

FEATURES

- Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding "-PBF" suffix.

MAXIMUM RATINGS

Characteristic	Symbol	BUX21	Unit
Collector-base voltage	V_{CBO}	250	V
Collector-emitter sustaining voltage	$V_{CEO(sus)}$	200	V
Collector-emitter sustaining voltage ($V_{BE} = -1.5V$)	$V_{CEX(sus)}$	250	V
Collector-emitter sustaining voltage ($R_{BE} = 100\Omega$)	$V_{CER(sus)}$	240	V
Emitter-base voltage	V_{EBO}	7	V
Continuous collector current	I_C	40	A
Peak collector current	I_{CM}	50	A
Base current	I_B	8	A
Total power dissipation ($T_C \leq 25^\circ C$) ($V_{CE} \leq 20V$)	P_T	250	W
Junction and storage temperature range	T_J, T_{stg}	-65 to +200	$^\circ C$
Maximum lead temperature at distances $\geq 1/16"$ from case for 10s max	T_L	200	$^\circ C$

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ C$ unless otherwise specified)

Characteristic	Symbol	Test Condition				Limits			Unit
		Voltage		Current		Min	Typ	Max	
		Vdc		Adc					
		V_{CE}	V_{BE}	I_C	I_B				
Collector-cutoff current	I_{CEO}	160	-	-	0	-	-	3	mA
Collector-cutoff current	I_{CEV}	250	-1.5	-	-	-	-	3	mA
Collector-cutoff current ($T_C = 125^\circ C$)	I_{CEV}	250	-1.5	-	-	-	-	12	mA
Emitter cutoff current	I_{EBO}	-	-5	0	-	-	-	1	mA
Collector-emitter sustaining voltage	$V_{CEO(sus)}^b$	-	-	0.2 ^a	-	200 ^a	-	-	V
Emitter-base breakdown voltage ($I_E = 0.05A$)	$V_{(BR)EBO}$	-	-	0	-	7	-	-	V
Base-emitter saturation voltage	$V_{BE(sat)}$	-	-	25 ^a	3	-	1.2	1.5	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	-	-	12 ^a	1.2	-	0.2	0.6	V
		-	-	25 ^a	3	-	0.7	1.5	
DC current gain	h_{FE}	2	-	12 ^a	-	20	-	60	
		4	-	25 ^a	-	10	-	-	
Secondary breakdown collector current ($t = 1s$, non-repetitive)	$I_{s/b}$	140	-	-	-	0.15	-	-	A
		20	-	-	-	12.5	-	-	

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise specified)

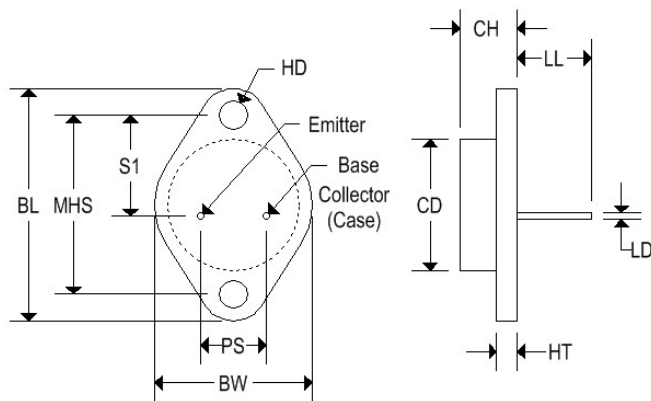
Characteristic	Symbol	Test Condition				Limits			Unit
		Voltage		Current		Min	Typ	Max	
		Vdc		Adc					
		V _{CE}	V _{BE}	I _C	I _B				
Transition frequency (f = 10MHz)	f _T	15	-	2	-	8	-	-	MHz
Turn on time (V _{CC} = 100V)	t _{on}	-	-	25	3	-	0.3	1.2	μs
Storage time (V _{CC} = 100V, I _{B1} = I _{B2})	t _s	-	-	25	3	-	1.0	1.8	μs
Fall time (V _{CC} = 100V, I _{B1} = I _{B2})	t _f	-	-	25	3	-	0.2	0.4	μs
Thermal resistance, junction to case	R _{θJC}	-	-	-	-	-	-	0.7	°C/W

a: Pulsed, pulse duration = 300μs, duty factor ≤ 2%

b: Sustaining voltages V_{CEO(sus)} MUST NOT be measured on a curve tracer

MECHANICAL CHARACTERISTICS

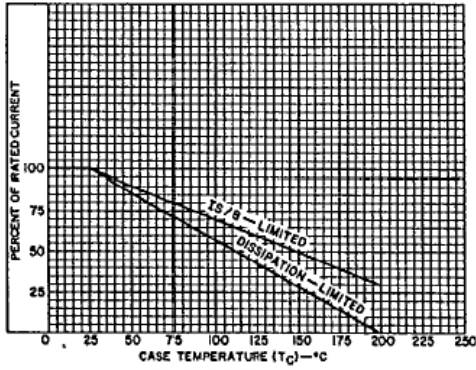
Case	TO-3
Marking	Alpha-numeric
Polarity	See below



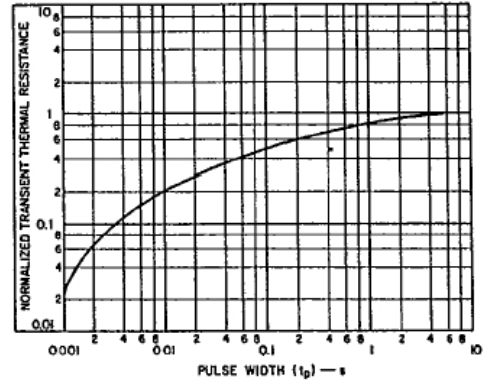
	TO-3			
	Inches		Millimeters	
	Min	Max	Min	Max
CD	-	0.875	-	22.220
CH	0.250	0.380	6.860	9.650
HT	0.060	0.135	1.520	3.430
BW	-	1.050	-	26.670
HD	0.131	0.188	3.330	4.780
LD	0.038	0.043	0.970	1.090
LL	0.312	0.500	7.920	12.700
BL	1.550 REF		39.370 REF	
MHS	1.177	1.197	29.900	30.400
PS	0.420	0.440	10.670	11.180
S1	0.655	0.675	16.640	17.150

BUX21

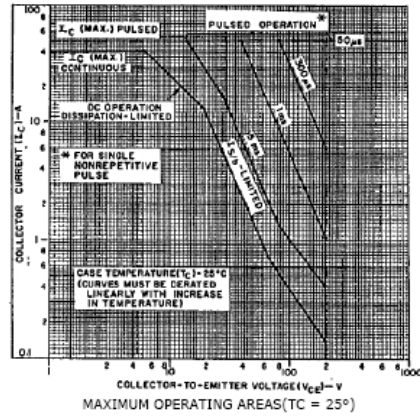
NPN SILICON POWER TRANSISTOR



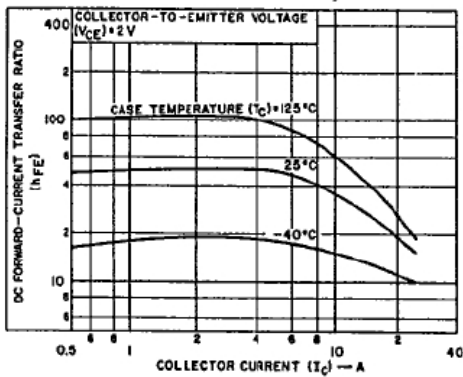
DISSIPATION AND I_S/I_B DERATING CURVE



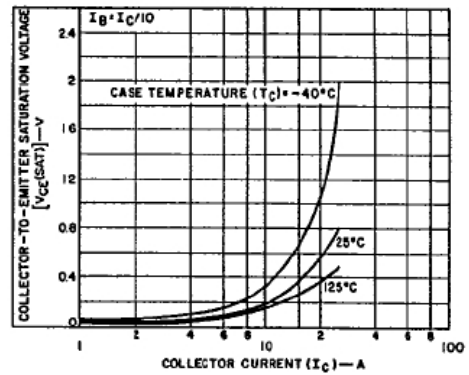
TYPICAL THERMAL-RESPONSE CHARACTERISTIC



MAXIMUM OPERATING AREAS (T_C = 25°C)



TYPICAL DC BETA CHARACTERISTICS

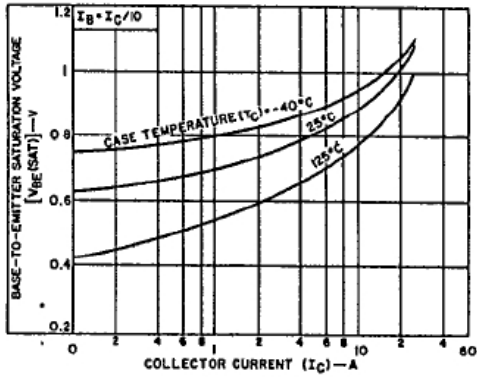


TYPICAL COLLECTOR-TO-EMITTER SATURATION VOLTAGE CHARACTERISTICS

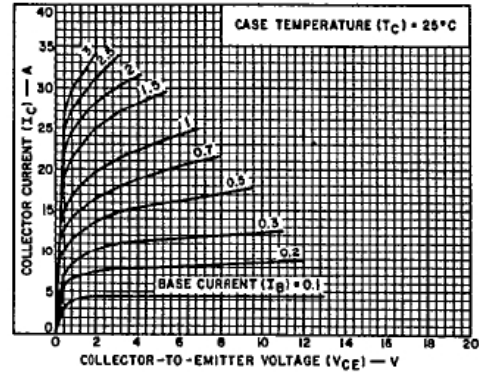
High-reliability discrete products
and engineering services since 1977

BUX21

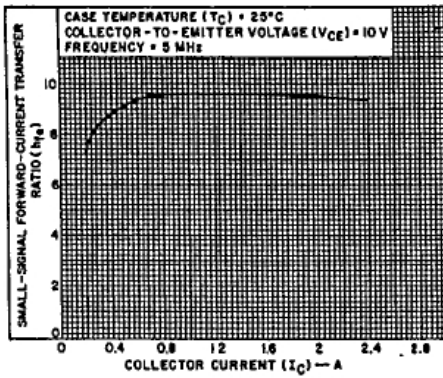
NPN SILICON POWER TRANSISTOR



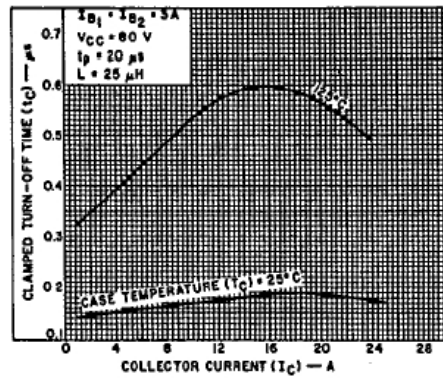
TYPICAL BASE-TO-EMITTER SATURATION VOLTAGE CHARACTERISTICS



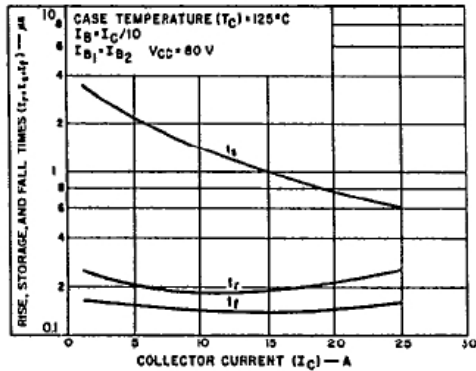
TYPICAL OUTPUT CHARACTERISTICS



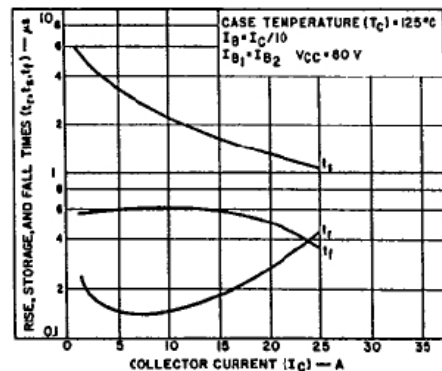
TYPICAL SMALL-SIGNAL FORWARD CURRENT TRANSFER RATIO CHARACTERISTICS



TYPICAL CLAMPED TURN-OFF TIME CHARACTERISTICS



TYPICAL SATURATED SWITCHING TIME CHARACTERISTICS AS A FUNCTION OF COLLECTOR CURRENT

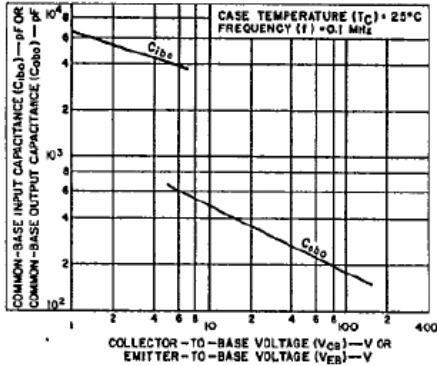


TYPICAL SWITCHING TIME CHARACTERISTICS OF $T_C = 125^\circ\text{C}$ AS A FUNCTION AT COLLECTOR CURRENT

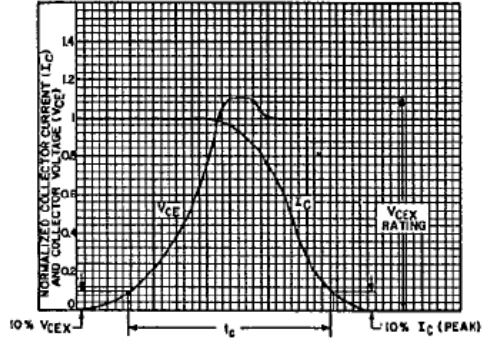
High-reliability discrete products
and engineering services since 1977

BUX21

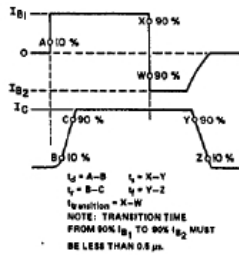
NPN SILICON POWER TRANSISTOR



TYPICAL COMMON BASE INPUT OR OUTPUT CAPACITANCE CHARACTERISTICS



OSCILLOSCOPE DISPLAY FOR NORMALIZED MEASUREMENT OF CLAMPED INDUCTIVE SWITCHING TIME



PHASE RELATIONSHIP BETWEEN INPUT AND OUTPUT CURRENTS SHOWING REFERENCE POINTS FOR SPECIFICATION OF SWITCHING TIMES

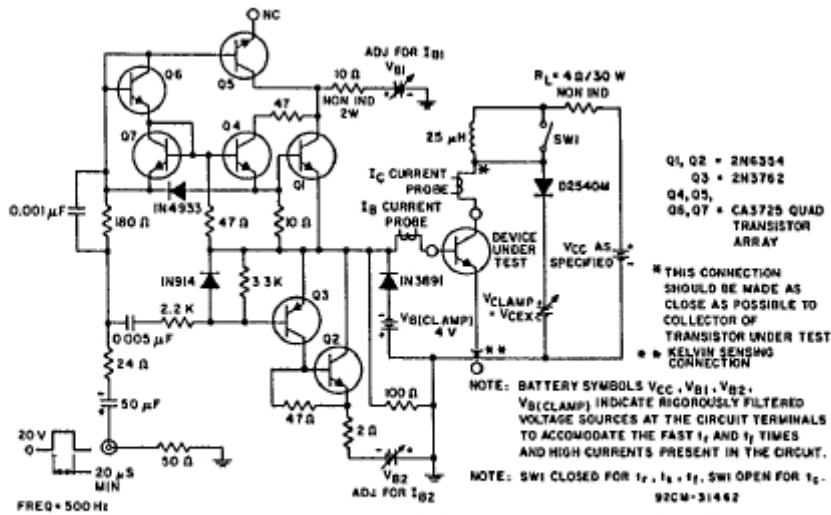


Fig. 15 — Circuit for measuring switching times.