

Silicon NPN Transistor

2N2270

General Purpose Transistor

60V / 1A

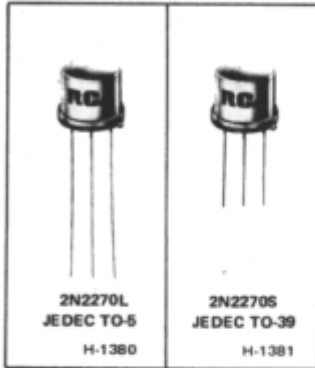
DATASHEET

OEM –RCA

Source: RCA Databook 1975

Power Transistors

2N2270



Silicon N-P-N Planar Transistor

General-Purpose Type for Small-Signal, Medium-Power Applications

Features:

- Minimum gain-bandwidth product = 100 MHz; useful in applications from dc to 20 MHz
- Operation at high junction temperatures
- Planar construction for low-noise and low-leakage characteristics
- Very low output capacitance

These devices are available with either 1/8-inch leads (TO-5 package) or 1/4-inch leads (TO-39 package). The longer-lead versions are specified by suffix "L" after the type number; the shorter-lead versions are specified by suffix "S" after the type number.

RCA-2N2270 is a silicon n-p-n planar transistor intended for a wide variety of small-signal and medium-power applications in military and industrial equipment. It features exceptionally

low noise and leakage characteristics, and very low output capacitance.

MAXIMUM RATINGS, Absolute-Maximum Values:

* COLLECTOR-TO-BASE VOLTAGE	V _{CBO}	60	V
COLLECTOR-TO-EMITTER VOLTAGE:			
With external base-to-emitter resistance (R _{BE}) ≤ 10 Ω	V _{CER}	60	V
With base open	V _{CEO}	45	V
* EMITTER-TO-BASE VOLTAGE	V _{EBO}	7	V
* COLLECTOR CURRENT	I _C	1	A
* TRANSISTOR DISSIPATION:	P _T		
At case temperatures up to 25°C		5	W
At case temperatures above 25°C		See Fig. 1	
At free-air temperatures up to 25°C		1	W
At free-air temperatures above 25°C		See Fig. 1	
* TEMPERATURE RANGE:			
Storage and operating (Junction)		-65 to +200	°C
* LEAD TEMPERATURE (During soldering):			
At distance ≥ 1/16 in. (1.58 mm) from seating plane for 10 s max		230	°C

* In accordance with JEDEC registration data format (JS-6 RDF-1)

File No. 24

2N2270

ELECTRICAL CHARACTERISTICS, At Case Temperature (T_C) = 25°C unless otherwise specified

CHARACTERISTIC	SYMBOL	VOLTAGE V			CURRENT mA			LIMITS		UNITS
		V_{CB}	V_{CE}	V_{EB}	I_C	I_E	I_B	MIN.	MAX.	
Collector Cutoff Current: With emitter open At $T_C = 150^\circ\text{C}$	I_{CBO}	60				0		–	0.05	μA
		60				0		–	50	
Emitter Cutoff Current	I_{EBO}			5	0			–	0.1	μA
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$				0.05 μA	0		60	–	V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$				0	0.1		7	–	V
Collector-to-Emitter Sustaining Voltage: With external base-to- emitter resistance (R_{BE}) = 10 Ω	$V_{CER(sus)}$				100 ^a			60	–	V
	$V_{CEO(sus)}$				100 ^a	0		45	–	
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$				150 ^a		15	–	0.9	V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$				150 ^a		15	–	1.2	V
DC Forward Current Transfer Ratio	h_{FE}		10		150 ^a			50	200	
			10		1			30	–	
Small-Signal Forward Current Transfer Ratio: $f = 1$ kHz $f = 20$ MHz	h_{fe}		10		5			50	275	
			10		50			5	–	
Gain-Bandwidth Product	f_T		10		50			100	–	MHz
Noise Figure: Generator resistance (R_G) = 1 k Ω Circuit bandwidth (BW) = 1 Hz $f = 1$ kHz	NF		10 (V_{CC})		0.3			–	10	dB
Output Capacitance	C_{ob}	10				0		–	15	pF
Input Capacitance	C_{ib}			0.5	0			–	80	pF
Saturated Switching Time (See Fig. 8)	$t_d+t_r+t_s+t_f$							–	30	ns
Thermal Resistance: Junction-to-case	$R_{\theta JC}$							–	35	$^\circ\text{C/W}$
	$R_{\theta FA}$							–	175	

* In accordance with JEDEC registration data format (JS-6 RDF-1)

^a Pulsed: Pulse duration = 300 μs ; duty factor = 1.8%

2N2270

File No. 24

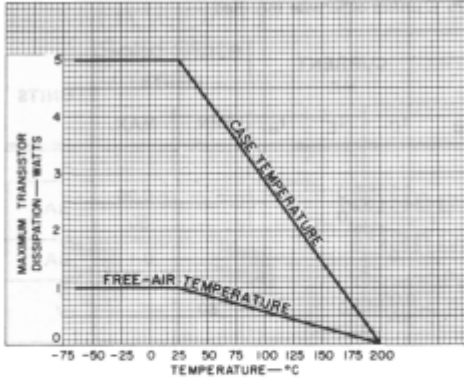


Fig. 1 - Rating chart.

92CS-1172R1

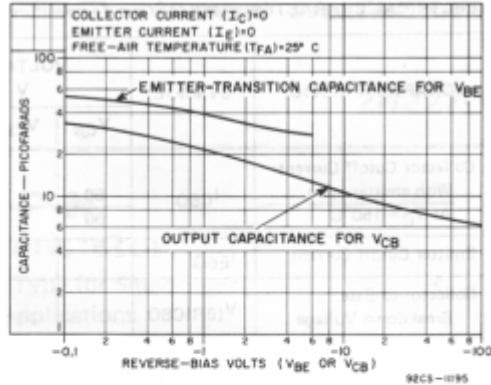


Fig. 2 - Typical emitter-transition-capacitance and output-capacitance characteristics.

92CS-1195

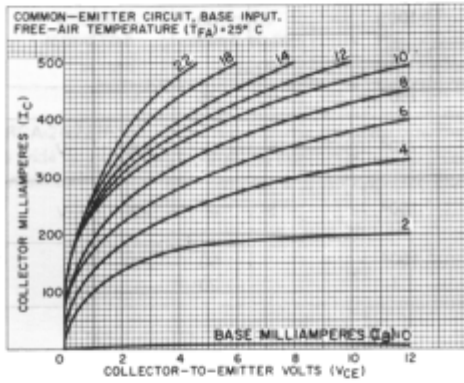


Fig. 3 - Typical collector characteristics.

92CS-1189

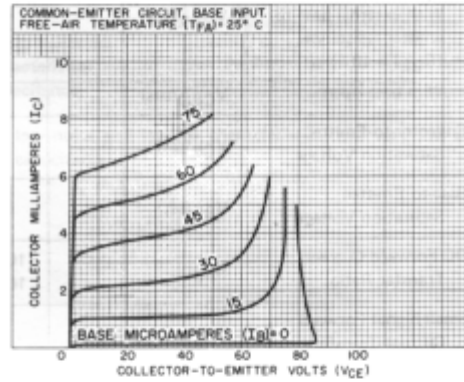


Fig. 4 - Typical collector characteristics.

92CS-1173R1

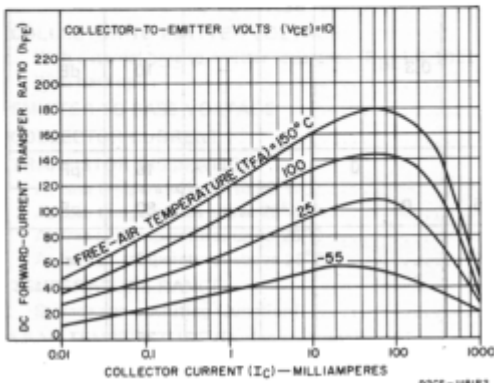


Fig. 5 - Typical dc forward-current transfer ratio characteristics.

92CS-1181R2

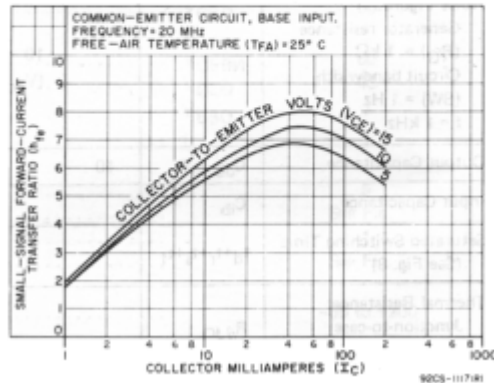
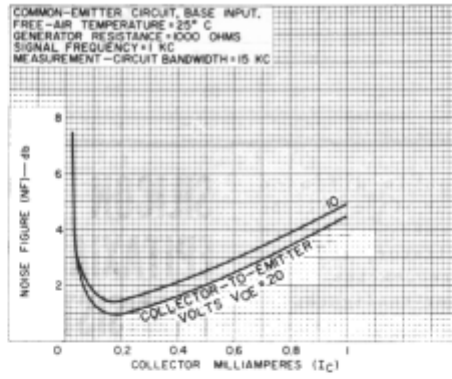


Fig. 6 - Typical small-signal forward-current transfer ratio characteristics.

92CS-1117R1



92CS-1179R1

Fig. 7—Typical of noise-figure characteristics.

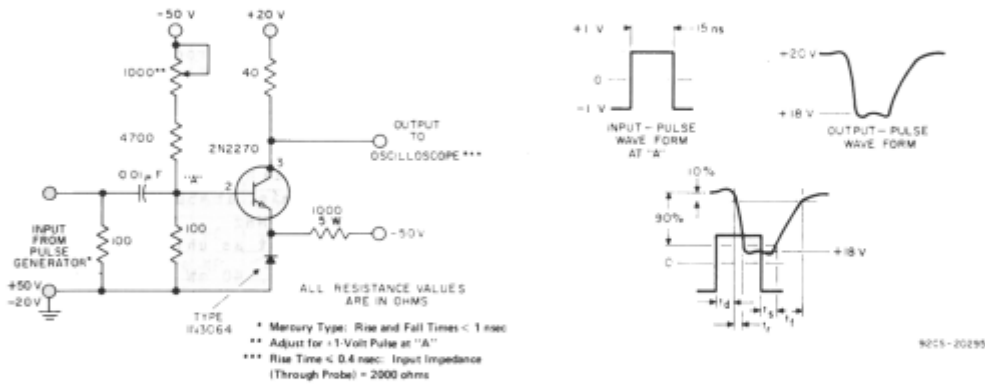


Fig. 8—Test circuit for measurement of saturated switching time and associated waveforms.

TERMINAL CONNECTIONS

- Lead 1 — Emitter
- Lead 2 — Base
- Lead 3 — Collector, Case