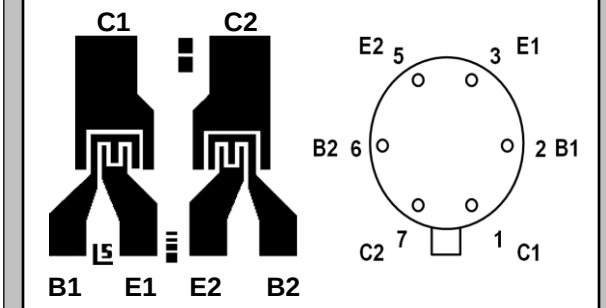
LINEAR SYSTEMS

*Improved Standard Products®*

# IT120A IT120 IT121 IT122

## MONOLITHIC DUAL NPN TRANSISTORS

| FEATURES | | |
|---|---|---|
| Direct Replacement for Intersil IT120 Series<br>Pin for Pin Compatible | | |
| **ABSOLUTE MAXIMUM RATINGS NOTE 1**<br>($T_A$= 25°C unless otherwise noted) | | |
| $I_C$ Collector-Current | 10mA | |
| **Maximum Temperatures** | | |
| Storage Temperature Range | -65°C to +150°C | |
| Operating Temperature Range | -55°C to +150°C | |
| **Maximum Power Dissipation** | **ONE SIDE** | **BOTH SIDES** |
| Device Dissipation $T_A$=25°C | 250mW | 500mW |
| Linear Derating Factor | 2.3mW/°C | 4.3W/°C |

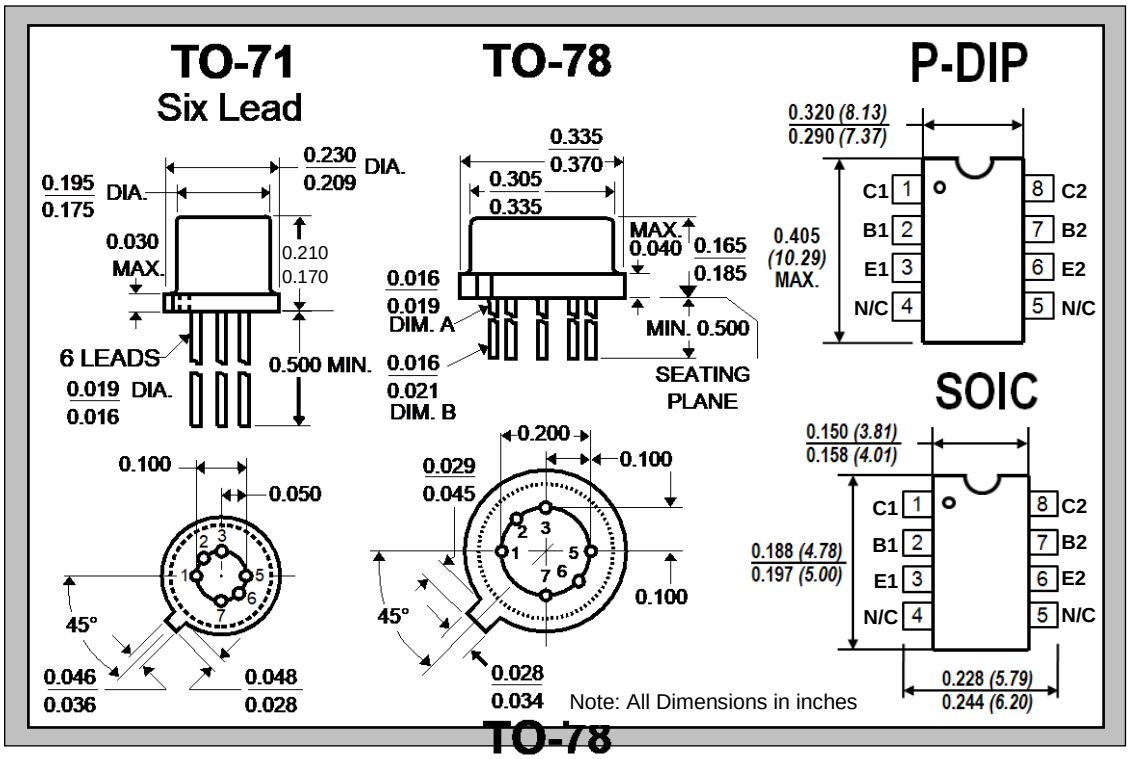



**ELECTRICAL CHARACTERISTICS $T_A$= 25°C (unless otherwise noted)**

| SYMBOL | CHARACTERISTIC | IT120A | IT120 | IT121 | IT122 | | UNITS | CONDITIONS | |
|---|---|---|---|---|---|---|---|---|---|
| $BV_{CBO}$ | Collector to Base Voltage | 45 | 45 | 45 | 45 | MIN. | V | $I_C$ = 10µA | $I_E$ = 0A |
| $BV_{CEO}$ | Collector to Emitter Voltage | 45 | 45 | 45 | 45 | MIN. | V | $I_C$ = 10µA | $I_B$ = 0A |
| $BV_{EBO}$ | Emitter-Base Breakdown Voltage | 6.2 | 6.2 | 6.2 | 6.2 | MIN. | V | $I_E$ = 10µA | $I_C$ = 0A **NOTE 2** |
| $BV_{CCO}$ | Collector to Collector Voltage | 60 | 60 | 60 | 60 | MIN. | V | $I_{CCO}$ = 10µA | $I_B = I_E$ = 0A |
| $h_{FE}$ | DC Current Gain | 200 | 200 | 80 | 80 | MIN. | | $I_C$ = 10µA | $V_{CE}$ = 5V |
| | | 225 | 225 | 100 | 100 | MIN. | | $I_C$ = 1.0mA | $V_{CE}$ = 5V |
| $V_{CE}$(SAT) | Collector Saturation Voltage | 0.5 | 0.5 | 0.5 | 0.5 | MAX. | V | $I_C$ = 0.5mA | $I_B$ = 0.05mA |
| $I_{EBO}$ | Emitter Cutoff Current | 1 | 1 | 1 | 1 | MAX. | nA | $I_C$ = 0 | $V_{EB}$ = 3V |
| $I_{CBO}$ | Collector Cutoff Current | 1 | 1 | 1 | 1 | MAX. | nA | $I_E$ = 0 | $V_{CB}$ = 45V |
| $C_{OBO}$ | Output Capacitance[3] | 2 | 2 | 2 | 2 | MAX. | pF | $I_E$ = 0 | $V_{CB}$ = 5V |
| $C_{C1C2}$ | Collector to Collector Capacitance[3] | 2 | 2 | 2 | 2 | MAX. | pF | $V_{CC}$ = 0 | |
| $I_{C1C2}$ | Collector to Collector Leakage Current | ±500 | ±500 | ±500 | ±500 | MAX. | nA | $V_{CCO}$ = ±60V | $I_B = I_E$ = 0A |
| $f_T$ | Current Gain Bandwidth Product[3] | 220 | 220 | 180 | 180 | MIN. | MHz | $I_C$ = 1mA | $V_{CE}$ = 5V |
| NF | Narrow Band Noise Figure[3] | 3 | 3 | 3 | 3 | MAX. | dB | $I_C$ = 100µA<br>BW = 200Hz, $R_G$ = 10 KΩ<br>f=1KHz | $V_{CE}$ = 5V |

**MATCHING CHARACTERISTICS @ 25°C (unless otherwise noted)**

| SYMBOL | CHARACTERISTIC | IT120A | IT120 | IT121 | IT122 | | UNITS | CONDITIONS |
|---|---|---|---|---|---|---|---|---|
| $\lvert V_{BE1}-V_{BE2}\rvert$ | Base Emitter Voltage Differential | 1 | 2 | 3 | 5 | MAX. | mV | $I_C$ = 10 µA $V_{CE}$ = 5V |
| $\Delta\lvert (V_{BE1}-V_{BE2})\rvert/\Delta T$ | Base Emitter Voltage Differential Change with Temperature[3] | 3 | 5 | 10 | 20 | MAX. | µV/°C | $I_C$ = 10 µA $V_{CE}$ = 5V T = -55°C to +125°C |
| $\lvert I_{B1}-I_{B2}\rvert$ | Base Current Differential | 2.5 | 5 | 25 | 25 | MAX. | nA | $I_C$ = 10 µA $V_{CE}$ = 5V |




TO-78
0.335
0.370
0.305
0.335
MAX.
0.040
0.165
0.185
0.016
0.019
DIM. A
MIN. 0.500
0.016
0.021
DIM. B
SEATING
PLANE
0.200
0.100
0.029
0.045
45°
0.028
0.034
0.100

**NOTES:**

1. These ratings are limiting values above which the serviceability of any semiconductor may be impaired.
2. The reverse base-to-emitter voltage must never exceed 6.2 volts; the reverse base-to-emitter current must never exceed 10 µA.
3. Not a production test.

Linear Integrated Systems (LIS) is a 25-year-old, third-generation precision semiconductor company providing high-quality discrete components. Expertise brought to LIS is based on processes and products developed at Amelco, Union Carbide, Intersil and Micro Power Systems by company President John H. Hall. Hall, a protégé of Silicon Valley legend Dr. Jean Hoerni, was the director of IC Development at Union Carbide, co-founder and vice president of R&D at Intersil, and founder/president of Micro Power Systems.