | 15   |      | A       |
|           |                                    |  | $T_J = 125^{\circ}C$ | 27   |      |         |

**THERMAL CHARACTERISTICS**

|                 | Characteristic      | Min. | Typ. | Max. | Unit |
|-----------------|---------------------|------|------|------|------|
| $R_{\theta JC}$ | Junction to Case    |      |      | 0.24 | °C/W |
| $R_{\theta JA}$ | Junction to Ambient |      |      | 40   |      |

- 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.