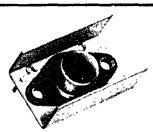
RCA
Solid State
Division

Power Transistors

2N3441 2N6263 2N6264
40373 40912 40913

JEDEC TO-66 H-1340



JEDEC TO-66
With Integral Heat Radiator H-1470A

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

Rugged Devices for Intermediate Power Applications in Industrial and Commercial Equipment

Features:

- 2N6264: premium type from 2N3441 family
- Maximum safe-area-of-operation curves for dc and pulse operation
- High voltage ratings
- Low saturation voltages
- Thermal-cycling rating curves

Applications:

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

RCA 2N3441, 2N6263, and 2N6264 are hometaxial-base* silicon n-p-n transistors intended for a wide variety of medium- to-high power, high-voltage applications.

Types 40373, 40912, and 40913 are the 2N3441, 2N6263, and 2N6264 with factory-attached heat-radiators intended for printed-circuit-board applications.

* "Hometaxial" was coined by RCA from "homogenous" and "axial" to describe a single-diffused transistor with a base region of homogeneous-resistivity 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.

MAXIMUM RATINGS, *Absolute-Maximum Values:*

		2N6263 40912	2N3441 40373	2N6264 40913	
*COLLECTOR-TO-BASE VOLTAGE	V_{CBO}	140	160	170	V
COLLECTOR-TO-EMITTER SUSTAINING VOLTAGE:					
* With base open	$V_{CEO(sus)}$	120	140	150	V
With external base-to-emitter resistance (R_{BE}) = 100Ω	$V_{CER(sus)}$	130	150	160	V
With base reverse-biased (V_{BE} = -1.5 V)	$V_{CEV(sus)}$	140	160	170	V
*EMITTER-TO-BASE VOLTAGE	V_{EBO}	7	7	7	V
*CONTINUOUS COLLECTOR CURRENT	I_C	3	3	3	A
PEAK COLLECTOR CURRENT		4	4	4	A
*CONTINUOUS BASE CURRENT	I_B	2	2	2	A
TRANSISTOR DISSIPATION:	P_T				
* At case temperature up to 25°C		20 (2N6263)	25 (2N3441)	50 (2N6264)	W
At ambient temperatures up to 25°C		5.8 (40912)	5.8 (40373)	5.8 (40913)	W
* At temperatures above 25°C		*See Figs. 4 & 7*	*See Figs. 4 & 7*	*See Figs. 1 & 7*	
*TEMPERATURE RANGE:					
Storage & 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 format 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		2N6263 40912		2N3441 40373		2N6264 40913		
		V_{CE}	V_{BE}	I_C	I_B	Min.	Max.	Min.	Max.	Min.	Max.	
Collector-Cutoff Current:												
		100			0	–	5	–	–	–	–	
* With base open	I_{CEO}	130			0	–	–	–	–	–	1	mA
		140			0	–	–	–	100	–	–	
Collector-Cutoff Current:												
		120	−1.5			–	2*	–	–	–	–	
	I_{CEX}	140	−1.5			–	–	–	5*	–	–	
		140	−1.5			–	–	–	1	–	–	
With base-emitter junction reversed biased		150	−1.5			–	–	–	–	–	0.05*	mA
		120	−1.5			–	10*	–	–	–	–	
	I_{CEX}	140	−1.5			–	–	–	6*	–	–	
	(T_C = 150°C)	140	−1.5			–	–	–	5	–	–	
		150	−1.5			–	–	–	–	–	1*	
* Emitter-Cutoff Current	I_{EBO}		−5			–	2	–	–	–	–	mA
			−7			–	–	–	1	–	0.2	
Collector-to-Emitter Sustaining Voltage:[a]	$V_{CEO}(sus)$											
* With base open				0.1[b]	0	120	–	140	–	150	–	
With external base-to-emitter resistance (R_{BE}) = 100 Ω	$V_{CER}(sus)$			0.1		130	–	150	–	160	–	V
With base-emitter junction reversed biased	$V_{CEV}(sus)$		−1.5	0.1		140	–	160	–	170	–	
		2		1[b]		–	–	–	–	20	60	
* DC Forward-Current	h_{FE}	2		3[b]		3	–	–	–	5	–	
Transfer Ratio		4		0.5[b]		20	100	25	100	–	–	
		4		2.7[b]		–	–	5	–	–	–	
				0.5[b]	0.05	–	1.2*	–	1	–	–	
Collector-to-Emitter Saturating Voltage	$V_{CE}(sat)$			1[b]	0.1	–	–	–	–	–	0.5*	V
				2.7[b]	0.9	–	–	–	6*	–	–	
		2		1[b]		–	–	–	–	–	1.5*	
Base-to-Emitter Voltage	V_{BE}	4		0.5[b]		–	2*	–	1.7	–	–	V
		4		2.7[b]		–	–	–	6*	–	–	
* Magnitude of Common-Emitter, Small-Signal, Short-Circuit Forward Current Transfer Ratio (f = 0.4 MHz)	$\|h_{fe}\|$	4		0.2		8	–	–	–	2	–	
		4		0.5		–	–	5	–	–	–	
Gain-Bandwidth Product	f_T	4		0.2		800	–	800	–	800	–	kHz
* Common-Emitter, Small-Signal, Short-Circuit Forward Current Transfer Ratio (f = 1 kHz)	h_{fe}	4		0.1		25	–	–	–	25	–	
		4		0.5		–	–	15	75	–	–	
Forward-Bias Second Breakdown Collector Current, Pulse Duration (non-repetitive) = 1 s	$I_{S/b}$	120				0.167	–	–	–	–	–	
		120				–	–	–	–	0.417	–	A
		120				–	–	0.21	–	–	–	
Thermal Resistance: Junction-to-Case	$R_{\theta JC}$					8.75 (max.) 2N6263		7 (max.) 2N3441		3.5 (max.) 2N6264		°C/W
Junction-to-Ambient	$R_{\theta JA}$					30 (max.) 40912		30 (max.) 40373		30 (max.) 40913		

*In accordance with JEDEC registration data format (JS-6 RDF-2).

[a] **CAUTION:** The sustaining voltage $V_{CEO}(sus)$, $V_{CER}(sus)$, and $V_{CEV}(sus)$ MUST NOT be measured on a curve tracer. These sustaining voltages should be measured by means of the test circuit shown in Fig. 11.

[b] Pulsed, pulse duration = 300 μs; duty factor ≤ 2 %.

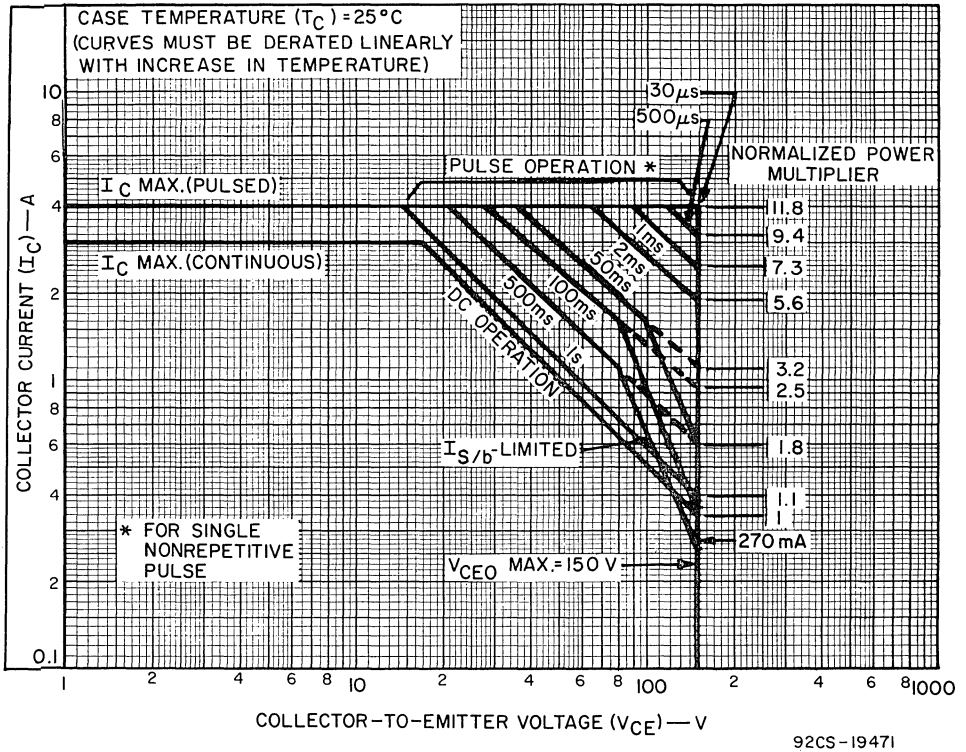


Fig.1 — Maximum operating areas for type 2N6264.

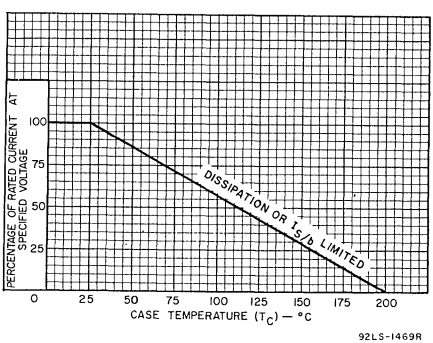


Fig.2 — Current derating curve for all types.

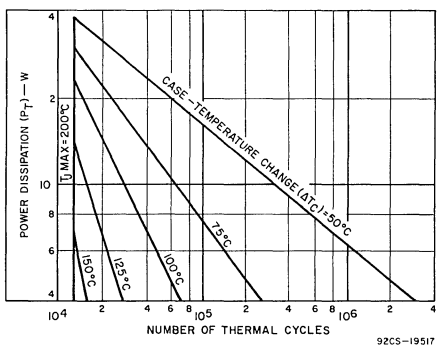


Fig.3 — Thermal-cycle rating chart for type 2N6264.

TERMINAL CONNECTIONS FOR 2N3441, 2N6263 & 2N6264

Pin 1 - Base
Pin 2 - Emitter
Case, Mounting Flange - Collector

TERMINAL CONNECTIONS FOR 40373, 40912, & 40913

Pin 1 - Base
Pin 2 - Emitter
Heat-Radiator - Collector

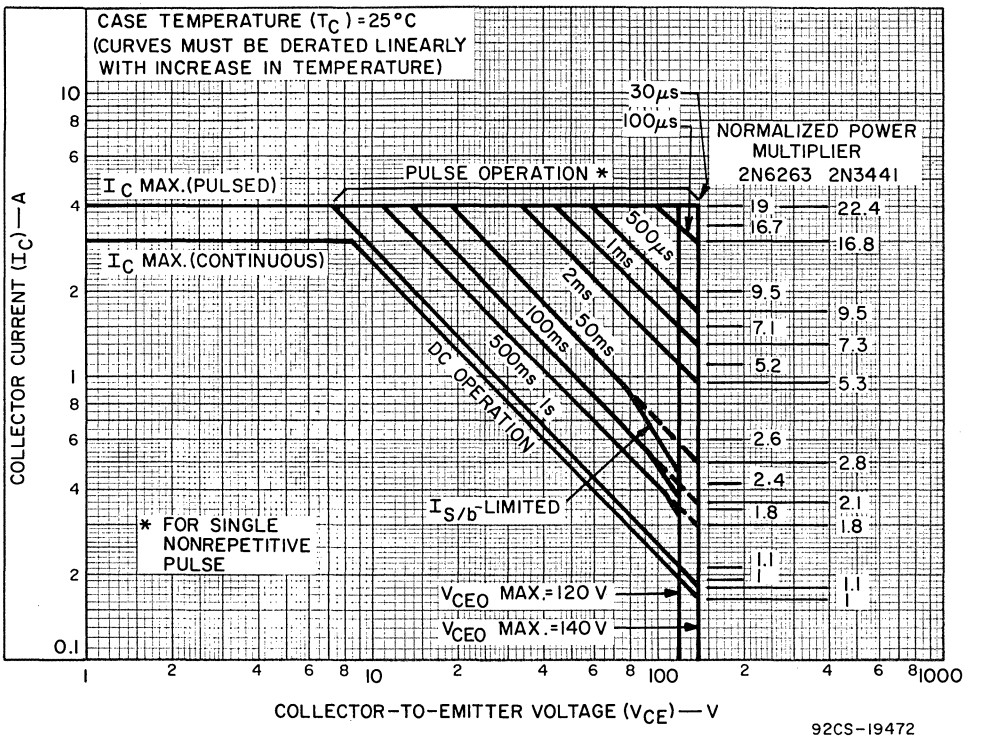


Fig.4—Maximum operating areas for type 2N6263 and 2N3441.

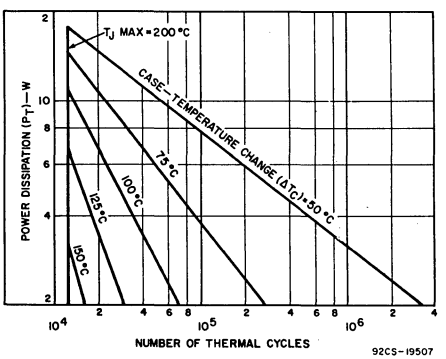


Fig.5—Thermal-cycle rating chart for type 2N3441.

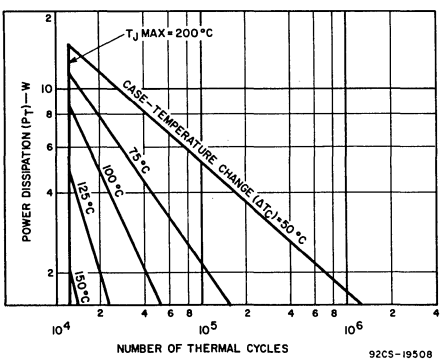


Fig.6—Thermal-cycle rating chart for type 2N6263.

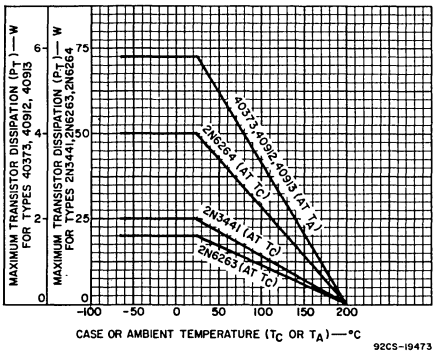


Fig.7—Dissipation derating curves for all types.

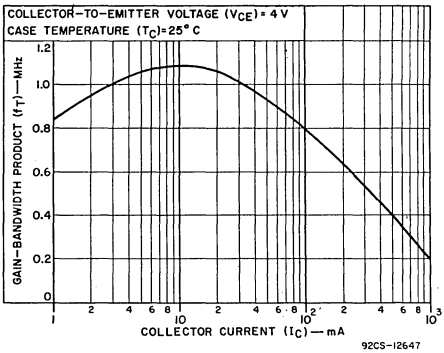


Fig.8—Typical gain-bandwidth product for all types.

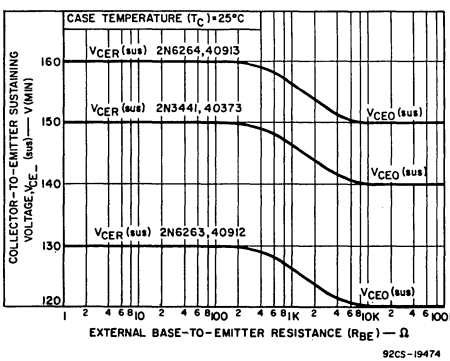


Fig.9—Sustaining voltage vs. base-to-emitter resistance for all types.

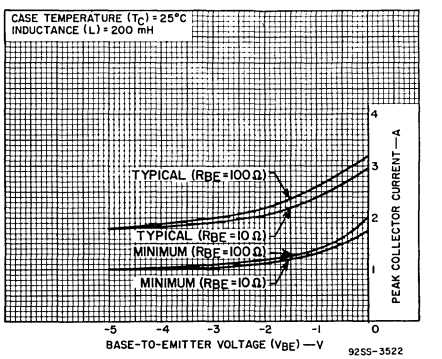


Fig.10—Reverse-bias second-breakdown characteristics for all types.

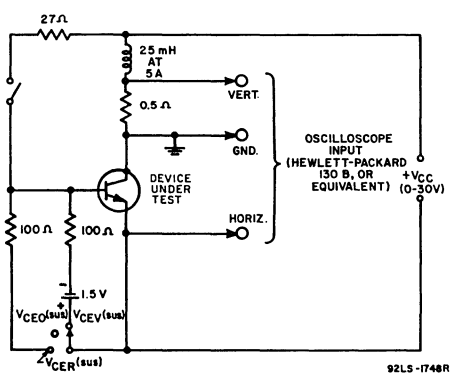
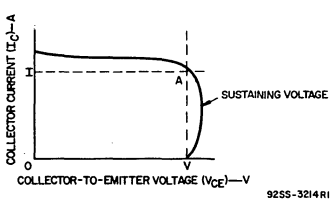


Fig.11—Circuit used to measure sustaining voltages, V_{CEO}(sus), V_{CER}(sus), and V_{CEV}(sus) for all types.



Note: The sustaining voltage, V_{CEO}(sus), V_{CER}(sus), or or V_{CEV}(sus) is acceptable when the trace falls to the right and above point "A" for all types. (For values of current and voltage, see *Electrical Characteristics)*

Fig.12—Oscilloscope display for measurement of sustaining voltages (test circuit shown in Fig. 11).

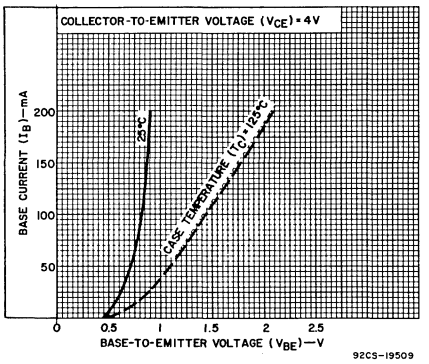


Fig.13—Typical input characteristics for types 2N6264 and 40913.

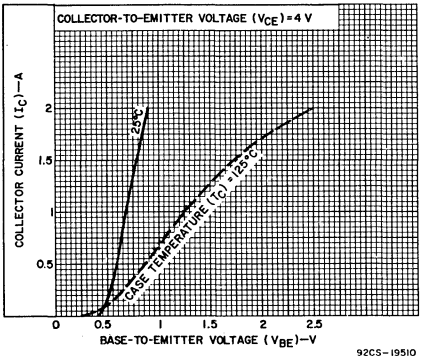


Fig.14—Typical transfer characteristics for types 2N6264 and 40913.

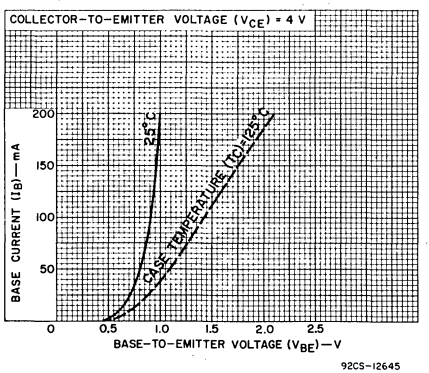


Fig.15—Typical input characteristics for types 2N3441 and 40373.

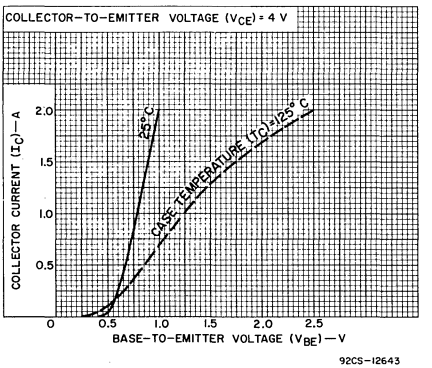


Fig.16—Typical transfer characteristics for types 2N3441 and 40373.

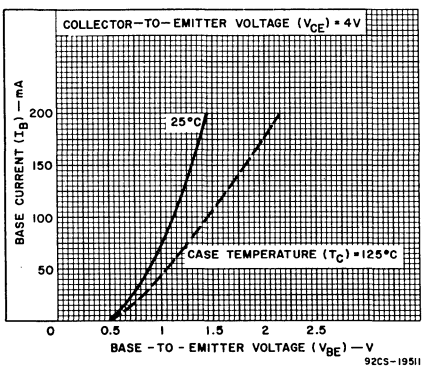


Fig.17—Typical input characteristics for types 2N6263 and 40912.

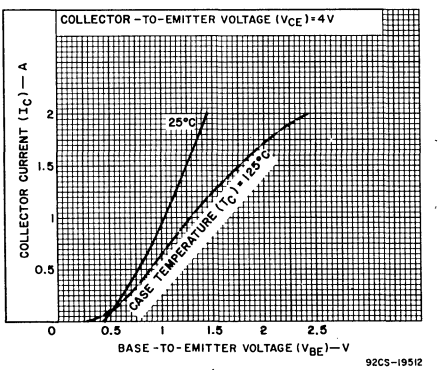


Fig.18—Typical transfer characteristics for types 2N6263 and 40912.

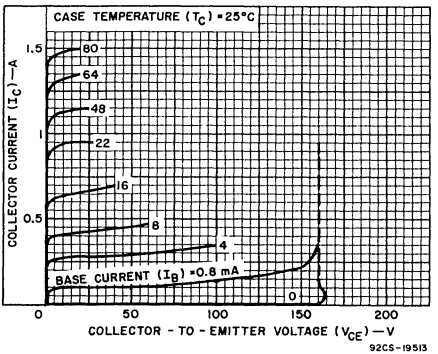


Fig.19—Typical output characteristics for types 2N6264 and 40913.

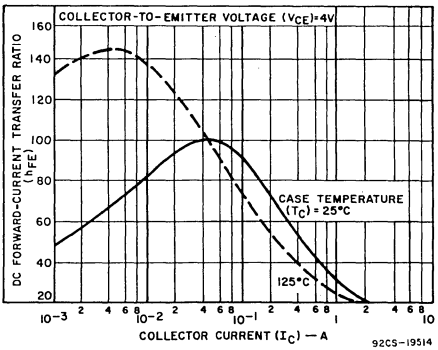


Fig.20—Typical dc-beta characteristics for types 2N6264 and 40913.

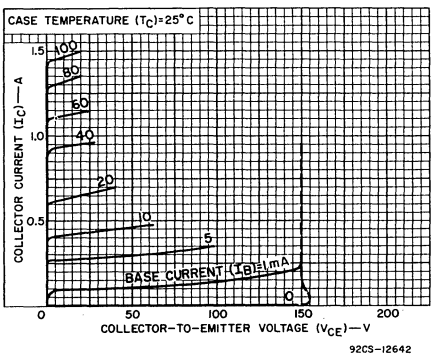


Fig.21—Typical output characteristics for types 2N3441 and 40373.

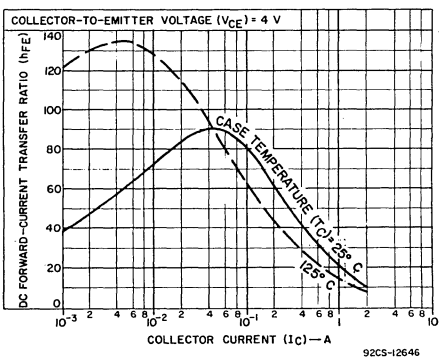


Fig.22—Typical dc-beta characteristics for types 2N3441 and 40373.

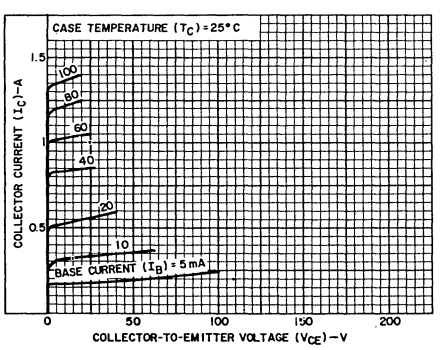


Fig.23—Typical output characteristics for types 2N6263 and 40912.

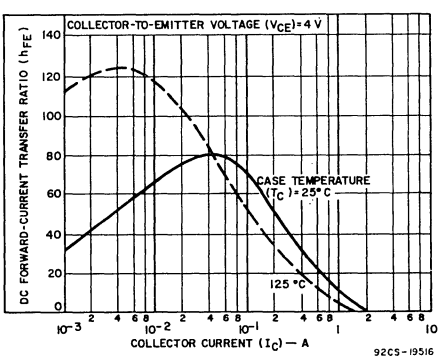


Fig.24—Typical dc-beta characteristics for types 2N6263 and 40912.