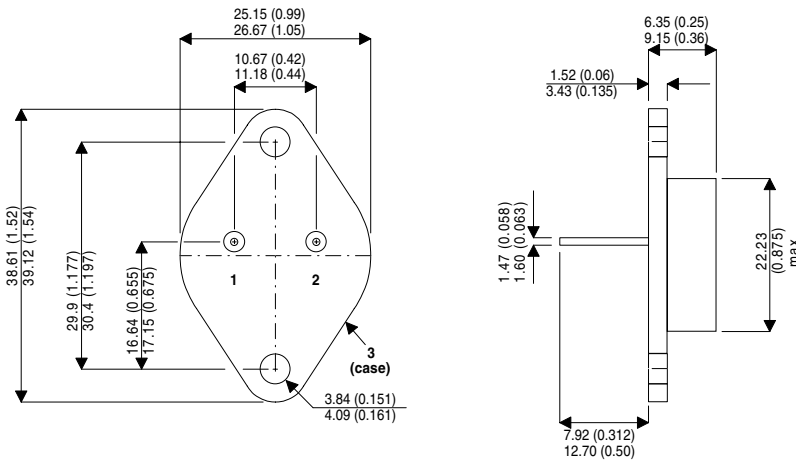


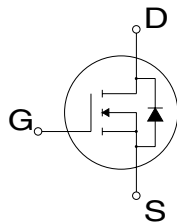
TO-3 Package Outline.  
Dimensions in mm (inches)



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  $I_L = 21A$

Semelab Plc reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by Semelab is believed to be both accurate and reliable at the time of going to press. However Semelab assumes no responsibility for any errors or omissions discovered in its use. Semelab encourages customers to verify that datasheets are current before placing orders.

**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>	$V_{DS} > I_{D(ON)} \times R_{DS(ON)} \text{ Max}$ $V_{GS} = 10V$	21			A
$R_{DS(ON)}$	Drain – Source On State Resistance <sup>2</sup>	$V_{GS} = 10V, I_D = 0.5 I_D \text{ [Cont.]}$			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	$I_D = I_D \text{ [Cont.] @ } 25^{\circ}C$		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	$I_D = I_D \text{ [Cont.] @ } 25^{\circ}C$		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>	$V_{GS} = 0V, I_S = -I_D \text{ [Cont.]}$			1.3	V
$t_{rr}$	Reverse Recovery Time	$I_S = -I_D \text{ [Cont.]}, di_S / dt = 100A/\mu s$		510		ns
$Q_{rr}$	Reverse Recovery Charge	$I_S = -I_D \text{ [Cont.]}, di_S / dt = 100A/\mu s$		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.