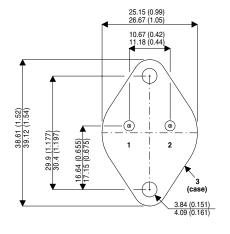
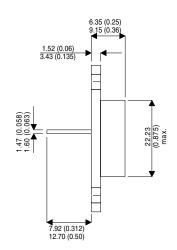




## TO-3 Package Outline. Dimensions in mm (inches)

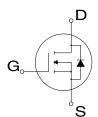




Pin 1 - Gate

Pin 2 - Source

Case - Drain



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

**V**DSS **500V 21A** I<sub>D(cont)</sub>  $0.220\Omega$ R<sub>DS(on)</sub>

- **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<sub>case</sub> = 25°C unless otherwise stated)

V <sub>DSS</sub>	Drain – Source Voltage	500	V	
I <sub>D</sub>	Continuous Drain Current	21	Α	
I <sub>DM</sub>	Pulsed Drain Current <sup>1</sup>	84	Α	
$V_{GS}$	Gate – Source Voltage	±30	V	
$V_{GSM}$	Gate – Source Voltage Transient	±40	v	
В	Total Power Dissipation @ T <sub>case</sub> = 25°C	235	W	
P <sub>D</sub>	Derate Linearly	1.88	W/°C	
$T_J$ , $T_{STG}$	Operating and Storage Junction Temperature Range	-55 to 150	- °C	
T <sub>L</sub>	Lead Temperature : 0.063" from Case for 10 Sec.	300		
I <sub>AR</sub>	Avalanche Current <sup>1</sup> (Repetitive and Non-Repetitive)	21	Α	
E <sub>AR</sub>	Repetitive Avalanche Energy <sup>1</sup>	30	m l	
E <sub>AS</sub>	Single Pulse Avalanche Energy <sup>2</sup>	1300	– mJ	

- 1) Repetitive Rating: Pulse Width limited by maximum junction temperature.
- 2) Starting  $T_J = 25$ °C, L = 5.90mH,  $R_G = 25\Omega$ , Peak  $I_L = 21$ A

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.

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# **STATIC ELECTRICAL RATINGS** (T<sub>case</sub> = 25°C unless otherwise stated)

	Characteristic	Test Conditions	Min.	Тур.	Max.	Unit
BV <sub>DSS</sub>	Drain – Source Breakdown Voltage	$V_{GS} = 0V$ , $I_{D} = 250\mu A$	500			٧
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	$V_{DS} = V_{DSS}$			25	
	$(V_{GS} = 0V)$	$V_{DS} = 0.8V_{DSS}$ , $T_{C} = 125^{\circ}C$			250	μΑ
I <sub>GSS</sub>	Gate – Source Leakage Current	$V_{GS} = \pm 30V , V_{DS} = 0V$			±100	nA
V <sub>GS(TH)</sub>	Gate Threshold Voltage	$V_{DS} = V_{GS}$ , $I_D = 1.0$ mA	2		4	V
I <sub>D(ON)</sub>	On State Drain Current <sup>2</sup>	$V_{DS} > I_{D(ON)} \times R_{DS(ON)} Max$ $V_{GS} = 10V$	21			Α
R <sub>DS(ON)</sub>	Drain – Source On State Resistance <sup>2</sup>	$V_{GS} = 10V$ , $I_D = 0.5 I_D$ [Cont.]			0.220	Ω

### DYNAMIC CHARACTERISTICS

	Characteristic	Test Conditions	Min.	Тур.	Max.	Unit
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V		3700	4440	
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> = 25V		510	715	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f = 1MHz		200	300	
Qg	Total Gate Charge <sup>3</sup>	V <sub>GS</sub> = 10V		150	225	
Q <sub>gs</sub>	Gate – Source Charge	V <sub>DD</sub> = 0.5 V <sub>DSS</sub>		25	37	nC
Q <sub>gd</sub>	Gate - Drain ("Miller") Charge	I <sub>D</sub> = I <sub>D</sub> [Cont.] @ 25°C		70	105	
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>GS</sub> = 15V		12	25	
t <sub>r</sub>	Rise Time	V <sub>DD</sub> = 0.5 V <sub>DSS</sub>		10	20	
t <sub>d(off)</sub>	Turn-off Delay Time	I <sub>D</sub> = I <sub>D</sub> [Cont.] @ 25°C		50	75	ns
t <sub>f</sub>	Fall Time	$R_G = 1.6\Omega$		8	15	

#### SOURCE - DRAIN DIODE RATINGS AND CHARACTERISTICS

	Characteristic	Test Conditions	Min.	Тур.	Max.	Unit
IS	Continuous Source Current	(Body Diode)			21	_
I <sub>SM</sub>	Pulsed Source Current <sup>1</sup>	(Body Diode)			84	Α
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	$V_{GS} = 0V$ , $I_S = -I_D$ [Cont.]			1.3	٧
t <sub>rr</sub>	Reverse Recovery Time	$I_S = -I_D$ [Cont.], $dI_S / dt = 100A/\mu s$		510		ns
Q <sub>rr</sub>	Reverse Recovery Charge	$I_S = -I_D$ [Cont.], $dI_S / dt = 100A/\mu s$		10		μС

### THERMAL CHARACTERISTICS

	Characteristic	Min.	Тур.	Max.	Unit
$R_{\theta JC}$	Junction to Case			0.53	°C/W
$R_{\theta JA}$	Junction to Ambient			30	0,44

- 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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