

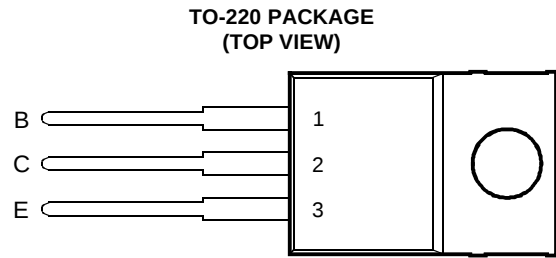
BUX84

NPN SILICON POWER TRANSISTOR

Copyright © 1997, Power Innovations Limited, UK

AUGUST 1978 - REVISED MARCH 1997

- 40 W at 25°C Case Temperature
- 2 A Continuous Collector Current
- 3 A Peak Collector Current
- Typical $t_f = 200$ ns at 25°C



MDTRACA

absolute maximum ratings at 25°C case temperature (unless otherwise noted)

RATING	SYMBOL	VALUE	UNIT
Collector-base voltage ($I_E = 0$)	V_{CBO}	800	V
Collector-emitter voltage ($V_{BE} = 0$)	V_{CES}	800	V
Collector-emitter voltage ($I_B = 0$)	V_{CEO}	400	V
Continuous collector current	I_C	2	A
Peak collector current (see Note 1)	I_{CM}	3	A
Continuous device dissipation at (or below) 25°C case temperature	P_{tot}	40	W
Operating junction temperature range	T_j	-65 to +150	°C
Storage temperature range	T_{stg}	-65 to +150	°C

NOTE 1: This value applies for $t_p \leq 2$ ms, duty cycle $\leq 2\%$.

PRODUCT INFORMATION

Information is current as of publication date. Products conform to specifications in accordance with the terms of Power Innovations standard warranty. Production processing does not necessarily include testing of all parameters.



BUX84

NPN SILICON POWER TRANSISTOR

AUGUST 1978 - REVISED MARCH 1997

electrical characteristics at 25°C case temperature (unless otherwise noted)

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$V_{CE(sus)}$ Collector-emitter sustaining voltage	$I_C = 0.1\text{ A}$ $L = 25\text{ mH}$ (see Note 2)	400			V
I_{CES} Collector-emitter cut-off current	$V_{CE} = 800\text{ V}$ $V_{BE} = 0$ $V_{CE} = 800\text{ V}$ $V_{BE} = 0$ $T_C = 125^\circ\text{C}$			0.2 1	mA
I_{EBO} Emitter cut-off current	$V_{EB} = 5\text{ V}$ $I_C = 0$			1	mA
h_{FE} Forward current transfer ratio	$V_{CE} = 5\text{ V}$ $I_C = 0.1\text{ A}$ (see Notes 3 and 4)		35		
$V_{CE(sat)}$ Collector-emitter saturation voltage	$I_B = 0.03\text{ A}$ $I_C = 0.3\text{ A}$ $I_B = 0.2\text{ A}$ $I_C = 1\text{ A}$ (see Notes 3 and 4)			0.8 1	V
$V_{BE(sat)}$ Base-emitter saturation voltage	$I_B = 0.2\text{ A}$ $I_C = 1\text{ A}$ (see Notes 3 and 4)			1.1	V
f_t Current gain bandwidth product	$V_{CE} = 10\text{ V}$ $I_C = 0.2\text{ A}$		12		MHz
C_{ob} Output capacitance	$V_{CB} = 20\text{ V}$ $I_E = 0$ $f = 0.1\text{ MHz}$		60		pF

NOTES: 2. Inductive loop switching measurement.

3. These parameters must be measured using pulse techniques, $t_p = 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

4. These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts.

5. To obtain f_t the $[h_{FE}]$ response is extrapolated at the rate of -6 dB per octave from $f = 1\text{ MHz}$ to the frequency at which $[h_{FE}] = 1$.

thermal characteristics

PARAMETER	MIN	TYP	MAX	UNIT
$R_{\theta JC}$ Junction to case thermal resistance			2.5	$^\circ\text{C/W}$

resistive-load-switching characteristics at 25°C case temperature (unless otherwise noted)

PARAMETER	TEST CONDITIONS [†]	MIN	TYP	MAX	UNIT
t_{on} Turn on time	$I_C = 1\text{ A}$ $I_{B(on)} = 0.2\text{ A}$ $I_{B(off)} = -0.4\text{ A}$ $V_{CC} = 250\text{ V}$ (see Figures 1 and 2)		0.25	0.5	μs
t_s Storage time			1.8		μs
t_f Fall time			0.2		μs
t_f Fall time	$I_C = 1\text{ A}$ $I_{B(on)} = 0.2\text{ A}$ $I_{B(off)} = -0.4\text{ A}$ $V_{CC} = 250\text{ V}$ $T_C = 95^\circ\text{C}$			0.4	μs

[†] Voltage and current values shown are nominal; exact values vary slightly with transistor parameters.

PRODUCT INFORMATION

The circuit diagram shows a Class B push-pull amplifier. The input stage consists of a differential pair of BD135 and BD136 transistors. The base of the BD135 is connected to the input signal V_1 through a $100\ \Omega$ resistor. The base of the BD136 is connected to ground through a $100\ \Omega$ resistor. The emitters of both transistors are connected to ground. The collectors are connected to a $+25\text{ V}$ supply through $120\ \Omega$ and $82\ \Omega$ resistors, respectively. A $47\ \Omega$ resistor is connected between the collectors. The output of the BD135 is connected to the base of a TWT (Traveling Wave Tube) through a $100\ \mu\text{F}$ capacitor. The TWT is connected to a 250 V supply through a $100\ \Omega$ resistor. The output of the TWT is connected to a $100\ \mu\text{F}$ capacitor. The input signal V_1 is a square wave with a period T and a pulse width t_p . The output voltage V_{cc} is 250 V . The supply voltage is $+25\text{ V}$. The resistors are $120\ \Omega$, $82\ \Omega$, $47\ \Omega$, and $100\ \Omega$. The capacitors are $680\ \mu\text{F}$ and $100\ \mu\text{F}$.

$t_p = 20\ \mu\text{s}$
Duty cycle = 1%
 $V_1 = 15\text{ V}$, Source Impedance = $50\ \Omega$

The diagram shows two waveforms, I_C and I_B , plotted against time. The horizontal axis represents time, and the vertical axis represents current.

Input Waveform (I_C): This is a trapezoidal pulse. It starts at 0%, rises to 90% at point C, remains at 90% until point E, and then falls back to 0% at point F. The rise and fall times are labeled as 10%.

Output Waveform (I_B): This waveform shows the current through the load capacitor. It starts at 0%, rises to 90% at point A, remains at 90% until point D, and then falls back to 0% at point F. The rise and fall times are labeled as 10%. The output current is labeled $I_{B(on)}$ during the high state and $I_{B(off)}$ during the low state. An arrow points to the falling edge of the output waveform with the label $\frac{dI_B}{dt} \geq 2 \text{ A}/\mu\text{s}$.

PRODUCT INFORMATION

BUX84
NPN SILICON POWER TRANSISTOR

AUGUST 1978 - REVISED MARCH 1997

TYPICAL CHARACTERISTICS

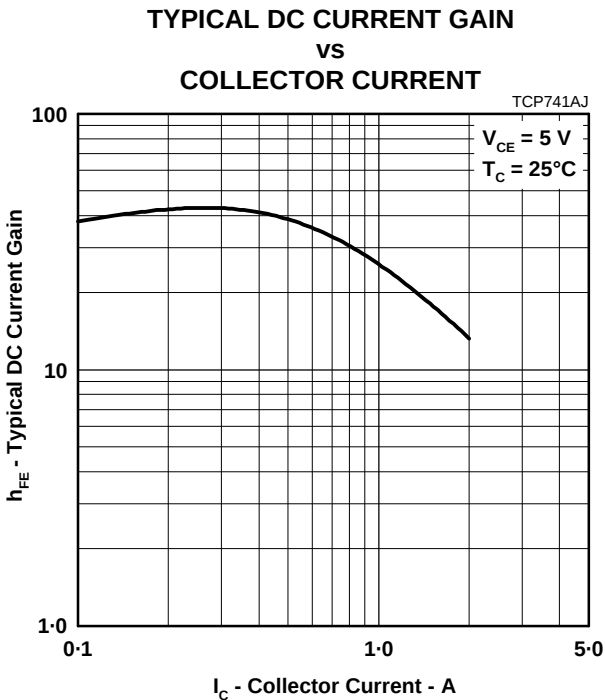


Figure 3.

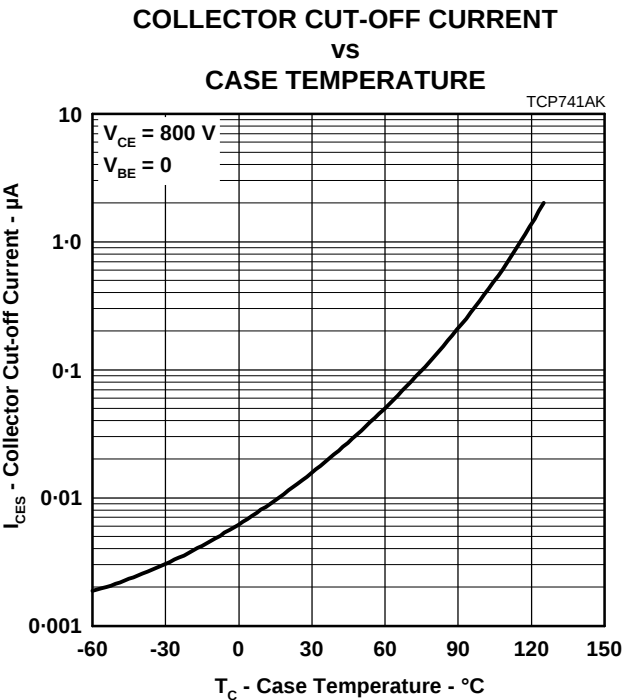


Figure 4.

MAXIMUM SAFE OPERATING REGIONS

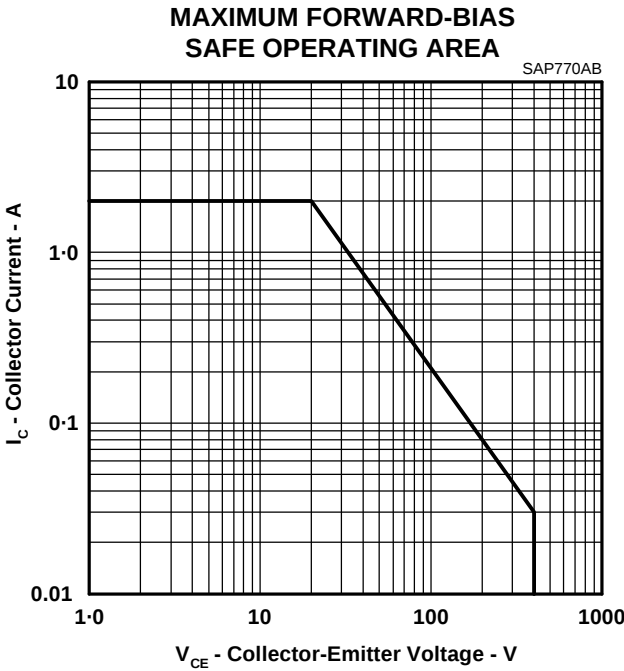


Figure 5.

PRODUCT INFORMATION

THERMAL INFORMATION

THERMAL RESPONSE JUNCTION TO CASE VS

POWER PULSE DURATION

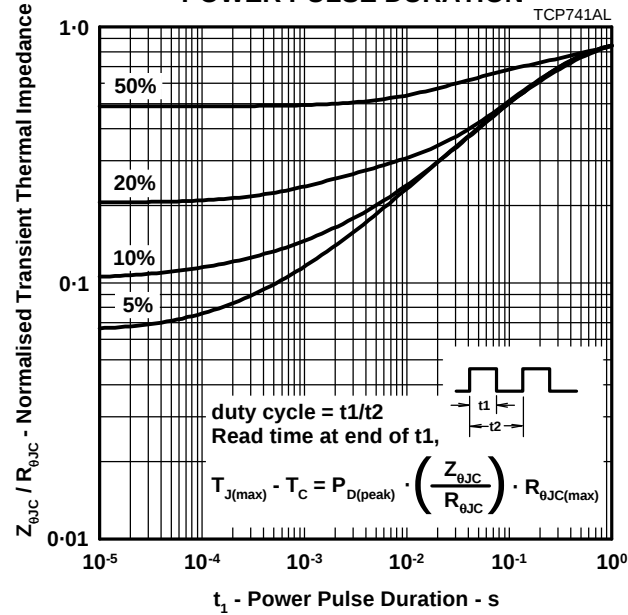


Figure 6.

BUX84

NPN SILICON POWER TRANSISTOR

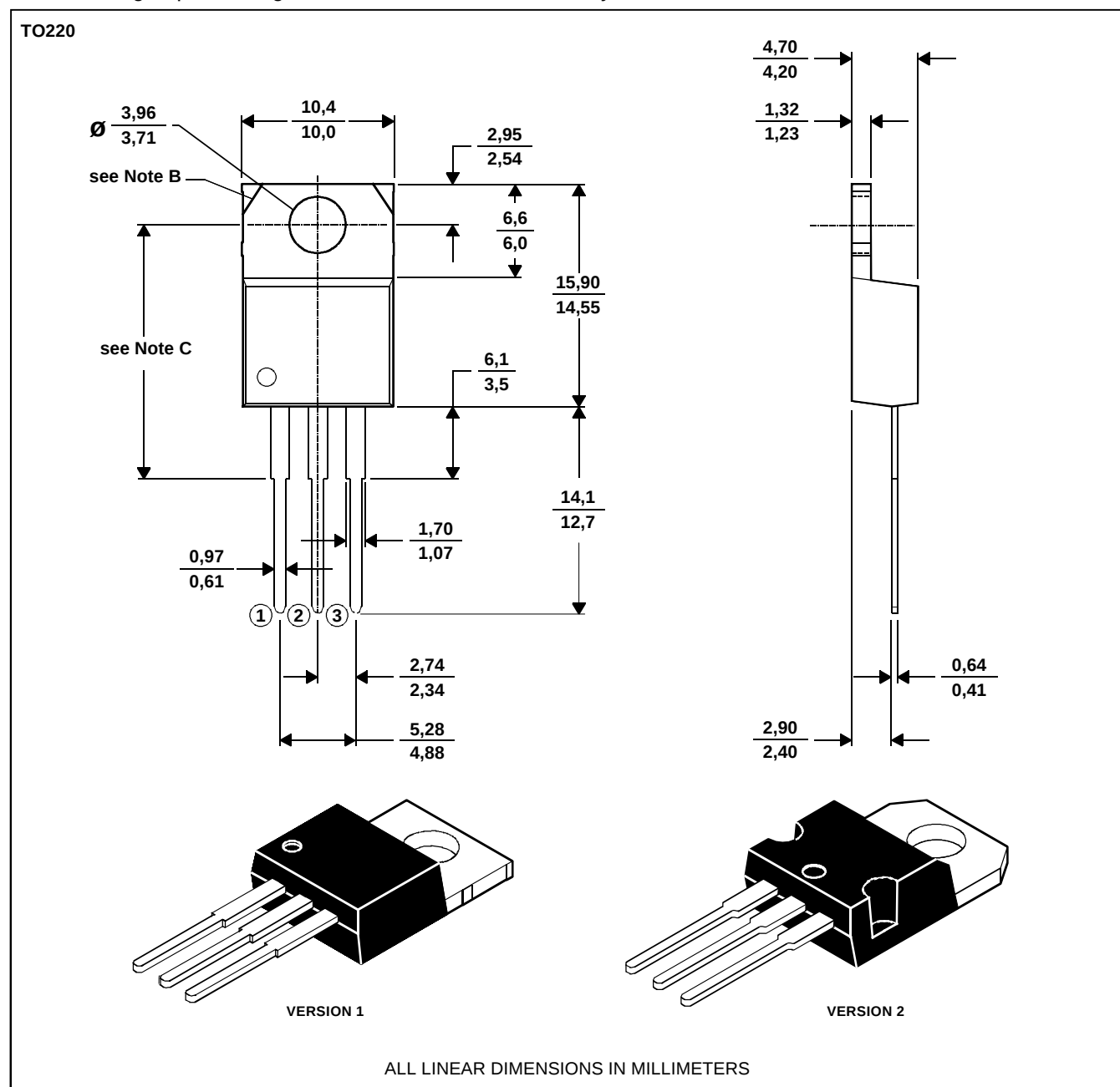
AUGUST 1978 - REVISED MARCH 1997

MECHANICAL DATA

TO-220

3-pin plastic flange-mount package

This single-in-line package consists of a circuit mounted on a lead frame and encapsulated within a plastic compound. The compound will withstand soldering temperature with no deformation, and circuit performance characteristics will remain stable when operated in high humidity conditions. Leads require no additional cleaning or processing when used in soldered assembly.



- NOTES: A. The centre pin is in electrical contact with the mounting tab.
 B. Mounting tab corner profile according to package version.
 C. Typical fixing hole centre stand off height according to package version.
 Version 1, 18.0 mm. Version 2, 17.6 mm.

MDXXBE

PRODUCT INFORMATION

IMPORTANT NOTICE

Power Innovations Limited (PI) reserves the right to make changes to its products or to discontinue any semiconductor product or service without notice, and advises its customers to verify, before placing orders, that the information being relied on is current.

PI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with PI's standard warranty. Testing and other quality control techniques are utilized to the extent PI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except as mandated by government requirements.

PI accepts no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein. Nor is any license, either express or implied, granted under any patent right, copyright, design right, or other intellectual property right of PI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used.

PI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, INTENDED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT APPLICATIONS, DEVICES OR SYSTEMS.

Copyright © 1997, Power Innovations Limited