

# SWITCHMODE™ NPN Silicon Power Transistors

The BUX85 is designed for high voltage, high speed power switching applications like converters, inverters, switching regulators, motor control systems.

**Specifications Features:**

- $V_{CEO(sus)}$  450 V
- $V_{CES(sus)}$  1000 V
- Fall time = 0.3  $\mu$ s (typ) at  $I_C = 1.0$  A
- $V_{CE(sat)} = 1.0$  V (max) at  $I_C = 1.0$  A,  $I_B = 0.2$  A

**MAXIMUM RATINGS**

Rating	Symbol	BUX84	BUX85	Unit
Collector–Emitter Voltage	$V_{CEO(sus)}$	400	450	Vdc
Collector–Emitter Voltage	$V_{CES}$	800	1000	Vdc
Emitter Base Voltage	$V_{EBO}$	5		Vdc
Collector Current — Continuous — Peak (1)	$I_C$ $I_{CM}$	2 3.0		Adc
Base Current — Continuous — Peak (1)	$I_B$ $I_{BM}$	0.75 1.0		Adc
Reverse Base Current — Peak	$I_{BM}$	1		Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	50 400		Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	–65 to +150		$^\circ\text{C}$

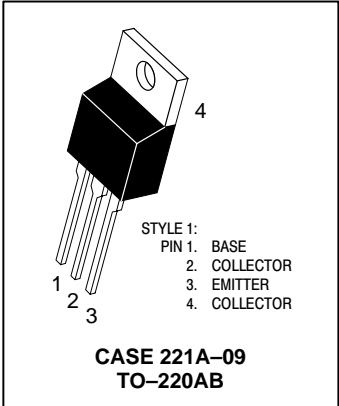
**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.5	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Maximum Lead Temperature for Soldering Purpose: 1/8" from Case for 5 Seconds	$T_L$	275	$^\circ\text{C}$

(1) Pulse Test: Pulse Width = 5 ms, Duty Cycle  $\leq 10\%$ .

## BUX85

**2 AMPERES  
POWER TRANSISTOR  
NPN SILICON  
450 VOLTS  
50 WATTS**



# BUX85

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

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

### OFF CHARACTERISTICS (1)

Collector–Emitter Sustaining Voltage ( $I_C = 100\text{ mAdc}$ , $L = 25\text{ mH}$ ) See fig. 1	$V_{CEO(sus)}$	450	—	—	Vdc
Collector Cutoff Current ( $V_{CES} = \text{Rated Value}$ ) ( $V_{CES} = \text{Rated Value}$ , $T_C = 125^\circ\text{C}$ )	$I_{CES}$	—	—	0.2 1.5	mAdc
Emitter Cutoff Current ( $V_{EB} = 5\text{ Vdc}$ , $I_C = 0$ )	$I_{EBO}$	—	—	1	mAdc

### ON CHARACTERISTICS (1)

DC Current Gain ( $I_C = 0.1\text{ Adc}$ , $V_{CE} = 5\text{ V}$ )	$h_{FE}$	30	50	—	—
Collector–Emitter Saturation Voltage ( $I_C = 0.3\text{ Adc}$ , $I_B = 30\text{ mAdc}$ ) ( $I_C = 1\text{ Adc}$ , $I_B = 200\text{ mAdc}$ )	$V_{CE(sat)}$	—	—	0.8 1	Vdc
Base–Emitter Saturation Voltage ( $I_C = 1\text{ Adc}$ , $I_B = 0.2\text{ Adc}$ )	$V_{BE(sat)}$	—	—	1.1	Vdc

### DYNAMIC CHARACTERISTICS

Current–Gain — Bandwidth Product ( $I_C = 500\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 1\text{ MHz}$ )	$f_T$	4	—	—	MHz
---	-------	---	---	---	-----

### SWITCHING CHARACTERISTICS

Turn–on Time	$V_{CC} = 250\text{ Vdc}$ , $I_C = 1\text{ A}$ $I_{B1} = 0.2\text{ A}$ , $I_{B2} = 0.4\text{ A}$ See fig. 2	$t_{on}$	—	0.3	0.5	$\mu\text{s}$
Storage Time		$t_s$	—	2	3.5	$\mu\text{s}$
Fall Time		$t_f$	—	0.3	—	$\mu\text{s}$
Fall Time		Same above cond. at $T_C = 95^\circ\text{C}$	$t_f$	—	—	1.4

(1) Pulse Test:  $PW = 300\ \mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

# BUX85

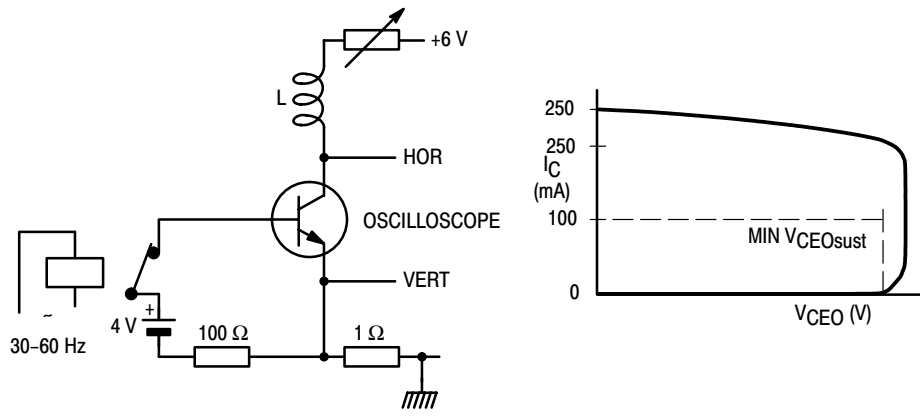


Figure 1. Test Circuit for  $V_{CEOsust}$

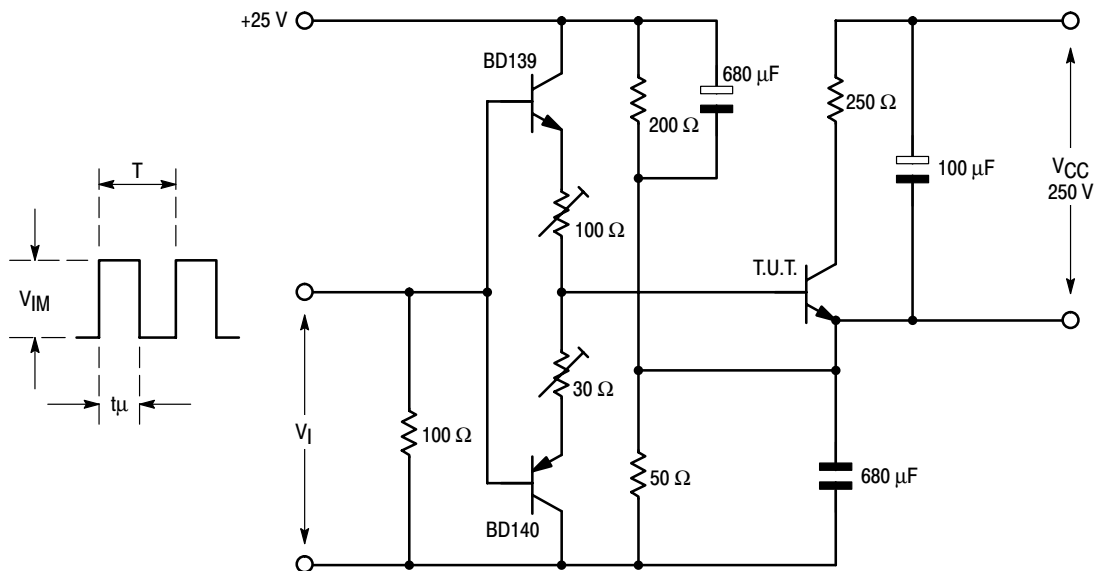
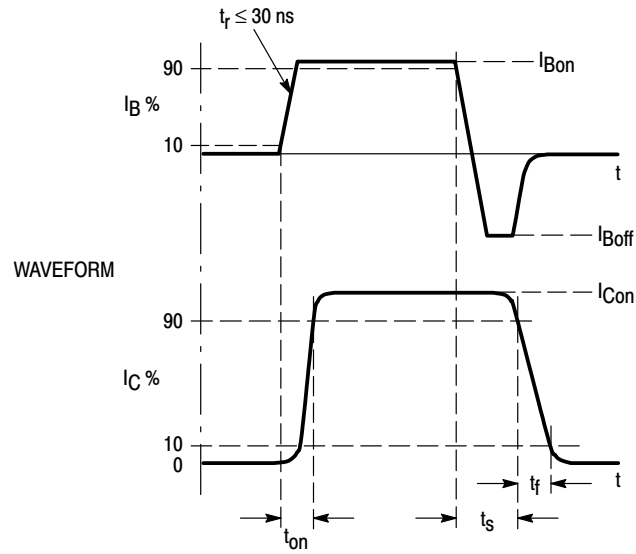
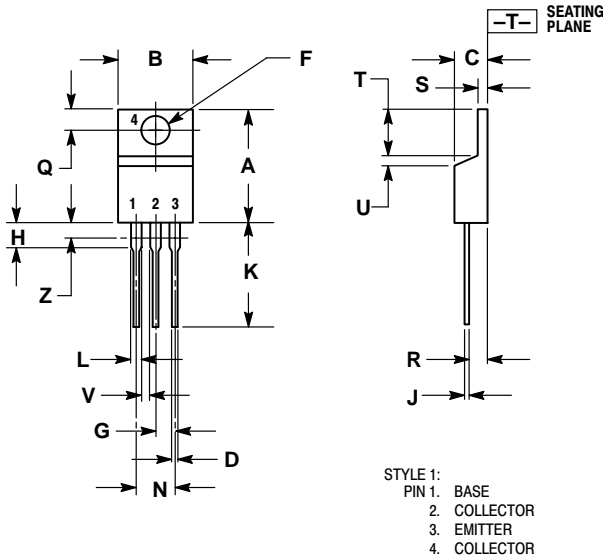


Figure 2. Switching Times/Test Circuit

# BUX85

## PACKAGE DIMENSIONS

### TO-220AB CASE 221A-09 ISSUE AA




#### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	---	1.15	---
Z	---	0.080	---	2.04

SWITCHMODE is a trademark of Semiconductor Components Industries, LLC.

**ON Semiconductor** and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer.

## PUBLICATION ORDERING INFORMATION

### Literature Fulfillment:

Literature Distribution Center for ON Semiconductor  
P.O. Box 5163, Denver, Colorado 80217 USA  
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
Email: ONlit@hibbertco.com

**N. American Technical Support:** 800-282-9855 Toll Free USA/Canada

**JAPAN:** ON Semiconductor, Japan Customer Focus Center  
4-32-1 Nishi-Gotanda, Shinagawa-ku, Tokyo, Japan 141-0031  
Phone: 81-3-5740-2700  
Email: r14525@onsemi.com

**ON Semiconductor Website:** <http://onsemi.com>

For additional information, please contact your local Sales Representative.