

BFY 72**RF AMPLIFIER AND HIGH-SPEED SWITCH****NPN DIFFUSED SILICON PLANAR EPITAXIAL TRANSISTOR**

GENERAL DESCRIPTION—The BFY72 is an NPN silicon PLANAR epitaxial transistor designed for RF amplifier and high-speed switching applications. This device features a minimum f_T of 250 Mc/s at $I_C = 50$ mA together with a maximum V_{CE} (sat) of 0.7 volt at 500 mA.

ABSOLUTE MAXIMUM RATINGS (Note 1)**Maximum Temperatures**

Storage Temperature

-65°C to +300°C

Operating Junction Temperature

200°C Maximum

Lead Temperature (Soldering, No Time Limit)

300°C Maximum

Maximum Power Dissipations

Total Dissipation at 25°C Case Temperature (Notes 2 and 3)

3.0 Watts

at 25°C Ambient Temperature (Notes 2 and 3)

0.8 Watt

Maximum Voltages V_{CBO} Collector to Base Voltage

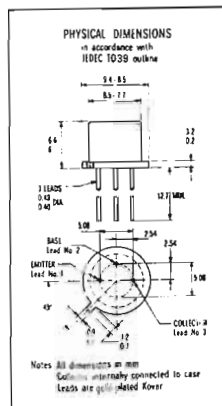
50 Volts

 V_{CEO} Collector to Emitter Voltage (Note 4)

28 Volts

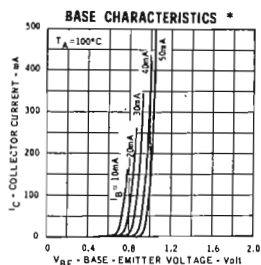
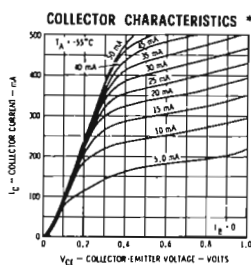
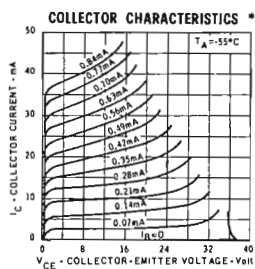
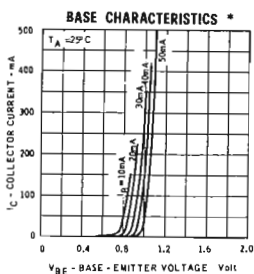
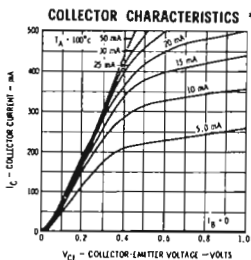
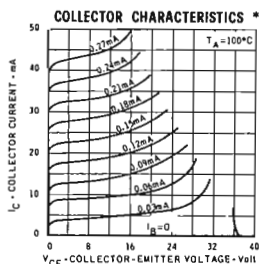
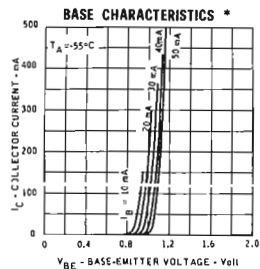
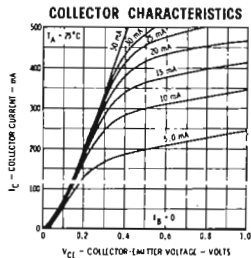
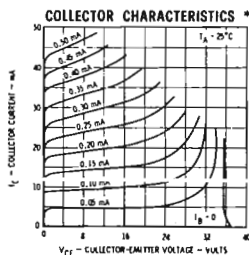
 V_{EBO} Emitter to Base Voltage

5.0 Volts

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

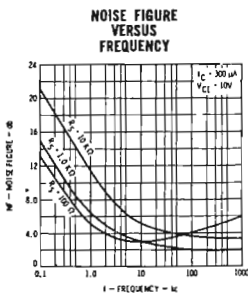
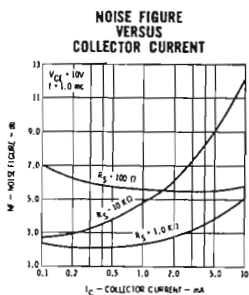
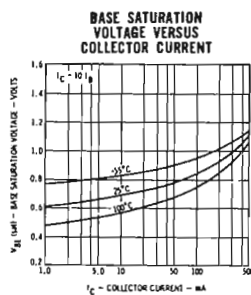
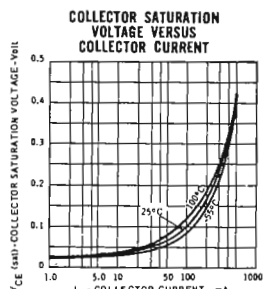
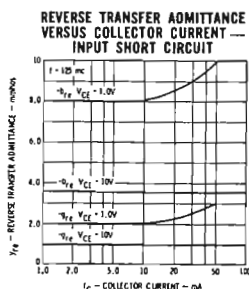
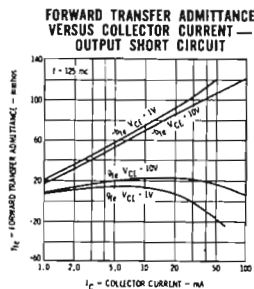
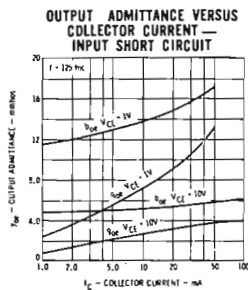
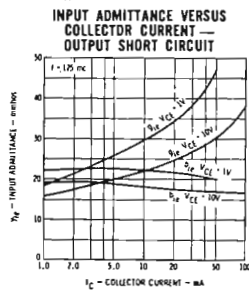
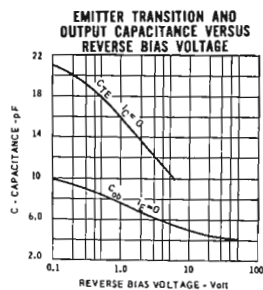
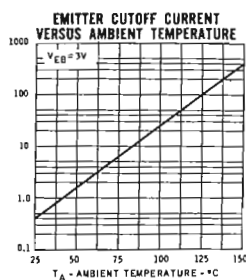
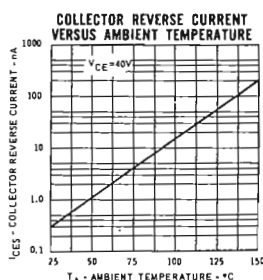
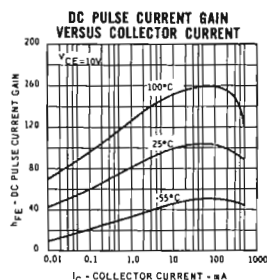
SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNITS	TEST CONDITIONS
h_{FE}	DC Current Gain	15	60			$I_C = 100 \mu A$ $V_{CE} = 10 V$
h_{FE}	DC Current Gain	20	85			$I_C = 1.0 mA$ $V_{CE} = 10 V$
h_{FE}	DC Pulse Current Gain (Note 5)	30	100			$I_C = 10 mA$ $V_{CE} = 10 V$
h_{FE}	DC Pulse Current Gain (Note 5)	40	100	150		$I_C = 150 mA$ $V_{CE} = 10 V$
h_{FE}	DC Pulse Current Gain (Note 5)	15	90			$I_C = 500 mA$ $V_{CE} = 10 V$
V_{BE} (sat)	Base Saturation Voltage	0.9	1.2		V	$I_C = 150 mA$ $I_B = 15 mA$
V_{BE} (sat)	Base Saturation Voltage	1.1	1.6		V	$I_C = 500 mA$ $I_B = 50 mA$
V_{CE} (sat)	Collector Saturation Voltage	0.15	0.25		V	$I_C = 150 mA$ $I_B = 15 mA$
V_{CE} (sat)	Collector Saturation Voltage	0.4	0.7		V	$I_C = 500 mA$ $I_B = 50 mA$
I_{CES}	Collector Reverse Current	0.3	20		nA	$V_{CE} = 40 V$ $V_{EB} = 0$
I_{EBO}	Emitter Cutoff Current	0.4	30		nA	$I_C = 0$ $V_{EB} = 3.0 V$
BV_{CBO}	Collector to Base Breakdown Voltage	50			V	$I_C = 10 \mu A$ $I_E = 0$
BV_{EBO}	Emitter to Base Breakdown Voltage	5.0			V	$I_E = 10 \mu A$ $I_C = 0$
V_{CEO} (sust)	Collector to Emitter Sustaining Voltage (Notes 4 and 5)	28			V	$I_C = 10 mA$ $I_B = 0$ (pulsed)
h_{fe}	High Frequency Current Gain ($f = 100 Mc/s$)	2.5	3.5			$I_C = 50 mA$ $V_{CE} = 10 V$
C_{ob}	Output Capacitance		5.0	8.0	pF	$I_E = 0$ $V_{CB} = 10 V$
C_{TE}	Emitter Transition Capacitance		14	30	pF	$I_C = 0$ $V_{EB} = 2.0 V$
t_{on}	Turn On Time (Note 6)		14	70	nsec	$I_C = 300 mA$ $I_{B1} = 30 mA$
t_{off}	Turn Off Time (Note 6)		80	170	nsec	$I_C = 300 mA$ $I_{B1} = 30 mA$ $I_{B2} = -30 mA$

TYPICAL ELECTRICAL CHARACTERISTICS

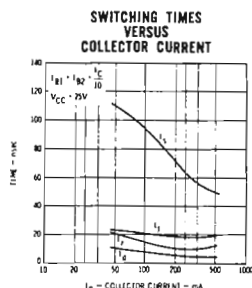
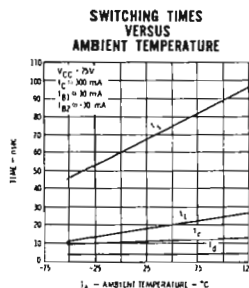
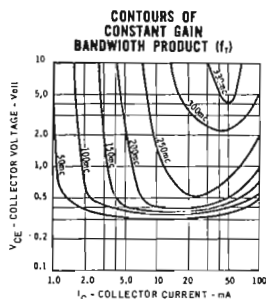


*Single family characteristics on Transistor Curve Tracer.

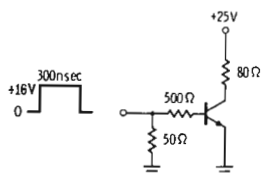
TYPICAL ELECTRICAL CHARACTERISTICS



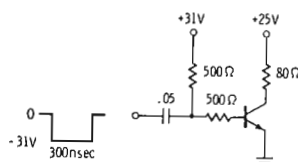
TYPICAL ELECTRICAL CHARACTERISTICS



t_{ON} TEST CIRCUIT



TEST CIRCUIT

TYPICAL SMALL SIGNAL CHARACTERISTICS ($f = 1 \text{ Kc/s}$)

SYMBOL	CHARACTERISTIC					UNITS
		$V_{CE}=1.0V, I_C=10mA$	$V_{CE}=10V, I_C=10mA$	$V_{CE}=1.0V, I_C=50mA$	$V_{CE}=10V, I_C=50mA$	
h_{ie}	Input Resistance	380	460	170	350	Ω
h_{oe}	Output Conductance	410	55	950	405	μmho
h_{fe}	Voltage Feedback Ratio	2250	130	2650	500	$\times 10^{-6}$
h_{fe}	Small Signal Current Gain	72	90	48	97	

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 $58.3^{\circ}\text{C}/\text{watt}$ (derating factor of $17.2\text{ mW}/^{\circ}\text{C}$); junction-to-ambient thermal resistance of $215^{\circ}\text{C}/\text{watt}$ (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 Publication AR 5.
- (5) Pulse Conditions: length = $300\text{ }\mu\text{sec}$; duty cycle = 2% .
- (6) See switching circuit for exact values of I_C , I_{H1} and I_{H2} .