RCA
Solid State
Division

Power Transistors
2N3055
2N6253
2N6254

JEDEC TO-3

H-1570

Hometaxial II* High-Power Silicon N-P-N Transistors

Rugged, Broadly Applicable Devices
For Industrial and Commercial Use

Features:

- 2N6254: premium type from 2N3055 family
- Maximum safe-area-of-operation curves
- Low saturation voltages
- High dissipation ratings
- Thermal-cycle rating curves

Applications:

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

RCA 2N3055, 2N6253 and 2N6254 are silicon n-p-n transistors intended for a wide variety of high-power applications. The hometaxial•-base construction of these devices renders them highly resistant to second breakdown over a wide range of operating conditions.

•"Hometaxial" was coined by RCA from "homogeneous" and "axial" to describe a single-diffused transistor with a base region of homogeneous-resistivity silicon in the axial direction (emitter-to-collector).

"Hometaxial II" is a term used to describe RCA's expanded line of transistors produced by the hometaxial process.

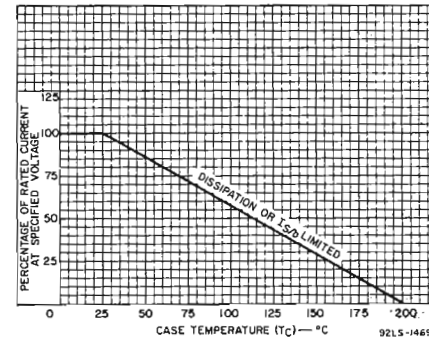

Fig. 1—Current derating curve.

MAXIMUM RATINGS, *Absolute-Maximum Values:*

		2N6253	2N3055	2N6254	
*COLLECTOR-TO-BASE VOLTAGE	V_{CBO}	55	100	100	V
COLLECTOR-TO-EMITTER SUSTAINING VOLTAGE:					
* With external base-to-emitter resistance (R_{BE}) = 100Ω	$V_{CER(sus)}$	55	70	85	V
* With base open	$V_{CEO(sus)}$	45	60	80	V
With base reverse-biased V_{BE} = -1.5 V	$V_{CEV(sus)}$	55	90	90	V
*EMITTER-TO-BASE VOLTAGE	V_{EBO}	5	7	7	V
*CONTINUOUS COLLECTOR CURRENT	I_C	15	15	15	A
*CONTINUOUS BASE CURRENT	I_B	7	7	7	A
*TRANSISTOR DISSIPATION	P_T				
At case temperatures up to 25°C		115	115	150	W
At case temperatures above 25°C		← See Fig. 1 →			
*TEMPERATURE RANGE:					
Storage and Operating (Junction)		← -65 to +200 →			°C
*PIN TEMPERATURE (During Soldering):					
At distances ≥ 1/32 in. (0.8 mm) from seating plane for 10 s max.		← 235 →			°C

*In accordance with JEDEC registration data formats (2N3055: JS-9 RDF-10/2N6253-4: JS-6 RDF-2).

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

	CHARACTERISTIC	SYMBOL	TEST CONDITIONS				LIMITS						UNITS
			VOLTAGE V dc		CURRENT A dc		2N6253		2N3055		2N6254		
			V_{CE}	V_{BE}	I_C	I_B	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
*	Collector-Cutoff Current: With base open	I_{CEO}	25			0	–	1.5	–	–	–	–	mA
			30			0	–	–	–	0.7	–	–	
			60			0	–	–	–	–	–	1	
	With base-emitter junction reverse-biased	I_{CEX}	55	-1.5			–	2	–	–	–	–	
			100	-1.5			–	–	–	5	–	0.5	
	At T_C = 150°C	I_{CEX}	50	-1.5			–	10	–	–	–	–	
			100	-1.5			–	–	–	30	–	5	
*	Emitter-Cutoff Current	I_{EBO}		–5			–	10	–	–	–	–	mA
				–7			–	–	–	5	–	0.5	
	Collector-to-Emitter Sustaining Voltage:												
*	With base open	$V_{CEO(sus)}$			0.2[a]	0	45	–	60	–	80	–	V
*	With external base-to-emitter resistance (R_{BE}) = 100Ω	$V_{CER(sus)}$			0.2[a]		55	–	70	–	85	–	
	With base-emitter junction reverse-biased	$V_{CEV(sus)}$		-1.5	0.1[a]		55	–	90	–	90	–	
*	DC Forward Current Transfer Ratio	h_{FE}	4		15[a]		3	–	–	–	5	–	
			4		10[a]		–	–	5	–	–	–	
			2		5[a]		–	–	–	–	20	70	
			4		4[a]		–	–	20	70	–	–	
			4		3[a]		20	150	–	–	–	–	
*	Base-to-Emitter Voltage	V_{BE}	4		3[a]		–	1.7	–	–	–	–	V
			4		4[a]		–	–	–	1.8	–	–	
			2		5[a]		–	–	–	–	–	1.5	
*	Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$			3[a]	0.3[a]	–	1	–	–	–	–	V
					4[a]	0.4[a]	–	–	–	1.1	–	–	
					5[a]	0.5[a]	–	–	–	–	–	0.5	
					10[a]	3.3[a]	–	–	–	8	–	–	
					15[a]	3[a]	–	–	–	–	–	4	
					15[a]	5[a]	–	4	–	–	–	–	
*	Common-Emitter, Small-Signal, Short-Circuit Forward Current Transfer Ratio (f = 1 kHz)	h_{fe}	4		1		10	–	15	120	10	–	
*	Magnitude of Common-Emitter, Small-Signal, Short-Circuit, Forward Current Transfer Ratio (f = 0.4 MHz)	$\|h_{fe}\|$	4		1		2	–	–	–	2	–	
	Gain-Bandwidth Product	f_T			1		–	–	800	–	–	–	kHz
*	Common-Emitter, Short-Circuit, Small-Signal, Forward Current Transfer Ratio Cutoff Frequency	f_{hfe}	4		1		10	–	10	–	10	–	kHz
	Forward-Bias Second Breakdown Collector Current	$I_{S/b}$	80				–	–	–	–	1.87	–	A
			60				–	–	1.95	–	–	–	
			45				2.55	–	–	–	–	–	
	Thermal Resistance: Junction-to-Case	$R_{\theta JC}$					–	1.5	–	1.5	–	1.17	°C/W

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

* In accordance with JEDEC registration data formats JS-9 RDF-10 (2N3055) and JS-6 RDF-2 (2N6253–4).

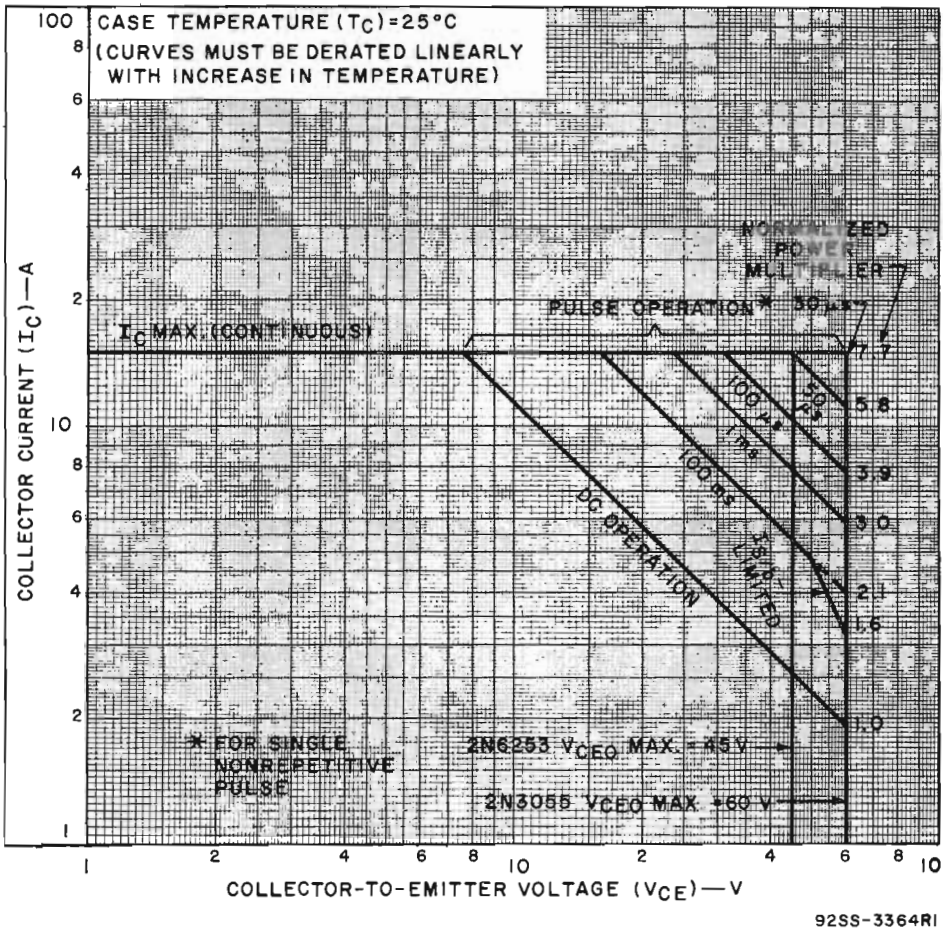

Fig.2—Maximum operating areas for types 2N6253 and 2N3055.

TERMINAL CONNECTIONS

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

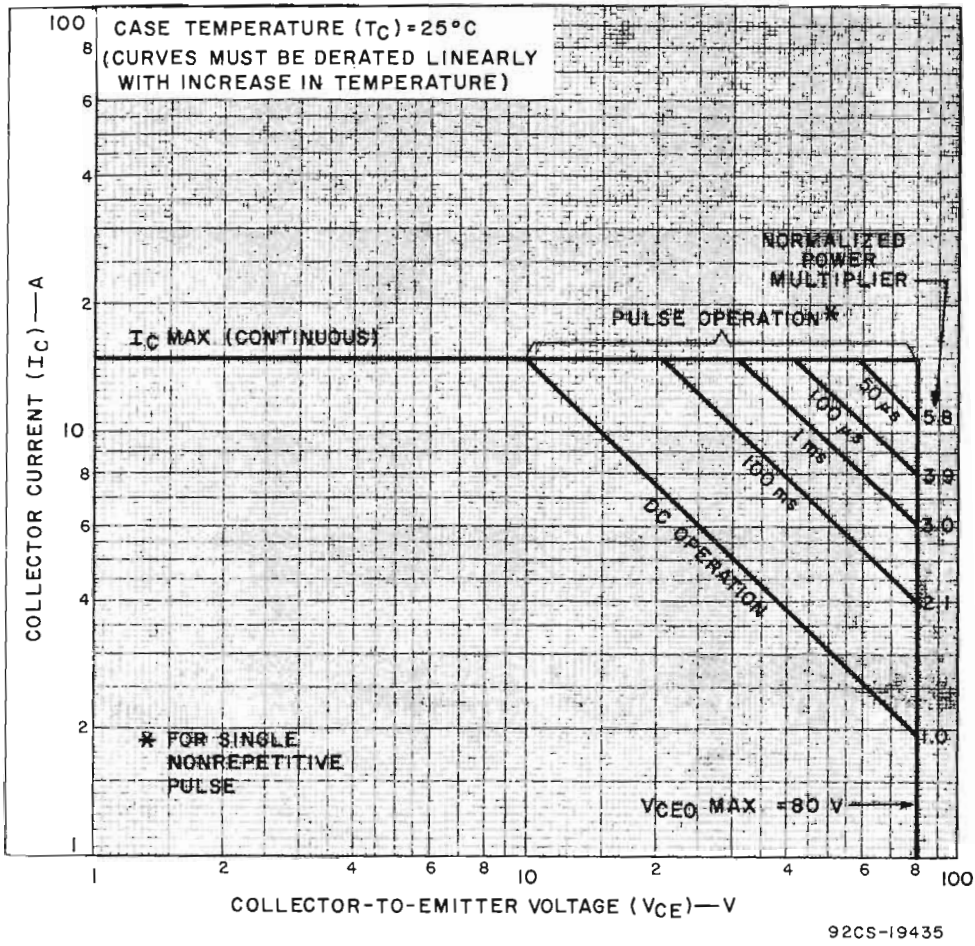

Fig.3—Maximum operating areas for 2N6254.

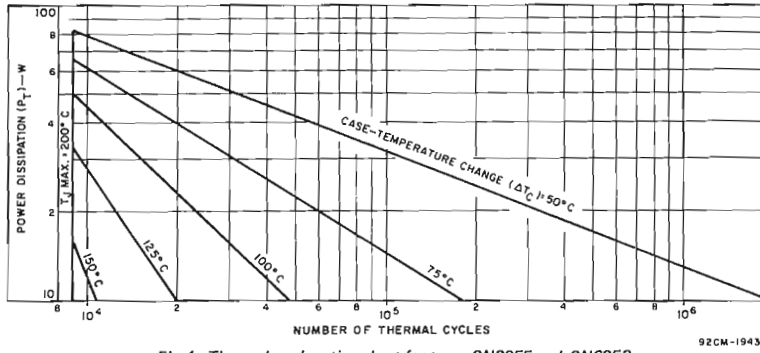

Fig.4—Thermal-cycle rating chart for types 2N3055 and 2N6253.

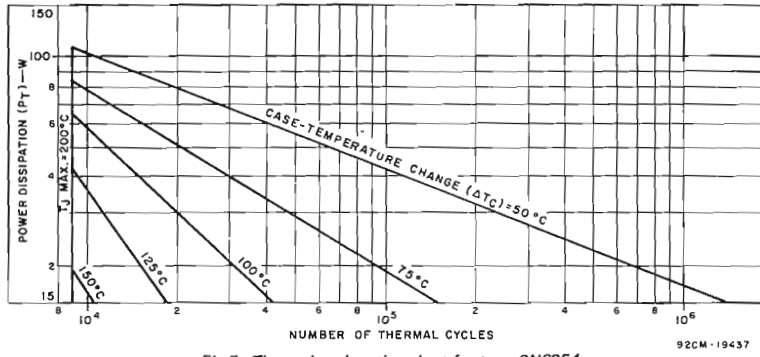

Fig.5—Thermal-cycle rating chart for type 2N6254.

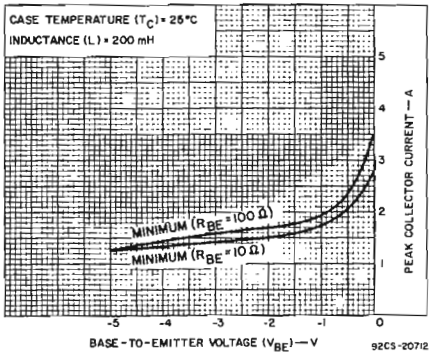

Fig.6—Reverse-bias, second-breakdown characteristics for all types.

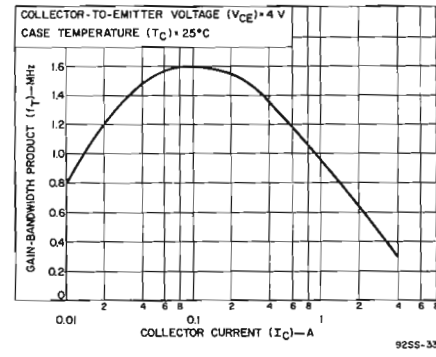

Fig.7—Typical gain-bandwidth product for all types.

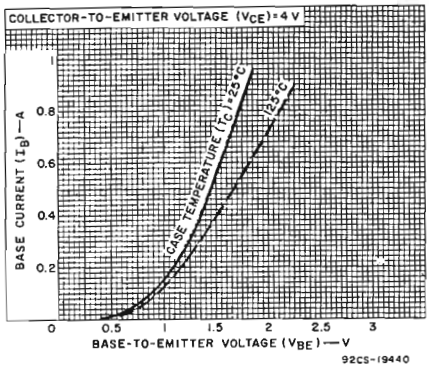

Fig.8—Typical input characteristics for type 2N6254.

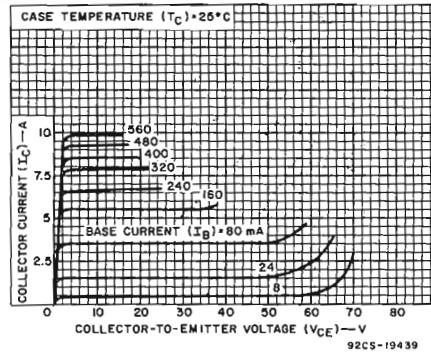

Fig.9—Typical output characteristics for type 2N6254.

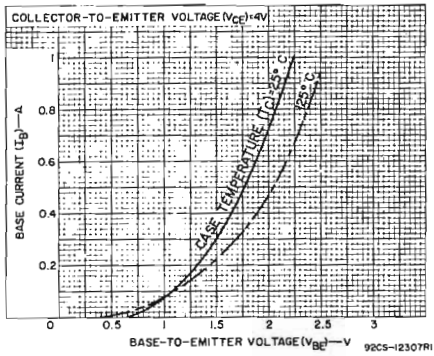

Fig.10—Typical input characteristics for type 2N3055.

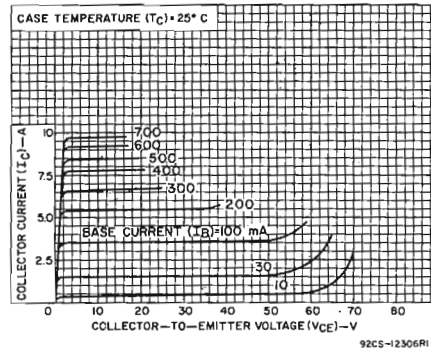

Fig.11—Typical output characteristics for type 2N3055.

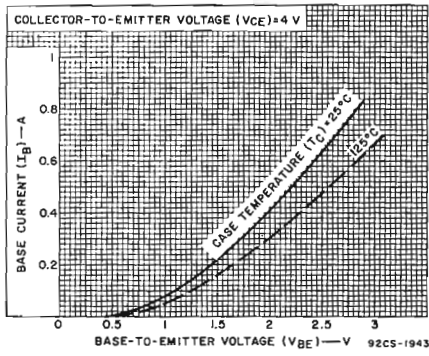

Fig.12—Typical input characteristics for type 2N6253.

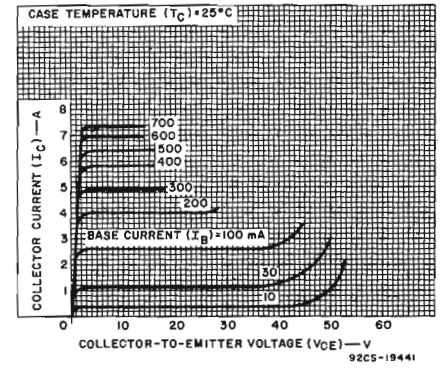

Fig.13—Typical output characteristics for type 2N6253.

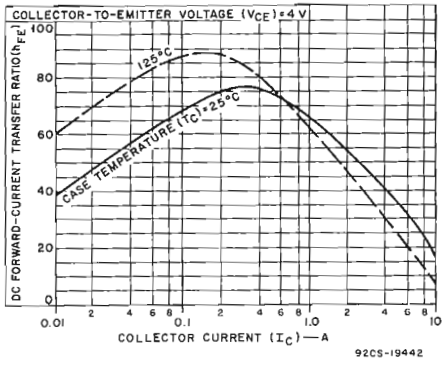

Fig.14—Typical dc-beta characteristics for type 2N6254.

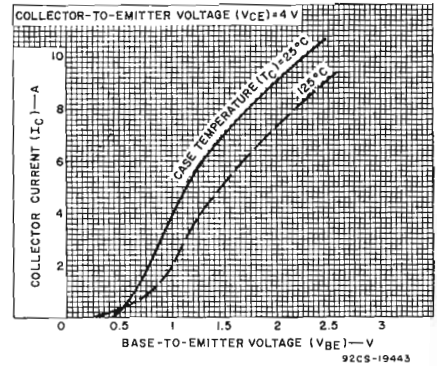

Fig.15—Typical transfer characteristics for type 2N6254.

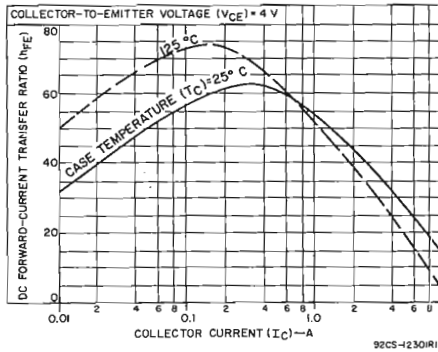

Fig.16—Typical dc-beta characteristics for type 2N3055.

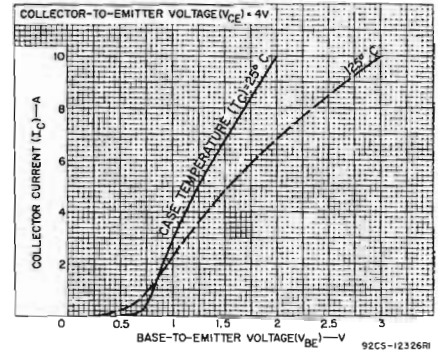

Fig.17—Typical transfer characteristics for types 2N6253 and 2N3055.

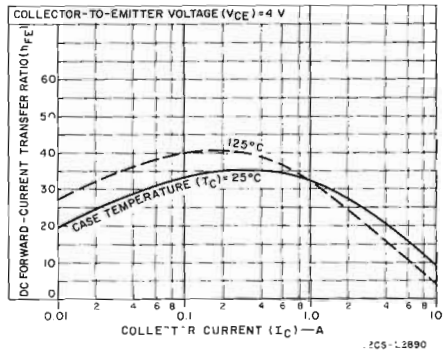

Fig.18—Typical dc-beta characteristics for type 2N6253.

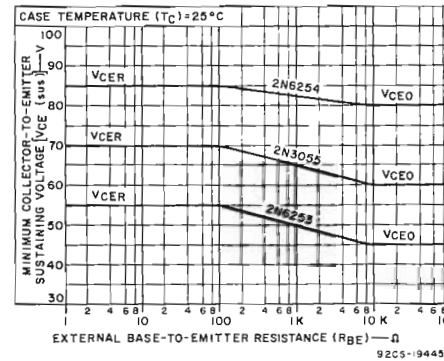

Fig.19—Sustaining voltage vs. base-to-emitter resistance for all types.