

3469674 FAIRCHILD SEMICONDUCTOR

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FAIRCHILD

A Schlumberger Company

2N/PN/FTSO2218
2N/PN/FTSO2221 T-29-23NPN Small Signal General Purpose
Amplifiers & Switches

- $V_{CEO} \dots 30 \text{ V (Min)}$

ABSOLUTE MAXIMUM RATINGS (Note 1)

Temperatures	2N	PN/FTSO
Storage Temperature	-65° C to 200° C	-55° C to 150° C
Operating Junction Temperature	175° C	150° C

PACKAGE

2N2218	TO-39
2N2221	TO-18
PN2218	TO-92
PN2221	TO-92
FTSO2218	TO-236AA/AB
FTSO2221	TO-236AA/AB

Power Dissipation (Notes 2 & 3)

	2N2218	2N2221
Total Dissipation at		
25° C Ambient Temperature	0.8 mW	0.5 W
25° C Case Temperature	3.0 W	1.8 W

	PN2218	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	60 V
V_{EBO} Emitter to Base Voltage	5.0 V
I_C Collector Current	800 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	60		V	$I_C = 10 \mu\text{A}, I_E = 0$
BV_{EBO}	Emitter to Base Breakdown Voltage	5.0		V	$I_E = 10 \mu\text{A}, I_C = 0$
I_{EBO}	Emitter Cutoff Current		10	nA	$V_{EB} = 3.0 \text{ V}, I_C = 0$
I_{CBO}	Collector Cutoff Current		10	nA	$V_{CB} = 50 \text{ V}, I_E = 0$
			10	μA	$V_{CB} = 50 \text{ V}, I_E = 0, T_A = 150^\circ \text{ C}$

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 175° C; junction-to-case thermal resistance of 50° C/W (derating factor of 20 mW/° C), and junction-to-ambient thermal resistance of 188° C/W (derating factor of 5.33 mW/° C) for 2N2218; for 2N2221, junction-to-case thermal resistance of 83.5° C/W (derating factor of 12 mW/° C); junction-to-ambient thermal resistance of 300° C/W (derating factor of 3.33 mW/° C). These ratings give a maximum junction temperature of 150° C, 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) for PN2218 and PN2221; (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 $\leq 2\%$.
 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.

2N/PN/FTSO2218

2N/PN/FTSO2221

T-29-23

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

SYMBOL	CHARACTERISTIC	MIN	MAX	UNITS	TEST CONDITIONS
h_{FE}	DC Current Gain (Note 5)	40	120		$I_C = 150 \text{ mA}, V_{CE} = 10 \text{ V}$
		20			$I_C = 150 \text{ mA}, V_{CE} = 1.0 \text{ V}$
		35			$I_C = 10 \text{ mA}, V_{CE} = 10 \text{ V}$
		25			$I_C = 1.0 \text{ mA}, V_{CE} = 10 \text{ V}$
		20			$I_C = 0.1 \text{ mA}, V_{CE} = 10 \text{ V}$
		20			$I_C = 500 \text{ mA}, V_{CE} = 10 \text{ V}$
$V_{CE(sus)}$	Collector to Emitter Sustaining Voltage (Note 5)	30		V	$I_C = 10 \text{ mA (pulsed)}, I_B = 0$
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage (Note 5)		0.4	V	$I_C = 150 \text{ mA}, I_B = 50 \text{ mA}$
			1.6	V	$I_C = 500 \text{ mA}, I_B = 50 \text{ mA}$
$V_{BE(sat)}$	Base to Emitter Saturation Voltage (Note 5)		1.3	V	$I_C = 150 \text{ mA}, I_B = 15 \text{ mA}$
			2.6	V	$I_C = 500 \text{ mA}, I_B = 50 \text{ mA}$
C_{ob}	Output Capacitance		8.0	pF	$V_{CB} = 10 \text{ V}, I_E = 0$
h_{fe}	High Frequency Current Gain	2.5			$I_C = 20 \text{ mA}, V_{CE} = 20 \text{ V}, f = 100 \text{ MHz}$
$R_e(h_{ie})$	Real Part of Common Emitter High Frequency Input Impedance		60	Ω	$I_C = 20 \text{ mA}, V_{CE} = 20 \text{ V}, f = 300 \text{ MHz}$