ON Semiconductor®

FFB2227A / FMB2227A
NPN & PNP General-Purpose Amplifier

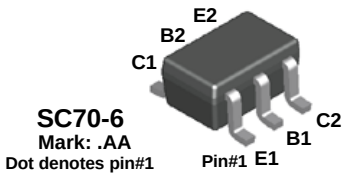
Description

This complementary device is a medium-power amplifier and switch, requiring collector currents up to 500 mA. Sourced from Process 19 and 63. See FFB2222A (NPN) and FFB2907A (PNP) for characteristics.

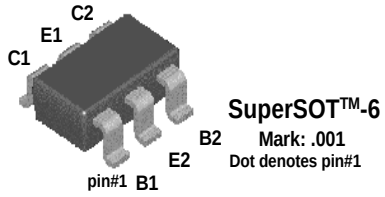
Ordering Information

Part Number	Top Mark	Package	Packing Method
FFB2227A	AA	SC70 6L	Tape and Reel
FMB2227A	001	SSOT 6L	Tape and Reel

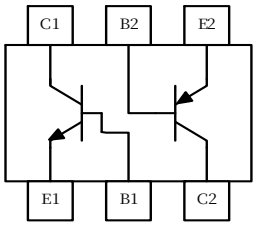
Block Diagram



FFB2227A Device Package

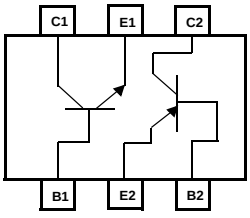


FMB2227A Device Package



FFB2227A Internal Connection

TRANSISTOR TYPE	
C1 B1 E1	NPN
C2 B2 E2	PNP



FMB2227A Internal Connection

Figure 1. Block Diagram

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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	30	V
V_{CBO}	Collector-Base Voltage	60	V
V_{EBO}	Emitter-Base Voltage	5	V
I_C	Collector Current - Continuous	500	mA
$T_{J,}$ T_{STG}	Operating and Storage Junction Temperature Range	- 55 to +150	°C

Notes:

1. These ratings are based on a maximum junction temperature of 150°C.
2. These are steady-state limits. ON 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 the serviceability of any semiconductor device may be impaired.

Thermal Characteristics(2)

Values are at T_A = 25°C unless otherwise noted.

Symbol	Parameter	Maximum		Units
		FFB2227A	FMB2227A	
P_D	Total Device Dissipation	300	700	mV
	Derate Above 25°C	2.4	5.6	mV/°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 Conditions	Min.	Typ.	Max.	Units
OFF CHARACTERISTICS						
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage[4]	I_C = 10 mA, I_B = 0	30			V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = 10 μA, I_E = 0	60			V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 10 μA, I_C = 0	5			V
I_{CBO}	Collector Cut-Off Current	V_{CB} = 50 V, I_E = 0			30	nA
I_{EBO}	Emitter Cut-Off Current	V_{EB} = 3.0 V, I_C = 0			30	nA
ON CHARACTERISTICS						
h_{FE}	DC Current Gain	I_C = 1.0 mA, V_{CE} = 10 V	50			
		I_C = 10 mA, V_{CE} = 10 V	75			
		I_C = 150 mA, V_{CE} = 10 V[4]	100			
		I_C = 300 mA, V_{CE} = 10 V[4]	30			
V_{CE}(sat)	Collector-Emitter Saturation Voltage[4]	I_C = 150 mA, I_B = 15 mA			0.4	V
		I_C = 300 mA, I_B = 30 mA			1.4	V
V_{BE}(sat)	Base-Emitter Saturation Voltage[4]	I_C = 150 mA, I_B = 15 mA			1.3	V
SMALL SIGNAL CHARACTERISTICS						
f_T	Current Gain - Bandwidth Product	I_C = 50 mA, V_{CE} = 20 V, f = 100 MHz		250		MHz
C_{obo}	Output Capacitance	V_{CB} = 10 V, I_E = 0, f = 100 kHz		4.0		pF
C_{ibo}	Input Capacitance	V_{EB} = 2.0 V, I_C = 0, f = 100 kHz		12		pF
NF	Noise Figure	I_C = 100 μA, V_{CE} = 10 V, R_S = 1.0 kΩ, f = 1.0 kHz		2.0		dB
SWITCHING CHARACTERISTICS						
t_{on}	Turn-on Time	V_{CC} = 30 V, I_C = 150 mA, I_{B1} = 15 mA		30		ns
t_d	Delay Time			8.0		ns
t_r	Rise Time			20		ns
t_{off}	Turn-off Time	V_{CC} = 6.0 V, I_C = 150 mA, I_{B1} = I_{B2} = 15 mA		80		ns
t_s	Storage Time			60		ns
t_f	Fall Time			20		ns

Notes:

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

4. Pulse test: pulse width ≤ 300 μs, duty cycle ≤ 2.0%.

Physical Dimensions

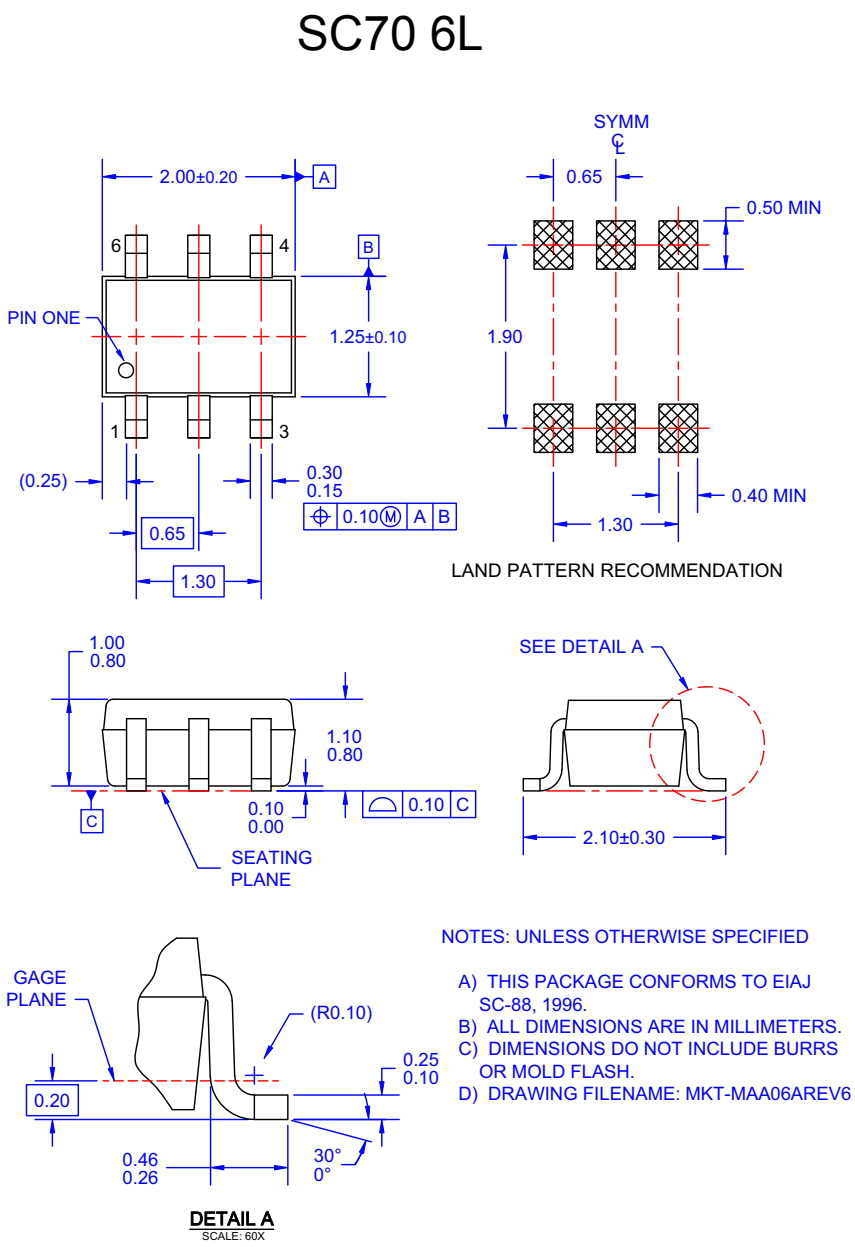

Figure 2. 6-LEAD, SC70, EIAJ SC-88, 1.25 MM WIDE (ACTIVE)

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Physical Dimensions (Continued)

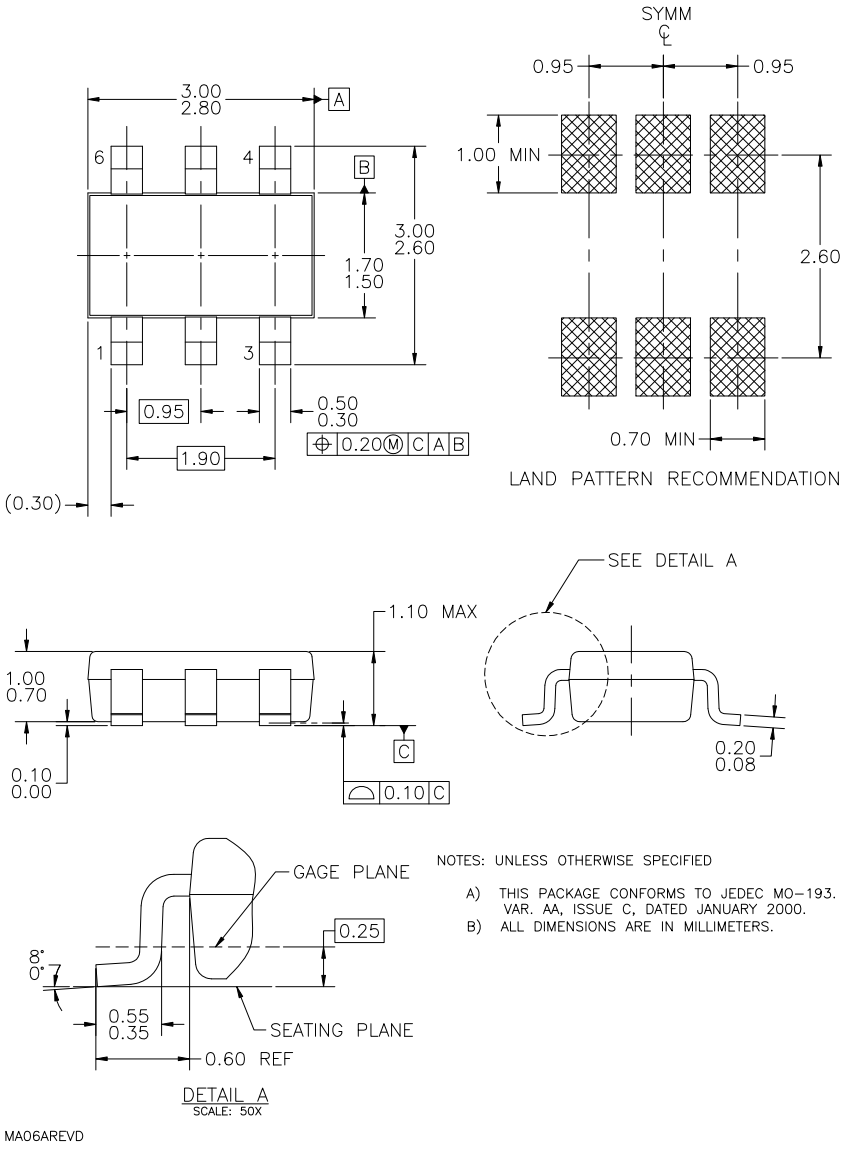

Figure 3. 6-LEAD, SUPER SOT-6, JEDEC MO-193, 1.6 MM WIDE (ACTIVE)

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