

RCA9166A, RCA9166B, MJ15022, MJ15024

File Number 1293

T-33-15

Silicon N-P-N Epitaxial-Base High-Power Transistors

Rugged Devices, Broadly Applicable For Industrial and Commercial Use

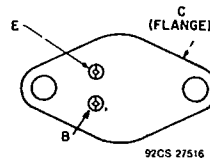
Features:

- High dissipation capability
- Maximum safe-area-of-operation curves
- High voltage
- High gain at high current

Applications:

- High-fidelity amplifiers
- Series and shunt regulators
- Linear/power amplifiers

TERMINAL DESIGNATIONS



JEDEC TO-204AA

The RCA9166A\*, RCA9166B\*, MJ15022, and MJ15024 are ballasted multiple-epitaxial silicon n-p-n transistors featuring high gain at high current and high voltage. They differ from each other in voltage ratings, safe-operating-area (SOA) ratings, and the currents at which the parameters are controlled.

All these types are supplied in the JEDEC TO-204AA steel hermetic package.

\*Formerly RCA Dev Type Nos. TA9166A and TA9166B, respectively.

MAXIMUM RATINGS, Absolute-Maximum Values:

	RCA9166A	RCA9166B	MJ15024	MJ15022	
V <sub>CEO</sub> .....	—	—	400	350	V
V <sub>CEB(sus)</sub> R <sub>BE</sub> = 100 Ω .....	275	225	275	225	V
V <sub>CEO(sus)</sub> .....	250	200	250	200	V
V <sub>EB0</sub> .....	—	—	5	—	V
I <sub>C</sub> .....	—	—	16	—	A
I <sub>CM</sub> .....	—	—	30	—	A
I <sub>B</sub> .....	—	—	5	—	A
P <sub>T</sub> .....	—	—	—	—	W
At T <sub>c</sub> ≤ 25°C .....	—	—	250	—	W
At T <sub>c</sub> > 25°C .....	—	—	1.43	—	W/°C
T <sub>stg</sub> , T <sub>J</sub> .....	—	—	-65 to 200	—	°C
T <sub>L</sub> .....	—	—	—	—	°C
At distance ≥ 1/32 in. (0.8 mm) from seating plane for 10 s max .....	—	—	230	—	°C

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ELECTRICAL CHARACTERISTICS, at Case Temperature ( $T_C$ )=25°C  
Unless Otherwise Specified

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CHARACTERISTIC	TEST CONDITIONS			LIMITS								UNITS
	VOLTAGE V dc		CURRENT A dc	RCA9166A		RCA9166B		MJ15024		MJ15022		
	V <sub>CE</sub>	V <sub>BE</sub>	I <sub>C</sub>	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
I <sub>CBO</sub>	400 <sup>a</sup>			—	—	—	—	—	1	—	—	mA
	350 <sup>a</sup>			—	—	—	—	—	—	—	1	
I <sub>CEO</sub>	200			—	1	—	—	—	0.5	—	—	mA
	150			—	—	—	1	—	—	—	0.5	
I <sub>CEX</sub>	400	-1.5		—	—	—	—	—	0.5	—	0.5	mA
	250	-1.5		—	—	—	—	—	0.25	—	—	
	200	-1.5		—	—	—	—	—	—	—	0.25	
I <sub>CER</sub> R <sub>BE</sub> =100 Ω, T <sub>C</sub> =150°C	200			—	4	—	—	—	4	—	—	mA
	150			—	—	—	4	—	—	—	4	
h <sub>FE</sub>	4		3 <sup>c</sup>	30	—	30	—	—	—	—	—	V
	4		5 <sup>c</sup>	20	—	20	—	—	—	—	—	
	4		8 <sup>c</sup>	—	—	—	—	15	60	15	60	
	4		16 <sup>c</sup>	3.2	—	3.2	—	5	—	5	—	
V <sub>CEO(sus)</sub> <sup>b</sup>			0.1	250	—	200	—	250	—	200	—	V
V <sub>CER(sus)</sub> <sup>b</sup> R <sub>BE</sub> =100 Ω			0.1	275	—	225	—	275	—	225	—	
V <sub>EBO</sub> I <sub>E</sub> =1 mA I <sub>E</sub> =0.5 mA				5	—	5	—	—	—	—	—	
V <sub>BE</sub>	4		3 <sup>c</sup>	—	2	—	2	—	—	—	—	
V <sub>CE(sat)</sub> I <sub>B</sub> =0.3 A I <sub>B</sub> =0.8 A I <sub>B</sub> =3.2 A	4		8 <sup>c</sup>	—	—	—	—	—	2.2	—	2.2	V
			3 <sup>c</sup>	—	1.0	—	1.0	—	—	—	—	
			8 <sup>c</sup>	—	—	—	—	—	1.4	—	1.4	
I <sub>S/b</sub> t <sub>p</sub> =0.5 s nonrep.	80		16 <sup>c</sup>	—	—	—	—	—	4	—	4	A
	50			3	—	3	—	2	—	2	—	
h <sub>fe</sub>   f=1 MHz	10			—	—	—	—	5	—	5	—	MHz
f <sub>T</sub>	10			1	4	20	4	20	4	20	4	
C <sub>ob</sub>	10 <sup>a</sup>			—	500	—	500	—	500	—	500	pF
R <sub>θJC</sub>	10			—	0.7	—	0.7	—	0.7	—	0.7	°C/W

<sup>a</sup>V<sub>CB</sub>.

<sup>b</sup>CAUTION: Sustaining voltages V<sub>CER(sus)</sub> and V<sub>CEO(sus)</sub> MUST NOT be measured on a curve tracer.

<sup>c</sup>Pulsed; pulse duration=300 μs, duty factor=1.8%.



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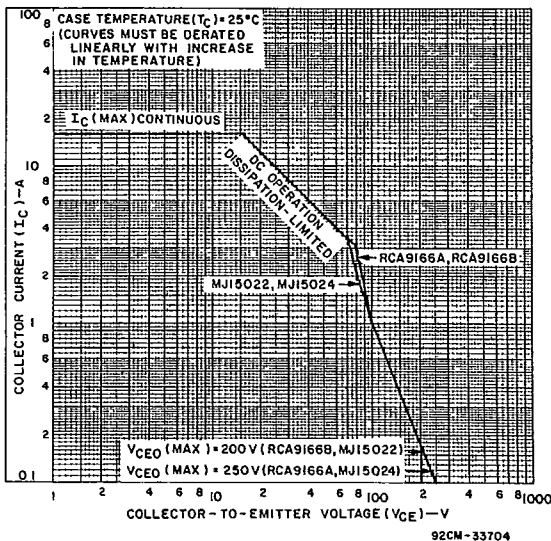


Fig. 1 - Maximum operating areas for all types.

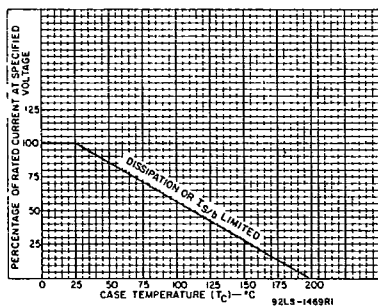


Fig. 2 - Current derating curve for all types.

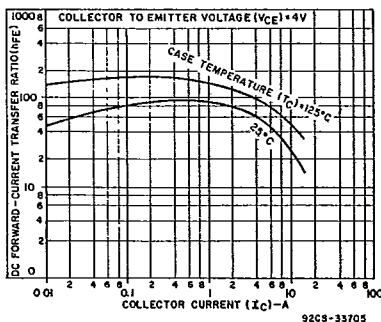


Fig. 3 - Typical dc beta characteristics as a function of collector current for all types.

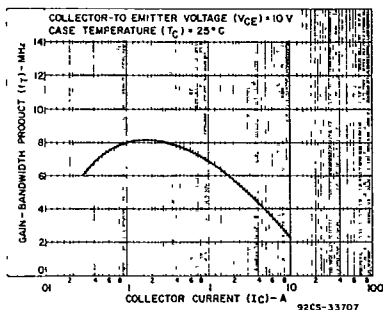


Fig. 4 - Typical gain-bandwidth product for all types.

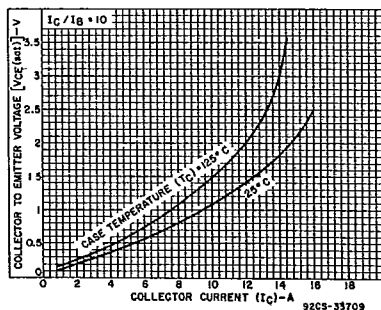


Fig. 5 - Typical saturation voltage characteristics for all types.

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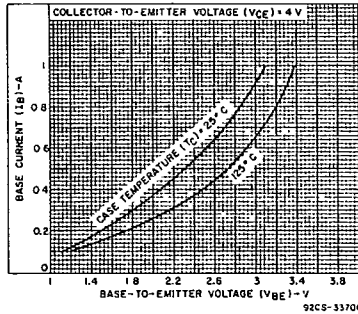


Fig. 6 - Typical input characteristics for all types.

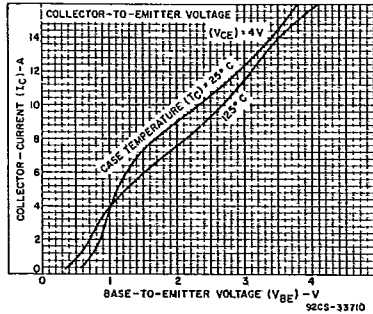


Fig. 7 - Typical transfer characteristics.

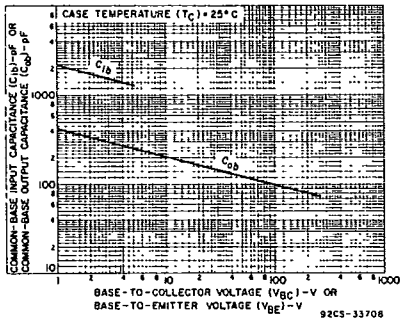
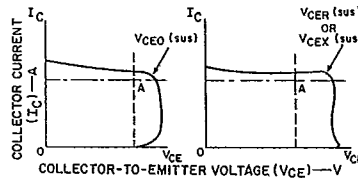


Fig. 8 - Typical common-base input or output capacitance characteristics as a function of reverse voltages for all types.



NOTE: The sustaining Voltages  $V_{CE0}(sus)$ ,  $V_{CER}(sus)$  or,  $V_{CEX}(sus)$  are acceptable when the trace falls to the right and above point "A". (For values of current and voltage, see Electrical Characteristics.)

92CS-15224RI

Fig. 9 - Oscilloscope display for measurement of sustaining voltages. (Test circuit shown in Fig. 10).

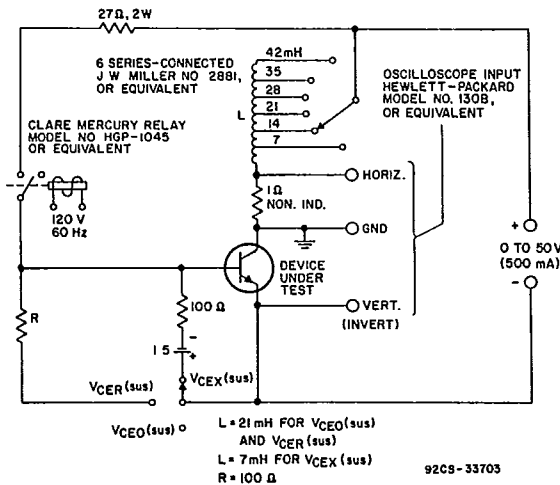


Fig. 10 - Circuit used to measure sustaining voltages  $V_{CE0}(sus)$ ,  $V_{CER}(sus)$ , and  $V_{CEX}(sus)$  for all types.