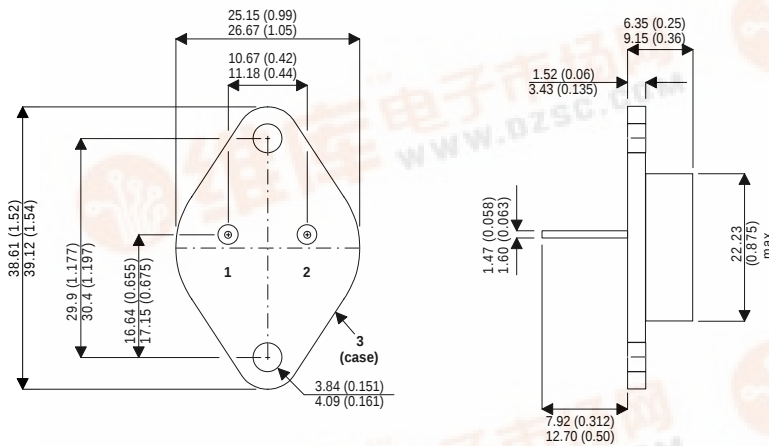


SML50A21

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



Pin 1 – Gate

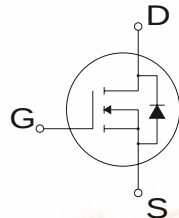
Pin 2 – Source

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 ($T_{case} = 25^{\circ}C$ 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 @ $T_{case} = 25^{\circ}C$	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 $T_J = 25^{\circ}C$, $L = 5.90mH$, $R_G = 25\Omega$, 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	μA
		$V_{DS} = 0.8V_{DSS}$, $T_C = 125^{\circ}C$			250	
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = \pm 30V$, $V_{DS} = 0V$			± 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	$V_{DS} > I_{D(ON)} \times R_{DS(ON)}$ 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	$I_D = I_D [Cont.] @ 25^{\circ}C$		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 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	$I_S = -I_D [Cont.]$, $dI_S / dt = 100A/\mu s$		510		ns
Q_{rr}	Reverse Recovery Charge	$I_S = -I_D [Cont.]$, $dI_S / dt = 100A/\mu s$		10		μC

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.