

IT136-IT139

# IT136-IT139

## Monolithic Dual PNP

### General Purpose Amplifier

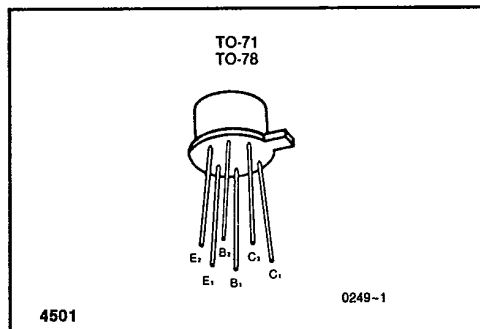


T-29-27

#### FEATURES

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

#### PIN CONFIGURATION



#### ORDERING INFORMATION

TO-78	TO-71
IT136	IT136-TO71
IT137	IT137-TO71
IT138	IT138-TO71
IT139	IT139-TO71

#### ABSOLUTE MAXIMUM RATINGS

(T<sub>A</sub> = 25°C unless otherwise noted)

Collector-Base Voltage (Note 1)

IT136, IT137 ..... 60V

IT138 ..... 55V

IT139 ..... 45V

Collector-Emitter Voltage (Note 1)

IT136, IT137 ..... 60V

IT138 ..... 55V

IT139 ..... 45V

Emitter Base Voltage (Notes 1 and 2) ..... 7V

Collector Current (Note 1) ..... 100mA

Collector-Collector Voltage ..... 70V

Storage Temperature Range ..... -65°C to +175°C

Operating Temperature Range ..... -55°C to +175°C

Lead Temperature (Soldering, 10sec) ..... +300°C

TO-71 TO-78

	One Side	Both Sides	One Side	Both Sides
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Power

Dissipation ... 200mW 400mW 250mW 500mW

Derate

above 25°C .. 1.3mW/°C 2.7mW/°C 1.7mW/°C 3.3mW/°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.

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

Symbol	Parameter	Test Conditions	IT136		IT137		IT138		IT139		Units
			Min	Max	Min	Max	Min	Max	Min	Max	
h <sub>FE</sub>	DC Current Gain	I <sub>C</sub> = 10μA, V <sub>CE</sub> = 5V	150		150		100		70		
		I <sub>C</sub> = 1.0mA, V <sub>CE</sub> = 5V	150	800	150	800	100	800	70	800	
		I <sub>C</sub> = 10mA, V <sub>CE</sub> = 5V	125		125		80		50		
		I <sub>C</sub> = 50mA, V <sub>CE</sub> = 5V	65		60		40		25		
		I <sub>C</sub> = 1mA, V <sub>CE</sub> = 5V T <sub>A</sub> = 55°C	75		75		60		40		
V <sub>BE(on)</sub>	Emitter-Base On Voltage	I <sub>C</sub> = 10mA, V <sub>CE</sub> = 5V		.9		.9		.9		.9	V
		I <sub>C</sub> = 50mA, V <sub>CE</sub> = 5V		1.0		1.0		1.0		1.0	
V <sub>CE(sat)</sub>	Collector Saturation Voltage	I <sub>C</sub> = 1mA, I <sub>B</sub> = .1mA		.3		.3		.3		.3	
		I <sub>C</sub> = 10mA, I <sub>B</sub> = 1mA		.6		.6		.6		.6	

INTERSIL'S SOLE AND EXCLUSIVE WARRANTY OBLIGATION WITH RESPECT TO THIS PRODUCT SHALL BE THAT STATED IN THE WARRANTY ARTICLE OF THE CONDITION OF SALE. THE WARRANTY SHALL BE EXCLUSIVE AND SHALL BE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR USE.

**NOTE:** All typical values have been characterized but are not tested.

**IT136-IT139****INTERNATIONAL**

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

Symbol	Parameter	Test Conditions	IT136		IT137		IT138		IT139		Units
			Min	Max	Min	Max	Min	Max	Min	Max	
$I_{CBO}$	Collector Cutoff Current	$I_E = 0, V_{CB} = 45\text{V}, V_{CD} = 30\text{V}^* \text{ (IT139)}, T_A = +150^\circ\text{C}$		0.1		0.1		0.1		0.1*	nA
				0.1		0.1		0.1		0.1*	$\mu\text{A}$
$I_{EBO}$	Emitter Cutoff Current	$I_C = 0, V_{EB} = 5\text{V}$		0.1		0.1		0.1		0.1	nA
$C_{obo}$	Output Capacitance (Note 3)	$I_E = 0, V_{CB} = 20\text{V}, f = 1\text{MHz}$		3		3		3		3	pF
$BV_{C_1C_2}$	Collector to Collector Breakdown Voltage	$I_C = \pm 1\mu\text{A}$	$\pm 100$		$\pm 100$		$\pm 100$		$\pm 100$		V
$V_{CEO(sust)}$	Collector to Emitter Sustaining Voltage	$I_C = 1\text{mA}, I_B = 0$	60		60		55		45		
$BV_{CBO}$	Collector Base Breakdown Voltage	$I_C = 10\mu\text{A}, I_E = 0$	60		60		55		45		
$BV_{EBO}$	Emitter Base Breakdown Voltage	$I_E = 10\mu\text{A}, I_C = 0$	7		7		7		7		
$ V_{BE_1} - V_{BE_2} $	Base Emitter Voltage Differential	$I_C = 1\text{mA}, V_{CE} = 5\text{V}$		1		2		3		5	mV
$\frac{\Delta  V_{BE_1} - V_{BE_2} }{\Delta T}$	Base Emitter Voltage Differential Change with Temperature (Note 3)	$I_C = 1\text{mA}, V_{CE} = 5\text{V}, T_A = -55^\circ\text{C} \text{ to } +125^\circ\text{C}$		3		5		10		20	$\mu\text{V}/^\circ\text{C}$
$ I_{B_1} - I_{B_2} $	Base Current Differential	$I_C = 10\mu\text{A}, V_{CE} = 5\text{V}$		2.5		5		10		20	nA
		$I_C = 1\text{mA}, V_{CE} = 5\text{V}$		.25		.5		1.0		2.0	$\mu\text{A}$

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  $10\mu\text{A}$ .

3. For design reference only, not 100% tested.

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