

Silicon NPN Transistor

RCA1B01

Power Transistor

95V / 15A

DATASHEET

OEM –RCA

Source: RCA Databook 1975

File No. 647

Power Transistors**RCA1B01**

JEDEC TO-3

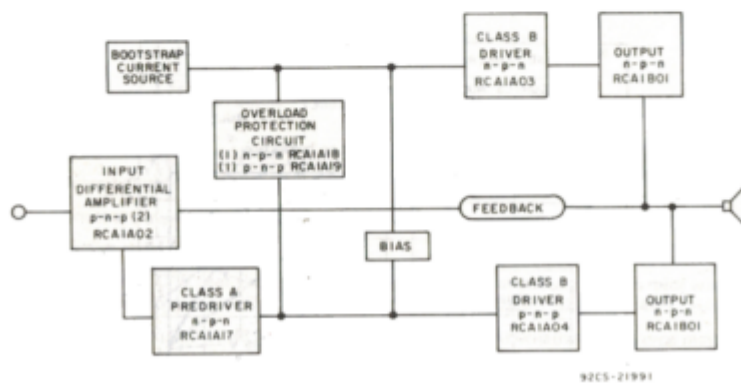
H-1570

**Silicon Transistor for
70-Watt
Quasi-Complementary-Symmetry
Audio Amplifiers
with
Hometaxial-Base Output Transistors**

RCA1B01 is an n-p-n hometaxial-base silicon transistor in a JEDEC TO-3 package. This device is particularly suitable for audio-output use, and can be driven by either the RCA1A03 n-p-n or RCA1A04 p-n-p transistor.

The 70-watt amplifier shown in Figs. 1 and 5 uses the

RCA1B01 in conjunction with seven TO-39 transistors, eleven diodes, and an 84-volt split power supply. The amplifier output is directly coupled to an 8-ohm speaker. This amplifier is most useful for instrumentation applications where ruggedness and raw power are essential.



92CS-21991

Fig. 1—Block diagram and transistor complement for 70-watt quasi-complementary-symmetry audio amplifier with hometaxial-base output transistors.

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MAXIMUM RATINGS, Absolute-Maximum Values:

COLLECTOR-TO-BASE VOLTAGE	V_{CB0}
COLLECTOR-TO-EMITTER VOLTAGE:	
With external base-to-emitter resistance (R_{BE}) = 100 Ω	V_{CER}
EMITTER-TO-BASE VOLTAGE	V_{EB0}
COLLECTOR CURRENT	I_C
BASE CURRENT	I_B
TRANSISTOR DISSIPATION:	P_T
At case temperatures up to 25°C	
At case temperatures above 25°C	
TEMPERATURE RANGE:	
Storage & Operating (Junction)	
PIN TEMPERATURE (During Soldering):	
At distances $\geq 1/32$ in. (0.8 mm) from case for 10 s max	

RCA1B01

95	V
95	V
7	V
15	A
7	A
115	W
See Fig. 2	
-65 to 200	°C
230	°C

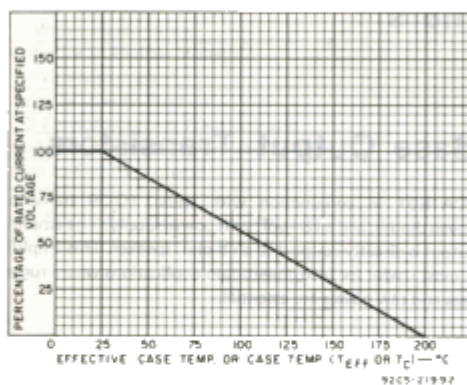


Fig. 2—Derating curves for all types.

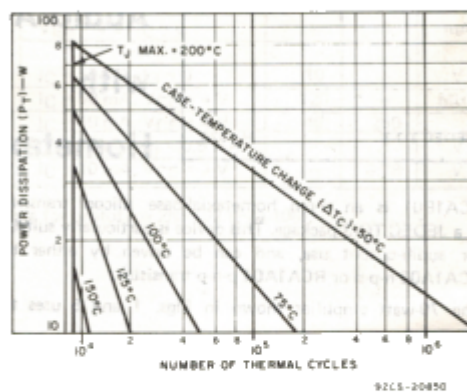


Fig. 3—Thermal-cycling ratings for RCA1B01.

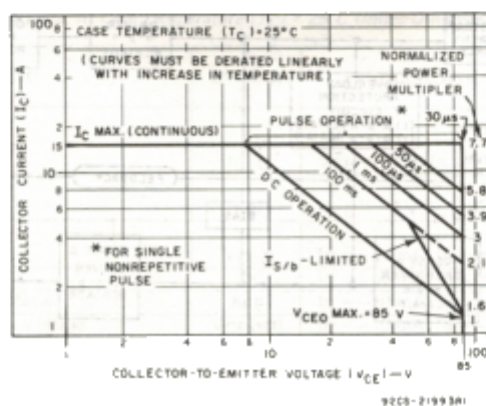
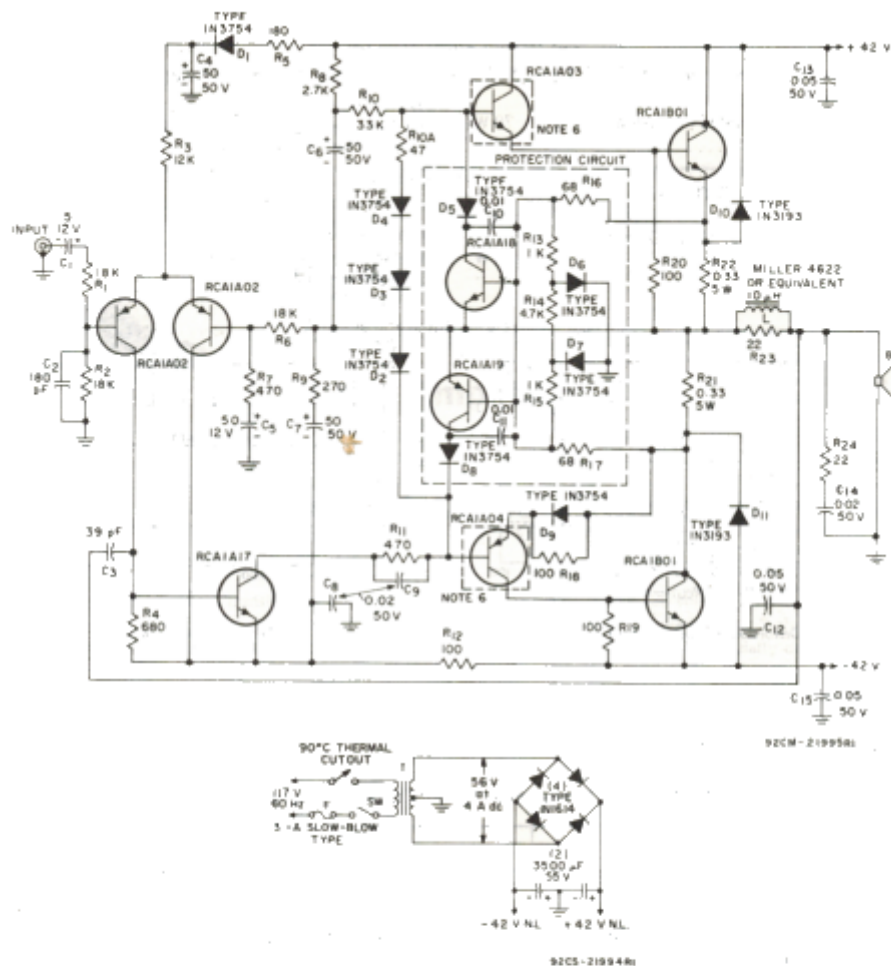


Fig. 4—Maximum operating areas for RCA1B01.

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NOTES:

1. T: Signal 56-4 (Signal Transformer Co., 1 Junius St., Brooklyn, N.Y. 11212), or equivalent.
2. Resistors are 1/2-watt unless otherwise specified; values are in ohms.
3. Capacitances are in μF unless otherwise specified.
4. Non-inductive resistors.
5. Provide approx. 1°C/W heat sinking per output device based on mousing with mica washer and ZnO thermal compound (Dow Corning No. 340, or equivalent) with $T_A = 45^\circ\text{C}$ max.
6. Mount on heat sink, Wakefield No. 209-AB, or equivalent. (Alternatively, this type may be obtained with a factory-attached integral heat sink.)

Fig. 5—70-Watt amplifier circuit featuring quasi-complementary-symmetry output employing homotaxial-base output transistors.

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TYPICAL PERFORMANCE DATA For 70-Watt Audio Amplifier

Measured at a line voltage of 120 V, $T_A = 25^\circ\text{C}$, and a frequency of 1 kHz, unless otherwise specified.

Power:			
Rated power (8-Ω load, at rated distortion)	70 W	IM Distortion:	
Typical power (4-Ω load)	100 W	10 dB below continuous power output at	
Typical power (16-Ω load)	40 W	60 Hz and 7 kHz (4:1)	0.1%
Music power (8-Ω load, at 5% THD with regulated supply)	100 W	Sensitivity:	
Dynamic power (8-Ω load, at 1% THD with regulated supply)	88 W	At continuous power-output rating	700 mV
		Hum and Noise:	
		Below continuous power output:	
		Input shorted	85 dB
		Input open	80 dB
Total Harmonic Distortion:		Input Resistance	20 kΩ
Rated distortion	1.0%		

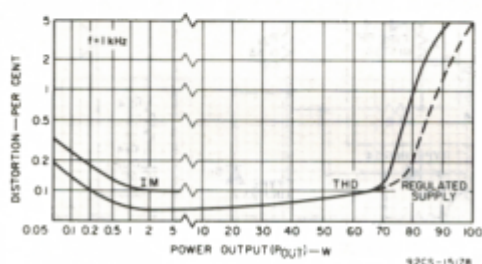


Fig. 6—Distortion vs. power output.

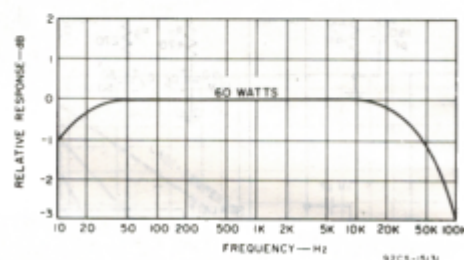


Fig. 7—Response curve.

Type RCA1B01

Package: JEDEC TO-3

Construction: Silicon n-p-n, hometaxial base

ELECTRICAL CHARACTERISTICS, At Case Temperature (T_C) = 25°C Unless Otherwise Specified

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	LIMITS		UNITS
			MIN.	MAX.	
Collector Cutoff Current: With external base-to-emitter resistance (R_{BE})	I_{CER}	$V_{CE} = 85\text{ V}, R_{BE} = 100\Omega$	—	0.5	mA
Emitter Cutoff Current: With collector open	I_{EBO}	$V_{EB} = 4\text{ V}, I_C = 0$	—	1	mA
Collector-to-Emitter Voltage: With external base-to-emitter resistance (R_{BE})	V_{CER}	$I_C = 0.2\text{ A}, R_{BE} = 100\Omega$	95	—	V
Gain Bandwidth Product	f_T	$V_{CE} = 4\text{ V}, I_C = 1\text{ A}$	0.8	—	MHz
DC Forward-Current Transfer Ratio	h_{FE}	$I_C = 4\text{ A}, V_{CE} = 4\text{ V}$	20	70	
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 4\text{ A}, I_B = 0.4\text{ A}$	—	1	V
Base-to-Emitter Voltage	V_{BE}	$I_C = 4\text{ A}, V_{CE} = 4\text{ V}$	—	1.4	V
Second-Breakdown Collector Current: With base forward biased	$I_{S/b}$	$V_{CE} = 60\text{ V}, t = 1\text{ s}$	1.95	—	A

For characteristics curves and test conditions, refer to published data for prototype 2N3055 (File 524).

TERMINAL CONNECTIONS FOR TYPE RCA1B01

Pin 1 — Base
Pin 2 — Emitter
Case — Collector
Mounting Flange — Collector