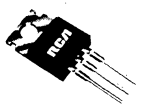
RCA
Solid State
Division

Power Transistors

RCA41 RCA41B
RCA41A RCA41C



JEDEC TO-220 AB H-1535

Epitaxial-Base, Silicon N-P-N VERSAWATT Transistors

For Power-Amplifier and
High-Speed-Switching Applications

Features:

- **65 W at 25°C case temperature**
- **7 A rated collector current**
- **Min. f_T of 3 MHz at 10 V, 500 mA**
- **Designed for complementary use with RCA42, RCA42A, RCA42B, and RCA42C p-n-p types**

RCA41, RCA41A, RCA41B, and RCA41C are epitaxial-base, silicon n-p-n transistors. They are intended for a wide variety of switching and amplifier applications, such as series and shunt regulators and driver and output stages of high-fidelity amplifiers. These new plastic power transistors are designed for complementary use with devices in the RCA42 series.● They differ from each other in voltage ratings.

● RCA42-series transistors are described in RCA data bulletin File No. 588.

MAXIMUM RATINGS, *Absolute-Maximum Values:*

		RCA41	RCA41A	RCA41B	RCA41C	
COLLECTOR-TO-BASE VOLTAGE	V_{CBO}	40	60	80	100	V
COLLECTOR-TO-EMITTER VOLTAGE:						
With base open	V_{CEO}	40	60	80	100	V
EMITTER-TO-BASE VOLTAGE	V_{EBO}	5	5	5	5	V
CONTINUOUS COLLECTOR CURRENT	I_C	7	7	7	7	A
PEAK COLLECTOR CURRENT		10	10	10	10	A
CONTINUOUS BASE CURRENT	I_B	3	3	3	3	A
TRANSISTOR DISSIPATION:	P_T					
At case temperatures up to 25°C		65	65	65	65	W
At ambient temperatures up to 25°C		2	2	2	2	W
TEMPERATURE RANGE:						
Storage & Operating (Junction)		← -65 to 150 →				°C
LEAD TEMPERATURE (During Soldering):						
At distance 1/8 in. (3.17 mm) from case for 10 s max.		← 235 →				°C

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

CHARACTERISTIC	SYMBOL	TEST CONDITIONS				LIMITS								UNITS
		DC VOLTAGE (V)		DC CURRENT (A)		RCA41		RCA41A		RCA41B		RCA41C		
		V_{CE}	V_{BE}	I_C	I_B	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
Collector-Cutoff Current:	I_{CEO}	30			0	–	0.7	–	0.7	–	–	–	–	mA
With base open		60			0	–	–	–	–	–	0.7	–	0.7	
With base-emitter junction short-circuited	I_{CES}	40	0			–	0.4	–	–	–	–	–	–	
		60	0			–	–	–	0.4	–	–	–	–	
		80	0			–	–	–	–	–	0.4	–	–	
		100	0			–	–	–	–	–	–	–	0.4	
Emitter-Cutoff Current	I_{EBO}		5	0		–	1	–	1	–	1	–	1	mA
Collector-to-Emitter Sustaining Voltage: With base open	$V_{CEO(sus)}$			0.03[a]	0	40	–	60	–	80	–	100	–	V
DC Forward-Current Transfer Ratio	h_{FE}	4		0.3[a]		30	–	30	–	30	–	30	–	
		4		3[a]		15	150	15	150	15	150	15	150	
Base-to-Emitter Voltage	V_{BE}	4		6[a]		–	2.2	–	2.2	–	2.2	–	2.2	V
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$			6[a]	0.6	–	2	–	2	–	2	–	2	V
Common-Emitter, Small-Signal, Forward-Current Transfer Ratio (f = 1 kHz)	h_{fe}	10		0.5		20	–	20	–	20	–	20	–	
Magnitude of Common-Emitter, Small-Signal, Forward-Current Transfer Ratio (f = 1 MHz)	$\|h_{fe}\|$	10		0.5		3	–	3	–	3	–	3	–	
Saturated Switching Time: (R_L = 5 Ω) See Figs. 5 and 6 Turn-on time $t_d + t_r$	t_{ON}	(V_{CC}) 30		6	0.6[b]	0.6 (typ.)		0.6 (typ.)		0.6 (typ.)		0.6 (typ.)		μs
Turn-off Time $t_s + t_f$	t_{OFF}	(V_{CC}) 30		6	0.6[b]	1.4 (typ.)		1.4 (typ.)		1.4 (typ.)		1.4 (typ.)		
Thermal Resistance: Junction-to-Case	$R_{\theta JC}$					–	1.92	–	1.92	–	1.92	–	1.92	°C/W
Junction-to-Ambient	$R_{\theta JA}$					–	62.5	–	62.5	–	62.5	–	62.5	

[a] Pulsed: Pulse duration = 300 μs, duty factor ≤ 2%

[b] $I_{B_1} = I_{B_2}$ = value shown

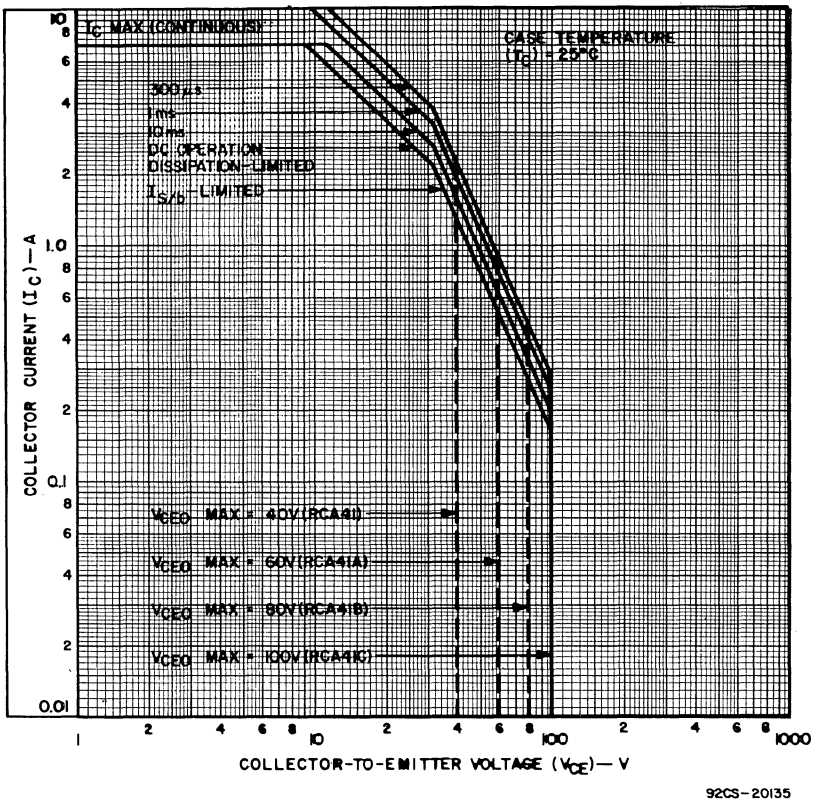


Fig. 1—Maximum safe operating areas for all types

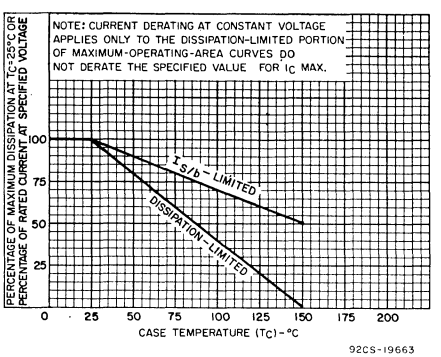


Fig. 2—Derating curves for all types.

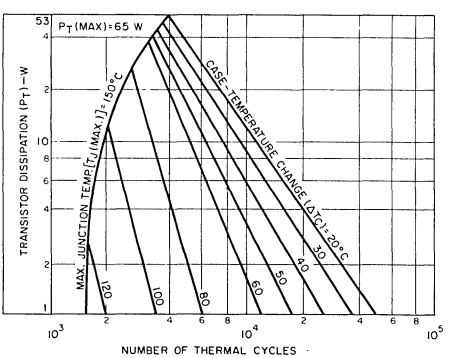


Fig. 3—Thermal-cycling ratings for all types.

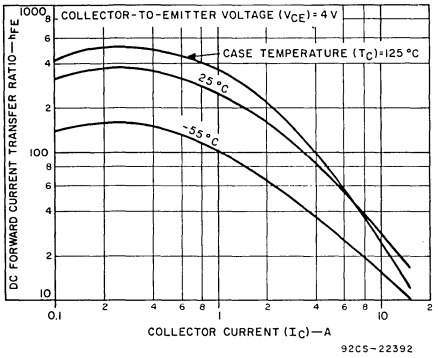


Fig. 4—Typical dc beta characteristics for all types.

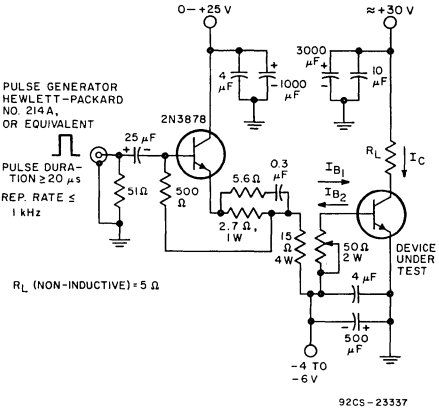


Fig. 5—Circuit used to measure switching times for all types.

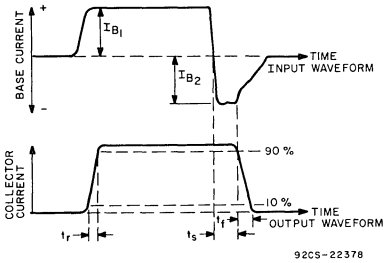


Fig. 6—Phase relationship between input and output currents showing reference points for specification of switching times (Test circuit shown in Fig. 5).

TERMINAL CONNECTIONS

Lead No. 1—Base
Lead No. 2—Collector
Lead No. 3—Emitter
Mounting Flange, Lead No. 4—Collector