FAIRCHILD
A Schlumberger Company

PE8050/PE8550 T-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 (Note 4)	25 V
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 (Note 5)	25		V	I_C = 10 mA, I_B = 0
V_{CBO}	Collector to Base Breakdown Voltage	30		V	I_C = 100 μA, I_E = 0
V_{EBO}	Emitter to Base Breakdown Voltage	6.0		V	I_E = 100 μA, 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	200		I_C = 10 mA, V_{CE} = 1.0 V
		65	200		I_C = 100 mA, V_{CE} = 1.0 V
		65	200		I_C = 500 mA, V_{CE} = 1.0 V
		40	200		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:

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 5 0 mW/° C); junction-to-ambient thermal resistance of 125° C/W (derating factor of 8.0 mW/° C).
4. Rating refers to a high current point where collector to emitter voltage is lowest.
5. Pulse conditions: length = 300 μs; duty cycle = 1%.
6. 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 mA, I_{C2} = 800 mA, V_{CE} = 1.0 V
h_{FE3}/h_{FE4}	Beta Ratio at Two Currents	0.8	1.5		I_{C1} = 150 mA, I_{C4} = 500 mA, V_{CE} = 1.0 V
h_{fe}	High Frequency Current Gain	1.0			I_C = 50 mA, V_{CE} = 10 V, f = 100 MHz
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage (Note 5)		0.15 0.5	V V	I_C = 200 mA, I_B = 20 mA I_C = 1.0 A, I_B = 100 mA
$V_{BE(sat)}$	Base to Emitter Saturation Voltage (Note 5)		0.9 1.2	V V	I_C = 200 mA, I_B = 20 mA I_C = 1.0 A, I_B = 100 mA
C_{cb}	Collector to Base Capacitance		40	pF	V_{CB} = 10 V, I_C = 0, f = 1.0 MHz

FAIRCHILD
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PN918/MPS918/FTSO918 T-31-23
PN3563/MPS3563/FTSO3563

NPN Small Signal High Frequency Amplifiers & Oscillators

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

PACKAGE

PN918	TO-92
PN3563	TO-92
MPS918	TO-92
MPS3563	TO-92
FTSO918	TO-236AA/AB
FTSO3563	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/MPS	FTSO
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		**3563**	**918**
V_{CEO}	Collector to Emitter Voltage (Note 4)	12 V	12 V
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 MIN	3563 MAX	MPS918 MIN	MPS918 MAX	UNITS	TEST CONDITIONS
BV_{CBO}	Collector to Base Breakdown Voltage	30		30		V V	I_C = 100 μA, I_E = 0 I_C = 10 μA, I_E = 0
BV_{EBO}	Emitter to Base Breakdown Voltage	2.0		3.0		V	I_E = 10 μA, 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 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:
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 μs; duty cycle ≤ 1%.
6. 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 T-31-23
PN3563/MPS3563/FTSO3563

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

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

SYMBOL	CHARACTERISTIC	PN918 MIN	PN918 MAX	UNITS	TEST CONDITIONS
BV_{CBO}	Collector to Base Breakdown Voltage	30		V	I_C = 10 μA, I_E = 0
BV_{EBO}	Emitter to Base Breakdown Voltage	3.0		V	I_E = 10 μA, I_C = 0
I_{CBO}	Collector Cutoff Current		10 1.0	nA μA	V_{CB} = 15 V, I_E = 0 V_{CB} = 15 V, I_E = 0, T_A = 150° C
h_{FE}	DC Current Gain (Note 5)	20			I_C = 3.0 mA, V_{CE} = 1.0 V
$V_{CEO(sus)}$	Collector to Emitter Sustaining Voltage (Notes 4 & 5)	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
C_{ob}	Output Capacitance		1.7 3.0	pF pF	V_{CB} = 10 V, I_E = 0, f = 1.0 MHz V_{CB} = 0, I_E = 0, f = 1.0 MHz
C_{ib}	Input Capacitance		1.6	pF	V_{EB} = 0.5 V, I_C = 0, f = 1.0 MHz

PN918/MPS918/FTSO918
PN3563/MPS3563/FTSO3563

T-31-23

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

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

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PN3565/FTSO3565 T-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)

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_{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	μA	$V_{CB} = 25$ V, $I_E = 0$, $T_A = 65° C$
h_{FE}	DC Current Gain	150 70	600		$I_C = 1.0$ mA, $V_{CE} = 10$ V $I_C = 100\ \mu A$, $V_{CE} = 10$ 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	kΩ	$I_C = 1.0$ mA, $V_{CE} = 5.0$ V, f = 1.0 kHz
h_{oe}	Output Conductance	0.5	100	μmhos	$I_C = 1.0$ mA, $V_{CE} = 5.0$ V, f = 1.0 kHz
h_{fe}	Small Signal Current Gain	120	750		$I_C = 1.0$ mA, $V_{CE} = 5.0$ V, f = 1.0 kHz

NOTES:

1. These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
2. 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).
3. Rating refers to a high current point where collector to emitter voltage is lowest.
4. 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.

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PN3566/FTSO3566

NPN Small Signal General Purpose Amplifiers

T-29-23

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

PACKAGE

PN3566	TO-92
FTSO3566	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)

	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 4)	30 V
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	μA	$V_{CB} = 20$ V, $I_E = 0$, $T_A = 75°C$
I_{EBO}	Emitter Cutoff Current		10	μA	$V_{EB} = 5.0$ V, $I_C = 0$
h_{FE}	DC Pulse Current Gain (Note 5)	150 80	600		$I_C = 10$ mA, $V_{CE} = 10$ V $I_C = 2.0$ 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 μs; 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.

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 mA, I_B = 10 mA
$V_{CEO(sus)}$	Collector to Emitter Sustaining Voltage (Notes 4 & 5)	30		V	I_C = 30 mA, I_B = 0 (pulsed)
$V_{BE(ON)}$	Base to Emitter "On" Voltage (pulsed) (Note 5)		0.9	V	I_C = 100 mA, V_{CE} = 1.0 V
C_{ob}	Output Capacitance		25	pF	V_{CB} = 10 V, I_E = 0, f = 140 kHz
h_{fe}	High Frequency Current Gain	2.0	35		I_C = 30 mA, V_{CE} = 10 V, f = 20 MHz

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PN3567/FTSO3567
PN3569/FTSO3569

NPN Small Signal General Purpose Amplifiers

T-29-23

- V_{CEO} ... 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_{CEO}	Collector to Emitter Voltage (Notes 4 & 6)	40 V
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 MIN	3567 MAX	3569 MIN	3569 MAX	UNITS	TEST CONDITIONS
BV_{CEO}	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 μA, I_E = 0
BV_{EBO}	Emitter to Base Breakdown Voltage	5.0		5.0		V	I_E = 10 μA, I_C = 0
I_{CBO}	Collector Cutoff Current		50 5.0		50 5.0	nA μA	V_{CB} = 40 V, I_E = 0 V_{CB} = 40 V, I_E = 0, T_A = 75° 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 μs; 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.

PN3567/FTSO3567
PN3569/FTSO3569

T-29-23

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

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