

3469674 FAIRCHILD SEMICONDUCTOR

84D 27412 D



# PE8050/PE8550 7-29-23

## NPN-PNP General Purpose Complementary Amplifiers & Output Drivers

- $V_{CEO}$  ... 25 V (Min)
- $h_{FE}$  ... Outstanding Beta Linearity to 1.0 A
- Three  $h_{FE}$  Groups
- Guaranteed SOA
- Complements ... PE8050, (NPN), PE8550, (PNP)

**PACKAGE**

|        |       |
|--------|-------|
| PE8050 | TO-92 |
| PE8550 | TO-92 |

**ABSOLUTE MAXIMUM RATINGS** (Note 1)**Temperatures**

|                                |                  |
|--------------------------------|------------------|
| Storage Temperature            | -55° C to 150° C |
| Operating Junction Temperature | 150° C           |

**Power Dissipation** ( $V_{CE} = 8.0$  V) (Notes 2 & 3)

|                           |         |
|---------------------------|---------|
| Total Dissipation at      |         |
| 25° C Ambient Temperature | 0.625 W |
| 25° C Case Temperature    | 1.0 W   |

**Voltages & Currents**

|                                        |       |
|----------------------------------------|-------|
| $V_{CEO}$ Collector to Emitter Voltage | 25 V  |
| (Note 4)                               |       |
| $V_{CBO}$ Collector to Base Voltage    | 30 V  |
| $V_{EBO}$ Emitter to Base Voltage      | 6.0 V |
| $I_C$ Collector Current (Continuous)   | 1.5 A |
| $I_C$ Collector Current (Pulsed)       | 1.5 A |

**ELECTRICAL CHARACTERISTICS** (25° C Ambient Temperature unless otherwise noted) (Note 6)

| SYMBOL    | CHARACTERISTIC                                     | MIN                  | MAX                      | UNITS | TEST CONDITIONS                                                                                                                            |
|-----------|----------------------------------------------------|----------------------|--------------------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------|
| $V_{CEO}$ | Collector to Emitter Breakdown Voltage<br>(Note 5) | 25                   |                          | V     | $I_C = 10$ mA, $I_E = 0$                                                                                                                   |
| $V_{CBO}$ | Collector to Base Breakdown Voltage                | 30                   |                          | V     | $I_C = 100$ $\mu$ A, $I_E = 0$                                                                                                             |
| $V_{EBO}$ | Emitter to Base Breakdown Voltage                  | 6.0                  |                          | V     | $I_E = 100$ $\mu$ A, $I_C = 0$                                                                                                             |
| $I_{CBO}$ | Collector Cutoff Current                           |                      | 100                      | nA    | $V_{CB} = 20$ V, $I_E = 0$                                                                                                                 |
| $h_{FE}$  | DC Current Gain (Note 5)                           | 50<br>65<br>65<br>40 | 200<br>200<br>200<br>200 |       | $I_C = 10$ mA, $V_{CE} = 1.0$ V<br>$I_C = 100$ mA, $V_{CE} = 1.0$ V<br>$I_C = 500$ mA, $V_{CE} = 1.0$ V<br>$I_C = 1.0$ A, $V_{CE} = 1.0$ V |
|           | Gain Grouping A                                    | 65                   | 130                      |       | $I_C = 100$ mA, $V_{CE} = 1.0$ V                                                                                                           |
|           | Gain Grouping B                                    | 85                   | 160                      |       |                                                                                                                                            |
|           | Gain Grouping C                                    | 120                  | 200                      |       |                                                                                                                                            |

**NOTES:**

- These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
- These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.
- These ratings give a maximum junction temperature of 150° C and (TO-92) junction-to-case thermal resistance of 125° C/W (derating factor of 5.0 mW/°C); junction-to-ambient thermal resistance of 125° C/W (derating factor of 8.0 mW/°C).
- Rating refers to a high current point where collector to emitter voltage is lowest.
- Pulse conditions: length = 300  $\mu$ s; duty cycle = 1%.
- For product family characteristic curves, refer to Curve Set T124 for PE8050 & T202 for PE8550.

**ELECTRICAL CHARACTERISTICS** (25° C Ambient Temperature unless otherwise noted) (Note 6)

| SYMBOL            | CHARACTERISTIC                                   | MIN | MAX         | UNITS  | TEST CONDITIONS                                                                                  |
|-------------------|--------------------------------------------------|-----|-------------|--------|--------------------------------------------------------------------------------------------------|
| $h_{FE1}/h_{FE2}$ | Beta Ratio at Two Currents                       | 0.8 | 1.8         |        | $I_{C1} = 100 \text{ mA}$ , $I_{C2} = 800 \text{ mA}$ , $V_{CE} = 1.0 \text{ V}$                 |
| $h_{FE3}/h_{FE4}$ | Beta Ratio at Two Currents                       | 0.8 | 1.5         |        | $I_{C1} = 150 \text{ mA}$ , $I_{C4} = 500 \text{ mA}$ , $V_{CE} = 1.0 \text{ V}$                 |
| $h_{fe}$          | High Frequency Current Gain                      | 1.0 |             |        | $I_C = 50 \text{ mA}$ , $V_{CE} = 10 \text{ V}$ , $f = 100 \text{ MHz}$                          |
| $V_{CE(sat)}$     | Collector to Emitter Saturation Voltage (Note 5) |     | 0.15<br>0.5 | V<br>V | $I_C = 200 \text{ mA}$ , $I_B = 20 \text{ mA}$<br>$I_C = 1.0 \text{ A}$ , $I_B = 100 \text{ mA}$ |
| $V_{BE(sat)}$     | Base to Emitter Saturation Voltage (Note 5)      |     | 0.9<br>1.2  | V<br>V | $I_C = 200 \text{ mA}$ , $I_B = 20 \text{ mA}$<br>$I_C = 1.0 \text{ A}$ , $I_B = 100 \text{ mA}$ |
| $C_{cb}$          | Collector to Base Capacitance                    |     | 40          | pF     | $V_{CB} = 10 \text{ V}$ , $I_C = 0$ , $f = 1.0 \text{ MHz}$                                      |

**FAIRCHILD**

A Schlumberger Company

**PN918/MPS918/FTSO918** 7-3123  
**PN3563/MPS3563/FTSO3563**NPN Small Signal High Frequency  
Amplifiers & Oscillators

- $G_{FE}$  ... 15 dB (Min) @ 200 MHz (PN/FTSO918)
- $C_{OB}$  ... 1.7 pF (Max) @ 10 V
- $NF$  ... 6.0 dB (Max) @ 60 MHz

**ABSOLUTE MAXIMUM RATINGS** (Note 1)**Temperatures**

Storage Temperature -55° C to 150° C  
Operating Junction Temperature 150° C

**PACKAGE**

|          |             |
|----------|-------------|
| PN918    | TO-92       |
| PN3563   | TO-92       |
| MPS918   | TO-92       |
| MPS3563  | TO-92       |
| FTSO918  | TO-236AA/AB |
| FTSO3563 | TO-236AA/AB |

**Power Dissipation** (Notes 2 & 3)

|                           |               |             |
|---------------------------|---------------|-------------|
| Total Dissipation at      | <b>PN/MPS</b> | <b>FTSO</b> |
| 25° C Ambient Temperature | 0.625 W       | 0.350 W*    |
| 65° C Ambient Temperature | 0.300 W       |             |
| 25° C Case Temperature    | 1.0 W         |             |

**Voltages & Currents**

|                                        |             |            |
|----------------------------------------|-------------|------------|
|                                        | <b>3563</b> | <b>918</b> |
| $V_{CEO}$ Collector to Emitter Voltage | 12 V        | 12 V       |
| (Note 4)                               |             |            |
| $V_{CBO}$ Collector to Base Voltage    | 30 V        | 30 V       |
| $V_{EBO}$ Emitter to Base Voltage      | 2.0 V       | 3.0 V      |
| $I_C$ Collector Current                | 50 mA       | 50 mA      |

**ELECTRICAL CHARACTERISTICS** (25° C Ambient Temperature unless otherwise noted) (Note 6)

| SYMBOL         | CHARACTERISTIC                                        | 3563 |     | MPS918 |     | UNITS | TEST CONDITIONS                                                 |
|----------------|-------------------------------------------------------|------|-----|--------|-----|-------|-----------------------------------------------------------------|
|                |                                                       | MIN  | MAX | MIN    | MAX |       |                                                                 |
| $BV_{CBO}$     | Collector to Base Breakdown Voltage                   | 30   |     | 30     |     | V     | $I_C = 100 \mu A, I_E = 0$<br>$I_C = 10 \mu A, I_E = 0$         |
| $BV_{EBO}$     | Emitter to Base Breakdown Voltage                     | 2.0  |     | 3.0    |     | V     | $I_E = 10 \mu A, I_C = 0$                                       |
| $I_{CBO}$      | Collector Cutoff Current                              |      | 50  |        | 10  | nA    | $V_{CB} = 15 V, I_E = 0$                                        |
| $h_{FE}$       | DC Current Gain (Note 5)                              | 20   | 200 | 20     |     |       | $I_C = 3.0 mA, V_{CE} = 1.0 V$<br>$I_C = 8.0 mA, V_{CE} = 10 V$ |
| $V_{CEO(sus)}$ | Collector to Emitter Sustaining Voltage (Notes 4 & 5) | 12   |     | 15     |     | V     | $I_C = 3.0 mA, I_B = 0$                                         |
| $V_{CE(sat)}$  | Collector to Emitter Saturation Voltage (Note 5)      |      |     |        | 0.4 | V     | $I_C = 10 mA, I_B = 1.0 mA$                                     |
| $V_{BE(sat)}$  | Base to Emitter Saturation Voltage                    |      |     |        | 1.0 | V     | $I_C = 10 mA, I_B = 1.0 mA$                                     |

**NOTES:**

- These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
  - These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.
  - These ratings give a maximum junction temperature of 150° C and (TO-92) junction-to-case thermal resistance of 125° C/W (derating factor of 8.0 mW/° C); junction-to-ambient thermal resistance of 200° C/W (derating factor of 5.0 mW/° C); (TO-236) junction-to-ambient thermal resistance of 357° C/W (derating factor of 2.8 mW/° C).
  - Rating refers to a high current point where collector to emitter voltage is lowest.
  - Pulse conditions: length = 300  $\mu s$ ; duty cycle  $\leq 1\%$ .
  - For product family characteristic curves, refer to Curve Set T121
- \* Package mounted on 99.5% alumina 8 mm x 8 mm x 0.6 mm.

**PN918/MPS918/FTSO918** *7-31-23*  
**PN3563/MPS3563/FTSO3563**

**ELECTRICAL CHARACTERISTICS** (25° C Ambient Temperature unless otherwise noted) (Note 6)

| SYMBOL    | CHARACTERISTIC                                                                        | 3563 |     | MPS918 |            | UNITS    | TEST CONDITIONS                                                                                                                                      |
|-----------|---------------------------------------------------------------------------------------|------|-----|--------|------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------|
|           |                                                                                       | MIN  | MAX | MIN    | MAX        |          |                                                                                                                                                      |
| $C_{ob}$  | Output Capacitance                                                                    |      | 1.7 |        | 1.7<br>3.0 | pF<br>pF | $V_{CB} = 10\text{ V}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$<br>$V_{CB} = 0$ , $I_E = 0$ , $f = 1.0\text{ MHz}$                                         |
| $C_{ib}$  | Input Capacitance                                                                     |      |     |        | 2.0        | pF       | $V_{EB} = 0.5\text{ V}$ , $I_C = 0$ , $f = 1.0\text{ MHz}$                                                                                           |
| $h_{fe}$  | High-Frequency Current Gain                                                           | 6.0  | 15  | 6.0    |            |          | $I_C = 4.0\text{ mA}$ , $V_{CE} = 10\text{ V}$ ,<br>$f = 100\text{ MHz}$<br>$I_C = 8.0\text{ mA}$ , $V_{CE} = 10\text{ V}$ ,<br>$f = 100\text{ MHz}$ |
| $h_{fe}$  | Small Signal Current Gain                                                             | 20   | 250 |        |            |          | $I_C = 8.0\text{ mA}$ , $V_{CE} = 10\text{ V}$ ,<br>$f = 1.0\text{ kHz}$                                                                             |
| $G_{pe}$  | Available Power Gain<br>(neutralized) (test<br>circuit 254 for<br>MPS918, PN/MPS3563) | 14   | 26  | 15     |            | dB<br>dB | $I_C = 6.0\text{ mA}$ , $V_{CB} = 12\text{ V}$ ,<br>$f = 200\text{ MHz}$<br>$I_C = 8.0\text{ mA}$ , $V_{CE} = 10\text{ V}$ ,<br>$f = 200\text{ MHz}$ |
| $P_o$     | Power Output<br>(test circuit no. 264)                                                |      |     | 30     |            | mW       | $I_C = 8.0\text{ mA}$ , $V_{CB} = 15\text{ V}$ ,<br>$f = 500\text{ MHz}$                                                                             |
| $\eta$    | Collector Efficiency                                                                  |      |     | 25     |            | %        | $I_C = 8.0\text{ mA}$ , $V_{CB} = 15\text{ V}$ ,<br>$f = 500\text{ MHz}$                                                                             |
| $r_b'C_c$ | Collector to Base Time<br>Constant                                                    | 8.0  | 25  |        |            | pF       | $I_C = 8.0\text{ mA}$ , $V_{CB} = 10\text{ V}$ ,<br>$f = 79.8\text{ MHz}$                                                                            |
| NF        | Noise Figure                                                                          |      |     |        | 6.0        | dB       | $I_C = 1.0\text{ mA}$ , $V_{CE} = 6.0\text{ V}$ ,<br>$f = 60\text{ kHz}$ , $R_G = 400\ \Omega$                                                       |

| SYMBOL        | CHARACTERISTIC                                           | PN918 |            | UNITS               | TEST CONDITIONS                                                                                              |
|---------------|----------------------------------------------------------|-------|------------|---------------------|--------------------------------------------------------------------------------------------------------------|
|               |                                                          | MIN   | MAX        |                     |                                                                                                              |
| $BV_{CBO}$    | Collector to Base Breakdown Voltage                      | 30    |            | V                   | $I_C = 10\ \mu\text{A}$ , $I_E = 0$                                                                          |
| $BV_{EBO}$    | Emitter to Base Breakdown Voltage                        | 3.0   |            | V                   | $I_E = 10\ \mu\text{A}$ , $I_C = 0$                                                                          |
| $I_{CBO}$     | Collector Cutoff Current                                 |       | 10<br>1.0  | nA<br>$\mu\text{A}$ | $V_{CB} = 15\text{ V}$ , $I_E = 0$<br>$V_{CB} = 15\text{ V}$ , $I_E = 0$ ,<br>$T_A = 150^\circ\text{C}$      |
| $h_{FE}$      | DC Current Gain (Note 5)                                 | 20    |            |                     | $I_C = 3.0\text{ mA}$ , $V_{CE} = 1.0\text{ V}$                                                              |
| $V_{CE(sus)}$ | Collector to Emitter Sustaining<br>Voltage (Notes 4 & 5) | 15    |            | V                   | $I_C = 3.0\text{ mA}$ , $I_B = 0$                                                                            |
| $V_{CE(sat)}$ | Collector to Emitter Saturation<br>Voltage (Note 5)      |       | 0.4        | V                   | $I_C = 10\text{ mA}$ , $I_B = 1.0\text{ mA}$                                                                 |
| $V_{BE(sat)}$ | Base to Emitter Saturation Voltage                       |       | 1.0        | V                   | $I_C = 10\text{ mA}$ , $I_B = 1.0\text{ mA}$                                                                 |
| $C_{ob}$      | Output Capacitance                                       |       | 1.7<br>3.0 | pF<br>pF            | $V_{CB} = 10\text{ V}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$<br>$V_{CB} = 0$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ |
| $C_{ib}$      | Input Capacitance                                        |       | 1.6        | pF                  | $V_{EB} = 0.5\text{ V}$ , $I_C = 0$ , $f = 1.0\text{ MHz}$                                                   |

PN918/MPS918/FTSO918  
PN3563/MPS3563/FTSO3563

T-31-23

**ELECTRICAL CHARACTERISTICS** (25°C Ambient Temperature unless otherwise noted) (Note 6)

| SYMBOL   | CHARACTERISTIC                                                     | PN918 |     | UNITS | TEST CONDITIONS                                                                                  |
|----------|--------------------------------------------------------------------|-------|-----|-------|--------------------------------------------------------------------------------------------------|
|          |                                                                    | MIN   | MAX |       |                                                                                                  |
| $h_{fe}$ | High Frequency Current Gain                                        | 6.0   |     |       | $I_C = 4.0 \text{ mA}$ , $V_{CE} = 10 \text{ V}$ ,<br>$f = 100 \text{ MHz}$                      |
| $G_{pe}$ | Available Power Gain (neutralized)<br>(test circuit 254 for PN918) | 15    |     | dB    | $I_C = 6.0 \text{ mA}$ , $V_{CB} = 12 \text{ V}$ ,<br>$f = 200 \text{ MHz}$                      |
| $P_o$    | Power Output<br>(test circuit no. 264)                             | 30    |     | mW    | $I_C = 8.0 \text{ mA}$ , $V_{CB} = 15 \text{ V}$ ,<br>$f = 500 \text{ MHz}$                      |
| $\eta$   | Collector Efficiency                                               | 25    |     | %     | $I_C = 8.0 \text{ mA}$ , $V_{CB} = 15 \text{ V}$ ,<br>$f = 500 \text{ MHz}$                      |
| NF       | Noise Figure                                                       |       | 6.0 | dB    | $I_C = 1.0 \text{ mA}$ , $V_{CE} = 6.0 \text{ V}$ ,<br>$f = 60 \text{ kHz}$ , $R_G = 400 \Omega$ |

3469674 FAIRCHILD SEMICONDUCTOR

84D 27417 D



# PN3565/FTSO3565 7-29-23

## NPN Low Level High Gain Amplifiers

- $V_{CEO}$  ... 25 V (Min)
- $h_{FE}$  ... 150-600 @ 1.0 mA

**PACKAGE**  
 PN3565 TO-92  
 FTSO3565 TO-236AA/AB

**ABSOLUTE MAXIMUM RATINGS** (Note 1)**Temperatures**

Storage Temperature -55° C to 150° C  
 Operating Junction Temperature 150° C

**Power Dissipation** (Note 2)

|                                                | PN      | FTSO     |
|------------------------------------------------|---------|----------|
| Total Dissipation at 25° C Ambient Temperature | 0.625 W | 0.350 W* |
| 25° C Case Temperature                         | 1.0 W   |          |

**Voltages & Currents**

|                                                 |       |
|-------------------------------------------------|-------|
| $V_{CEO}$ Collector to Emitter Voltage (Note 3) | 25 V  |
| $V_{CBO}$ Collector to Base Voltage             | 30 V  |
| $V_{EBO}$ Emitter to Base Voltage               | 6.0 V |
| $I_C$ Collector Current                         | 50 mA |

**ELECTRICAL CHARACTERISTICS** (25° C Ambient Temperature unless otherwise noted) (Note 4)

| SYMBOL         | CHARACTERISTIC                          | MIN       | MAX  | UNITS      | TEST CONDITIONS                                                   |
|----------------|-----------------------------------------|-----------|------|------------|-------------------------------------------------------------------|
| $BV_{CBO}$     | Collector to Base Breakdown Voltage     | 30        |      | V          | $I_C = 100 \mu A, I_E = 0$                                        |
| $BV_{EBO}$     | Emitter to Base Breakdown Voltage       | 6.0       |      | V          | $I_C = 0, I_E = 10 \mu A$                                         |
| $I_{CBO}$      | Collector Cutoff Current                |           | 50   | nA         | $V_{CB} = 25 V, I_E = 0$                                          |
| $I_{CBO}$      | Collector Cutoff Current                |           | 3.0  | $\mu A$    | $V_{CB} = 25 V, I_E = 0, T_A = 65^\circ C$                        |
| $h_{FE}$       | DC Current Gain                         | 150<br>70 | 600  |            | $I_C = 1.0 mA, V_{CE} = 10 V$<br>$I_C = 100 \mu A, V_{CE} = 10 V$ |
| $V_{CEO(sus)}$ | Collector to Emitter Sustaining Voltage | 25        |      | V          | $I_C = 2.0 mA, I_B = 0$                                           |
| $V_{CE(sat)}$  | Collector to Emitter Saturation Voltage |           | 0.35 | V          | $I_C = 1.0 mA, I_B = 0.1 mA$                                      |
| $C_{ob}$       | Open Circuit Output Capacitance         |           | 40   | pF         | $I_E = 0, V_{CB} = 5.0 V, f = 140 kHz$                            |
| $h_{fe}$       | High Frequency Current Gain             | 2.0       | 12   |            | $I_C = 1.0 mA, V_{CE} = 5.0 V, f = 20 MHz$                        |
| $h_{ie}$       | Input Resistance                        | 2.0       | 20   | k $\Omega$ | $I_C = 1.0 mA, V_{CE} = 5.0 V, f = 1.0 kHz$                       |
| $h_{oe}$       | Output Conductance                      | 0.5       | 100  | $\mu mhos$ | $I_C = 1.0 mA, V_{CE} = 5.0 V, f = 1.0 kHz$                       |
| $h_{re}$       | Small Signal Current Gain               | 120       | 750  |            | $I_C = 1.0 mA, V_{CE} = 5.0 V, f = 1.0 kHz$                       |

**NOTES:**

- These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
  - These ratings give a maximum junction temperature of 150° C and (TO92) junction-to-case thermal resistance of 125° C/W (derating factor of 8.0 mW/° C); junction-to-ambient thermal resistance of 200° C/W (derating factor of 5.0 mW/° C); (TO236) junction-to-ambient thermal resistance of 357° C/W (derating factor of 2.8 mW/° C).
  - Rating refers to a high current point where collector to emitter voltage is lowest.
  - For product family characteristic curves, refer to Curve Set T155.
- \* Package mounted on 99.5% alumina 8 mm x 8 mm x 0.6 mm.

3469674 FAIRCHILD SEMICONDUCTOR

84D 27418 D.



PN3566/FTSO3566

NPN Small Signal General Purpose  
Amplifiers

7-29-23

- $V_{CEO}$  ... 30 V (Min)
- $h_{FE}$  ... 150-600 @ 10 mA
- Complement ... MPS3638A

## PACKAGE

PN3566  
FTSO3566

TO-92

TO-236AA/AB

## ABSOLUTE MAXIMUM RATINGS (Note 1)

## Temperatures

Storage Temperature -55°C to 150°C  
Operating Junction Temperature 150°C

## Power Dissipation (Notes 2 &amp; 3)

|                          | PN      | FTSO     |
|--------------------------|---------|----------|
| Total Dissipation at     |         |          |
| 25°C Ambient Temperature | 0.625 W | 0.350 W* |
| 25°C Case Temperature    | 1.0 W   |          |

## Voltages &amp; Currents

|                                        |        |
|----------------------------------------|--------|
| $V_{CEO}$ Collector to Emitter Voltage | 30 V   |
| (Note 4)                               |        |
| $V_{CBO}$ Collector to Base Voltage    | 40 V   |
| $V_{EBO}$ Emitter to Base Voltage      | 5.0 V  |
| $I_C$ Collector Current                | 200 mA |

## ELECTRICAL CHARACTERISTICS (25°C Ambient Temperature unless otherwise noted) (Note 6)

| SYMBOL     | CHARACTERISTIC                      | MIN       | MAX | UNITS   | TEST CONDITIONS                                               |
|------------|-------------------------------------|-----------|-----|---------|---------------------------------------------------------------|
| $BV_{CBO}$ | Collector to Base Breakdown Voltage | 40        |     | V       | $I_C = 100 \mu A, I_E = 0$                                    |
| $BV_{EBO}$ | Emitter to Base Breakdown Voltage   | 5.0       |     | V       | $I_E = 10 \mu A, I_C = 0$                                     |
| $I_{CBO}$  | Collector Cutoff Current            |           | 50  | nA      | $V_{CB} = 20 V, I_E = 0$                                      |
| $I_{CBO}$  | Collector Cutoff Current            |           | 5.0 | $\mu A$ | $V_{CB} = 20 V, I_E = 0, T_A = 75^\circ C$                    |
| $I_{EBO}$  | Emitter Cutoff Current              |           | 10  | $\mu A$ | $V_{EB} = 5.0 V, I_C = 0$                                     |
| $h_{FE}$   | DC Pulse Current Gain (Note 5)      | 150<br>80 | 600 |         | $I_C = 10 mA, V_{CE} = 10 V$<br>$I_C = 2.0 mA, V_{CE} = 10 V$ |

## NOTES:

1. These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
  2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.
  3. These ratings give a maximum junction temperature of 150°C and (TO-92) junction-to-case thermal resistance of 125°C/W (derating factor of 8.0 mW/°C); junction-to-ambient thermal resistance of 200°C/W (derating factor of 5.0 mW/°C); (TO-236) junction-to-ambient thermal resistance of 357°C/W (derating factor of 2.8 mW/°C).
  4. Rating refers to a high current point where collector to emitter voltage is lowest.
  5. Pulse conditions: length = 300  $\mu s$ ; duty cycle  $\leq 1\%$ .
  6. For product family characteristic curves, refer to Curve Set T145.
- \* Package mounted on 99.5% alumina 8 mm x 8 mm x 0.6 mm.

PN3566/FTSO3566

T-29-23

**ELECTRICAL CHARACTERISTICS** (25° C Ambient Temperature unless otherwise noted) (Note 6)

| SYMBOL        | CHARACTERISTIC                                            | MIN | MAX | UNITS | TEST CONDITIONS                                                        |
|---------------|-----------------------------------------------------------|-----|-----|-------|------------------------------------------------------------------------|
| $V_{CE(sat)}$ | Collector to Emitter Saturation Voltage (Pulsed) (Note 5) |     | 1.0 | V     | $I_C = 100 \text{ mA}$ , $I_B = 10 \text{ mA}$                         |
| $V_{CE(sus)}$ | Collector to Emitter Sustaining Voltage (Notes 4 & 5)     | 30  |     | V     | $I_C = 30 \text{ mA}$ , $I_B = 0$ (pulsed)                             |
| $V_{BE(ON)}$  | Base to Emitter "On" Voltage (pulsed) (Note 5)            |     | 0.9 | V     | $I_C = 100 \text{ mA}$ , $V_{CE} = 1.0 \text{ V}$                      |
| $C_{ob}$      | Output Capacitance                                        |     | 25  | pF    | $V_{CB} = 10 \text{ V}$ , $I_E = 0$ , $f = 140 \text{ kHz}$            |
| $h_{fe}$      | High Frequency Current Gain                               | 2.0 | 35  |       | $I_C = 30 \text{ mA}$ , $V_{CE} = 10 \text{ V}$ , $f = 20 \text{ MHz}$ |


**PN3567/FTSO3567**  
**PN3569/FTSO3569**
**NPN Small Signal General Purpose Amplifiers**
**T-29-23**

- $V_{CE0}$  ... 40 V (Min)
- $h_{FE}$  ... 100-300 @ 10 mA (3569); 40-120 @ 150 mA (3567)
- Complement ... MPS4355

**PACKAGE**

|          |             |
|----------|-------------|
| PN3567   | TO-92       |
| PN3569   | TO-92       |
| FTSO3567 | TO-236AA/AB |
| FTSO3569 | TO-236AA/AB |

**ABSOLUTE MAXIMUM RATINGS** (Note 1)**Temperatures**

|                                |                  |
|--------------------------------|------------------|
| Storage Temperature            | -55° C to 150° C |
| Operating Junction Temperature | 150° C           |

**Power Dissipation** (Notes 2 & 3)

| Total Dissipation at      | PN      | FTSO     |
|---------------------------|---------|----------|
| 25° C Ambient Temperature | 0.625 W | 0.350 W* |
| 25° C Case Temperature    | 1.0 W   |          |

**Voltages & Currents**

|                                        |        |
|----------------------------------------|--------|
| $V_{CE0}$ Collector to Emitter Voltage | 40 V   |
| (Notes 4 & 6)                          |        |
| $V_{CBO}$ Collector to Base Voltage    | 80 V   |
| $V_{EBO}$ Emitter to Base Voltage      | 5.0 V  |
| $I_C$ Collector Current                | 500 mA |
| $I_B$ Base Current                     | 100 mA |

**ELECTRICAL CHARACTERISTICS** (25° C Ambient Temperature unless otherwise noted) (Note 7)

| SYMBOL     | CHARACTERISTIC                                  | 3567 |     | 3569 |     | UNITS   | TEST CONDITIONS                                 |
|------------|-------------------------------------------------|------|-----|------|-----|---------|-------------------------------------------------|
|            |                                                 | MIN  | MAX | MIN  | MAX |         |                                                 |
| $BV_{CE0}$ | Collector to Emitter Breakdown Voltage (Note 5) | 40   |     | 40   |     | V       | $I_C = 30$ mA, $I_B = 0$                        |
| $BV_{CBO}$ | Collector to Base Breakdown Voltage             | 80   |     | 80   |     | V       | $I_C = 100$ $\mu$ A, $I_E = 0$                  |
| $BV_{EBO}$ | Emitter to Base Breakdown Voltage               | 5.0  |     | 5.0  |     | V       | $I_E = 10$ $\mu$ A, $I_C = 0$                   |
| $I_{CBO}$  | Collector Cutoff Current                        |      | 50  |      | 50  | nA      | $V_{CB} = 40$ V, $I_E = 0$                      |
|            |                                                 |      | 5.0 |      | 5.0 | $\mu$ A | $V_{CB} = 40$ V, $I_E = 0$ , $T_A = 75^\circ$ C |
| $I_{EBO}$  | Emitter Cutoff Current                          |      | 25  |      | 25  | nA      | $V_{EB} = 4.0$ V, $I_C = 0$                     |

**NOTES:**

1. These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
2. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.
3. These ratings give a maximum junction temperature of 150° C and (TO-92) junction-to-case thermal resistance of 125° C/W (derating factor of 8.0 mW/° C); junction-to-ambient thermal resistance of 200° C/W (derating factor of 5.0 mW/° C); (TO-236) junction-to-ambient thermal resistance of 357° C/W (derating factor of 2.8 mW/° C).
4. Rating refers to a high current point where collector to emitter voltage is lowest
5. Pulse conditions: length = 300  $\mu$ s; duty cycle = 1%.
6. Applicable 0 to 30 mA.
7. For product family characteristic curves, refer to Curve Set T145.

\* Package mounted on 99.5% alumina 8 mm x 8 mm x 0.6 mm.

FAIRCHILD SEMICONDUCTOR

84 DE 3469674 0027421 1

3469674 FAIRCHILD SEMICONDUCTOR

84D 27421 D

PN3567/FTSO3567

PN3569/FTSO3569

T-29-23

**ELECTRICAL CHARACTERISTICS** (25° C Ambient Temperature unless otherwise noted) (Note 7)

| SYMBOL        | CHARACTERISTIC                                        | 3567     |      | 3569       |      | UNITS | TEST CONDITIONS                                                                                       |
|---------------|-------------------------------------------------------|----------|------|------------|------|-------|-------------------------------------------------------------------------------------------------------|
|               |                                                       | MIN      | MAX  | MIN        | MAX  |       |                                                                                                       |
| $h_{FE}$      | DC Current Gain (Note 5)                              | 40<br>40 | 120  | 100<br>100 | 300  |       | $I_C = 150 \text{ mA}$ , $V_{CE} = 1.0 \text{ V}$<br>$I_C = 30 \text{ mA}$ , $V_{CE} = 1.0 \text{ V}$ |
| $V_{CE(sat)}$ | Collector to Emitter Saturation Voltage (Note 5)      |          | 0.25 |            | 0.25 | V     | $I_C = 150 \text{ mA}$ , $I_B = 15 \text{ mA}$                                                        |
| $V_{BE(ON)}$  | Base to Emitter "On" Voltage (Note 5)                 |          | 1.1  |            | 1.1  | V     | $I_C = 150 \text{ mA}$ , $V_{CE} = 1.0 \text{ V}$                                                     |
| $C_{cb}$      | Collector to Base Capacitance                         |          | 20   |            | 20   | pF    | $V_{CB} = 10 \text{ V}$ , $I_E = 0$ , $f = 140 \text{ kHz}$                                           |
| $C_{eb}$      | Emitter to Base Capacitance                           |          | 80   |            | 80   | pF    | $V_{EB} = 0.5 \text{ V}$ , $I_C = 0$ , $f = 140 \text{ kHz}$                                          |
| $ h_{ie} $    | Magnitude of Common Emitter Small Signal Current Gain | 3.0      | 30   | 3.0        | 30   |       | $I_C = 50 \text{ mA}$ , $V_{CE} = 10 \text{ V}$ ,<br>$f = 20 \text{ MHz}$                             |