BUV27

NPN Silicon Power Transistor

This device is designed for use in switching regulators and motor control.

Features

- Low Collection Emitter Saturation Voltage
- Fast Switching Speed
- Pb−Free Package is Available*

ON Semiconductor®

http://onsemi.com

POWER TRANSISTOR
12 AMPERES
120 VOLTS
70 WATTS

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°C) Derate above 25°C	P_D	70 0.56	W W/°C
Operating and Storage Temperature	T_J, T_{stg}	− 65 to 150	°C

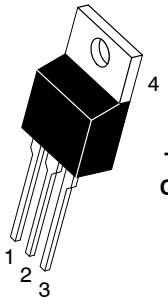
THERMAL CHARACTERISTICS

Rating	Symbol	Max	Unit
Thermal Resistance, Junction−to−Case Junction−to−Ambient	$R_{\theta JC}$ $R_{\theta JA}$	1.78 62.5	°C/W

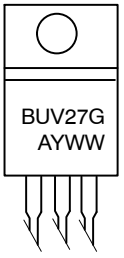
Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Pulse Test: Pulse Width = 5.0 ms, Duty Cycle ≤ 10%.

MARKING DIAGRAM



TO−220AB
CASE 221A
STYLE 1



BUV27 = Device Code
A = Assembly Location
Y = Year
WW = Work Week
G = Pb−Free Package

ORDERING INFORMATION

Device	Package	Shipping
BUV27	TO−220AB	50 per Rail
BUV27G	TO−220AB (Pb−Free)	50 per Rail

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

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
I_{CER}	Collector Cut−off Current (R_{BE} = 50 Ω)	V_{CE} = 240 V, T_C = 125°C			3.0	mA
I_{CEX}	Collector Cut−off Current	V_{CE} = 240 V, V_{BE} = −1.5 V, T_C = 125°C			1.0	mA
I_{EBO}	Emitter Cut−off Current (I_C = 0)	V_{BE} = 5 V			1.0	mA
$V_{CEO(sus)}$	Collector−Emitter Sustaining Voltage	I_C = 0.2 A, L = 25 mH	120			V
V_{EBO}	Emitter−Base Voltage (I_C = 0)	I_E = 50 mA	7.0		30	V
$V_{CE(sat)}$ (Note 2)	Collector−Emitter Saturation Voltage	I_C = 4 A, I_B = 0.4 A I_C = 8 A, I_B = 0.8 A			0.7 1.5	V
$V_{BE(sat)}$ (Note 2)	Base−Emitter Saturation Voltage	I_C = 8 A, I_B = 0.8 A			2.0	V
Resistive Load						
t_{on} t_s t_f	Turn−on Time Storage Time Fall Time	V_{CC} = 90 V, I_C = 8 A V_{BE} = −6 V, I_{B1} = 0.8 A R_{BB} = 3.75 Ω		0.4 0.5 0.12	0.8 1.2 0.25	ms μs μs
Inductive Load						
t_s t_f	Storage Time Fall Time	V_{CC} = 90 V, I_C = 8 A I_{B1} = 0.8 A, V_{BE} = −5 V L_B = 1 μH		0.6 0.04		μs
t_s t_f	Storage Time Fall Time	V_{CC} = 90 V, I_C = 8 A I_{B1} = 0.8 A, V_{BE} = −5 V L_B = 1 μH, T_J = 125°C			2.0 0.15	

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

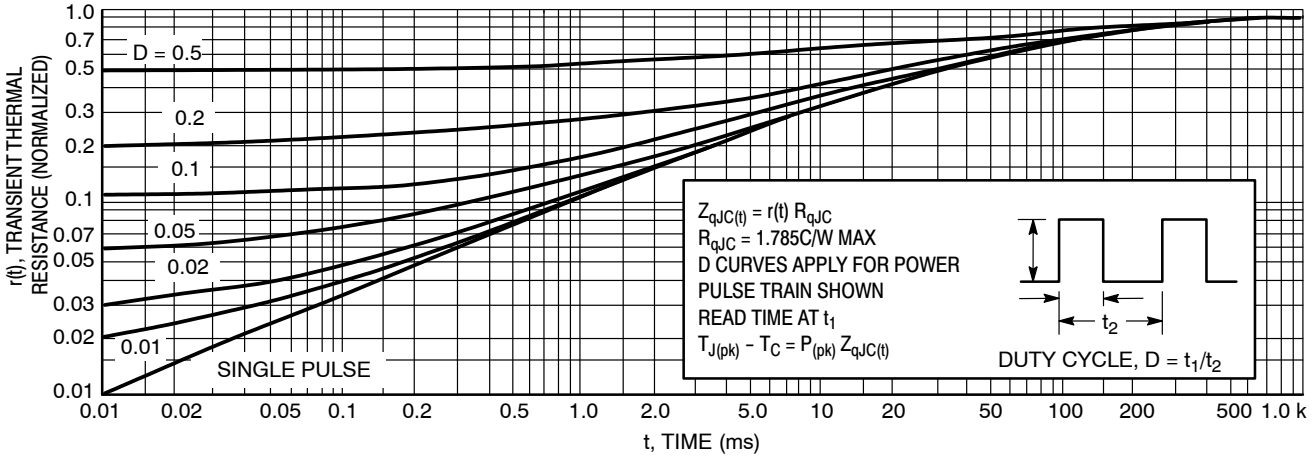


Figure 1. Thermal Response

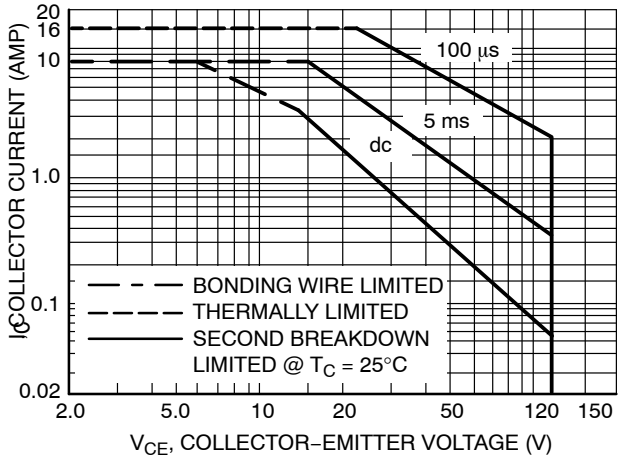


Figure 2. Forward Bias Safe Operating Area

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 then the curves indicate.

The data of Figures 2 is based on $T_{J(pk)}$ = 150°C; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)}$ < 150°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.

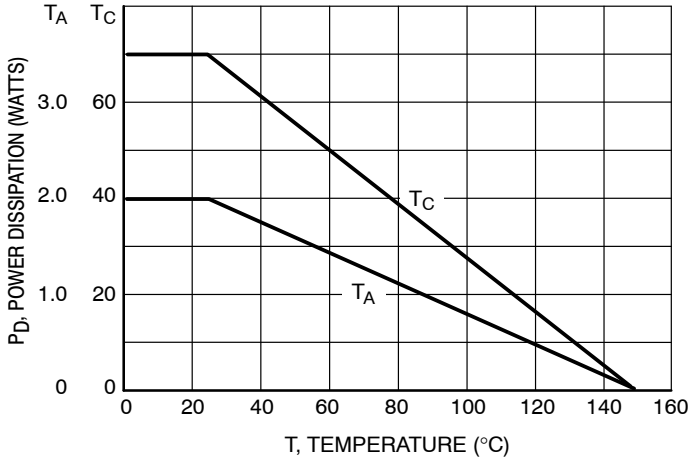
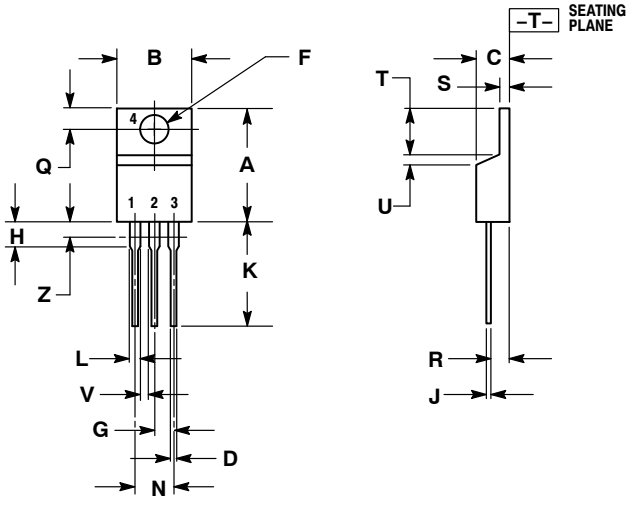


Figure 3. Power Derating

PACKAGE DIMENSIONS

TO−220
CASE 221A−09
ISSUE AG



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.

	INCHES		MILLIMETERS	
DIM	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	0.036	0.64	0.91
F	0.142	0.161	3.61	4.09
G	0.095	0.105	2.42	2.66
H	0.110	0.161	2.80	4.10
J	0.014	0.025	0.36	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

STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

PUBLICATION ORDERING INFORMATION

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