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August 2013

FFB3946 / FMB3946
NPN & PNP General-Purpose Amplifier

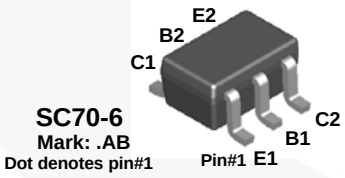
Description

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.

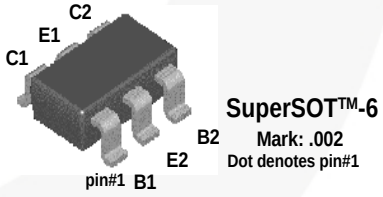
Ordering Information

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

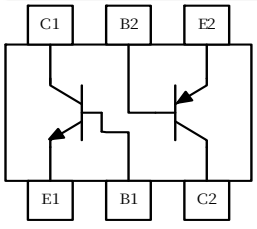
Block Diagram



FFB3946 Device Package

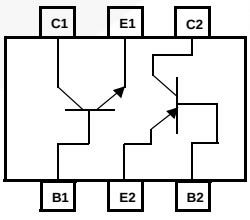


FMB3946 Device Package



FFB3946 Internal Connection

TRANSISTOR TYPE	
C1 B1 E1	NPN
C2 B2 E2	PNP



FMB3946 Internal Connection

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°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	°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°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/°C
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	415	180	°C/W

Note:

2. PCB board size: FR-4 76 x 114 x 0.6T mm^3 (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°C unless otherwise noted.

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

Note:

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

Physical Dimensions

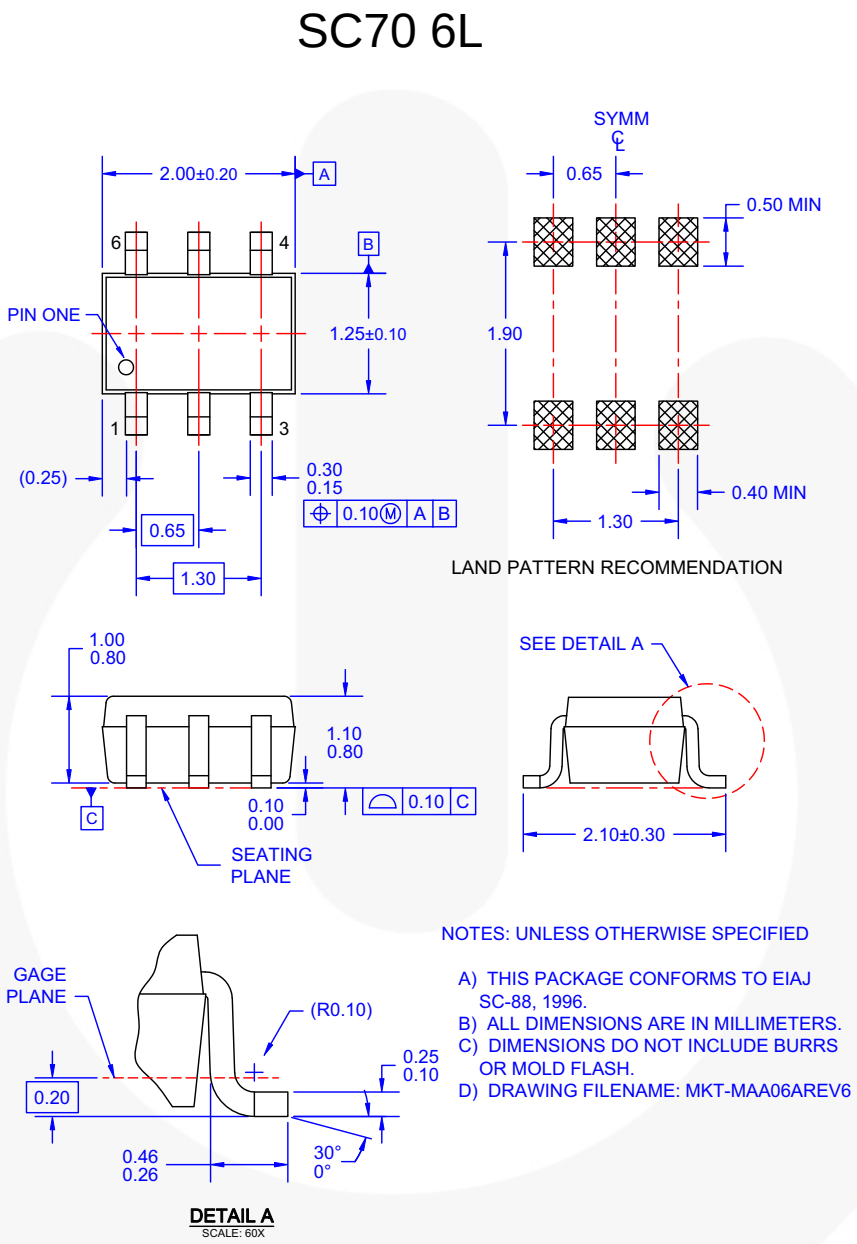


Figure 2. 6-LEAD, SC70, EIAJ SC-88, 1.25 MM WIDE (ACTIVE)

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Physical Dimensions (Continued)

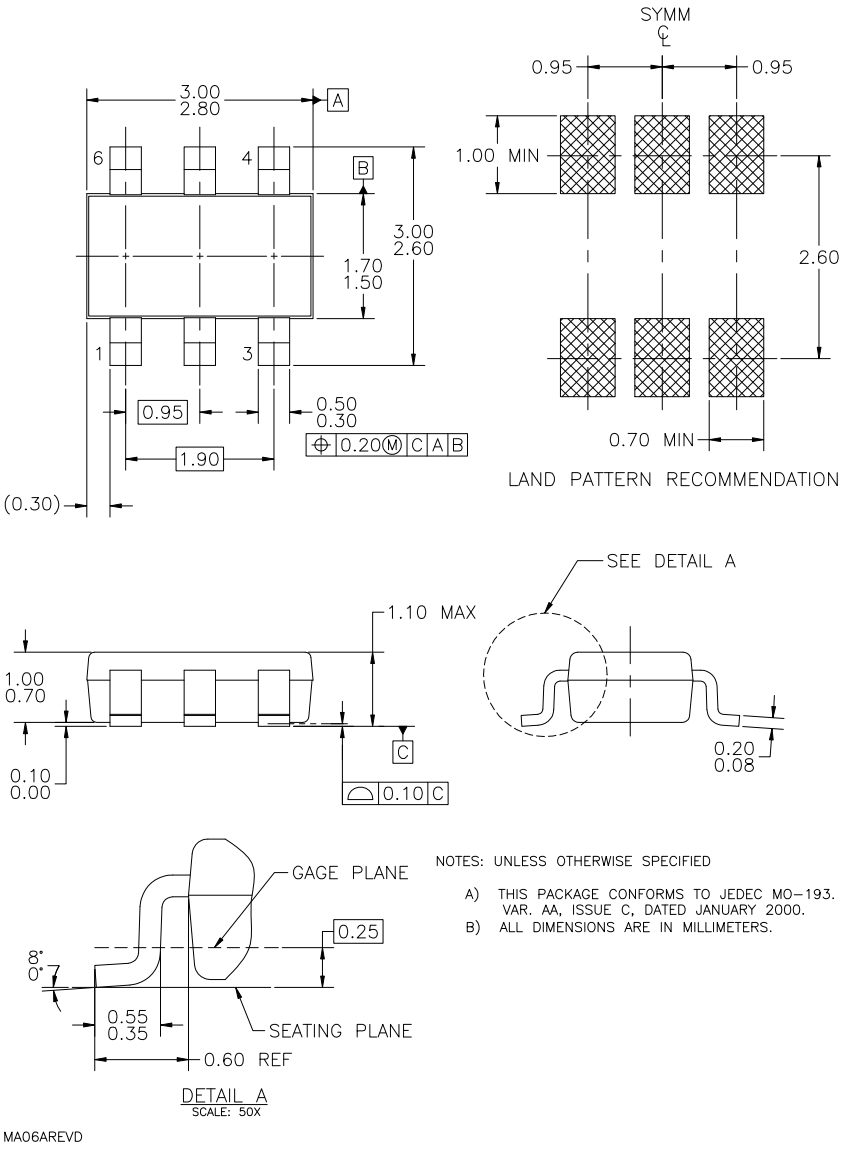

Figure 3. 6-LEAD, SUPERSOT6, JDEC MO-193, 1.6 MM WIDE (ACTIVE)

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