2N5002 • 2N5004

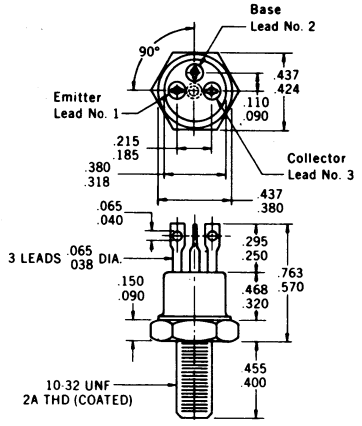
50 WATT NPN POWER TRANSISTORS

DIFFUSED SILICON PLANAR* EPITAXIAL TRANSISTORS

SEE 2N5003 • 2N5005 FOR PNP COMPLEMENT

- **HIGH POWER** . . . . . **50 WATTS @ $T_C = 50°C$, $V_{CE} = 40$ V**
- **HIGH VOLTAGE** . . . . . **80 V (MIN) LV_{CEO}**
- **HIGH CURRENT SATURATION VOLTAGE** . . . . **1.5 V (MAX) V_{CE}(sat) @ 5.0 A**
- **HIGH FREQUENCY** . . . . . **60 AND 70 MHz (MIN) f_T**
- **BETA GUARANTEED @ 3 POINTS** . . . . . **50 mA, 2.5 A AND 5.0 A**
- **ISOLATED COLLECTOR PACKAGE** . . . . . **NO ISOLATING HARDWARE REQUIRED**
- **DISCRETE EMITTER GEOMETRY WITH INTEGRATED FEEDBACK RESISTORS**

PHYSICAL DIMENSIONS
(in accordance with JEDEC TO-59 outline)



NOTES: All dimensions in inches
All leads electrically isolated from case
Package weight is 6.44 grams

ABSOLUTE MAXIMUM RATINGS (Note 1)

Maximum Temperatures

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

Maximum Power Dissipation

Total Dissipation at 50°C Case Temperature, $V_{CE} = 40$ V (See Maximum Permissible Power Curve and Note 4)	50 Watts

Maximum Voltages and Current

V_{CES}	Collector to Emitter Voltage	100 Volts
V_{CEO}	Collector to Emitter Voltage (Note 2)	80 Volts
V_{EBO}	Emitter to Base Voltage	6.0 Volts
I_C	Collector Current	5.0 Amps

ELECTRICAL CHARACTERISTICS (25°C Case Temperature unless otherwise noted)

SYMBOL	CHARACTERISTIC	2N5002 MIN.	2N5002 TYP.	2N5002 MAX.	2N5004 MIN.	2N5004 TYP.	2N5004 MAX.	UNITS	TEST CONDITIONS	
V_{CEO}(sust)	**Collector to Emitter Sustaining Voltage** (Notes 2 and 3)	**80**			**80**			**Volts**	**$I_C = 100$ mA**	**$I_B = 0$**
BV_{CES}	Collector to Emitter Breakdown Voltage	100			100			Volts	$I_C = 1.0$ mA	$V_{BE} = 0$
BV_{EBO}	Emitter to Base Breakdown Voltage	6.0			6.0			Volts	$I_C = 0$	$I_E = 1.0$ mA
h_{FE}	**DC Pulse Current Gain** (Note 3)	**20**	**46**		**50**	**100**			**$I_C = 50$ mA**	**$V_{CE} = 5.0$ V**
h_{FE}	**DC Pulse Current Gain** (Note 3)	**30**	**64**	**90**	**70**	**114**	**200**		**$I_C = 2.5$ A**	**$V_{CE} = 5.0$ V**
$h_{FE}(-55°C)$	DC Pulse Current Gain (Note 3)	15	26		35	50			$I_C = 2.5$ A	$V_{CE} = 5.0$ V
h_{FE}	**DC Pulse Current Gain** (Note 3)	**20**	**53**		**40**	**65**			**$I_C = 5.0$ A**	**$V_{CE} = 5.0$ V**
h_{fe}	**High Frequency Current Gain (f = 20 MHz)**	**3.0**	**3.4**		**3.5**	**4.4**			**$I_C = 0.5$ A**	**$V_{CE} = 5.0$ V**
V_{CE}(sat)	Pulsed Collector Saturation Voltage (Note 3)		0.43	0.75		0.43	0.75	Volts	$I_C = 2.5$ A	$I_B = 0.25$ A
V_{CE}(sat)	**Pulsed Collector Saturation Voltage** (Note 3)		**0.85**	**1.5**		**0.85**	**1.5**	**Volts**	**$I_C = 5.0$ A**	**$I_B = 0.5$ A**

Additional Electrical Characteristics on page 2
Notes on page 2

*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

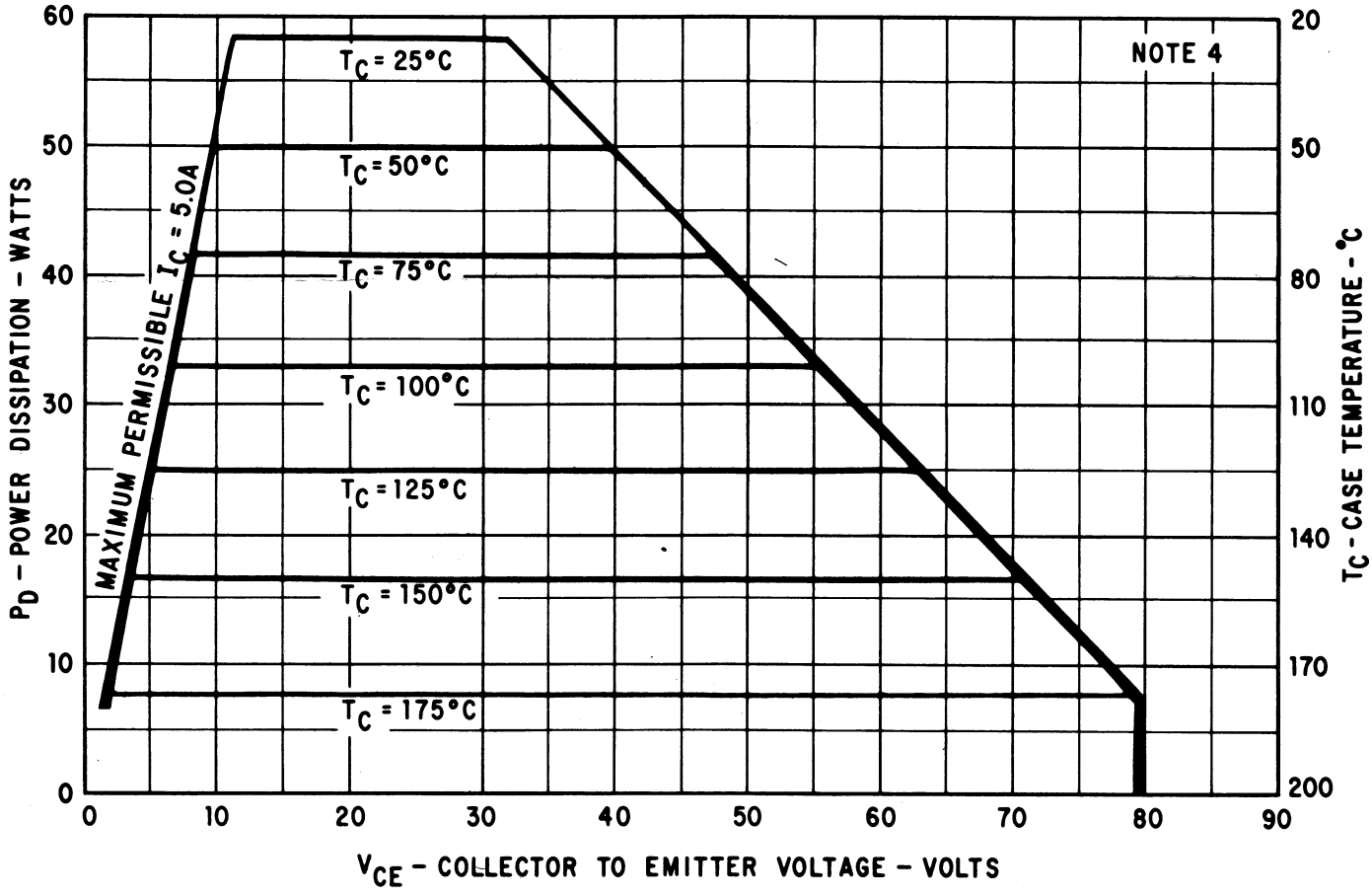
ELECTRICAL CHARACTERISTICS (25°C Case Temperature unless otherwise noted)

SYMBOL	CHARACTERISTIC	2N5002 MIN.	2N5002 TYP.	2N5002 MAX.	2N5004 MIN.	2N5004 TYP.	2N5004 MAX.	UNITS	TEST CONDITIONS	
V_{BE}(sat)	Pulsed Base Saturation Voltage (Note 3)		1.16	1.45		1.16	1.45	Volts	$I_C = 2.5$ A	$I_B = 0.25$ A
V_{BE}(sat)	Pulsed Base Saturation Voltage (Note 3)		1.50	2.2		1.50	2.2	Volts	$I_C = 5.0$ A	$I_B = 0.5$ A
V_{BE}(on)	Pulsed Base Emitter "ON" Voltage (Note 3)			1.45			1.45	Volts	$I_C = 2.5$ A	$V_{CE} = 5.0$ V
I_{CES}	Collector Cutoff Current		0.007	1.0		0.007	1.0	μA	$V_{CE} = 60$ V	$V_{BE} = 0$
I_{EBO}	Emitter Cutoff Current			1.0			1.0	μA	$I_C = 0$	$V_{EB} = 5.0$ V
I_{CEX}(150°C)	Collector Reverse Current			500			500	μA	$V_{CE} = 60$ V	$V_{EB} = 2.0$ V
C_{cb}	Collector to Base Capacitance		90	250		90	250	pF	$I_E = 0$	$V_{CB} = 10$ V

NOTES:

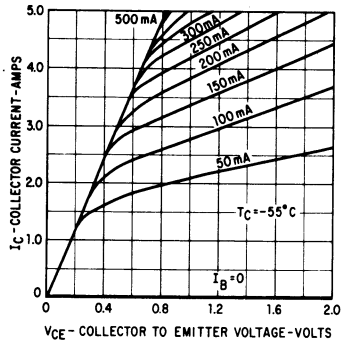
(1) These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
(2) This rating refers to a high current point where collector to emitter voltage is lowest. For more information send for Fairchild Publication APP-4/2.
(3) Pulse Conditions: length = 300μs; duty cycle = 1%.
(4) Contact factory for maximum permissible power under pulsed or reverse biased operating conditions.

MAXIMUM PERMISSIBLE DC FORWARD BIASED POWER DISSIPATION

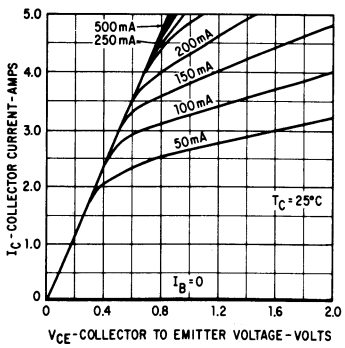


TYPICAL ELECTRICAL CHARACTERISTICS

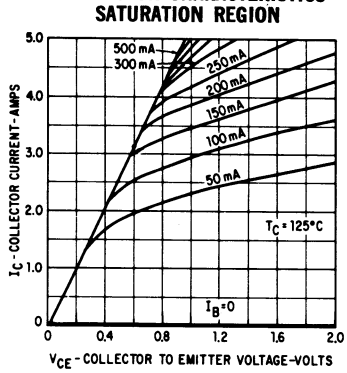
COLLECTOR CHARACTERISTICS* SATURATION REGION



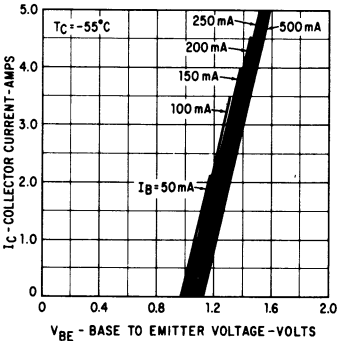
COLLECTOR CHARACTERISTICS* SATURATION REGION



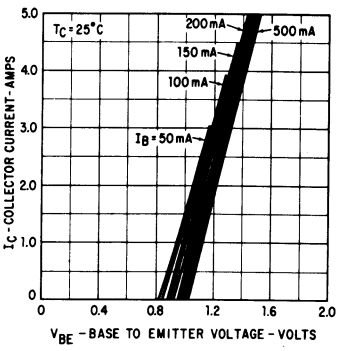
COLLECTOR CHARACTERISTICS* SATURATION REGION



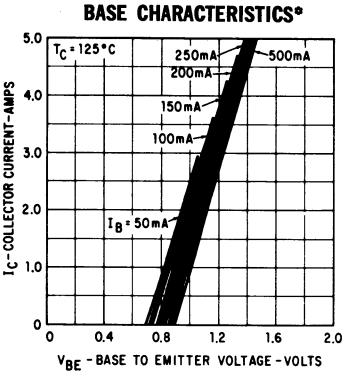
BASE CHARACTERISTICS*



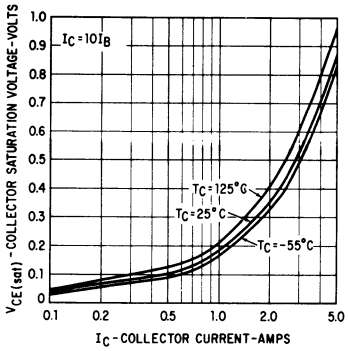
BASE CHARACTERISTICS*



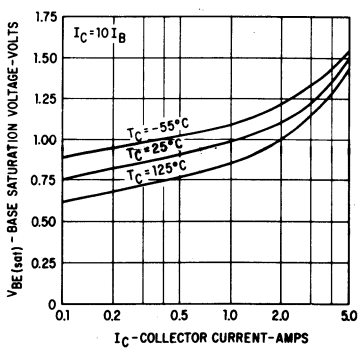
BASE CHARACTERISTICS*



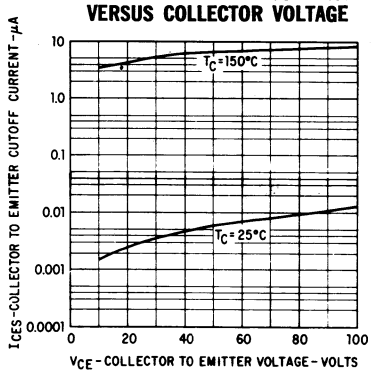
COLLECTOR SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



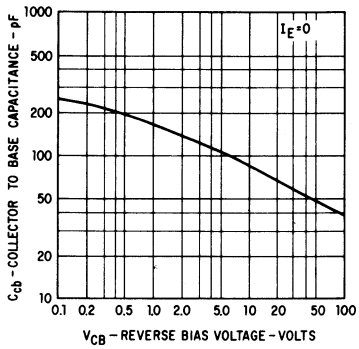
BASE SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



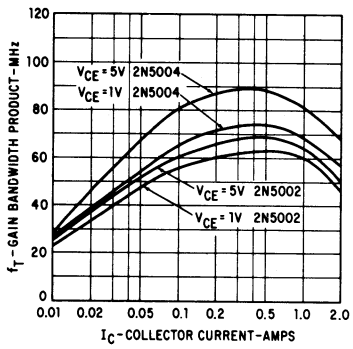
COLLECTOR CUTOFF CURRENT VERSUS COLLECTOR VOLTAGE



COLLECTOR TO BASE CAPACITANCE VERSUS REVERSE BIAS VOLTAGE



GAIN BANDWIDTH PRODUCT VERSUS COLLECTOR CURRENT

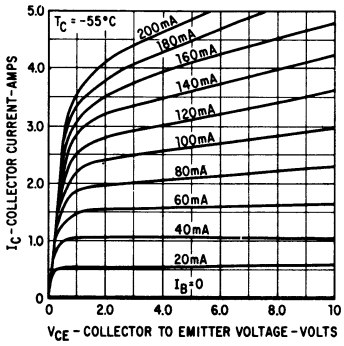


*Single Family Characteristics on Transistor Curve Tracer.

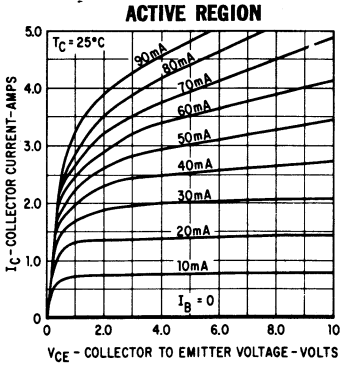
TYPICAL ELECTRICAL CHARACTERISTICS

2N5002

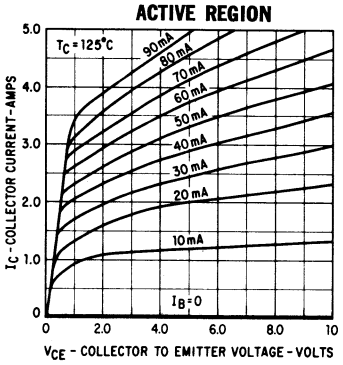
COLLECTOR CHARACTERISTICS* ACTIVE REGION



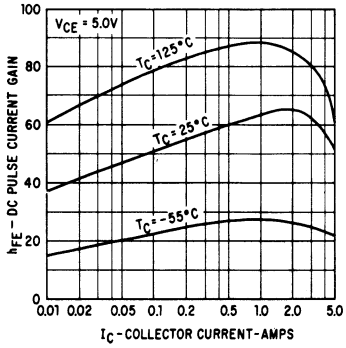
COLLECTOR CHARACTERISTICS* ACTIVE REGION



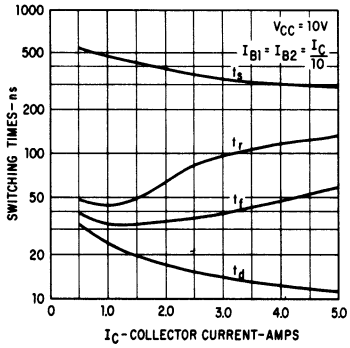
COLLECTOR CHARACTERISTICS* ACTIVE REGION



DC PULSE CURRENT GAIN VERSUS COLLECTOR CURRENT

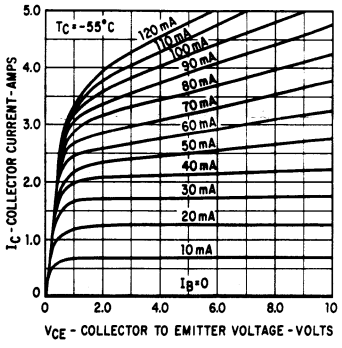


SWITCHING TIMES VERSUS COLLECTOR CURRENT

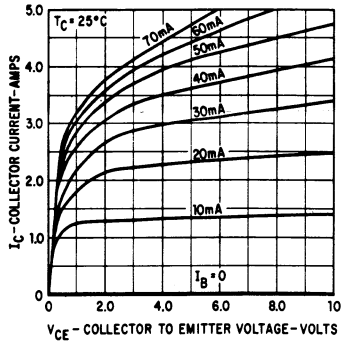


2N5004

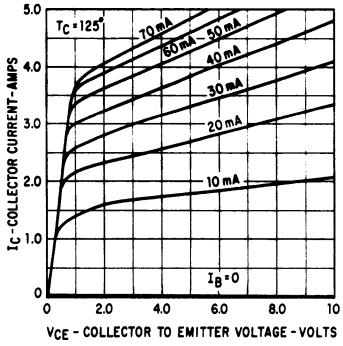
COLLECTOR CHARACTERISTICS* ACTIVE REGION



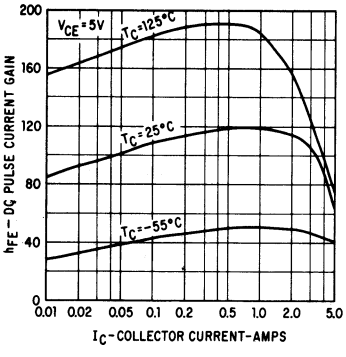
COLLECTOR CHARACTERISTICS* ACTIVE REGION



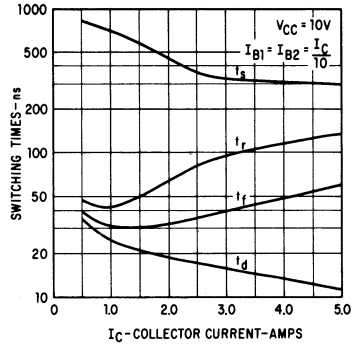
COLLECTOR CHARACTERISTICS* ACTIVE REGION



DC PULSE CURRENT GAIN VERSUS COLLECTOR CURRENT



SWITCHING TIMES VERSUS COLLECTOR CURRENT



*Single Family Characteristics on Transistor Curve Tracer.

2N5003 · 2N5005

50 WATT PNP POWER TRANSISTORS

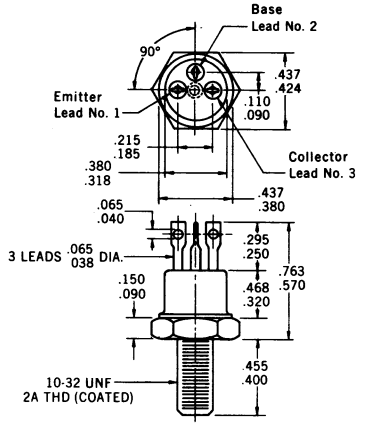
DIFFUSED SILICON PLANAR* EPITAXIAL TRANSISTORS

SEE 2N5002 • 2N5004 FOR NPN COMPLEMENT

FEATURES

- **HIGH POWER - - 50 WATTS @ $T_C = 50°C$, $V_{CE} = -40$ V**
- **HIGH VOLTAGE - - −80 V (MIN) LV_{CEO}**
- **HIGH CURRENT SAT. VOLTAGE - - −1.5 V (MAX) $V_{CE}(sat)$ @ 5.0 A**
- **HIGH FREQUENCY - - 60 AND 70 MHz (MIN) f_T**
- **BETA GUARANTEED @ 3 POINTS - - 50 mA, 2.5 A AND 5.0 A**
- **ISOLATED COLLECTOR PACKAGE - - NO ISOLATING HARDWARE REQUIRED**
- **DISCRETE EMITTER GEOMETRY WITH INTEGRATED FEEDBACK RESISTORS**

PHYSICAL DIMENSIONS
(in accordance with JEDEC TO-59 outline)



NOTES: All dimensions in inches
All leads electrically isolated from case
Package weight is 6.44 grams

ABSOLUTE MAXIMUM RATINGS (Note 1)

Maximum Temperatures		
Storage Temperature		−65°C to +200°C
Operating Junction Temperature		−65°C to +200°C
Lead Temperature (Soldering, 60 seconds time limit)		+300°C
Maximum Power Dissipation		
Total Dissipation at 50°C Case Temperature, $V_{CE} = -40$ V (See Maximum Permissible Power Curve and Note 4)		50 Watts
Maximum Voltages and Current		
V_{CES}	Collector to Emitter Voltage	−100 Volts
V_{CEO}	Collector to Emitter Voltage (Note 2)	− 80 Volts
V_{EBO}	Emitter to Base Voltage	− 5.5 Volts
I_C	Collector Current	5.0 Amps

ELECTRICAL CHARACTERISTICS (25°C Case Temperature unless otherwise noted)

SYMBOL	CHARACTERISTIC	2N5003 MIN.	2N5003 TYP.	2N5003 MAX.	2N5005 MIN.	2N5005 TYP.	2N5005 MAX.	UNITS	TEST CONDITIONS	
V_{CEO}(sust)	**Collector to Emitter Sustaining Voltage** (Notes 2 and 3)	**−80**			**−80**			**Volts**	**$I_C = 100$ mA**	**$I_B = 0$**
BV_{CES}	Collector to Emitter Breakdown Voltage	−100			−100			Volts	$I_C = 1.0$ mA	$V_{BE} = 0$
BV_{EBO}	Emitter to Base Breakdown Voltage	−5.5			−5.5			Volts	$I_C = 0$	$I_E = 1.0$ mA
h_{FE}	**DC Pulse Current Gain (Note 3)**	**20**	**52**		**50**	**133**			**$I_C = 50$ mA**	**$V_{CE} = -5.0$ V**
h_{FE}	**DC Pulse Current Gain** (Note 3)	**30**	**50**	**90**	**70**	**114**	**200**		**$I_C = 2.5$ A**	**$V_{CE} = -5.0$ V**
$h_{FE}(-55°C)$	DC Pulse Current Gain (Note 3)	15	32		35	90			$I_C = 2.5$ A	$V_{CE} = -5.0$ V
h_{FE}	**DC Pulse Current Gain** (Note 3)	**20**	**38**		**40**	**77**			**$I_C = 5.0$ A**	**$V_{CE} = -5.0$ V**
h_{fe}	**High Frequency Current Gain ($f = 20$ MHz)**	**3.0**	**4.05**		**3.5**	**4.85**			**$I_C = 0.5$ A**	**$V_{CE} = -5.0$ V**
V_{CE}(sat)	Pulsed Collector Saturation Voltage (Note 3)		−0.45	−0.75		−0.45	−0.75	Volts	$I_C = 2.5$ A	$I_B = 0.25$ A
V_{CE}(sat)	**Pulsed Collector Saturation Voltage** (Note 3)		**−0.9**	**−1.5**		**−0.9**	**−1.5**	**Volts**	**$I_C = 5.0$ A**	**$I_B = 0.5$ A**

Additional Electrical Characteristics on page 2

*Planar is a patented Fairchild process.

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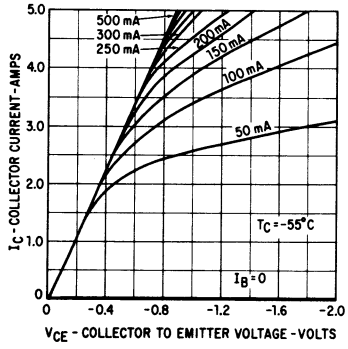
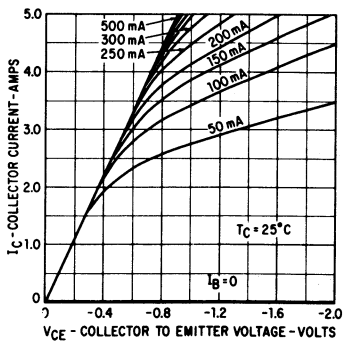
TYPICAL ELECTRICAL CHARACTERISTICS

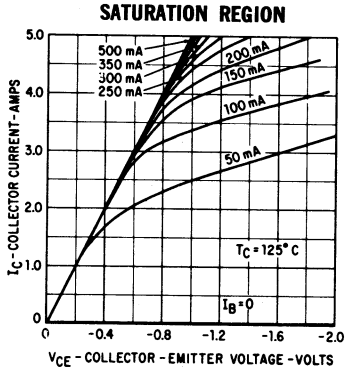
COLLECTOR CHARACTERISTICS SATURATION REGION



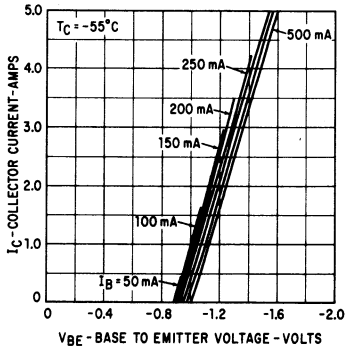
COLLECTOR CHARACTERISTICS SATURATION REGION



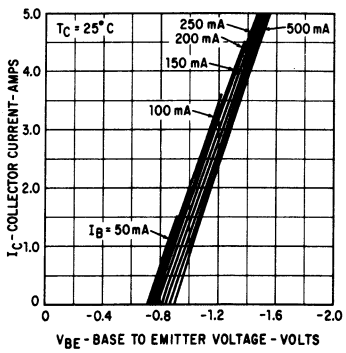
COLLECTOR CHARACTERISTICS SATURATION REGION



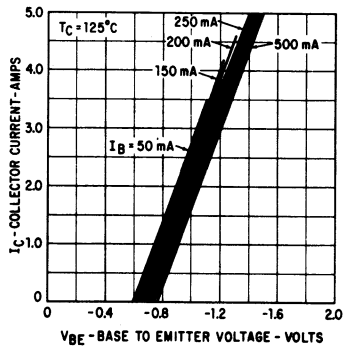
BASE CHARACTERISTICS



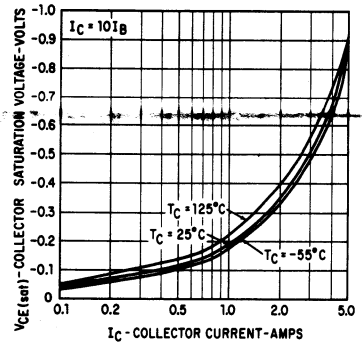
BASE CHARACTERISTICS



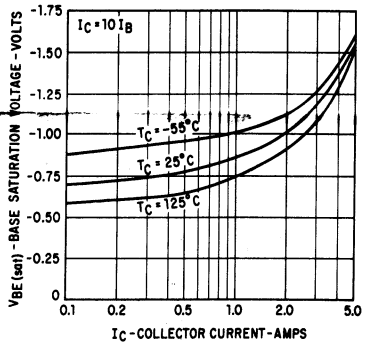
BASE CHARACTERISTICS



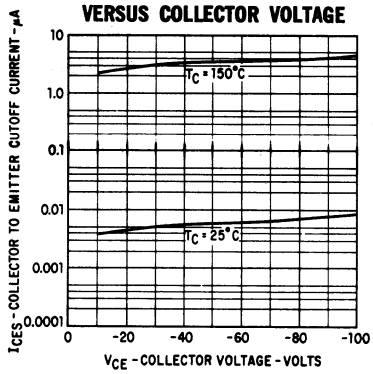
COLLECTOR SATURATION VOLTAGE VS. COLLECTOR CURRENT



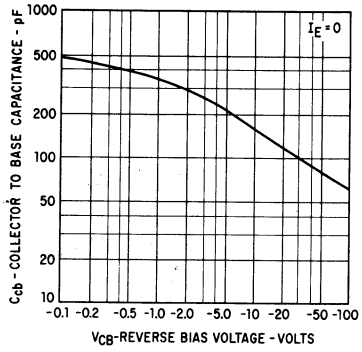
BASE SATURATION VOLTAGE VS. COLLECTOR CURRENT



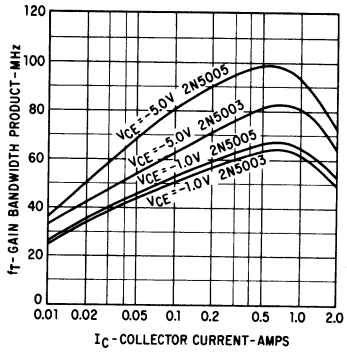
COLLECTOR CUTOFF CURRENT VERSUS COLLECTOR VOLTAGE



COLLECTOR TO BASE CAPACITANCE VERSUS REVERSE BIAS VOLTAGE



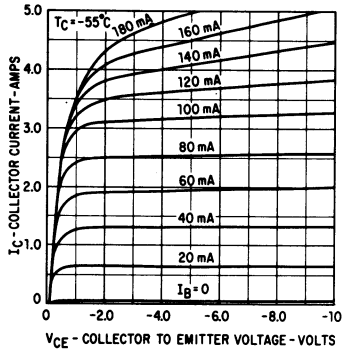
GAIN BANDWIDTH PRODUCT VERSUS COLLECTOR CURRENT



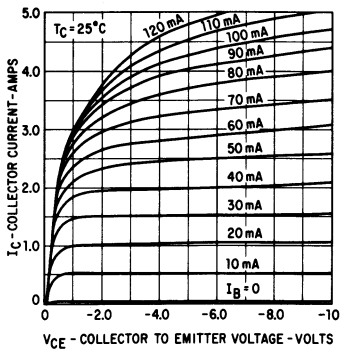
TYPICAL ELECTRICAL CHARACTERISTICS

2N5003

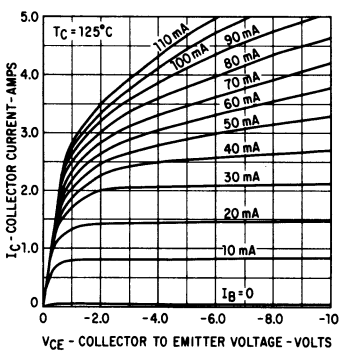
COLLECTOR CHARACTERISTICS



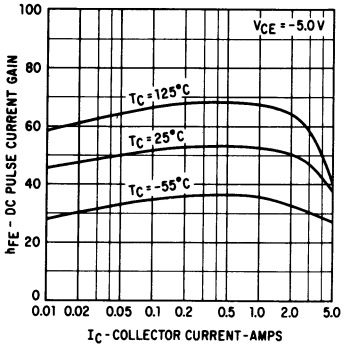
COLLECTOR CHARACTERISTICS



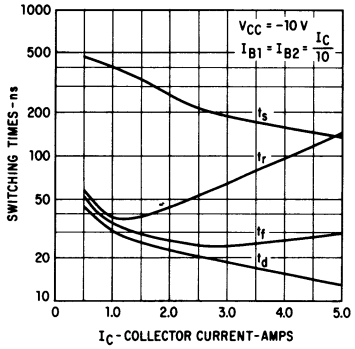
COLLECTOR CHARACTERISTICS



DC PULSE CURRENT GAIN VERSUS COLLECTOR CURRENT

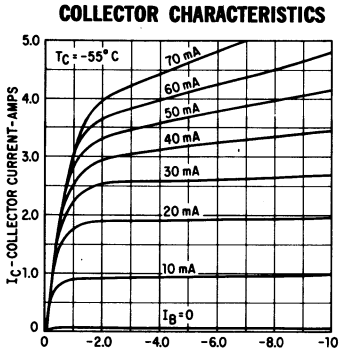


SWITCHING TIMES VERSUS COLLECTOR CURRENT

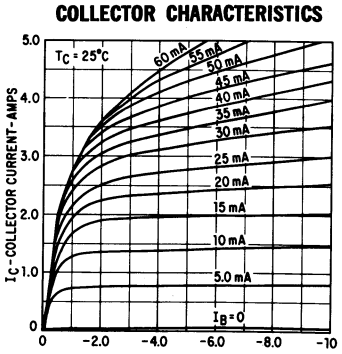


2N5005

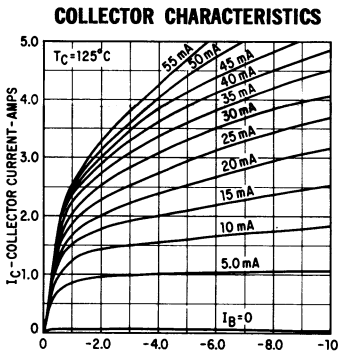
COLLECTOR CHARACTERISTICS



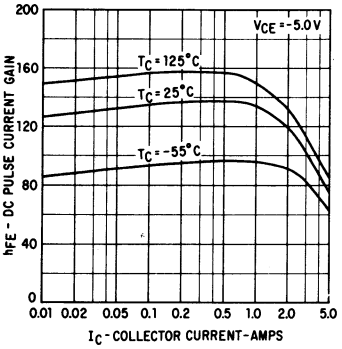
COLLECTOR CHARACTERISTICS



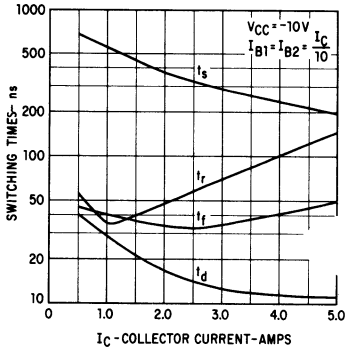
COLLECTOR CHARACTERISTICS



DC PULSE CURRENT GAIN VERSUS COLLECTOR CURRENT



SWITCHING TIMES VERSUS COLLECTOR CURRENT



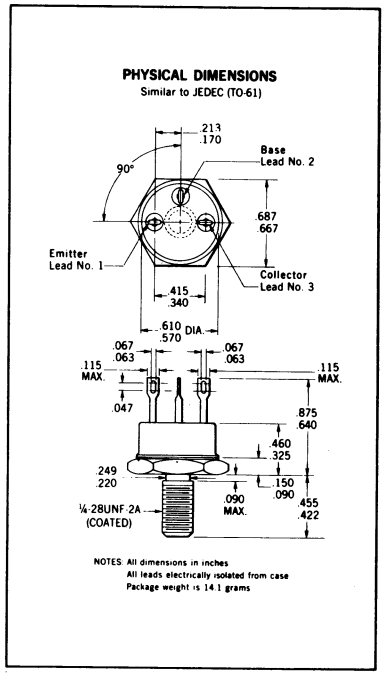
2N5006 · 2N5008

100 WATT NPN POWER TRANSISTORS

DIFFUSED SILICON PLANAR* EPITAXIAL TRANSISTORS

SEE 2N5007 • 2N5009 FOR PNP COMPLEMENT

- **HIGH POWER - - 100 WATTS @ $T_C = 50°C$, $V_{CE} = 40$ V**
- **HIGH VOLTAGE - - 80 V (MIN) LV_{CEO}**
- **HIGH CURRENT SATURATION VOLTAGE - - 1.5 VOLTS (MAX) $V_{CE}(sat)$ @ 10 A**
- **HIGH FREQUENCY - - 30 AND 40 MHz (MIN) f_T**
- **BETA GUARANTEED AT 3 POINTS - - 100 mA, 5.0 A AND 10 A**
- **ISOLATED COLLECTOR PACKAGE - - NO ISOLATING HARDWARE REQUIRED**
- **DISCRETE EMITTER GEOMETRY WITH INTEGRATED FEEDBACK RESISTORS**



ABSOLUTE MAXIMUM RATINGS (Note 1)

Maximum Temperatures		
Storage Temperature		−65°C to +200°C
Operating Junction Temperature		−65°C to +200°C
Lead Temperature (Soldering, 60 seconds time limit)		+300°C
Maximum Power Dissipation		
Total Dissipation at 50°C Case Temperature, $V_{CE} = 40$V (See Maximum Permissible Power Curve and Note 4)		**100 Watts**
Maximum Voltages and Current		
V_{CES}	Collector to Emitter Voltage	100 Volts
V_{CEO}	Collector to Emitter Voltage (Note 2)	80 Volts
V_{EBO}	Emitter to Base Voltage	6.0 Volts
I_C	Collector Current	10 Amps

ELECTRICAL CHARACTERISTICS (25°C Case Temperature unless otherwise noted)

SYMBOL	CHARACTERISTIC	2N5006 MIN.	2N5006 TYP.	2N5006 MAX.	2N5008 MIN.	2N5008 TYP.	2N5008 MAX.	UNITS	TEST CONDITIONS	
$V_{CEO}(sust)$	**Collector to Emitter Sustaining Voltage** (Notes 2 and 3)	**80**			**80**			**Volts**	**$I_C = 200$ mA**	**$I_B = 0$**
BV_{CES}	Collector to Emitter Breakdown Voltage	100			100			Volts	$I_C = 1.0$ mA	$V_{BE} = 0$
BV_{EBO}	Emitter to Base Breakdown Voltage	6.0			6.0			Volts	$I_C = 0$	$I_E = 1.0$ mA
h_{FE}	**DC Pulse Current Gain** (Note 3)	**20**	**35**		**50**	**95**			**$I_C = 100$ mA**	**$V_{CE} = 5.0$ V**
h_{FE}	**DC Pulse Current Gain** (Note 3)	**30**	**42**	**90**	**70**	**108**	**200**		**$I_C = 5.0$ A**	**$V_{CE} = 5.0$ V**
$h_{FE}(-55°C)$	DC Pulse Current Gain (Note 3)	12	18		35	51			$I_C = 5.0$ A	$V_{CE} = 5.0$ V
h_{FE}	**DC Pulse Current Gain** (Note 3)	**20**	**33**		**45**	**91**			**$I_C = 10$ A**	**$V_{CE} = 5.0$ V**
h_{fe}	**High Frequency Current Gain ($f = 20$ MHz)**	**1.5**	**2.05**		**2.0**	**2.8**			**$I_C = 2.0$ A**	**$V_{CE} = 5.0$ V**
$V_{CE}(sat)$	Pulsed Collector Saturation Voltage (Note 3)		0.55	0.9		0.55	0.9	Volts	$I_C = 5.0$ A	$I_B = 0.5$ A
$V_{CE}(sat)$	**Pulsed Collector Saturation Voltage** (Note 3)		**1.1**	**1.5**		**1.1**	**1.5**	**Volts**	**$I_C = 10$ A**	**$I_B = 1.0$ A**

Additional Electrical Characteristics on page 2

*Planar is a patented Fairchild process.

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

FAIRCHILD SEMICONDUCTOR
A DIVISION OF FAIRCHILD CAMERA AND INSTRUMENT CORPORATION

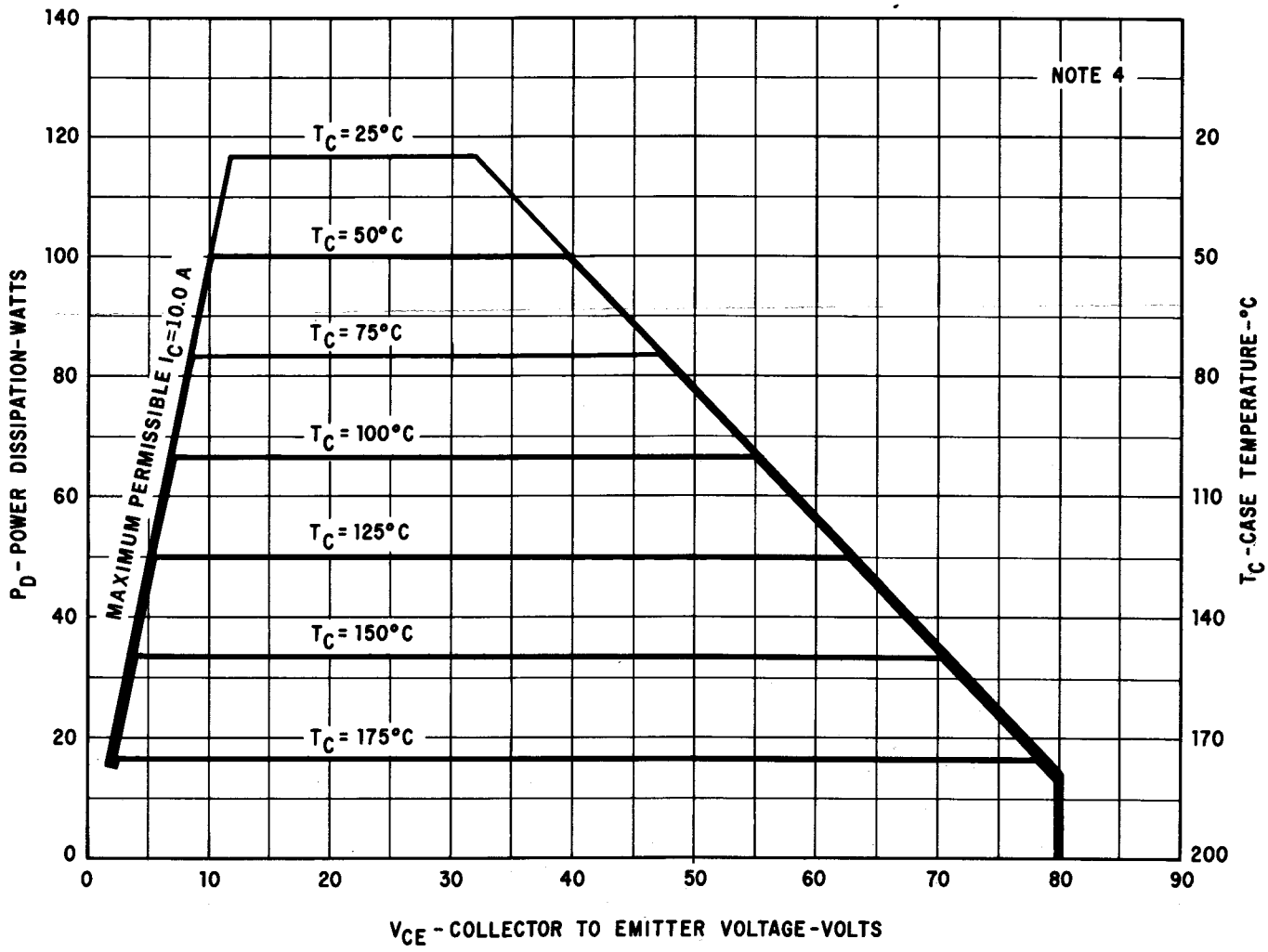
ELECTRICAL CHARACTERISTICS (25°C Case Temperature unless otherwise noted)

SYMBOL	CHARACTERISTIC	2N5006 MIN.	2N5006 TYP.	2N5006 MAX.	2N5008 MIN.	2N5008 TYP.	2N5008 MAX.	UNITS	TEST CONDITIONS	
V_{BE}(sat)	Pulsed Base Saturation Voltage (Note 3)		1.2	1.8		1.2	1.8	Volts	$I_C = 5.0$ A	$I_B = 0.5$ A
V_{BE}(sat)	Pulsed Base Saturation Voltage (Note 3)		1.7	2.2		1.7	2.2	Volts	$I_C = 10$ A	$I_B = 1.0$ A
V_{BE}(on)	Pulsed Base Emitter "ON" Voltage (Note 3)			1.8			1.8	Volts	$I_C = 5.0$ A	$V_{CE} = 5.0$ V
I_{CES}	Collector Cutoff Current		0.014	1.0		0.014	1.0	μA	$V_{CE} = 60$ V	$V_{BE} = 0$
I_{EBO}	Emitter Cutoff Current			1.0			1.0	μA	$I_C = 0$	$V_{EB} = 5.0$ V
I_{CEX}(150°C)	Collector Reverse Current			500			500	μA	$V_{CE} = 60$ V	$V_{EB} = 2.0$ V
C_{cb}	Collector to Base Capacitance (f = 1.0 MHz)		235	275		235	275	pF	$I_E = 0$	$V_{CB} = 10$ V

NOTES:

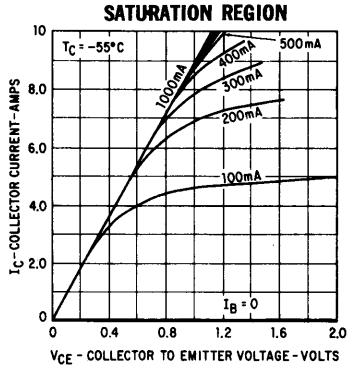
(1) These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
(2) This rating refers to a high current point where collector to emitter voltage is lowest. For more information send for Fairchild Publication APP-4/2.
(3) Pulse Conditions: length = 300μs; duty cycle = 1%.
(4) Contact factory for maximum permissible power under pulsed or reverse biased operating conditions.

MAXIMUM PERMISSIBLE DC FORWARD BIASED POWER DISSIPATION

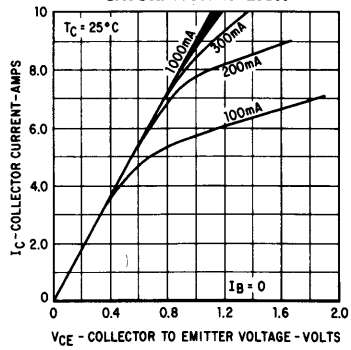


TYPICAL ELECTRICAL CHARACTERISTICS

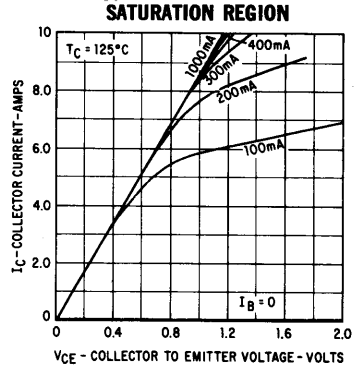
COLLECTOR CHARACTERISTICS* SATURATION REGION



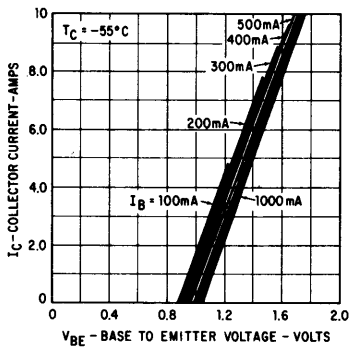
COLLECTOR CHARACTERISTICS* SATURATION REGION



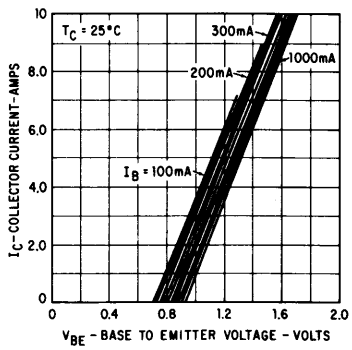
COLLECTOR CHARACTERISTICS* SATURATION REGION



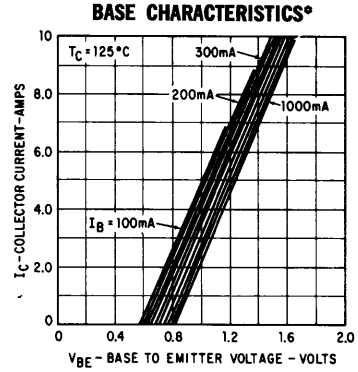
BASE CHARACTERISTICS*



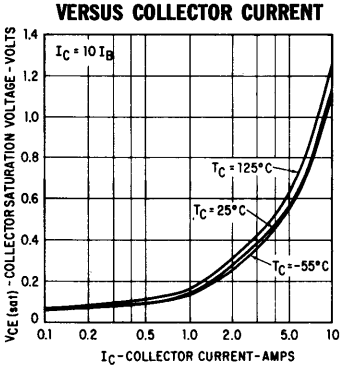
BASE CHARACTERISTICS*



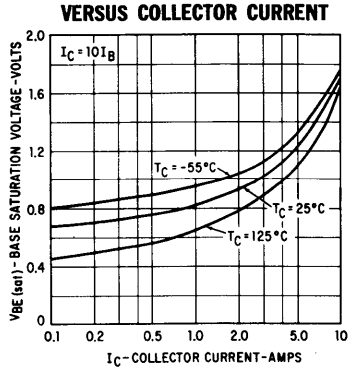
BASE CHARACTERISTICS*



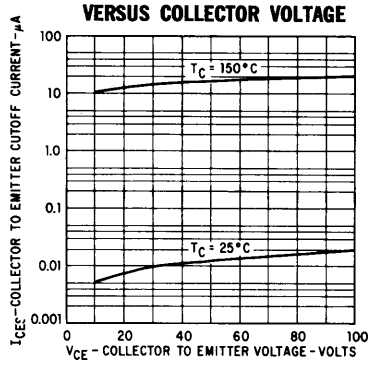
COLLECTOR SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



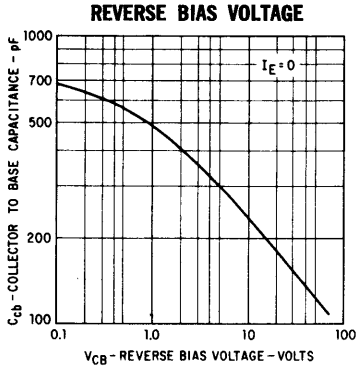
BASE SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



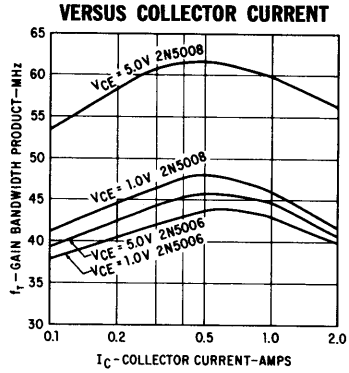
COLLECTOR CUTOFF CURRENT VERSUS COLLECTOR VOLTAGE



COLLECTOR TO BASE CAPACITANCE VERSUS REVERSE BIAS VOLTAGE



GAIN BANDWIDTH PRODUCT VERSUS COLLECTOR CURRENT

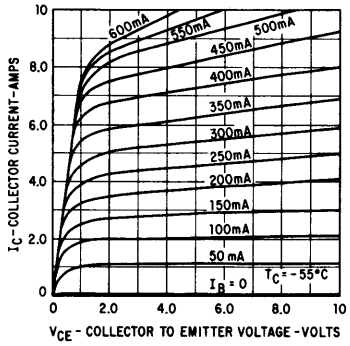


* Single family characteristics on transistor curve tracer.

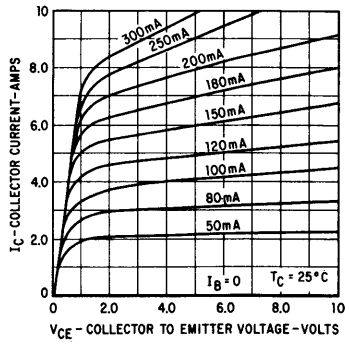
TYPICAL ELECTRICAL CHARACTERISTICS

2N5006

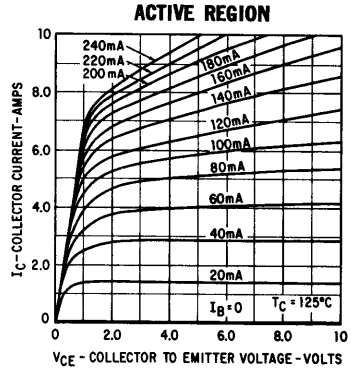
COLLECTOR CHARACTERISTICS* ACTIVE REGION



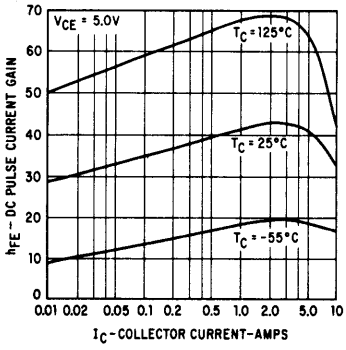
COLLECTOR CHARACTERISTICS* ACTIVE REGION



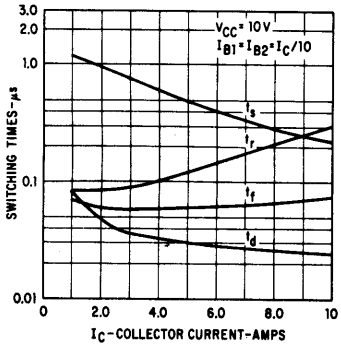
COLLECTOR CHARACTERISTICS* ACTIVE REGION



DC PULSE CURRENT GAIN VERSUS COLLECTOR CURRENT

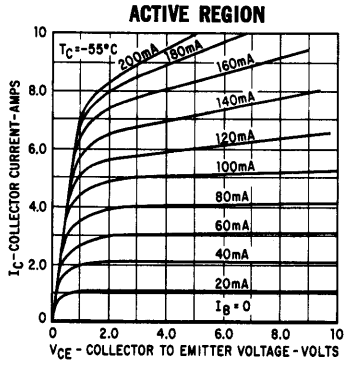


SWITCHING TIMES VERSUS COLLECTOR CURRENT

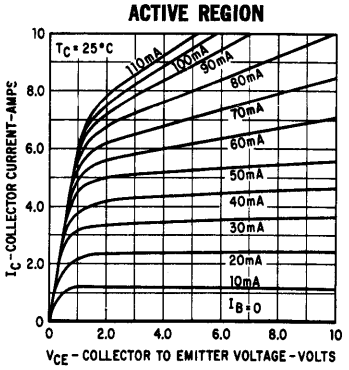


2N5008

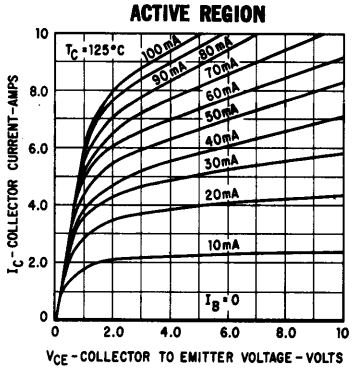
COLLECTOR CHARACTERISTICS* ACTIVE REGION



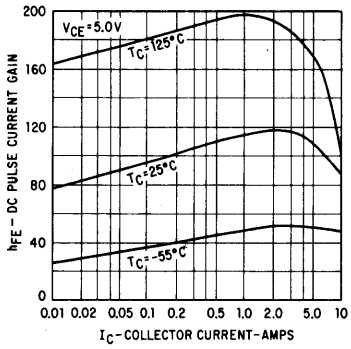
COLLECTOR CHARACTERISTICS* ACTIVE REGION



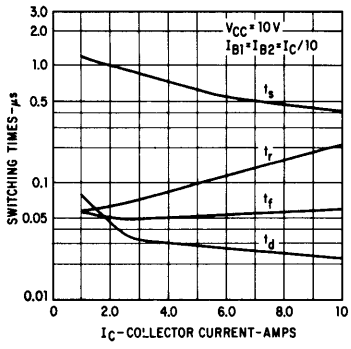
COLLECTOR CHARACTERISTICS* ACTIVE REGION



DC PULSE CURRENT GAIN VERSUS COLLECTOR CURRENT



SWITCHING TIMES VERSUS COLLECTOR CURRENT



*Single family characteristic on Transistor Curve Tracer.

2N5007 • 2N5009

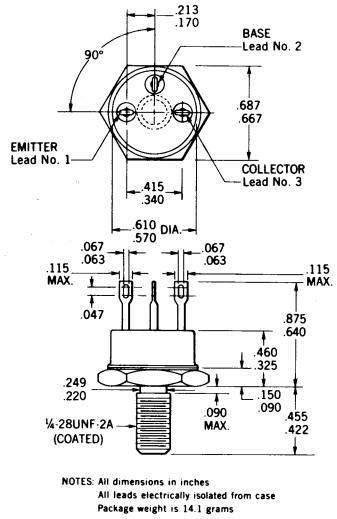
100 WATT PNP POWER TRANSISTORS

DIFFUSED SILICON PLANAR* EPITAXIAL TRANSISTORS

SEE 2N5006 • 2N5008 FOR NPN COMPLEMENT

- **HIGH POWER** . . . . . **100 WATTS AT $T_C = 50°C$, $V_{CE} = -40$ V**
- **HIGH VOLTAGE** . . . . . **−80 V (MIN) LV_{CEO}**
- **HIGH CURRENT SATURATION VOLTAGE** . . . **−1.5 V (MAX) $V_{CE(sat)}$ AT 10 A**
- **HIGH FREQUENCY** . . . . . **30 AND 40 MHz (MIN) f_T**
- **BETA GUARANTEED AT 3 POINTS** . . . . . **100 mA, 5.0 A AND 10 A**
- **ISOLATED COLLECTOR PACKAGE** . . . . . **NO ISOLATING HARDWARE REQUIRED**
- **DISCRETE EMITTER GEOMETRY WITH INTEGRATED FEEDBACK RESISTORS**

PHYSICAL DIMENSIONS
Similar to JEDEC (TO-61)



NOTES: All dimensions in inches
All leads electrically isolated from case
Package weight is 14.1 grams

ABSOLUTE MAXIMUM RATINGS (Note 1)

Maximum Temperatures

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

Maximum Power Dissipation

Total Dissipation at 50°C Case Temperature, $V_{CE} = -40$ V (See Maximum Permissible Power Curve and Note 4)	**100 Watts**

Maximum Voltages and Current

V_{CES}	Collector to Emitter Voltage	−100 Volts
V_{CEO}	Collector to Emitter Voltage (Note 2)	−80 Volts
V_{EBO}	Emitter to Base Voltage	−5.5 Volts
I_C	Collector Current	10 Amps

ELECTRICAL CHARACTERISTICS (25°C Case Temperature unless otherwise noted)

SYMBOL	CHARACTERISTIC	2N5007 MIN.	2N5007 MAX.	2N5009 MIN.	2N5009 MAX.	UNITS	TEST CONDITIONS	
$V_{CEO(sus)}$	**Collector to Emitter Sustaining Voltage** (Notes 2 and 3)	**−80**		**−80**		**Volts**	**$I_C = 200$ mA**	**$I_B = 0$**
BV_{CES}	Collector to Emitter Breakdown Voltage	−100		−100		Volts	$I_C = 1.0$ mA	$V_{BE} = 0$
BV_{EBO}	Emitter to Base Breakdown Voltage	−5.5		−5.5		Volts	$I_C = 0$	$I_E = 1.0$ mA
h_{FE}	**DC Pulse Current Gain** (Note 3)	**20**		**50**			**$I_C = 100$ mA**	**$V_{CE} = -5.0$ V**
h_{FE}	**DC Pulse Current Gain** (Note 3)	**30**	**90**	**70**	**200**		**$I_C = 5.0$ A**	**$V_{CE} = -5.0$ V**
$h_{FE}(-55°C)$	DC Pulse Current Gain (Note 3)	12		35			$I_C = 5.0$ A	$V_{CE} = -5.0$ V
h_{FE}	**DC Pulse Current Gain** (Note 3)	**20**		**45**			**$I_C = 10$ A**	**$V_{CE} = -5.0$ V**
h_{fe}	**High Frequency Current Gain (f = 20 MHz)**	**1.5**		**2.0**			**$I_C = 2.0$ A**	**$V_{CE} = -5.0$ V**
$V_{CE(sat)}$	Pulsed Collector Saturation Voltage (Note 3)		−0.9		−0.9	Volts	$I_C = 5.0$ A	$I_B = 0.5$ A
$V_{CE(sat)}$	**Pulsed Collector Saturation Voltage** (Note 3)		**−1.5**		**−1.5**	**Volts**	**$I_C = 10$ A**	**$I_B = 1.0$ A**

Additional Electrical Characteristics on page 2

*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

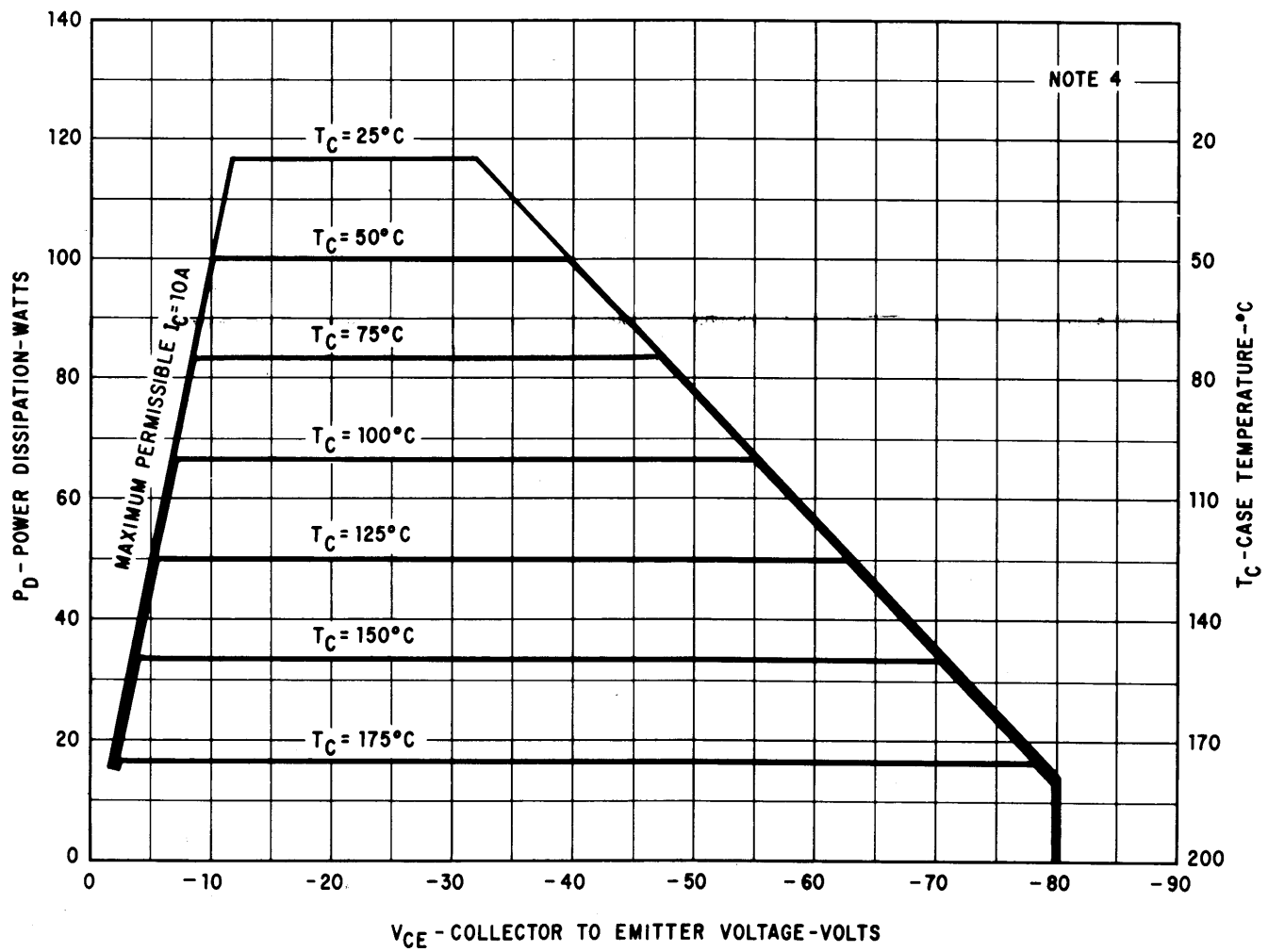
ELECTRICAL CHARACTERISTICS (25°C Case Temperature unless otherwise noted)

SYMBOL	CHARACTERISTIC	2N5007 MIN.	2N5007 MAX.	2N5009 MIN.	2N5009 MAX.	UNITS	TEST CONDITIONS	
$V_{BE(sat)}$	Pulsed Base Saturation Voltage (Note 3)		−1.8		−1.8	Volts	$I_C = 5.0$ A	$I_B = 0.5$ A
$V_{BE(sat)}$	Pulsed Base Saturation Voltage (Note 3)		−2.2		−2.2	Volts	$I_C = 10$ A	$I_B = 1.0$ A
$V_{BE(on)}$	Pulsed Base Emitter "ON" Voltage (Note 3)		−1.8		−1.8	Volts	$I_C = 5.0$ A	$V_{CE} = -5.0$ V
I_{CES}	Collector Cutoff Current		1.0		1.0	μA	$V_{CE} = -60$ V	$V_{BE} = 0$
I_{EBO}	Emitter Cutoff Current		1.0		1.0	μA	$I_C = 0$	$V_{EB} = -4.0$ V
I_{CEX}(150°C)	Collector Reverse Current		500		500	μA	$V_{CE} = -60$ V	$V_{EB} = -2.0$ V
C_{cb}	Collector to Base Capacitance (f = 1.0 MHz)		500		500	pF	$I_E = 0$	$V_{CB} = -10$ V

NOTES:

(1) These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
(2) This rating refers to a high current point where collector to emitter voltage is lowest.
(3) Pulse Conditions: length = 300 μs; duty cycle = 1%.
(4) Contact factory for maximum permissible power under pulsed or reverse biased operating conditions.

MAXIMUM PERMISSIBLE DC FORWARD BIASED POWER DISSIPATION



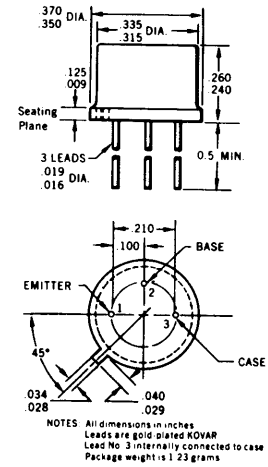
2N5022 · 2N5023

PNP HIGH VOLTAGE, HIGH CURRENT SWITCHES

DIFFUSED SILICON PLANAR* EPITAXIAL TRANSISTORS

- **FAST SWITCHING** . . . . . $t_{on} = 25$ ns (TYP) @ 500 mA
  . . . . . $t_{off} = 65$ ns (TYP) @ 500 mA
- **LOW SATURATION VOLTAGE** . . . $V_{CE}(sat) = 0.7$ V (MAX) @ 1.0 A
- **HIGH FREQUENCY** . . . . . $f_T = 200$ MHz (MIN) @ 50 mA
- **HIGH BETA** . . . . . $h_{FE} = 40 - 100$ @ 500 mA
  . . . . . $h_{FE} = 40$ (MIN) @ 1.0 A

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 (Note 2 and 3)

Total Dissipation at 25°C Case Temperature	4.0 Watts
Total Dissipation at 25°C Ambient Temperature	1.0 Watt

Maximum Voltages and Current

		2N5022	2N5023
V_{CBO}	Collector to Base Voltage	−50 Volts	−30 Volts
V_{CES}	Collector to Emitter Voltage	−50 Volts	−30 Volts
V_{CEO}	Collector to Emitter Voltage (Note 4)	−50 Volts	−30 Volts
V_{EBO}	Emitter to Base Voltage	−5.0 Volts	−5.0 Volts
I_C	Maximum Collector Current (Note 5)	1.0 Amp	1.0 Amp

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

SYMBOL	CHARACTERISTIC	2N5022 MIN.	2N5022 TYP.	2N5022 MAX.	2N5023 MIN.	2N5023 TYP.	2N5023 MAX.	UNITS	TEST CONDITIONS	
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
h_{FE}	DC Pulse Current Gain (Note 5)	15	40		30	50			$I_C = 100$ mA	$V_{CE} = -1.0$ V
h_{FE}	**DC Pulse Current Gain** (Note 5)	25	45	100	**40**	**60**	**100**		$I_C =$ **500 mA**	$V_{CE} = -1.0$ **V**
h_{FE}	**DC Pulse Current Gain** (Note 5)	25	45		**40**	**60**			$I_C =$ **1000 mA**	$V_{CE} = -5.0$ **V**
$h_{FE}(-55°C)$	DC Pulse Current Gain (Note 5)	10	25		20	45			$I_C = 500$ mA	$V_{CE} = -1.0$ V
$V_{CE}(sat)$	Pulsed Collector Saturation Voltage (Note 5)		−0.1	−0.2		−0.09	−0.17	Volts	$I_C = 100$ mA	$I_B = 10$ mA
$V_{CE}(sat)$	Pulsed Collector Saturation Voltage (Note 5)		−0.24	−0.4		−0.19	−0.35	Volts	$I_C = 500$ mA	$I_B = 50$ mA
$V_{CE}(sat)$	**Pulsed Collector Saturation Voltage** (Note 5)		−0.41	−0.8		**−0.3**	**−0.7**	**Volts**	$I_C =$ **1000 mA**	$I_B =$ **100 mA**
h_{fe}	**High Frequency Current Gain (f = 100 MHz)**	1.7	2.3		**2.0**	**2.8**			$I_C =$ **50 mA**	$V_{CE} = -10$ **V**
C_{cb}	Collector to Base Capacitance		18	25		20	25	pF	$V_{CB} = -10$ V	$I_E = 0$
C_{eb}	Emitter to Base Capacitance		80	100		80	100	pF	$V_{BE} = 0.5$ V	$I_C = 0$

*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 43.8°C/Watt (derating factor of 22.8 mW/°C); junction to ambient thermal resistance of 175°C/Watt (derating factor of 5.72 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%.
(6) See switching circuit for exact values of I_C, I_B, and I_{B2}.

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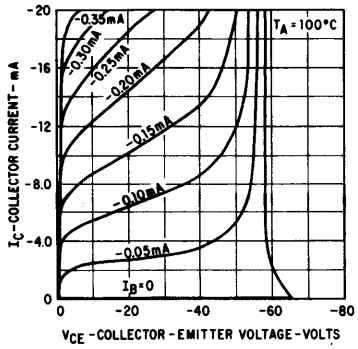
ELECTRICAL CHARACTERISTICS (25°C Free Air Temperature unless otherwise noted)

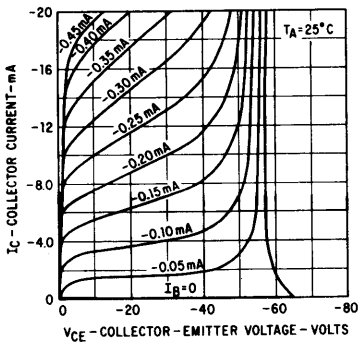
SYMBOL	CHARACTERISTIC	2N5022 MIN.	2N5022 TYP.	2N5022 MAX.	2N5023 MIN.	2N5023 TYP.	2N5023 MAX.	UNITS	TEST CONDITIONS	
V_{CEO}(sust)	Collector to Emitter Sustaining Voltage (Note 4 and 5)	−50			−30			Volts	$I_C = 10$ mA	$I_B = 0$
BV_{CBO}	Collector to Base Breakdown Voltage	−50			−30			Volts	$I_C = 100\ \mu$A	$I_E = 0$
BV_{CES}	Collector to Base Breakdown Voltage	−50			−30			Volts	$I_C = 100\ \mu$A	$V_{BE} = 0$
BV_{EBO}	Emitter to Base Breakdown Voltage	−5.0			−5.0			Volts	$I_E = 100\ \mu$A	$I_C = 0$
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	$I_C = 1000$ mA	$I_B = 100$ mA
I_{CES}	Collector Reverse Current		10	100				nA	$V_{CE} = -30$ V	$V_{BE} = 0$
I_{CES}	Collector Reverse Current					8.0	100	nA	$V_{CE} = -20$ V	$V_{BE} = 0$
I_{CES}(100°C)	Collector Reverse Current		1.5	15				μA	$V_{CE} = -30$ V	$V_{BE} = 0$
I_{CES}(100°C)	Collector Reverse Current					1.0	15	μA	$V_{CE} = -20$ V	$V_{BE} = 0$

2N5022

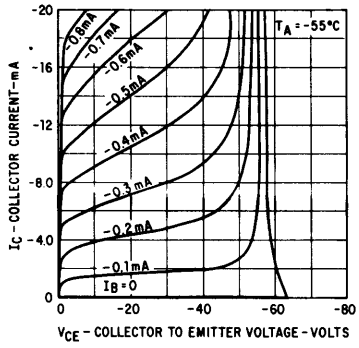
COLLECTOR CHARACTERISTICS



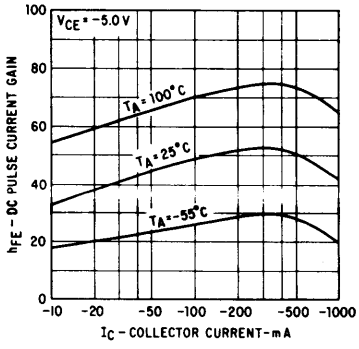
COLLECTOR CHARACTERISTICS



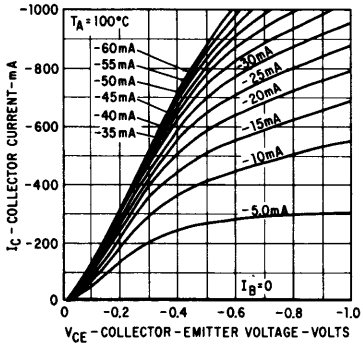
COLLECTOR CHARACTERISTICS



DC PULSE CURRENT GAIN VERSUS COLLECTOR CURRENT



COLLECTOR CHARACTERISTICS



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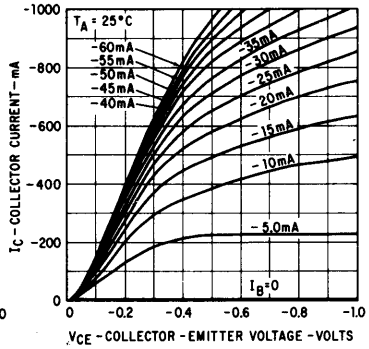
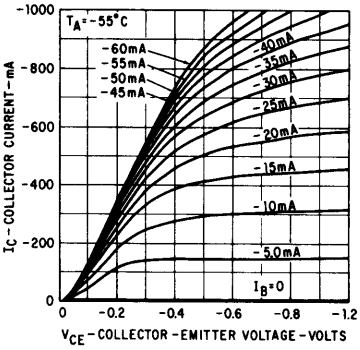
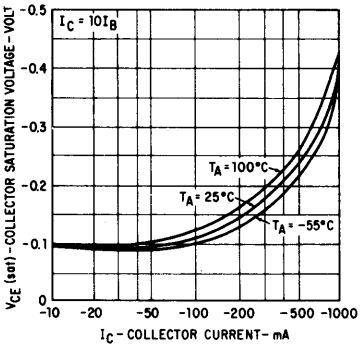


COLLECTOR CHARACTERISTICS



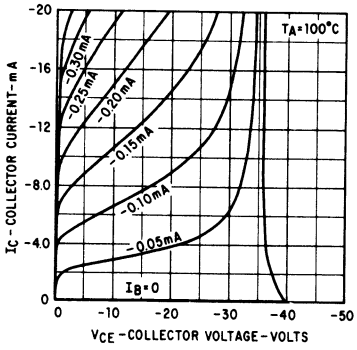
COLLECTOR SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



TYPICAL ELECTRICAL CHARACTERISTICS

2N5023

COLLECTOR CHARACTERISTICS*



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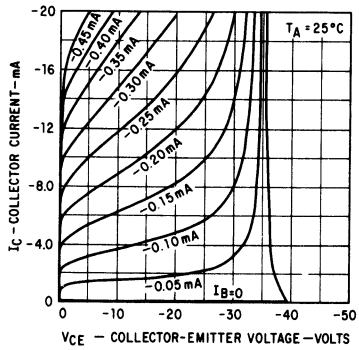
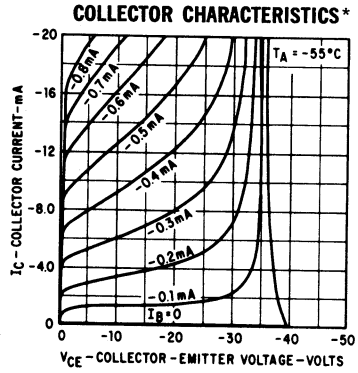
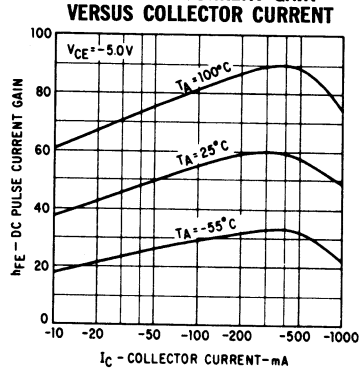


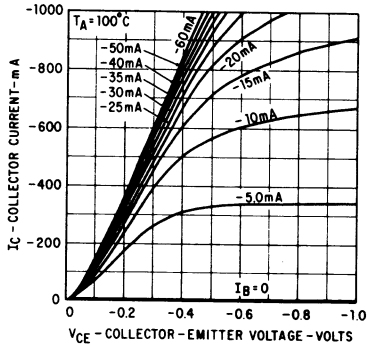
COLLECTOR CHARACTERISTICS*



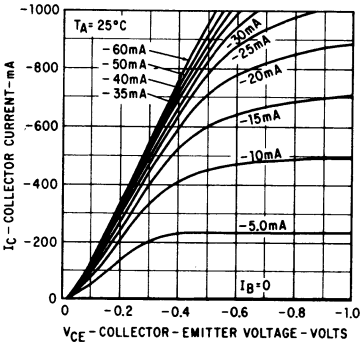
DC PULSE CURRENT GAIN VERSUS COLLECTOR CURRENT



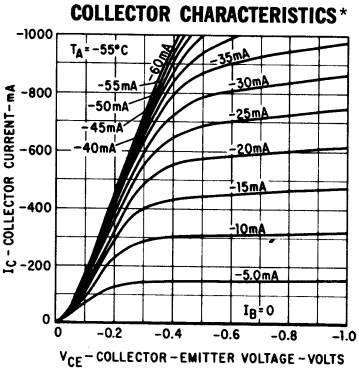
COLLECTOR CHARACTERISTICS*



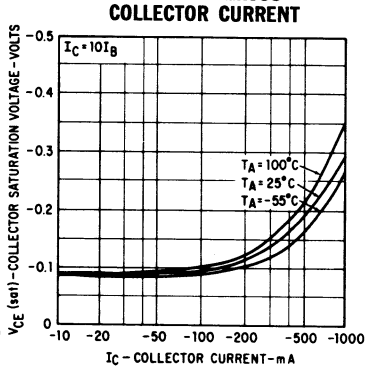
COLLECTOR CHARACTERISTICS*



COLLECTOR CHARACTERISTICS*

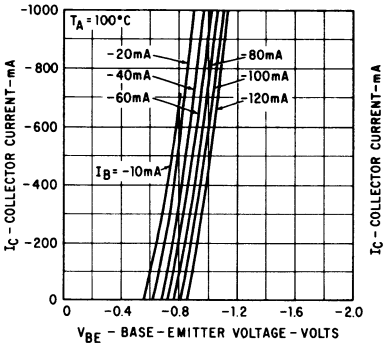


COLLECTOR SATURATION VOLTAGE VERSUS COLLECTOR CURRENT

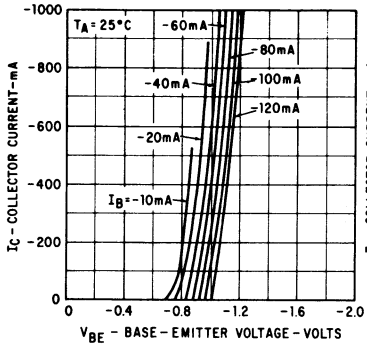


2N5022 • 2N5023

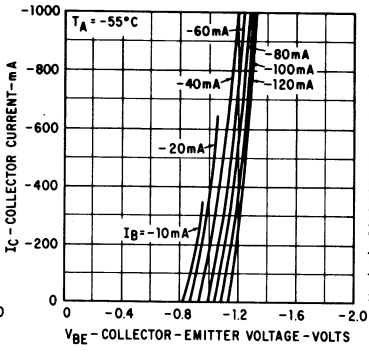
BASE CHARACTERISTIC*



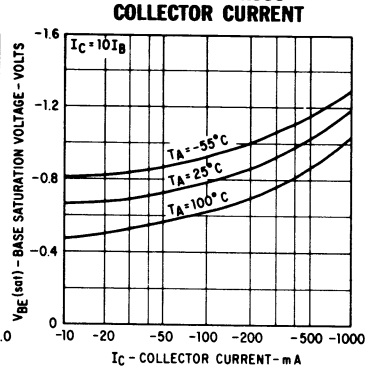
BASE CHARACTERISTIC*



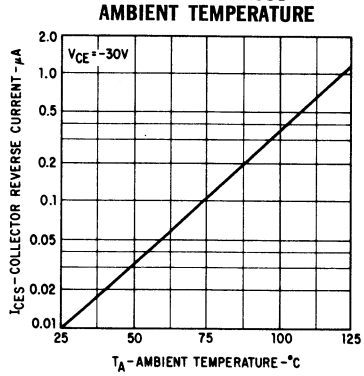
BASE CHARACTERISTIC*



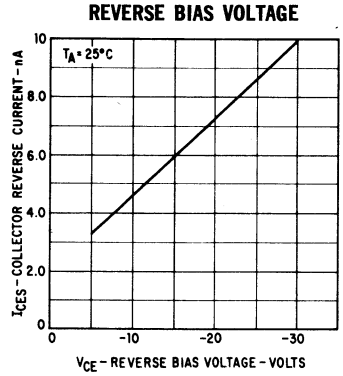
BASE SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



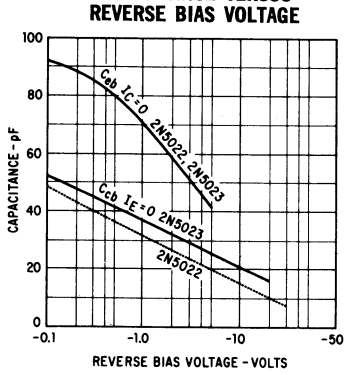
COLLECTOR REVERSE CURRENT VERSUS AMBIENT TEMPERATURE



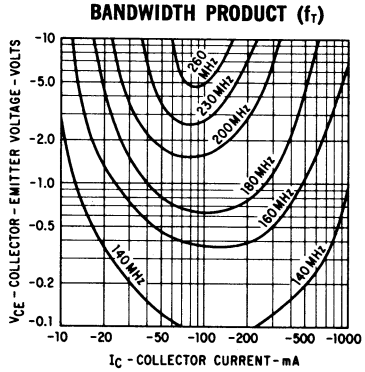
COLLECTOR REVERSE CURRENT VERSUS REVERSE BIAS VOLTAGE



INPUT AND OUTPUT CAPACITANCE VERSUS REVERSE BIAS VOLTAGE

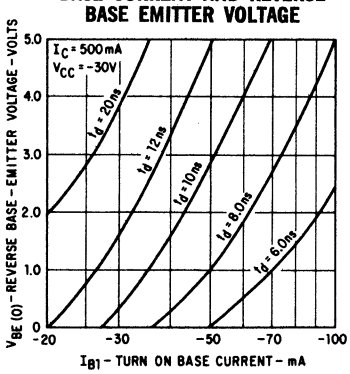


CONTOURS OF CONSTANT BANDWIDTH PRODUCT (f_T)

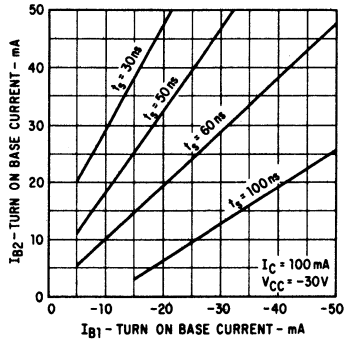


* Single family characteristic on Transistor Curve Tracer

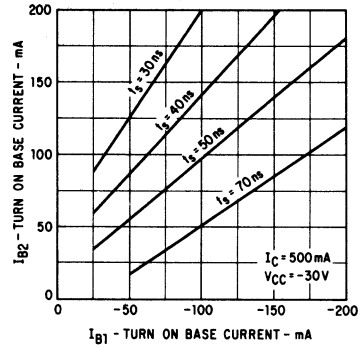
DELAY TIME VERSUS TURN ON BASE CURRENT AND REVERSE BASE EMITTER VOLTAGE



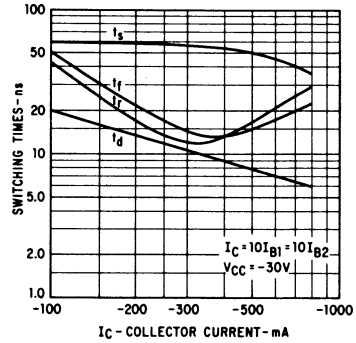
STORAGE TIME VERSUS TURN ON AND TURN OFF BASE CURRENTS



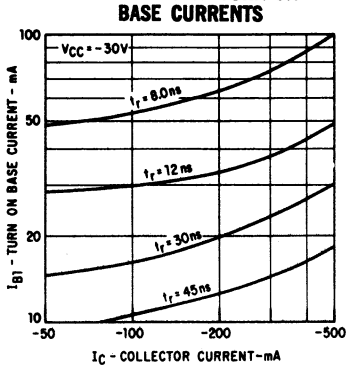
STORAGE TIME VERSUS TURN ON AND TURN OFF BASE CURRENTS



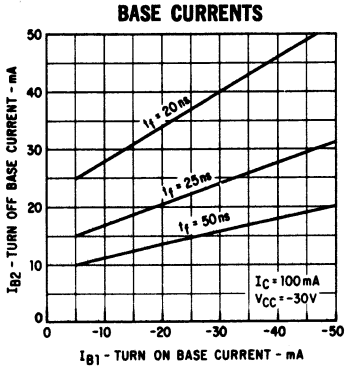
SWITCHING TIMES VERSUS COLLECTOR CURRENT



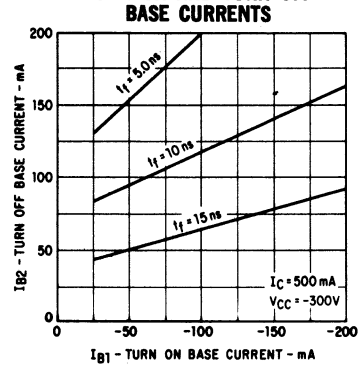
RISE TIME VERSUS COLLECTOR CURRENT AND TURN-ON BASE CURRENTS



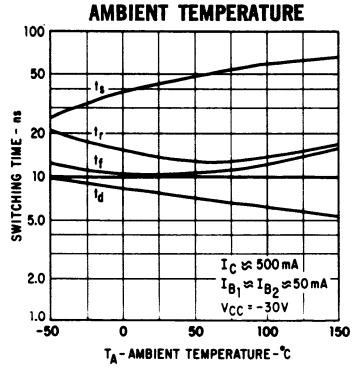
FALL TIME VERSUS TURN ON AND TURN OFF BASE CURRENTS



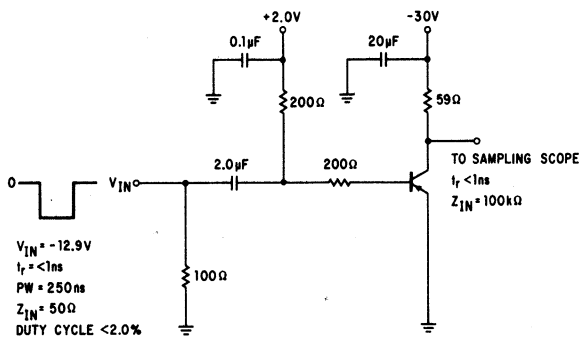
FALL TIME VERSUS TURN ON AND TURN OFF BASE CURRENTS



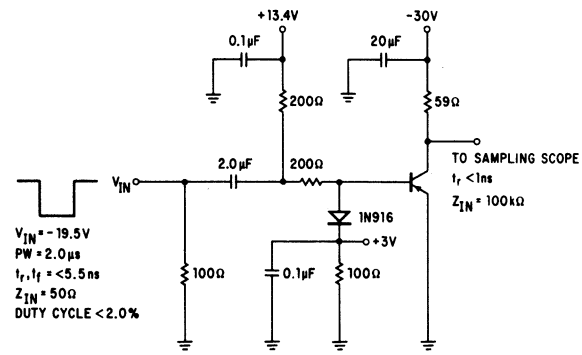
SWITCHING TIMES VERSUS AMBIENT TEMPERATURE



TURN-ON CIRCUIT



TURN-OFF CIRCUIT



2N5025 · 2N5026

NPN VHF POWER TRANSISTORS

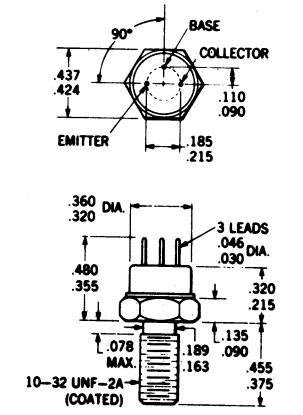
DIFFUSED SILICON PLANAR* EPITAXIAL TRANSISTORS

- **HIGH RF POWER GUARANTEE** - - 13.5 V operation: 20 W @ 50 MHz, Pin = 3.5 W
  (Unneutralized, Class C) - - 28 V operation: 25 W @ 80 MHz, Pin = 2.5 W
- **HIGH LV_{CEO} AND BV_{CES}** - - 13.5 V operation: 40 V and 75 V
  - - 28 V operation: 50 V and 90 V
- **DISCRETE EMITTER GEOMETRY WITH INTEGRATED FEEDBACK RESISTORS**

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			
Total Dissipation at 25°C Case Temperature (See Maximum Permissible DC Power Dissipation Curve and Note 5)		45 Watts	
Maximum Voltages and Current		**2N5025**	**2N5026**
V_{CEO}	Collector to Emitter Voltage [Note 4]	40 Volts	50 Volts
V_{CES}	Collector to Emitter Voltage	75 Volts	90 Volts
V_{EBO}	Emitter to Base Voltage	4.5 Volts	4.5 Volts
V_{CER}	Collector to Emitter Voltage	40 Volts	50 Volts
I_C	Collector Current	7.5 Amps	7.5 Amps

PHYSICAL DIMENSIONS
In accordance with JEDEC (TO-60)



NOTES: All dimensions in inches
Leads are nickel-plated kovar
Emitter internally connected to case
Package weight is 4.8 grams

ELECTRICAL CHARACTERISTICS (25°C Case Temperature unless otherwise noted)

SYMBOL	CHARACTERISTIC	2N5025 MIN.	2N5025 TYP.	2N5025 MAX.	2N5026 MIN.	2N5026 TYP.	2N5026 MAX.	UNITS	TEST CONDITIONS	
P_{out}	**Power Output (f = 50 MHz)**	**20**	**22**					**Watts**	**P_{in} = 3.5 W**	**V_{CC} = 13.5 V**
P_{out}	**Power Output (f = 80 MHz)**				**25**	**30**		**Watts**	**P_{in} = 2.5 W**	**V_{CC} = 28 V**
η	Collector Efficiency (f = 50 MHz)	65						%	P_{out} = 20 W	V_{CC} = 13.5 V
η	Collector Efficiency (f = 80 MHz)				65			%	P_{out} = 25 W	V_{CC} = 28 V
h_{fe}	High Frequency Current Gain (f = 50 MHz)	3.0	4.0		3.0	4.0			I_C = 1.0 A	V_{CB} = 2.0 V
C_{obo}	Collector Base Capacitance (f = 1.0 MHz)		54	85				pF	V_{CB} = 13.5 V	I_E = 0
C_{obo}	Collector Base Capacitance (f = 1.0 MHz)					43	60	pF	V_{CB} = 28 V	I_E = 0
BV_{CES}	**Collector to Emitter Breakdown Voltage**	**75**			**90**			**Volts**	**I_C = 5.0 mA**	**V_{BE} = 0**
V_{CEO}(sust)	**Collector to Emitter Sustaining Voltage** [Notes 2 and 4]	**40**	**65**		**50**	**75**		**Volts**	**I_C = 200 mA**	**I_B = 0**
BV_{CER}	**Collector to Emitter Breakdown Voltage** [Note 4]	**40**			50			Volts	I_C = 200 mA	R_{BE} = 10 Ω
BV_{EBO}	Emitter to Base Breakdown Voltage	4.5			4.5			Volts	I_E = 1.0 mA	I_C = 0
h_{FE}	DC Pulse Current Gain [Note 3]	20	40		20	40			I_C = 2.0 A	V_{CE} = 2.0 V
V_{CE}(sat)	Pulsed Collector Saturation Voltage [Note 3]			1.0			1.0	Volts	I_C = 2.0 A	I_B = 0.2 A
V_{BE}(sat)	Pulsed Base Saturation Voltage [Note 3]			1.5			1.5	Volts	I_C = 2.0 A	I_B = 0.2 A
I_{CES}	Collector Cutoff Current			10				μA	V_{CE} = 50 V	V_{BE} = 0
I_{CES}	Collector Cutoff Current						10	μA	V_{CE} = 60 V	V_{BE} = 0
I_{CES} (150°C)	Collector Cutoff Current			1.0				mA	V_{CE} = 50 V	V_{BE} = 0
I_{CES} (150°C)	Collector Cutoff Current						1.0	mA	V_{CE} = 60 V	V_{BE} = 0

(See notes on back page)

*Planar is a patented Fairchild process.

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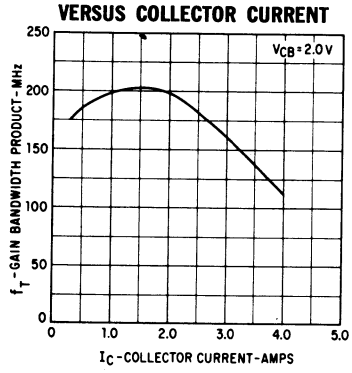
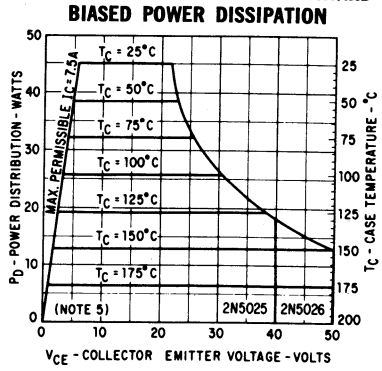
TYPICAL ELECTRICAL CHARACTERISTICS

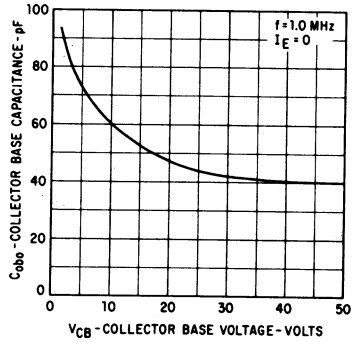
GAIN BANDWIDTH PRODUCT VERSUS COLLECTOR CURRENT



MAXIMUM PERMISSIBLE DC FORWARD BIASED POWER DISSIPATION

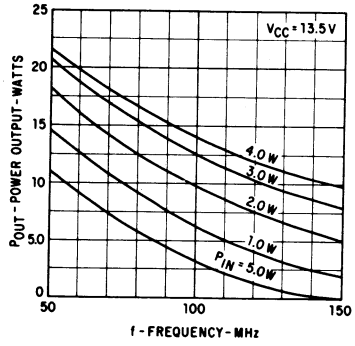


COLLECTOR BASE CAPACITANCE VERSUS COLLECTOR BASE VOLTAGE

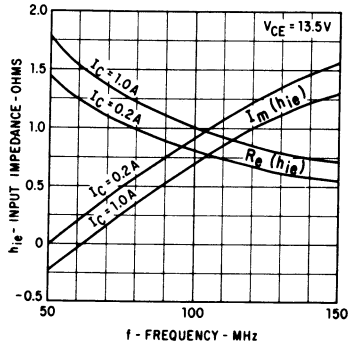


2N5025

POWER OUTPUT VERSUS FREQUENCY

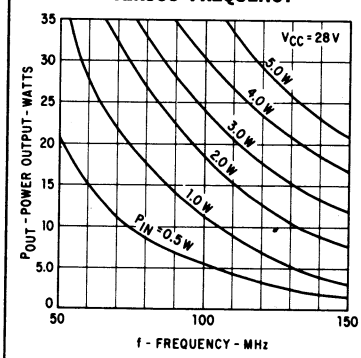


INPUT IMPEDANCE VERSUS FREQUENCY

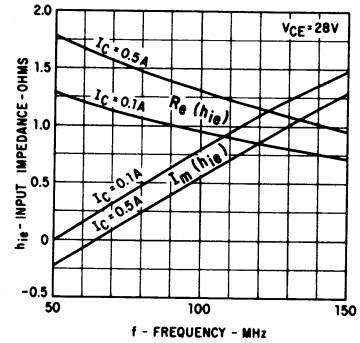


2N5026

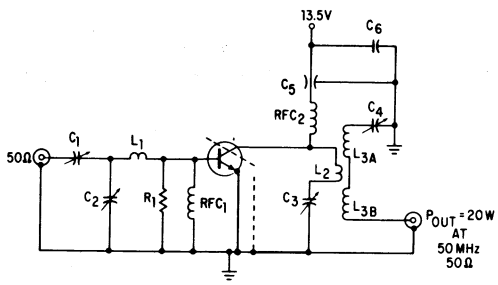
POWER OUTPUT VERSUS FREQUENCY



INPUT IMPEDANCE VERSUS FREQUENCY



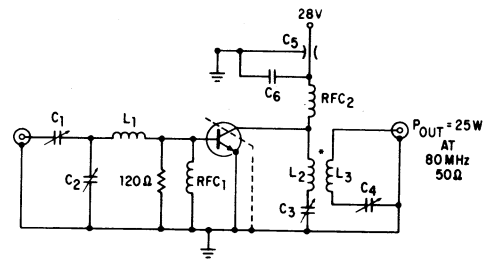
50 MHz AMPLIFIER TEST CIRCUIT



C_1 = 9 - 180 pF (ARCO #463 or Equivalent)
C_2 = 50 - 380 pF (ARCO #465 or Equivalent)
C_3 = 50 - 380 pF (ARCO #465 or Equivalent)
C_4 = 4 - 40 pF (ARCO #403 or Equivalent)
C_5 = 1000 pF Feed - thru
C_6 = 1.0 μF, 50 WVDC
L_1 = 2t., ⅛" dia. copper tubing, ½" I.D., ⅜" long, 0.10 μH, Qu > 200
L_2 = 2t., ⅛" dia. copper tubing, ¾" I.D., 7/16" long, 0.13 μH, Qu > 200
L_{3A} = 4t., ⅛" dia. copper tubing, ¾" I.D., ¾" long
L_{3B} = 6t., ⅛" dia. copper tubing, ¾" I.D., 1" long } 1.0 μH, Qu > 200
R_1 = 120 Ω non-inductive
RFC_1 = 7 μH (Ohmite Z - 50 or Equivalent)
RFC_2 = 11t., #22 enameled wire, close-wound, ¼" I.D., 0.3 μH

Note: L_{3A} & L_{3B} are wound continuously with ½" space between sections to admit L_2. kHz< K ≈ 0.2.

80 MHz AMPLIFIER TEST CIRCUIT



C_1 = 16 - 150 pF (ARCO #424 or equivalent)
C_2= 24 - 200 pF (ARCO #425 or equivalent)
C_3 = 4 - 40 pF (ARCO #422 or equivalent)
C_4 = 2 - 25 pF (ARCO #421 or equivalent)
C_5 = 1000 μF, Feed - thru
C_6 = 1.0 μF, 50 WVDC
L_1 = 1t., ⅛" dia. copper tubing, ⅜" I.D., ⅜" long, 0.01 μH, Qu > 200
L_2 = 3t., ⅛" dia. copper tubing, ¾" I.D., ⅝" long, 0.2 μH, Qu > 200
L_3 = 6t., ⅛" dia. copper tubing, ¾" I.D., 1 1/16" long, 0.6 μH, Qu > 200
RFC_1 = 7.0 μH (Ohmite Z-50 or equivalent)
RFC_2 = 11t., #20 Nylclad copper wire, close wound, ¼" I.D., 0.3 μH

Note: Spacing between L_2 and L_3 is 1 turn. kHz< K ≈ 0.2

NOTES:

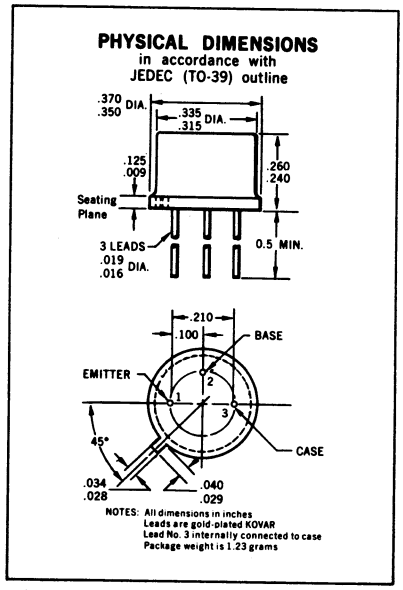
(1) These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
(2) Ratings refer to a high-current point where collector to emitter voltage is lowest. For more information send for Fairchild Publication APP-4/2.
(3) Pulse conditions: length = 300 μs; duty cycle = 1%.
(4) Pulsed thru a 25MH inductor.
(5) Contact factory for maximum permissible power under pulsed or reverse biased operating conditions.

2N5042

PNP HIGH CURRENT AMPLIFIER

DIFFUSED SILICON PLANAR* EPITAXIAL TRANSISTOR

- **EXCELLENT BETA LINEARITY** - - $\frac{h_{FE}\ @\ 500\ mA}{h_{FE}\ @\ 150\ mA} = 0.75$ (min.)
- **LOW SATURATION VOLTAGE** - - $V_{CE}(sat) = 0.45$ (typ.) @ $I_C = 1.0$ A, $I_B = 33$ mA
- **HIGH BREAKDOWN VOLTAGE** - - $LV_{CEO} = 40$ V (min.) @ $I_C = 30$ mA
- **LOW DISTORTION** - - 0.5% (typ.) @ 5.0 WATTS
- **COMPLEMENTARY WITH NPN SE8002 AND 2N3110**



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

Total Dissipation

at 25°C Case Temperature (Notes 2 & 3)	4.0 Watts
at 25°C Ambient Temperature (Notes 2 & 3)	0.8 Watt

Maximum Voltages

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

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

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
h_{FE2} / h_{FE1}	**DC Pulse Current Gain Ratio** (Note 5)	**0.75**	**0.85**			h_{FE1} @ $I_C = 150$ mA $V_{CE} = -1.0$ V; h_{FE2} @ $I_C = 500$ mA $V_{CE} = -1.0$ V
h_{FE1}	**DC Pulse Current Gain** (Note 5)	**40**	**75**	**150**		**$I_C = 150$ mA** **$V_{CE} = -1.0$ V**
h_{FE2}	**DC Pulse Current Gain** (Note 5)	**30**	**65**			**$I_C = 500$ mA** **$V_{CE} = -1.0$ V**
h_{FE}	DC Pulse Current Gain (Note 5)	30	85	225		$I_C = 10$ mA $V_{CE} = -1.0$ V
V_{CEO}(sust)	**Collector to Emitter Sustaining Voltage** (Notes 4 & 5)	**−40**			**Volts**	**$I_C = 30$ mA** (pulsed) $I_B = 0$
BV_{CBO}	Collector to Base Breakdown Voltage	−40			Volts	$I_C = 100\ \mu A$ $I_E = 0$
BV_{EBO}	Emitter to Base Breakdown Voltage	−5.0			Volts	$I_C = 0$ $I_E = 10\ \mu A$
V_{CE}(sat)	Pulsed Collector Saturation Voltage (Note 5)		−0.09	−0.25	Volt	$I_C = 150$ mA $I_B = 15$ mA
V_{CE}(sat)	Pulsed Collector Saturation Voltage (Note 5)		−0.20	−0.50	Volt	$I_C = 500$ mA $I_B = 50$ mA
V_{CE}(sat)	**Pulsed Collector Saturation Voltage** (Note 5)		**−0.45**	**−1.3**	**Volts**	**$I_C = 1.0$ A** **$I_B = 33$ mA**
V_{BE}(on)	Pulsed Base Emitter On Voltage (Note 5)		−0.69	−0.75	Volt	$I_C = 20$ mA $V_{CE} = -5.0$V
V_{BE}(sat)	Pulsed Base Saturation Voltage (Note 5)		−0.82	−1.1	Volts	$I_C = 150$ mA $I_B = 15$ mA
V_{BE}(sat)	Pulsed Base Saturation Voltage (Note 5)		−0.85	−1.1	Volts	$I_C = 500$ mA $I_B = 50$ mA
V_{BE}(sat)	Pulsed Base Saturation Voltage (Note 5)		−0.95	−1.2	Volts	$I_C = 1.0$ A $I_B = 33$ mA
I_{CBO}	Collector Cutoff Current		0.2	50	nA	$I_E = 0$ $V_{CB} = -30$ V
I_{CBO}(150°C)	Collector Cutoff Current		1.0	20	μA	$I_E = 0$ $V_{CB} = -30$ V
I_{EBO}	Emitter Cutoff Current		0.1	50	nA	$I_C = 0$ $V_{EB} = -4.0$ V
h_{fe}	High Frequency Current Gain (f = 100 MHz)	1.0	2.0	5.0		$I_C = 50$ mA $V_{CE} = -10$ V
C_{cb}	Collector to Base Capacitance (f = 1.0 MHz)		15	35	pF	$I_E = 0$ $V_{CB} = -10$ V
C_{eb}	Emitter to Base Capacitance (f = 1.0 MHz)		75	120	pF	$I_C = 0$ $V_{EB} = -0.5$ V
t_{on}	Turn On Time (Note 6)		23		ns	$I_C \approx 500$ mA $I_{B1} \approx 50$ mA
t_{off}	Turn Off Time (Note 6)		200		ns	$I_C \approx 500$ mA $I_{B1} = I_{B2} \approx 50$ mA
NF	Narrow Band Noise Figure (f = 1.0 kHz)		1.0		dB	$I_C = 200\ \mu A$ $V_{CE} = 5.0$ V $R_S = 1.0$ kΩ

*Planar is a patented Fairchild process.

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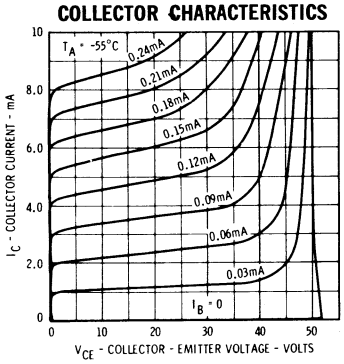
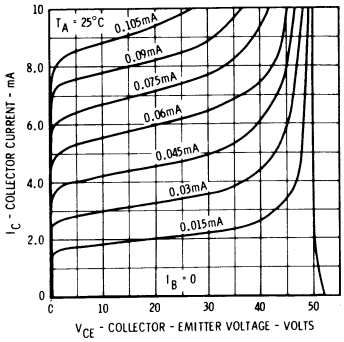
TYPICAL ELECTRICAL CHARACTERISTICS

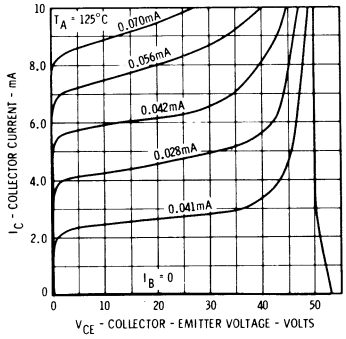
ACTIVE REGION COLLECTOR CHARACTERISTICS



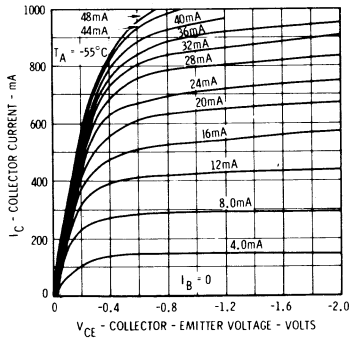
ACTIVE REGION COLLECTOR CHARACTERISTICS



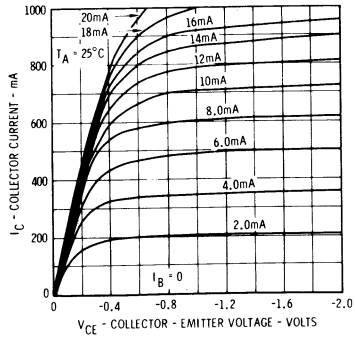
ACTIVE REGION COLLECTOR CHARACTERISTICS



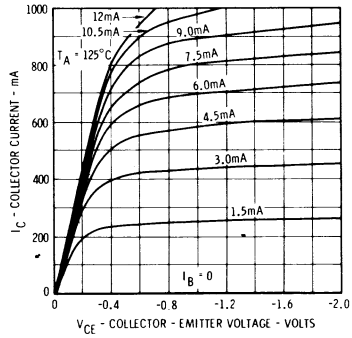
SATURATION REGION COLLECTOR CHARACTERISTICS



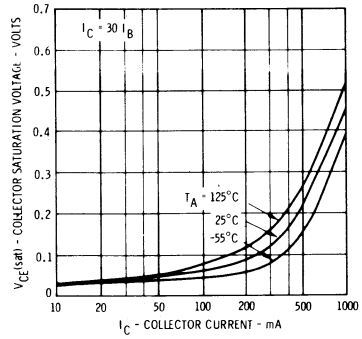
SATURATION REGION COLLECTOR CHARACTERISTICS



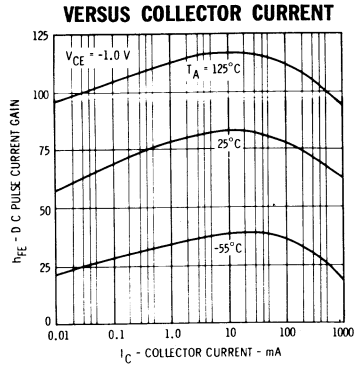
SATURATION REGION COLLECTOR CHARACTERISTICS



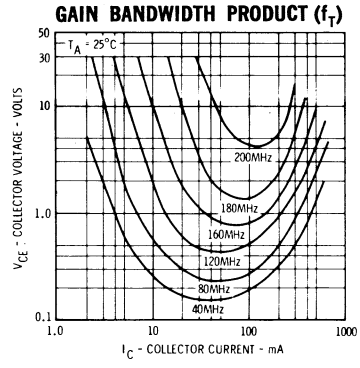
COLLECTOR SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



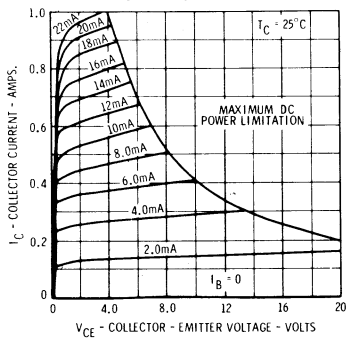
DC PULSE CURRENT GAIN VERSUS COLLECTOR CURRENT



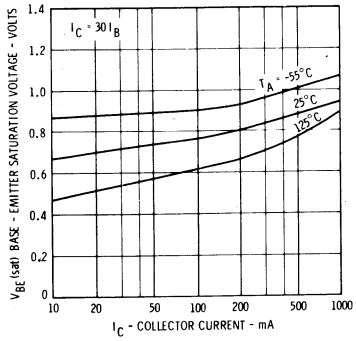
CONTOURS OF CONSTANT GAIN BANDWIDTH PRODUCT (f_T)



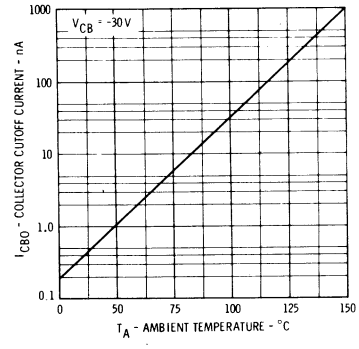
LARGE SIGNAL COLLECTOR CHARACTERISTICS



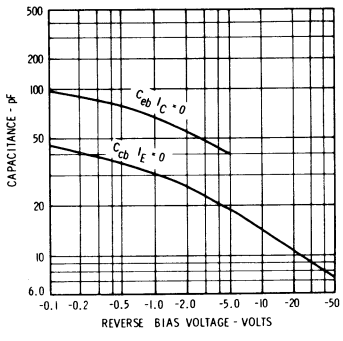
PULSED BASE SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



COLLECTOR CUTOFF CURRENT VERSUS AMBIENT TEMPERATURE



INPUT AND OUTPUT CAPACITANCE VERSUS REVERSE BIAS VOLTAGE



FAIRCHILD TRANSISTOR 2N5042

SMALL SIGNAL CHARACTERISTICS ($f = 1.0$ kHz)

SYMBOL	CHARACTERISTIC	TYP.	UNITS	TEST CONDITIONS	
h_{ie}	Input Resistance	2.3	kΩ	$I_C = 1.0$ mA	$V_{CE} = 5.0$ V
h_{oe}	Output Conductance	17	μmhos	$I_C = 1.0$ mA	$V_{CE} = 5.0$ V
h_{re}	Voltage Feedback Ratio	4.5	$\times 10^{-4}$	$I_C = 1.0$ mA	$V_{CE} = 5.0$ V
h_{fe}	Small Signal Current Gain	78		$I_C = 1.0$ mA	$V_{CE} = 5.0$ 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 200°C and junction to case thermal resistance of 43.8°C/Watt (derating factor of 22.8 mW/°C); junction to ambient thermal resistance of 219°C/Watt (derating factor of 4.56 mW/°C).

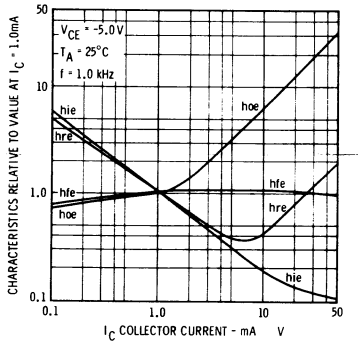
(4) This rating refers to a high current point where collector-to-emitter voltage is lowest.

(5) Pulse Conditions: length = 300 μs; duty cycle = 1%.

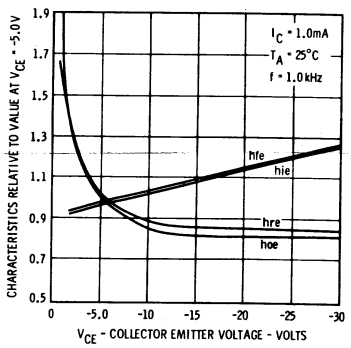
(6) See switching circuit for exact values of I_C, I_{B1}, and I_{B2}.

TYPICAL ELECTRICAL CHARACTERISTICS

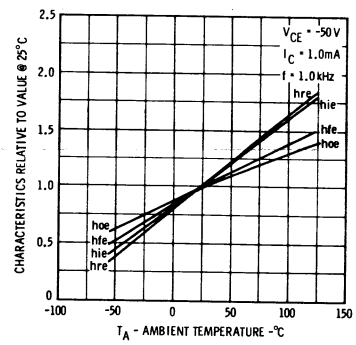
COMMON EMITTER CHARACTERISTICS VERSUS COLLECTOR CURRENT



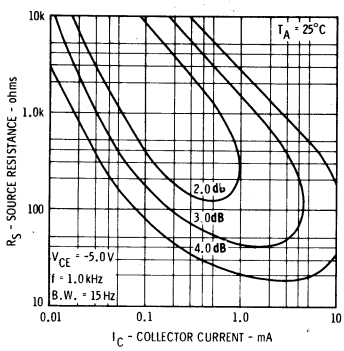
COMMON EMITTER CHARACTERISTICS VERSUS COLLECTOR-EMITTER VOLTAGE



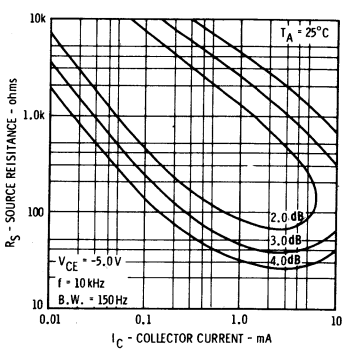
COMMON EMITTER CHARACTERISTICS VERSUS AMBIENT TEMPERATURE



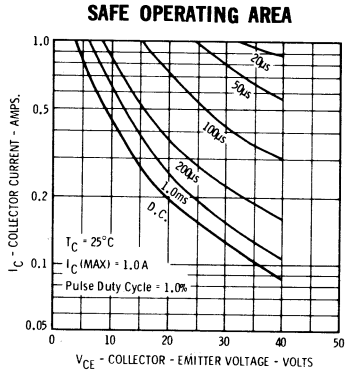
CONTOURS OF CONSTANT NARROW BAND NOISE FIGURE



CONTOURS OF CONSTANT NARROW BAND NOISE FIGURE

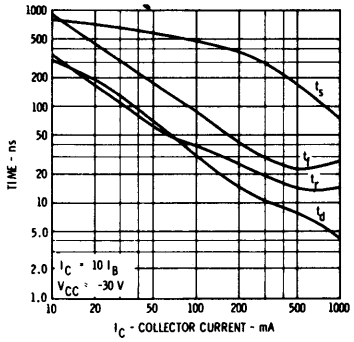


FORWARD BIASED SAFE OPERATING AREA

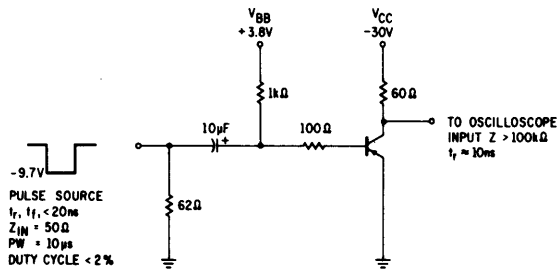


FAIRCHILD TRANSISTOR 2N5042

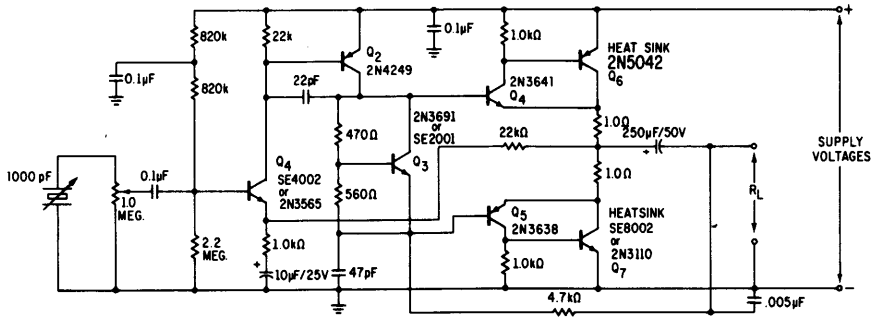
SWITCHING TIMES VERSUS COLLECTOR CURRENT



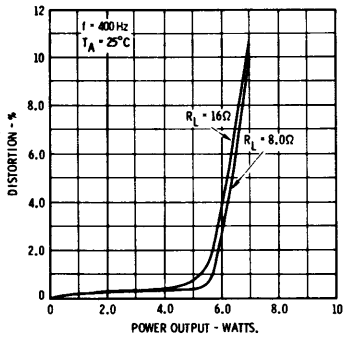
t_{on} AND t_{off} TEST CIRCUIT



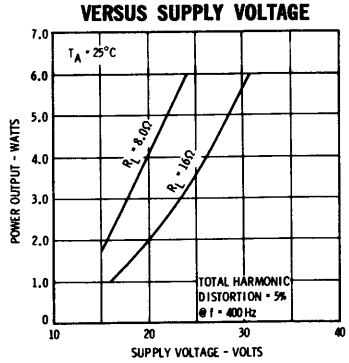
FIVE WATT AUDIO AMPLIFIER



DISTORTION VERSUS POWER OUTPUT

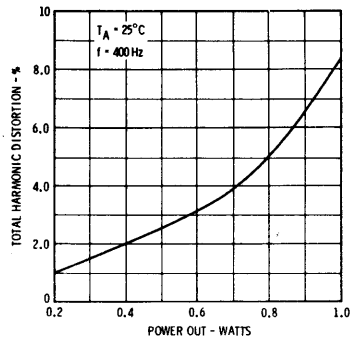


POWER OUTPUT VERSUS SUPPLY VOLTAGE

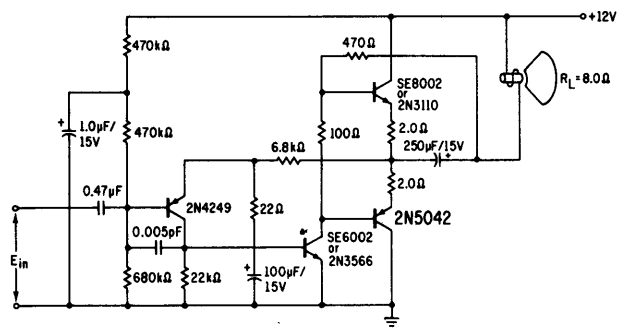


	V_{supply}=30V R_L=16Ω	V_{supply}=24V R_L=8.0 Ω
Total Harmonic Distortion @ f = 400 Hz, P_{out} = 5.0 W	0.7%	0.5%
Sensitivity @ f = 400 Hz, P_{out} = 5.0 W	410 mV(rms)	300 mV(rms)
$\frac{S+N}{N}$ (dB below 5.0 W)	64 dB	75 dB

TOTAL HARMONIC DISTORTION VERSUS POWER OUT



1.0 WATT AUDIO AMPLIFIER



SENSITIVITY - 14 mV(rms) for 1.0 watt output (R_L = 8.0Ω; 400 Hz)
S+N/N - 62 dB below 1.0watt

2N5065

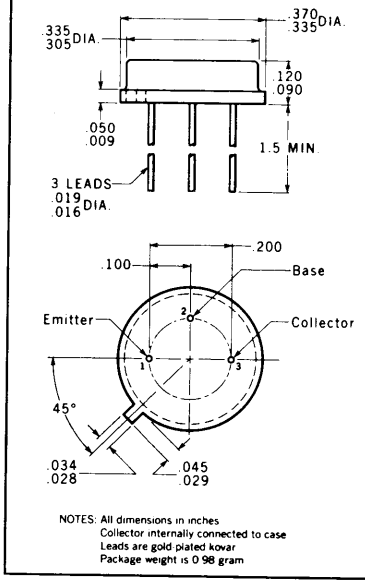
NPN HIGH SPEED HIGH CURRENT RADIATION RESISTANT SWITCH

SILICON PLANAR* EPITAXIAL TRANSISTOR

FEATURES

- **GUARANTEED PERFORMANCE AFTER 3 × 10^{14} nvt > 10 keV (INTEGRATED FAST NEUTRON DOSE)**
- **15 ns MAX. t_{on}; 35 ns MAX. t_{off}; 16 ns MAX. τ_s**
- **0.95 V MAX. V_{CE} (sat) @ 1.0 Amp.**
- **500 MHz MIN. f_T**
- **h_{FE} — 10 MIN. POST-IRRADIATION; 50 MIN. PRE-IRRADIATION @ 300 mA**

PHYSICAL DIMENSIONS



NOTES: All dimensions in inches
Collector internally connected to case
Leads are gold plated kovar
Package weight is 0.98 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	2.5 Watts
25°C Ambient Temperature	0.6 Watt

Maximum Voltages and Current

V_{CBO} Collector to Base Voltage	25 Volts
V_{CES} Collector to Emitter Voltage	25 Volts
V_{CEO} Collector to Emitter Voltage [Note 5]	15 Volts
V_{EBO} Emitter to Base Voltage	4.0 Volts
I_C Collector Current	1.0 Amp.

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

SYMBOL	CHARACTERISTIC	PRE-IRRADIATION Min.	Typ.	Max.	POST-IRRADIATION (3×10^{14} nvt >10 keV) Min.	Typ.	Max.	UNITS	TEST CONDITIONS	
t_{on}	**Turn On Time** [Note 6]		11	**15**		11	**15**	**ns**	$I_C \approx 1.0$ A	$I_{B1} \approx 200$ mA
t_{off}	**Turn Off Time** [Note 6]		20	**35**		15	**35**	**ns**	$I_C \approx 1.0$ A	$I_{B1} = I_{B2} \approx 200$ mA
τ_s	**Charge Storage Time** [Note 6]		**13**	**16**		**8.0**	**16**	**ns**	$I_C \approx 100$ mA	$I_{B1} \approx 100$ mA, $I_{B2} \approx -100$ mA
h_{fe}	**High Frequency Current Gain (f = 100 MHz)**	5.5	7.0		**5.0**	6.8			**$I_C = 100$ mA**	**$V_{CE} = 5.0$V**
V_{CE} (sat)	**Pulsed Collector Saturation Voltage** [Note 5]		0.15	0.23		0.21	0.30	**Volts**	$I_C = 100$ mA	$I_B = 10$ mA
V_{CE} (sat)	Pulsed Collector Saturation Voltage [Note 5]		0.20	0.33		0.29	0.42	Volts	$I_C = 300$ mA	$I_B = 30$ mA
V_{CE} (sat)	**Pulsed Collector Saturation Voltage** [Note 5]		0.45	**0.70**		0.59	**0.95**	**Volts**	**$I_C = 1.0$A**	**$I_B = 200$ mA**
V_{CE} (sat) (125°C)	Pulsed Collector Saturation Voltage [Note 5]		0.3	0.5		0.4	0.6	Volts	$I_C = 300$ mA	$I_B = 30$ mA
h_{FE}	DC Pulse Current Gain [Note 5]	50	88	120	10	19			$I_C = 300$ mA	$V_{CE} = 0.5$ V
h_{FE}	DC Pulse Current Gain [Note 5]	50	96		11	20			$I_C = 100$ mA	$V_{CE} = 0.5$ V
h_{FE} (−35°C)	DC Pulse Current Gain [Note 5]	20	40		5.0	7.0			$I_C = 300$ mA	$V_{CE} = 0.5$ V
h_{FE} (−55°C)	DC Pulse Current Gain [Note 5]	15	36		3.0	5.0			$I_C = 300$ mA	$V_{CE} = 0.5$ V
V_{BE} (sat)	Pulsed Base Saturation Voltage [Note 5]		0.79	1.1		0.81	1.1	Volts	$I_C = 100$ mA	$I_B = 10$ mA
V_{BE} (sat)	Pulsed Base Saturation Voltage [Note 5]		0.9	1.3		0.91	1.3	Volts	$I_C = 300$ mA	$I_B = 30$ mA
V_{BE} (sat)	Pulsed Base Saturation Voltage [Note 5]	1.0	1.17	2.4	1.0	1.24	2.4	Volts	$I_C = 1.0$ A	$I_B = 200$ mA
I_{CES}	Collector Reverse Current		8.5	100		8.5	100	μA	$V_{CE} = 15$ V	$V_{EB} = 0$
I_{CES} (125°C)	Collector Reverse Current			150			150	μA	$V_{CE} = 15$ V	$V_{EB} = 0$
C_{cb}	Collector to Base Capacitance		6.0	15		6.0	15	pF	$I_E = 0$	$V_{CB} = 5.0$ V
C_{eb}	Emitter to Base Capacitance		15	25		15	25	pF	$I_C = 0$	$V_{EB} = 0.5$ V
BV_{CES}	Collector to Emitter Breakdown Voltage	25	46		25	54		Volts	$I_C = 0.5$ mA	$I_B = 0$
BV_{CBO}	Collector to Base Breakdown Voltage	25			25			Volts	$I_C = 0.5$ mA	$I_E = 0$
V_{CEO} (sust)	Collector to Emitter Sustaining Voltage [Note 5]	15	17.5		15	23		Volts	$I_C = 30$ mA	$I_B = 0$
BV_{EBO}	Emitter to Base Breakdown Voltage	4.0	5.7		4.0	5.8		Volts	$I_C = 0$	$I_E = 0.1$ mA

* Planar is a patented Fairchild process.

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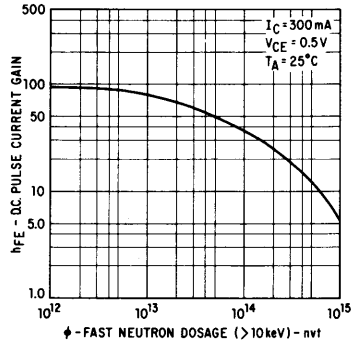
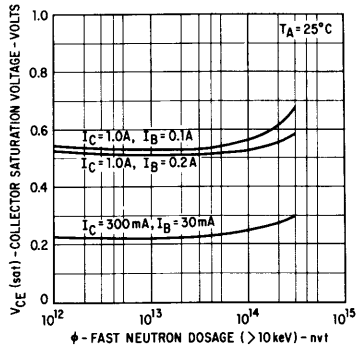
FAIRCHILD SEMICONDUCTOR
A DIVISION OF FAIRCHILD CAMERA AND INSTRUMENT CORPORATION

TYPICAL ELECTRICAL CHARACTERISTICS

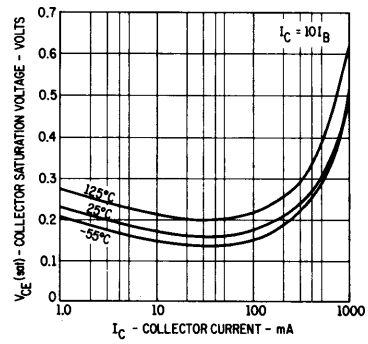
DC CURRENT GAIN VERSUS NEUTRON DOSAGE



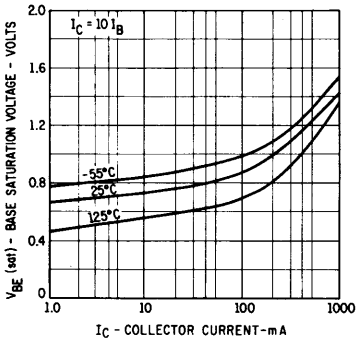
COLLECTOR SATURATION VOLTAGE VERSUS FAST NEUTRON DOSAGE



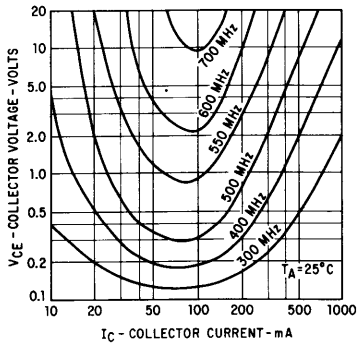
COLLECTOR SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



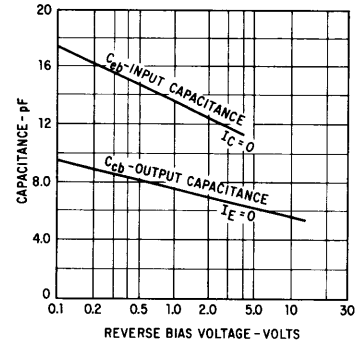
BASE SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



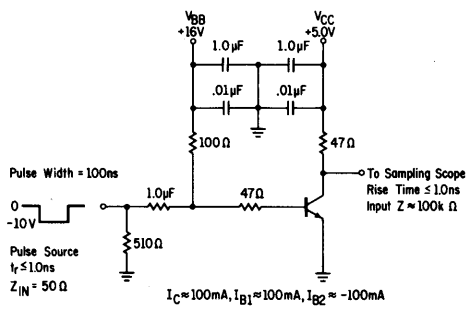
CONTOURS OF CONSTANT GAIN BANDWIDTH PRODUCT (f_T)



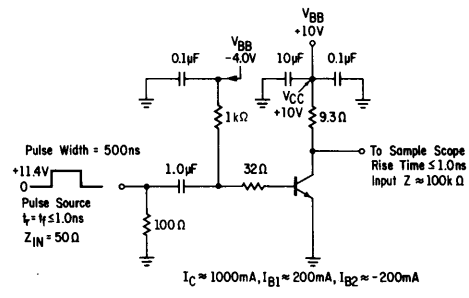
INPUT AND OUTPUT CAPACITANCE VERSUS REVERSE BIAS VOLTAGE



CHARGE STORAGE TIME MEASUREMENT CIRCUIT



t_{on} AND t_{off} MEASUREMENT CIRCUIT



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 58.3°C/Watt (derating factor of 17.2 mW/°C); junction to ambient thermal resistance of 291.7°C/Watt (derating factor of 3.43 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}.

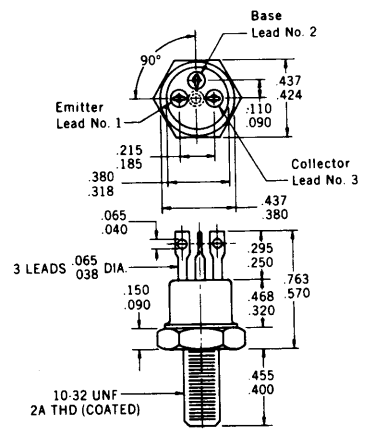
2N5083 • 2N5084 • 2N5085

35 WATT NPN POWER TRANSISTORS

DIFFUSED SILICON PLANAR* EPITAXIAL TRANSISTORS

- **HIGH VOLTAGE** . . . . . 150 AND 120 VOLT (MIN) BV_{CES}, 80 AND 60 VOLT (MIN) LV_{CEO}
- **LOW** $V_{CE(sat)}$ . . . . . 1.0 VOLT (MAX) AT $I_C = 10$ A, $I_B = 2.0$ A
- **HIGH SPEED** . . . . . MAX. t_{on} OF 350 ns AND t_{off} OF 650 ns AT $I_C = 5.0$ A, $I_B = 0.5$ A
- **HIGH FREQUENCY** . . . $f_T = 50$ AND 80 MHz (MIN)
- **LOW LEAKAGE** . . . . . MAX. I_{CES} OF 100 μA AT 150°C AS A RESULT OF PLANAR CONSTRUCTION

PHYSICAL DIMENSIONS
(in accordance with JEDEC TO-59 outline)



NOTES: All dimensions in inches
All leads electrically isolated from case
Package weight is 6.44 grams

ABSOLUTE MAXIMUM RATINGS (Note 1)

Maximum Temperatures

Storage Temperature Range	−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	35 Watts

		2N5083 2N5084	2N5085
Maximum Voltages and Currents			
V_{CBO}	Collector to Base Voltage	120 Volts	150 Volts
V_{CEO}	Collector to Emitter Voltage (Note 4)	60 Volts	80 Volts
V_{EBO}	Emitter to Base Voltage	6.0 Volts	6.0 Volts
I_C	Collector Current	10 Amps	10 Amps
I_B	Base Current	2.0 Amps	2.0 Amps

ELECTRICAL CHARACTERISTICS (25°C Case Temperature unless otherwise noted)

SYMBOL	CHARACTERISTICS		MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS	
BV_{CES}	**Collector to Emitter Breakdown Voltage**	2N5083, 2N5084	120			Volts	$I_C = 1.0$ mA	$V_{BE} = 0$
		2N5085	150			Volts	$I_C = 1.0$ mA	$V_{BE} = 0$
$V_{CEO(sus)}$	Collector to Emitter Sustaining Voltage (Notes 4 and 5)	2N5083, 2N5084	60			Volts	$I_C = 50$ mA	$I_B = 0$
		2N5085	80			Volts	$I_C = 50$ mA	$I_B = 0$
BV_{EBO}	Emitter to Base Voltage		6.0			Volts	$I_C = 0$	$I_E = 1.0$ mA
I_{CES}	Collector Reverse Current	2N5083, 2N5084		0.001	1.0	μA	$V_{CE} = 60$ V	$V_{BE} = 0$
		2N5085		0.001	1.0	μA	$V_{CE} = 100$ V	$V_{BE} = 0$
I_{EBO}	Emitter Reverse Current			0.002	1.0	μA	$I_C = 0$	$V_{EB} = 4.0$ V
h_{FE}	D.C. Pulse Current Gain (Note 5)	2N5084	100	150	300		$I_C = 2.0$ A	$V_{CE} = 2.0$ V
		2N5083, 2N5085	40	75	120		$I_C = 2.0$ A	$V_{CE} = 2.0$ V
$V_{CE(sat)}$	**Pulsed Collector Saturation Voltage** (Note 5)			**0.8**	**1.0**	**Volts**	$I_C = 10$ A	$I_B = 2.0$ A
$V_{BE(sat)}$	Pulsed Base Saturation Voltage (Note 5)			1.15	1.8	Volts	$I_C = 10$ A	$I_B = 2.0$ A
$V_{CE(sat)}$	Pulsed Collector Saturation Voltage (Note 5)			0.35	0.5	Volts	$I_C = 5.0$ A	$I_B = 0.5$ A
$V_{BE(sat)}$	Pulsed Base Saturation Voltage (Note 5)			1.0	1.3	Volts	$I_C = 5.0$ A	$I_B = 0.5$ A
C_{cb}	Collector to Base Capacitance			45	80	pF	$I_E = 0$	$V_{CB} = 10$ V
C_{eb}	Emitter to Base Capacitance			330	500	pF	$I_C = 0$	$V_{EB} = 0.5$ V

Notes on Page 2 Additional Electrical Characteristics on Page 2

*Planar is a patented Fairchild process.

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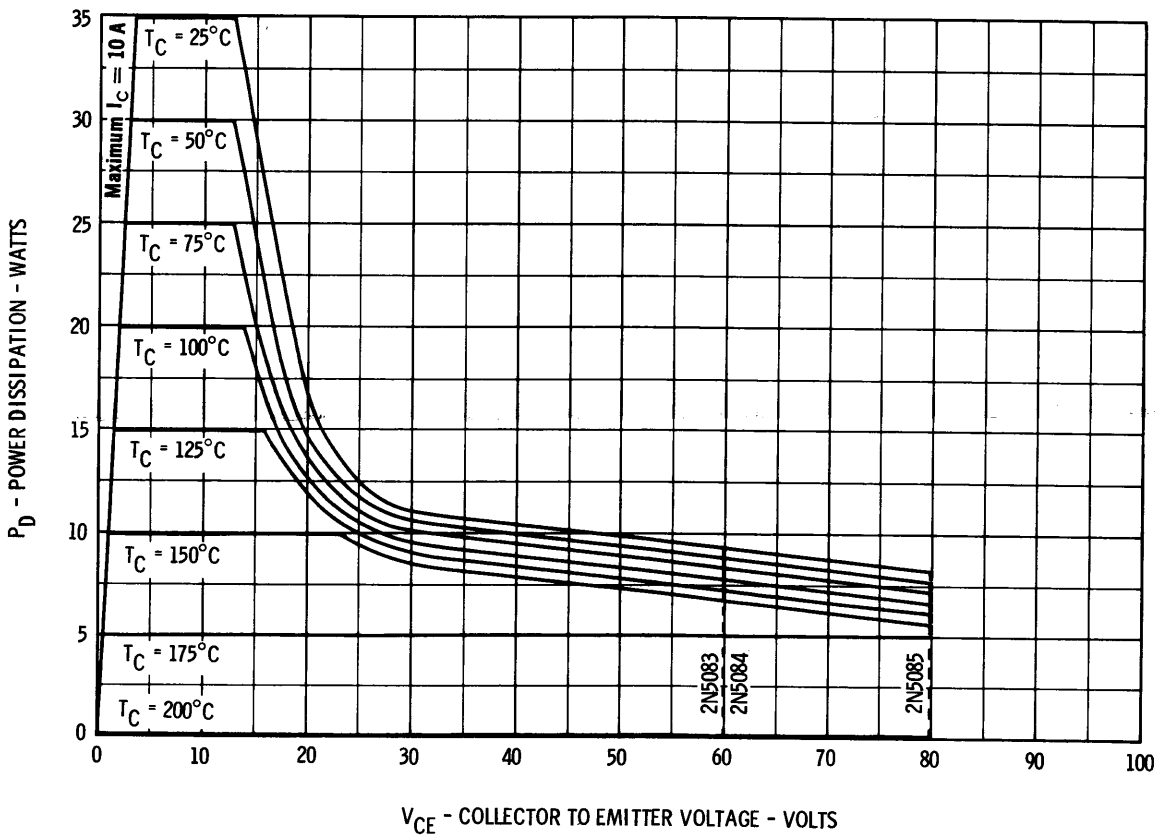
ELECTRICAL CHARACTERISTICS (25°C Case Temperature unless otherwise noted)

SYMBOL	CHARACTERISTICS		MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS	
t_d	**Delay Time** (Note 6)			**20**	**50**	**ns**	$I_C = 5.0$ A	$I_{B1} = 0.5$ A
t_r	**Rise Time** (Note 6)			**160**	**300**	**ns**	$I_C = 5.0$ A	$I_{B1} = 0.5$ A
t_s	**Storage Time** (Note 6)			**180**	**350**	**ns**	$I_C = 5.0$ A	$I_{B1} = 0.5$ A $I_{B2} = -0.5$ A
t_f	**Fall Time** (Note 6)			**120**	**300**	**ns**	$I_C = 5.0$ A	$I_{B1} = 0.5$ A $I_{B2} = -0.5$ A
h_{fe}	**High Frequency Current Gain (f = 20 MHz)**	2N5084	4.0	**6.0**			$I_C = 0.5$ A	$V_{CE} = 5.0$ V
		2N5083 2N5085	2.5	**6.0**			$I_C = 0.5$ A	$V_{CE} = 5.0$ V
h_{FE}(−55°C)	D.C. Pulse Current Gain (Note 5)	2N5084	35	75			$I_C = 2.0$ A	$V_{CE} = 2.0$ V
		2N5083 2N5085	15	40			$I_C = 2.0$ A	$V_{CE} = 2.0$ V
I_{CES}(150°C)	**Collector Reverse Current**	**2N5083**		2.0	**100**	**μA**	$V_{CE} = 60$ V	$V_{BE} = 0$
		2N5084						
		2N5085		3.0	**100**	**μA**	$V_{CE} = 100$ V	$V_{BE} = 0$

MAXIMUM PERMISSIBLE DC FORWARD BIAS POWER DISSIPATION

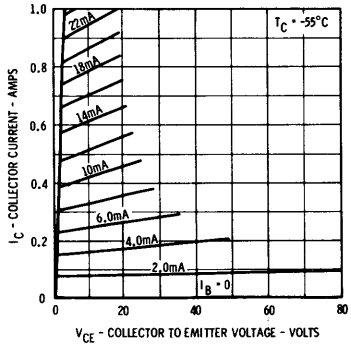


NOTES:
(1) These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
(2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.
(3) See Maximum Permissible D.C. Forward Bias Power Dissipation graph.
(4) This rating refers to a high current point where collector to emitter voltage is lowest. For more information send for Fairchild Publication APP-4/2.
(5) Pulse Conditions: length = 300 μs; duty cycle = 1%.
(6) Test conditions are given in the switching circuit.

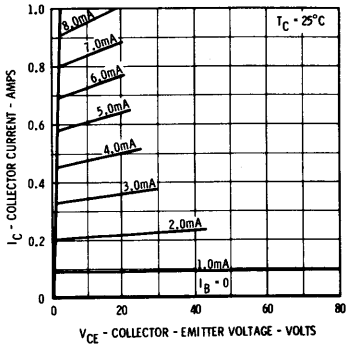
TYPICAL ELECTRICAL CHARACTERISTICS

2N5083 • 2N5085

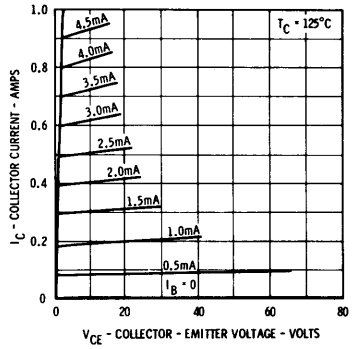
COLLECTOR CHARACTERISTICS* ACTIVE REGION



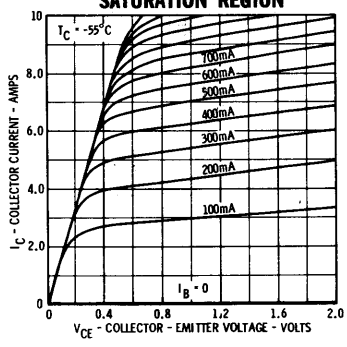
COLLECTOR CHARACTERISTICS* ACTIVE REGION



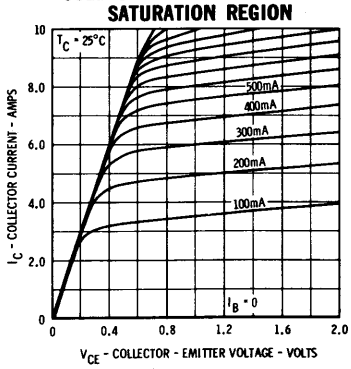
COLLECTOR CHARACTERISTICS* ACTIVE REGION



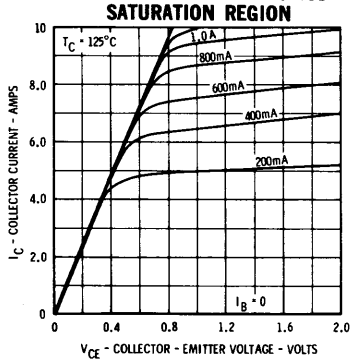
COLLECTOR CHARACTERISTICS* SATURATION REGION



COLLECTOR CHARACTERISTICS* SATURATION REGION



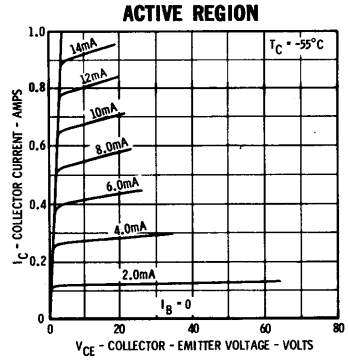
COLLECTOR CHARACTERISTICS* SATURATION REGION



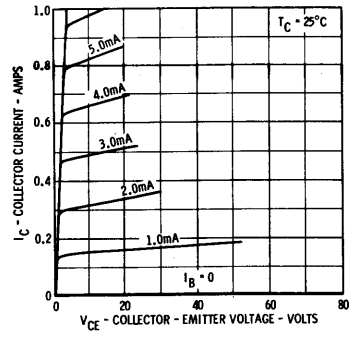
TYPICAL ELECTRICAL CHARACTERISTICS

2N5084

COLLECTOR CHARACTERISTICS* ACTIVE REGION



COLLECTOR CHARACTERISTICS* ACTIVE REGION



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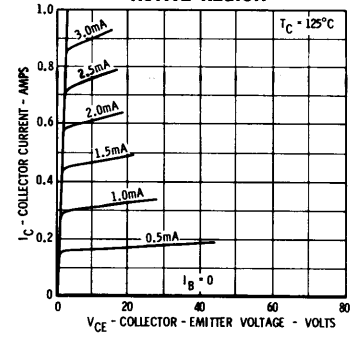

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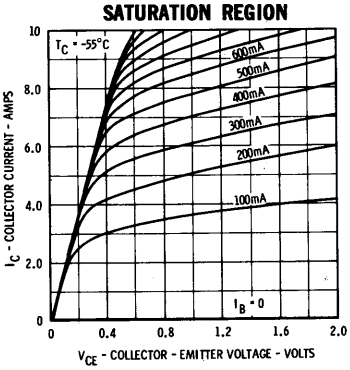

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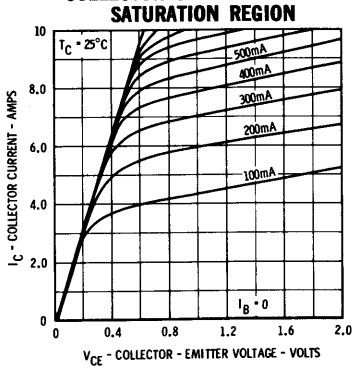
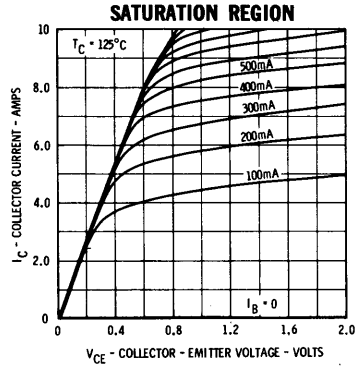


COLLECTOR CHARACTERISTICS* SATURATION REGION



*Single family characteristics on Transistor Curve Tracer