File Number 1172

BUX21

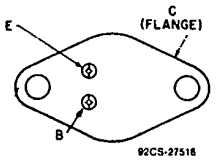
Silicon N-P-N Switching Transistor

For Switching Applications in Industrial and Commercial Equipment

Features:

- V_{CEO} — 200V
- I_C — 40 A
- P_T — 250 W

TERMINAL DESIGNATIONS



JEDEC TO-204AA

The RCA-BUX21 is a silicon n-p-n power transistor featuring fast switching speeds, low saturation voltage, and high safe-operating-area (SOA) ratings. It is specially designed for converters, inverters, pulse-width-modulated regulators, and a variety of power switching circuits.

The RCA-BUX21 transistor is supplied in a steel JEDEC TO-204AA hermetic package.

MAXIMUM RATINGS, *Absolute-Maximum Values:*

	BUX21	
V_{CBO}	250	V
$V_{CEO}(sus)$	200	V
$V_{CEX}(sus)$		
V_{BE} = -1.5V	250	V
$V_{CER}(sus)$		
R_{BE} = 100 Ω	240	V
V_{EBO}	7	V
I_C	40	A
I_{CM}	50	A
I_B	8	A
P_T		
At T_C up to 25°C and V_{CE} up to 20 V	250	W
T_J, T_{stg}	-65 to +200	°C
T_L		
At distances ≥ 1/16 in. (1.58 mm) from case for 10 s max.	200	°C

BUX21

ELECTRICAL CHARACTERISTICS, *at Case Temperature (T_C) = 25°C unless otherwise specified*

CHARACTERISTIC	TEST CONDITIONS				LIMITS			UNITS
	VOLTAGE V dc		CURRENT A dc		BUX21			
	V_{CE}	V_{BE}	I_C	I_B	Min.	Typ.	Max.	
I_{CEO}	160	–	–	0	–	–	3	mA
I_{CEV}	250	–1.5	–	–	–	–	3	mA
T_C = 125°C	250	–1.5	–	–	–	–	12	mA
I_{EBO}	–	–5	0	–	–	–	1	mA
$V_{CEO(sus)}$[b]	–	–	0.2[a]	–	200[a]	–	–	V
$V_{(BR)EBO}$ I_E = 0.05 A	–	–	0	–	7	–	–	V
$V_{BE(sat)}$	–	–	25[a]	3	–	1.2	1.5	V
$V_{CE(sat)}$	–	–	12[a]	1.2	–	0.2	0.6	V
	–	–	25[a]	3	–	0.7	1.5	V
h_{FE}	2	–	12[a]	–	20	–	60	
	4	–	25[a]	–	10	–	–	
$I_{S/b}$	140	–	–	–	0.15	–	–	A
t = 1s, nonrepetitive	20	–	–	–	12.5	–	–	A
f_T f = 10 MHz	15	–	2	–	8	–	–	MHz
t_{on}	V_{CC} = 100 V	–	25	3	–	0.3	1.2	µs
t_s $(I_{B_1} = I_{B_2})$	V_{CC} = 100 V	–	25	3	–	1.0	1.8	µs
t_f $(I_{B_1} = I_{B_2})$	V_{CC} = 100 V	–	25	3	–	0.2	0.4	µs
$R_{\theta JC}$	–	–	–	–	–	–	0.7	°C/W

[a] Pulsed, pulse duration = 300 µs, duty factor ≤ 2%.

[b] **CAUTION:** Sustaining Voltages $V_{CEO(sus)}$ *MUST NOT* be measured on a curver tracer.

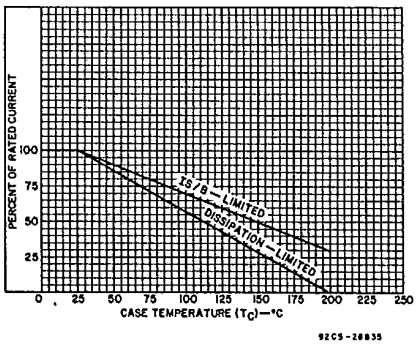


Fig. 1 — Dissipation and $I_{S/b}$ derating curve.

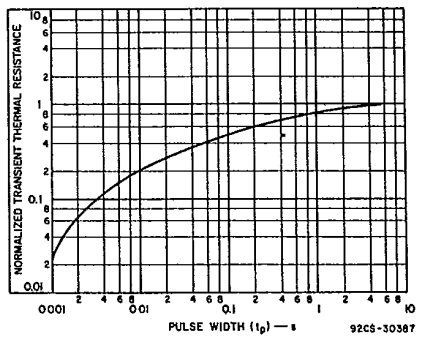


Fig. 2 — Typical thermal-response characteristic.

BUX21

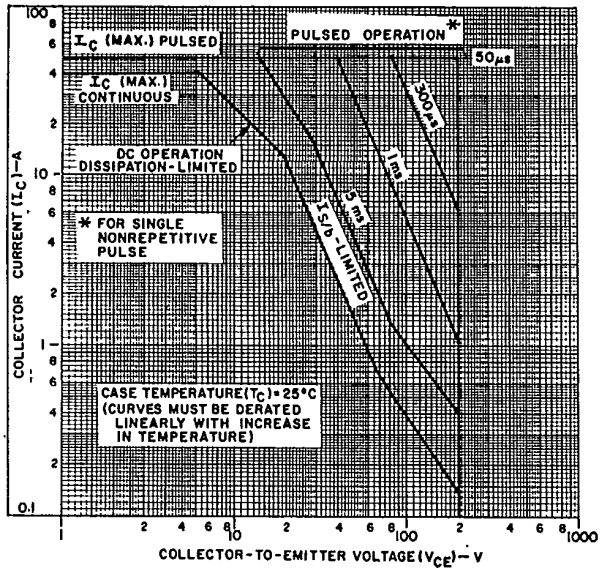


Fig. 3 — Maximum operating areas (T_C = 25°C).

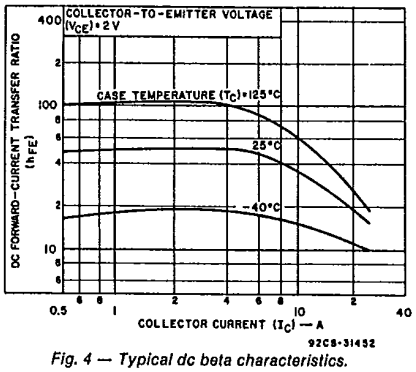


Fig. 4 — Typical dc beta characteristics.

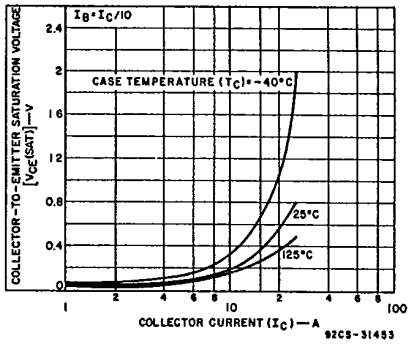


Fig. 5 — Typical collector-to-emitter saturation voltage characteristics.

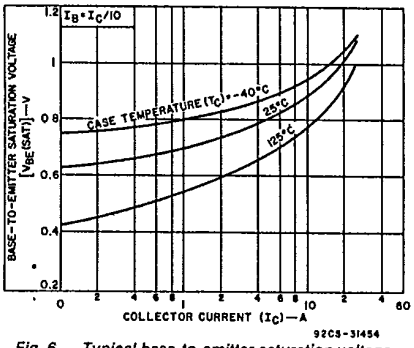


Fig. 6 — Typical base-to-emitter saturation voltage characteristics.

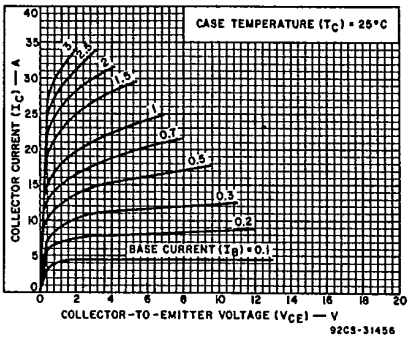


Fig. 7 — Typical output characteristics.

BUX21

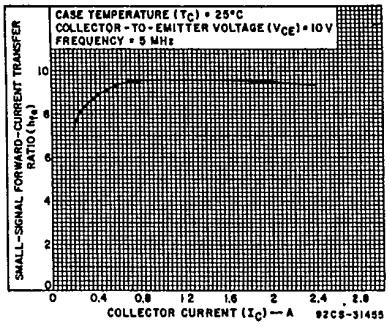


Fig. 8 — Typical small-signal forward-current transfer ratio characteristics.

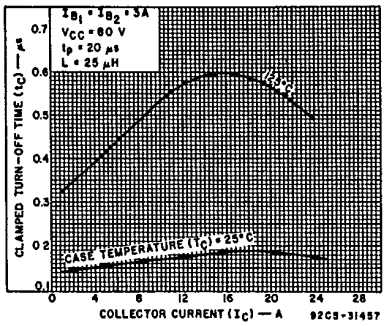


Fig. 9 — Typical clamped turn-off time characteristics.

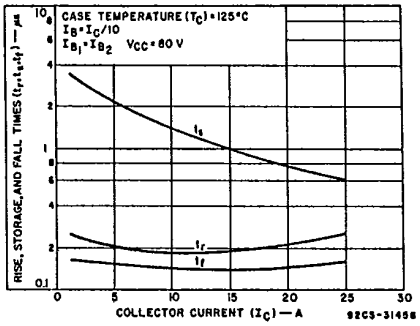


Fig. 10 — Typical saturated-switching-time characteristics as a function of collector current.

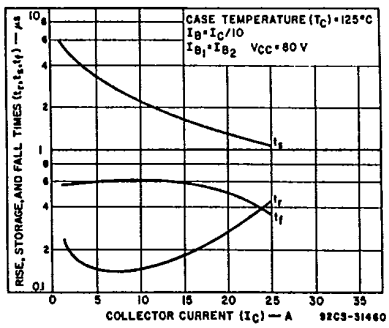


Fig. 11 — Typical-switching-time characteristics at T_C = 125°C as a function of collector current.

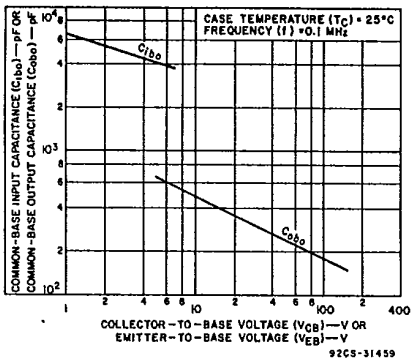


Fig. 12 — Typical common-base input (C_{ibo}) or output (C_{obo}) capacitance characteristics.

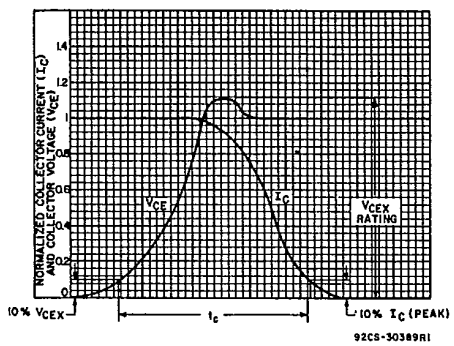


Fig. 13 — Oscilloscope display for normalized measurement of clamped inductive switching time (t_c).

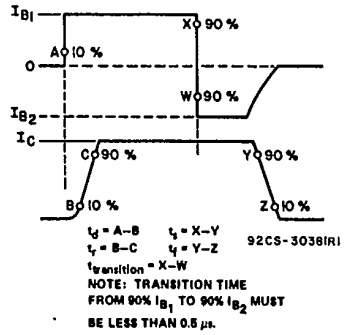


Fig. 14 — Phase relationship between input and output currents showing reference points for specification of switching times.

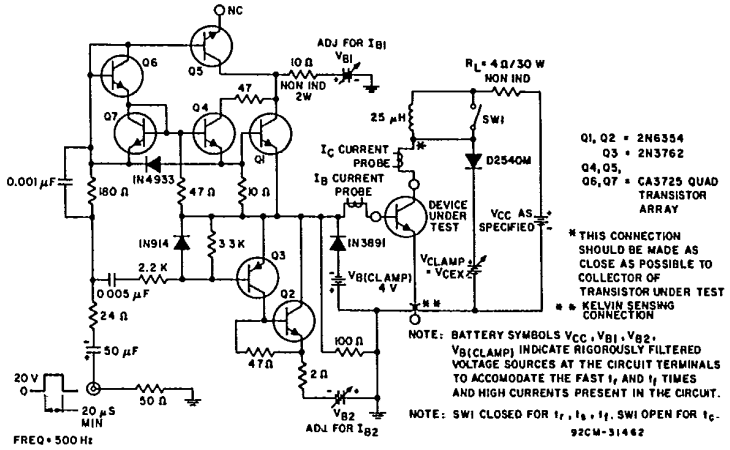


Fig. 15 — Circuit for measuring switching times.