RCA
Solid State
Division

Power Transistors

41500

JEDEC TO-220AB

H-1535R1

Epitaxial-Base, Silicon N-P-N VERSAWATT Transistor

General-Purpose Medium-Power Type for Switching and Amplifier Applications

Features

- **Low saturation voltages**
- **VERSAWATT package (molded silicone plastic)**
- **Maximum safe-area-of-operation curves specified for dc operation**

RCA-41500 is an epitaxial-base silicon n-p-n transistor supplied in the JEDEC TO-220AB version of the VERSAWATT package. This transistor is intended for a variety of medium-power switching and amplifier applications, such as series and shunt regulators and driver and output stages of high-fidelity amplifiers. The 41500 may also be used as the n-p-n complement of p-n-p type 41501. (Data for the 41501 are supplied in bulletin File No. 770.)

MAXIMUM RATINGS, *Absolute-Maximum Values:*

COLLECTOR-TO-BASE VOLTAGE	V_{CBO}	35	V
COLLECTOR-TO-EMITTER VOLTAGE:			
With external base-supply resistance (R_{BB}) = 100 Ω, and base supply voltage (V_{BB}) = 0	V_{CEX}	35	V
With base open	V_{CEO}	25	V
EMITTER-TO-BASE VOLTAGE	V_{EBO}	3	V
COLLECTOR CURRENT (Continuous)			
At case temperature ≤ 106°C	I_C	7	A
BASE CURRENT (Continuous)			
At case temperature ≤ 130°C	I_B	3	A
TRANSISTOR DISSIPATION:	P_T		
At case temperatures up to 25°C		40	W
At case temperatures up to 100°C		16	W
At ambient temperatures up to 25°C		1.8	W
At case temperatures above 25°C		Derate linearly at 0.32 W/°C, or see Fig. 4,	
At case temperatures above 100°C		Derate linearly at 0.32 W/°C	
At ambient temperatures above 25°C		Derate linearly at 0.0144 W/°C	
TEMPERATURE RANGE:			
Storage and Operating (Junction)		−65 to 150	°C
LEAD TEMPERATURE (During Soldering):			
At distance ≥ 1/8 in. (3.17 mm) from case 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		41500		
		V_{CE}	V_{BE}	I_C	I_B	Min.	Max.	
Collector-Cutoff Current: With external base-to-emitter resistance (R_{BE}) = 100 Ω	I_{CER}	30				–	0.25	mA
Emitter-Cutoff Current	I_{EBO}		–3	0		–	1	mA
Collector-to-Emitter Sustaining Voltage: With base open	$V_{CEO}(sus)$			0.1[a]	0	25	–	V
With external base-to-emitter resistance (R_{BE}) = 100 Ω	$V_{CER}(sus)$			0.1		35	–	
DC Forward-Current Transfer Ratio	h_{FE}	4		1[a]		25	–	
Base-to-Emitter Voltage	V_{BE}	4		1[a]		–	1.5	V
Collector-to-Emitter Saturation Voltage	$V_{CE}(sat)$			1[a]	0.1	–	1	V
Common-Emitter, Small-Signal, Short-Circuit, Forward-Current Transfer Ratio (f = 50 kHz)	h_{fe}	4		0.5		20	–	
Gain-Bandwidth Product	f_T	4		0.5		4	–	MHz
Magnitude of Common-Emitter, Small-Signal, Short-Circuit, Forward Current Transfer Ratio (f = 1 MHz)	$\|h_{fe}\|$	4		0.5		4	–	
Collector-to-Base Capacitance (f = 1 MHz, V_{CB} = 10 V)	C_{obo}			0		–	250	pF
Thermal Resistance: Junction-to-Case	$R_{\theta JC}$					–	3.125	°C/W
Junction-to-Ambient	$R_{\theta JA}$					–	70	

[a]Pulsed; pulse duration = 300 μs; rep. rate = 60 Hz; duty factor ⩽ 2%.

CAUTION: The sustaining voltage $V_{CER}(sus)$ MUST NOT be measured on a curve tracer.

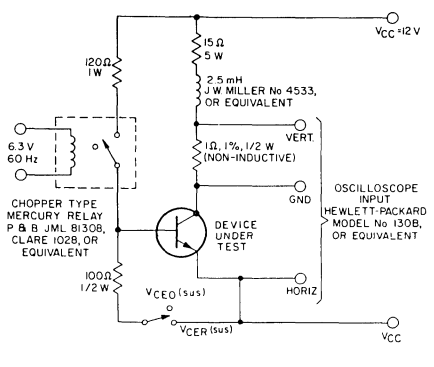
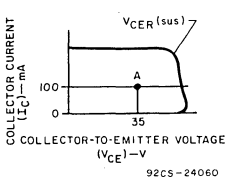


Fig. 1 – Circuit used to measured sustaining voltage $V_{CER}(sus)$.



The sustaining voltage, $V_{CER}(sus)$, is acceptable when the traces fall to the right and above point "A".

Fig. 2 – Oscilloscope display for measurement of sustaining voltage (test circuit shown in Fig. 1).

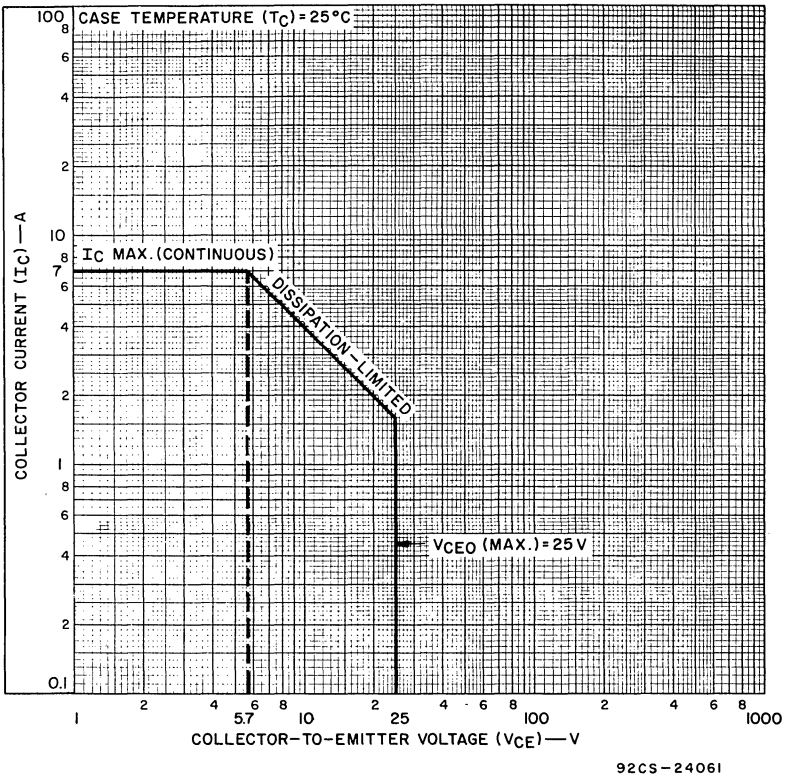


Fig. 3 — Maximum operating area.

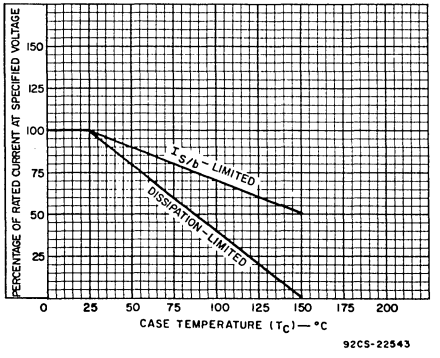


Fig. 4 — Current derating curves.

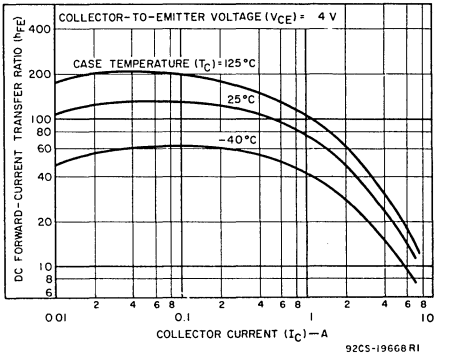


Fig. 5 — Typical dc beta characteristics.

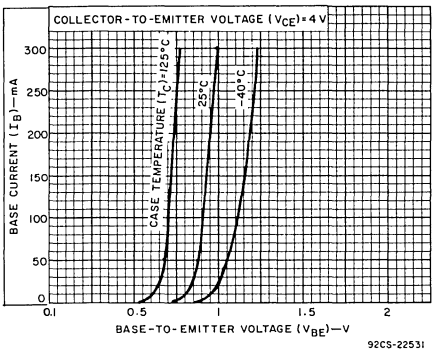


Fig. 6 — Typical input characteristics.

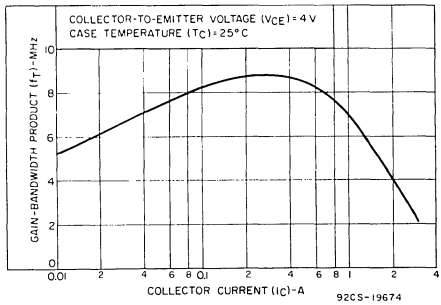


Fig. 7 — Typical gain-bandwidth product.

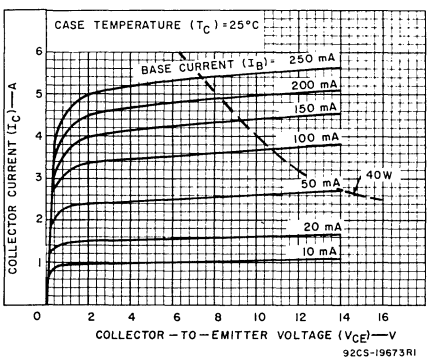


Fig. 8 — Typical output characterstics.

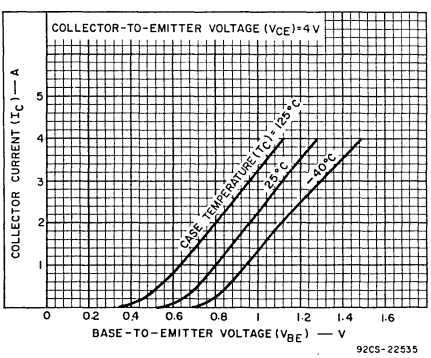


Fig. 9 — Typical transfer characteristics.

TERMINAL CONNECTIONS

Terminal No. 1 — Base
Terminal No. 2 — Collector
Terminal No. 3 — Emitter
Terminal No. 4 — Collector