

SWITCHMODE™ Series

NPN Silicon Power Transistor

... designed for high speed, high current, high power applications.

- High DC current gain:
 h_{FE} min. = 20 at $I_C = 12$ A
- Low $V_{CE(sat)}$, $V_{CE(sat)}$
max. = 0.6 V at $I_C = 8$ A
- Very fast switching times:
TF max. = 0.4 μ s at $I_C = 25$ A

MAXIMUM RATINGS

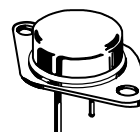
Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CEO(sus)}$	200	Vdc
Collector–Base Voltage	V_{CBO}	250	Vdc
Emitter–Base Voltage	V_{EBO}	7	Vdc
Collector–Emitter Voltage ($V_{BE} = -1.5$ V)	V_{CEX}	250	Vdc
Collector–Emitter Voltage ($R_{BE} = 100 \Omega$)	V_{CER}	240	Vdc
Collector–Current — Continuous	I_C	40	Adc
— Peak ($PW \leq 10$ ms)	I_{CM}	50	Apk
Base–Current continuous	I_B	8	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$	P_D	250	Watts
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–65 to 200	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	θ_{JC}	0.7	$^\circ\text{C/W}$

BUV21

40 AMPERES
NPN SILICON
POWER
METAL TRANSISTOR
200 VOLTS
250 WATTS



CASE 197A-05
TO-204AE
(TO-3)

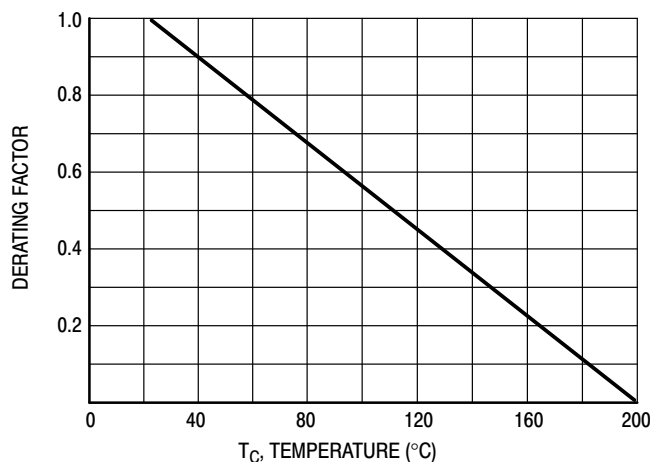


Figure 1. Power Derating

BUV21

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

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS¹

Collector–Emitter Sustaining Voltage ($I_C = 200\text{ mA}$, $I_B = 0$, $L = 25\text{ mH}$)	$V_{CEO(sus)}$	200		Vdc
Collector Cutoff Current at Reverse Bias: ($V_{CE} = 250\text{ V}$, $V_{BE} = -1.5\text{ V}$) ($V_{CE} = 250\text{ V}$, $V_{BE} = -1.5\text{ V}$, $T_C = 125^\circ\text{C}$)	I_{CEX}		3.0 12.0	mAdc
Collector–Emitter Cutoff Current ($V_{CE} = 160\text{ V}$)	I_{CEO}		3.0	mAdc
Emitter–Base Reverse Voltage ($I_E = 50\text{ mA}$)	V_{EBO}	7		V
Emitter–Cutoff Current ($V_{EB} = 5\text{ V}$)	I_{EBO}		1.0	mAdc

SECOND BREAKDOWN

Second Breakdown Collector Current with base forward biased ($V_{CE} = 20\text{ V}$, $t = 1\text{ s}$) ($V_{CE} = 140\text{ V}$, $t = 1\text{ s}$)	$I_{S/b}$	12 0.15		Adc
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ON CHARACTERISTICS¹

DC Current Gain ($I_C = 12\text{ A}$, $V_{CE} = 2\text{ V}$) ($I_C = 25\text{ A}$, $V_{CE} = 4\text{ V}$)	h_{FE}	20 10	60	
Collector–Emitter Saturation Voltage ($I_C = 12\text{ A}$, $I_B = 1.2\text{ A}$) ($I_C = 25\text{ A}$, $I_B = 3\text{ A}$)	$V_{CE(sat)}$		0.6 1.5	Vdc
Base–Emitter Saturation Voltage ($I_C = 25\text{ A}$, $I_B = 3\text{ A}$)	$V_{BE(sat)}$		1.5	Vdc

DYNAMIC CHARACTERISTICS

Current Gain – Bandwidth Product ($V_{CE} = 15\text{ V}$, $I_C = 2\text{ A}$, $f = 4\text{ MHz}$)	f_T	8.0		MHz
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SWITCHING CHARACTERISTICS (Resistive Load)

Turn-on Time	($I_C = 25\text{ A}$, $I_{B1} = I_{B2} = 3\text{ A}$, $V_{CC} = 100\text{ V}$, $R_C = 4\ \Omega$)	t_{on}	1.0	μs
Storage Time		t_s	1.8	
Fall Time		t_f	0.4	

¹ Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2\%$.

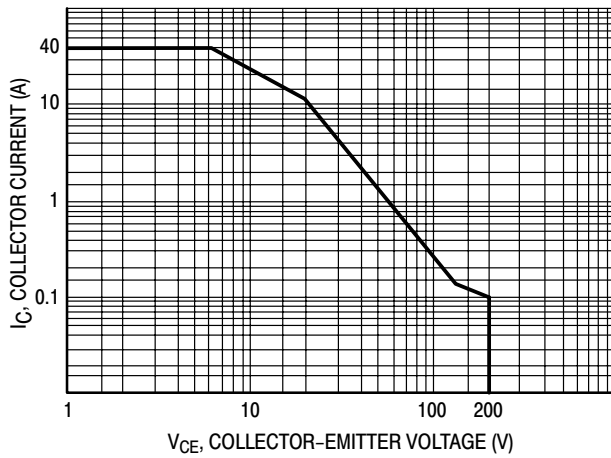


Figure 2. Active Region Safe Operating Area

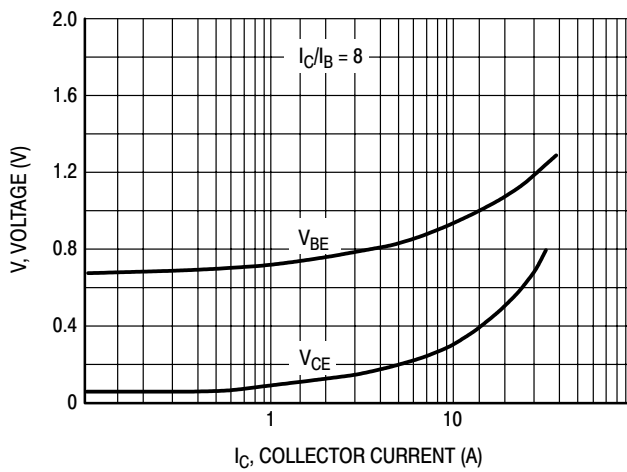


Figure 3. "On" Voltages

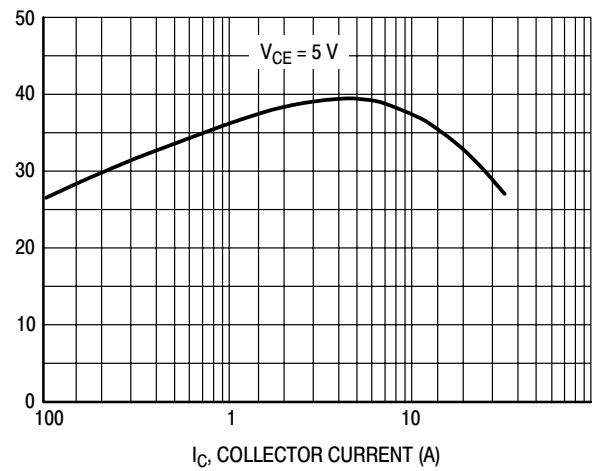


Figure 4. DC Current Gain

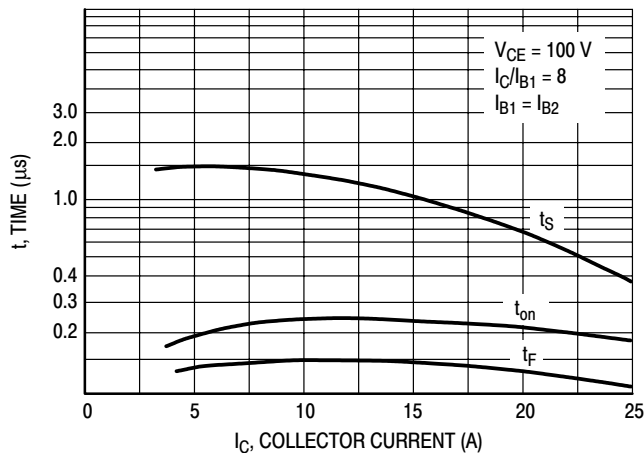


Figure 5. Resistive Switching Performance

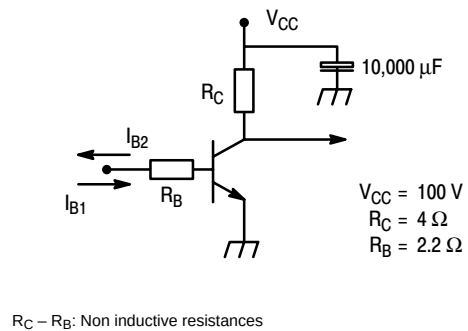
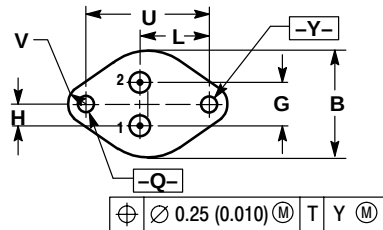
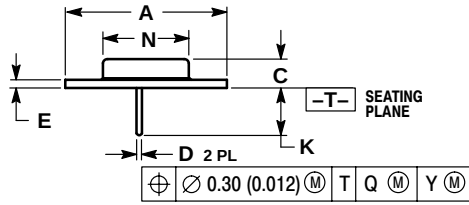


Figure 6. Switching Times Test Circuit

BUV21

PACKAGE DIMENSIONS

TO-204 (TO-3) CASE 197A-05 ISSUE J



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.530	REF	38.86	REF
B	0.990	1.050	25.15	26.67
C	0.250	0.335	6.35	8.51
D	0.057	0.063	1.45	1.60
E	0.060	0.070	1.53	1.77
G	0.430	BSC	10.92	BSC
H	0.215	BSC	5.46	BSC
K	0.440	0.480	11.18	12.19
L	0.665	BSC	16.89	BSC
N	0.760	0.830	19.31	21.08
Q	0.151	0.165	3.84	4.19
U	1.187	BSC	30.15	BSC
V	0.131	0.188	3.33	4.77

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