



**THE DATASHEET OF  
FMB2227A**



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ON Semiconductor®

# FFB2227A / FMB2227A NPN & PNP General-Purpose Amplifier

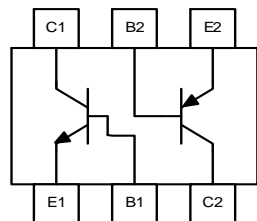
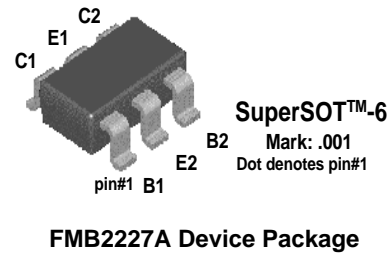
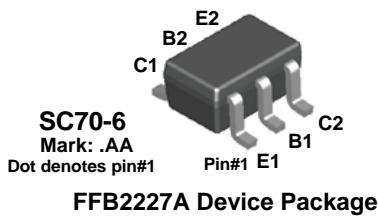
## Description

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



TRANSISTOR TYPE			
C1	B1	E1	NPN
C2	B2	E2	PNP

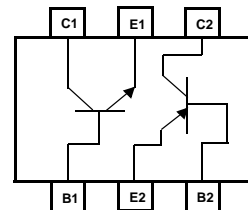


Figure 1. Block Diagram

## Absolute Maximum Ratings<sup>(1)</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	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	$^\circ\text{C}$

### Notes:

1. These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .
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<sup>(2)</sup>

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

Symbol	Parameter	Maximum		Units
		FFB2227A	FMB2227A	
$P_D$	Total Device Dissipation	300	700	mV
	Derate Above $25^\circ\text{C}$	2.4	5.6	$\text{mV}/^\circ\text{C}$
$R_{\theta JA}$	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  $\text{mm}^3$  (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

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

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

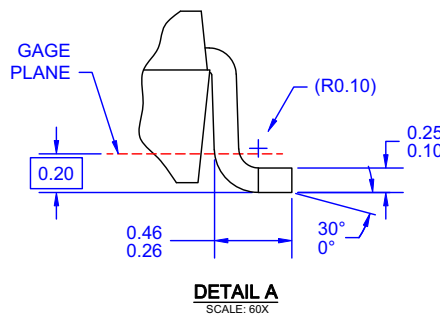
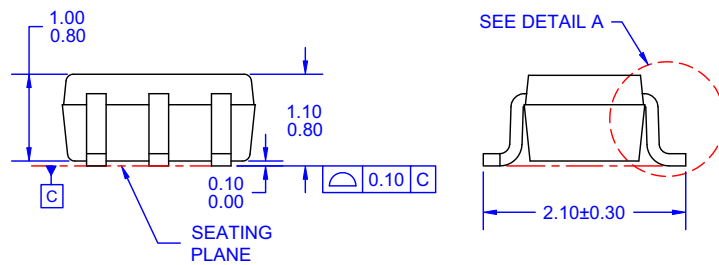
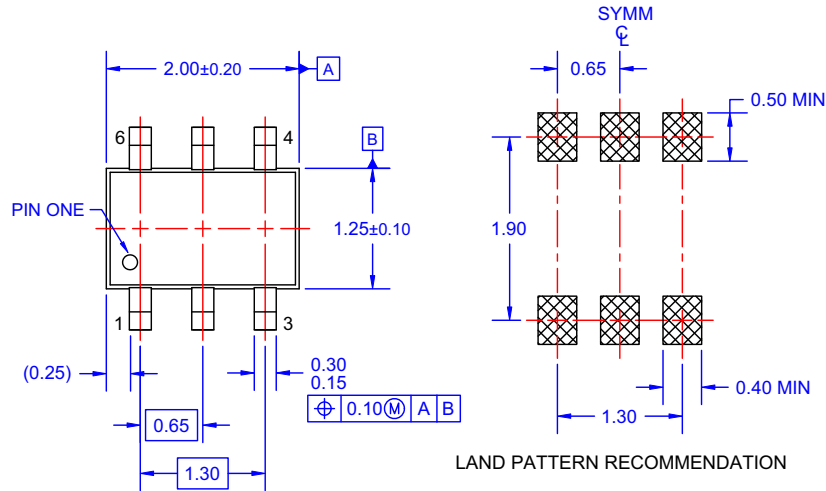
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
<b>OFF CHARACTERISTICS</b>						
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage <sup>(4)</sup>	$I_C = 10\text{ mA}, I_B = 0$	30			V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 10\text{ }\mu\text{A}, I_E = 0$	60			V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10\text{ }\mu\text{A}, I_C = 0$	5			V
$I_{CBO}$	Collector Cut-Off Current	$V_{CB} = 50\text{ V}, I_E = 0$			30	nA
$I_{EBO}$	Emitter Cut-Off Current	$V_{EB} = 3.0\text{ V}, I_C = 0$			30	nA
<b>ON CHARACTERISTICS</b>						
$h_{FE}$	DC Current Gain	$I_C = 1.0\text{ mA}, V_{CE} = 10\text{ V}$	50			
		$I_C = 10\text{ mA}, V_{CE} = 10\text{ V}$	75			
		$I_C = 150\text{ mA}, V_{CE} = 10\text{ V}^{(4)}$	100			
		$I_C = 300\text{ mA}, V_{CE} = 10\text{ V}^{(4)}$	30			
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage <sup>(4)</sup>	$I_C = 150\text{ mA}, I_B = 15\text{ mA}$			0.4	V
		$I_C = 300\text{ mA}, I_B = 30\text{ mA}$			1.4	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage <sup>(4)</sup>	$I_C = 150\text{ mA}, I_B = 15\text{ mA}$			1.3	V
<b>SMALL SIGNAL CHARACTERISTICS</b>						
$f_T$	Current Gain - Bandwidth Product	$I_C = 50\text{ mA}, V_{CE} = 20\text{ V}, f = 100\text{ MHz}$		250		MHz
$C_{obo}$	Output Capacitance	$V_{CB} = 10\text{ V}, I_E = 0, f = 100\text{ kHz}$		4.0		pF
$C_{ibo}$	Input Capacitance	$V_{EB} = 2.0\text{ V}, I_C = 0, f = 100\text{ kHz}$		12		pF
NF	Noise Figure	$I_C = 100\text{ }\mu\text{A}, V_{CE} = 10\text{ V}, R_S = 1.0\text{ k}\Omega, f = 1.0\text{ kHz}$		2.0		dB
<b>SWITCHING CHARACTERISTICS</b>						
$t_{on}$	Turn-on Time	$V_{CC} = 30\text{ V}, I_C = 150\text{ mA}, I_{B1} = 15\text{ mA}$		30		ns
$t_d$	Delay Time			8.0		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

**Notes:**

3. All voltages (V) and currents (A) are negative polarity for PNP transistors.
4. Pulse test: pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2.0\%$ .

Physical Dimensions

SC70 6L



NOTES: UNLESS OTHERWISE SPECIFIED

- A) THIS PACKAGE CONFORMS TO EIAJ SC-88, 1996.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH.
- D) DRAWING FILENAME: MKT-MAA06AREV6

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

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Physical Dimensions (Continued)

SSOT 6L

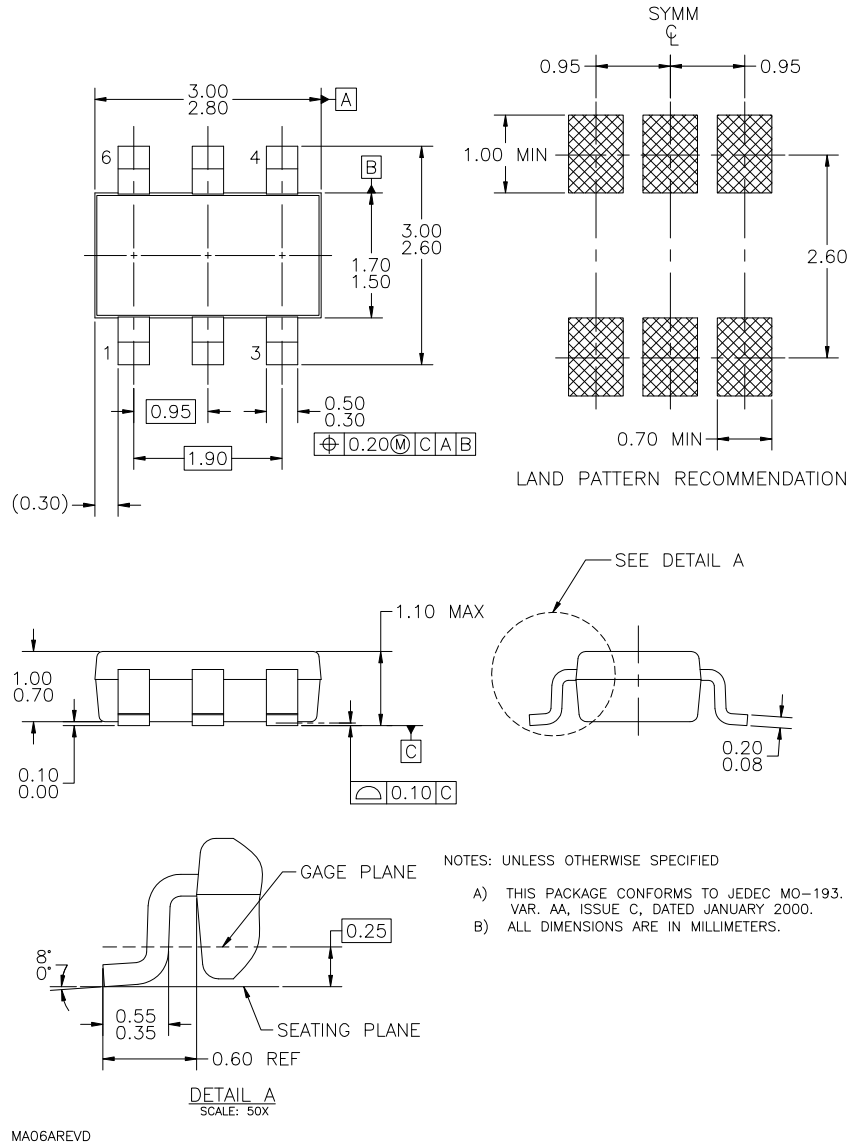


Figure 3. 6-LEAD, SUPER SOT-6, JEDEC MO-193, 1.6 MM WIDE (ACTIVE)

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