

# BUV27

## NPN Silicon Power Transistor

Designed for use in switching regulators and motor control.

### Features

- Low Collection Emitter Saturation Voltage
- Fast Switching Speed

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Sustaining Voltage	$V_{CEO}$	120	Vdc
Collector-Emitter Breakdown Voltage	$V_{CBO}$	240	Vdc
Emitter-Base Voltage	$V_{EBO}$	7.0	Vdc
Collector Current - Continuous - Peak (Note 1)	$I_C$ $I_{CM}$	12 20	Adc
Base Current	$I_B$	4.0	Adc
Total Device Dissipation ( $T_C = 25^\circ\text{C}$ ) Derate above $25^\circ\text{C}$	$P_D$	70 0.56	Watts W/ $^\circ\text{C}$
Operating and Storage Temperature	$T_J, T_{stg}$	- 65 to 150	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

Rating	Symbol	Max	Unit
Thermal Resistance - Junction to Case - Junction to Ambient	$R_{\theta JC}$ $R_{\theta JA}$	1.78 62.5	$^\circ\text{C/W}$

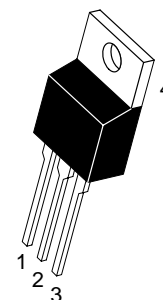
1. Pulse Test: Pulse Width = 5.0 ms, Duty Cycle  $\leq 10\%$ .



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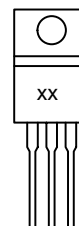
<http://onsemi.com>

**POWER TRANSISTOR  
12 AMPERES  
120 VOLTS  
70 WATTS**



**TO-220AB  
CASE 221A  
STYLE 1**

### MARKING DIAGRAM



xx = Specific Device Code

### ORDERING INFORMATION

Device	Package	Shipping
BUV27	TO-220AB	50 per Rail
BUV27	TO-220AB	3000 per Carton

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## ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
I <sub>CER</sub>	Collector Cut-off Current (R <sub>BE</sub> = 50 Ω)	V <sub>CE</sub> = 240 V, T <sub>C</sub> = 125°C			3.0	mA
I <sub>CEX</sub>	Collector Cut-off Current	V <sub>CE</sub> = 240 V, V <sub>BE</sub> = -1.5 V, T <sub>C</sub> = 125°C			1.0	mA
I <sub>EBO</sub>	Emitter Cut-off Current (I <sub>C</sub> = 0)	V <sub>BE</sub> = 5 V			1.0	mA
V <sub>CEO(sus)</sub>	Collector-Emitter Sustaining Voltage	I <sub>C</sub> = 0.2 A, L = 25 mH	120			V
V <sub>EBO</sub>	Emitter-Base Voltage (I <sub>C</sub> = 0)	I <sub>E</sub> = 50 mA	7.0		30	V
V <sub>CE(sat)</sub> (Note 2)	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 4 A, I <sub>B</sub> = 0.4 A I <sub>C</sub> = 8 A, I <sub>B</sub> = 0.8 A			0.7 1.5	V
V <sub>BE(sat)</sub> (Note 2)	Base-Emitter Saturation Voltage	I <sub>C</sub> = 8 A, I <sub>B</sub> = 0.8 A			2.0	V

### Resistive Load

t <sub>on</sub>	Turn-on Time	V <sub>CC</sub> = 90 V, I <sub>C</sub> = 8 A		0.4	0.8	ms
t <sub>s</sub>	Storage Time	V <sub>BE</sub> = -6 V, I <sub>B1</sub> = 0.8 A		0.5	1.2	μs
t <sub>f</sub>	Fall Time	R <sub>BB</sub> = 3.75 Ω		0.12	0.25	μs

### Inductive Load

t <sub>s</sub>	Storage Time	V <sub>CC</sub> = 90 V, I <sub>C</sub> = 8 A		0.6		μs
t <sub>f</sub>	Fall Time	I <sub>B1</sub> = 0.8 A, V <sub>BE</sub> = -5 V L <sub>B</sub> = 1 μH		0.04		
t <sub>s</sub>	Storage Time	V <sub>CC</sub> = 90 V, I <sub>C</sub> = 8 A			2.0	
t <sub>f</sub>	Fall Time	I <sub>B1</sub> = 0.8 A, V <sub>BE</sub> = -5 V L <sub>B</sub> = 1 μH, T <sub>J</sub> = 125°C			0.15	

2. Pulsed: Pulse Duration = 300 μs, Duty Cycle = 2%

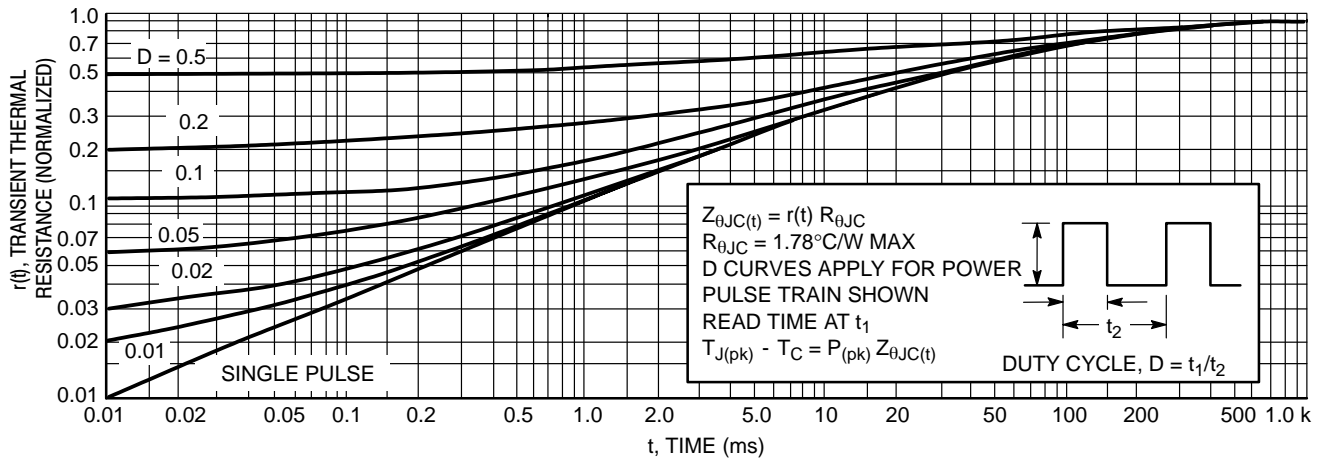


Figure 1. Thermal Response

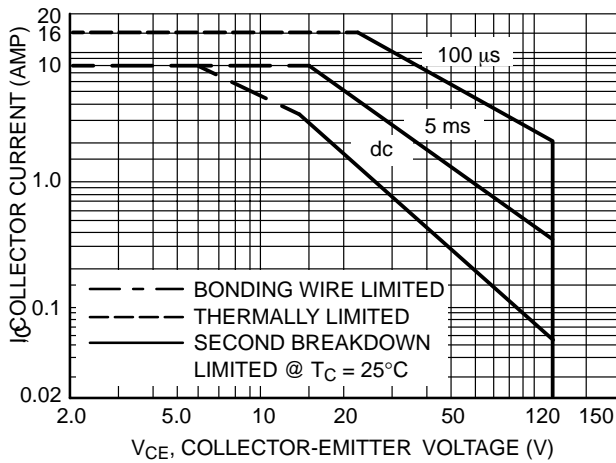


Figure 2. Forward Bias Safe Operating Area

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 Figures 2 is based on  $T_{J(pk)} = 150^\circ\text{C}$ ;  $T_C$  is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(pk)} < 150^\circ\text{C}$ .  $T_{J(pk)}$  may be calculated from the data in Figure 1. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

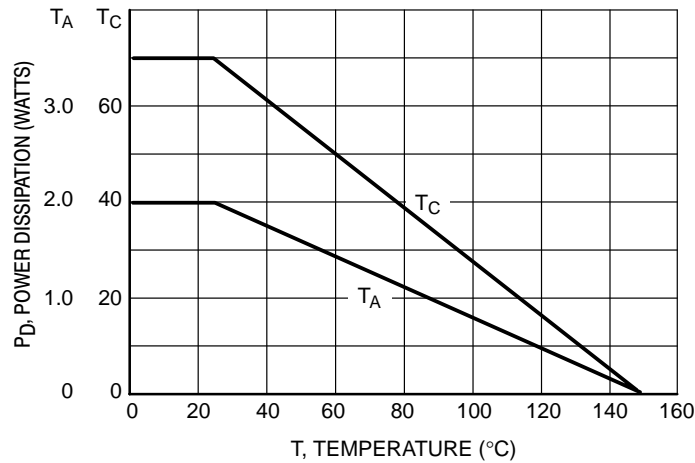
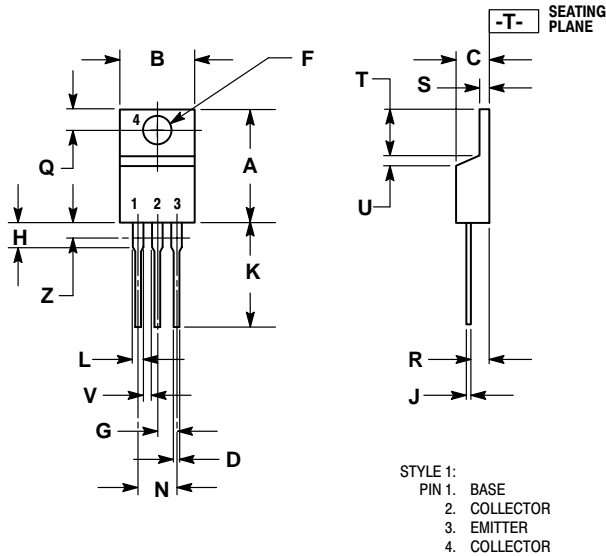


Figure 3. Power Derating

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## 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

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