

**BUX41**

15 AMPERES  
NPN SILICON  
POWER  
METAL TRANSISTOR  
200 VOLTS  
120 WATTS

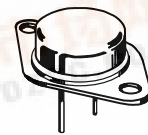
**SWITCHMODE Series  
NPN Silicon Power Transistor**

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

- Very fast switching times:  
T<sub>F</sub> max. = 0.4 μs at I<sub>C</sub> = 8 A

**MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V <sub>CEO(sus)</sub>	200	Vdc
Collector–Base Voltage	V <sub>CBO</sub>	250	Vdc
Emitter–Base Voltage	V <sub>EBO</sub>	7	Vdc
Collector–Emitter Voltage (V <sub>BE</sub> = -2.5 V)	V <sub>CEX</sub>	250	Vdc
Collector–Emitter Voltage (R <sub>BE</sub> = 100 Ω)	V <sub>CER</sub>	240	Vdc
Collector–Current — Continuous	I <sub>C</sub>	15	Adc
— Peak (pw ≤ 10 ms)	I <sub>CM</sub>	20	Apk
Base–Current continuous	I <sub>B</sub>	3	Adc
Total Power Dissipation @ T <sub>C</sub> = 25°C	P <sub>D</sub>	120	Watts
Operating and Storage Junction Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-65 to 200	°C



CASE 1-07  
TO-204AA  
(TO-3)

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	θ <sub>JC</sub>	1.46	°C/W

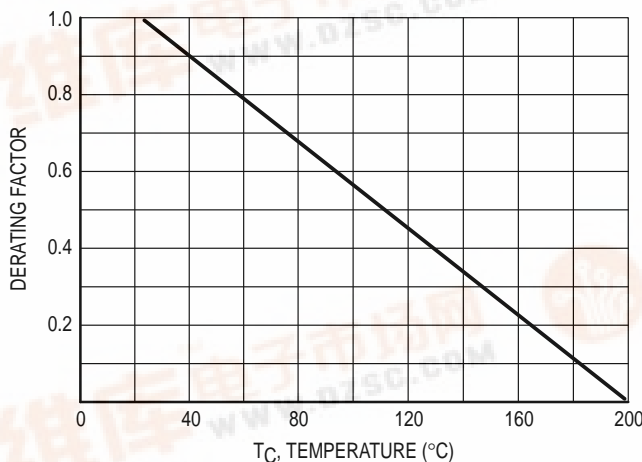


Figure 1. Power Derating

**BUX41****ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS<sup>1</sup></b>				
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: ( $V_{CE} = 250\text{ V}$ , $V_{BE} = -1.5\text{ V}$ ) ( $V_{CE} = 250\text{ V}$ , $V_{BE} = -1.5\text{ V}$ , $T_C = 125^\circ\text{C}$ )	$I_{CEX}$		1.0 5.0	mAdc
Collector–Emitter Cutoff Current ( $V_{CE} = 160\text{ V}$ )	$I_{CEO}$		1.0	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 ( $V_{CE} = 30\text{ V}$ , $t = 1\text{ s}$ ) ( $V_{CE} = 135\text{ V}$ , $t = 1\text{ s}$ )	$I_{S/b}$	4.0 0.15		Adc
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**ON CHARACTERISTICS<sup>1</sup>**

DC Current Gain ( $I_C = 5\text{ A}$ , $V_{CE} = 4\text{ V}$ ) ( $I_C = 8\text{ A}$ , $V_{CE} = 4\text{ V}$ )	$h_{FE}$	15 8	45	
Collector–Emitter Saturation Voltage ( $I_C = 5\text{ A}$ , $I_B = 0.5\text{ A}$ ) ( $I_C = 8\text{ A}$ , $I_B = 1\text{ A}$ )	$V_{CE(sat)}$		1.2 1.6	Vdc
Base–Emitter Saturation Voltage ( $I_C = 8\text{ A}$ , $I_B = 1\text{ A}$ )	$V_{BE(sat)}$		2.0	Vdc

**DYNAMIC CHARACTERISTICS**

Current Gain — Bandwidth Product ( $V_{CE} = 15\text{ V}$ , $I_C = 1\text{ A}$ , $f = 4\text{ MHz}$ )	$f_T$	8.0		MHz
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**SWITCHING CHARACTERISTICS (Resistive Load)**

Turn-on Time	( $I_C = 8\text{ A}$ , $I_{B1} = I_{B2} = 1\text{ A}$ , $V_{CC} = 150\text{ V}$ , $R_C = 18.75\ \Omega$ )	$t_{on}$	0.6	$\mu\text{s}$
Storage Time		$t_s$	1.5	
Fall Time		$t_f$	0.4	

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

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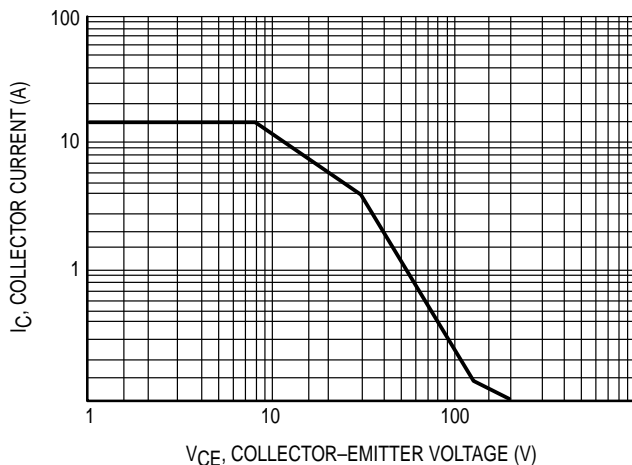


Figure 2. Active Region Safe Operating Area

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  $T_C = 25^\circ\text{C}$ ,  $T_{J(pk)}$  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.

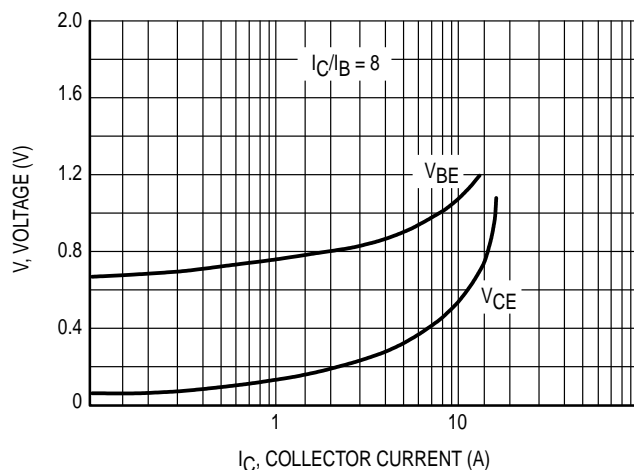


Figure 3. "On" Voltages

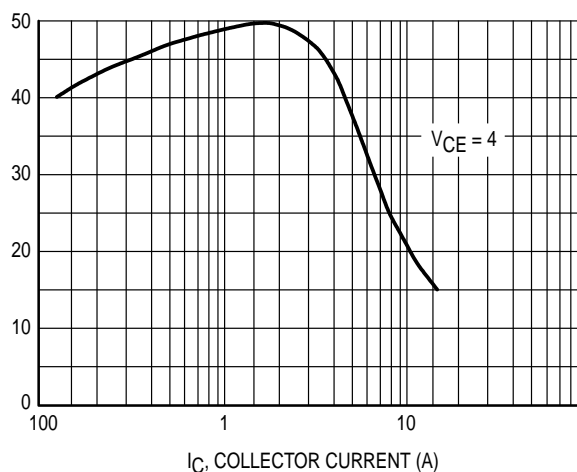


Figure 4. DC Current Gain

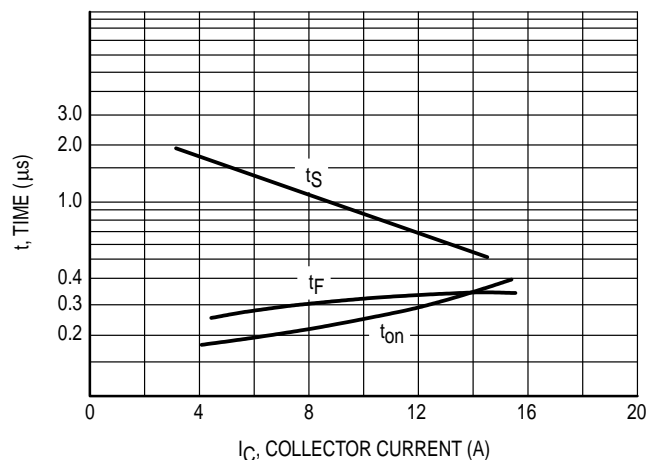
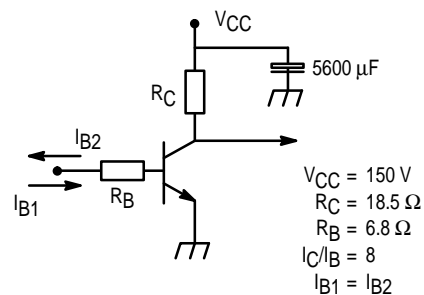



Figure 5. Resistive Switching Performance



$R_C - R_B$ : Non inductive resistances

Figure 6. Switching Times Test Circuit

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