RCA Solid State Division

Power Transistors
RCA8350
RCA8350A RCA8350B

JEDEC TO-3

H-1570

10-Ampere P-N-P Darlington Power Transistors

40-60-80 Volts, 70 Watts
Gain of 1000 at 5 A

Features:

- Operated from IC without predriver
- High reverse second-breakdown capability

Applications:

- Power switching
- Audio amplifiers
- Hammer drivers
- Series and shunt regulators

The RCA8350, RCA8350A and RCA8350B° are monolithic p-n-p silicon Darlington transistors designed for low- and medium-frequency power applications. The high gain of these devices makes it possible for them to be driven directly from integrated circuits. They are complementary to the 2N6383, 2N6384, and 2N6385▲.

°Formerly RCA Dev. Nos. TA8351, TA8488, and TA8350, respectively.
▲Technical data for 2N6383, 2N6384, and 2N6385 are given in RCA bulletin File No. 609.

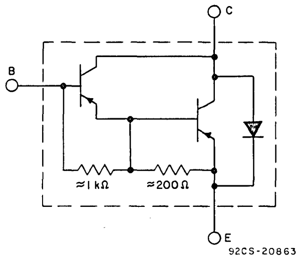

Fig. 1—Schematic diagram for all types.

MAXIMUM RATINGS, *Absolute-Maximum Values:*

		RCA8350B	RCA8350A	RCA8350	
COLLECTOR-TO-BASE VOLTAGE	V_{CBO}	−80	−60	−40	V
COLLECTOR-TO-EMITTER SUSTAINING VOLTAGE:					
With external base-to-emitter resistance (R_{BE}) = 100 Ω	$V_{CER}(sus)$	−80	−60	−40	V
With base open	$V_{CEO}(sus)$	−80	−60	−40	V
With base reverse-biased V_{BE} = +1.5 V	$V_{CEV}(sus)$	−80	−60	−40	V
EMITTER-TO-BASE VOLTAGE	V_{EBO}	−5	−5	−5	V
CONTINUOUS COLLECTOR CURRENT	I_C	−10	−10	−10	A
PEAK COLLECTOR CURRENT	I_{CM}	−15	−15	−15	A
CONTINUOUS BASE CURRENT	I_B	−0.25	−0.25	−0.25	A
TRANSISTOR DISSIPATION:	P_T				
At case temperatures up to 25°C		70	70	70	W
At case temperatures above 25°C		See Fig. 3			
TEMPERATURE RANGE:					
Storage and Operating (Junction)		−65 to +150			°C
PIN TEMPERATURE (During Soldering):					
At distances ≥1/32 in. (0.8 mm) from seating plane for 10 s max.		235			°C

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

CHARACTERISTIC	SYMBOL	TEST CONDITIONS				LIMITS						UNITS
		VOLTAGE V dc		CURRENT A dc		RCA8350B		RCA8350A		RCA8350		
		V_{CE}	V_{BE}	I_C	I_B	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
Collector-Cutoff Current: With base open	I_{CEO}	−80 −60 −40			0 0 0	– – –	−1 – –	– – –	– −1 –	– – –	– – −1	mA
With base open and T_C = 150°C	I_{CEO}	−80 −60 −40			0 0 0	– – –	−10 – –	– – –	– −10 –	– – –	– – −10	mA
With base reverse-biased	I_{CEV}	−80 −60 −40	+1.5 +1.5 +1.5			– – –	−0.3 – –	– – –	– −0.3 –	– – –	– – −0.3	mA
With base reverse-biased and T_C = 150°C	I_{CEV}	−80 −60 −40	+1.5 +1.5 +1.5			– – –	−3 – –	– – –	– −3 –	– – –	– – −3	mA
Emitter-Cutoff Current	I_{EBO}		5	0		–	−10	–	−10	–	−10	mA
Collector-to-Emitter Sustaining Voltage: With base open	$V_{CEO}(sus)$			−0.2[a]	0	−80	–	−60	–	−40	–	V
With external base-to-emitter resistance (R_{BE}) = 100 Ω	$V_{CER}(sus)$			−0.2[a]		−80	–	−60	–	−40	–	V
With base-emitter junction reverse-biased	$V_{CEV}(sus)$		+1.5	−0.2[a]		−80	–	−60	–	−40	–	V
DC Forward Current Transfer Ratio	h_{FE}	−3 −3		−5[a] −10[a]		1000 100	20,000 –	1000 100	20,000 –	1000 100	20,000 –	
Base-to-Emitter Voltage	V_{BE}	−3 −3		−5[a] −10[a]		– –	−2.8 −4.5	– –	−2.8 −4.5	– –	−2.8 −4.5	V
Collector-to-Emitter Saturation Voltage	$V_{CE}(sat)$			−5[a] −10[a]	−0.01[a] −0.1[a]	– –	−2 −3	– –	−2 −3	– –	−2 −3	V
Parallel Diode Forward Voltage	V_F			−10		–	−4	–	−4	–	−4	V
Common-Emitter, Small-Signal, Short-Circuit Forward Current Transfer Ratio: f = 1 kHz	h_{fe}	−5		−1		1000	–	1000	–	1000	–	
Magnitude of Common-Emitter, Small-Signal Short-Circuit, Forward Current Transfer Ratio: f = 1.0 MHz	$\|h_{fe}\|$	−5		−1		20	–	20	–	20	–	
Second-Breakdown Energy: With base reverse-biased and L = 3 mH, R_{BE} = 100 Ω	$E_{S/b}$[b]		+1.5	−4.5		30	–	30	–	30	–	mJ
Forward-Bias Second Breakdown Collector Current: 1-s nonrepetitive pulse	$I_{S/b}$	−35 −20				−1 −5	– –	−1 −5	– –	−1 −5	– –	A
Thermal Resistance: Junction-to-Case	$R_{\theta JC}$					–	1.75	–	1.75	–	1.75	°C/W

[a] Pulsed: Pulse duration = 300 μs, duty factor = 1.8%.

[b] $E_{S/b}$ is defined as the energy at which second breakdown occurs under specified reverse bias conditions. $E_{S/b} = 1/2\ LI^2$ where L is a series load or leakage inductance, and I is the peak collector current.

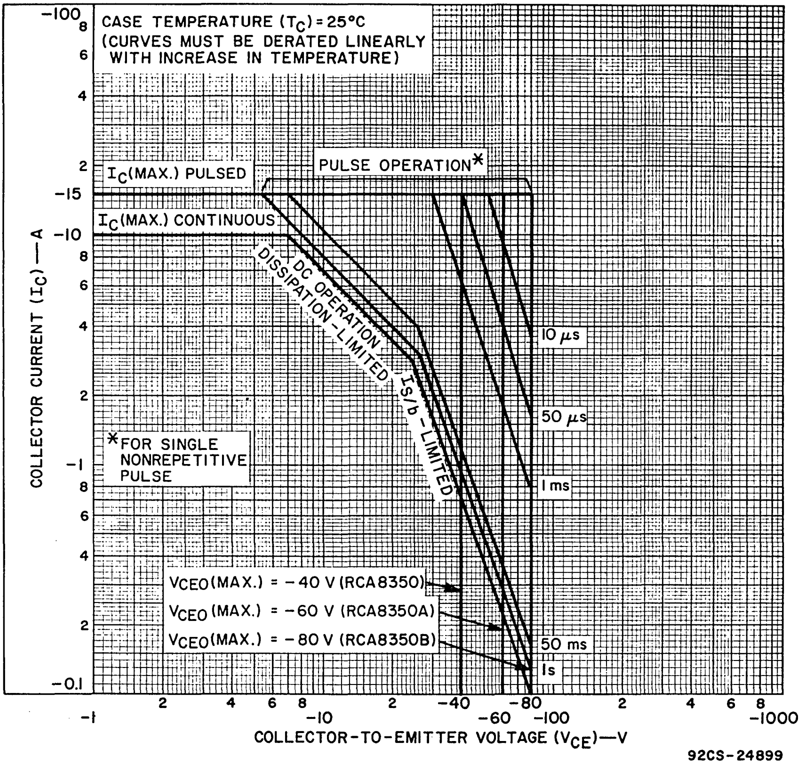

Fig. 2—Maximum operating areas for all types.

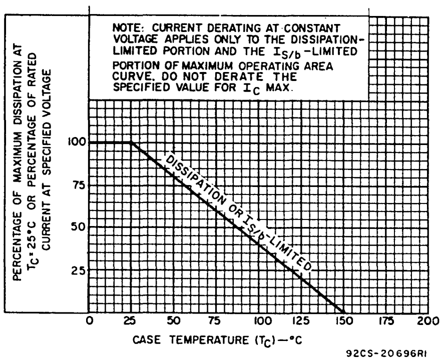

Fig. 3—Dissipation derating curve for all types.

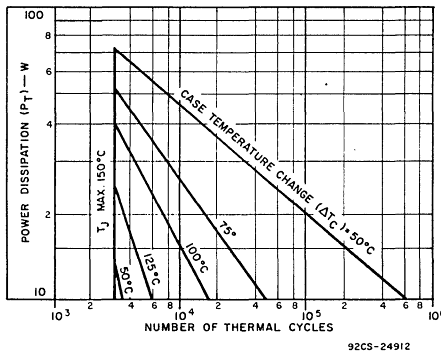

Fig. 4—Thermal-cycling rating chart for all types.

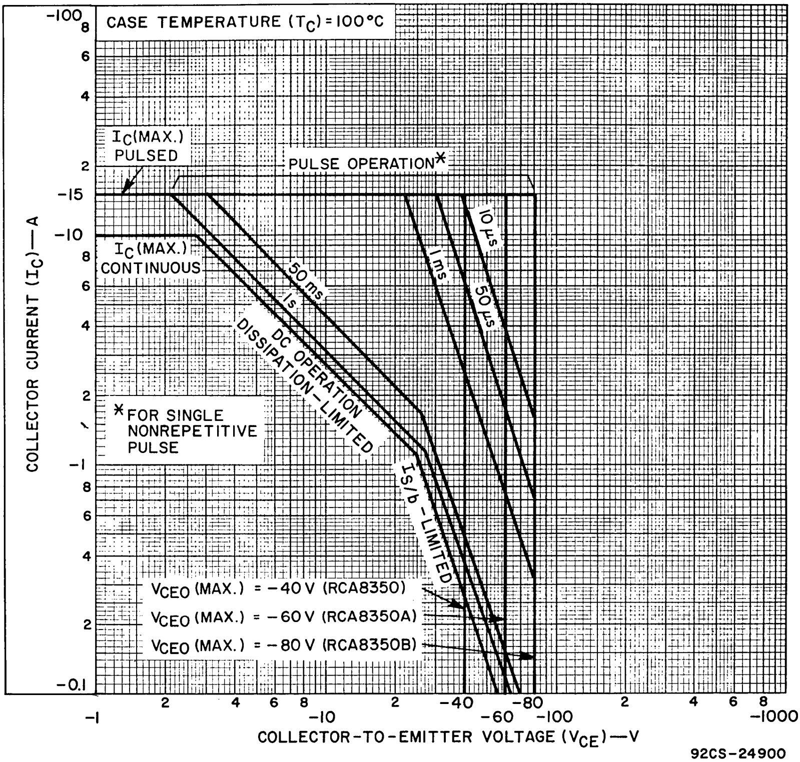

Fig. 5—Maximum operating areas for all types at T_C = 100°C.

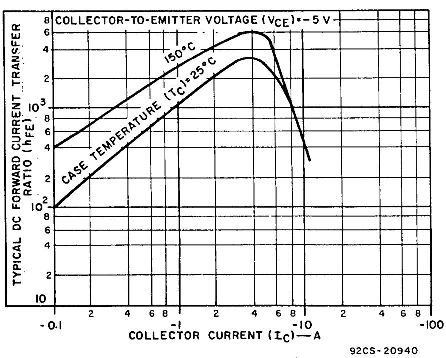

Fig. 6—Typical dc beta characteristics for all types.

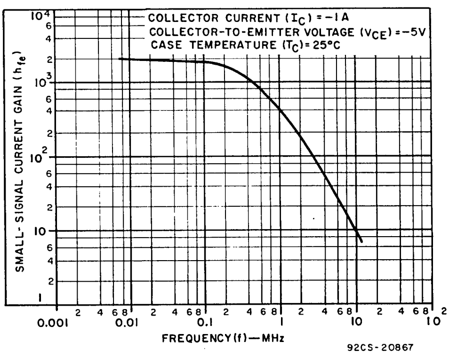

Fig. 7—Typical small-signal gain for all types.

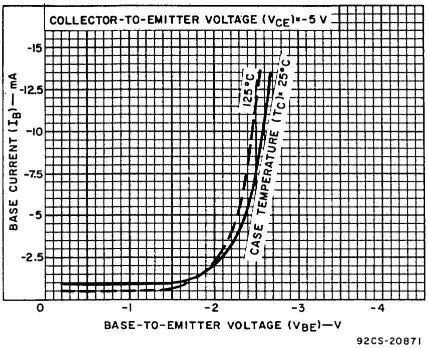

Fig. 8—Typical input characteristics for all types.

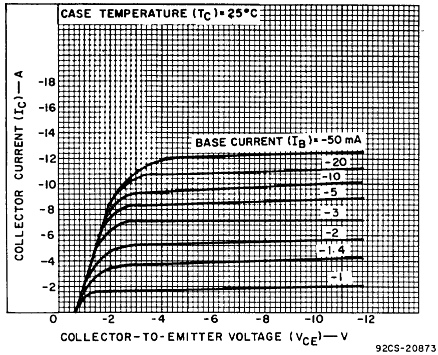

Fig. 9—Typical output characteristics for all types.

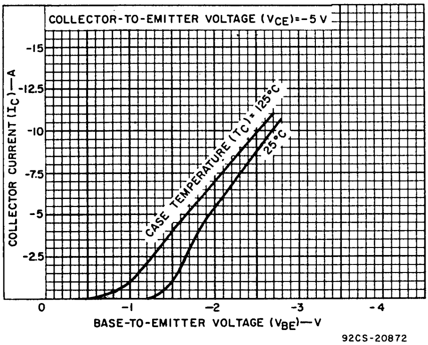

Fig. 10—Typical transfer characteristics for all types.

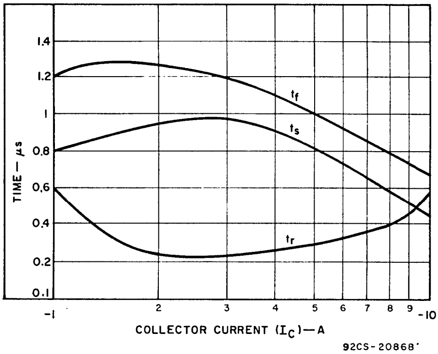

Fig. 11—Typical saturated switching-time characteristics for all types.

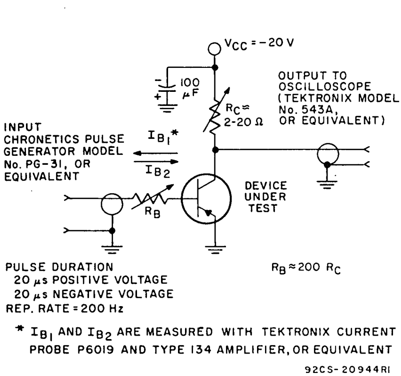

Fig. 12—Circuit used to measure saturated switching times.

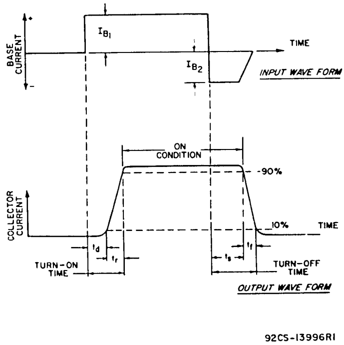

Fig. 13—Phase relationship between input current and output current showing reference points for specification of switching times (test circuit shown in Fig. 12).

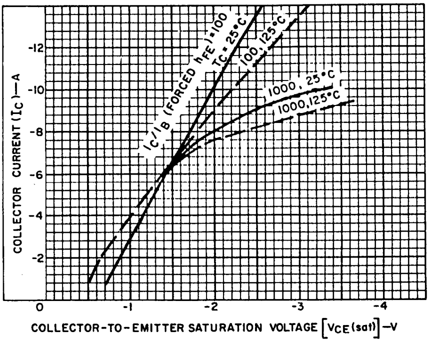

Fig. 14—Typical saturation characteristics for all types.

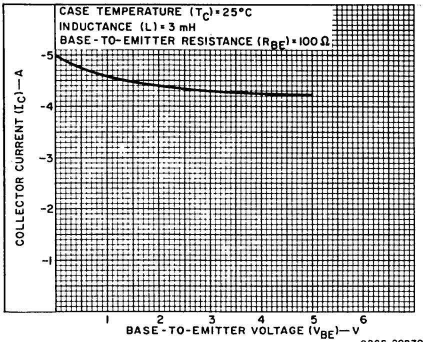

Fig. 15—Minimum values of reverse-bias second breakdown characteristic ($E_{S/b}$) for all types.

TERMINAL CONNECTIONS

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