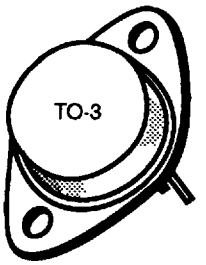
SEME LAB



MOS POWER 4 IGBT

T-39-31

SML40G100AN 1000V 40A

N - CHANNEL ENHANCEMENT MODE HIGH VOLTAGE POWER INSULATED GATE BIPOLAR TRANSISTOR

MAXIMUM RATINGS All Ratings: T_C = 25°C unless otherwise specified.

Symbol	Parameter	SML40G100AN	UNIT
V_{CES}	Collector-Emitter Voltage	1000	Volts
V_{GE}	Gate-Emitter Voltage	±20	
I_{C1}	Continuous Collector Current	40	Amps
I_{C2}	Continuous Collector Current @ T_C = 100°C	21	
I_{CM}	Pulsed Collector Current ①	80	
I_{LM}	Clamped Inductive Load Current @ T_J = +125°C ②	42	
P_D	Total Power Dissipation	145	Watts
T_J,T_{STG}	Operating and Storage Junction Temperature Range	-55 to 150	°C
T_L	Max. Lead Temp. for Soldering Conditions: 0.063" from Case for 10 Sec.	300	

STATIC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic / Test Conditions	MIN	TYP	MAX	UNIT
BV_{CES}	Collector-Emitter Breakdown Voltage (V_{GE} = 0V, I_C = 250µA)	1000			Volts
RBV_{CES}	Reverse Collector-Emitter Breakdown Voltage (V_{GE} = 0V, I_C = -1.0A)	-15	-25		
$V_{GE}(TH)$	Gate Threshold Voltage (V_{CE} = V_{GE}, I_C = 1.0mA)	2.5		5	
$V_{CE}(ON)$	Collector-Emitter On Voltage (V_{GE} = 15V, I_C = I_{C2})			3.3	
I_{CES}	Collector Cut-off Current (V_{CE} = V_{CES}, V_{GE} = 0V)			500	µA
	Collector Cut-off Current (V_{CE} = 0.8 V_{CES}, V_{GE} = 0V, T_C = 125°C)			1.0	mA
I_{GES}	Gate-Emitter Leakage Current (V_{GE} = ±20V, V_{CE} = 0V)			±100	nA

THERMAL CHARACTERISTICS

Symbol	Characteristic	MIN	TYP	MAX	UNIT
$R_{\Theta JC}$	Junction to Case			0.86	°C/W
$R_{\Theta JA}$	Junction to Ambient			30	

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DYNAMIC CHARACTERISTICS

SML40G100AN

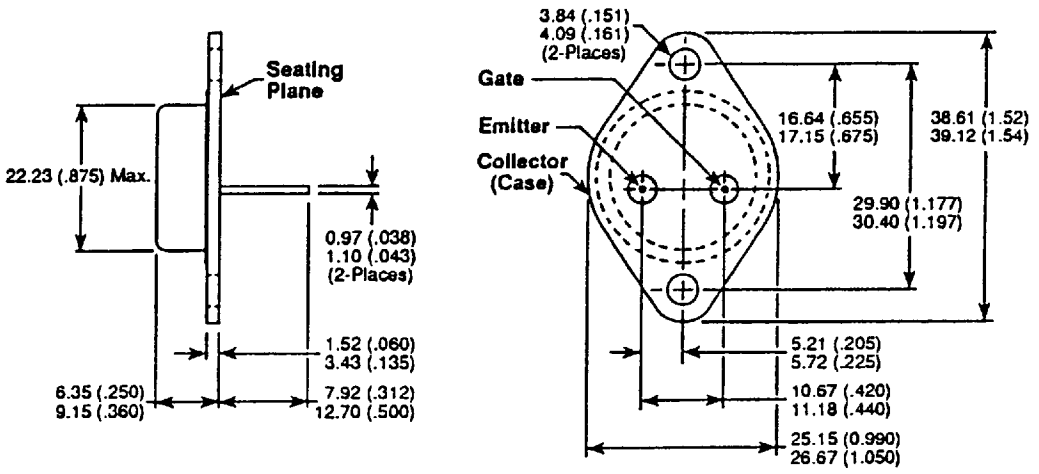
Symbol	Characteristic	Test Conditions	MIN	TYP	MAX	UNIT
C_{ies}	Input Capacitance	V_{GE} = 0V V_{CE} = 25V f = 1 MHz			2235	pF
C_{oes}	Output Capacitance				280	
C_{res}	Reverse Transfer Capacitance				95	
Q_g	Total Gate Charge ③	V_{GE} = 10V V_{CC} = 0.5 V_{CES} I_C = I_{C1}		69	103	nC
Q_{ge}	Gate-Emitter Charge			9	13	
Q_{gc}	Gate-Collector ("Miller") Charge			41	61	
t_d(on)	Turn-on Delay Time (Resistive Switching)	V_{GE} = 15V V_{CC} = 0.5 V_{CES} I_C = I_{C2} R_G = 50Ω		75		ns
t_r	Rise Time (Resistive Switching)			200		
t_d(off)	Turn-off Delay Time (Resistive Switching)			600		
t_f	Fall Time (Resistive Switching)			600		
t_d(off)	Turn-off Delay Time (Inductive Switching)	V_{CLAMP}(Peak) = 0.8V_{CES} V_{GE} = 15V, I_C = I_{C2} R_G = 50Ω, T_J = 125°C		750		ns
t_f	Fall Time (Inductive Switching)			600		

① Repetitive Rating: Pulse width limited by maximum junction temperature.

② V_{CLAMP} = 0.8V_{CES} Volts, R_G = 50Ω.

③ See MIL-STD-750 Method 3471

TO-3 Package Outline (TO-204AE)



Dimensions in Millimeters and (Inches)

TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

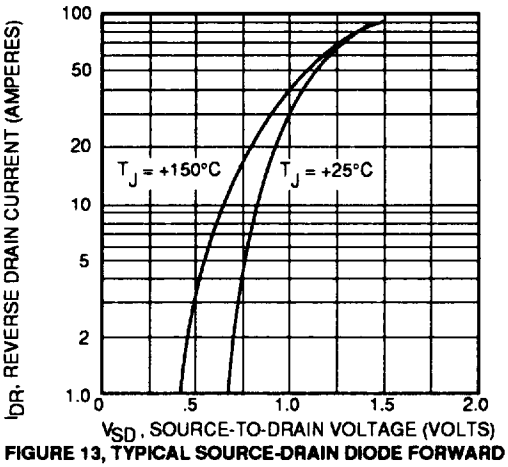
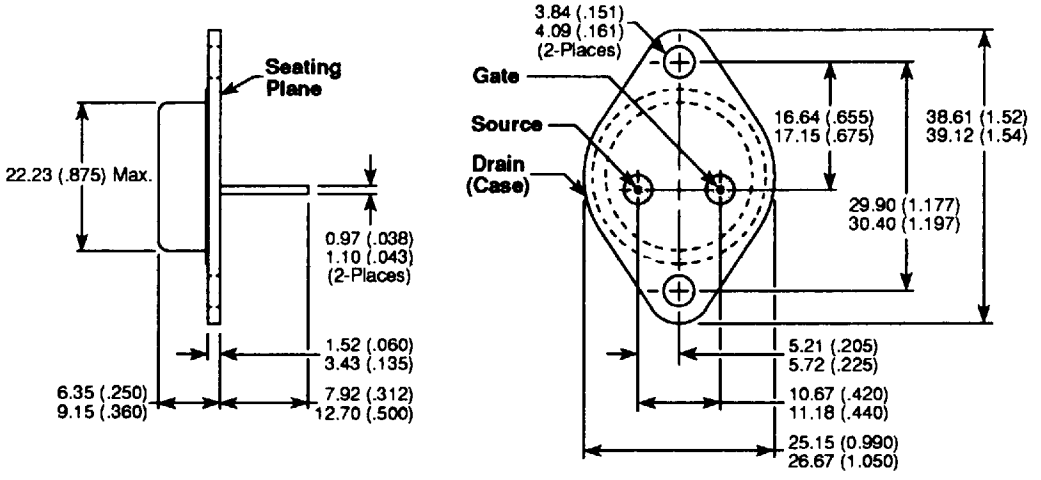


FIGURE 13, TYPICAL SOURCE-DRAIN DIODE FORWARD VOLTAGE

This curve shows the reverse drain current and source-drain forward voltage characteristics of the parasitic diode. The temperature coefficient (TC) of the diode can be derived by utilizing the following formula:

$$TC = \frac{V_{SD}(150°C) - V_{SD}(25°C)}{125°C}$$

PACKAGE OUTLINE



Dimensions in Millimeters and (Inches)

This drawing gives all the mechanical drawings and dimensions for the package. This is a standard package and conforms to the present industry standards. For further information, contact the factory.