High-Voltage, High-Power Silicon N-P-N Power Transistor

For Switching and Linear Applications in Military, Industrial and Commercial Equipment

RCA423

Features:

- **Maximum safe-area-of-operation curves**
- **Low saturation voltage: $V_{CE}^{(sat)}$ = 0.8V max**
- **High voltage rating: $V_{CEO}^{(sus)}$ = 325V**
- **High dissipation rating: P_T = 125W**
- **Steel Hermetic TO-204MA Package**

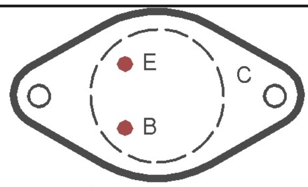
Applications:

- **Inverter**
- **Deflection Circuits**
- **Switching Regulators**
- **High-Voltage Bridge Amplifiers**
- **Ignition circuits**

The RCA423 is an epitaxial silicon n-p-n transistor utilizing a multiple-emitter-site structure. The transistor features high breakdown-voltage values make them especially suitable for use in inverters, deflection circuits, switching regulators, high-voltage bridge amplifiers, ignition circuits and other high voltage switching applications.

The RCA423 is supplied in the steel JEDEC TO-204MA hermetic package.

Terminal Designations



bottom view

JEDEC TO-204MA

MAXIMUM RATINGS, *Absolute-Maximum Values:*

V_{CBO}	400	V
$V_{CEO}^{(sus)}$	325	V
V_{EBO}	5	V
I_C	7	A
I_{CM}	10	A
I_B	2	A
P_T $T_C \leq 25°C$	125	W
P_T $T_C > 25°C$ Derate linearly	0.714	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

RCA423

Characteristic Symbol	Test Conditions				Limits			Units
	Voltage (V)		DC Current (A)					
	V_{CE}	V_{BE}	I_C	I_B	Min.	Typ.	Max.	
I_{CEO}	300				-	-	0.25	
I_{CEV}	400	-1.5			-	-	0.25	
I_{CEV} (TC=125°C)	400	-1.5			-	-	0.5	mA
I_{EBO}		-5			-	-	5	
h_{FE}	5		1[a]		30	-	90	
	5		2.5[a]		10	-	-	
$V_{CEO}^{(sus)b}$ (Fig. 3)			0.1		325[b]	-	-	
$V_{BE}^{(sat)}$			1[a]	0.1	-	0.9	1.5	V
$V_{CE}^{(sat)}$			1[a]	0.1	-	0.2	0.8	
$I_{S/b}^{c}$ Pulse duration (non-repetitive) = 1s	150				0.1	-	-	A
f_T	10		0.2		-	4	-	MHz
t_r			1	0.1 (IB1)	-	0.35	-	
t_s			1	0.1 (IB1)	-	1.4	-	µs
				-0.5 (-IB2)				
t_f			1	0.1 (IB1)	-	0.15	-	
				-0.5 (-IB2)				
$R_{\theta JC}$	10		5				1.4	°C/W

a Pulsed: pulse duration ≤ 350µs, duty factor = 2%

b CAUTION: The sustaining voltage $V_{CEO}^{(sus)}$ *MUST NOT* be measured on a curve tracer and measured by means of the test circuit shown in Fig.3

c $I_{S/b}$ is defined as the current at which second breakdown occurs at a specified collector voltage with the emitter-base junction forward-biased for transistor operation in the active region

d I_{B1} = -I_{B2} = value shown

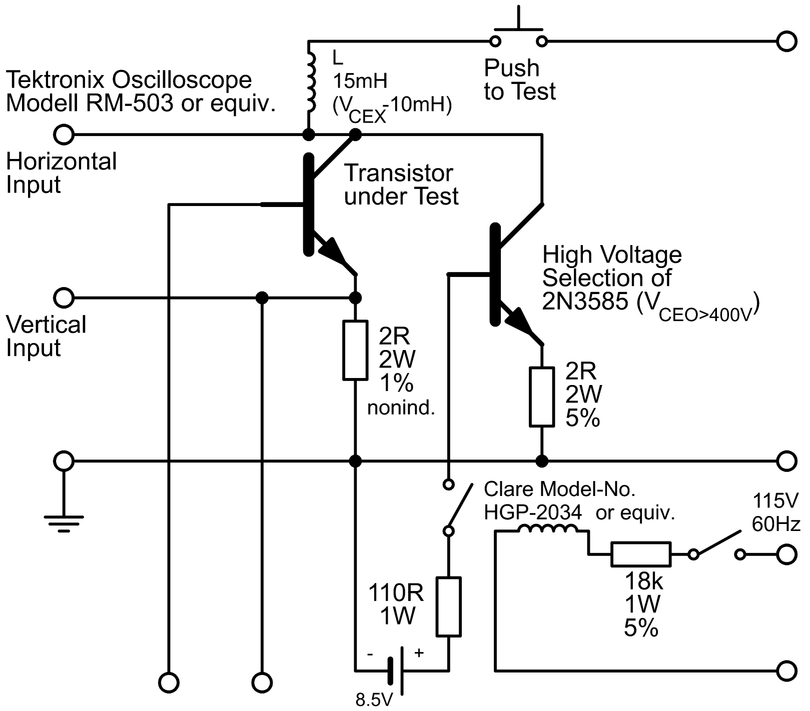
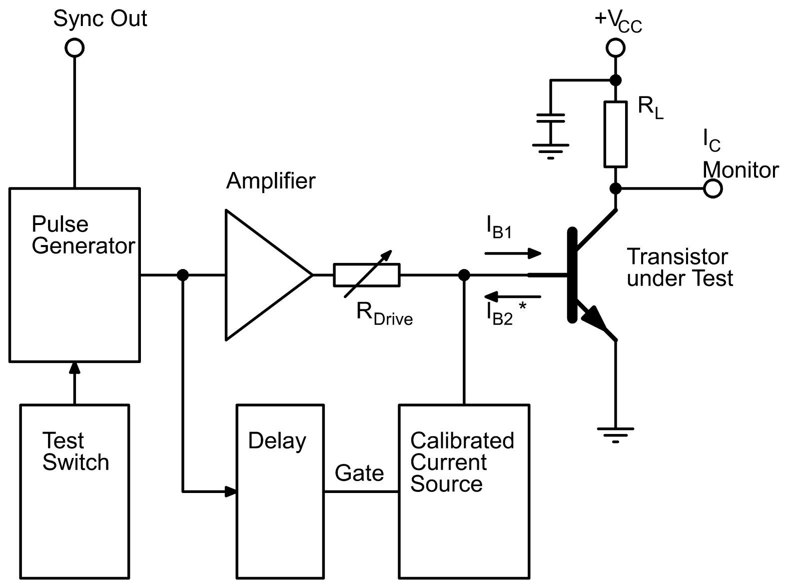


Fig. 3 Circuit used to measure sustaining voltage, $V_{CEO}^{(sus)}$



* I_{B1} and I_{B2} measured with tektronix current probe P6019 or equivalent

Circuit used to measure switching time (t_r,t_s,t_f)

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
C_{OBO} - open circuit 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_f - fall time
t_r - rise time
t_s - storage time
T_C - case temperature
T_{stg} - storage temperature
T_J - operating (junction) temperature
T_L - lead temperature during soldering
θ - conduction angle

Source: RCA SSD-220C (1981)