

# FFB2907A / FMB2907A / MMPQ2907A

## PNP Multi-Chip General-Purpose Amplifier

### Description

This device is designed for use as a general-purpose amplifier and switch for collector currents to 500 mA. Sourced from Process 63.

### Block Diagram

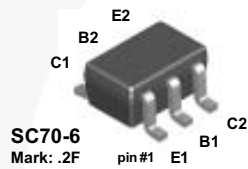


Figure 1. FFB2907A Device Package

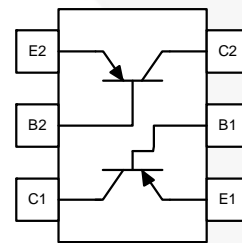


Figure 2. FFB2907A Internal Connections

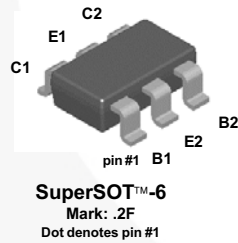


Figure 3. FMB2907A Device Package

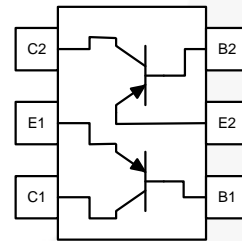


Figure 4. FMB2907A Internal Connections

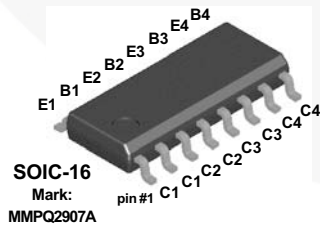


Figure 5. MMPQ2907A Device Package

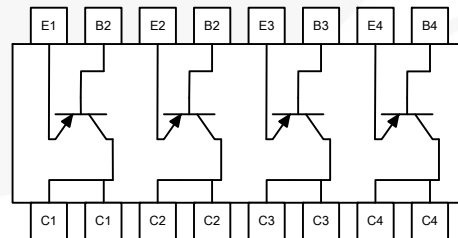


Figure 6. MMPQ2907A Internal Connections

## Ordering Information

Part Number	Top Mark	Package	Packing Method
FFB2907A	.2F	SC70 6L	Tape and Reel
FMB2907A	.2F	SSOT 6L	Tape and Reel
MMPQ2907A	MMPQ2907A	SOIC 16L	Tape and Reel

## Absolute Maximum Ratings<sup>(1),(2)</sup>

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Value	Unit
$V_{CEO}$	Collector-Emitter Voltage	-60	V
$V_{CBO}$	Collector-Base Voltage	-60	V
$V_{EBO}$	Emitter-Base Voltage	-5.0	V
$I_C$	Collector Current - Continuous	-600	mA
$T_J, T_{STG}$	Junction and Storage Temperature	-55 to +150	$^\circ\text{C}$

### Notes:

- These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .
- These are steady-state limits. Fairchild Semiconductor should be consulted on applications involving pulsed or low-duty cycle operations.

## Thermal Characteristics<sup>(3)</sup>

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Max.			Unit
		FFB2907A	FMB2907A	MMPQ2907A	
$P_D$	Total Device Dissipation	300	700	1,000	mW
	Derate Above $25^\circ\text{C}$	2.4	5.6	8.0	mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	415	180		$^\circ\text{C}/\text{W}$
	Thermal Resistance, Junction to Ambient, Effective 4 Die			125	
	Thermal Resistance, Junction to Ambient, Each Die			240	

### Note:

- PCB size: FR-4 76 x 114 x 1.57 mm<sup>3</sup> (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

## Electrical Characteristics<sup>(4)</sup>

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage <sup>(4)</sup>	$I_C = -10\text{ mA}, I_B = 0$	-60			V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = -10\ \mu\text{A}, I_E = 0$	-60			V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = -10\ \mu\text{A}, I_C = 0$	-5.0			V
$I_{BL}$	Base Cut-Off Current	$V_{CE} = -30\text{ V}, V_{EB} = -0.5\text{ V}$			-50	nA
$I_{CEX}$	Collector Cut-Off Current	$V_{CE} = -30\text{ V}, V_{EB} = -0.5\text{ V}$			-50	nA
$I_{CBO}$	Collector Cut-Off Current	$V_{CB} = -50\text{ V}, I_E = 0$			-0.02	$\mu\text{A}$
		$V_{CB} = -50\text{ V}, I_E = 0, T_A = 125^\circ\text{C}$			-20	
$h_{FE}$	DC Current Gain	$I_C = -0.1\text{ mA}, V_{CE} = -10\text{ V}$	75			
		$I_C = -1.0\text{ mA}, V_{CE} = -10\text{ V}$	100			
		$I_C = -10\text{ mA}, V_{CE} = -10\text{ V}$	100			
		$I_C = -150\text{ mA}, V_{CE} = -10\text{ V}^{(4)}$	100		300	
		$I_C = -500\text{ mA}, V_{CE} = -10\text{ V}^{(4)}$	50			
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage <sup>(4)</sup>	$I_C = -150\text{ mA}, I_B = -15\text{ mA}$			-0.4	V
		$I_C = -500\text{ mA}, I_B = -50\text{ mA}$			-1.6	
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = -150\text{ mA}, I_B = -15\text{ mA}^{(4)}$			-1.3	V
		$I_C = -500\text{ mA}, I_B = -50\text{ mA}$			-2.6	
$f_T$	Current Gain-Bandwidth Product	$I_C = -50\text{ mA}, V_{CE} = -20\text{ V}, f = 100\text{ MHz}$		250		MHz
$C_{ob}$	Output Capacitance	$V_{CB} = -10\text{ V}, I_E = 0, f = 100\text{ kHz}$		6.0		pF
$C_{ib}$	Input Capacitance	$V_{EB} = -2.0\text{ V}, I_C = 0, f = 100\text{ kHz}$		12		pF
$t_{on}$	Turn-On Time	$V_{CC} = -30\text{ V}, I_C = -150\text{ mA}, I_{B1} = -15\text{ mA}$		30		ns
$t_d$	Delay Time			8		ns
$t_r$	Rise Time			20		ns
$t_{off}$	Turn-Off Time	$V_{CC} = -6.0\text{ V}, I_C = -150\text{ mA}, I_{B1} = I_{B2} = -15\text{ mA}$		80		ns
$t_s$	Storage Time			60		ns
$t_f$	Fall Time			20		ns

**Note:**

4. Pulse test: pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2.0\%$ .

## Typical Performance Characteristics

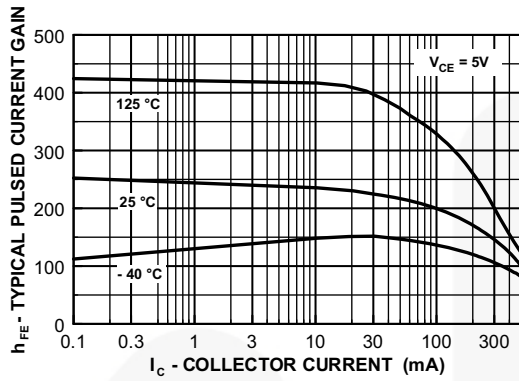


Figure 7. Typical Pulsed Current Gain vs. Collector Current

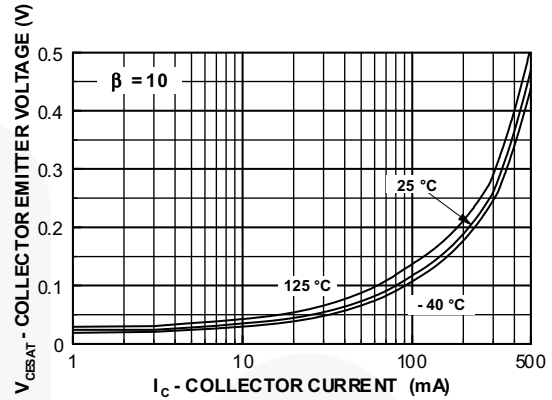


Figure 8. Collector-Emitter Saturation Voltage vs. Collector Current

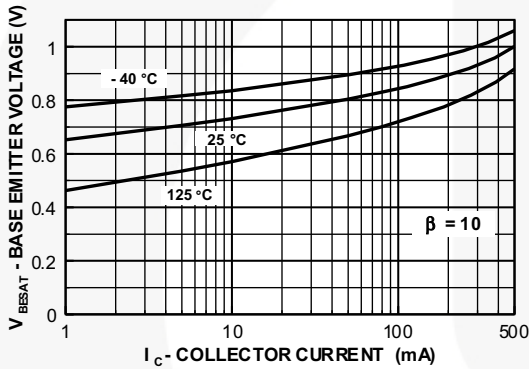


Figure 9. Base-Emitter Saturation Voltage vs. Collector Current

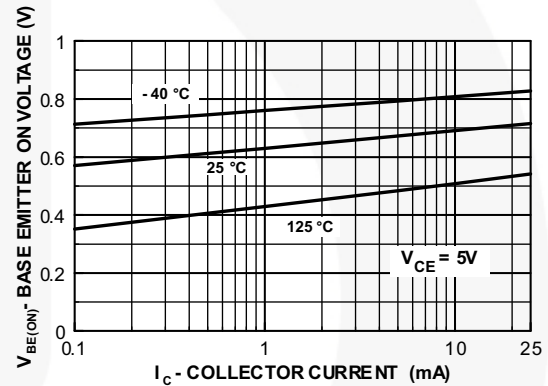


Figure 10. Base-Emitter On Voltage vs. Collector Current

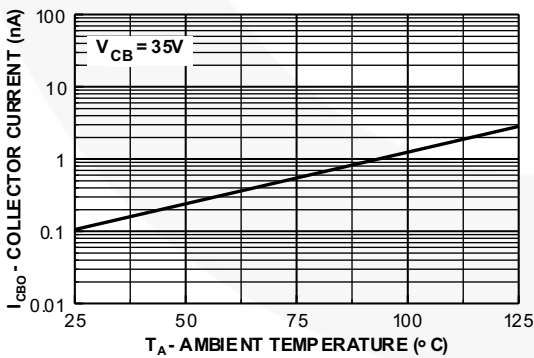


Figure 11. Collector Cut-Off Current vs. Ambient Temperature

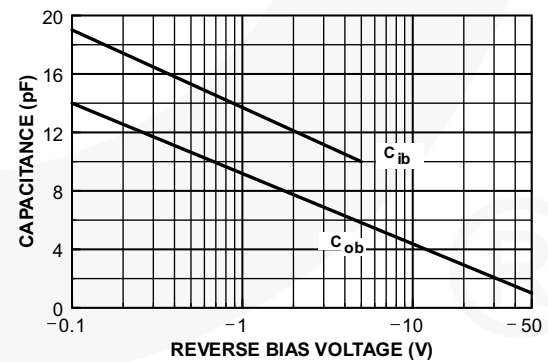


Figure 12. Input and Output Capacitance vs. Reverse Bias Voltage

Typical Performance Characteristics (Continued)

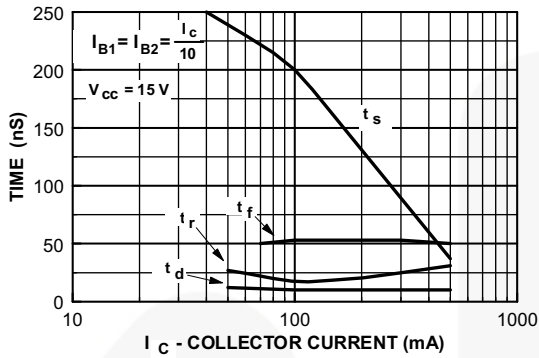


Figure 13. Switching Times vs. Collector Current

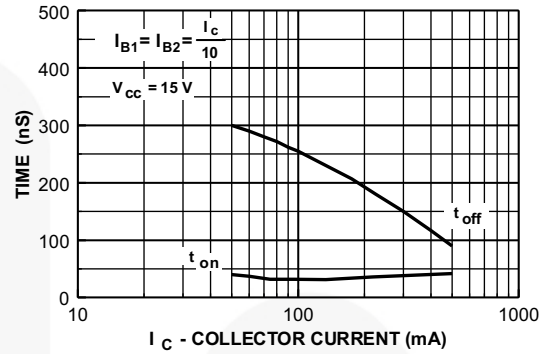


Figure 14. Turn-On and Turn-Off Times vs. Collector Current

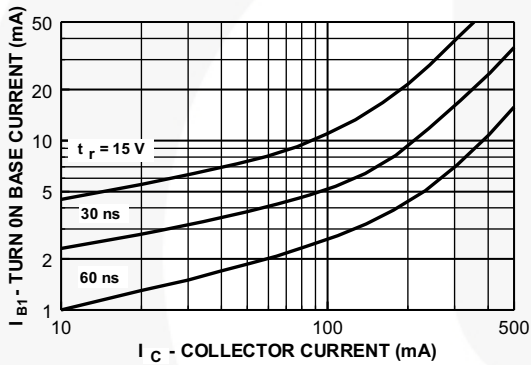


Figure 15. Rise Time vs. Collector and Turn-On Base Current

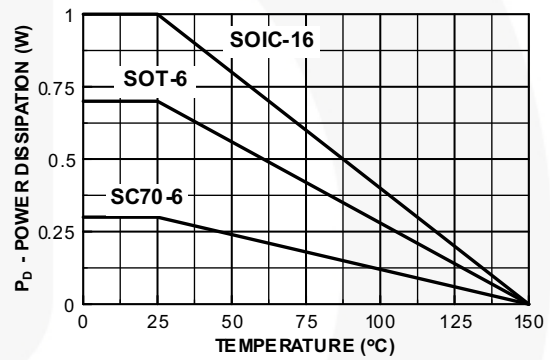


Figure 16. Power Dissipation vs. Ambient Temperature

Typical Performance Characteristics (f = 1.0 kHz)

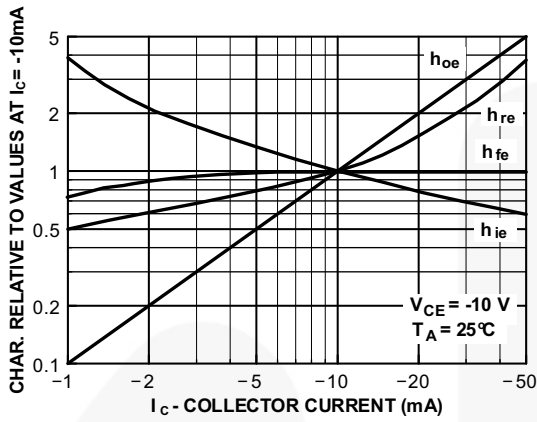


Figure 17. Common Emitter Characteristics

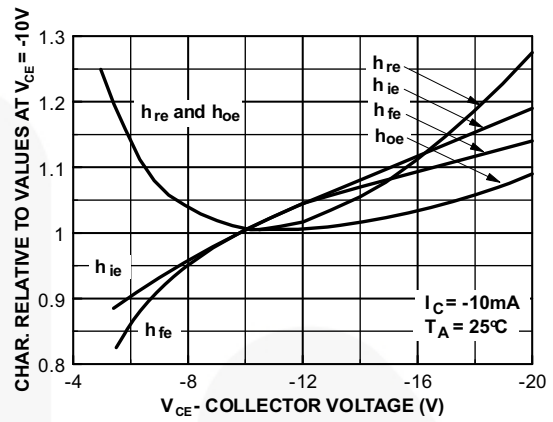


Figure 18. Common Emitter Characteristics

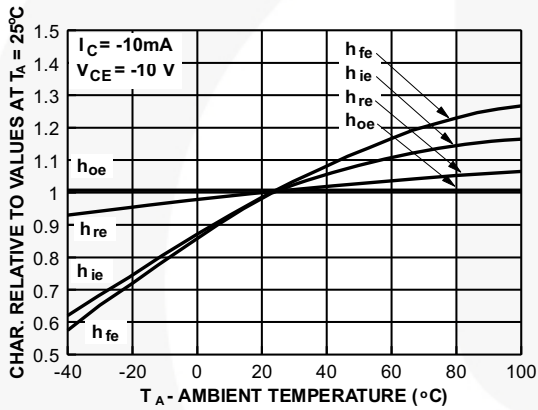
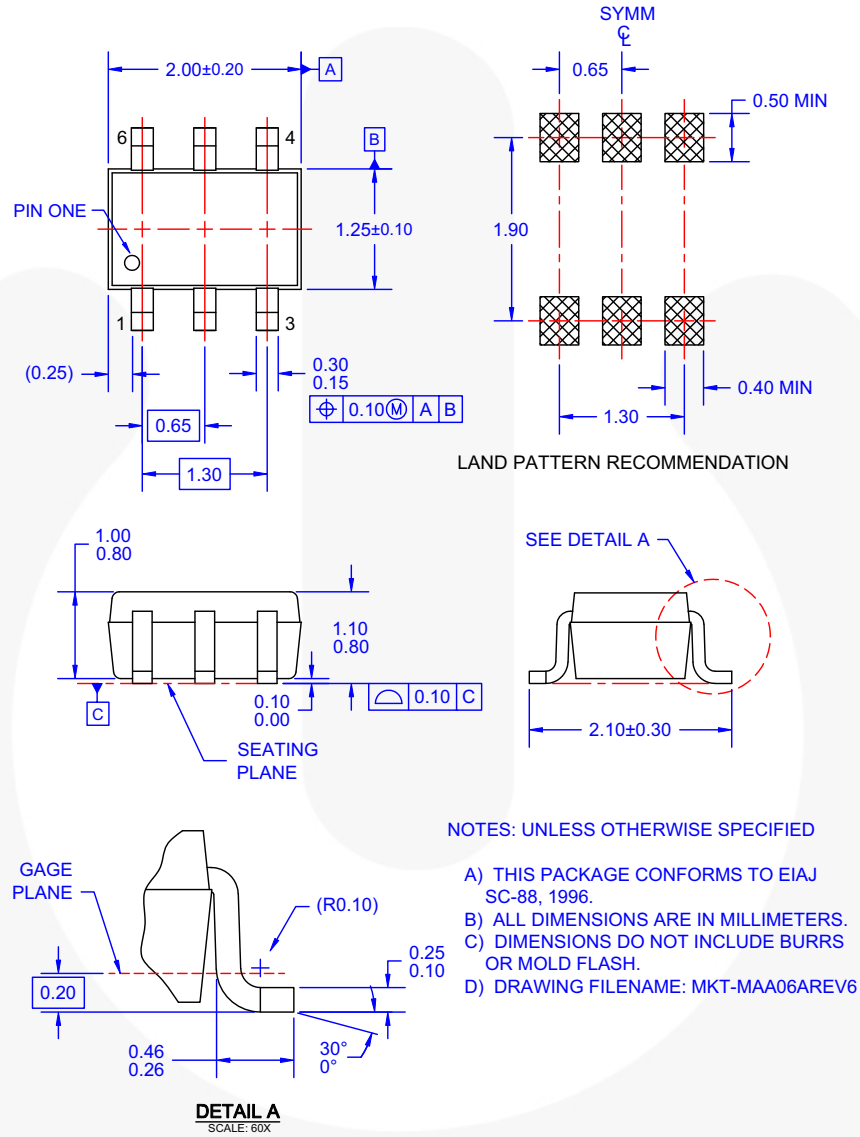


Figure 19. Common Emitter Characteristics

## Physical Dimensions

### SC70 6L



**Figure 20. 6-LEAD, SC70, EIAJ SC-88, 1.25 MM WIDE (ACTIVE)**

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Physical Dimensions (Continued)

SSOT 6L

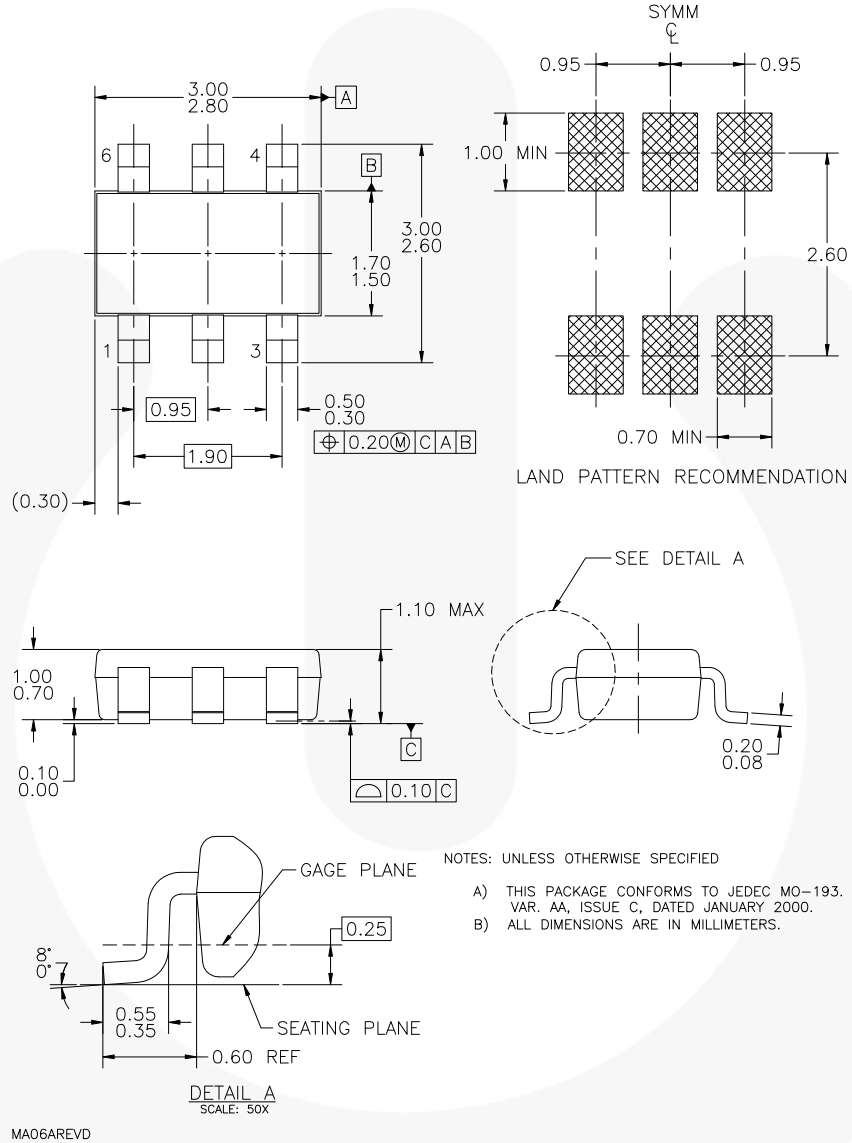


Figure 21. 6-LEAD, SUPERSOT-6, JEDEC MO-193, 1.6 MM WIDE (ACTIVE)

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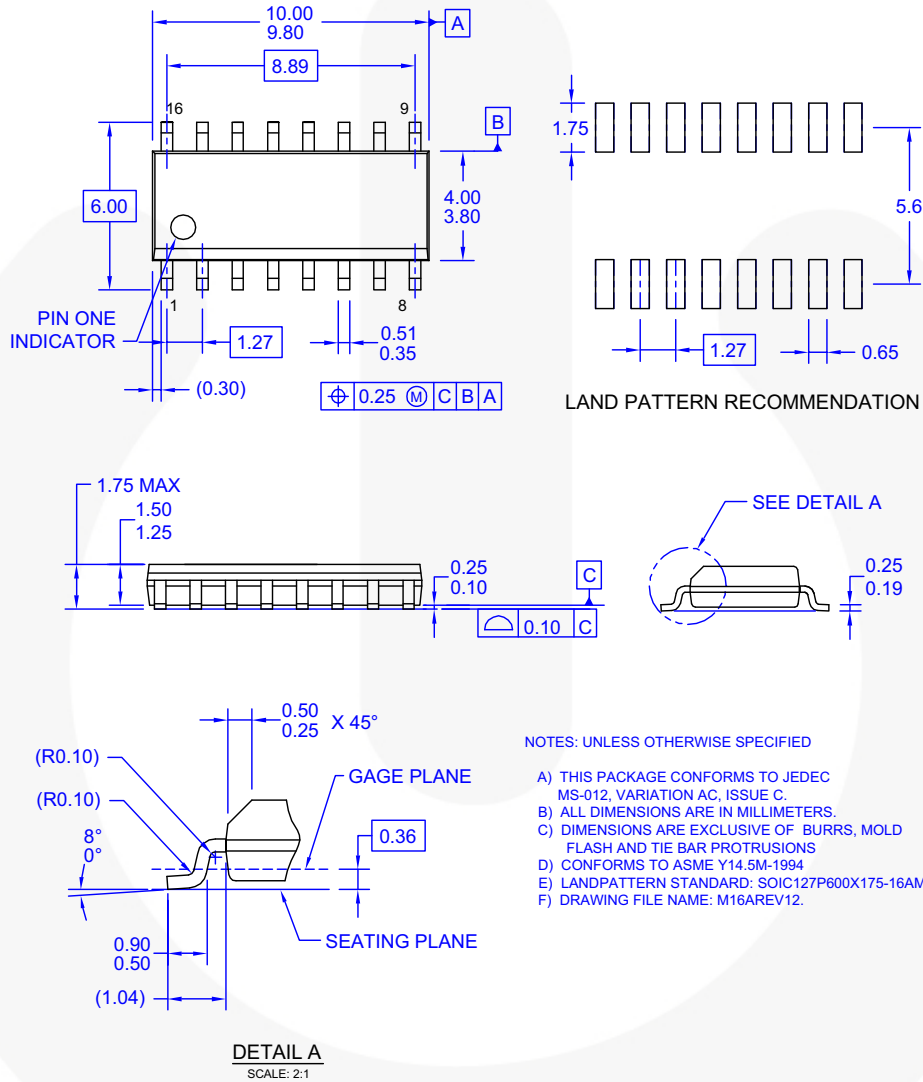
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**Physical Dimensions** (Continued)

**SO 16L NB**



**Figure 22. 16-LEAD, SOIC, JEDEC MS-012, 0.150 inch, NARROW BODY (ACTIVE)**

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Rev. I66



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