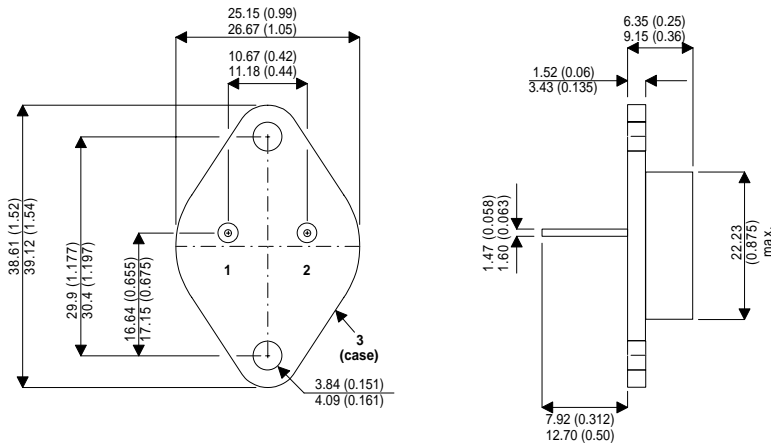


TO-3 Package Outline.  
Dimensions in mm (inches)

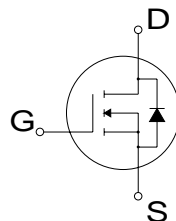


Pin 1 – Gate      Pin 2 – Source      Case – Drain

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

**$V_{DSS}$       500V**  
 **$I_{D(cont)}$       21A**  
 **$R_{DS(on)}$       0.220 $\Omega$**

- 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	500	V
$I_D$	Continuous Drain Current	21	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	84	A
$V_{GS}$	Gate – Source Voltage	$\pm 30$	V
$V_{GSM}$	Gate – Source Voltage Transient	$\pm 40$	
$P_D$	Total Power Dissipation @ $T_{case} = 25^{\circ}C$	235	W
	Derate Linearly	1.88	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)	21	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  $T_J = 25^{\circ}C$ ,  $L = 5.90mH$ ,  $R_G = 25\Omega$ , Peak  $I_L = 21A$

**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 ( $V_{GS} = 0V$ )	$V_{DS} = V_{DSS}$			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 $V_{GS} = 10V$	21			A
$R_{DS(ON)}$	Drain – Source On State Resistance <sup>2</sup>	$V_{GS} = 10V, I_D = 0.5 I_D [Cont.]$			0.220	$\Omega$

**DYNAMIC CHARACTERISTICS**

	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
$C_{iss}$	Input Capacitance	$V_{GS} = 0V$		3700	4440	pF
$C_{oss}$	Output Capacitance	$V_{DS} = 25V$		510	715	
$C_{rss}$	Reverse Transfer Capacitance	$f = 1MHz$		200	300	
$Q_g$	Total Gate Charge <sup>3</sup>	$V_{GS} = 10V$		150	225	nC
$Q_{gs}$	Gate – Source Charge	$V_{DD} = 0.5 V_{DSS}$		25	37	
$Q_{gd}$	Gate – Drain (“Miller”) Charge	$I_D = I_D [Cont.] @ 25^{\circ}C$		70	105	
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 15V$		12	25	ns
$t_r$	Rise Time	$V_{DD} = 0.5 V_{DSS}$		10	20	
$t_{d(off)}$	Turn-off Delay Time	$I_D = I_D [Cont.] @ 25^{\circ}C$		50	75	
$t_f$	Fall Time	$R_G = 1.6\Omega$		8	15	

**SOURCE – DRAIN DIODE RATINGS AND CHARACTERISTICS**

	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	(Body Diode)			21	A
$I_{SM}$	Pulsed Source Current <sup>1</sup>	(Body Diode)			84	
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS} = 0V, I_S = -I_D [Cont.]$			1.3	V
$t_{rr}$	Reverse Recovery Time	$I_S = -I_D [Cont.], di_S / dt = 100A/\mu s$		510		ns
$Q_{rr}$	Reverse Recovery Charge	$I_S = -I_D [Cont.], di_S / dt = 100A/\mu s$		10		$\mu C$

**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.