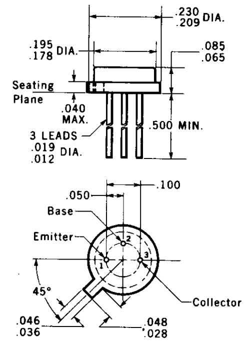
2N5200 • 2N5201

NPN RADIATION RESISTANT GENERAL PURPOSE AMPLIFIERS

DIFFUSED SILICON PLANAR* EPITAXIAL TRANSISTORS

- **GUARANTEED PERFORMANCE AFTER FAST NEUTRON DOSAGE (3×10^{14} AND 10^{15} nvt > 10 keV)**
- **HIGH GAIN . . . . . $h_{FE} = 23$ (MIN) AFTER 3×10^{14} nvt > 10 keV**
  . . . . . $h_{FE} = 10$ (MIN) AFTER 10^{15} nvt > 10 keV
- **LOW CAPACITY . . . $C_{eb} = 2.0$ pF (MAX)**
  . . . $C_{cb} = 2.5$ pF (MAX)
- **VOLTAGE . . . . . . $V_{CEO(sus)} = 20$ V (MIN)**

PHYSICAL DIMENSIONS
in accordance with
JEDEC (TO-46) outline



NOTES: All dimensions in inches
Leads are gold-plated kovar
Collector internally connected to case
Package weight is 0.36 gram

ABSOLUTE MAXIMUM RATINGS (Note 1)

Maximum Temperatures		
Storage Temperature		−55°C to +200°C
Operating Temperature		+200°C
Lead Temperature (soldering, 10 seconds time limit)		+300°C
Maximum Power Dissipation (Notes 2 and 3)		
Total Dissipation at 25°C Case Temperature		1.2 Watts
at 25°C Ambient Temperature		0.3 Watt
Maximum Voltages		
V_{CBO}	Collector to Base Voltage	20 Volts
V_{CES}	Collector to Emitter Voltage	20 Volts
V_{CEO}	Collector to Emitter Voltage (Note 4)	20 Volts
V_{EBO}	Emitter to Base Voltage	4.5 Volts

ELECTRICAL CHARACTERISTICS (25°C Free Air Temperature unless otherwise noted)

SYMBOL	CHARACTERISTICS		PRE-IRRADIATION MIN.	TYP.	MAX.	POST IRRADIATION (3×10^{14}nvt>10 keV) MIN.	TYP.	MAX.	POST IRRADIATION (10^{15}nvt>10 keV) MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS	
$V_{CEO(sus)}$	**Collector to Emitter Sustaining Voltage (Note 4)**		**20**			**20**			**20**			**Volts**	**$I_C = 2.0$ mA**	$I_B = 0$
h_{FE}	DC Pulse Current Gain	2N5200	45			15			5.0				$I_C = 30$ mA	$V_{CE} = 5.0$ V
	(Note 5)	2N5201	65			20			7.0				$I_C = 30$ mA	$V_{CE} = 5.0$ V
h_{FE}	**DC Pulse Current Gain**	2N5200	50		150	15			5.0				$I_C = 10$ mA	$V_{CE} = 5.0$ V
	(Note 5)	**2N5201**	**75**		**150**	**23**			**10**				**$I_C = 10$ mA**	$V_{CE} = 5.0$ V
h_{FE}	DC Current Gain	2N5200	40			10							$I_C = 1.0$ mA	$V_{CE} = 5.0$ V
		2N5201	70			15			5.0				$I_C = 1.0$ mA	$V_{CE} = 5.0$ V
h_{FE}	DC Current Gain	2N5200	40			10							$I_C = 500\ \mu A$	$V_{CE} = 5.0$ V
		2N5201	65			12							$I_C = 500\ \mu A$	$V_{CE} = 5.0$ V
h_{FE}	DC Current Gain	2N5200	40			5.0							$I_C = 100\ \mu A$	$V_{CE} = 5.0$ V
		2N5201	65			7.0							$I_C = 100\ \mu A$	$V_{CE} = 5.0$ V
$h_{FE}(-55°C)$	Pulsed DC Current Gain	2N5200	25			5.0							$I_C = 10$ mA	$V_{CE} = 5.0$ V
	(Note 5)	2N5201	40			10			5.0				$I_C = 10$ mA	$V_{CE} = 5.0$ V
h_{fe}	High Frequency Current Gain	2N5200	9.0			8.0			7.0				$I_C = 10$ mA	$V_{CE} = 5.0$ V
	(f = 100 MHz)	2N5201	11			10			7.0				$I_C = 10$ mA	$V_{CE} = 5.0$ V
C_{cb}	**Collector to Base Capacitance** (f = 1.0 MHz)				**2.5**			**2.5**			**2.5**	**pF**	$I_E = 0$	**$V_{CB} = 5.0$ V**
C_{eb}	**Emitter to Base Capacitance** (f = 1.0 MHz)				**2.0**			**2.0**			**2.0**	**pF**	$I_C = 0$	**$V_{EB} = 0.5$ V**

*Planar is a patented Fairchild process.

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 146°C/Watt (derating factor of 6.85 mW/°C); junction to ambient thermal resistance of 583°C/Watt (derating factor of 1.72 mW/°C).
(4) This rating refers to a high-current point where collector to emitter voltage is lowest.
(5) Pulse Conditions: length = 300 μs; duty cycle = 1%.

FAIRCHILD
SEMICONDUCTOR
A DIVISION OF FAIRCHILD CAMERA AND INSTRUMENT CORPORATION

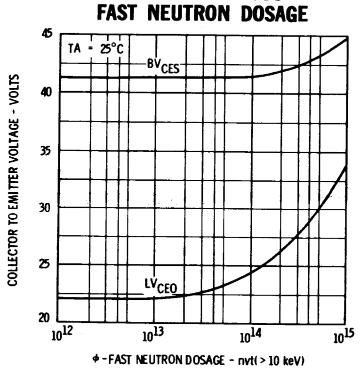
313 FAIRCHILD DRIVE, MOUNTAIN VIEW, CALIFORNIA, (415) 962-5011, TWX: 910-379-6435

ELECTRICAL CHARACTERISTICS (25°C Free Air Temperature unless otherwise noted)

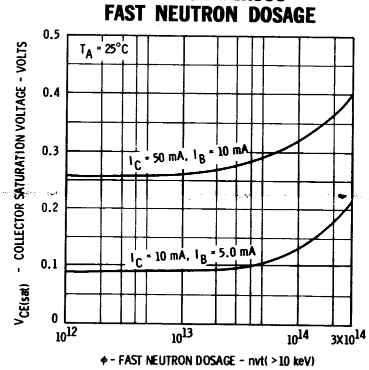
SYMBOL	CHARACTERISTICS	PRE-IRRADIATION MIN.	PRE-IRRADIATION TYP.	PRE-IRRADIATION MAX.	POST IRRADIATION ($3x10^{14}$nvt>10 keV) MIN.	TYP.	MAX.	POST IRRADIATION (10^{15}nvt>10 keV) MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS	
$V_{CE(sat)}$	Pulsed Collector Saturation Voltage (Note 5)			0.15			0.35			0.7	Volt	$I_C = 10$ mA	$I_B = 2.0$ mA
$V_{CE(sat)}$	Pulsed Collector Saturation Voltage (Note 5)			0.5			1.0				Volt	$I_C = 50$ mA	$I_B = 10$ mA
$V_{BE(sat)}$	Pulsed Base Saturation Voltage (Note 5)			0.96			1.0			1.0	Volt	$I_C = 10$ mA	$I_B = 1.0$ mA
$V_{BE(sat)}$	Pulsed Base Saturation Voltage (Note 5)			1.42			1.7				Volts	$I_C = 50$ mA	$I_B = 5.0$ mA
I_{CES}	Collector Reverse Current			10			50			100	nA	$V_{CE} = 10$ V	$V_{BE} = 0$
I_{CES}(125°C)	Collector Reverse Current			10			20			50	μA	$V_{CE} = 10$ V	$V_{BE} = 0$
BV_{CBO}	Collector to Base Breakdown Voltage	20			20			20			Volts	$I_C = 10$ μA	$I_E = 0$
BV_{CES}	Collector to Emitter Breakdown Voltage	20			20			20			Volts	$I_C = 10$ μA	$V_{BE} = 0$
BV_{EBO}	Emitter to Base Breakdown Voltage	4.5			4.5			4.5			Volts	$I_C = 0$	$I_E = 10$μA
$r_b'C_c$	Collector Base Time Constant (f = 80 MHz)		10								ps	$I_C = 10$ mA	$V_{CE} = 5.0$ V

TYPICAL POST-IRRADIATION ELECTRICAL CHARACTERISTICS

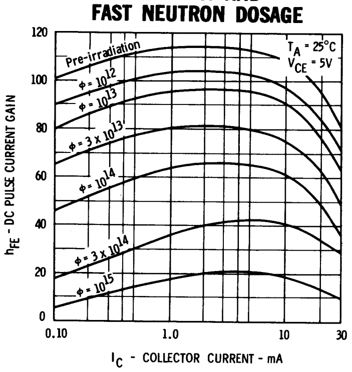
COLLECTOR TO EMITTER VOLTAGES VERSUS FAST NEUTRON DOSAGE



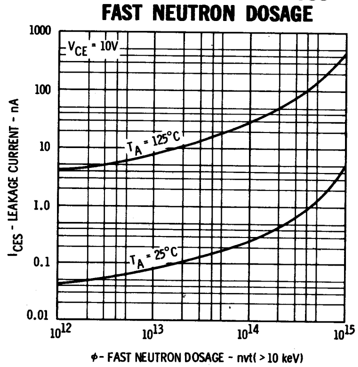
COLLECTOR SATURATION VOLTAGE VERSUS FAST NEUTRON DOSAGE



DC PULSE CURRENT VERSUS CURRENT AND FAST NEUTRON DOSAGE

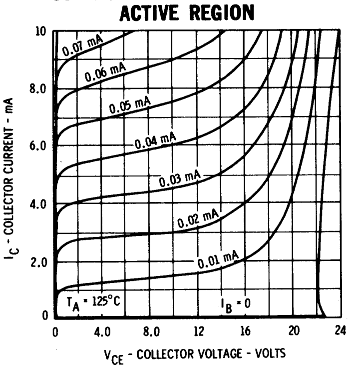


LEAKAGE CURRENT VERSUS FAST NEUTRON DOSAGE

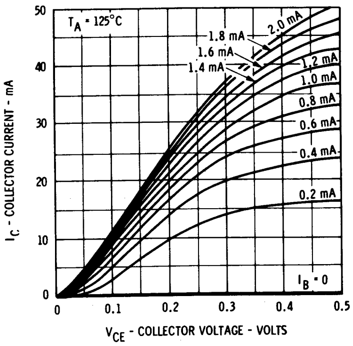


TYPICAL ELECTRICAL CHARACTERISTICS

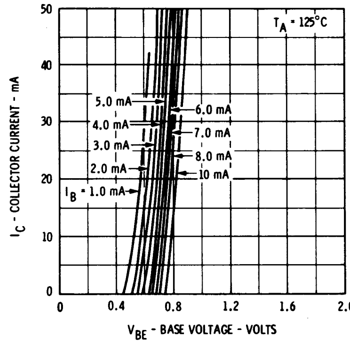
COLLECTOR CHARACTERISTICS* ACTIVE REGION



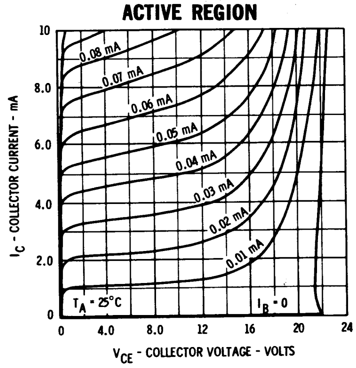
COLLECTOR CHARACTERISTICS* SATURATION REGION



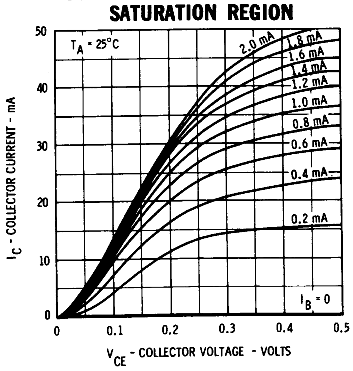
BASE CHARACTERISTICS*



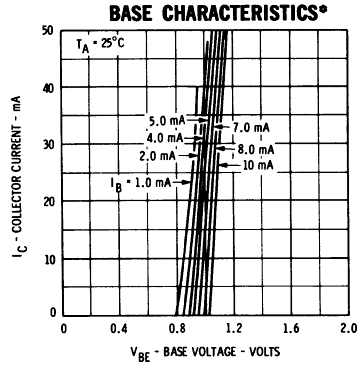
COLLECTOR CHARACTERISTICS* ACTIVE REGION



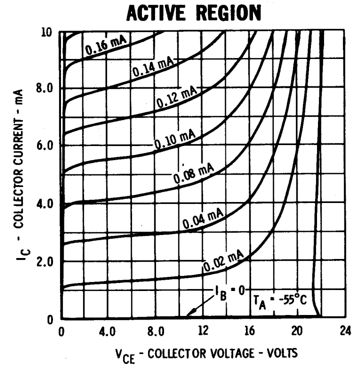
COLLECTOR CHARACTERISTICS* SATURATION REGION



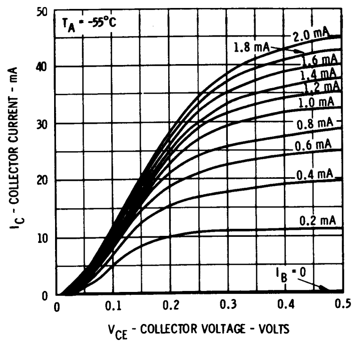
BASE CHARACTERISTICS*



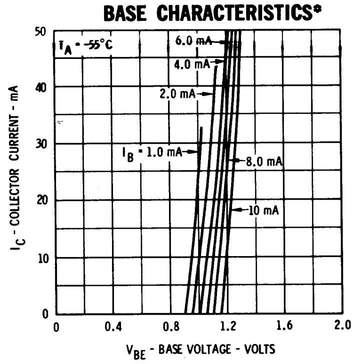
COLLECTOR CHARACTERISTICS* ACTIVE REGION



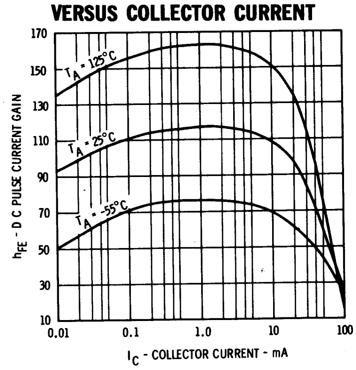
COLLECTOR CHARACTERISTICS* SATURATION REGION



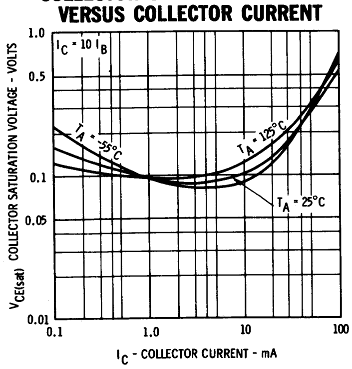
BASE CHARACTERISTICS*



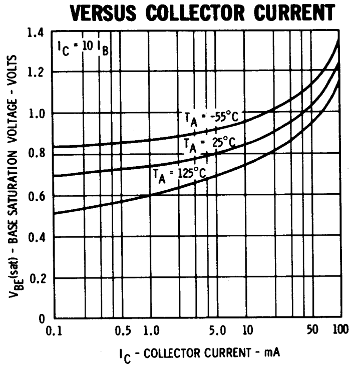
DC PULSE CURRENT GAIN VERSUS COLLECTOR CURRENT



COLLECTOR SATURATION VOLTAGE VERSUS COLLECTOR CURRENT

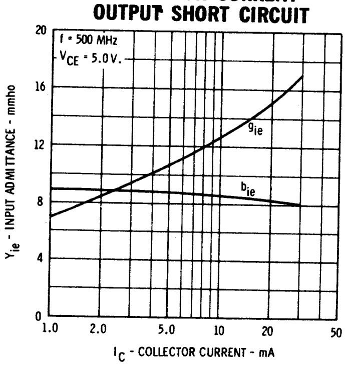


BASE SATURATION VOLTAGE VERSUS COLLECTOR CURRENT

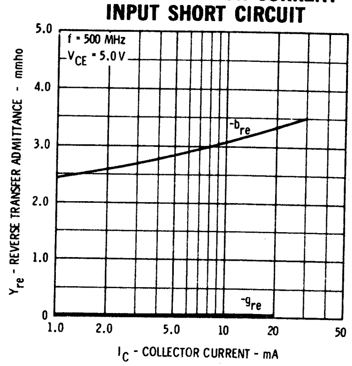


TYPICAL ELECTRICAL CHARACTERISTICS

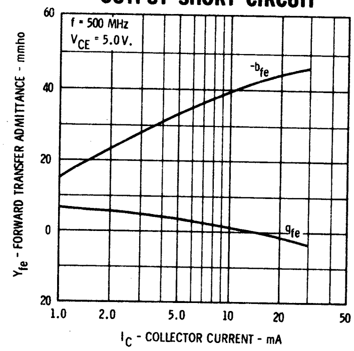
INPUT ADMITTANCE VERSUS COLLECTOR CURRENT OUTPUT SHORT CIRCUIT



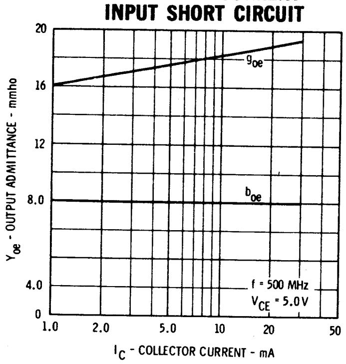
REVERSE TRANSFER ADMITTANCE VERSUS COLLECTOR CURRENT INPUT SHORT CIRCUIT



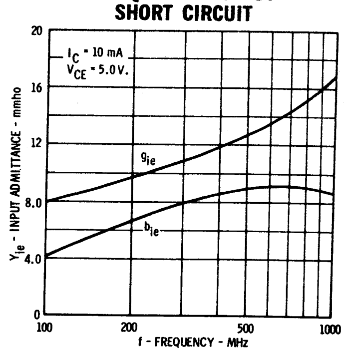
FOWARD TRANSFER ADMITTANCE VERSUS COLLECTOR CURRENT OUTPUT SHORT CIRCUIT



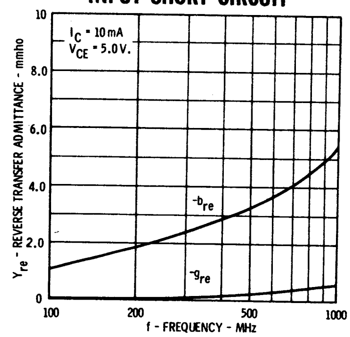
OUTPUT ADMITTANCE VERSUS COLLECTOR CURRENT INPUT SHORT CIRCUIT



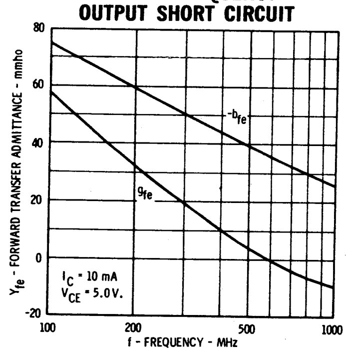
INPUT ADMITTANCE VERSUS FREQUENCY OUTPUT SHORT CIRCUIT



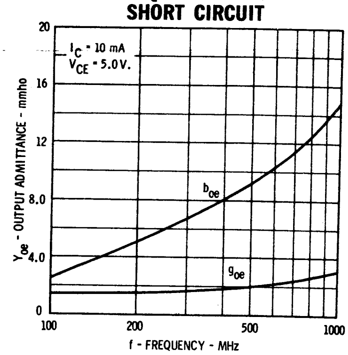
REVERSE TRANSFER ADMITTANCE VERSUS FREQUENCY INPUT SHORT CIRCUIT



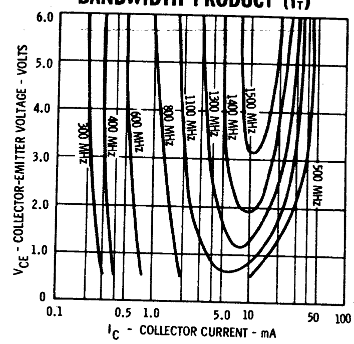
FORWARD TRANSFER ADMITTANCE VERSUS FREQUENCY OUTPUT SHORT CIRCUIT



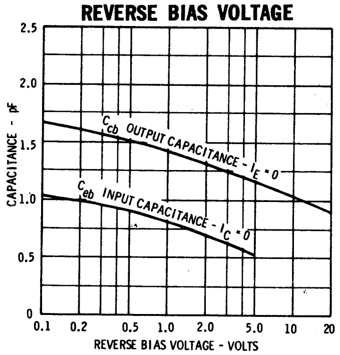
OUTPUT ADMITTANCE VERSUS FREQUENCY INPUT SHORT CIRCUIT



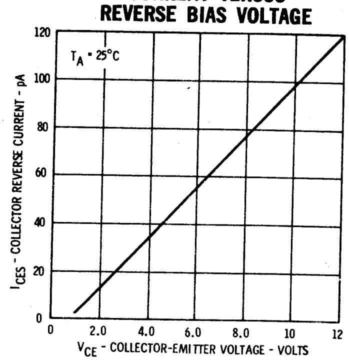
CONTOUR OF CONSTANT GAIN BANDWIDTH PRODUCT (f_T)



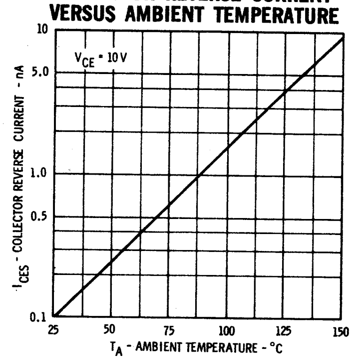
INPUT AND OUTPUT CAPACITANCE VERSUS REVERSE BIAS VOLTAGE



COLLECTOR-EMITTER REVERSE CURRENT VERSUS REVERSE BIAS VOLTAGE



COLLECTOR REVERSE CURRENT VERSUS AMBIENT TEMPERATURE



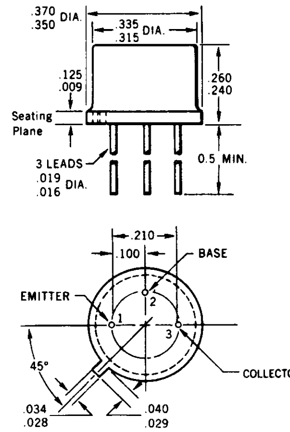
2N5236

RADIATION RESISTANT NPN CLASS-C RF AMPLIFIER

DIFFUSED SILICON PLANAR* EPITAXIAL TRANSISTOR

- **GUARANTEED PERFORMANCE AFTER FAST NEUTRON DOSAGE ($3x10^{14}$ nvt > 10 keV)**
- **HIGH GAIN . . . . $h_{FE} = 10$ (MIN), 17 (TYP) AT 50 mA**
- **HIGH POWER OUT . . . . 0.5 WATT (TYP) AT 250 MHz**
- **HIGH GAIN BANDWITH PRODUCT . . . $f_T = 400$ MHz (MIN) AT 50 mA**
- **LARGE SIGNAL CAPABILITY**

PHYSICAL DIMENSIONS
in accordance with
JEDEC (TO-39) outline



NOTES: All dimensions in inches
Leads are gold-plated KOVAR
Lead No. 3 internally connected to case
Package weight is 1.23 grams

ABSOLUTE MAXIMUM RATINGS (Note 1)

Maximum Temperatures

Storage Temperature	−65°C to +200°C
Operating Junction Temperature	200°C
Lead Temperature (soldering, 60 second time limit)	300°C

Maximum Power Dissipation (Notes 6 and 7)

Total Dissipation at 25°C Case Temperature	1.0 Watt
at 25°C Ambient Temperature	0.6 Watt

Maximum Voltages

V_{CBO}	Collector to Base Voltage	40 Volts
V_{CEO}	Collector to Emitter Voltage (Note 4)	20 Volts
V_{EBO}	Emitter to Base Voltage	4.0 Volts

ELECTRICAL CHARACTERISTICS (25°C Free Air Temperature unless otherwise noted)

SYMBOL	CHARACTERISTICS	PRE-IRRADIATION MIN.	PRE-IRRADIATION TYP.	PRE-IRRADIATION MAX.	POST-IRRADIATION ($3x10^{14}$nvt >10 keV) MIN.	POST-IRRADIATION TYP.	POST-IRRADIATION MAX.	UNITS	TEST CONDITIONS	
h_{FE}	**DC Pulse Current Gain** (Note 5)	30	50	120	10	17			**$I_C = 50$ mA**	**$V_{CE} = 5.0$ V**
$V_{CE(sat)}$	Pulsed Collector Saturation Voltage (Note 5)		0.12	0.2		0.3	0.7	Volts	$I_C = 50$ mA	$I_B = 5.0$ mA
I_{CES}	Collector Cutoff Current		0.03	1.0		0.7	20	nA	$V_{CE} = 20$ V	$V_{BE} = 0$
I_{CES}(125°C)	Collector Cutoff Current		0.03	1.0		0.7	20	μA	$V_{CE} = 20$ V	$V_{BE} = 0$
BV_{CBO}	Collector to Base Breakdown Voltage	40	50		40	50		Volts	$I_C = 100$ μA	$I_E = 0$
BV_{EBO}	Emitter to Base Breakdown Voltage	4.0	5.5		4.0	5.5		Volts	$I_C = 0$	$I_E = 100$ μA
$V_{CEO(sus)}$	Collector to Emitter Sustaining Voltage (Notes 4 and 5)	20	25		20	32		Volts	$I_C = 15$ mA	$I_B = 0$
h_{fe}	**High Frequency Current Gain (f = 100 MHz)**	5.0	7.5		**4.0**	**6.5**			**$I_C = 50$ mA**	**$V_{CE} = 10$ V**
C_{cb}	Collector to Base Capacitance (f = 1.0 MHz)		2.3	3.0			3.0	pF	$I_E = 0$	$V_{CB} = 10$ V
G_{PE}	Amplifier Power Gain (f = 250 MHz)	6.0	7.0		5.0	6.5		dB	$I_C = 0$	$V_{CE} = 20$ V (Zero Signal)
h_{FE}(−55°C)	DC Pulse Current Gain (Note 5)	15			5.0				$I_C = 50$ mA	$V_{CE} = 5.0$ V

*Planar is a patented Fairchild process.

NOTES:

(1) These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
(2) RF power-in = 100 mW (see test circuit).
(3) RF power-in = 100 mW. Conduction angle adjusted through R to obtain maximum efficiency with a minimum of 400 mW out. (See test circuit).
(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) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.
(7) These ratings give a maximum junction temperature of 200°C and junction to case thermal resistance of 175°C/Watt (derating factor of 5.71 mW/°C); junction to ambient thermal resistance of 292°C/Watt (derating factor of 3.42 mW/°C).

FAIRCHILD SEMICONDUCTOR
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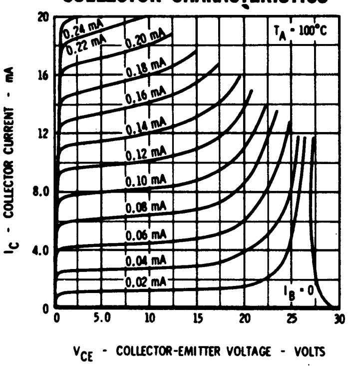
313 FAIRCHILD DRIVE, MOUNTAIN VIEW, CALIFORNIA, (415) 962-5011, TWX: 910-379-6435

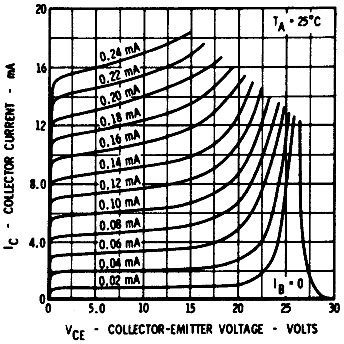
FAIRCHILD TRANSISTOR 2N5236

TYPICAL ELECTRICAL CHARACTERISTICS

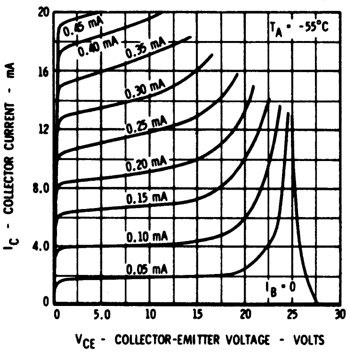
COLLECTOR CHARACTERISTICS



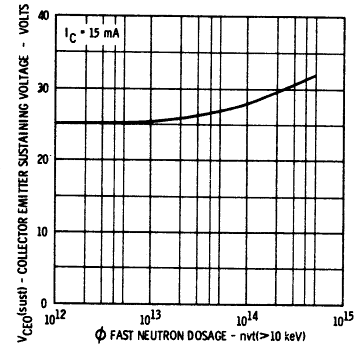
COLLECTOR CHARACTERISTICS



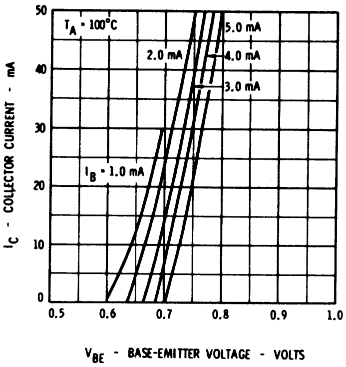
COLLECTOR CHARACTERISTICS



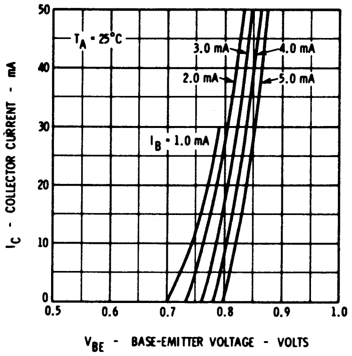
COLLECTOR EMITTER SUSTAINING VOLTAGE VERSUS FAST NEUTRON DOSAGE



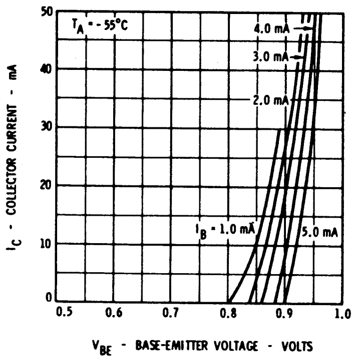
BASE CHARACTERISTICS



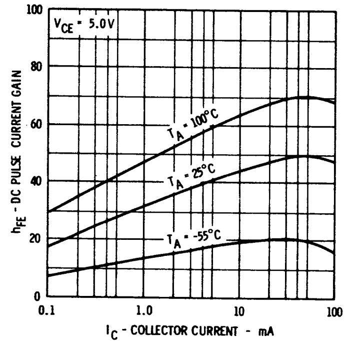
BASE CHARACTERISTICS



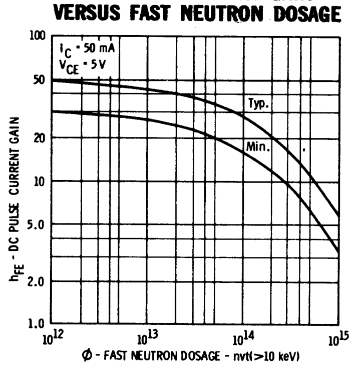
BASE CHARACTERISTICS



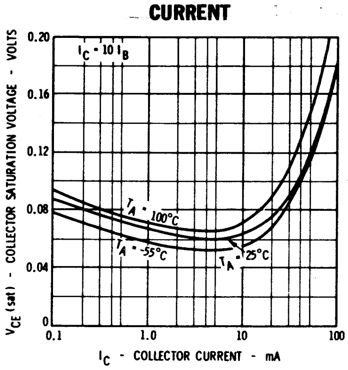
DC PULSE CURRENT GAIN VERSUS COLLECTOR CURRENT



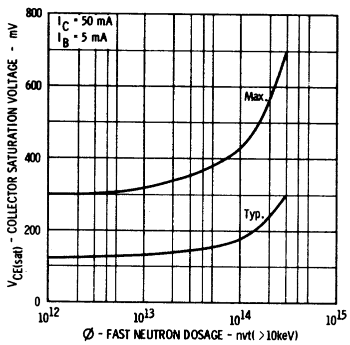
MINIMUM AND TYPICAL DC PULSE CURRENT GAIN VERSUS FAST NEUTRON DOSAGE



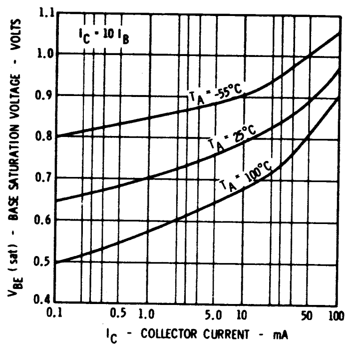
COLLECTOR SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



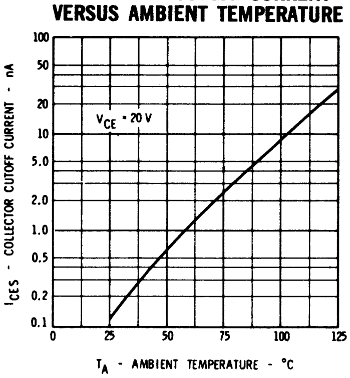
TYPICAL AND MAXIMUM COLLECTOR SATURATION VOLTAGE VERSUS FAST NEUTRON DOSAGE



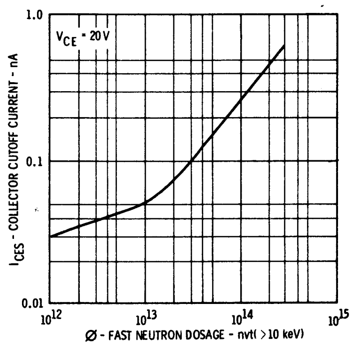
BASE SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



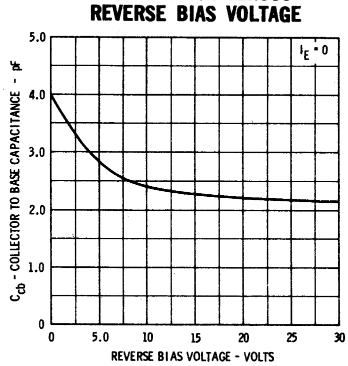
COLLECTOR CUTOFF CURRENT VERSUS AMBIENT TEMPERATURE



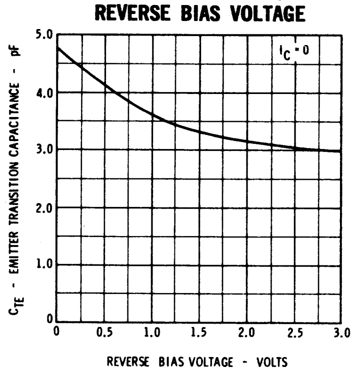
COLLECTOR CUTOFF CURRENT VERSUS FAST NEUTRON DOSAGE



COLLECTOR TO BASE CAPACITANCE VERSUS REVERSE BIAS VOLTAGE



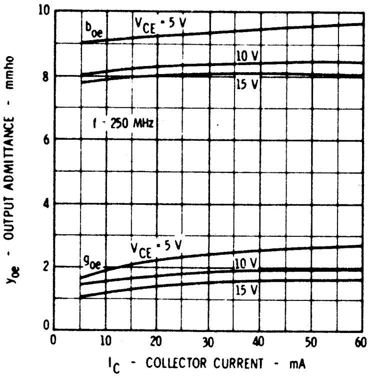
EMITTER TO BASE CAPACITANCE VERSUS REVERSE BIAS VOLTAGE



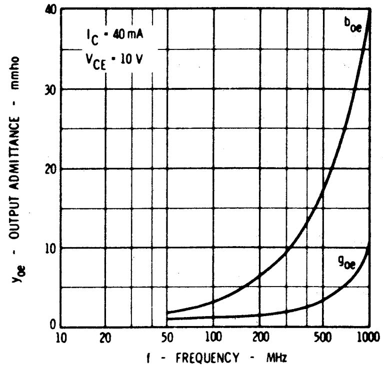
FAIRCHILD TRANSISTOR 2N5236

TYPICAL ELECTRICAL CHARACTERISTICS

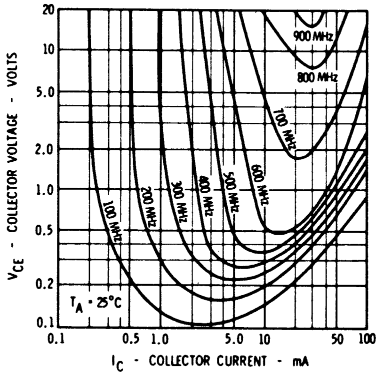
OUTPUT ADMITTANCE VERSUS COLLECTOR CURRENT-INPUT SHORT CIRCUIT



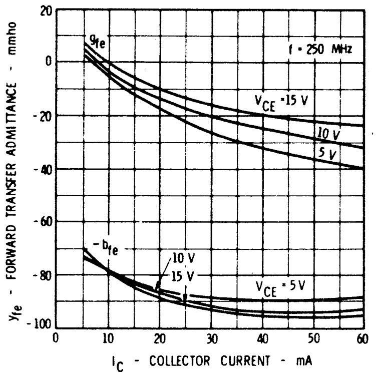
OUTPUT ADMITTANCE VERSUS FREQUENCY INPUT SHORT CIRCUIT



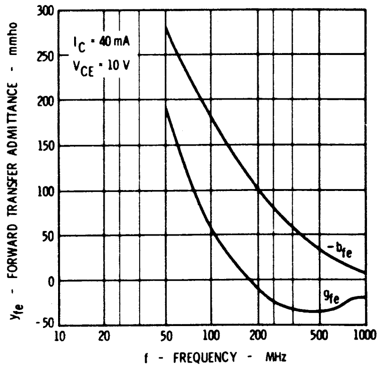
CONTOURS OF CONSTANT GAIN BANDWIDTH PRODUCT (f_T)



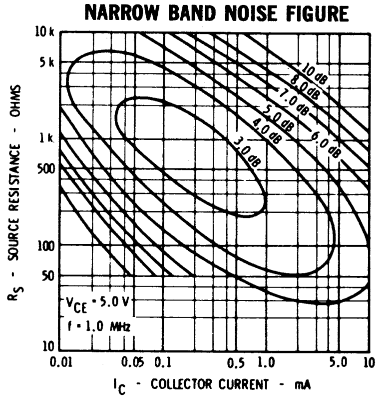
FORWARD TRANSFER ADMITTANCE VERSUS COLLECTOR CURRENT-OUTPUT SHORT CIRCUIT



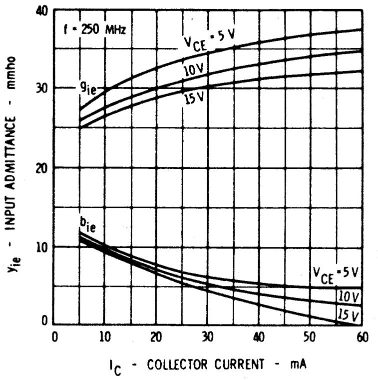
FORWARD TRANSFER ADMITTANCE VERSUS FREQUENCY — OUTPUT SHORT CIRCUIT



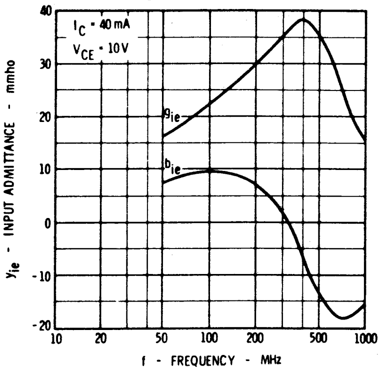
CONTOURS OF CONSTANT NARROW BAND NOISE FIGURE



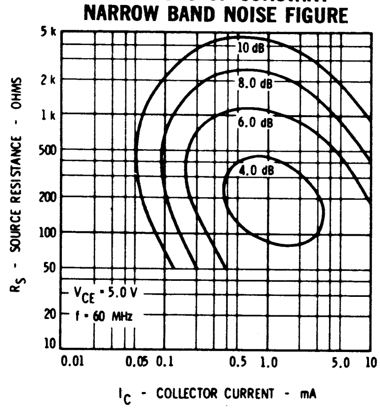
INPUT ADMITTANCE VERSUS COLLECTOR CURRENT-OUTPUT SHORT CIRCUIT



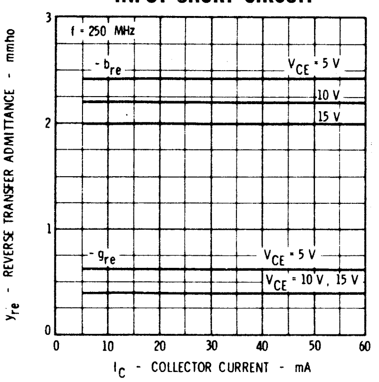
INPUT ADMITTANCE VERSUS FREQUENCY — OUTPUT SHORT CIRCUIT



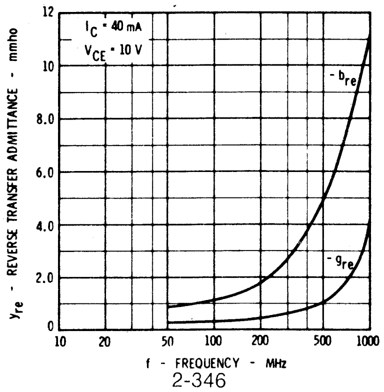
CONTOURS OF CONSTANT NARROW BAND NOISE FIGURE



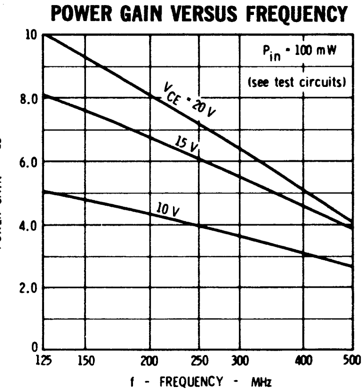
REVERSE TRANSFER ADMITTANCE VERSUS COLLECTOR CURRENT-INPUT SHORT CIRCUIT



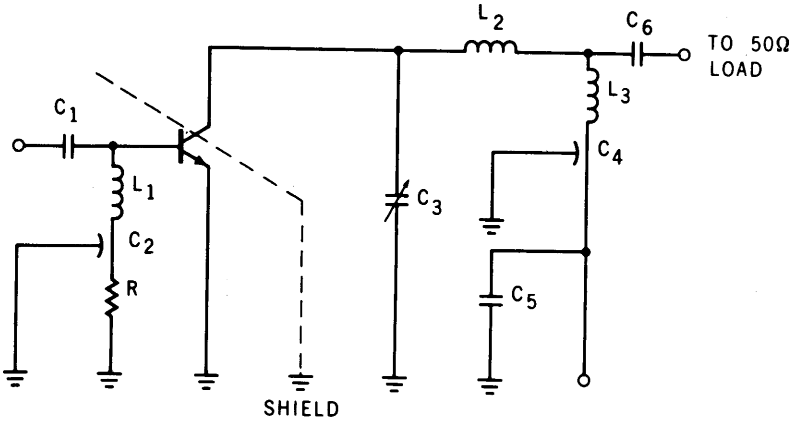
REVERSE TRANSFER ADMITTANCE VERSUS FREQUENCY — INPUT SHORT CIRCUIT



POWER GAIN VERSUS FREQUENCY



125 MHz POWER AMPLIFIER



$C_1 . C_2 . C_4 . C_6$ = 1000 pF BUTTON MICA

C_3 = 2 - 8 pF

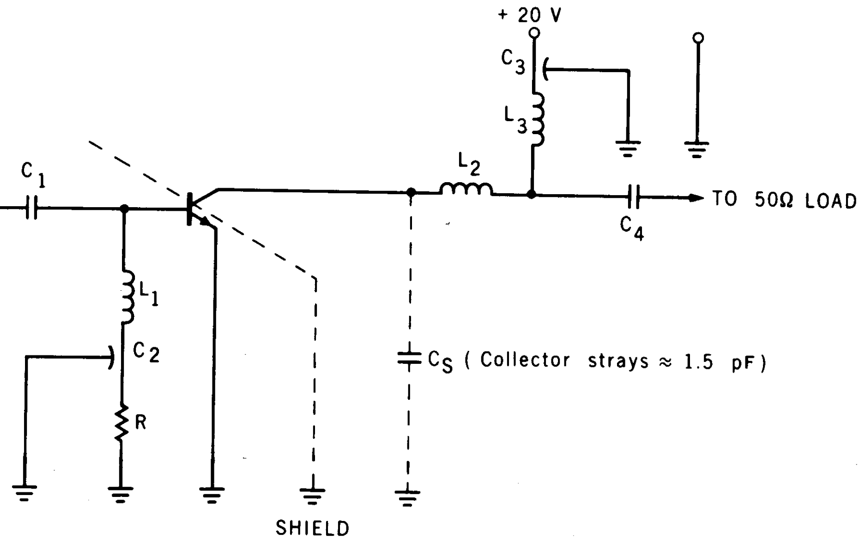
C_5 = 6 μF AT 50 V

L_1 L_3 = RFC fr > 125 MHz

L_2 = - 16 pF

R = 200 Ω

250 MHz POWER AMPLIFIER



C_1 = 120 pF

$C_2 . C_3 . C_4$ = 1000 pF BUTTON MICA

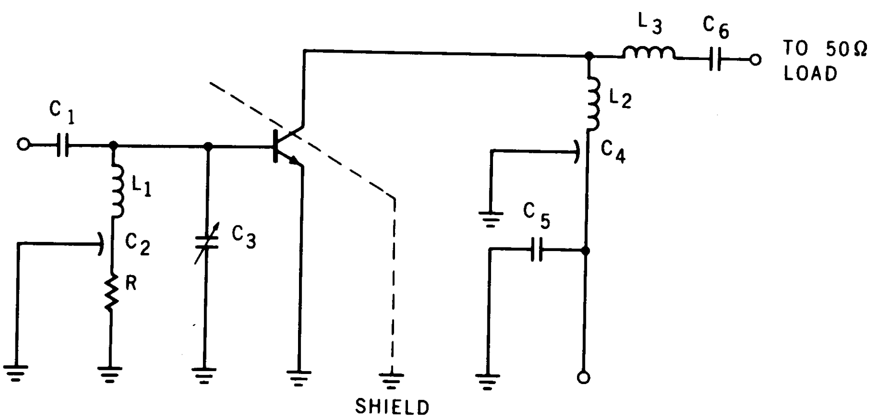
C_S (COLLECTOR STRAYS) ≈ 1.5 pF

$L_1 . L_3$ = .47 μH (RF CHOKE) fr > 250 MHz

L_2 = -5.5 pF

R = 200 Ω

500 MHz POWER AMPLIFER



C_1 = 10 pF

$C_2 . C_4 . C_6$ = 1000 pF BUTTON MICA

C_5 = 6 μF AT 50 V C_3 = 1 - 10 pF

L_1 = - 9 pF

L_2 = - 3.5 pF

L_3 = - 7.5 pF

R = 20 Ω

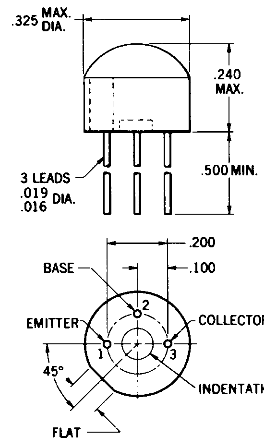
2N5242 • 2N5243

PNP HIGH-CURRENT SWITCHES

DIFFUSED SILICON PLANAR* EPITAXIAL TRANSISTORS

- **FAST SWITCHING** . . . . $t_{on} = 25$ **ns (TYP) AT 500 mA**
  $t_{off} = 65$ **ns (TYP) AT 500 mA**
- **LOW SATURATION VOLTAGE** . . . $V_{CE(sat)} = 0.75$ **V (MAX) AT 1.0 A**
- **HIGH FREQUENCY** . . . . $f_T = 250$ **MHz (TYP) AT 50 mA**
- **HIGH BETA** . . . . $h_{FE} = 25$ **- 100 AT 500 mA**
  $h_{FE} = 50$ **(TYP) AT 1.0 A**

PHYSICAL DIMENSIONS
in accordance with
JEDEC (TO-105) outline



NOTES All dimensions in inches
Leads are gold-plated nickel
Package is electrically Non-conductive material
Package weight is 0.66 gram

ABSOLUTE MAXIMUM RATINGS (Note 1)

Maximum Temperatures

Storage Temperature	−55°C to +125°C
Operating Junction Temperature	+125°C
Lead Temperature (soldering, 10 second time limit)	+260°C

Maximum Power Dissipation (Notes 2 and 3)

Total Dissipation at 25°C Case Temperature	4.0 Watts
at 25°C Ambient Temperature	0.5 Watt

Maximum Voltages and Current

		2N5242	2N5243
V_{CBO}	Collector to Base Voltage	−20 Volts	−30 Volts
V_{CES}	Collector to Emitter Voltage	−20 Volts	−30 Volts
V_{CEO}	Collector to Emitter Voltage (Note 4)	−20 Volts	−30 Volts
V_{EBO}	Emitter to Base Voltage	−5.0 Volts	−5.0 Volts
I_C	Collector Current	1.0 Amp	1.0 Amp

ELECTRICAL CHARACTERISTICS (25°C Free Air Temperature unless otherwise noted)

		2N5242			2N5243					
SYMBOL	CHARACTERISTICS	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS	
$V_{CEO(sus)}$	Collector to Emitter Sustaining Voltage (Notes 4 and 5)	−20			−30			Volts	$I_C = 10$ mA	$I_B = 0$
$V_{CE(sat)}$	Pulsed Collector Saturation Voltage (Note 5)		−0.22	−0.38		−0.24	−0.38	Volts	$I_C = 500$ mA	$I_B = 50$ mA
$V_{CE(sat)}$	**Pulsed Collector Saturation Voltage** (Note 5)		**−0.33**	**−0.75**		**−0.33**	**−0.75**	**Volts**	$I_C = 1.0$ A	$I_B = 100$ mA
h_{FE}	DC Pulse Current Gain (Note 5)	25	50	100	25	45	100		$I_C = 500$ mA	$V_{CE} = -1.0$ V
h_{FE}	DC Pulse Current Gain (Note 5)	**25**	**50**		25	45			$I_C = 1.0$ A	$V_{CE} = -5.0$ V
t_{on}	**Turn On Time** (Note 6)		**25**	**40**		**25**	**40**	**ns**	$I_C \approx 500$ mA	$I_{B1} \approx 50$ mA
t_{off}	**Turn Off Time** (Note 6)		**65**	**90**		**65**	**90**	**ns**	$I_C \approx 500$ mA	$I_{B1} \approx 50$ mA, $I_{B2} \approx -50$ mA
C_{cb}	Collector to Base Capacitance		20	35		18	35	pF	$I_E = 0$	$V_{CB} = -10$ V
h_{fe}	**High Frequency Current Gain (f = 100 MHz)**	**1.7**	**2.5**		1.7	2.3			$I_C = 50$ mA	$V_{CE} = -10$ V

*Planar is a patented Fairchild process.

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 125°C and junction to case thermal resistance of 25°C/Watt (derating factor of 40 mW/°C); junction to ambient thermal resistance of 200°C/Watt (derating factor of 5.0 mW/°C).
(4) This rating refers to a high current point where collector to emitter voltage is lowest.
(5) Pulse Conditions: length = 300 μs; duty cycle = 1%.
(6) See switching circuit for exact values of I_C, I_{B1} and I_{B2}.

FAIRCHILD SEMICONDUCTOR
A DIVISION OF FAIRCHILD CAMERA AND INSTRUMENT CORPORATION
313 FAIRCHILD DRIVE, MOUNTAIN VIEW, CALIFORNIA, (415) 962-5011, TWX: 910-379-6435

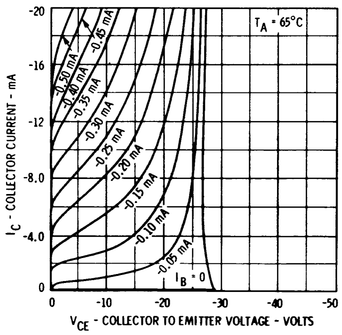
ELECTRICAL CHARACTERISTICS (25°C Free Air Temperature unless otherwise noted)

SYMBOL	CHARACTERISTICS	2N5242 MIN.	2N5242 TYP.	2N5242 MAX.	2N5243 MIN.	2N5243 TYP.	2N5243 MAX.	UNITS	TEST CONDITIONS	
BV_{CBO}	Collector to Base Breakdown Voltage	−20			−30			Volts	$I_C = 100\ \mu A$	$I_E = 0$
BV_{CES}	Collector to Emitter Breakdown Voltage	−20			−30			Volts	$I_C = 100\ \mu A$	$V_{BE} = 0$
BV_{EBO}	Emitter to Base Breakdown Voltage	−5.0			−5.0			Volts	$I_C = 0$	$I_E = 100\ \mu A$
h_{FE}	DC Pulse Current Gain (Note 5)	15	45		15	40			$I_C = 100$ mA	$V_{CE} = -1.0$ V
$V_{CE(sat)}$	Pulsed Collector Saturation Voltage (Note 5)		−0.1	−0.2		−0.12	−0.2	Volts	$I_C = 100$ mA	$I_B = 10$ mA
$V_{BE(sat)}$	Pulsed Base Saturation Voltage (Note 5)		−0.8	−1.0		−0.8	−1.0	Volts	$I_C = 100$ mA	$I_B = 10$ mA
$V_{BE(sat)}$	Pulsed Base Saturation Voltage (Note 5)	−0.9	−1.02	−1.4	−0.9	−1.02	−1.4	Volts	$I_C = 500$ mA	$I_B = 50$ mA
$V_{BE(sat)}$	Pulsed Base Saturation Voltage (Note 5)		−1.2	−1.75		−1.2	−1.75	Volts	$I_C = 1.0$ A	$I_B = 100$ mA
I_{CES}	Collector Reverse Current		6.0	100				nA	$V_{CE} = -10$ V	$V_{BE} = 0$
I_{CES}	Collector Reverse Current					8.0	100	nA	$V_{CE} = -20$ V	$V_{BE} = 0$
I_{CES}(65°C)	Collector Reverse Current		0.1	1.0				μA	$V_{CE} = -10$ V	$V_{BE} = 0$
I_{CES}(65°C)	Collector Reverse Current					0.15	1.0	μA	$V_{CE} = -20$ V	$V_{BE} = 0$
C_{eb}	Emitter to Base Capacitance		80	100		80	100	pF	$I_C = 0$	$V_{BE} = 0.5$ V

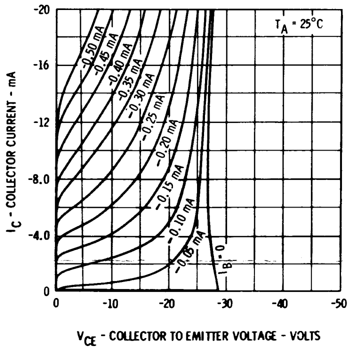
TYPICAL ELECTRICAL CHARACTERISTICS

2N5242

COLLECTOR CHARACTERISTICS*

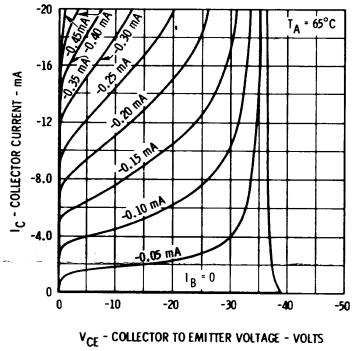


COLLECTOR CHARACTERISTICS*

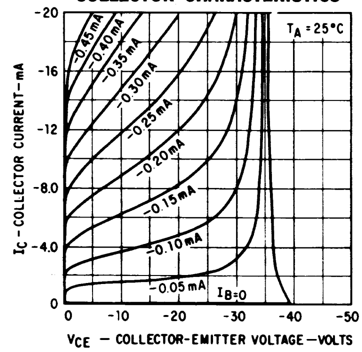


2N5243

COLLECTOR CHARACTERISTICS*

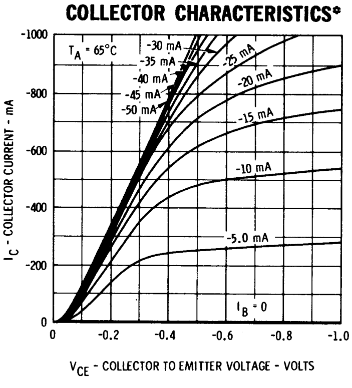


COLLECTOR CHARACTERISTICS*

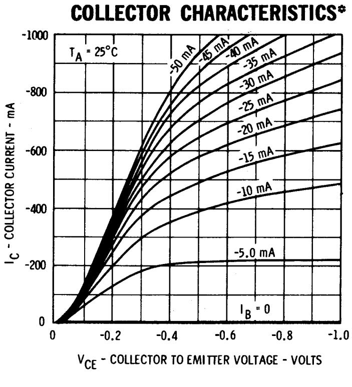


2N5242 • 2N5243

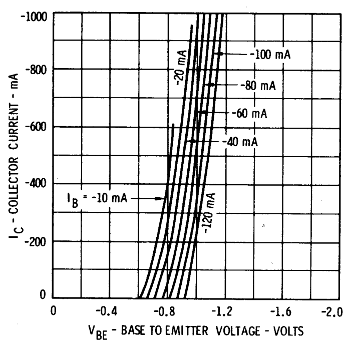
COLLECTOR CHARACTERISTICS*



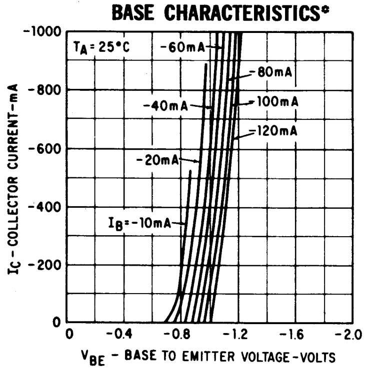
COLLECTOR CHARACTERISTICS*



BASE CHARACTERISTICS*



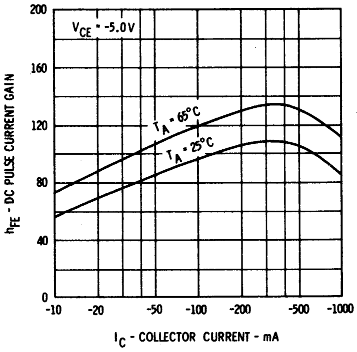
BASE CHARACTERISTICS*



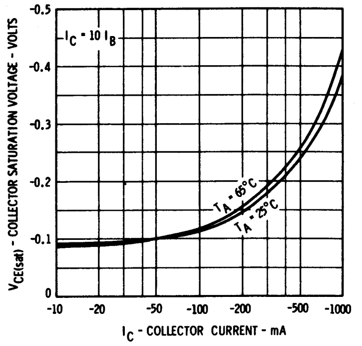
*Single family characteristics on Transistor Curve Tracer

TYPICAL ELECTRICAL CHARACTERISTICS

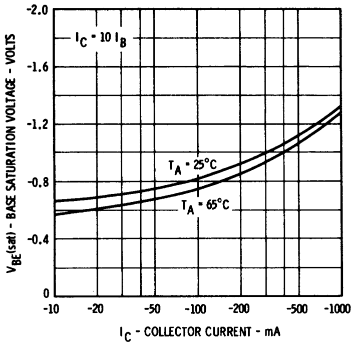
DC PULSE CURRENT GAIN VERSUS COLLECTOR CURRENT



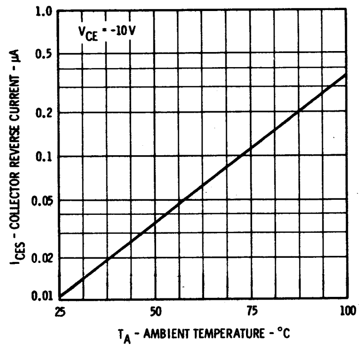
COLLECTOR SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



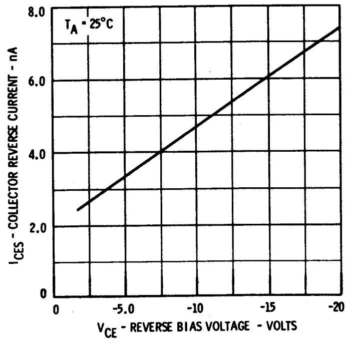
BASE SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



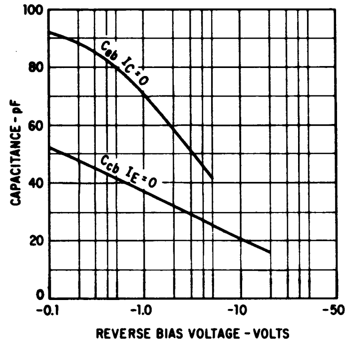
COLLECTOR REVERSE CURRENT VERSUS AMBIENT TEMPERATURE



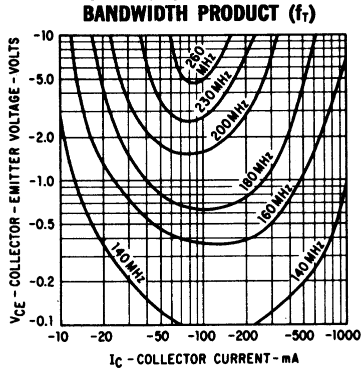
COLLECTOR REVERSE CURRENT VERSUS REVERSE BIAS VOLTAGE



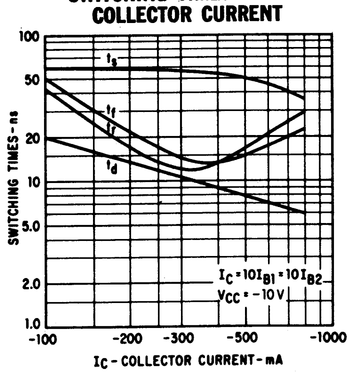
INPUT AND OUTPUT CAPACITANCE VERSUS REVERSE BIAS VOLTAGE



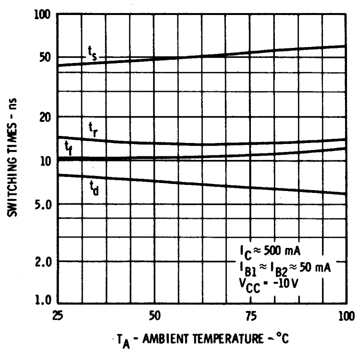
CONTOURS OF CONSTANT BANDWIDTH PRODUCT (f_T)



SWITCHING TIMES VERSUS COLLECTOR CURRENT

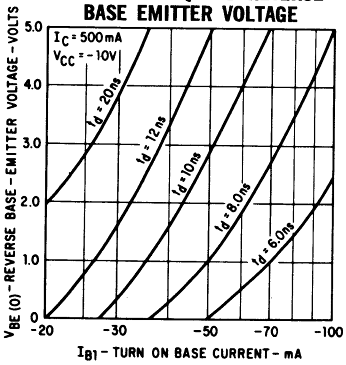


SWITCHING TIMES VERSUS AMBIENT TEMPERATURE

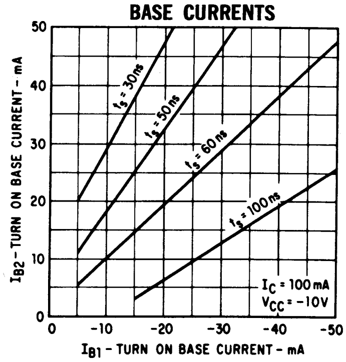


TYPICAL ELECTRICAL CHARACTERISTICS

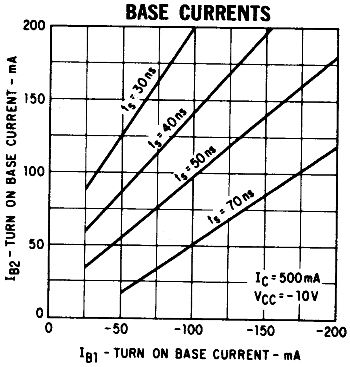
DELAY TIME VERSUS TURN ON BASE CURRENT AND REVERSE BASE EMITTER VOLTAGE



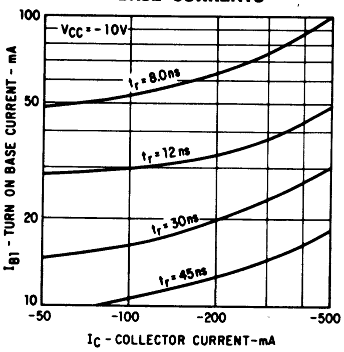
STORAGE TIME VERSUS TURN ON AND TURN OFF BASE CURRENTS



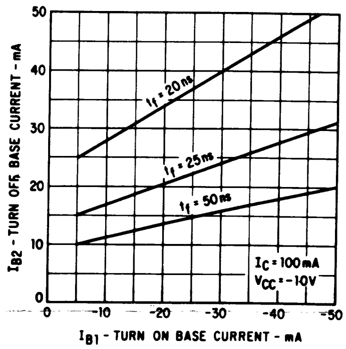
STORAGE TIME VERSUS TURN ON AND TURN OFF BASE CURRENTS



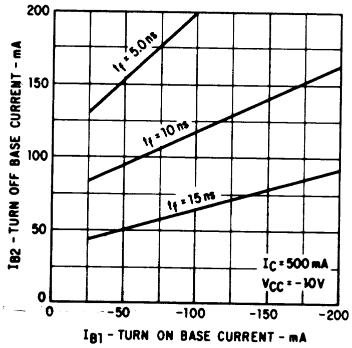
RISE TIME VERSUS COLLECTOR CURRENT AND TURN-ON BASE CURRENTS



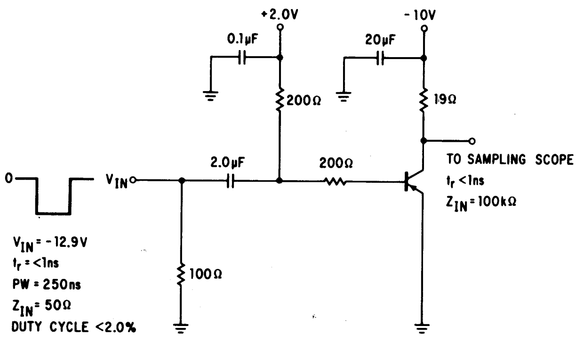
FALL TIME VERSUS TURN ON AND TURN OFF BASE CURRENTS



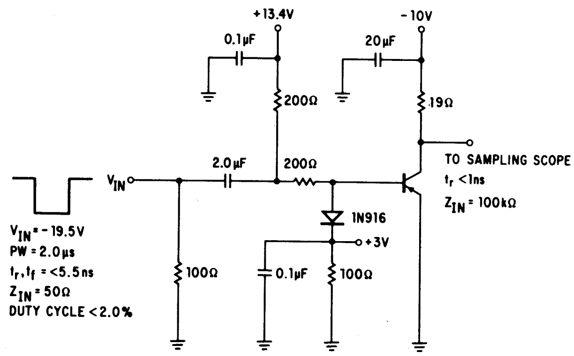
FALL TIME VERSUS TURN ON AND TURN OFF BASE CURRENTS



TURN-ON CIRCUIT



TURN-OFF CIRCUIT



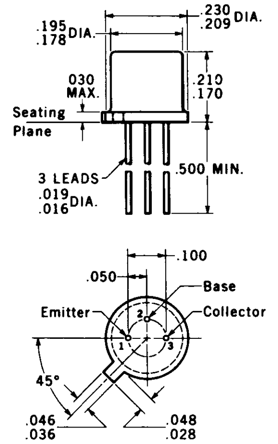
2N5244

PNP RADIATION RESISTANT HIGH-SPEED SWITCH AND RF AMPLIFIER

DIFFUSED SILICON PLANAR* EPITAXIAL TRANSISTOR

- **GUARANTEED PERFORMANCE AFTER NEUTRON IRRADIATION OF 3X10^{14} nvt > 10 keV**
- **HIGH FREQUENCY . . . . f_T = 400 MHz (MIN) AFTER RADIATION**
- **HIGH VOLTAGE . . . . . . LV_{CEO} = —40 V (MIN) AFTER RADIATION**
- **EXCELLENT BETA . . . . h_{FE} = 14 (MIN) AT I_C = 10 mA AFTER RADIATION**
- **FAST SWITCHING . . . . . t_{on} = 15 ns (TYP) AT $I_C \approx$ 50 mA AFTER RADIATION**
  t_{off} = 60 ns (TYP) AT $I_C \approx$ 50 mA AFTER RADIATION
- **LOW NOISE FIGURE . . . NF = 7.0 dB (TYP) AFTER RADIATION**

PHYSICAL DIMENSIONS
in accordance with
JEDEC (TO-18) outline



NOTES: All dimensions in inches
Leads are gold-plated kovar
Collector internally connected to case
Package weight is 0.44 gram

ABSOLUTE MAXIMUM RATINGS (Note 1)

Maximum Temperatures

Storage Temperature	−65°C to +200°C
Operating Junction Temperature	200°C
Lead Temperature (Soldering, 60 second time limit)	300°C

Maximum Power Dissipation (Notes 2 and 3)

Total Dissipation at 25°C Case Temperature	1.0 Watt
at 25°C Ambient Temperature	0.36 Watt

Maximum Voltages and Current

V_{CES}	Collector to Base Voltage	−40 Volts
V_{CBO}	Collector to Base Voltage	−40 Volts
V_{CEO}	Collector to Emitter Voltage (Note 4)	−40 Volts
V_{EBO}	Emitter to Base Voltage	−5.0 Volts
I_C	Collector Current	100 mA

ELECTRICAL CHARACTERISTICS (25°C Free Air Temperature unless otherwise noted)

SYMBOL	CHARACTERISTICS	PRE-IRRADIATION			POST-IRRADIATION (3x10^{14}nvt>10 keV)			UNITS	TEST CONDITIONS	
		MIN.	TYP.	MAX.	MIN.	TYP.	MAX.			
h_{FE}	DC Current Gain	140	160		4.0	6.0			I_C = 100 μA	V_{CE} = −5.0 V
h_{FE}	DC Current Gain	150	200		8.0	10.5			I_C = 1.0 mA	V_{CE} = −1.0 V
h_{FE}	**DC Pulse Current Gain** (Note 5)	150	200	300	**14**	17			**I_C = 10 mA**	V_{CE} = −1.0 V
h_{FE}	DC Pulse Current Gain (Note 5)	30	60		5.0	6.5			I_C = 50 mA	V_{CE} = −1.0 V
h_{FE}(−55°C)	DC Pulse Current Gain (Note 5)	70	100		7.0	8.0			I_C = 10 mA	V_{CE} = −1.0 V
h_{fe}	**High Frequency Current Gain (f = 100 MHz)**	4.5	6.0		**4.0**	**5.5**			**I_C = 10 mA**	**V_{CE} = −20 V**
$V_{CE(sat)}$	Pulsed Collector Saturation Voltage (Note 5)		−0.1	−0.14		−0.32	−0.55	Volts	I_C = 10 mA	I_B = 1.0 mA
$V_{CE(sat)}$	Pulsed Collector Saturation Voltage (Note 5)		−0.2	−0.3				Volts	I_C = 50 mA	I_B = 5.0 mA
$V_{CE(sat)}$	Pulsed Collector Saturation Voltage (Note 5)		−0.16	−0.28			−1.0	Volts	I_C = 50 mA	I_B = 10 mA
$V_{CE(sat)}$	Pulsed Collector Saturation Voltage (Note 5)		−0.125	−0.2				Volts	I_C = 50 mA	I_B = 16.67 mA
$V_{BE(sat)}$	Pulsed Base Saturation Voltage (Note 5)	−0.7	−0.77	−0.9	−0.7	−0.75	−0.9	Volts	I_C = 10 mA	I_B = 1.0 mA
$V_{BE(sat)}$	Pulsed Base Saturation Voltage (Note 5)		−0.88	−1.1		−0.84	−1.1	Volts	I_C = 50 mA	I_B = 5.0 mA
$V_{BE(sat)}$	Pulsed Base Saturation Voltage (Note 5)		−0.9	−1.2		−0.88	−1.2	Volts	I_C = 50 mA	I_B = 16.67 mA
C_{cb}	Collector to Base Capacitance (f = 1.0 MHz)		2.2	3.5		2.2	3.5	pF	I_E = 0	V_{CB} = −10 V
C_{eb}	Emitter to Base Capacitance (f = 1.0 MHz)		4.0	5.5		4.0	5.5	pF	I_C = 0	V_{EB} = −0.5 V
NF	**Noise Figure** (f = 100 MHz)		3.5			**7.0**		**dB**	**I_C = 1.0 mA**	**V_{CE} = −5.0 V**

*Planar is a patented Fairchild process.

FAIRCHILD
SEMICONDUCTOR
A DIVISION OF FAIRCHILD CAMERA AND INSTRUMENT CORPORATION

313 FAIRCHILD DRIVE, MOUNTAIN VIEW, CALIFORNIA, (415) 962-5011, TWX: 910-379-6435

FAIRCHILD TRANSISTOR 2N5244

ELECTRICAL CHARACTERISTICS (25°C Free Air Temperature unless otherwise noted)

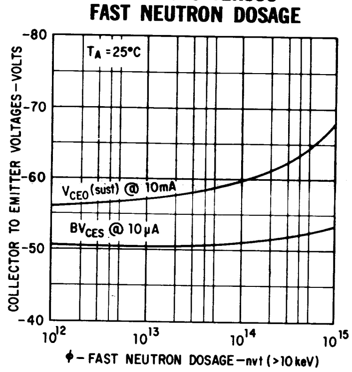
SYMBOL	CHARACTERISTICS	PRE-IRRADIATION MIN.	TYP.	MAX.	POST-IRRADIATION ($3x10^{14}$nvt>10 keV) MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS	
t_{on}	**Turn On Time** (Note 6)		15	40		**15**	**40**	**ns**	**$I_C \approx 50$ mA**	**$I_{B1} \approx 16.67$ mA**
t_{off}	**Turn Off Time** (Note 6)		160	200		**60**	**200**	**ns**	**$I_C \approx 50$ mA**	**$I_{B1} \approx 16.67$ mA** **$I_{B2} \approx -16.67$ mA**
I_{CES}	Collector Reverse Current		0.15	15		3.3	1000	nA	$V_{CE} = -30$ V	$V_{BE} = 0$
I_{CES}(125°C)	Collector Reverse Current			15				μA	$V_{CE} = -30$ V	$V_{BE} = 0$
BV_{CBO}	Collector to Base Breakdown Voltage	−40			−40			Volts	$I_C = 10$ μA	$I_E = 0$
BV_{CES}	Collector to Emitter Breakdown Voltage	−40	−56		−40	−58		Volts	$I_C = 10$ μA	$V_{BE} = 0$
BV_{EBO}	Emitter to Base Breakdown Voltage	−5.0	−5.4		−5.0	−5.4		Volts	$I_C = 0$	$I_E = 10$ μA
$V_{CEO(sus)}$	**Collector to Emitter Sustaining Voltage** (Notes 4 and 5)	−40	−56		**−40**	**−62**		**Volts**	**$I_C = 10$ mA (pulsed)**	**$I_B = 0$**

NOTES:

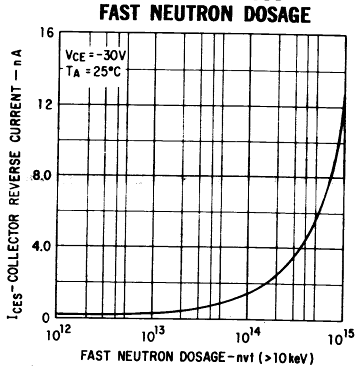
(1) These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
(2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.
(3) These ratings give a maximum junction temperature of 200°C and junction to case thermal resistance of 175°C/Watt (derating factor of 5.71 mW/°C); junction to ambient thermal resistance of 500°C/Watt (derating factor of 2.06 mW/°C).
(4) This rating refers to a high current point where collector to emitter voltage is lowest.
(5) Pulse Conditions: length = 300 μs; duty cycle = 1%.
(6) See switching circuit for exact values of I_C, I_{B1} and I_{B2}.

TYPICAL ELECTRICAL CHARACTERISTICS (POST IRRADIATION PERFORMANCE)

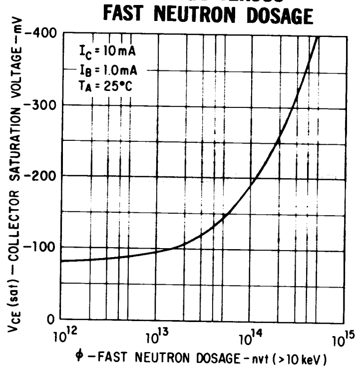
COLLECTOR TO EMITTER VOLTAGES VERSUS FAST NEUTRON DOSAGE



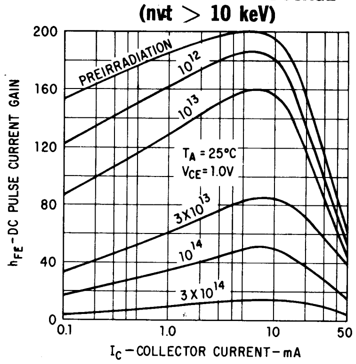
COLLECTOR TO EMITTER CURRENT VERSUS FAST NEUTRON DOSAGE



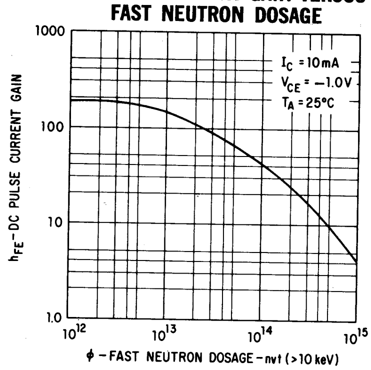
COLLECTOR SATURATION VOLTAGE VERSUS FAST NEUTRON DOSAGE



DC PULSE CURRENT GAIN VERSUS COLLECTOR CURRENT AND FAST NEUTRON DOSAGE (nvt > 10 keV)



DC PULSE CURRENT GAIN VERSUS FAST NEUTRON DOSAGE



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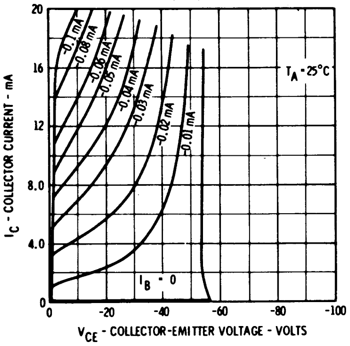
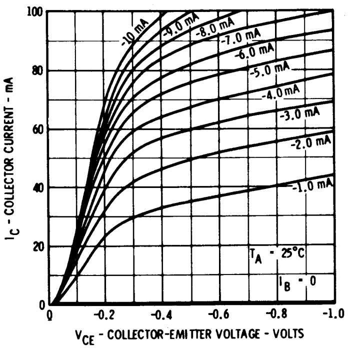
TYPICAL ELECTRICAL CHARACTERISTICS

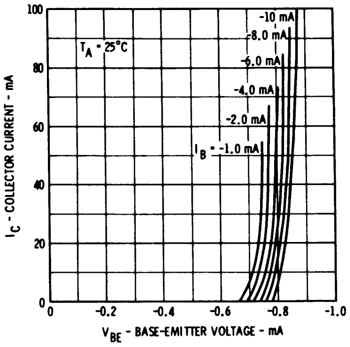
COLLECTOR CHARACTERISTICS ACTIVE REGION



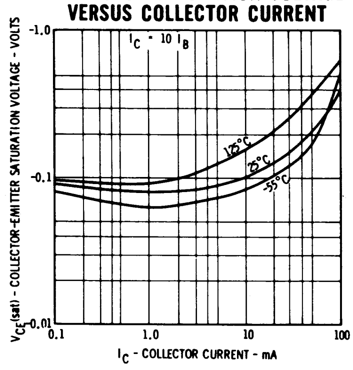
COLLECTOR CHARACTERISTICS SATURATION REGION



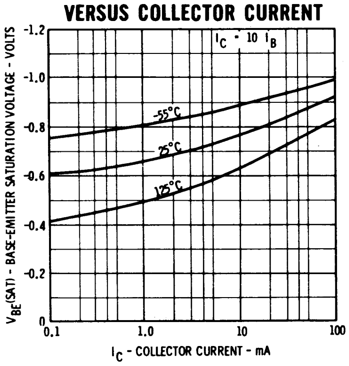
BASE CHARACTERISTICS



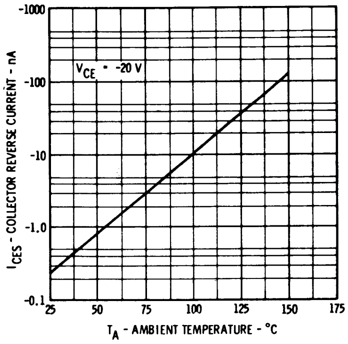
COLLECTOR SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



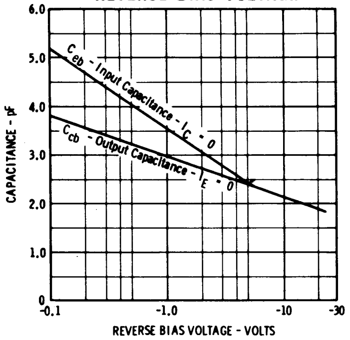
BASE SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



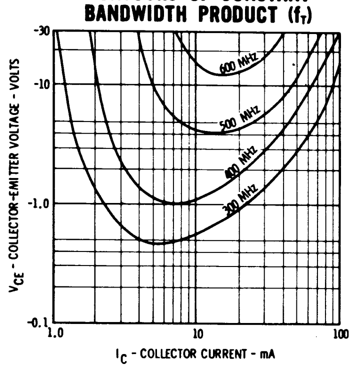
COLLECTOR-BASE DIODE REVERSE CURRENT VERSUS TEMPERATURE



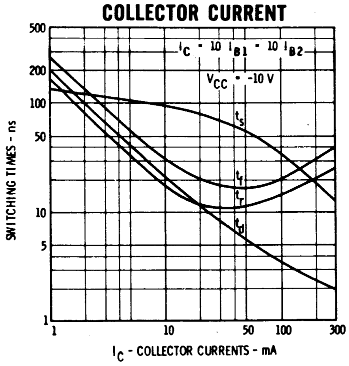
INPUT AND OUTPUT CAPACITANCE VERSUS REVERSE BIAS VOLTAGE



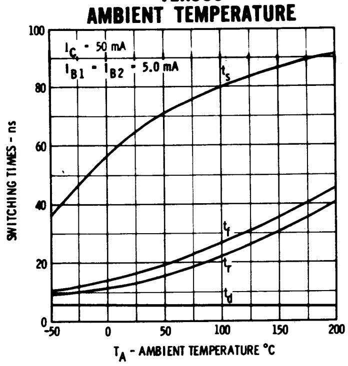
CONTOURS OF CONSTANT BANDWIDTH PRODUCT (f_T)



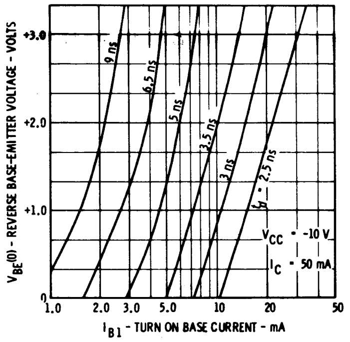
SWITCHING TIMES VERSUS COLLECTOR CURRENT



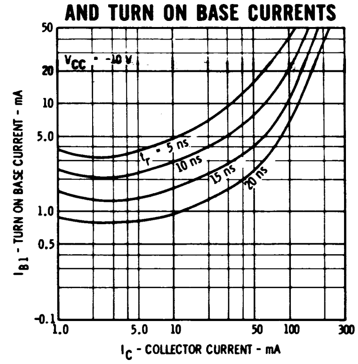
SWITCHING TIMES VERSUS AMBIENT TEMPERATURE



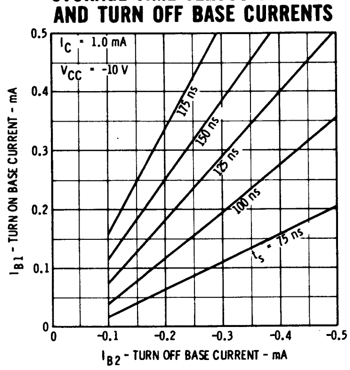
DELAY TIME VERSUS TURN ON BASE CURRENT AND REVERSE BASE EMITTER VOLTAGE



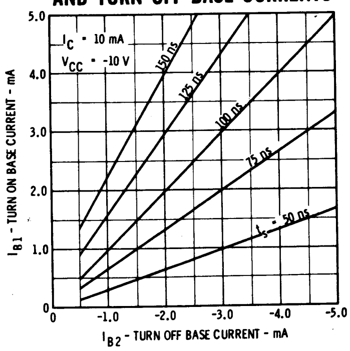
RISE TIME VERSUS COLLECTOR AND TURN ON BASE CURRENTS



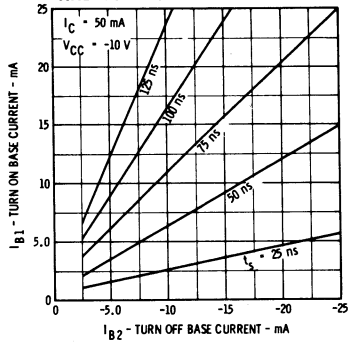
STORAGE TIME VERSUS TURN ON AND TURN OFF BASE CURRENTS



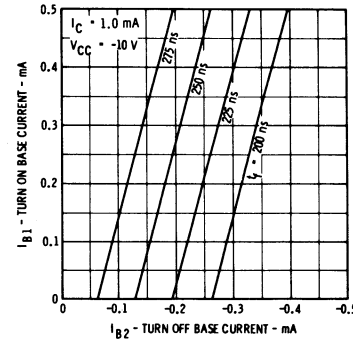
STORAGE TIME VERSUS TURN ON AND TURN OFF BASE CURRENTS



STORAGE TIME VERSUS TURN ON AND TURN OFF BASE CURRENTS



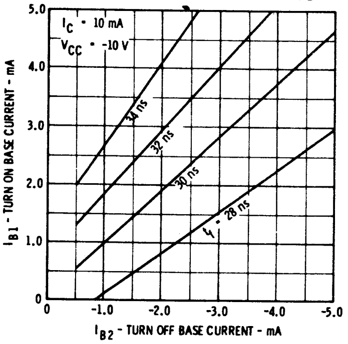
FALL TIME VERSUS TURN ON AND TURN OFF BASE CURRENTS



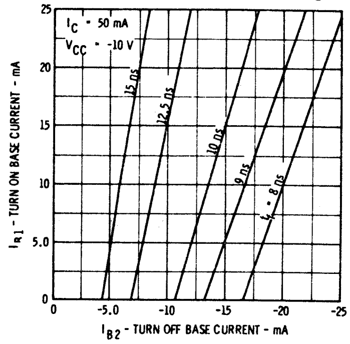
FAIRCHILD TRANSISTOR 2N5244

TYPICAL ELECTRICAL CHARACTERISTICS

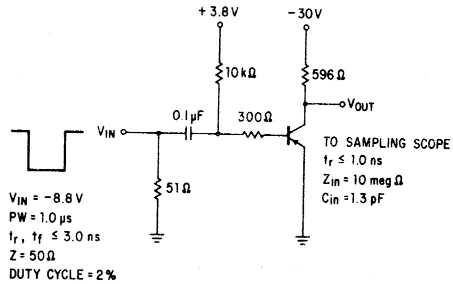
FALL TIME VERSUS TURN ON AND TURN OFF BASE CURRENTS



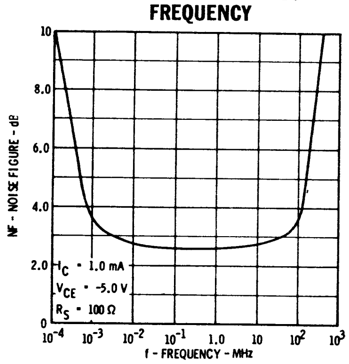
FALL TIME VERSUS TURN ON AND TURN OFF BASE CURRENTS



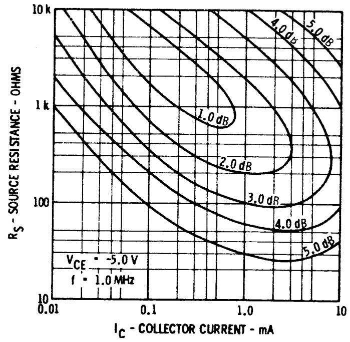
SWITCHING TIME TEST CIRCUIT



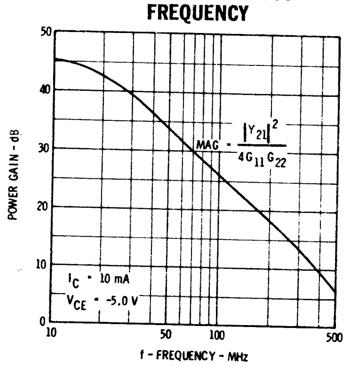
NOISE FIGURE VERSUS FREQUENCY



NOISE FIGURE VERSUS SOURCE RESISTANCE AND COLLECTOR CURRENT

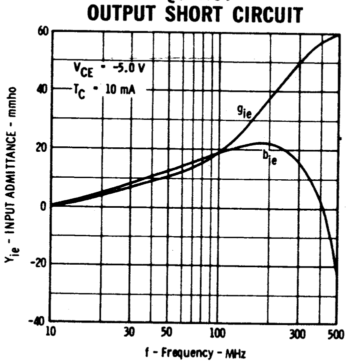


POWER GAIN VERSUS FREQUENCY

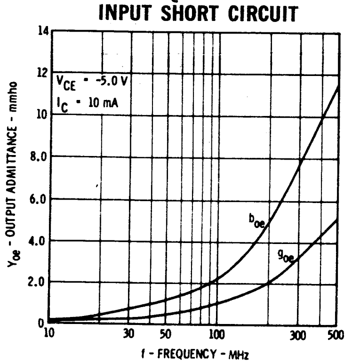


TYPICAL COMMON EMITTER "Y" PARAMETERS

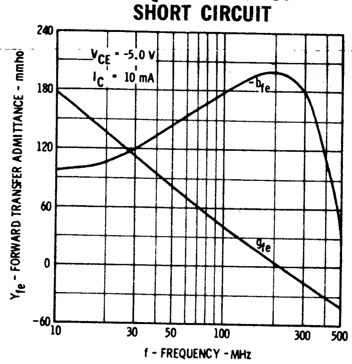
INPUT ADMITTANCE VERSUS FREQUENCY — OUTPUT SHORT CIRCUIT



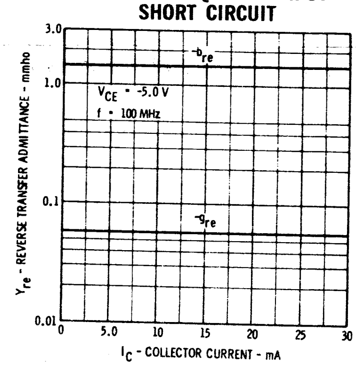
OUTPUT ADMITTANCE VERSUS FREQUENCY — INPUT SHORT CIRCUIT



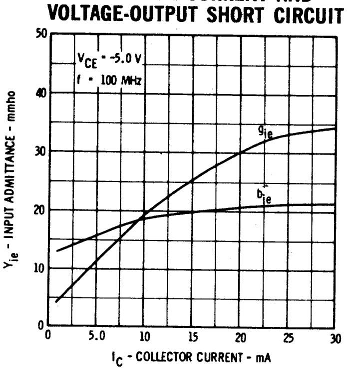
FORWARD TRANSFER ADMITTANCE VERSUS FREQUENCY-OUTPUT SHORT CIRCUIT



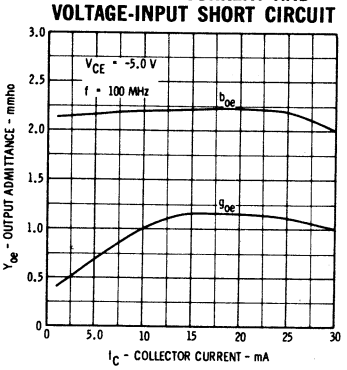
REVERSE TRANSFER ADMITTANCE VERSUS FREQUENCY-INPUT SHORT CIRCUIT



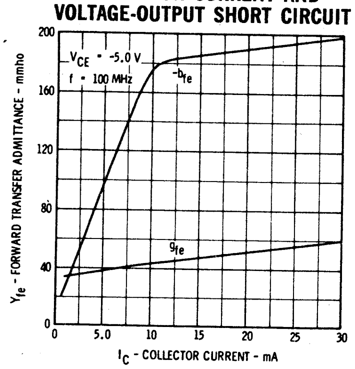
INPUT ADMITTANCE VERSUS COLLECTOR CURRENT AND VOLTAGE-OUTPUT SHORT CIRCUIT



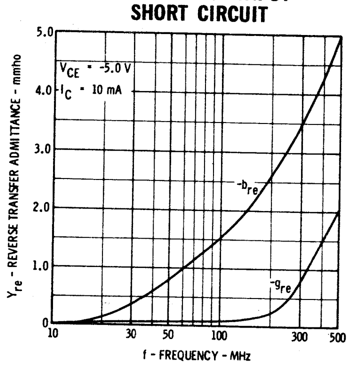
OUTPUT ADMITTANCE VERSUS COLLECTOR CURRENT AND VOLTAGE-INPUT SHORT CIRCUIT



FORWARD TRANSFER ADMITTANCE VERSUS COLLECTOR CURRENT AND VOLTAGE-OUTPUT SHORT CIRCUIT



REVERSE TRANSFER ADMITTANCE VERSUS COLLECTOR CURRENT AND VOLTAGE-INPUT SHORT CIRCUIT



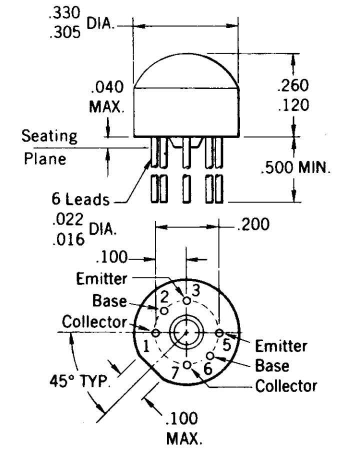
2N5254 • 2N5255 • 2N5256

PNP LOW-LEVEL, LOW-NOISE DIFFERENTIAL AMPLIFIERS

DIFFUSED SILICON PLANAR* EPITAXIAL TRANSISTORS

- **EXCELLENT V_{BE} MATCH . . . . . 3.0 mV (MAX.) AT 100 μA**
- **TIGHT BETA MATCH . . . . . . 10% (MAX.) AT 100 μA**
- **EXCELLENT V_{BE} TRACKING . . . 10 μV/°C (MAX.) AT 100 μA FROM —40°C TO +85°C**
- **HIGH BETA . . . . 175 (MIN.) AT 1.0 mA; 150 (MIN.) AT 100μA**
- **LOW NOISE FIGURE . . . . . . 2.5 dB (MAX.) AT 1.0 kHz**
- **LOW COST EPOXY PACKAGE**

PHYSICAL DIMENSIONS



NOTES: All dimensions in inches
Package weight is 0.77 gram

ABSOLUTE MAXIMUM RATINGS (Note 1)

Maximum Temperatures			
Storage Temperature			−55°C to +125°C
Operating Junction Temperature			+125°C
Lead Temperature (Soldering, 10 second time limit)			+260°C
Maximum Power Dissipation (Notes 2 and 3)		One Side	Both Sides
Total Dissipation at 25°C Case Temperature		0.8 Watt	1.4 Watts
at 25°C Ambient Temperature		0.35 Watt	0.43 Watt
Maximum Voltages and Current for Each Transistor			
V_{CBO}	Collector to Base Voltage		−40 Volts
V_{CEO}	Collector to Emitter Voltage (Note 4)		−40 Volts
V_{EBO}	Emitter to Base Voltage		−5.0 Volts
I_C	Collector Current		50 mA

MATCHING AND ELECTRICAL CHARACTERISTICS (25°C Free Air Temperature unless otherwise noted)

SYMBOL	CHARACTERISTIC	2N5255 MIN.	TYP.	MAX.	2N5256 MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS	
h_{FE1}/h_{FE2}	**DC Current Gain Ratio** (Note 5)	0.8		1.0	**0.9**		**1.0**		$I_C = 100\ \mu A$	$V_{CE} = -5.0\ V$
$\|(V_{BE1} - V_{BE2})\|$	**Base-Emitter Voltage Differential** (Note 6)			5.0			**3.0**	**mV**	$I_C = 100\ \mu A$	$V_{CE} = -5.0\ V$
$\|\Delta(V_{BE1} - V_{BE2})\|$	**Base-Emitter Voltage Differential Change (T_A = −40°C to +25°C) (Note 6)**			1.3 (20 μV/°C)			**0.65 (10 μV/°C)**	**mV**	$I_C = 100\ \mu A$	$V_{CE} = -5.0\ V$
$\|\Delta(V_{BE1} - V_{BE2})\|$	Base-Emitter Voltage Differential Change (T_A = +25°C to +85°C) (Note 6)			1.2 (20 μV/°C)			0.60 (10 μV/°C)	mV	$I_C = 100\ \mu A$	$V_{CE} = -5.0\ V$
$I_{B1} - I_{B2}$	Base Current Differential		80			40		nA	$I_C = 100\ \mu A$	$V_{CE} = -5.0\ V$
$\Delta(I_{B1} - I_{B2})$	Base Current Differential Change (T_A = −40°C to +85°C)		2.5			2.0		nA/°C	$I_C = 100\ \mu A$	$V_{CE} = -5.0\ V$

Additional Electrical Characteristics on Page 2

*Planar is a patented Fairchild process.

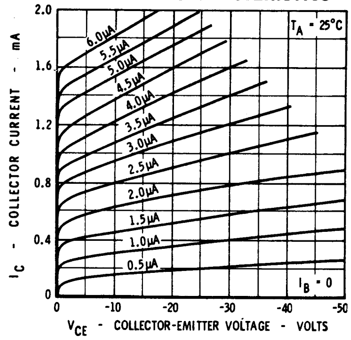
NOTES:

(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 125°C and junction to case thermal resistance of 125°C/Watt (derating factor of 8.0 mW/°C) for one side, and 71°C/Watt (derating factor of 14 mW/°C) for both sides. Junction to ambient thermal resistance of 285°C/Watt (derating factor of 3.5 mW/°C) for one side; and 233°C/Watt (derating factor of 4.3 mW/°C) for both sides.
(4) Rating refers to a high-current point where collector to emitter voltage is lowest.
(5) Lowest of two h_{FE} readings is taken as h_{FE1} for purposes of this ratio.
(6) Absolute values.
(7) Pulse Conditions: length = 300 μs; duty cycle = 1%.

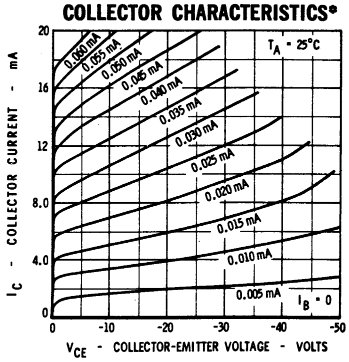
FAIRCHILD SEMICONDUCTOR
A DIVISION OF FAIRCHILD CAMERA AND INSTRUMENT CORPORATION
313 FAIRCHILD DRIVE, MOUNTAIN VIEW, CALIFORNIA, (415) 962-5011, TWX: 910-379-6435

TYPICAL ELECTRICAL CHARACTERISTICS
2N5254 ONLY

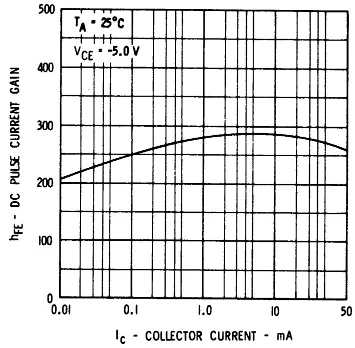
COLLECTOR CHARACTERISTICS*



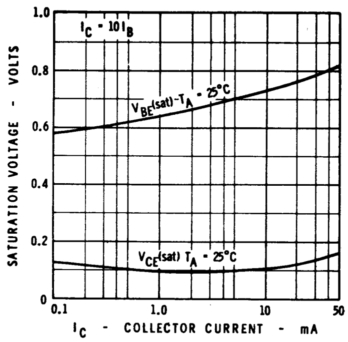
COLLECTOR CHARACTERISTICS*



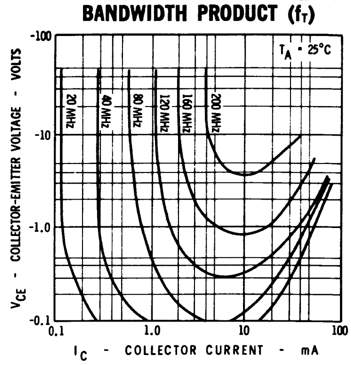
DC PULSE CURRENT GAIN VERSUS COLLECTOR CURRENT



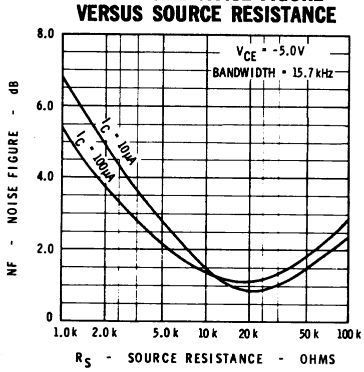
COLLECTOR AND BASE SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



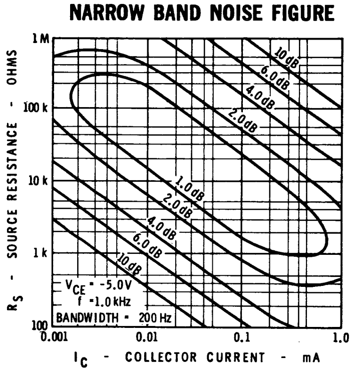
CONTOURS OF CONSTANT GAIN BANDWIDTH PRODUCT (f_T)



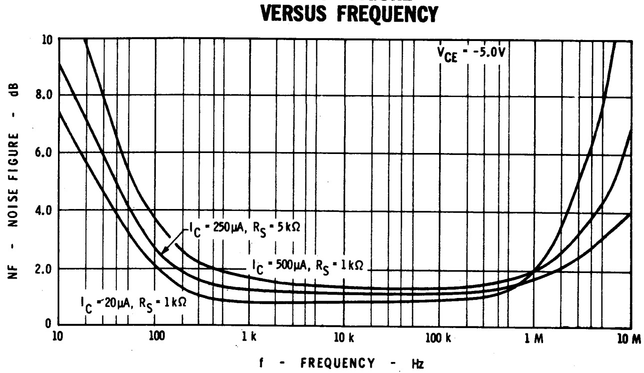
WIDE BAND NOISE FIGURE VERSUS SOURCE RESISTANCE



CONTOURS OF CONSTANT NARROW BAND NOISE FIGURE



NOISE FIGURE VERSUS FREQUENCY



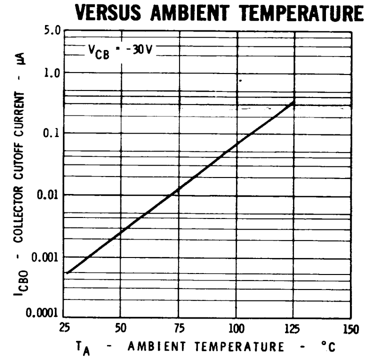
*Single family characteristics on Transistor Curve Tracer

ELECTRICAL CHARACTERISTICS (25°C Free Air Temperature unless otherwise noted)

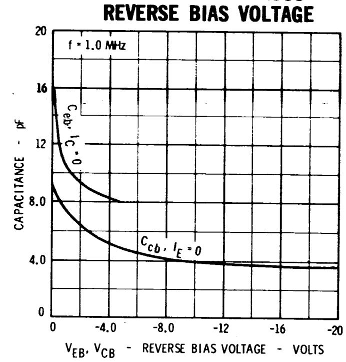
SYMBOL	CHARACTERISTIC	2N5254 MIN.	2N5254 MAX.	2N5255 2N5256 MIN.	2N5255 2N5256 MAX.	UNITS	TEST CONDITIONS	
h_{FE}	**DC Current Gain**	70		175			$I_C = 1.0$ mA	$V_{CE} = -5.0$ V
h_{FE}	**DC Current Gain**	50	750	150	750		$I_C = 100\ \mu A$	$V_{CE} = -5.0$ V
h_{FE}	DC Current Gain			90			$I_C = 20\ \mu A$	$V_{CE} = -5.0$ V
$V_{CE(sat)}$	Pulsed Collector Saturation Voltage (Note 7)		−0.25		−0.25	Volts	$I_C = 10$ mA	$I_B = 0.5$ mA
$V_{BE(on)}$	Emitter-Base On Voltage		−0.9		−0.9	Volts	$I_C = 0.1$ mA	$V_{CE} = -5.0$ V
I_{CBO}	Collector Cutoff Current		10		10	nA	$I_E = 0$	$V_{CB} = -30$ V
I_{CBO}(85°C)	Collector Cutoff Current		1.0		1.0	μA	$I_E = 0$	$V_{CB} = -30$ V
I_{CEO}	Collector Cutoff Current		10		10	nA	$I_B = 0$	$V_{CE} = -5.0$ V
I_{EBO}	Emitter Cutoff Current		10		10	nA	$I_C = 0$	$V_{EB} = -4.0$ V
$V_{BE(sat)}$	Pulsed Base Saturation Voltage (Note 7)		−0.9		−0.9	Volts	$I_C = 10$ mA	$I_B = 0.5$ mA
h_{fe}	High Frequency Current Gain (f = 20 MHz)	2.0	15	2.0	15		$I_C = 1.0$ mA	$V_{CE} = -5.0$ V
h_{fe}	Small Signal Current Gain (f = 1.0 kHz)	70	900	175	900		$I_C = 1.0$ mA	$V_{CE} = -5.0$ V
h_{ie}	Input Impedance (f = 1.0 kHz)	1.7	25	4.4	25	kΩ	$I_C = 1.0$ mA	$V_{CE} = -5.0$ V
h_{oe}	Output Conductance (f = 1.0 kHz)	5.0	70	15	70	μmhos	$I_C = 1.0$ mA	$V_{CE} = -5.0$ V
h_{re}	Voltage Feedback Ratio (f = 1.0 kHz)		1200		1200	$X10^{-6}$	$I_C = 1.0$ mA	$V_{CE} = -5.0$ V
BV_{CBO}	Collector to Base Breakdown Voltage	−40		−40		Volts	$I_C = 10\ \mu A$	$I_E = 0$
$V_{CEO(sus)}$	Collector to Emitter Sustaining Voltage (pulsed, Notes 4 and 7)	−40		−40		Volts	$I_C = 10$ mA	$I_B = 0$
BV_{EBO}	Emitter to Base Breakdown Voltage	−5.0		−5.0		Volts	$I_E = 10\ \mu A$	$I_C = 0$
C_{cb}	Collector to Base Capacitance		6.0		6.0	pF	$I_E = 0$	$V_{CB} = -10$ V
C_{eb}	Emitter to Base Capacitance		16		16	pF	$I_C = 0$	$V_{EB} = -0.5$ V
NF	**Narrow Band Noise Figure (f = 1.0 kHz)**		3.0		**2.5**	**dB**	$I_C = 100\ \mu A$, **B.W. = 200 Hz**	$V_{CE} = -5.0$ V, $R_S = 10$ kΩ
NF	Wide Band Noise Figure (3.0 dB points at 10 Hz and 10 kHz)		3.0		2.5	dB	$I_C = 100\ \mu A$, B.W. = 15.7 kHz	$V_{CE} = -5.0$ V, $R_S = 10$ kΩ

THESE CURVES APPLY TO ALL TYPES

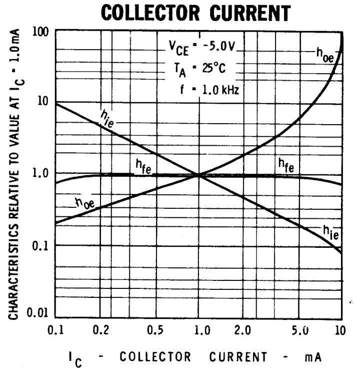
COLLECTOR CUTOFF CURRENT VERSUS AMBIENT TEMPERATURE



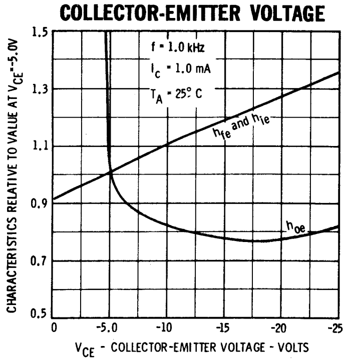
CAPACITANCE VERSUS REVERSE BIAS VOLTAGE



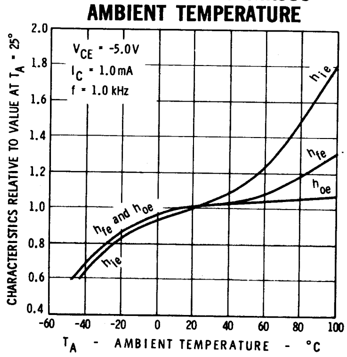
COMMON EMITTER CHARACTERISTICS VERSUS COLLECTOR CURRENT



COMMON EMITTER CHARACTERISTICS VERSUS COLLECTOR-EMITTER VOLTAGE



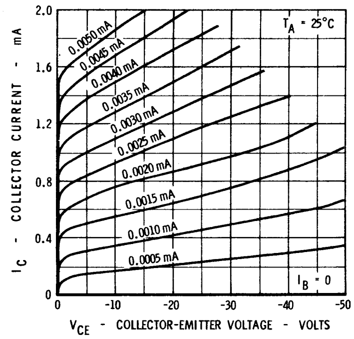
COMMON EMITTER CHARACTERISTICS VERSUS AMBIENT TEMPERATURE



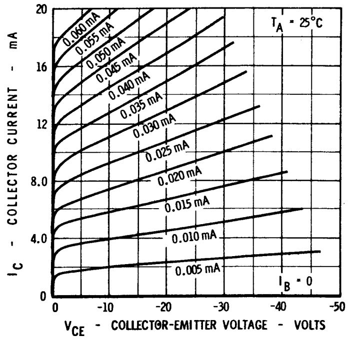
TYPICAL ELECTRICAL CHARACTERISTICS

2N5255 • 2N5256

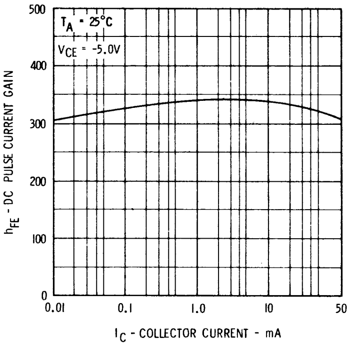
COLLECTOR CHARACTERISTICS*



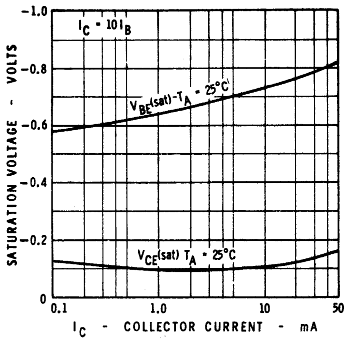
COLLECTOR CHARACTERISTICS*



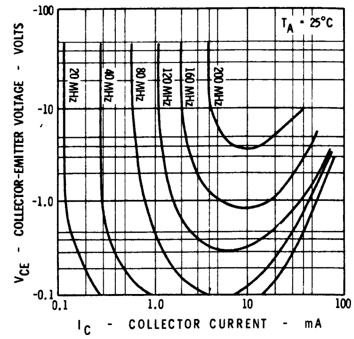
DC PULSE CURRENT GAIN VERSUS COLLECTOR CURRENT



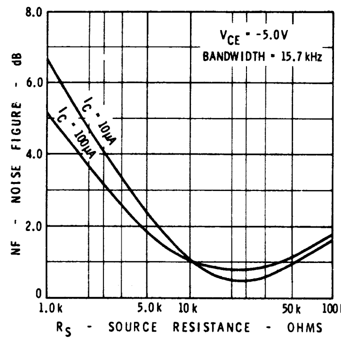
COLLECTOR AND BASE SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



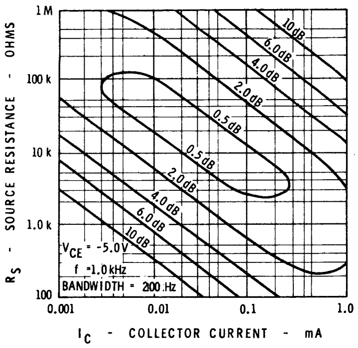
CONTOURS OF CONSTANT GAIN BANDWIDTH PRODUCT (f_T)



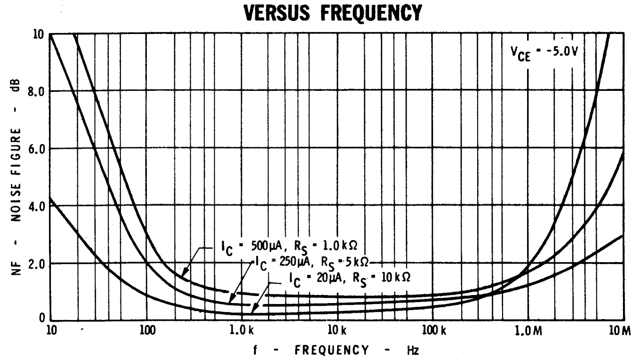
WIDE BAND NOISE FIGURE VERSUS SOURCE RESISTANCE



CONTOURS OF CONSTANT NARROW BAND NOISE FIGURE



NOISE FIGURE VERSUS FREQUENCY



*Single family characteristics on Transistor Curve Tracer