

RCA
Solid State
Division

Power Transistors

40542

40543

SILICON N-P-N, MOLDED SILICONE-PLASTIC HOMETAXIAL-BASE TRANSISTORS

RCA-40542 and -40543 are hometaxial**^{*}-base silicon n-p-n power transistors employing a new plastic package with formed leads which can be inserted into a TO-3 socket.

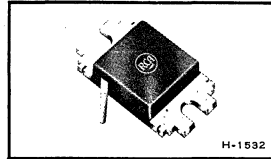
These types differ in voltage ratings and in the current at which the parameters are controlled. The 40542 is intended as a complement to p-n-p type 40051 in complementary-symmetry output stages of audio-amplifier circuits. The 40543 was designed specifically for amplifier applications.

*Data for type 40051 appears in File No. 67.

**"HOMETAXIAL" was coined by RCA from two words, "homogeneous" and "axial," to provide a name for a transistor structure in which the base region comprises homogeneous resistivity silicon material in the axial direction (emitter-to-collector). Hometaxial types provide greater power-handling capability, lower saturation resistance, and freedom from second breakdown.

FOR OUTPUT STAGES IN AUDIO-AMPLIFIER CIRCUITS

40542 -- N-P-N Complement of 40051*



40542 & 40543
For TO-3 Sockets

- Molded silicone-plastic package
- Low saturation voltage:

$$V_{CE(sat)} = 1.0 \text{ V max. at } I_C = 2.5 \text{ A (40542)}$$

$$= 1.0 \text{ V max. at } I_C = 3.0 \text{ A (40543)}$$

- Low thermal resistance:
 $\theta_{J-C} = 1.5 \text{ }^\circ\text{C/W max.}$

MAXIMUM RATINGS

Absolute-Maximum Values:		40542	40543	
COLLECTOR-TO-EMITTER SUSTAINING VOLTAGE:				
With external base-to-emitter resistance (R_{BE}) = 100Ω	$V_{CER(sus)}$	50	60	V
EMITTER-TO-BASE VOLTAGE	V_{EBO}	5	5	V
COLLECTOR CURRENT	I_C	6	8	A
TRANSISTOR DISSIPATION:	P_T			
At case temperatures up to 25°C		83	83	W
At temperatures above 25°C		Derate linearly to 0 W at 150°C .		
TEMPERATURE RANGE:				
Storage & Operating (Junction).		-65 to 150		$^\circ\text{C}$
LEAD TEMPERATURE (During Soldering):				
At distances $\geq 1/16$ in. from seating plane for 10 s max.		235		$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS

Case Temperature (T_C) = 25° C

Characteristic	Symbol	TEST CONDITIONS				LIMITS				Units
		DC Voltage (V)		DC Current (A)		Type 40542		Type 40543		
		V_{CE}	V_{EB}	I_C	I_B	Min.	Max.	Min.	Max.	
Collector-Cutoff Current With external base-to-emitter resistance (R_{BE}) = 100 Ω	I_{CER}	40 50				— —	1.0 —	— —	— 1.0	mA
Emitter-Cutoff Current	I_{EBO}		5	0		—	5.0	—	5.0	mA
DC Forward Current Transfer Ratio	h_{FE}	4 4		2.5 ^a 3.0 ^a		20 —	70 —	— 20	— 70	
Collector-to-Emitter Sustaining Voltage With external base-to-emitter resistance (R_{BE}) = 100 Ω	$V_{CER(sus)}$			0.2 ^a		50	—	60	—	V
Base-to-Emitter Voltage	V_{BE}	4 4		2.5 ^a 3.0 ^a		— —	1.7 —	— —	— 1.7	V
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$			2.5 ^a 3.0 ^a	0.25 0.3	— —	1.0 —	— —	— 1.0	V
Gain-Bandwidth Product	f_T	4		0.5		0.8	2.8	0.8	2.8	MHz
Thermal Resistance (Junction-to-Case)	θ_{J-C}					—	1.5	—	1.5	°C/W

^aPulsed; pulse duration = 300 μ s, duty factor = 1.8%.TERMINAL CONNECTIONS FOR TYPES
40542 & 40543Lead No. 1 — Base
Lead No. 2 — Emitter
Mounting Flange — Collector

TYPICAL DC BETA
FOR TYPE 40542

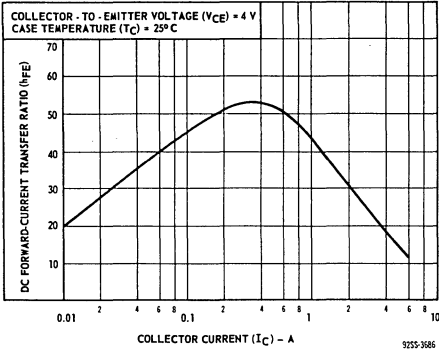


Fig. 1

TYPICAL INPUT CHARACTERISTICS
FOR TYPE 40542

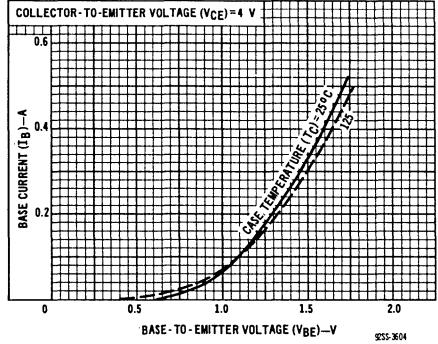


Fig. 2

TYPICAL OUTPUT CHARACTERISTICS
FOR TYPE 40542

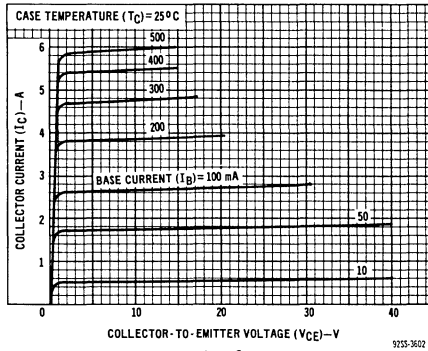


Fig. 3

TYPICAL TRANSFER CHARACTERISTICS
FOR TYPE 40542

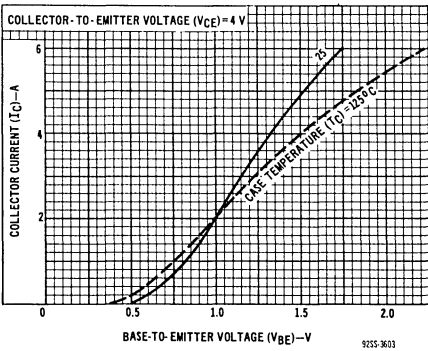


Fig. 4

TYPICAL GAIN-BANDWIDTH PRODUCT
FOR TYPE 40542

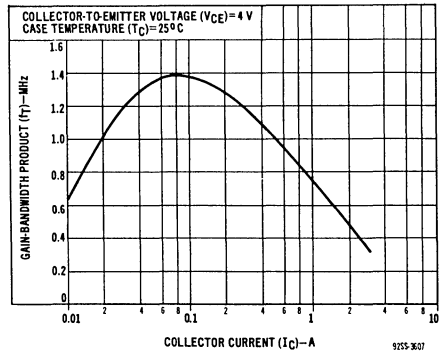


Fig. 5

TYPICAL DC BETA
FOR TYPE 40543

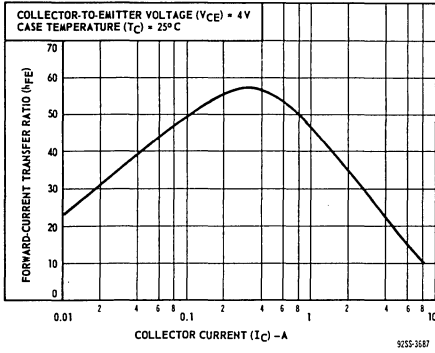


Fig. 6

TYPICAL INPUT CHARACTERISTICS
FOR TYPE 40543

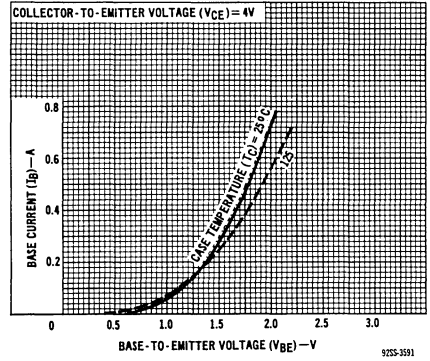


Fig. 7

TYPICAL OUTPUT CHARACTERISTICS
FOR TYPE 40543

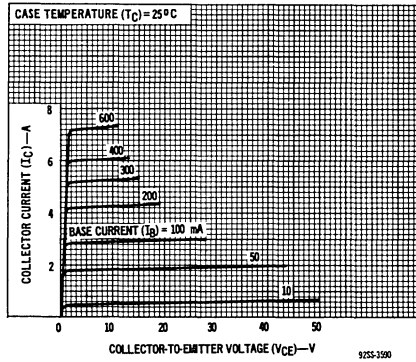


Fig. 8

TYPICAL TRANSFER CHARACTERISTICS
FOR TYPE 40543

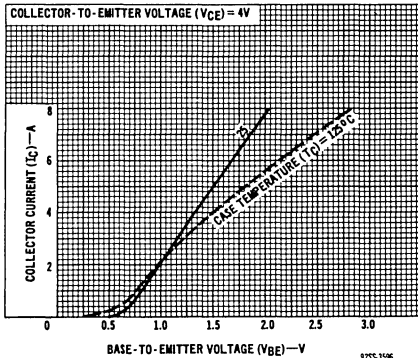


Fig. 9

TYPICAL GAIN-BANDWIDTH PRODUCT
FOR TYPE 40543

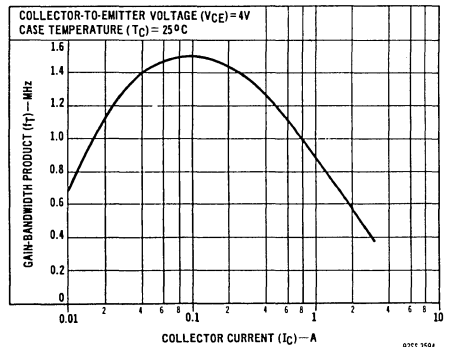


Fig. 10