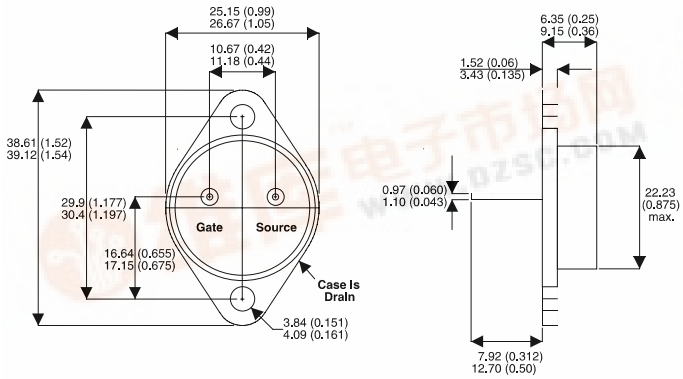
SEME LAB

| | | | |
|---|---|---|---|
| SML1001R1AN | 1000V | 9.5A | 1.10Ω |
| SML901R1AN | 900V | 9.5A | 1.10Ω |
| SML1001R3AN | 1000V | 8.5A | 1.30Ω |
| SML901R3AN | 900V | 8.5A | 1.30Ω |

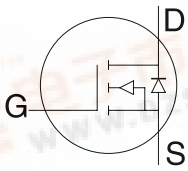
## TO3 Package Outline.

Dimensions in mm (Inches)




# POWER MOS IV™

## N-CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER MOSFETS




## MAXIMUM RATINGS ($T_{case}$ =25°C unless otherwise stated)

| | Parameter | SML 901R1AN | SML 1001R1AN | SML 901R3AN | SML 1001R3AN | Unit |
|---|---|---|---|---|---|---|
| $V_{DSS}$ | Drain – Source Voltage | 900 | 1000 | 900 | 1000 | V |
| $I_D$ | Continuous Drain Current | 9.5 | | 8.5 | | A |
| $I_{DM}$ | Pulsed Drain Current [1] | 38 | | 34 | | A |
| $V_{GS}$ | Gate – Source Voltage | ±30 | | | | V |
| $P_D$ | Total Power Dissipation @ $T_{case}$ = 25°C<br>Derate above 25°C | 230 | | | | W |
| $T_J$ , $T_{STJ}$ | Operating and Storage Junction Temperature Range | -55 to 150 | | | | °C |

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

| | Characteristic / Test Conditions / Part Number | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain – Source Breakdown Voltage<br>($V_{GS}$ = 0V , $I_D$ = 250μA) | SML1001R1AN / SML1001R3AN | 1000 | | | V |
| | | SML901R1AN / SML901R3AN | 900 | | | |
| $I_{DSS}$ | Zero Gate Voltage Drain Current ($V_{GS}$ = 0V , $V_{DS}$ = $V_{DSS}$) | | | | 250 | μA |
| | ($V_{GS}$ = 0V , $V_{DS}$ = 0.8$V_{DSS}$ , $T_C$ = 125°C) | | | | 1000 | |
| $I_{GSS}$ | Gate – Source Leakage Current ($V_{GS}$ = ±30V , $V_{DS}$ = 0V) | | | | ±100 | nA |
| $I_{D(ON)}$ | On State Drain Current [2]<br>($V_{DS}$ > $I_{D(ON)}$ x $R_{DS(ON)}$ Max , $V_{GS}$ = 10V) | SML1001R1AN / SML901R1AN | 9.5 | | | A |
| | | SML1001R1AN / SML901R3AN | 8.5 | | | |
| $V_{GS(TH)}$ | Gate Threshold Voltage | | 2 | | 4 | V |
| $R_{DS(ON)}$ | Static Drain – Source On State Resistance [2]<br>($V_{GS}$ =10V , $I_D$ = 0.5 $I_D$ [Cont.]) | SML1001R1AN / SML901R1AN | | | 1.1 | Ω |
| | | SML1001R3AN / SML901R3AN | | | 1.3 | |

1) Repetitive Rating: Pulse Width limited by maximum junction temperature.
2) Pulse Test: Pulse Width < 380μS , Duty Cycle < 2%

**SML1001R1AN 1000V 9.5A 1.10Ω**
**SML901R1AN 900V 9.5A 1.10Ω**
**SML1001R3AN 1000V 8.5A 1.30Ω**
**SML901R3AN 900V 8.5A 1.30Ω**

SEME LAB

## DYNAMIC CHARACTERISTICS

| | Characteristic | Test Conditions. | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $C_{iss}$ | Input capacitance | $V_{GS}$ = 0V | | 2460 | 2950 | pF |
| $C_{oss}$ | Output capacitance | $V_{DS}$ = 25V | | 360 | 500 | |
| $C_{rss}$ | Reverse transfer capacitance | f = 1MHz | | 105 | 160 | |
| $Q_g$ | Total Gate Charge[3] | $V_{GS}$ = 10V | | 90 | 130 | nC |
| $Q_{gs}$ | Gate – Source Charge | $I_D$ = $I_D$ [Cont.] | | 9.3 | 14 | |
| $Q_{gd}$ | Gate – Drain ("Miller") Charge | $V_{DD}$ = 0.5 $V_{DSS}$ | | 47 | 70 | |
| $t_{d(on)}$ | Turn–on Delay Time | $V_{DD}$ = 0.5 $V_{DSS}$ | | 15 | 30 | ns |
| $t_r$ | Rise Time | $I_D$ = $I_D$ [Cont.] | | 16 | 32 | |
| $t_{d(off)}$ | Turn-off Delay Time | $V_{GS}$ = 15V | | 64 | 95 | |
| $t_f$ | Fall Time | $R_G$ = 1.8Ω | | 24 | 48 | |

## SOURCE – DRAIN DIODE RATINGS AND CHARACTERISTICS

| | Characteristic / Test Conditions. | Part Number | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current (Body Diode) | SML1001R1AN / SML901R1AN | | | 9.5 | A |
| | | SML901R3AN / SML901R3AN | | | 8.5 | |
| $I_{SM}$ | Pulsed Source Current[1] (Body Diode) | SML1001R1AN / SML901R1AN | | | 38 | A |
| | | SML1001R3AN / SML901R3AN | | | 34 | |
| $V_{SD}$ | 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 | | 320 | 636 | 1200 | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | 2.2 | 4.5 | 9 | μC |

## SAFE OPERATING AREA CHARACTERISTICS

| | Characteristic / Test Conditions / Part Number | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| SOA1 | Safe Operating Area | $V_{DS}$ = 0.4 $V_{DSS}$ , $I_{DS}$ = $P_D$ / 0.4 $V_{DSS}$ , t = 1 Sec | 230 | | | W |
| SOA2 | Safe Operating Area | $I_{DS}$ = $I_{DS}$ [Cont.] , $V_{DS}$ = $P_D$ / $I_D$ [Cont.] , t = 1 Sec | 230 | | | |
| $I_{LM}$ | Inductive Current Clamped | SML1001R1AN / SML901R1AN | 38 | | | A |
| | | SML1001R3AN / SML901R3AN | 34 | | | |

## THERMAL CHARACTERISTICS ($T_{case}$ =25°C unless otherwise stated)

| | Characteristic / Test Conditions. | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| $R_{\theta JC}$ | Junction to Case | | | 0.53 | °C/W |
| $R_{\theta JA}$ | Junction to Ambient | | | 30 | °C/W |
| $T_L$ | Max. Lead Temperature for Soldering Conditions: 0.065" from Case for 10 sec. | | | 300 | °C |

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