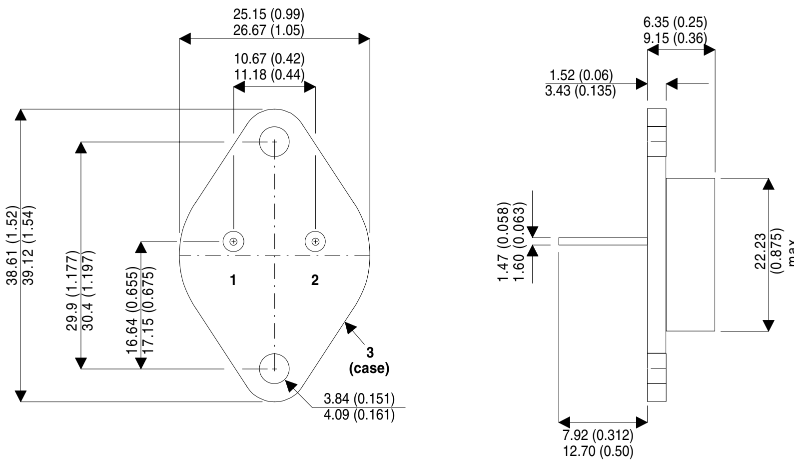
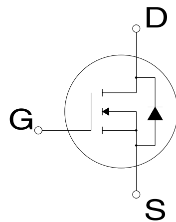
SEME LAB

SML50A21

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
$R_{DS(on)}$	0.220Ω

- **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°C unless otherwise stated)

V_{DSS}	Drain – Source Voltage	500	V
I_D	Continuous Drain Current	21	A
I_{DM}	Pulsed Drain Current [1]	84	A
V_{GS}	Gate – Source Voltage	±30	V
V_{GSM}	Gate – Source Voltage Transient	±40	
P_D	Total Power Dissipation @ T_{case} = 25°C	235	W
	Derate Linearly	1.88	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[1] (Repetitive and Non-Repetitive)	21	A
E_{AR}	Repetitive Avalanche Energy [1]	30	mJ
E_{AS}	Single Pulse Avalanche Energy [2]	1300	

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

2) Starting T_J = 25°C, L = 5.90mH, R_G = 25Ω, 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.

Semelab plc. Telephone +44(0)1455 556565. Fax +44(0)1455 552612.
E-mail: sales@semelab.co.uk Website: http://www.semelab.co.uk

Document Number 5963
Issue 1

SEME LAB

SML50A21

STATIC ELECTRICAL RATINGS (T$_{case}$ = 25°C unless otherwise stated)

	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain – Source Breakdown Voltage	V_{GS} = 0V , I_D = 250μA	500			V
I_{DSS}	Zero Gate Voltage Drain Current (V_{GS} = 0V)	V_{DS} = V_{DSS}			25	μA
		V_{DS} = 0.8V_{DSS} , T_C = 125°C			250	
I_{GSS}	Gate – Source Leakage Current	V_{GS} = ±30V , V_{DS} = 0V			±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 [2]	V_{DS} > $I_{D(ON)}$ x $R_{DS(ON)}$ Max V_{GS} = 10V	21			A
$R_{DS(ON)}$	Drain – Source On State Resistance [2]	V_{GS} = 10V , I_D = 0.5 I_D [Cont.]			0.220	Ω

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[3]	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°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°C		50	75	
t_f	Fall Time	R_G = 1.6Ω		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[1]	(Body Diode)			84	
V_{SD}	Diode Forward Voltage[2]	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/μs		510		ns
Q_{rr}	Reverse Recovery Charge	I_S = – I_D [Cont.] , dI_S / dt = 100A/μs		10		μC

THERMAL CHARACTERISTICS

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

1) Repetitive Rating: Pulse Width limited by maximum junction temperature.
2) Pulse Test: Pulse Width < 380μS , Duty Cycle < 2%
3) See MIL–STD–750 Method 3471

CAUTION — Electrostatic Sensitive Devices. Anti-Static Procedures Must Be Followed.

Semelab plc. Telephone +44(0)1455 556565. Fax +44(0)1455 552612.
E-mail: sales@semelab.co.uk Website: http://www.semelab.co.uk

Document Number 5963
Issue 1