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FAIRCHILD
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2N3253

T-35-19

NPN Switching Type

ABSOLUTE MAXIMUM RATINGS (Note 1)

Temperatures

Storage Temperature	-65° C to 200° C
Operating Junction Temperature	200° C

Power Dissipation (Notes 2 & 3)

Total Dissipation at	
25° C Ambient Temperature	0.8 W
25° C Case Temperature	3.0 W

Voltages & Currents

V_{CEO}	Collector to Emitter Voltage (Note 4)	40 V
V_{CBO}	Collector to Base Voltage	75 V
V_{EBO}	Emitter to Base Voltage	5.0 V
I_C	Collector Current	1.0 A

PACKAGE

2N3253 TO-39

3

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	75		V	I_C = 10 μA, I_E = 0
BV_{EBO}	Emitter to Base Breakdown Voltage	5.0		V	I_E = 10 μA, I_C = 0
I_{EBO}	Emitter Cutoff Current		50	nA	V_{EB} = 4.0 V, I_C = 0
I_{CBO}	Collector Reverse Current (100° C)		500 75	nA μA	V_{CB} = 60 V, I_E = 0 V_{CB} = 60 V, I_E = 0
I_{CEX}	Collector Reverse Current		500	nA	V_{CE} = 60 V, V_{EB} = 4.0 V
I_{BL}	Base Current		500	nA	V_{CE} = 60 V, V_{OB} = 4.0 V
h_{FE}	DC Pulse Current Gain (Note 5)	25 25 20	 75 		I_C = 150 mA, V_{CE} = 1.0 V I_C = 375 mA, V_{CE} = 1.0 V I_C = 750 mA, V_{CE} = 5.0 V
$V_{CEO(sus)}$	Collector to Emitter Sustaining Voltage (Notes 4 & 5)	40		V	I_C = 10 mA, I_B = 0
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage (Pulsed) (Note 5)		0.35 0.6 1.2	V V V	I_C = 150 mA, I_B = 15 mA I_C = 500 mA, I_B = 50 mA I_C = 1.0 A, I_B = 100 mA
$V_{BE(sat)}$	Base to Emitter Saturation Voltage (Pulsed) (Note 5)	 0.7	1.0 1.3 1.8	V V V	I_C = 150 mA, I_B = 15 mA I_C = 500 mA, I_B = 50 mA I_C = 1.0 A, I_B = 100 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 T139.

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

SYMBOL	CHARACTERISTIC	MIN	MAX	UNITS	TEST CONDITIONS
C_{ob}	Output Capacitance		12	pF	V_{CB} = 20 V, I_E = 0
C_{ib}	Input Capacitance		80	pF	V_{EB} = 0.5 V, I_C = 0
h_{fe}	High Frequency Current Gain	1.75			I_C = 50 mA, V_{CE} = 10 V, f = 100 MHz
t_d	Turn On Delay Time (test circuit no. 3164)		15	ns	I_C = 500 mA, I_{B1} = 50 mA
t_r	Rise Time (test circuit no. 3164)		35	ns	I_C = 500 mA, I_{B1} = 50 mA
t_s	Storage Time (test circuit no. 3165)		40	ns	I_C = 500 mA, I_{B1} = I_{B2} = 50 mA
t_f	Fall Time (test circuit no. 3165)		30	ns	I_C = 500 mA, I_{B1} = I_{B2} = 50 mA
Q_T	Total Control Charge (test circuit no. 3163)		5.0	ncoul	I_C = 500 mA, I_B = 50 mA

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2N3700/2N3701 T-29-23

NPN Small Signal General Purpose Amplifiers

- V_{CEO} ... **80 V (Min) @ 30 mA**
- $V_{CE(sat)}$ ... **0.5 V (Max) @ 500 mA**

PACKAGE

2N3700	TO-18
2N3701	TO-18

ABSOLUTE MAXIMUM RATINGS (Note 1)

Temperatures

Storage Temperature	-65° C to 200° C
Operating Junction Temperature	200° C

Power Dissipation (Notes 2 & 3)

Total Dissipation at	
25° C Ambient Temperature	0.5 W
100° C Case Temperature	1.0 W
25° C Case Temperature	1.8 W

Voltages & Currents

V_{CEO}	Collector to Emitter Voltage (Note 4)	80 V
V_{CBO}	Collector to Base Voltage	140 V
V_{EBO}	Emitter to Base Voltage	7.0 V
I_C	Collector Current	1.0 A

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

SYMBOL	CHARACTERISTIC	3700 MIN	3700 MAX	3701 MIN	3701 MAX	UNITS	TEST CONDITIONS
BV_{CBO}	Collector to Base Breakdown Voltage	140		140		V	I_C = 100 μA, I_E = 0
BV_{EBO}	Emitter to Base Breakdown Voltage	7.0		7.0		V	I_E = 100 μA, I_C = 0
I_{EBO}	Emitter Cutoff Current		10		10	nA	V_{EB} = 5.0 V, I_C = 0
I_{CBO}	Collector Cutoff Current		10 10		10 10	nA μA	V_{CB} = 90 V, I_E = 0 V_{CB} = 90 V, I_E = 0, T_A = 150° C
h_{FE}	DC Pulse Current Gain (Note 5)	100 90 50 50 15 40	300	40 40 30 30 15	120 120 100 100		I_C = 150 mA, V_{CE} = 10 V I_C = 10 mA, V_{CE} = 10 V I_C = 0.1 mA, V_{CE} = 10 V I_C = 500 mA, V_{CE} = 10 V I_C = 1.0 mA, V_{CE} = 10 V I_C = 150 mA, V_{CE} = 10 V, T_A = -55° 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 200° C and junction-to-case thermal resistance of 97° C/W (derating factor of 10.3 mW/° C); junction-to-ambient thermal resistance of 350° C/W (derating factor of 2.85 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 T149.

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

SYMBOL	CHARACTERISTIC	3700 MIN	3700 MAX	3701 MIN	3701 MAX	UNITS	TEST CONDITIONS
$V_{CEO(sus)}$	Collector to Emitter Sustaining Voltage (Notes 4 & 5)	80		80		V	I_C = 30 mA, I_B = 0
$V_{CE(sat)}$	Pulsed Collector to Emitter Saturation Voltage (Note 5)		0.2 0.5		0.2 0.5	V V	I_C = 150 mA, I_B = 15 mA I_C = 500 mA, I_B = 50 mA
$V_{BE(sat)}$	Base to Emitter Saturation Voltage (Pulsed)		1.1		1.1	V	I_C = 150 mA, I_B = 15 mA
C_{ob}	Output Capacitance		12		12	pF	V_{CB} = 10 V, I_E = 0, f = 1.0 MHz
C_{ib}	Input Capacitance		60		60	pF	V_{EB} = 0.5 V, I_C = 0, f = 1.0 MHz
h_{fe}	High Frequency Current Gain	5.0	10	4.0	10		I_C = 50 mA, V_{CE} = 10 V, f = 20 MHz
h_{fe}	Small Signal Current Gain	80	400	30	200		I_C = 1.0 mA, V_{CE} = 5.0 V, f = 1.0 kHz
$r_b'C_c$	Collector to Base Time Constant	25	400	25	400	ps	I_C = 10 mA, V_{CB} = 10 V, f = 4.0 MHz
NF	Noise Figure		4.0			dB	I_C = 100 μA, V_{CE} = 10 V, f = 1.0 kHz, R_G = 1.0 kΩ

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2N3724/2N3725
2N4013/2N4014

NPN Small Signal High Current High Speed Switches

- V_{CEO} ... 30 V (Min) (2N3724, 2N4013), 50 V (Min) (2N3725, 2N4014)
- $V_{CE(sat)}$ ... 0.65 V (Max) @ 800 mA, 0.75 V (Max) @ 1.0 A (2N3724, 2N4013)
- h_{FE} ... 60-150 @ 1.0 A (2N3724, 2N4013)
- t_{on} ... 35 ns (Max), t_{off} ... 60 ns (Max) @ 500 mA

PACKAGE

2N3724	TO-5
2N3725	TO-5
2N4013	TO-18
2N4014	TO-18

ABSOLUTE MAXIMUM RATINGS (Note 1)

Temperatures

Storage Temperature	-65° C to 200° C
Operating Junction Temperature	200° C

Power Dissipation (Notes 2 & 3)

	4013/4	3724/5
Total Dissipation at		
25° C Ambient Temperature	0.36 W	0.8 W
25° C Case Temperature	1.2 W	3.5 W

Voltages & Currents		3724/4013	3725/4014
V_{CEO}	Collector to Emitter Voltage (Note 4)	30 V	50 V
V_{CBO}	Collector to Base Voltage	50 V	80 V
V_{CES}	Collector to Emitter Voltage	50 V	80 V
V_{EBO}	Emitter to Base Voltage	6.0 V	6.0 V
I_C	Collector Current (Note 5)	1.0 A	1.0 A
I_C	DC Collector Current	500 mA	500 mA

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

SYMBOL	CHARACTERISTIC	3724/4013 MIN	3724/4013 MAX	3725/4014 MIN	3725/4014 MAX	UNITS	TEST CONDITIONS
BV_{CES}	Collector to Emitter Breakdown Voltage	50		80		V	$I_C = 10\ \mu A$, $V_{BE} = 0$
BV_{CBO}	Collector to Base Breakdown Voltage	50		50		V	$I_C = 10\ \mu A$, $I_E = 0$
BV_{EBO}	Emitter to Base Breakdown Voltage	6.0		6.0		V	$I_E = 10\ \mu A$, $I_C = 0$

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 200° C and junction-to-case thermal resistance of 50 ° C/W (derating factor of 20 mW/° C) for 2N3724 and 2N3725; and 146° C/W (derating factor of 6.85 mW/° C) for the 2N4013 and 2N4014; junction-to-ambient thermal resistance of 219° C/W (derating factor of 4.56 mW/° C) for the 2N3724, 2N3725, and 485° C/W (derating factor of 2.06 mW/° C) for the 2N4013 and 2N4014.
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 T162 for 2N3724/5 and T139 for 2N4013/4

2N3724/2N3725
2N4013/2N4014

T-35-15

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

SYMBOL	CHARACTERISTIC	3724/4013 MIN	3724/4013 MAX	3725/4014 MIN	3725/4014 MAX	UNITS	TEST CONDITIONS
I_{CBO}	Collector Cutoff Current		1.7			μA	V_{CB} = 40 V, I_E = 0
					1.7	μA	V_{CB} = 60 V, I_E = 0
			120			μA	V_{CB} = 40 V, I_E = 0, T_A = 100° C
					120	μA	V_{CB} = 60 V, I_E = 0, T_A = 100° C
I_{CES}	Collector Reverse Current		10			μA	V_{CE} = 50 V, I_E = 0
					10	μA	V_{CE} = 80 V, I_E = 0
h_{FE}	DC Pulse Current Gain (Note 5)	60	150	60	150		I_C = 100 mA, V_{CE} = 1.0 V
		35		35			I_C = 500 mA, V_{CE} = 1.0 V
		40		40			I_C = 300 mA, V_{CE} = 1.0 V
		30		25			I_C = 1.0 A, V_{CE} = 5.0 V
		30		30			I_C = 10 mA, V_{CE} = 1.0 V
		25		20			I_C = 800 mA, V_{CE} = 2.0 V
		30		30			I_C = 100 mA, V_{CE} = 1.0 V, T_A = −55° C
		20		20			I_C = 500 mA, V_{CE} = 1.0 V, T_A = −55° C
$V_{CEO(sus)}$	Collector to Emitter Sustaining Voltage (Notes 4 & 5)	30		50		V	I_C = 10 mA, I_B = 0
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage (Note 5)		0.25		0.25	V	I_C = 10 mA, I_B = 1.0 mA
			0.2		0.26	V	I_C = 100 mA, I_B = 10 mA1
			0.32		0.4	V	I_C = 300 mA, I_B = 30 mA
			0.42		0.52	V	I_C = 500 mA, I_B = 50 mA
			0.65		0.8	V	I_C = 800 mA, I_B = 80 mA
			0.75		0.95	V	I_C = 1.0 A, I_B = 100 mA
$V_{BE(sat)}$	Base to Emitter Saturation Voltage (Note 5)		0.76		0.76	V	I_C = 10 mA, I_B = 1.0 mA
			0.86		0.86	V	I_C = 100 mA, I_B = 10 mA
			1.1		1.1	V	I_C = 300 mA, I_B = 30 mA
			1.5		1.5	V	I_C = 800 mA, I_B = 80 mA
			1.7		1.7	V	I_C = 1.0 A, I_B = 100 mA
		0.8	1.1	0.8	1.1	V	I_C = 500 mA, I_B = 50 mA
C_{ob}	Output Capacitance		12		10	pF	V_{CB} = 10 V, I_E = 0
C_{ib}	Input Capacitance		55		55	pF	V_{BE} = 0.5 V, I_C = 0
h_{fe}	High Frequency Current Gain	3.0		3.0			I_C = 50 mA, V_{CE} = 10 V, f = 100 MHz
t_{on}	Turn On Time (test circuit no. 265)		35		35	ns	I_C = 500 mA, I_{B1} = 50 mA
t_{off}	Turn Off Time (test circuit no. 265)		60		60	ns	I_C = 500 mA, I_{B1} = 50 mA, I_{B2} = −50 mA

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2N3903/FTSO3903 T-35-15
2N3904/FTSO3904

NPN Small Signal General Purpose Amplifiers & Switches

- V_{CEO} ... 40 V (Min)
- h_{FE} ... 100-300 @ 10 mA (2N/FTSO3904)
- NF ... 5.0 dB (Max) Wide Band (2N/FTSO3904)
- Complements ... 2N3905, 2N3906

PACKAGE

2N3903	TO-92
2N3904	TO-92
FTSO3903	TO-236AA/AB
FTSO3904	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	2N	FTSO
25° C Ambient Temperature	0.625 W	0.350 W*
70° C Ambient Temperature	0.400 W	
25° C Case Temperature	1.0 W	

Voltages & Currents

V_{CEO}	Collector to Emitter Voltage (Note 4)	40 V
V_{CBO}	Collector to Base Voltage	60 V
V_{EBO}	Emitter to Base Voltage	6.0 V
I_C	Collector Current	200 mA

ELECTRICAL CHARACTERISTICS (25° C Ambient Temperature unless otherwise noted) (Note 5)

SYMBOL	CHARACTERISTIC	3903 MIN	3903 MAX	3904 MIN	3904 MAX	UNITS	TEST CONDITIONS
BV_{CEO}	Collector to Emitter Breakdown Voltage (Note 4)	40		40		V	I_C = 1.0 mA, I_B = 0
BV_{CBO}	Collector to Base Breakdown Voltage	60		60		V	I_C = 10 μA, I_E = 0
BV_{EBO}	Emitter to Base Breakdown Voltage	6.0		6.0		V	I_E = 10 μA, I_C = 0
I_{CEX}	Collector Cutoff Current		50		50	nA	V_{CE} = 30 V, V_{EB} = 3.0 V
I_{BL}	Base Cutoff Current		50		50	nA	V_{CE} = 30 V, V_{EB} = 3.0 V
h_{FE}	DC Current Gain (Note 4)	20 35 50 30 15	 150 	40 70 100 60 30	 300 		I_C = 0.1 mA, V_{CE} = 1.0 V I_C = 1.0 mA, V_{CE} = 1.0 V I_C = 10 mA, V_{CE} = 1.0 V I_C = 50 mA, V_{CE} = 1.0 V I_C = 100 mA, V_{CE} = 1.0 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. Pulse conditions: length = 300 μs; duty cycle = 2%.
5. For product family characteristic curves, refer to Curve Set T144.

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

2N3903/FTSO3903
2N3904/FTSO3904 T-35-15

ELECTRICAL CHARACTERISTICS (25° C Ambient Temperature unless otherwise noted) (Note 5)

SYMBOL	CHARACTERISTIC	3903 MIN	3903 MAX	3904 MIN	3904 MAX	UNITS	TEST CONDITIONS
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage (Note 4)		0.2 0.3		0.2 0.3	V V	I_C = 10 mA, I_B = 1.0 mA I_C = 50 mA, I_B = 5.0 mA
$V_{BE(sat)}$	Base to Emitter Saturation Voltage (Note 4)	0.65	0.85 0.95	0.65	0.85 0.95	V V	I_C = 10 mA, I_B = 1.0 mA I_C = 50 mA, I_B = 5.0 mA
C_{ob}	Output Capacitance		4.0		4.0	pF	V_{CB} = 5.0 V, I_E = 0, f = 100 kHz
C_{ib}	Input Capacitance		8.0		8.0	pF	V_{BE} = 0.5 V, I_C = 0, f = 100 kHz
h_{fe}	Small Signal Current Gain	50	200	100	400		I_C = 1.0 mA, V_{CE} = 10 V, f = 1.0 kHz
h_{ie}	Input Impedance	1.0	8.0	1.0	10	kΩ	I_C = 1.0 mA, V_{CE} = 10 V, f = 1.0 kHz
h_{oe}	Output Admittance	1.0	40	1.0	40	μmho	I_C = 1.0 mA, V_{CE} = 10 V, f = 1.0 kHz
h_{re}	Voltage Feedback Ratio	0.1	5.0	0.5	8.0	$x10^{-4}$	I_C = 1.0 mA, V_{CE} = 10 V, f = 1.0 kHz
f_T	Current Gain Bandwidth Product	250		300		MHz	I_C = 10 mA, V_{CE} = 20 V, f = 100 MHz
t_d	Turn On Delay Time (test circuit no. 526)		35		35	ns	I_C = 10 mA, V_{CC} = 3.0 V, I_{B1} = 10 mA, $V_{BE(OFF)}$ = 0.5 V
t_r	Rise Time (test circuit no. 526)		35		35	ns	I_C = 10 mA, V_{CC} = 3.0 V, I_{B1} = 10 mA, $V_{BE(OFF)}$ = 0.5 V
t_s	Storage Time (test circuit no. 527)		175		200	ns	I_C = 10 mA, V_{CC} = 3.0 V, I_{B1} = I_{B2} = 1.0 mA
t_f	Fall Time (test circuit no. 527)		50		50	ns	I_C = 10 mA, V_{CC} = 3.0 V, I_{B1} = I_{B2} = 1.0 mA
NF	Noise Figure		6.0		5.0	dB	I_C = 100 μA, V_{CE} = 5.0 V, f = 10 Hz to 15.7 kHz, R_G = 1.0 kΩ

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2N3905/FTSO3905 T-37-15
2N3906/FTSO3906

PNP Small Signal General Purpose Amplifiers & Switches

- **V_{CEO} ... -40 V (Min)**
- **h_{FE} ... 100-300 @ 10 mA (2N3906)**
- **NF ... 4.0 dB (Max) Wide Band (2N3906)**
- **Complements ... 2N3903, 2N3904**

PACKAGE

2N3905	TO-92
2N3906	TO-92
FTSO3905	TO-236AA/AB
FTSO3906	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	2N	FTSO
25° C Ambient Temperature	0.625 W	0.350 W*
70° C Ambient Temperature	0.400 W	
25° C Case Temperature	1.0 W	

Voltages & Currents

V_{CEO}	Collector to Emitter Voltage (Note 4)	−40 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	3905 MIN	3905 MAX	3906 MIN	3906 MAX	UNITS	TEST CONDITIONS
BV_{CEO}	Collector to Emitter Breakdown Voltage (Note 5)	−40		−40		V	I_C = 1.0 mA, I_B = 0
BV_{CBO}	Collector to Base Breakdown Voltage	−40		−40		V	I_C = 10 μA, I_E = 0
BV_{EBO}	Emitter to Base Breakdown Voltage	−5.0		−5.0		V	I_E = 10 μA, I_C = 0
I_{CEX}	Collector Cutoff Current		50		50	nA	V_{CE} = −30 V, V_{EB} = −3.0 V
I_{BL}	Base Cutoff Current		50		50	nA	V_{CE} = −30 V, V_{EB} = −3.0 V
h_{FE}	DC Pulse Current Gain (Note 5)	30 40 50 30 15	 150 	60 80 100 60 30	 300 		I_C = 0.1 mA, V_{CE} = −1.0 V I_C = 1.0 mA, V_{CE} = −1.0 V I_C = 10 mA, V_{CE} = −1.0 V I_C = 50 mA, V_{CE} = −1.0 V I_C = 100 mA, V_{CE} = −1.0 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 ≤ 2%.
6. For product family characteristic curves, refer to Curve Set T215.

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

2N3905/FTSO3905
2N3906/FTSO3906 T-37-15

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

SYMBOL	CHARACTERISTIC	3905 MIN	3905 MAX	3906 MIN	3906 MAX	UNITS	TEST CONDITIONS
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage (Note 5)		−0.25 −0.4		−0.25 −0.4	V V	I_C = 10 mA, I_B = 1.0 mA I_C = 50 mA, I_B = 5.0 mA
$V_{BE(sat)}$	Base to Emitter Saturation Voltage (Note 5)	−0.65	−0.85 −0.95	−0.65	−0.85 −0.95	V V	I_C = 10 mA, I_B = 1.0 mA I_C = 50 mA, I_B = 5.0 mA
C_{ob}	Output Capacitance		4.5		4.5	pF	V_{CB} = −5.0 V, I_E = 0, f = 100 kHz
C_{ib}	Input Capacitance		10		10	pF	V_{EB} = −0.5 V, I_C = 0, f = 100 kHz
h_{fe}	Small Signal Current Gain	50	200	100	400		I_C = 1.0 mA, V_{CE} = −10 V, f = 1.0 kHz
h_{ie}	Input Impedance	0.5	8.0	2.0	10	kΩ	I_C = 1.0 mA, V_{CE} = −10 V, f = 1.0 kHz
h_{oe}	Output Admittance	1.0	40	3.0	60	μmho	I_C = 1.0 mA, V_{CE} = −10 V, f = 1.0 kHz
h_{re}	Voltage Feedback Ratio	0.1	5.0	0.1	10	$x10^{-4}$	I_C = 1.0 mA, V_{CE} = −10 V, f = 1.0 kHz
f_T	Current Gain Bandwidth Product	200		250		MHz	I_C = 10 mA, V_{CE} = −20 V, f = 100 MHz
t_d	Turn On Delay Time (test circuit no. 333)		35		35	ns	$I_C \cong$ 10 mA, $I_{B1} \cong$ 1.0 mA, V_{CC} = −3.0 V
t_r	Rise Time (test circuit no. 333)		35		35	ns	$I_C \cong$ 10 mA, $I_{B1} \cong$ 1.0 mA, V_{CC} = −3.0 V
t_s	Storage Time (test circuit no. 239)		200		225	ns	$I_C \cong$ 10 mA, $I_{B1} \cong$ 1.0 mA, $I_{B2} \cong$ −1.0 mA, V_{CC} = −3.0 V
t_f	Fall Time (test circuit no. 239)		60		75	ns	$I_C \cong$ 10 mA, $I_{B1} \cong$ 1.0 mA, $I_{B2} \cong$ −1.0 mA, V_{CC} = −3.0 V
NF	Wide Band Noise Figure		5.0		4.0	dB	I_C = 100 μA, V_{CE} = −5.0 V R_S = 1.0 kΩ, f = 10 Hz to 15.7 kHz