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FFB3946 / FMB3946 NPN & PNP General-Purpose Amplifier

Description

This complementary device is designed for use as a general-purpose amplifier and switch. The useful dynamic range extends to 100 mA as a switch and 100 MHz as an amplifier. Sourced from Process 23 and 66. See FFB3904 (NPN) and FFB3906 (PNP) for characteristics.

Ordering Information

Part Number	Top Mark	Package	Packing Method
FFB3946	AB	SC70 6L	Tape and Reel
FMB3946	002	SSOT 6L	Tape and Reel

Block Diagram

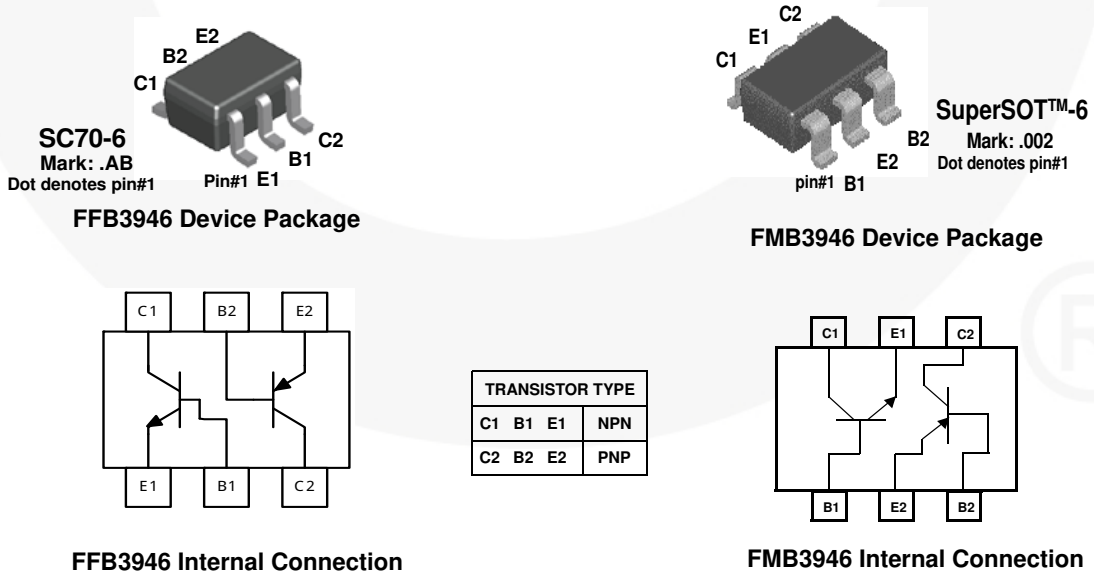


Figure 1. Block Diagram

Absolute Maximum Ratings⁽¹⁾

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	Units
V_{CEO}	Collector-Emitter Voltage	40	V
V_{CBO}	Collector-Base Voltage	40	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current - Continuous	200	mA
T_J, T_{stg}	Junction and Storage Temperature	-55 to +150	$^\circ\text{C}$

Notes:

1. These ratings are based on a maximum junction temperature of 150°C .
2. These are steady-state limits. Fairchild Semiconductor should be consulted on applications involving pulsed or low-duty cycle operations.
3. All voltages (V) and currents (A) are negative polarity for PNP transistors.
4. These ratings are limiting values above which serviceability of any semiconductor advice may be impaired.

Thermal Characteristics⁽²⁾

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

Symbol	Parameter	Maximum		Units
		FFB3946	FMB3946	
P_D	Total Device Dissipation	300	700	mW
	Derate Above 25°C	2.4	5.6	mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	415	180	$^\circ\text{C}/\text{W}$

Note:

2. PCB board size: FR-4 76 x 114 x 0.6T mm³ (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

Electrical Characteristics⁽³⁾Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristics						
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	$I_C = 10\text{ mA}, I_B = 0$	40			V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 10\ \mu\text{A}, I_E = 0$	40			V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10\ \mu\text{A}, I_C = 0$	5.0			V
I_{CBO}	Collector Cut-Off Current	$V_{CB} = 30\text{ V}, I_E = 0$			50	nA
I_{EBO}	Emitter Cut-Off Current	$V_{EB} = 4.0\text{ V}, I_C = 0$			50	nA
On Characteristics						
h_{FE}	DC Current Gain	$I_C = 100\ \mu\text{A}, V_{CE} = 1.0\text{ V}$	40			
		$I_C = 1.0\text{ mA}, V_{CE} = 1.0\text{ V}$	70			
		$I_C = 10\text{ mA}, V_{CE} = 1.0\text{ V}$	100		300	
		$I_C = 50\text{ mA}, V_{CE} = 1.0\text{ V}$	60			
		$I_C = 100\text{ mA}, V_{CE} = 1.0\text{ V}$	30			
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 10\text{ mA}, I_B = 1.0\text{ mA}$			0.25	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 10\text{ mA}, I_B = 1.0\text{ mA}$			0.9	V
Small-Signal Characteristics						
f_T	Current Gain-Bandwidth Product	$I_C = 10\text{ mA}, V_{CE} = 20\text{ V},$ $f = 100\text{ MHz}$		200		MHz
C_{obo}	Output Capacitance	$V_{CB} = 5.0\text{ V}, f = 100\text{ kHz}$		4.5		pF
C_{ibo}	Input Capacitance	$V_{CB} = 0.5\text{ V}, f = 100\text{ kHz}$		10		pF

Note:

3. All voltages (V) and currents (A) are negative polarity for PNP transistors.

Physical Dimensions

SC70 6L

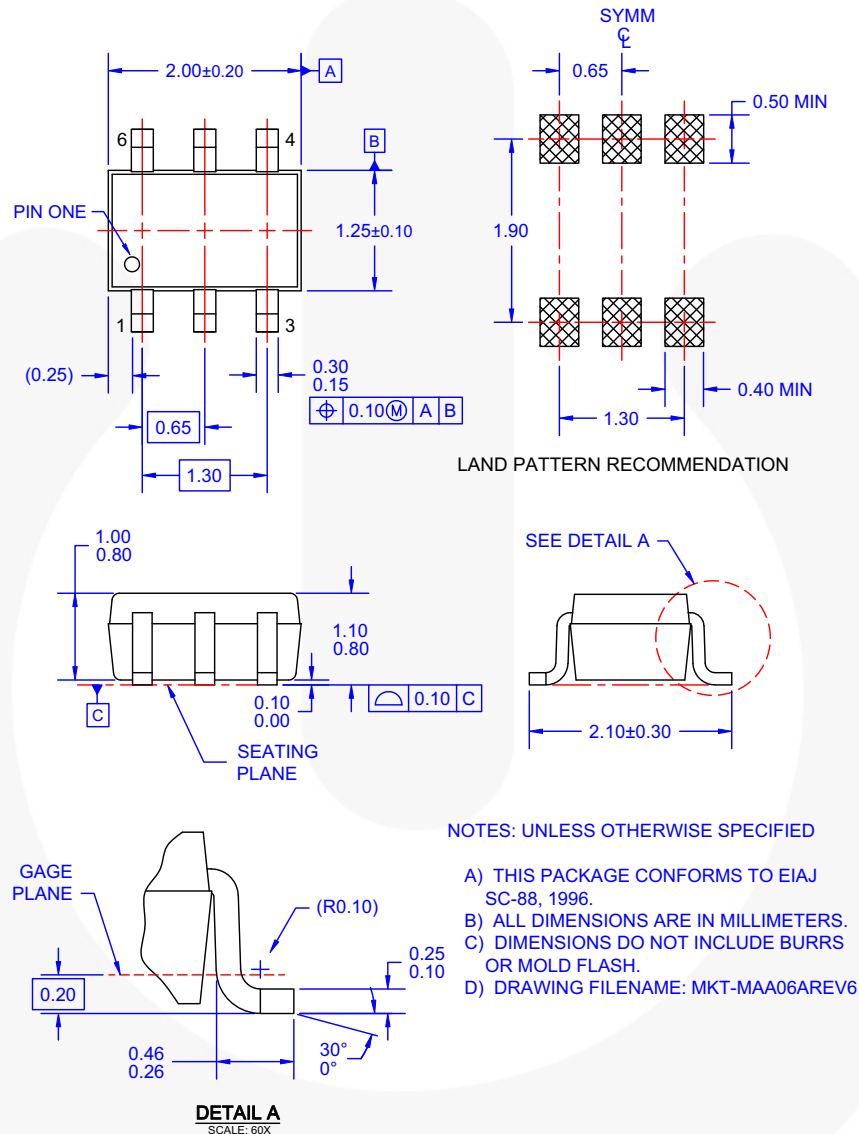


Figure 2. 6-LEAD, SC70, EIAJ SC-88, 1.25 MM WIDE (ACTIVE)

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Physical Dimensions (Continued)

SSOT 6L

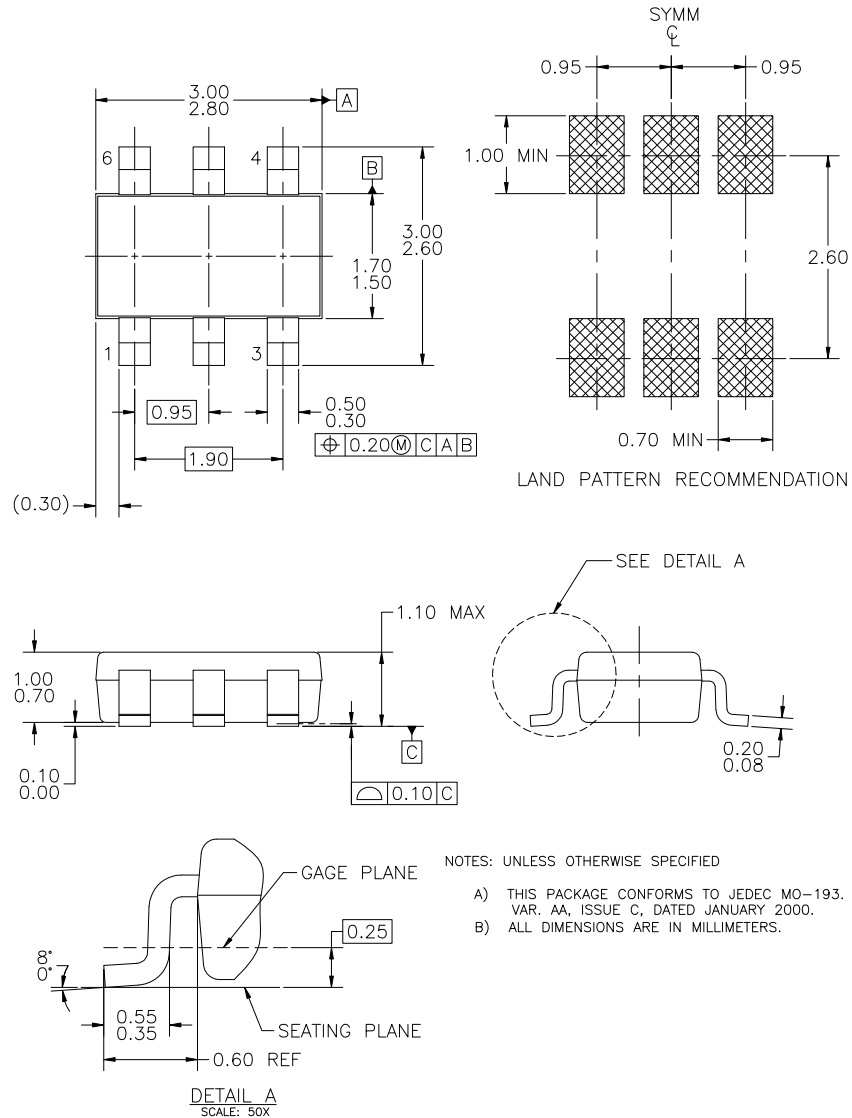


Figure 3. 6-LEAD, SUPERSOT6, JEDEC MO-193, 1.6 MM WIDE (ACTIVE)

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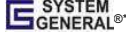



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