RCA
Solid State
Division

Power Transistors

RCS242

JEDEC TO-3

H-1570

Hometaxial-Base, High-Power Silicon N-P-N Transistor

Rugged, Broadly Applicable Device
For Industrial and Commercial Use

Features:

- 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

The RCA-RCS242 is a silicon n-p-n transistor intended for a wide variety of high-power applications. The hometaxial-base construction of the device renders it highly resistant to second breakdown over a wide range of operating conditions. The RCS242 is provided in a JEDEC TO-3 hermetic package.

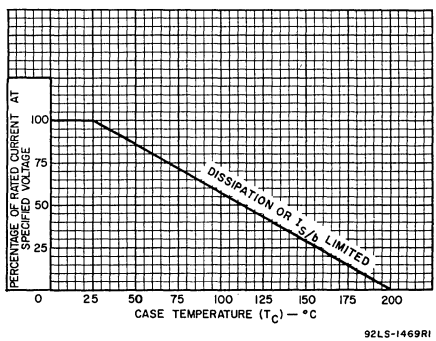

Fig. 1 — Current derating curve.

MAXIMUM RATINGS, *Absolute-Maximum Values:*

COLLECTOR-TO-BASE VOLTAGE	V_{CBO}	50	V
COLLECTOR-TO-EMITTER SUSTAINING VOLTAGE:			
With external base-to-emitter resistance (R_{BE}) = 100 Ω	$V_{CER(sus)}$	50	V
With base open	$V_{CEO(sus)}$	40	V
EMITTER-TO-BASE VOLTAGE	V_{EBO}	4	V
CONTINUOUS COLLECTOR CURRENT	I_C	15	A
CONTINUOUS BASE CURRENT	I_B	7	A
TRANSISTOR DISSIPATION	P_T		
At case temperatures up to 25°C		115	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

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

CHARACTERISTIC	SYMBOL	TEST CONDITIONS					LIMITS		UNITS
		VOLTAGE V dc			CURRENT A dc		RCS242		
		V_{CB}	V_{CE}	V_{BE}	I_C	I_B	Min.	Max.	
Collector-Cutoff Current: With emitter open	I_{CBO}	40				0	–	5	mA
Emitter-Cutoff Current	I_{EBO}			–4			–	10	mA
Collector-to-Emitter Sustaining Voltage: With base open	$V_{CEO}(sus)$				0.2[a]	0	40	–	
With external base-to-emitter resistance (R_{BE}) = 100 Ω	$V_{CER}(sus)$				0.2[a]		50	–	V
DC Forward Current Transfer Ratio	h_{FE}		4		3[a]		20	–	
Base-to-Emitter Voltage	V_{BE}		4		3[a]		–	1.8	V
Collector-to-Emitter Saturation Voltage	$V_{CE}(sat)$				3[a]	0.3	–	1.1	V
Common-Emitter, Small-Signal, Short-Circuit Forward Current Transfer Ratio: f = 1 kHz	h_{fe}		4		1		10	–	
Magnitude of Common-Emitter, Small-Signal, Short-Circuit, Forward Current Transfer Ratio: f = 0.4 MHz	$\lvert h_{fe} \rvert$		4		1		2	–	
Common-Emitter, Short-Circuit, Small-Signal, Forward Current Transfer Ratio Cutoff Frequency	f_{hfe}		4		1		10	–	kHz
Forward-Bias Second Breakdown Collector Current: t = 1 s, nonrepetitive	$I_{S/b}$		40				2.5	–	A
Thermal Resistance: Junction-to-Case	$R_{\theta JC}$						–	1.5	°C/W

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

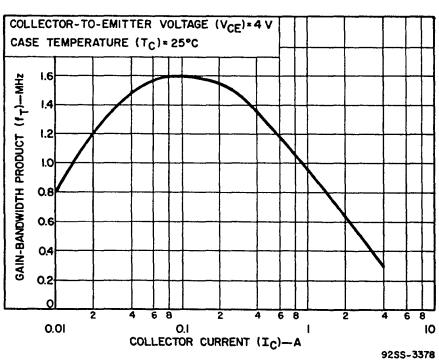

Fig. 2 – Typical gain-bandwidth product.

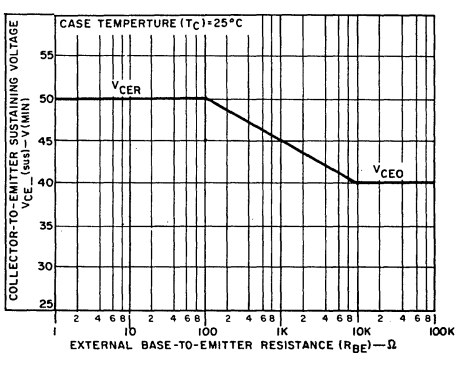

Fig. 3 – Sustaining voltage vs. base-to-emitter resistance.

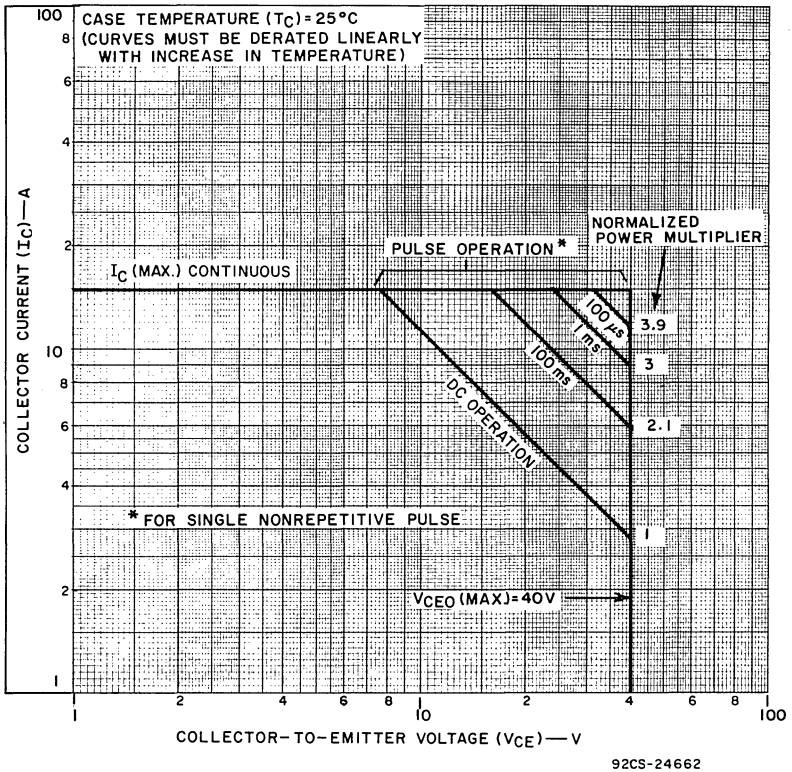

Fig. 4 — Maximum operating areas.

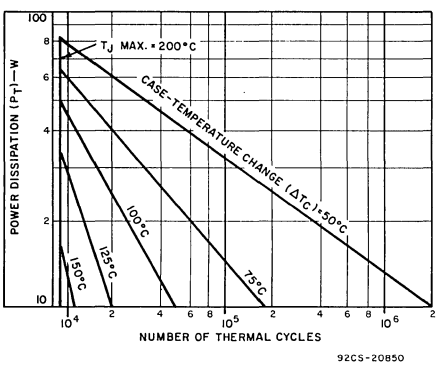

Fig. 5 — Thermal-cycle rating chart.

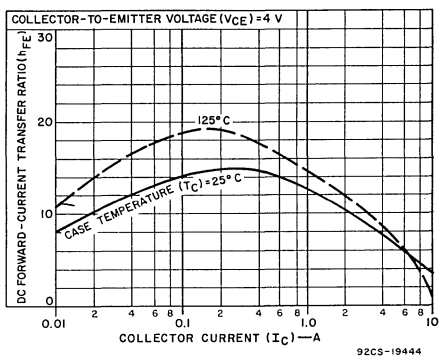

Fig. 6 — Typical dc-beta characteristics.

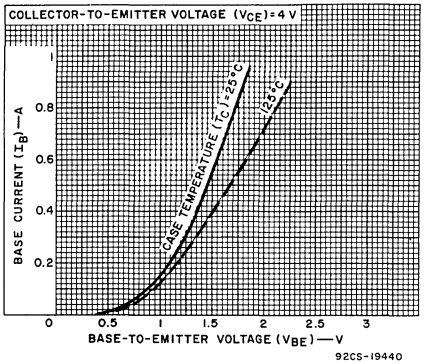

Fig. 7 — Typical input characteristics.

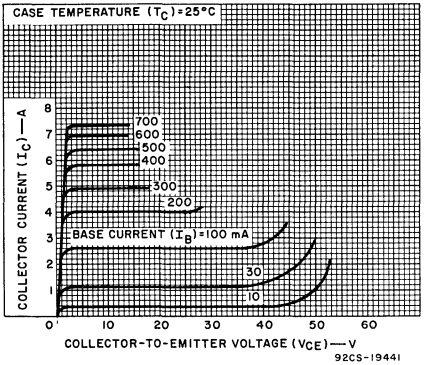

Fig. 8 — Typical output characteristics.

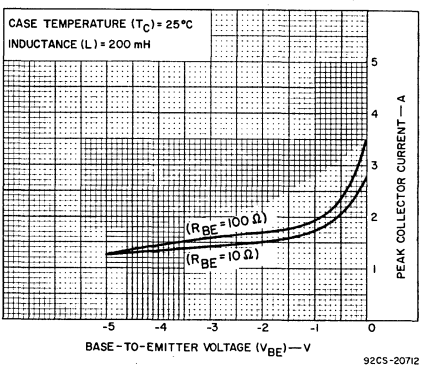

Fig. 9 — Reverse-bias second-breakdown characteristics.

TERMINAL CONNECTIONS

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