

IT126 - IT129

# Monolithic Dual NPN General Purpose Amplifier

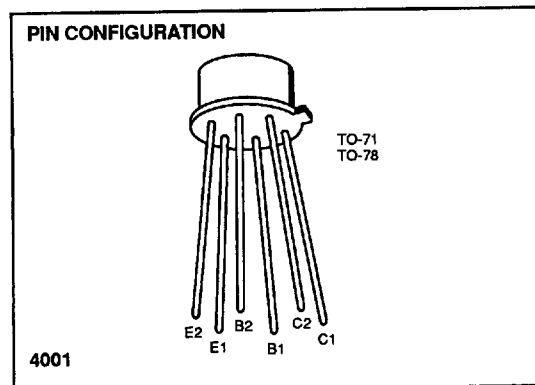


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### FEATURES

- High Gain at Low Current
- Low Output Capacitance
- Tight  $I_B$  Match
- Tight  $V_{BE}$  Tracking
- Dielectrically Isolated Matched Pairs for Differential Amplifiers



### ABSOLUTE MAXIMUM RATINGS

( $T_A = 25^\circ\text{C}$  unless otherwise specified)

Collector-Base Voltage (Note 1)	
IT126, IT127	60V
IT128	55V
IT129	45V
Collector-Emitter Voltage (Note 1)	
IT126, IT127	60V
IT128	55V
IT129	45V
Emitter-Base Voltage (Notes 1 and 2)	7.0V
Collector Current (Note 1)	100mA
Collector-Collector Voltage	70V
Storage Temperature Range	$-65^\circ\text{C}$ to $+175^\circ\text{C}$
Operating Temperature Range	$-55^\circ\text{C}$ to $+175^\circ\text{C}$
Lead Temperature (Soldering, 10sec)	$+300^\circ\text{C}$

	TO-71		TO-78	
Power Dissipation	One Side	Both Sides	One Side	Both Sides
Total Dissipation at $25^\circ\text{C}$	200mW	400mW	250mW	500mW
Derating Factor	1.3mW/ $^\circ\text{C}$	2.7mW/ $^\circ\text{C}$	1.7mW/ $^\circ\text{C}$	3.3mW/ $^\circ\text{C}$

**NOTE:** Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions above those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

### ORDERING INFORMATION

Part	Package	Temperature Range
IT126	Hermetic TO-78	$-55^\circ\text{C}$ to $+175^\circ\text{C}$
IT126/71	Hermetic TO-71	$-55^\circ\text{C}$ to $+175^\circ\text{C}$
XIT126	Sorted Chips in Carriers	$-55^\circ\text{C}$ to $+175^\circ\text{C}$
IT127	Hermetic TO-78	$-55^\circ\text{C}$ to $+175^\circ\text{C}$
IT127/71	Hermetic TO-71	$-55^\circ\text{C}$ to $+175^\circ\text{C}$
XIT127	Sorted Chips in Carriers	$-55^\circ\text{C}$ to $+175^\circ\text{C}$
IT128	Hermetic TO-78	$-55^\circ\text{C}$ to $+175^\circ\text{C}$
IT128/71	Hermetic TO-71	$-55^\circ\text{C}$ to $+175^\circ\text{C}$
XIT128	Sorted Chips in Carriers	$-55^\circ\text{C}$ to $+175^\circ\text{C}$
IT129	Hermetic TO-78	$-55^\circ\text{C}$ to $+175^\circ\text{C}$
IT129/71	Hermetic TO-71	$-55^\circ\text{C}$ to $+175^\circ\text{C}$
XIT129	Sorted Chips in Carriers	$-55^\circ\text{C}$ to $+175^\circ\text{C}$



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ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise specified)

SYMBOL	PARAMETER	IT126		IT127		IT128		IT129		UNITS	TEST CONDITIONS
		MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX		
h <sub>FE</sub>	DC Current Gain	150		150		100		70		V	I <sub>C</sub> = 10μA, V <sub>CE</sub> = 5V
		200	800	200	800	150	800	100			I <sub>C</sub> = 1.0mA, V <sub>CE</sub> = 5V
		230		230		170		115			I <sub>C</sub> = 10mA, V <sub>CE</sub> = 5V
		100		100		75		50			I <sub>C</sub> = 50mA, V <sub>CE</sub> = 5V
		75		75		60		40			I <sub>C</sub> = 1mA, V <sub>CE</sub> = 5V, T <sub>A</sub> = -55°C
V <sub>BE(on)</sub>	Emitter-Base On Voltage		0.9		0.9		0.9		0.9	V	I <sub>C</sub> = 10mA, V <sub>CE</sub> = 5V
			1.0		1.0		1.0		1.0		I <sub>C</sub> = 50mA, V <sub>CE</sub> = 5V
V <sub>CE(sat)</sub>	Collector Saturation Voltage		0.3		0.3		0.3		0.3		I <sub>C</sub> = 10mA, I <sub>B</sub> = 1mA
			1.0		1.0		1.0		1.0		I <sub>C</sub> = 50mA, I <sub>B</sub> = 5mA
I <sub>CBO</sub>	Collector Cutoff Current		0.1		0.1		0.1		0.1*	nA	I <sub>E</sub> = 0, V <sub>CB</sub> = 45V, V <sub>CB</sub> = 30V* (IT129), T <sub>A</sub> = +150°C
			0.1		0.1		0.1		0.1*		
I <sub>EBO</sub>	Emitter Cutoff Current		0.1		0.1		0.1		0.1	nA	I <sub>C</sub> = 0, V <sub>EB</sub> = 5V
C <sub>obo</sub>	Output Capacitance (Note 3)		3		3		3		3	pF	I <sub>E</sub> = 0, V <sub>CB</sub> = 20V
BV <sub>C1 C2</sub>	Collector to Collector Breakdown Current	±100		±100		±100		±100		V	I <sub>C</sub> = ±1μA
V <sub>CEO(sust)</sub>	Collector to Emitter Sustaining Voltage	60		60		55		45			I <sub>C</sub> = 1mA, I <sub>B</sub> = 0
BV <sub>CB0</sub>	Collector Base Breakdown Voltage	60		60		55		45			I <sub>C</sub> = 10μA, I <sub>E</sub> = 0
BV <sub>EBO</sub>	Emitter Base Breakdown Voltage	7		7		7		7			I <sub>E</sub> = 10μA, I <sub>C</sub> = 0

MATCHING CHARACTERISTICS

SYMBOL	PARAMETER	IT126		IT127		IT128		IT129		UNITS	TEST CONDITIONS
		MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX		
V <sub>BE1</sub> - V <sub>BE2</sub>	Base Emitter Voltage Differential		1		2		3		5	mV	I <sub>C</sub> = 1mA, V <sub>CE</sub> = 5V
$\frac{\Delta( V_{BE1} - V_{BE2} )}{\Delta T}$	Base Emitter Voltage Differential Change with Temperature (Note 3)		3		5		10		20	μV/°C	I <sub>C</sub> = 1mA, V <sub>CE</sub> = 5V T <sub>A</sub> = -55°C to +125°C
I <sub>B1</sub> - I <sub>B2</sub>	Base Current Differential		2.5		5		10		20	nA	I <sub>C</sub> = 10μA, V <sub>CE</sub> = 5V
			0.25		0.5		1.0		2.0	μA	I <sub>C</sub> = 1mA, V <sub>CE</sub> = 5V

- NOTES: 1. Per transistor.  
 2. The reverse base-to-emitter voltage must never exceed 7.0 volts and the reverse base-to-emitter current must never exceed 10μA.  
 3. For design reference only, not 100% tested.

SMA 508A DISCONTINUED