

Silicon N-P-N ·VERSAWATT Transistors

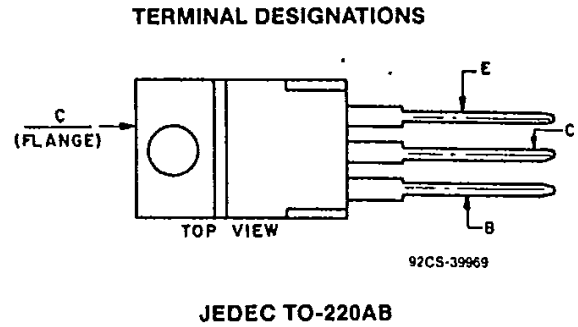
Designed for Medium-Power Linear and Switching Service
in Consumer, Automotive, and Industrial Applications

Features:

- Maximum safe-area-of-operation curves
- Low saturation voltages
- High dissipation ratings

Applications:

- Series and shunt regulators
- High-fidelity amplifiers
- Power-switching circuits



RCA3054 and RCA3055 are silicon n-p-n transistors intended for a wide variety of high-current applications. The construction of these devices renders them highly resistant to second breakdown over a wide range of operating conditions.

The VERSAWATT case has a proven thermal-cycle capability. This capability is assured by real-time quality controls in our manufacturing locations. The RCA3054 and RCA3055 are supplied in the JEDEC TO-220AB straight-lead version of the package. They are also available on special order in a variety of lead-form configurations.

MAXIMUM RATINGS, Absolute-Maximum Values:

	RCA3054	RCA3055	
COLLECTOR-TO-BASE VOLTAGE	90	100	V
COLLECTOR-TO-EMITTER SUSTAINING VOLTAGE:			
With external base-to-emitter resistance (R_{BE}) = 100 Ω	60	70	V
With base open	55	60	V
With base reverse-biased $V_{BE} \approx -1.5$ V	90	90	V
EMITTER-TO-BASE VOLTAGE	7	7	V
CONTINUOUS COLLECTOR CURRENT	4	15	A
CONTINUOUS BASE CURRENT	2	4	A
TRANSISTOR DISSIPATION:			
At case temperatures up to 25°C	36	75	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 $\geq 1/32$ in. (0.8 mm) from seating plane for 10 s max.	235		°C

RCA3054, RCA3055

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

CHARACTERISTIC	SYMBOL	TEST CONDITIONS					LIMITS				UNITS
		VOLTAGE V dc			CURRENT A dc		RCA3054		RCA3055		
		V _{CE}	V _{EB}	V _{BE}	I _C	I _B	MIN.	MAX.	MIN.	MAX.	
Collector-Cutoff Current: With base open	I _{CEO}	30				0	—	0.5	—	0.7	mA
With base-emitter junction reverse-biased	I _{CEX}	90 100		—1.5 —1.5			— —	1 —	— —	— 5	
At T _C = 150°C	I _{CEX}	90 100		—1.5 —1.5			— —	6 —	— —	— 30	
Emitter-Cutoff Current	I _{EBO}		7		0		—	1.0	—	5	mA
Collector-to-Emitter Sustaining Voltage: With base open	V _{CEO(sus)}				0.1 ^a 0.2 ^a	0 0	55 —	— —	— 60	— —	V
With external base-to- emitter resistance (R _{BE}) = 100 Ω	V _{CEr(sus)}				0.1 ^a 0.2 ^a		60 —	— —	— 70	— —	
With base-emitter junction reverse-biased	V _{CEV(sus)}			—1.5	0.1 ^a		90	—	90	—	
DC Forward-Current Transfer Ratio	h _{FE}	4 4 4 4			3 ^a 10 ^a 0.5 ^a 4 ^a		5 — 25 —	— — 100 —	— — 5 — 20	— — — 70	
Collector-to-Emitter Saturation Voltage	V _{CE(sat)}				0.5 ^a 4 ^a	0.05 ^a 0.4 ^a	— —	1.0 —	— —	— 1.1	V
Base-to-Emitter Voltage	V _{BE}	4 4			0.5 ^a 4 ^a		— —	1.7 —	— —	— 1.8	V
Common-Emitter, Small-Signal, Short-Circuit, Forward Current Transfer Ratio Cutoff Frequency	f _{hfe}	4 4			0.1 1		30 —	— —	— 10	— —	kHz
Magnitude of Common- Emitter, Small-Signal Short-Circuit Forward Current Transfer Ratio (f = 0.4 MHz)	h _{fe}	4 4			0.1 1		2 —	— —	— 8	— —	
Common-Emitter, Small-Signal, Short- Circuit Forward Current Transfer Ratio (f = 1 kHz)	h _{fe}	4 4			0.1 1		25 —	— —	— 15	— 120	
Forward-Bias Second Breakdown Collector Current ^b (t ≥ 1 s)	I _{S/b}	55 60					0.65 —	— —	— 1.2	— —	A
Thermal Resistance:											
Junction-to-Case	R _{θJC}						—	3.5	—	1.67	°C/W
Junction-to-Ambient	R _{θJA}						—	70	—	70	

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

^b Pulsed: 1-second non-repetitive pulse.

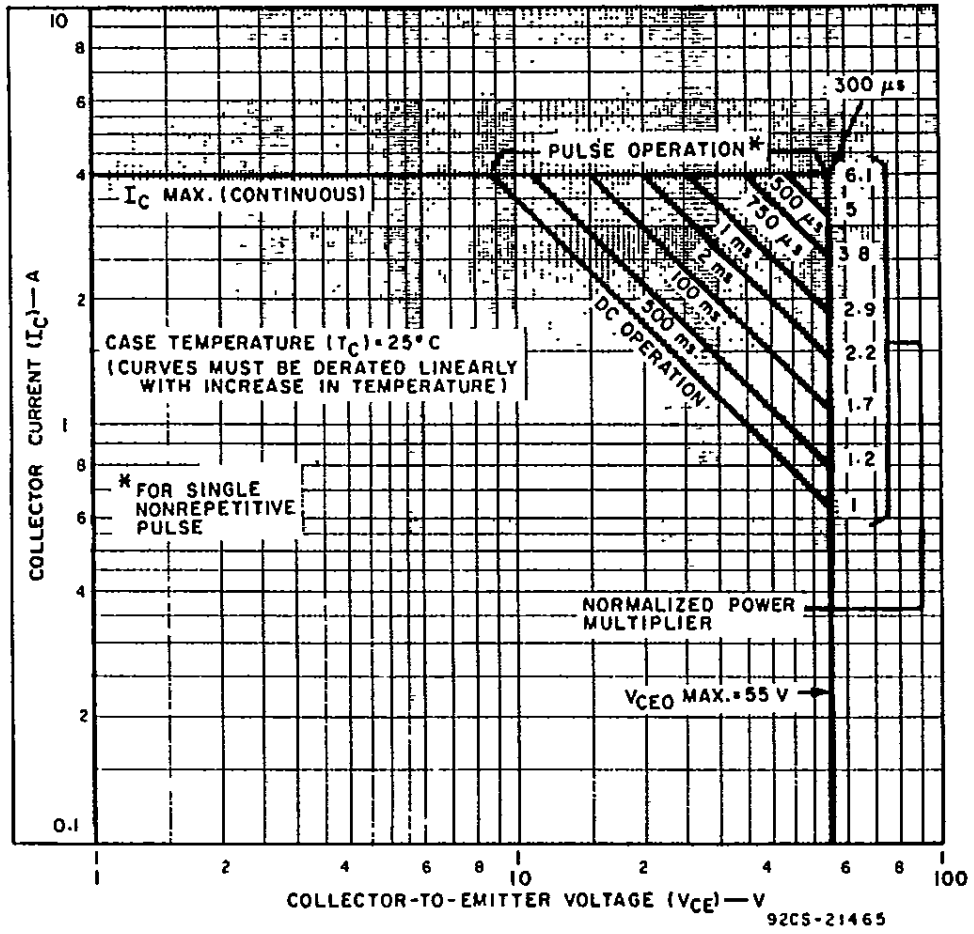


Fig. 1 — Maximum operating areas for RCA3054.

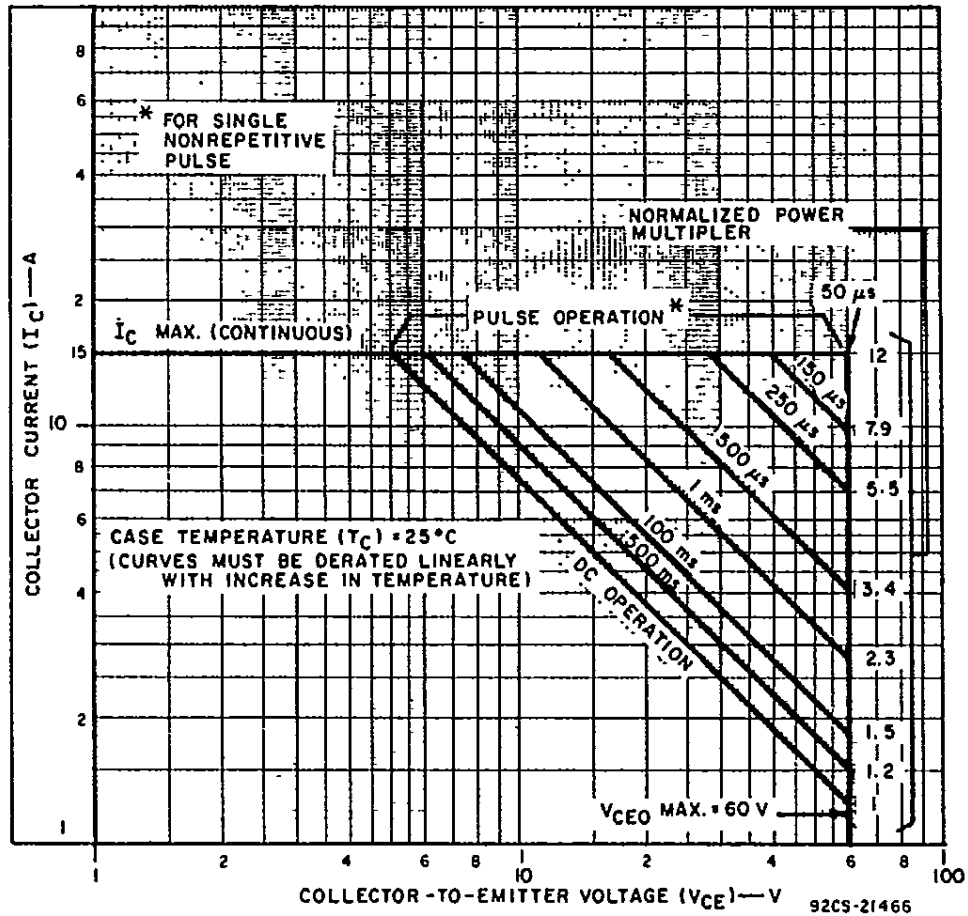


Fig. 2 — Maximum operating areas for RCA3055.

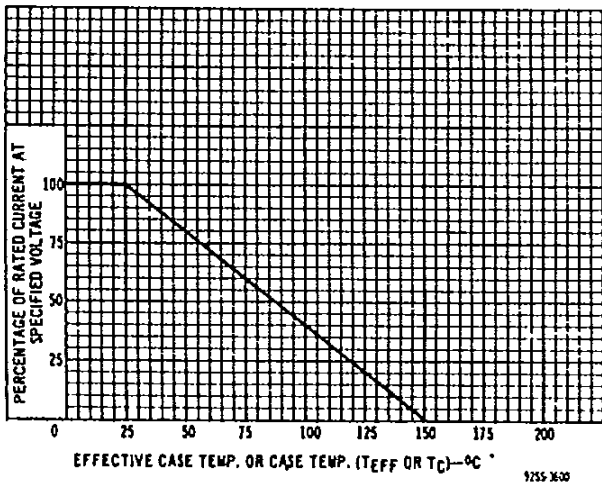


Fig. 3 — Derating curve for both types.

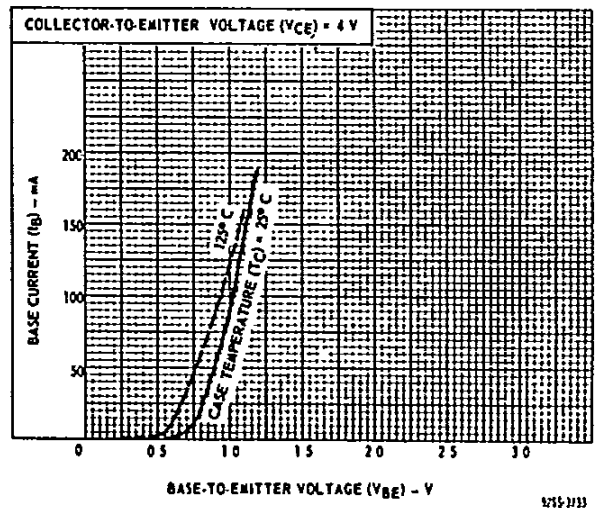


Fig. 4 — Typical input characteristics for RCA3054.

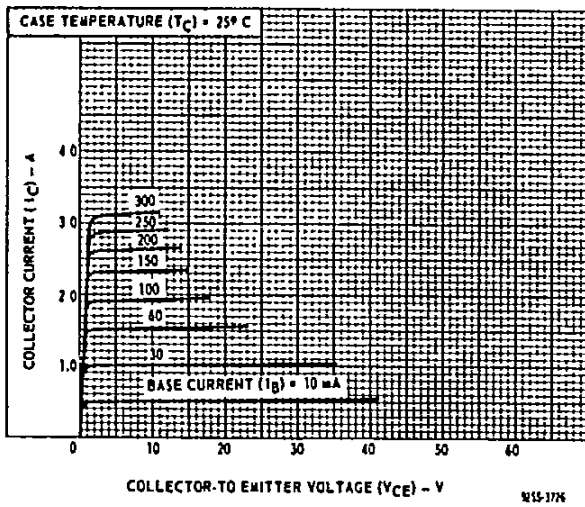


Fig. 5 — Typical output characteristics for RCA3054.

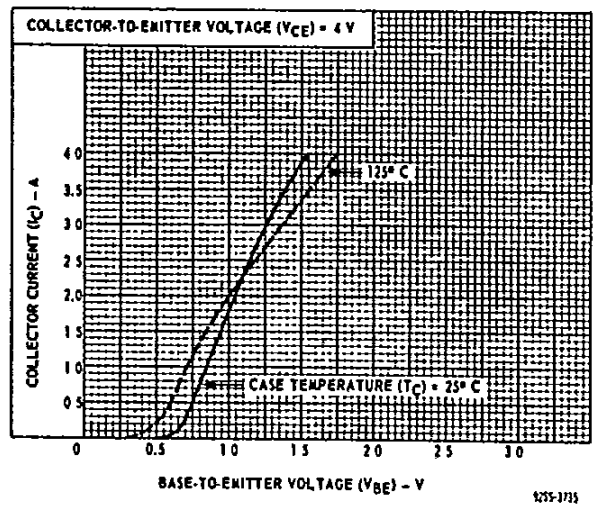


Fig. 6 — Typical transfer characteristics for RCA3054.

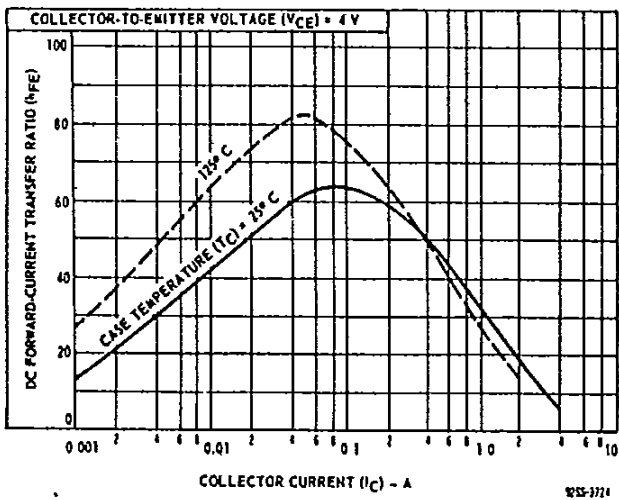


Fig. 7 — Typical dc beta characteristics for RCA3054.

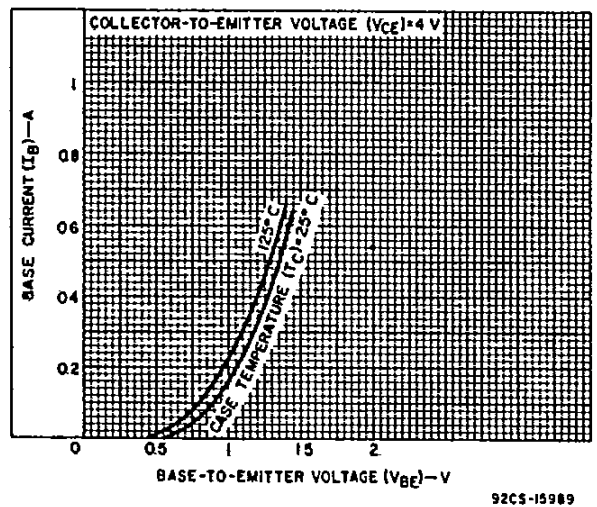


Fig. 8 — Typical input characteristics for RCA3055.

RCA3054, RCA3055

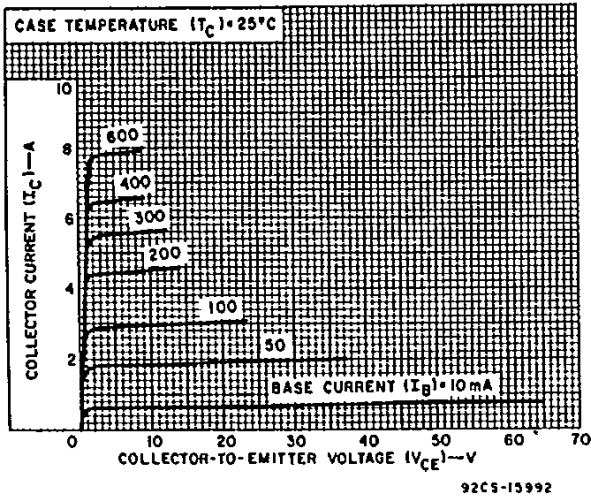


Fig. 9 — Typical output characteristics for RCA3055.

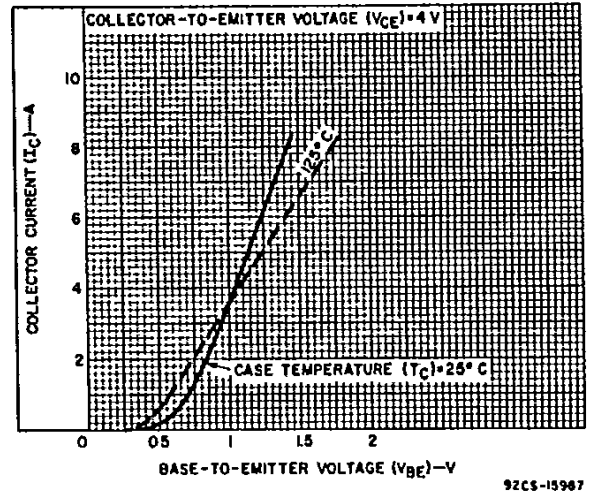


Fig. 10 — Typical transfer characteristics for RCA3055.

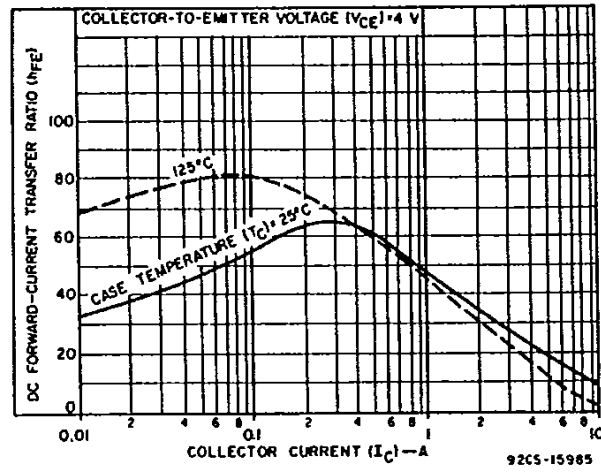


Fig. 11 — Typical dc beta characteristics for RCA3055.