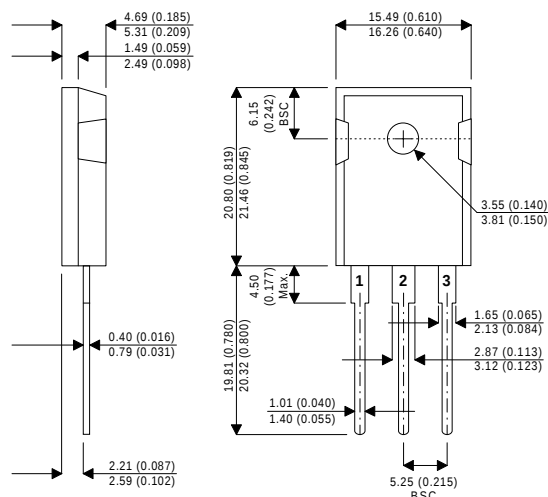
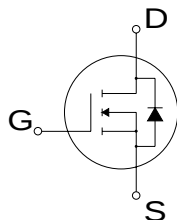


**TO-247AD Package Outline.**

Dimensions in mm (inches)


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

**N-CHANNEL  
ENHANCEMENT MODE  
HIGH VOLTAGE  
POWER MOSFETS**
 $V_{DSS}$  **400V**
 $I_{D(cont)}$  **37A**
 $R_{DS(on)}$  **0.120Ω**

- **Faster Switching**
- **Lower Leakage**
- **100% Avalanche Tested**
- **Popular TO-247 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                                         | 400        | V    |
| $I_D$          | Continuous Drain Current                                       | 37         | A    |
| $I_{DM}$       | Pulsed Drain Current <sup>1</sup>                              | 148        | A    |
| $V_{GS}$       | Gate – Source Voltage                                          | ±20        | V    |
| $V_{GSM}$      | Gate – Source Voltage Transient                                | ±30        |      |
| $P_D$          | Total Power Dissipation @ $T_{case} = 25^{\circ}C$             | 370        | W    |
|                | Derate Linearly                                                | 2.96       | 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) | 37         | 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  $T_J = 25^{\circ}C$ ,  $L = 1.90mH$ ,  $R_G = 25\Omega$ , Peak  $I_L = 37A$

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

|              | Characteristic                                       | Test Conditions                                              | Min. | Typ. | Max.      | Unit     |
|--------------|------------------------------------------------------|--------------------------------------------------------------|------|------|-----------|----------|
| $BV_{DSS}$   | Drain – Source Breakdown Voltage                     | $V_{GS} = 0V$ , $I_D = 250\mu A$                             | 400  |      |           | V        |
| $I_{DSS}$    | Zero Gate Voltage Drain Current<br>( $V_{GS} = 0V$ ) | $V_{DS} = V_{DSS}$                                           |      |      | 25        | $\mu A$  |
|              |                                                      | $V_{DS} = 0.8V_{DSS}$ , $T_C = 125^{\circ}\text{C}$          |      |      | 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>$V_{GS} = 10V$ | 37   |      |           | A        |
| $R_{DS(ON)}$ | Drain – Source On State Resistance <sup>2</sup>      | $V_{GS} = 10V$ , $I_D = 0.5 I_D$ [Cont.]                     |      |      | 0.120     | $\Omega$ |

**DYNAMIC CHARACTERISTICS**

|              | Characteristic                 | Test Conditions                                                                                             | Min. | Typ. | Max. | Unit |
|--------------|--------------------------------|-------------------------------------------------------------------------------------------------------------|------|------|------|------|
| $C_{iss}$    | Input Capacitance              | $V_{GS} = 0V$<br>$V_{DS} = 25V$<br>$f = 1MHz$                                                               |      | 4040 |      | pF   |
| $C_{oss}$    | Output Capacitance             |                                                                                                             |      | 670  |      |      |
| $C_{rss}$    | Reverse Transfer Capacitance   |                                                                                                             |      | 280  |      |      |
| $Q_g$        | Total Gate Charge <sup>3</sup> | $V_{GS} = 10V$<br>$V_{DD} = 0.5 V_{DSS}$<br>$I_D = I_D$ [Cont.] @ $25^{\circ}\text{C}$                      |      | 195  |      | nC   |
| $Q_{gs}$     | Gate – Source Charge           |                                                                                                             |      | 20   |      |      |
| $Q_{gd}$     | Gate – Drain (“Miller”) Charge |                                                                                                             |      | 85   |      |      |
| $t_{d(on)}$  | Turn-on Delay Time             | $V_{GS} = 15V$<br>$V_{DD} = 0.5 V_{DSS}$<br>$I_D = I_D$ [Cont.] @ $25^{\circ}\text{C}$<br>$R_G = 1.6\Omega$ |      | 14   |      | ns   |
| $t_r$        | Rise Time                      |                                                                                                             |      | 14   |      |      |
| $t_{d(off)}$ | Turn-off Delay Time            |                                                                                                             |      | 55   |      |      |
| $t_f$        | Fall Time                      |                                                                                                             |      | 12   |      |      |

**SOURCE – DRAIN DIODE RATINGS AND CHARACTERISTICS**

|          | Characteristic                     | Test Conditions                                | Min. | Typ. | Max. | Unit    |
|----------|------------------------------------|------------------------------------------------|------|------|------|---------|
| $I_S$    | Continuous Source Current          | (Body Diode)                                   |      |      | 37   | A       |
| $I_{SM}$ | Pulsed Source Current <sup>1</sup> | (Body Diode)                                   |      |      | 148  |         |
| $V_{SD}$ | 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.], $dI_S / dt = 100A/\mu s$ |      | 470  |      | ns      |
| $Q_{rr}$ | Reverse Recovery Charge            | $I_S = -I_D$ [Cont.], $dI_S / dt = 100A/\mu s$ |      | 7.4  |      | $\mu C$ |

**THERMAL CHARACTERISTICS**

|                 | Characteristic      | Min. | Typ. | Max. | Unit                 |
|-----------------|---------------------|------|------|------|----------------------|
| $R_{\theta JC}$ | Junction to Case    |      |      | 0.34 | $^{\circ}\text{C/W}$ |
| $R_{\theta JA}$ | 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.

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