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ON Semiconductor®

FFB2227A / FMB2227A NPN & PNP General-Purpose Amplifier

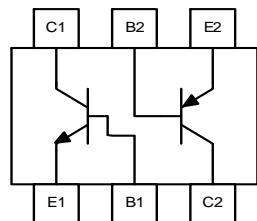
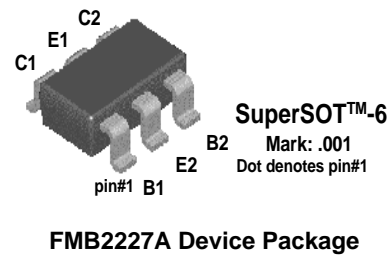
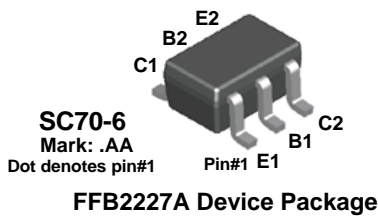
Description

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

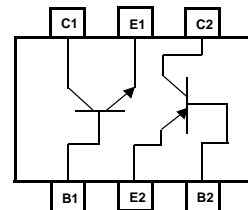


Figure 1. Block Diagram

Absolute Maximum Ratings⁽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	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°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 $T_A = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Maximum		Units
		FFB2227A	FMB2227A	
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 Conditions	Min.	Typ.	Max.	Units
OFF CHARACTERISTICS						
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage ⁽⁴⁾	$I_C = 10\text{ mA}, I_B = 0$	30			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			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
ON CHARACTERISTICS						
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 ⁽⁴⁾	$I_C = 150\text{ mA}, I_B = 15\text{ mA}$			0.4	V
		$I_C = 300\text{ mA}, I_B = 30\text{ mA}$			1.4	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage ⁽⁴⁾	$I_C = 150\text{ mA}, I_B = 15\text{ mA}$			1.3	V
SMALL SIGNAL CHARACTERISTICS						
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	$I_C = 100\ \mu\text{A}, V_{CE} = 10\text{ V}, R_S = 1.0\text{ k}\Omega, f = 1.0\text{ kHz}$		2.0		dB
SWITCHING CHARACTERISTICS						
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 $\leq 300\ \mu\text{s}$, duty cycle $\leq 2.0\%$.

Physical Dimensions

SC70 6L

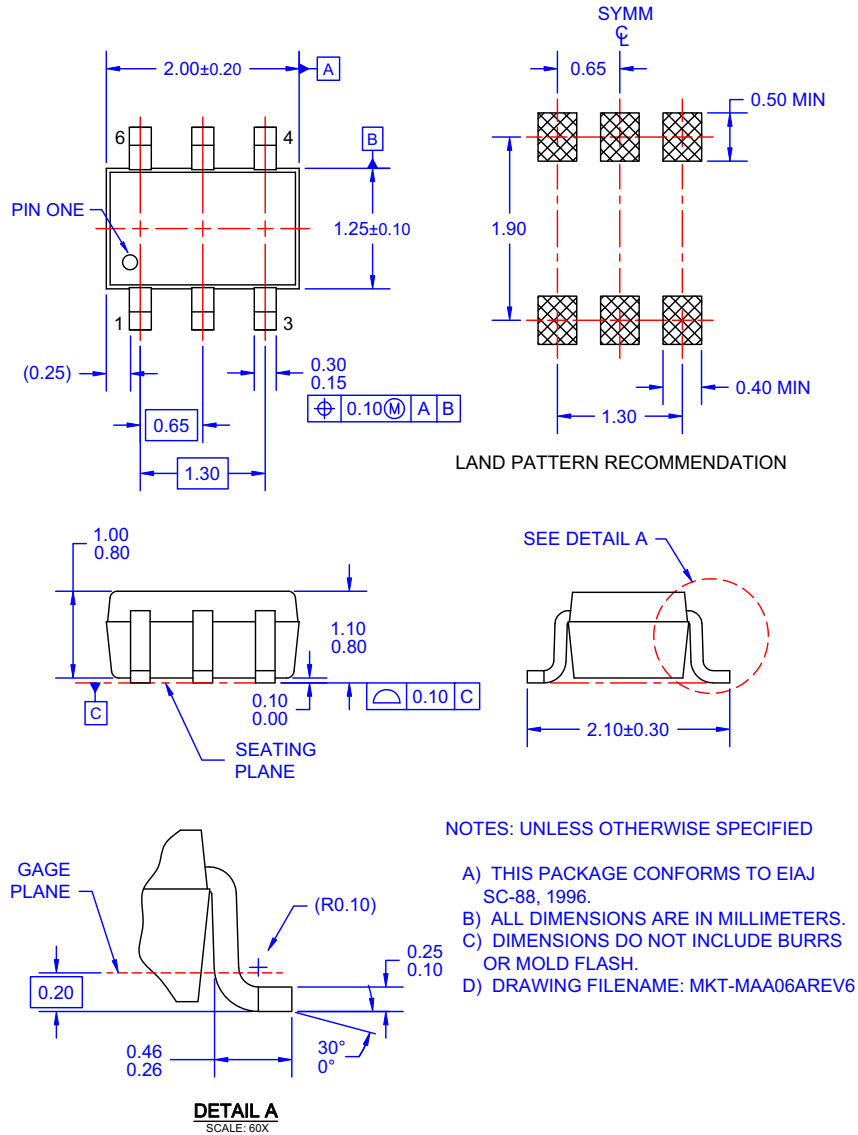


Figure 2. 6-LEAD, SC70, EIAJ SC-88, 1.25 MM WIDE (ACTIVE)

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Physical Dimensions (Continued)

SSOT 6L

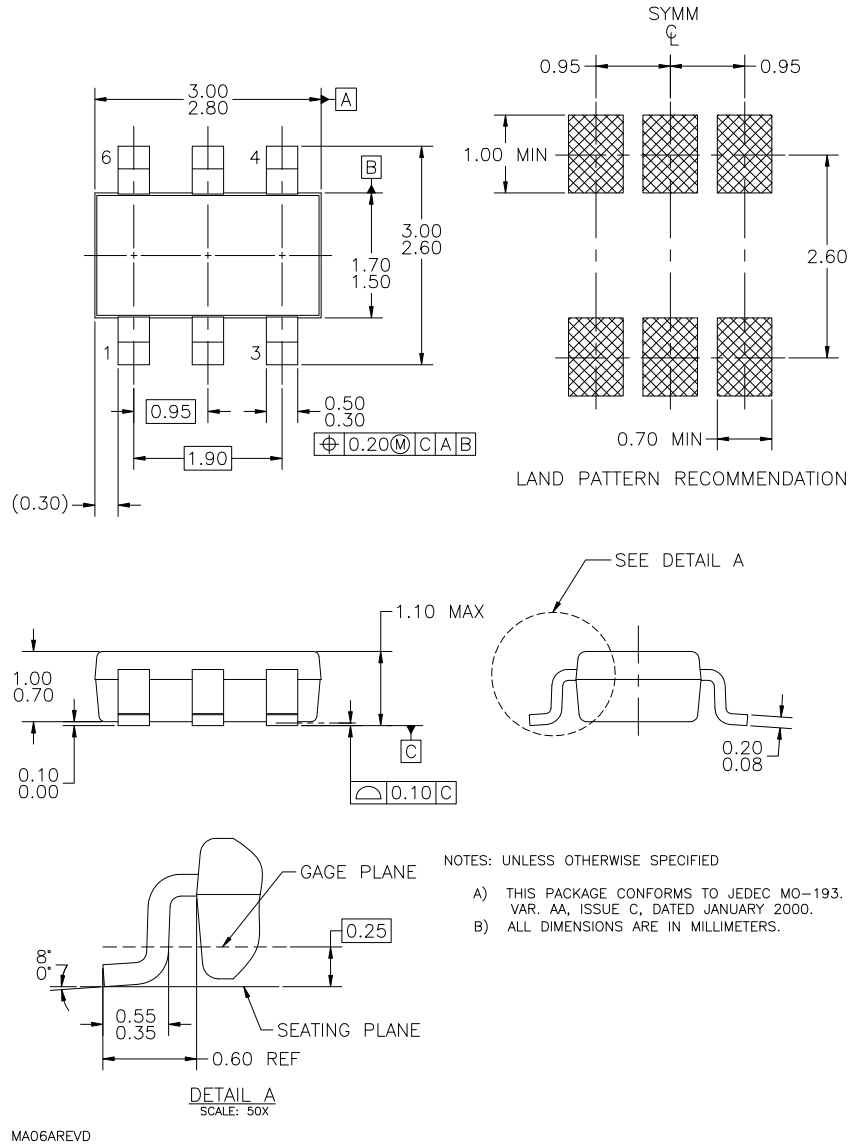


Figure 3. 6-LEAD, SUPER SOT-6, JEDEC MO-193, 1.6 MM WIDE (ACTIVE)

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