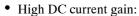
BUV20

SWITCHMODE [™] Series NPN Silicon Power Transistor

SWITCHMODE series NPN silicon power transistors are designed for high speed, high current, high power applications.



$$h_{FE} min = 20 at I_C = 25 A$$

= 10 at $I_C = 50 A$

• Low V_{CE(sat)}:

$$V_{CE(sat)}$$
 max. = 0.6 V at I_C = 25 A = 0.9 V at I_C = 50 A

• Very fast switching times:

$$T_F = 0.25 \mu s \text{ at } I_C = 50 \text{ A}$$

MAXIMUM RATINGS

Rating	Symbol	BUV20	BUV60	Unit
Collector-Emititer Voltage	V _{CEO(sus)}	12	Vdc	
Collector-Base Voltage	V _{CBO}	160	260	Vdc
Emitter-Base Voltage	V _{EBO}	7	7	Vdc
Collector–Emitter Voltage (V _{BE} = -1.5 V)	V _{CEX}	160	260	Vdc
Collector–Emitter voltage $(R_{BE} = 100 \Omega)$	V _{CER}	150	260	Vdc
Collector-Current — Continuous — Peak (PW ≤ 10 ms)	I _C	50 60		Adc Apk
Base-Current continuous	Ι _Β	10		Adc
Total Power Dissipation @ T _C = 25°C	P _D	250		Watts
Operating and Storage Junction Temperature Range	T _J , T _{stg}	−65 t	°C	

THERMAL CHARACTERISTICS

Characteristic	Symbol	BUV20	BUV60	Unit
Thermal Resistance, Junction to Case	θ _{JC}	0.	.7	°C/W



ON Semiconductor®

http://onsemi.com

50 AMPERES
NPN SILICON POWER
METAL TRANSISTOR
125 VOLTS, 250 WATTS



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

BUV20

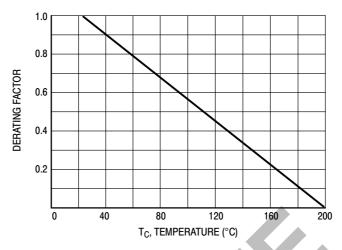


Figure 1. Power Derating

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

Characteristic		Symbol	Min	Max	Unit
DFF CHARACTERISTICS ¹				•	•
Collector–Emitter Sustaining Voltage ($I_C = 200 \text{ mA}, I_B = 0, L = 25 \text{ mH}$)	BUV20, BUV60	V _{CEO(sus)}	125		Vdc
Collector Cutoff Current at Reverse Bias $(V_{CE}=140~V, V_{BE}=-1.5~V)\\ (V_{CE}=140~V, V_{BE}=-1.5~V, T_{C}=125^{\circ}C)\\ (V_{CE}=260~V, V_{BE}=-1.5~V)$	BUV20 BUV20 BUV60	I _{CEX}		3.0 12	mAdc
Collector–Emitter Cutoff Current (V _{CE} = 100 V)	BUV20	I _{CEO}		3.0	mAdc
Emitter-Base Reverse Voltage (I _E = 50 mA)	BUV20, BUV60	V _{EBO}	7		V
Emitter-Cutoff Current (V _{EB} = 5 V)	3UV20, BUV60	I _{EBO}		1.0	mAdc
ECOND BREAKDOWN					•
Second Breakdown Collector Current with base forward biase $(V_{CE} = 20 \text{ V}, t = 1 \text{ s})$ $(V_{CE} = 40 \text{ V}, t = 1 \text{ s})$	d	I _{S/b}	12 1.5		Adc
ON CHARACTERISTICS ¹				•	•
DC Current Gain $(I_C = 25 \text{ A, V}_{CE} = 2 \text{ V})$ $(I_C = 50 \text{ A, V}_{CE} = 4 \text{ V})$	BUV20 BUV20	h _{FE}	20 10	60 -	
Collector–Emitter Saturation Voltage ($I_C = 25 \text{ A}, I_B = 2.5 \text{ A}$) ($I_C = 50 \text{ A}, I_B = 5 \text{ A}$)	BUV20 BUV20	V _{CE(sat)}		0.6 1.2	Vdc
Base–Emitter Saturation Voltage $(I_C = 50 \text{ A}, I_B = 5 \text{ A})0$	BUV20	V _{BE(sat)}		2.0	Vdc
Collector–Emitter Saturation Voltage $ \begin{array}{l} (I_C=25~A,~I_B=1.25~A) \\ (I_C=50~A,~I_B=5~A) \\ (I_C=60~A,~I_B=~7.5~A) \end{array} $	BUV60 BUV60 BUV60	V _{CE(sat)}		0.9 0.9 1.2	Vdc
Base-Emitter Saturation Voltage ($I_C = 50 \text{ A}, I_B = 5 \text{ A}$) ($I_C = 60 \text{ A}, I_B = 7.5 \text{ A}$)	BUV60 BUV60	V _{BE(sat)}		1.6 1.8	Vdc
DYNAMIC CHARACTERISTICS	<u>.</u>				
Current Gain — Bandwidth Product (V _{CE} = 15 V, I _C = 2 A, f = 4 MHz)		f _T	8.0		MHz

BUV20

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

	Characteristic	Symbol	Min	Max	Unit
SWITCHING CHARACTER	STICS (Resistive Load)				
Turn-on Time		t _{on}		1.5	μs
Storage Time	$(I_C = 50 \text{ A}, I_{B1} = I_{B2} = 5 \text{ A},$ $V_{CC} = 30 \text{ V}, R_C = 0.6 \Omega)$	t _s		1.2	
Fall Time		t _f		0.25	

 $[\]overline{\ }^{1}$ Pulse Test: Pulse Width \leq 300 μ s, Duty Cycle \leq 2%.



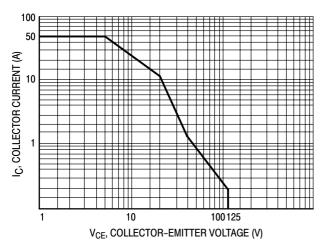


Figure 2. Active Region Safe Operating Area

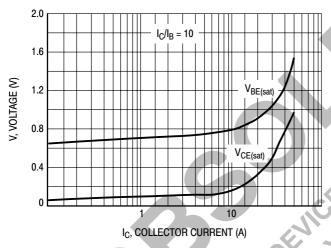


Figure 3. "On" Voltages

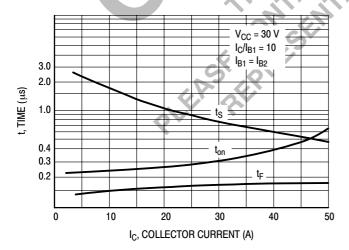


Figure 5. Resistive Switching Performance

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate I_C – V_{CE} limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 2 is based on $T_C = 25^{\circ}C$. $T_{J(pk)}$ is variable depending on power level. Second breakdown limitations do not derate the same as thermal limitations.

At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

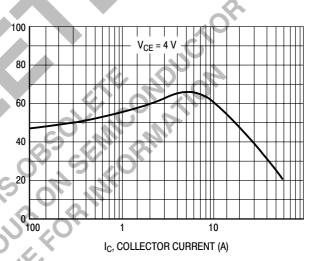
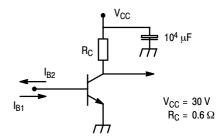


Figure 4. DC Current Gain



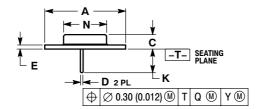
R_C — Non inductive resistance

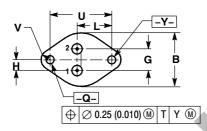
Figure 6. Switching Times Test Circuit

BUV₂₀

PACKAGE DIMENSIONS

TO-204AE (TO-3) **CASE 197A-05** ISSUF J





NOTES:

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

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