

# Switch-mode NPN Silicon Power Transistors

## BUX85G

The BUX85G is designed for high voltage, high speed power switching applications like converters, inverters, switching regulators, motor control systems.

### Features

- These Devices are Pb-Free and are RoHS Compliant\*

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO(sus)}$	450	Vdc
Collector-Emitter Voltage	$V_{CES}$	1000	Vdc
Emitter-Base Voltage	$V_{EBO}$	5	Vdc
Collector Current – Continuous	$I_C$	2	Adc
Collector Current – Peak (Note 1)	$I_{CM}$	3.0	Adc
Base Current – Continuous	$I_B$	0.75	Adc
Base Current – Peak (Note 1)	$I_{BM}$	1.0	Adc
Reverse Base Current – Peak	$I_{BM}$	1	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	50 0.4	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +150	$^\circ\text{C}$

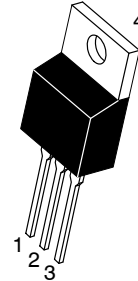
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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

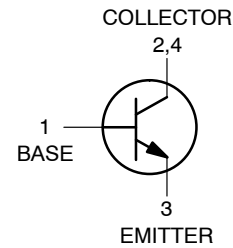
### THERMAL CHARACTERISTICS

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

## 2.0 AMPERES POWER TRANSISTOR NPN SILICON 450 VOLTS, 50 WATTS



TO-220  
CASE 221A  
STYLE 1



### MARKING DIAGRAM



BUX85 = Device Code  
A = Assembly Location  
Y = Year  
WW = Work Week  
G = Pb-Free Package

### ORDERING INFORMATION

Device	Package	Shipping
BUX85G	TO-220 (Pb-Free)	50 Units / Rail

\*For additional information on our Pb-Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

# BUX85G

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

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b> (Note 2)					
Collector–Emitter Sustaining Voltage ( $I_C = 100\text{ mAdc}$ , $L = 25\text{ mH}$ ) See Figure 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

 (Note 2)

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 ( $I_C = 500\text{ mAdc}$ , $V_{CE} = 1.0\text{ Vdc}$ , $f = 1\text{ MHz}$ )	$f_T$	4	–	–	MHz
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## 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 Figure 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

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

# BUX85G

## TYPICAL CHARACTERISTICS

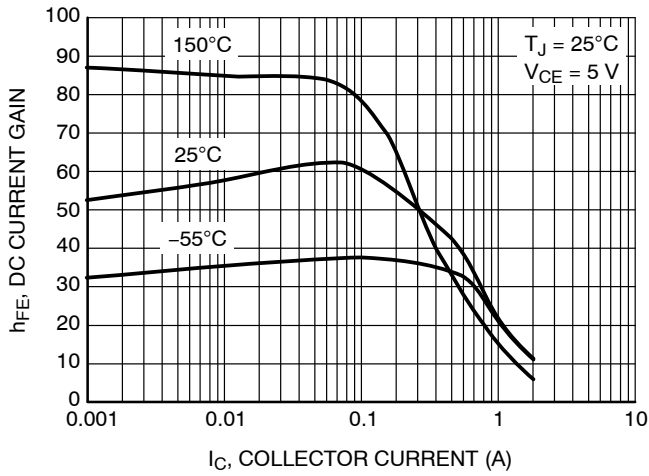


Figure 1. DC Current Gain

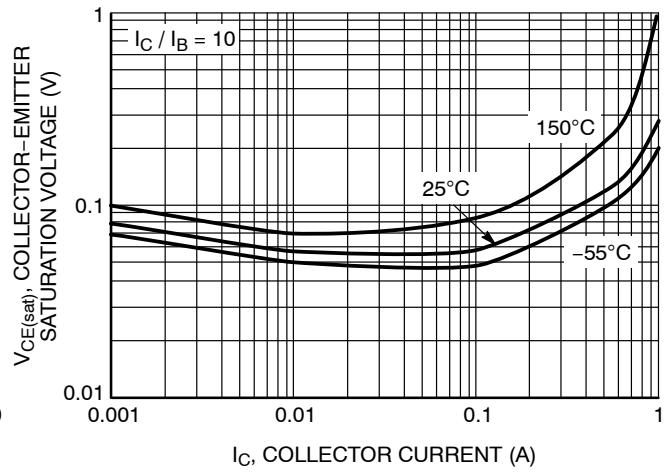


Figure 2.  $V_{CE(sat)}$ , Collector-Emitter Saturation Voltage

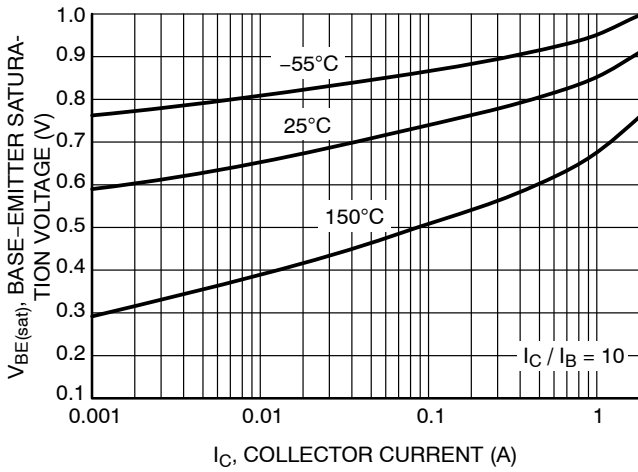


Figure 3.  $V_{BE(sat)}$ , Base-Emitter Saturation Voltage

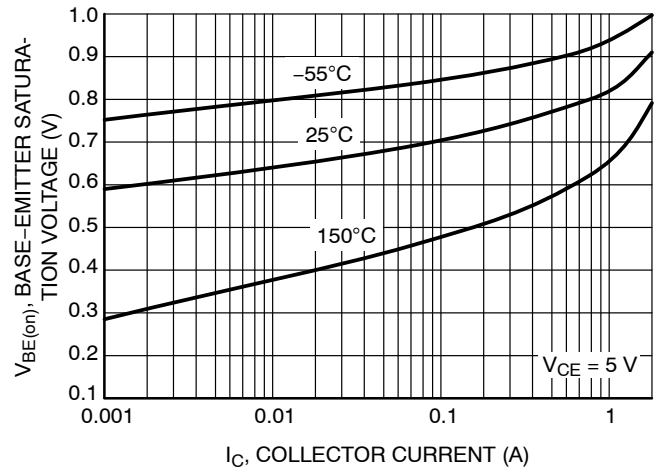


Figure 4.  $V_{BE(on)}$ , Base-Emitter On Voltage

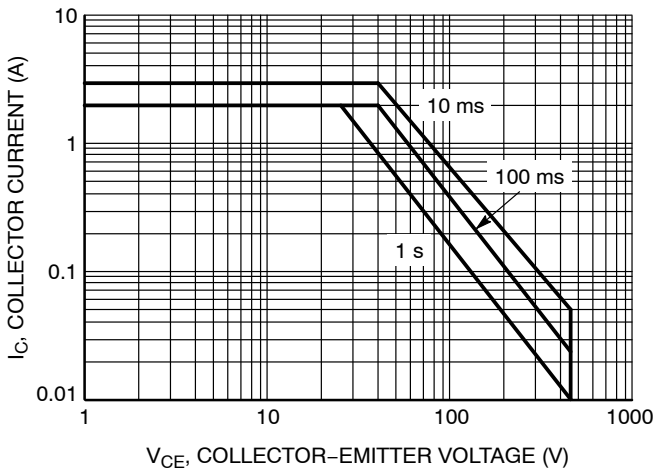


Figure 5. Safe Operating Area (SOA)

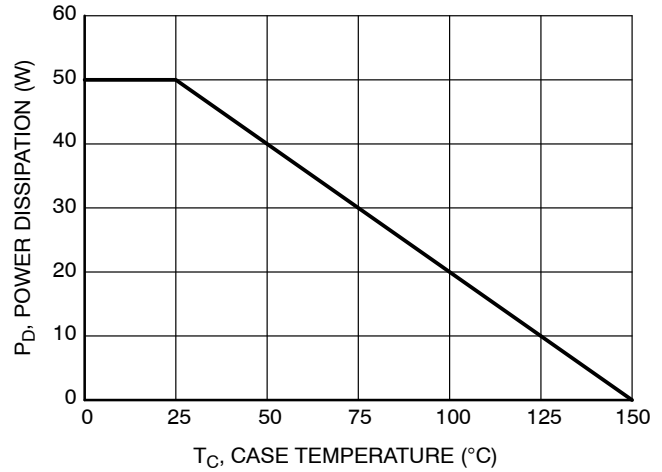


Figure 6. Power Derating

# BUX85G

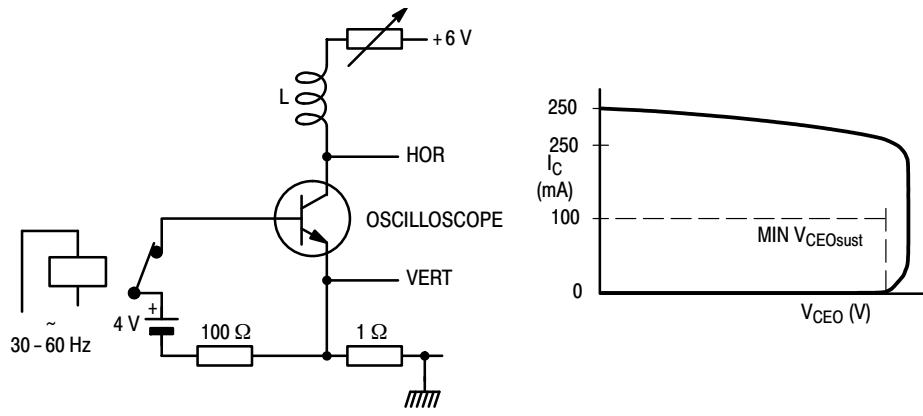


Figure 1. Test Circuit for  $V_{CEOsust}$

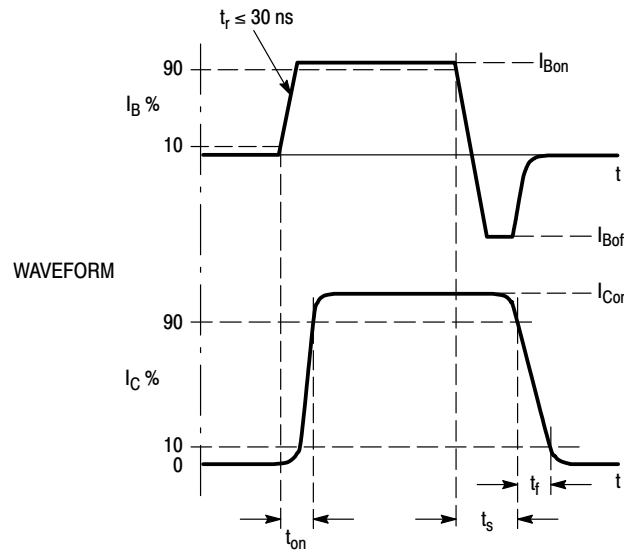
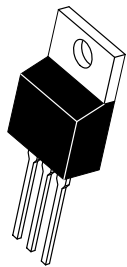


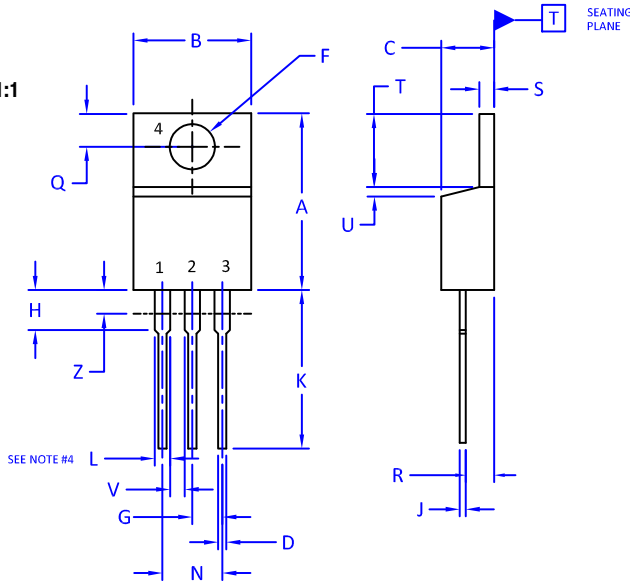
Figure 2. Switching Times/Test Circuit

TO-220  
CASE 221A  
ISSUE AK

DATE 13 JAN 2022



SCALE 1:1



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 2009.
2. CONTROLLING DIMENSION: INCHES
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.
4. MAX WIDTH FOR F102 DEVICE = 1.35MM

DIM	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.570	0.620	14.48	15.75
B	0.380	0.415	9.66	10.53
C	0.160	0.190	4.07	4.83
D	0.025	0.038	0.64	0.96
F	0.142	0.161	3.60	4.09
G	0.095	0.105	2.42	2.66
H	0.110	0.161	2.80	4.10
J	0.014	0.024	0.36	0.61
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	1.41
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

STYLE 1:

- PIN 1. BASE
- 2. COLLECTOR
- 3. EMITTER
- 4. COLLECTOR

STYLE 2:

- PIN 1. BASE
- 2. EMITTER
- 3. COLLECTOR
- 4. EMITTER

STYLE 3:

- PIN 1. CATHODE
- 2. ANODE
- 3. GATE
- 4. ANODE

STYLE 4:

- PIN 1. MAIN TERMINAL 1
- 2. MAIN TERMINAL 2
- 3. GATE
- 4. MAIN TERMINAL 2

STYLE 5:

- PIN 1. GATE
- 2. DRAIN
- 3. SOURCE
- 4. DRAIN

STYLE 6:

- PIN 1. ANODE
- 2. CATHODE
- 3. ANODE
- 4. CATHODE

STYLE 7:

- PIN 1. CATHODE
- 2. ANODE
- 3. CATHODE
- 4. ANODE

STYLE 8:

- PIN 1. CATHODE
- 2. ANODE
- 3. EXTERNAL TRIP/DELAY
- 4. ANODE

STYLE 9:

- PIN 1. GATE
- 2. COLLECTOR
- 3. EMITTER
- 4. COLLECTOR

STYLE 10:

- PIN 1. GATE
- 2. SOURCE
- 3. DRAIN
- 4. SOURCE

STYLE 11:

- PIN 1. DRAIN
- 2. SOURCE
- 3. GATE
- 4. SOURCE

STYLE 12:

- PIN 1. MAIN TERMINAL 1
- 2. MAIN TERMINAL 2
- 3. GATE
- 4. NOT CONNECTED

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