# Silicon N-P-N Epitaxial-Base High-Power Transistor

# RCA9166A

*Features:*

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

*Applications:*

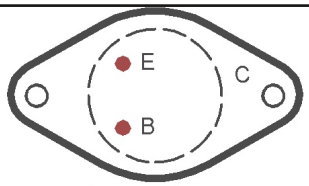
- **High-fidelity amplifiers**
- **Series and shunt regulators**
- **Linear power amplifiers**

The RCA9166 Series are ballasted epitaxial-base 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.

The RCA9166 Series are supplied in the JEDEC TO-204MA hermetic steel package.

Formerly Types are the TA9166 Series.

**Terminal Designations**



bottom view

**JEDEC TO-204MA**

## MAXIMUM RATINGS, *Absolute-Maximum Values:*

| | | |
|---|---|---|
| $V_{CBO}$ | - | V |
| $U_{CER}^{(SUS)}$ $R_{BE}$ = 100Ω | 275 | V |
| $V_{CEO}^{(SUS)}$ | 250 | V |
| $V_{EBO}$ | 5 | V |
| $I_C$ | 16 | A |
| $I_{CM}$ | 30 | A |
| $I_B$ | 5 | A |
| $P_T$ $T_C \leq 25°C$ | 250 | W |
| $P_T$ $T_C > 25°C$ Derate linearly | 1.43 | W/°C |
| $T_{stg}$ $T_J$ | -65 to +200 | °C |
| $T_L$ At distance ≥ 1/32 in. (0.8mm) from seating plane for 10s max. | 230 | °C |



Source: RCA SSD-220C (1981)

## Electrical Characteristics, *at Case Temperature ($T_C$) = 25°C*

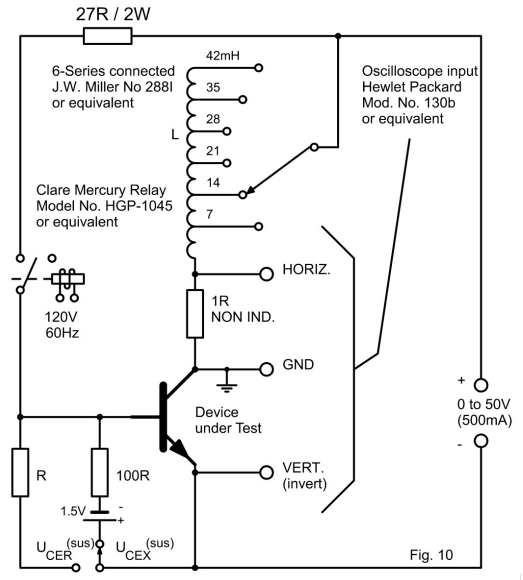
*Unless Otherwise Specified*

| CHARACTERISTIC | | TEST CONDITIONS | | LIMITS | | UNITS |
|---|---|---|---|---|---|---|
| | | VOLTAGE V dc | CURRENT A dc | RCA9166A | | |
| | | $V_{CE}$ | $I_C$ | Min. | Max. | |
| $I_{CEO}$ | | 200 | | - | 1 | mA |
| $I_{CER}$ $R_{BE}$ = 100Ω, $T_C$ = 150°C | | 200 | | - | 4 | mA |
| $h_{FE}$ | | 4 | 3[c] | 30 | - | |
| | | 4 | 5[c] | 20 | - | |
| | | 4 | 8[c] | - | - | |
| | | 4 | 16[c] | 3.2 | - | |
| $V_{CEO}$ (sus) [b] | | | 0.1 | 250 | - | V |
| $V_{CER}$ (sus) [b] $R_{BE}$ = 100Ω | | | 0.1 | 275 | - | V |
| $V_{EBO}$ $I_E$=1mA | | | | 5 | - | V |
| $U_{BE}$ | | 4 | 3[c] | - | 2 | V |
| $U_{CE}^{(sat)}$ IB= | 0.3A | | 3[c] | - | 1 | V |
| | 0.8A | | | - | - | V |
| | 3.2A | | | - | - | V |
| $I_{S/b}$ $t_p$=0,5s nonrep. | | 80 | | 3 | - | A |
| $\|h_{fe}\|$ f=1MHz | | 10 | 1 | 4 | 20 | |
| $f_T$ | | 10 | 1 | 4 | 20 | MHz |
| $C_{OB}$ | | 10[a] | | - | 500 | pF |
| $R_{\theta JC}$ | | 10 | 10 | - | 0.7 | °C/W |

Note a: $V_{CB}$

Note b: *CAUTION* Sustaining voltages $V_{CER}^{(sus)}$ and $V_{CEO}^{(sus)}$ *MUST NOT* be measured on a curve tracer, see Fig. 10

Note c: Pulse duration = 300µs, duty factor = 1.8%






Source: RCA SSD-220C (1981)

$I_C$ - continous collector current
$I_{CM}$ - peak collector current
$I_{CER}$ - collector-cutoff current with specified resistance between base and emitter
$I_{CEX}$ - collector-cutoff current with specified circuit between base and emitter
$I_B$ - continous base current
$I_{EBO}$ - emitter-cutoff current, collector open
$I_{S/b}$ - forward-bias, second break-down collector current
$V_{CBO}$ - collector-to-base voltage, emitter open
$V_{CEO}$ - collector-to-emitter voltage, base open
$V_{CEO}^{(sus)}$ - collector-to-emitter sustaining voltage, base open
$V_{CER}^{(sus)}$ - collector-to-emitter sustaining voltage with specified resistance between base and emitter
$V_{EBO}$ - emitter-to-base voltage, collector open
$V_{BE}$ - base-to-emitter voltage
$V_{CE}^{sat}$ - collector-to-emitter saturation voltage
$C_{OB}$ - common-base output capacitance
fT - gain-bandwidth product (unity-gain frequency for devices in which gain roll-off has a -1 slope)
$h_{FE}$ - dc forward-current transfer ratio
$|h_{fe}|$ - magnitude of common-emitter, small-signal, short-circuit, forward-current transfer ratio
$R_{BE}$ - external base-to-emitter resistance
$R_{\theta JC}$ - thermal resistance, junction-to-case
$P_T$ - transistor dissipation at specified temperature
$T_C$ - case temperature
$T_{stg}$ - storage temperature
$T_J$ - operating (junction) temperature
$T_L$ - lead temperature during soldering
$\theta$ - conduction angle



Source: RCA SSD-220C (1981)