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

ON Semiconductor®

www.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	I_C	12	Adc
Collector Current − Peak (Note 1)	I_{CM}	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

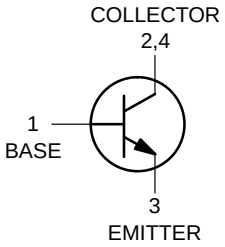
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.
1. Pulse Test: Pulse Width = 5.0 ms, Duty Cycle ≤ 10%.

THERMAL CHARACTERISTICS

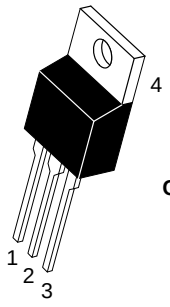
Rating	Symbol	Max	Unit
Thermal Resistance, Junction−to−Case Junction−to−Ambient	$R_{\theta JC}$ $R_{\theta JA}$	1.78 62.5	°C/W

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

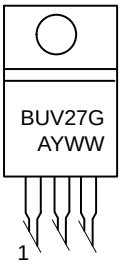
SCHEMATIC



MARKING DIAGRAM



TO−220
CASE 221A
STYLE 1



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

ORDERING INFORMATION

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

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	

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

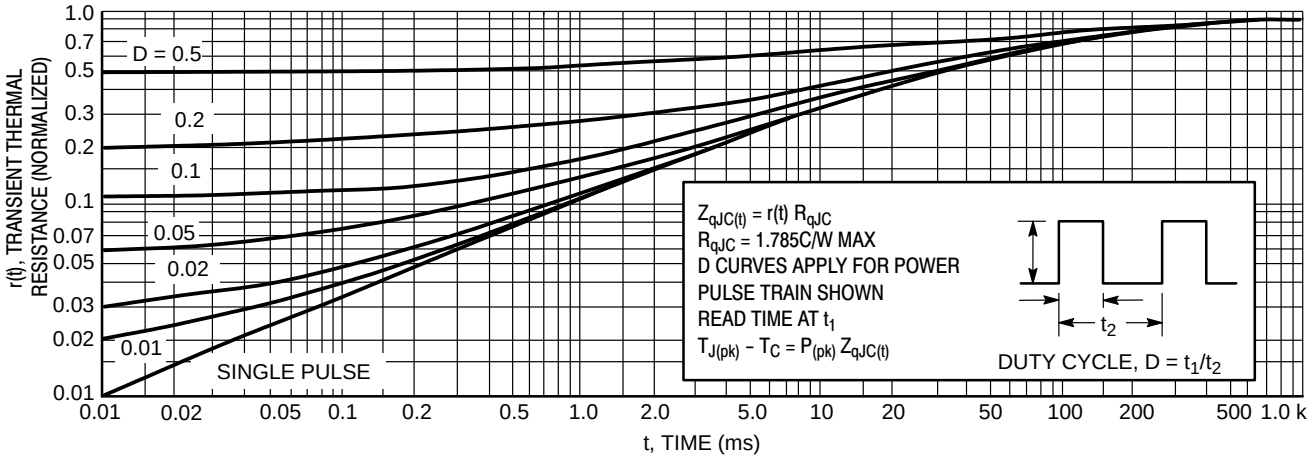


Figure 1. Thermal Response

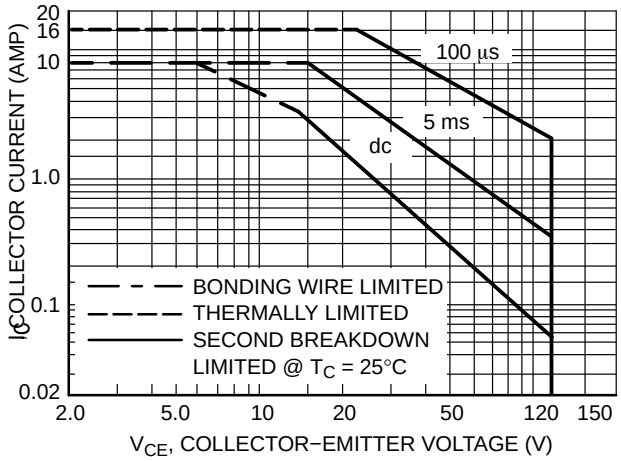


Figure 2. Forward Bias Safe Operating Area

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.

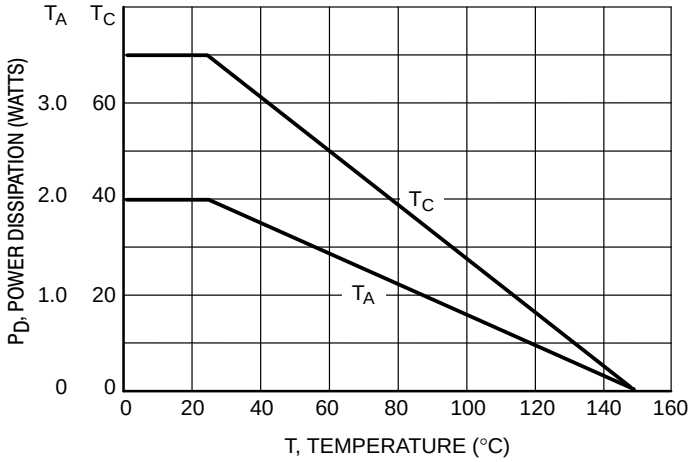


Figure 3. Power Derating

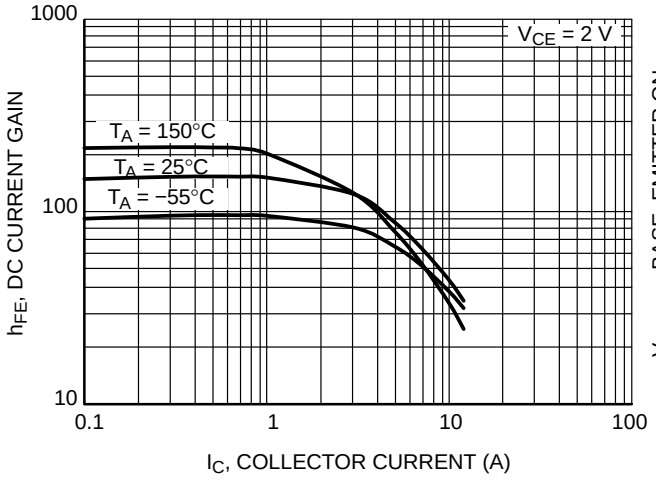


Figure 4. DC Current Gain vs. Collector Current

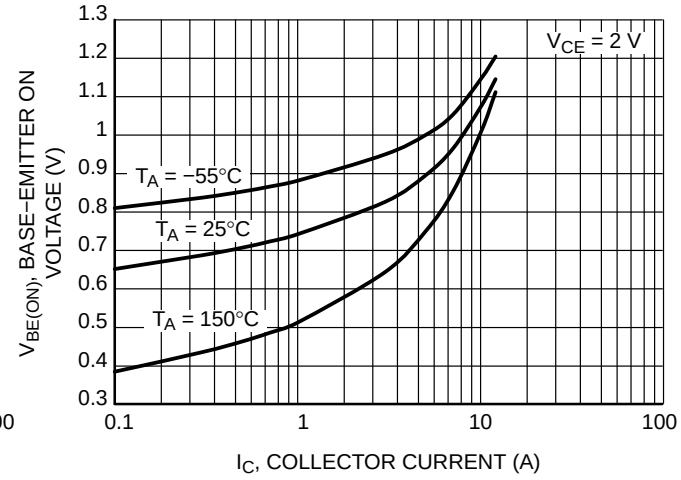


Figure 5. Base−Emitter Turn−ON Voltage vs. Collector Current

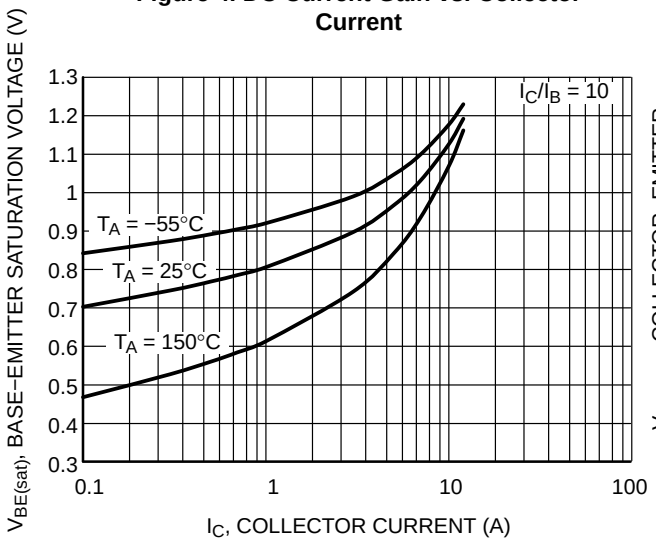


Figure 6. Base−Emitter Saturation Voltage vs. Collector Current

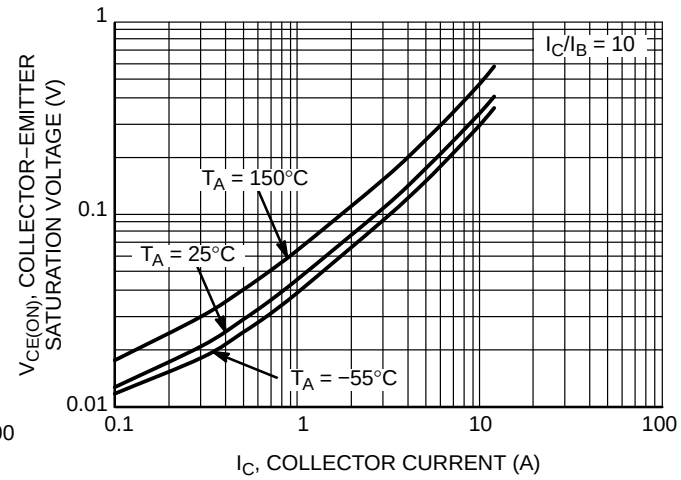


Figure 7. Collector−Emitter Saturation Voltage vs. Collector Current

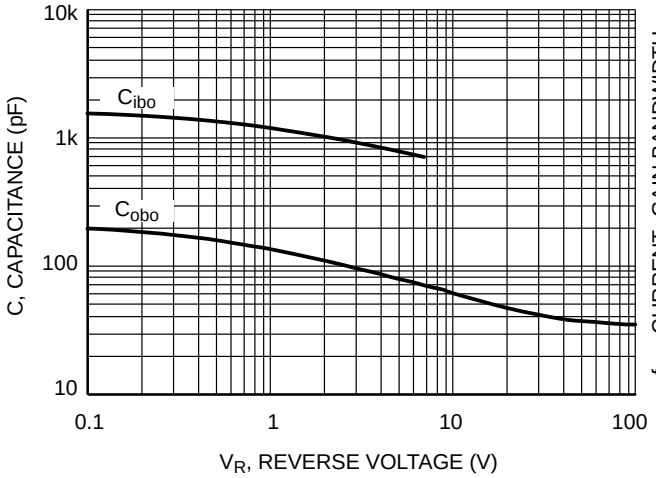


Figure 8. Capacitance

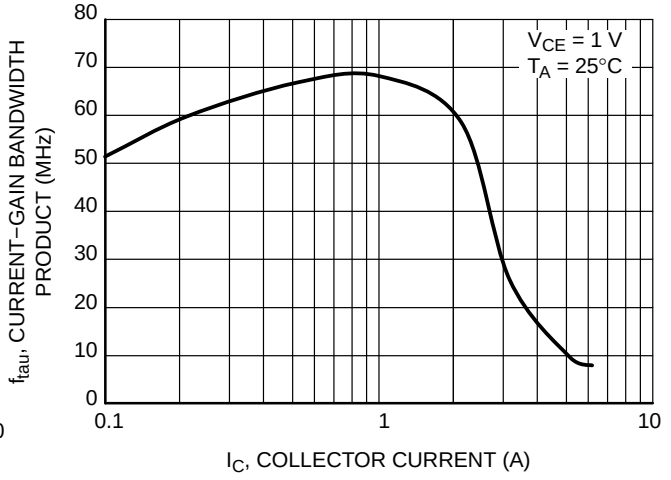
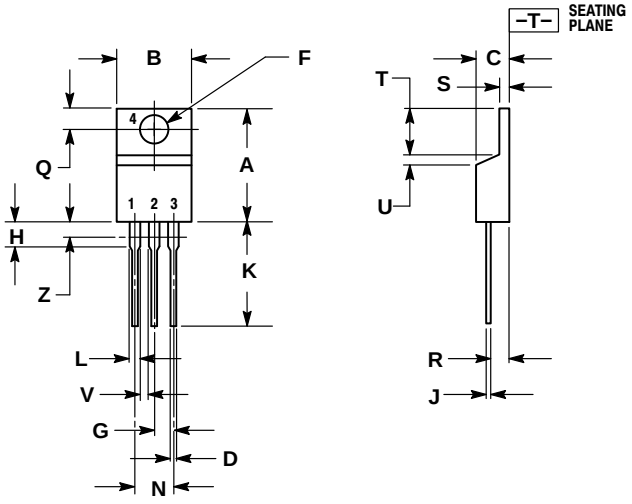


Figure 9. Current Gain Bandwidth Product vs. Collector Current

PACKAGE DIMENSIONS

TO−220
CASE 221A−09
ISSUE AH



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	0.415	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	3.61	4.09
G	0.095	0.105	2.42	2.66
H	0.110	0.161	2.80	4.10
J	0.014	0.024	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	1.39
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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