

BFY 57

HIGH-VOLTAGE AMPLIFIER

NPN DIFFUSED SILICON PLANAR TRANSISTOR

GENERAL DESCRIPTION-The BFY 57 is an NPN silicon PLANAR transistor primarily designed for high-voltage, medium-power amplifier applications. This device features a guaranteed minimum V_{CEO} of 125 volts and a minimum f_T of 40 Mc/s, and operates at current levels up to 100 mA.

ABSOLUTE MAXIMUM RATINGS (Note 1)

Maximum Temperatures

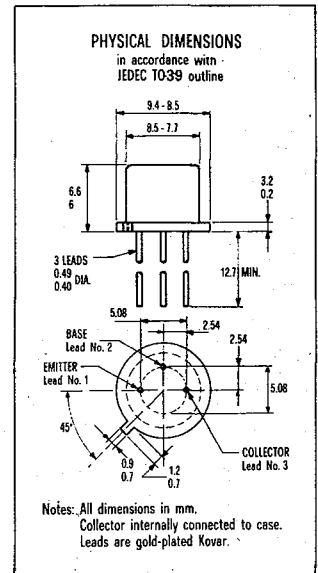
Storage Temperature	-65°C to + 200°C
Operating Junction Temperature	200°C Maximum
Lead Temperature (Soldering, 60 sec time limit)	300°C Maximum

Maximum Power Dissipations

Total Dissipation at 25°C Case Temperature (Notes 2 and 3)	5.0 Watts
at 25°C Ambient Temperature (Notes 2 and 3)	0.8 Watt

Maximum Voltages

V_{CBO} Collector to Base Voltage	125 Volts
V_{CEO} Collector to Emitter Voltage (Note 4)	125 Volts
V_{EBO} Emitter to Base Voltage	5.0 Volts

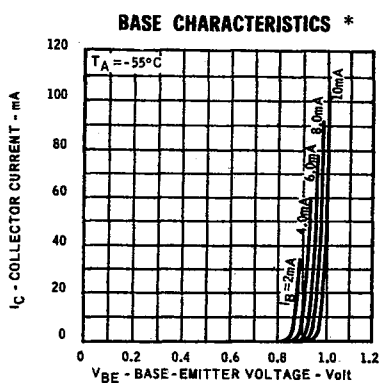
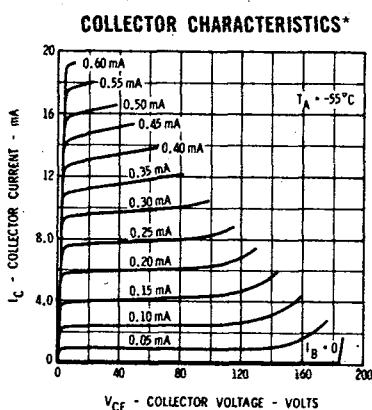
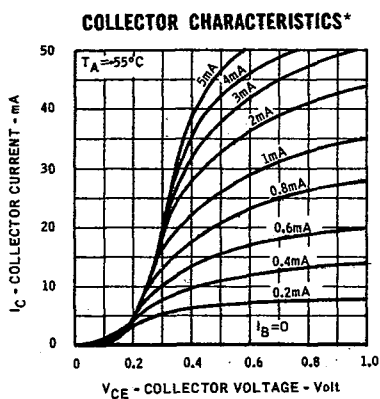
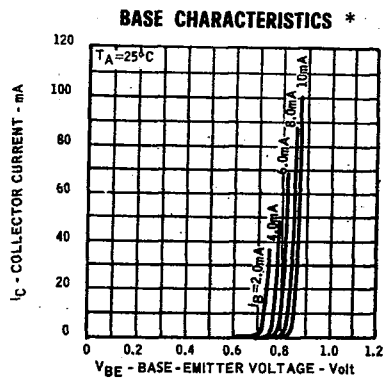
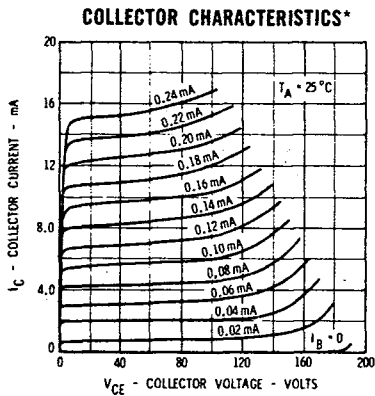
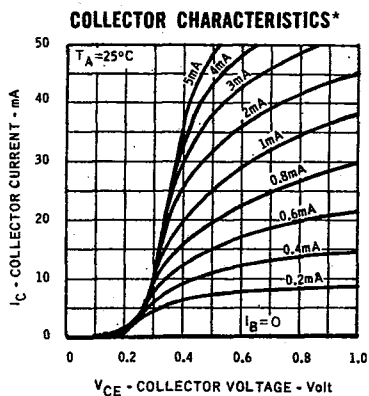
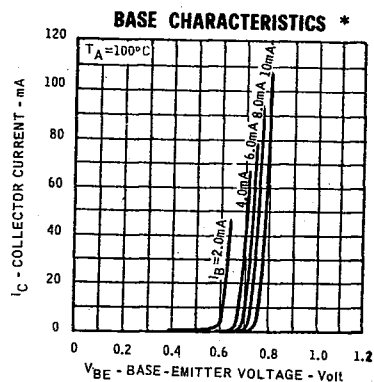
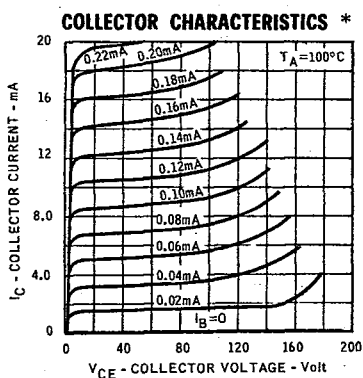
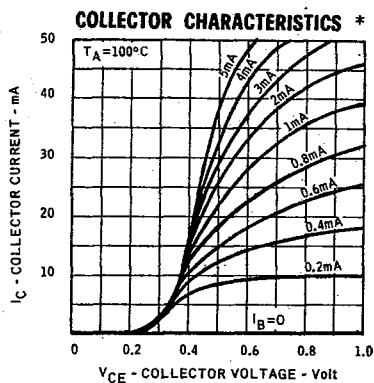


ELECTRICAL CHARACTERISTICS (25°C free air temperature unless otherwise noted)

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
h_{FE}	DC Current Gain	15	35			$I_C = 100 \mu A$ $V_{CE} = 10 V$
h_{FE}	DC Pulse Current Gain (Note 5)	30	60	150		$I_C = 30 mA$ $V_{CE} = 10 V$
$V_{BE} (sat)$	Base Saturation Voltage		0.8	0.9	V	$I_C = 50 mA$ $I_B = 5.0 mA$
$V_{CE} (sat)$	Collector Saturation Voltage		0.52	1.5	V	$I_C = 50 mA$ $I_B = 5.0 mA$
I_{CBO}	Collector Cutoff Current		0.3	100	nA	$I_E = 0$ $V_{CB} = 75 V$
I_{EBO}	Emitter Cutoff Current			100	nA	$I_C = 0$ $V_{EB} = 4.0 V$
BV_{CBO}	Collector to Base Breakdown Voltage	125			V	$I_E = 0$
BV_{EBO}	Emitter to Base Breakdown Voltage	5.0			V	$I_E = 100 \mu A$ $I_C = 0$
$V_{CEO} (sust)$	Collector to Emitter Sustaining Voltage (Notes 4 and 5)	125			V	$I_C = 30 mA$ $I_B = 0$ (pulsed)
h_{fe}	High Frequency Current Gain ($f = 20 Mc/s$)	2.0				$I_C = 30 mA$ $V_{CE} = 10 V$
C_{ob}	Output Capacitance		6.0	12	pF	$I_E = 0$ $V_{CB} = 20 V$
C_{TE}	Emitter Transition Capacitance		70	80	pF	$I_C = 0$ $V_{EB} = 0.5 V$
h_{fe}	Small Signal Current Gain ($f = 1 Kc/s$)		50			$I_C = 1.0 mA$ $V_{CE} = 5.0 V$
h_{ie}	Input Resistance ($f = 1 Kc/s$)		1.5		K Ω	$I_C = 1.0 mA$ $V_{CE} = 5.0 V$
h_{oe}	Output Conductance ($f = 1 Kc/s$)		5.3		μmho	$I_C = 1.0 mA$ $V_{CE} = 5.0 V$
h_{re}	Voltage Feedback Ratio ($f = 1 Kc/s$)		1.5		$\times 10^{-4}$	$I_C = 1.0 mA$ $V_{CE} = 5.0 V$
h_{ib}	Input Resistance ($f = 1 Kc/s$)		27		Ω	$I_C = 1.0 mA$ $V_{CB} = 5.0 V$
h_{ob}	Output Conductance ($f = 1 Kc/s$)		0.09		μmho	$I_C = 1.0 mA$ $V_{CB} = 5.0 V$
h_{rb}	Voltage Feedback Ratio ($f = 1 Kc/s$)		0.25		$\times 10^{-4}$	$I_C = 1.0 mA$ $V_{CB} = 5.0 V$



TYPICAL ELECTRICAL CHARACTERISTICS

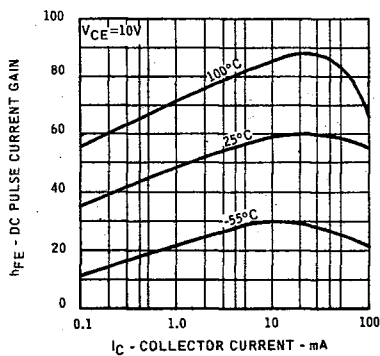


* Single family characteristics on Transistor Curve Tracer

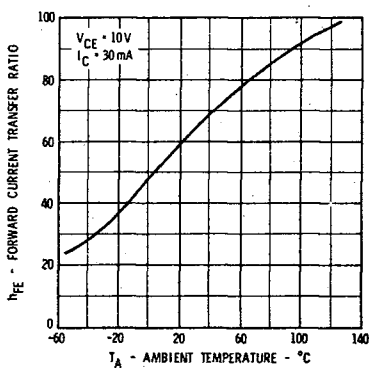


TYPICAL ELECTRICAL CHARACTERISTICS

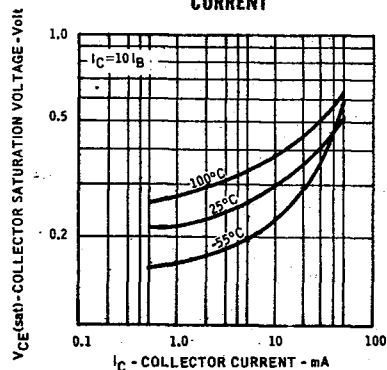
DC PULSE CURRENT GAIN VERSUS COLLECTOR CURRENT



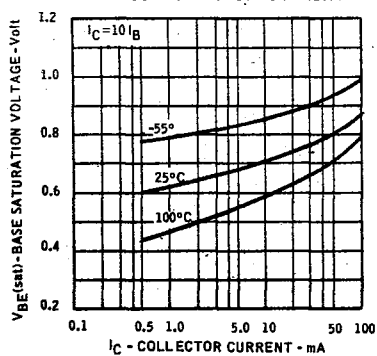
DC PULSED CURRENT GAIN VERSUS AMBIENT TEMPERATURE



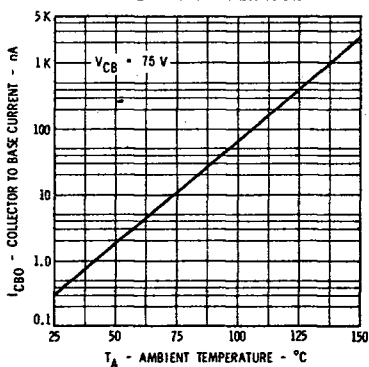
COLLECTOR SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



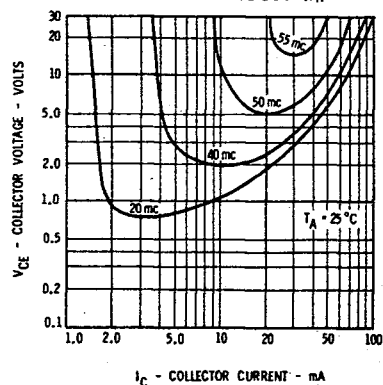
BASE SATURATION VOLTAGE VERSUS COLLECTOR CURRENT



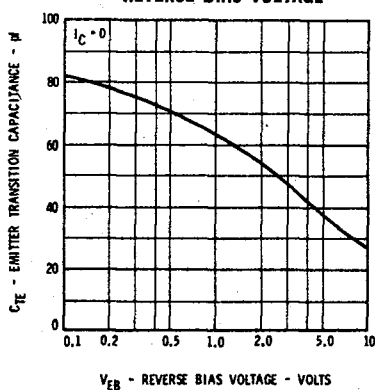
COLLECTOR-BASE DIODE REVERSE CURRENT VERSUS AMBIENT TEMPERATURE



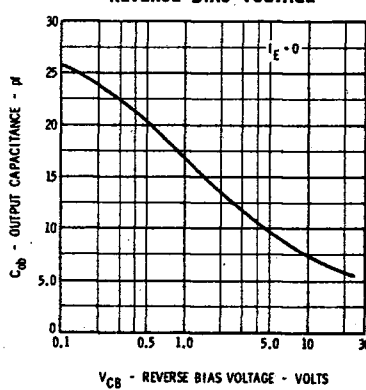
CONTOURS OF CONSTANT GAIN BANDWIDTH PRODUCT (f_T)



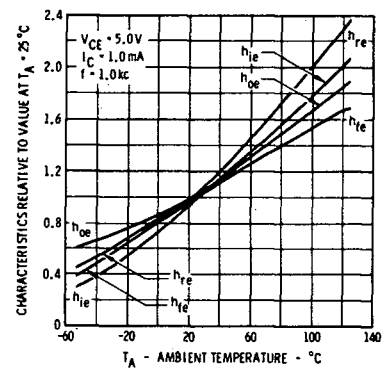
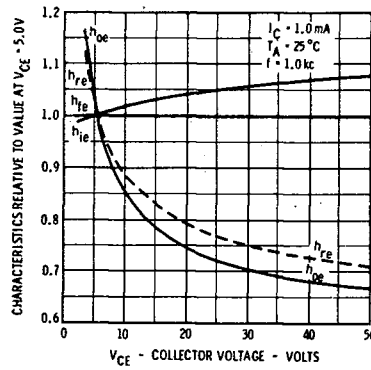
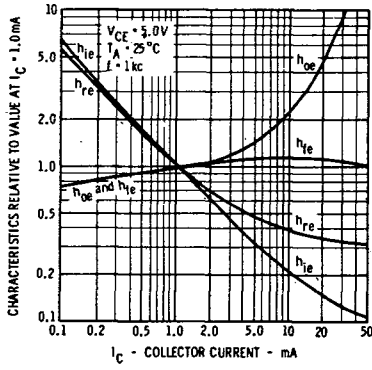
EMITTER TRANSITION CAPACITANCE VERSUS REVERSE BIAS VOLTAGE



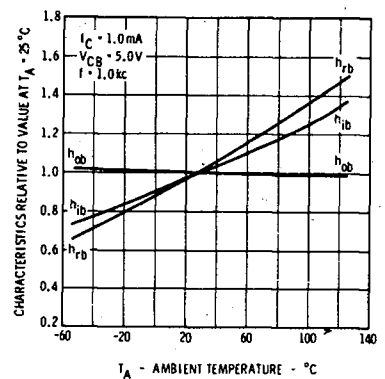
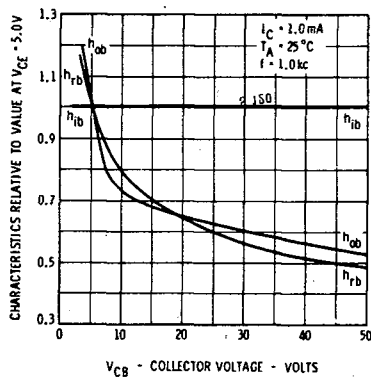
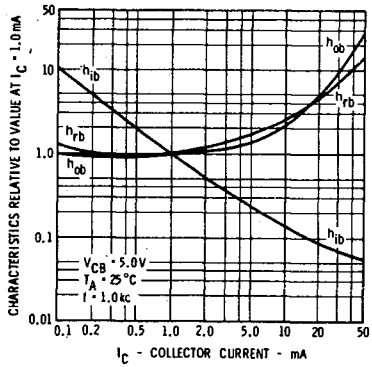
OUTPUT CAPACITANCE VERSUS REVERSE BIAS VOLTAGE



TYPICAL COMMON EMITTER CHARACTERISTICS



TYPICAL COMMON BASE CHARACTERISTICS



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 35° C/watt (derating factor of $28.6 \text{ mW}/^\circ \text{ C}$); junction-to-ambient thermal resistance of 219° C/watt (derating factor of $4.56 \text{ mW}/^\circ \text{ C}$).
- (4) This rating refers to a high-current point where collector-to-emitter voltage is lowest. For more information send for SGS-AR5 Publication
- (5) Pulse Conditions: length = $300 \mu\text{sec}$; duty cycle = 1%.