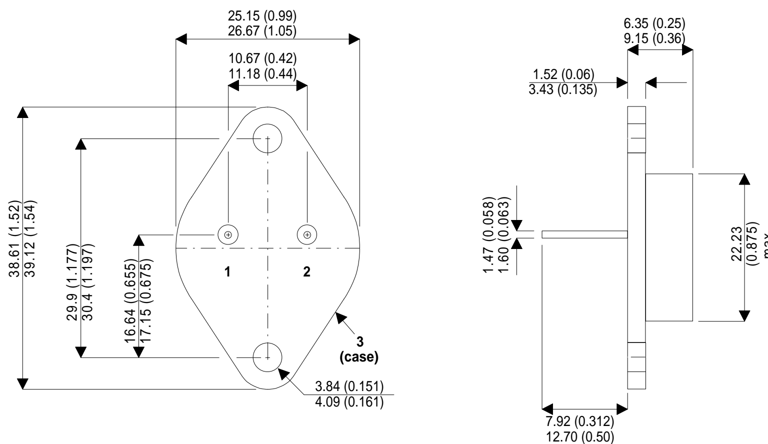
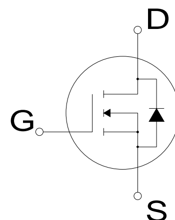
SEME LAB

# SML80A12

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




**Pin 1 – Gate** **Pin 2 – Source** **Case – Drain**




## N–CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFETS

| | |
|---|---|
| $V_{DSS}$ | **800V** |
| $I_{D(cont)}$ | **11.5A** |
| $R_{DS(on)}$ | **0.650Ω** |

- **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 | 800 | V |
| $I_D$ | Continuous Drain Current | 11.5 | A |
| $I_{DM}$ | Pulsed Drain Current [1] | 46 | A |
| $V_{GS}$ | Gate – Source Voltage | ±30 | V |
| $V_{GSM}$ | Gate – Source Voltage Transient | ±40 | |
| $P_D$ | Total Power Dissipation @ $T_{case}$ = 25°C | 200 | W |
| | Derate Linearly | 1.6 | 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) | 11.5 | A |
| $E_{AR}$ | Repetitive Avalanche Energy [1] | 30 | mJ |
| $E_{AS}$ | Single Pulse Avalanche Energy [2] | 1210 | |

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

2) Starting $T_J$ = 25°C, L = 18.3mH, $R_G$ = 25Ω, Peak $I_L$ = 11.5A

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# SML80A12

## 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 | 800 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current ($V_{GS}$ = 0V) | $V_{DS}$ = $V_{DSS}$ | | | 25 | μA |
| | | $V_{DS}$ = 0.8$V_{DSS}$ , $T_C$ = 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 | 11.5 | | | A |
| $R_{DS(ON)}$ | Drain – Source On State Resistance [2] | $V_{GS}$ = 10V , $I_D$ = 0.5 $I_D$ [Cont.] | | | 0.650 | Ω |

## DYNAMIC CHARACTERISTICS

| | Characteristic | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $C_{iss}$ | Input Capacitance | $V_{GS}$ = 0V | | 3050 | 3700 | pF |
| $C_{oss}$ | Output Capacitance | $V_{DS}$ = 25V | | 300 | 420 | |
| $C_{rss}$ | Reverse Transfer Capacitance | f = 1MHz | | 150 | 225 | |
| $Q_g$ | Total Gate Charge[3] | $V_{GS}$ = 10V | | 150 | 225 | nC |
| $Q_{gs}$ | Gate – Source Charge | $V_{DD}$ = 0.5 $V_{DSS}$ | | 17 | 25 | |
| $Q_{gd}$ | Gate – Drain (“Miller”) Charge | $I_D$ = $I_D$ [Cont.] @ 25°C | | 70 | 105 | |
| $t_{d(on)}$ | Turn–on Delay Time | $V_{GS}$ = 15V | | 12 | 24 | ns |
| $t_r$ | Rise Time | $V_{DD}$ = 0.5 $V_{DSS}$ | | 11 | 22 | |
| $t_{d(off)}$ | Turn-off Delay Time | $I_D$ = $I_D$ [Cont.] @ 25°C | | 60 | 90 | |
| $t_f$ | Fall Time | $R_G$ = 1.6Ω | | 12 | 24 | |

## SOURCE – DRAIN DIODE RATINGS AND CHARACTERISTICS

| | Characteristic | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current | (Body Diode) | | | 11.5 | A |
| $I_{SM}$ | Pulsed Source Current[1] | (Body Diode) | | | 46 | |
| $V_{SD}$ | 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 | | 650 | | ns |
| $Q_{rr}$ | Reverse Recovery Charge | $I_S$ = – $I_D$ [Cont.] , $dI_S$ / dt = 100A/μs | | 9 | | μC |

## THERMAL CHARACTERISTICS

| | Characteristic | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| $R_{θJC}$ | Junction to Case | | | 0.62 | °C/W |
| $R_{θJA}$ | 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.

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