RCA9166A, RCA9166B, MJ15022, MJ15024

File Number **1293**

T-33-15

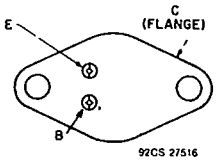
Silicon N-P-N Epitaxial-Base High-Power Transistors

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_{CBO}	—	—	400	350	V
$V_{CER(SUS)}$ R_{BE} = 100 Ω	275	225	275	225	V
$V_{CEO(SUS)}$	250	200	250	200	V
V_{EBO}		5			V
I_C		16			A
I_{CM}		30			A
I_B		5			A
P_T					
At $T_C \leq 25°C$		250			W
At $T_C > 25°C$ Derate linearly		1.43			W/°C
T_{stg}, T_J		-65 to 200			°C
T_L					
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_{CE}	V_{BE}	I_C	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
I_{CBO}	400[a]			—	—	—	—	—	1	—	—	mA
	350[a]			—	—	—	—	—	—	—	1	
I_{CEO}	200			—	1	—	—	—	0.5	—	—	
	150			—	—	—	1	—	—	—	0.5	
I_{CEX}	400	−1.5		—	—	—	—	—	0.5	—	0.5	
	250	−1.5		—	—	—	—	—	0.25	—	—	
	200	−1.5		—	—	—	—	—	—	—	0.25	
I_{CER} R_{BE}=100 Ω,	200			—	4	—	—	—	4	—	—	
T_C=150°C	150			—	—	—	4	—	—	—	4	
h_{FE}	4		3[c]	30	—	30	—	—	—	—	—	
	4		5[c]	20	—	20	—	—	—	—	—	
	4		8[c]	—	—	—	—	15	60	15	60	
	4		16[c]	3.2	—	3.2	—	5	—	5	—	
$V_{CEO(sus)}$[b]			0.1	250	—	200	—	250	—	200	—	V
$V_{CER(sus)}$[b] R_{BE}=100 Ω			0.1	275	—	225	—	275	—	225	—	
V_{EBO} I_E=1 mA				5	—	5	—	—	—	—	—	
I_E=0.5 mA				—	—	—	—	5	—	5	—	
V_{BE}	4		3[c]	—	2	—	2	—	—	—	—	
	4		8[c]	—	—	—	—	—	2.2	—	2.2	
$V_{CE(sat)}$ I_B=0.3 A			3[c]	—	1.0	—	1.0	—	—	—	—	
I_B=0.8 A			8[c]	—	—	—	—	—	1.4	—	1.4	
I_B=3.2 A			16[c]	—	—	—	—	—	4	—	4	
$I_{S/b}$ t_p=0.5 s	80			3	—	3	—	2	—	2	—	A
nonrep.	50			—	—	—	—	5	—	5	—	
$\|h_{fe}\|$ f=1 MHz	10		1	4	20	4	20	4	20	4	20	
f_T	10		1	4	20	4	20	4	20	4	20	MHz
C_{ob}	10[a]			—	500	—	500	—	500	—	500	pF
$R_{\theta JC}$	10		10	—	0.7	—	0.7	—	0.7	—	0.7	°C/W

[a] V_{CB}.
[b] *CAUTION:* Sustaining voltages $V_{CER(sus)}$ and $V_{CEO(sus)}$ *MUST NOT* be measured on a curve tracer.

[c] Pulsed; pulse duration=300 μs, duty factor=1.8%.

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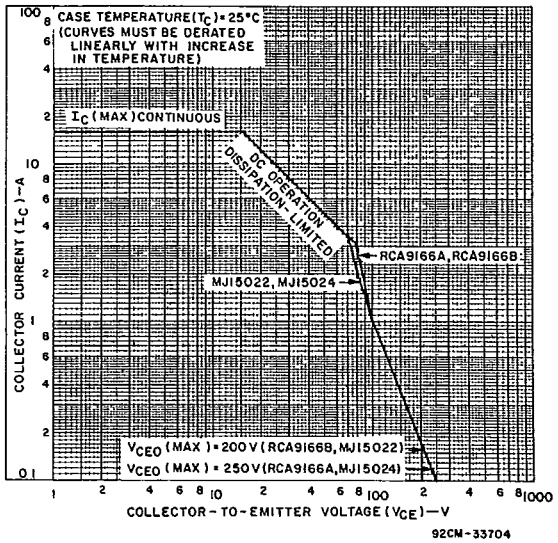

Fig. 1 - Maximum operating areas for all types.

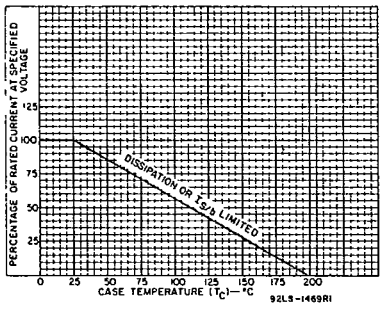

Fig. 2 - Current derating curve for all types.

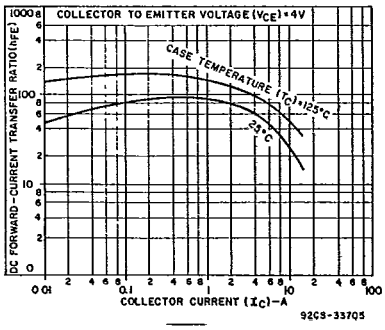

Fig. 3 - Typical dc beta characteristics as a function of collector current for all types.

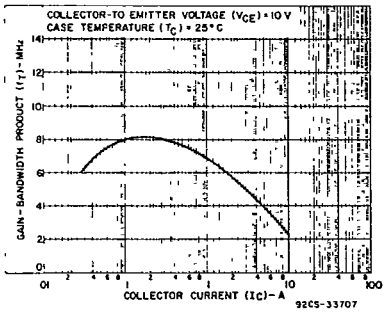

Fig. 4 - Typical gain-bandwidth product for all types.

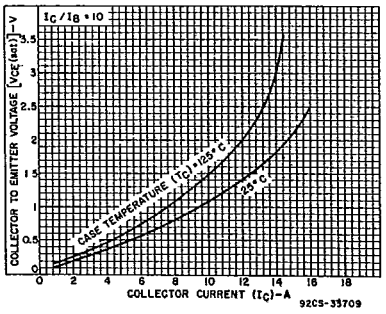

Fig. 5 - Typical saturation voltage characteristics for all types.

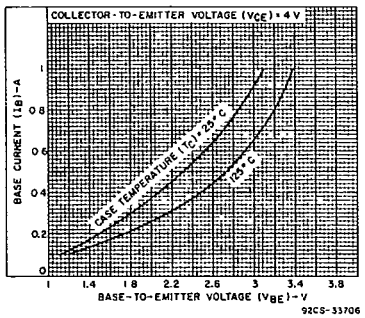

Fig. 6 - Typical input characteristics for all types.

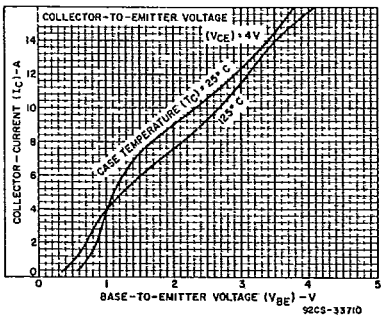

Fig. 7 - Typical transfer characteristics.

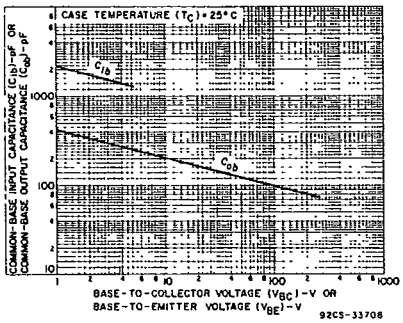

Fig. 8 - Typical common-base input or output capacitance characteristics as a function of reverse voltages for all types.

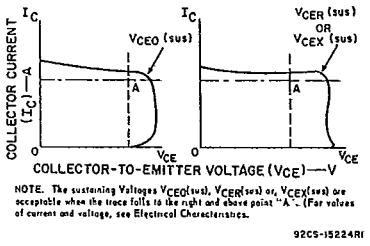

Fig. 9 - Oscilloscope display for measurement of sustaining voltages. (Test circuit shown in Fig. 10).

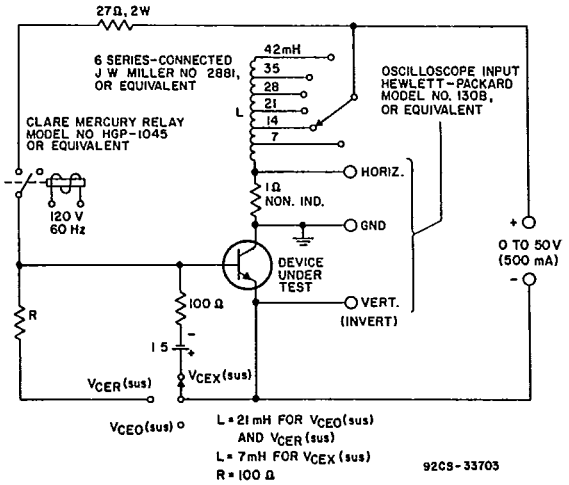

Fig. 10 - Circuit used to measure sustaining voltages V_{CEO}(sus), V_{CER}(sus), and V_{CEX}(sus) for all types.