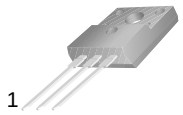
NPN Silicon Transistor

BUT11AF

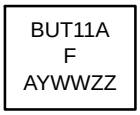
High Voltage Power Switching Applications



1. Base
2. Collector
3. Emitter

TO−220 Fullpack, 3−Lead
CASE 221AT

MARKING DIAGRAM



BUT11AF = Specific Device Code
A = Site Code
Y = Year
WW = Work Week
ZZ = Assembly Lot Code

ORDERING INFORMATION

Device	Package	Shipping
BUT11AFTU	TO−220 Fullpack (Pb−Free)	1000 Units / Tube

MAXIMUM RATINGS (T_C = 25°C unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{CBO}	Collector−Base Voltage	1000	V
V_{CEO}	Collector−Emitter Voltage	450	V
V_{EBO}	Emitter−Base Voltage	9	V
I_C	Collector Current (DC)	5	A
I_{CP}	*Collector Current (Pulse)	10	A
I_B	Base Current (DC)	2	A
I_{BP}	*Base Current (Pulse)	4	A
P_C	Collector Dissipation (T_C = 25°C)	40	W
T_J	Junction Temperature	150	°C
T_{STG}	Storage Temperature	−65~150	°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.

THERMAL CHARACTERISTICS (T_C = 25°C, unless otherwise noted)

Symbol	Parameter	Max	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	3.125	°C/W

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}(sus)	*Collector−Emitter Sustaining Voltage	I_C = 100 mA, I_B = 0	450	−	−	V
I_{CES}	Collector Cut−off Current	V_{CE} = 1000 V, V_{BE} = 0	−	−	1	mA
I_{EBO}	Emitter Cut−off Current	V_{BE} = 9 V, I_C = 0	−	−	10	mA
V_{CE}(sat)	Collector−Emitter Saturation Voltage	I_C = 2.5 A, I_B = 0.5 A	−	−	1.5	V
V_{BE}(sat)	Base−Emitter Saturation Voltage	I_C = 2.5 A, I_B = 0.5 A	−	−	1.3	V
t_{ON}	Turn On Time	V_{CC} = 250 V, I_C = 2.5 A, I_{B1} = $-I_{B2}$ = 0.5 A, R_L = 100 Ω	−	−	1	μs
t_{STG}	Storage Time		−	−	4	μs
t_F	Fall Time		−	−	0.8	μs

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.
*Pulsed: pulsed duration = 300 μs, duty cycle = 1.5%

TYPICAL CHARACTERISTICS

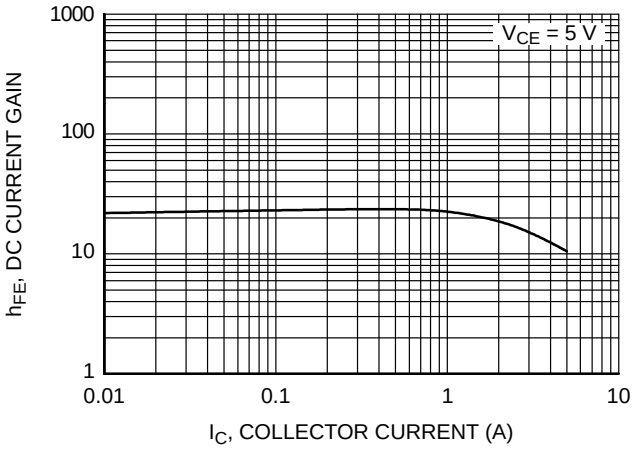


Figure 1. DC Current Gain

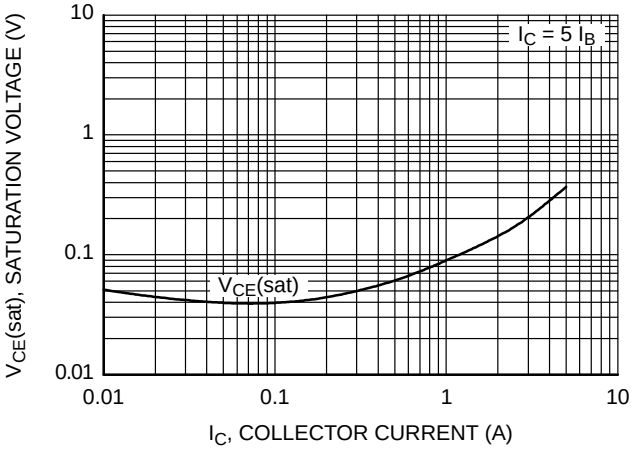


Figure 2. Collector−Emitter Saturation Voltage

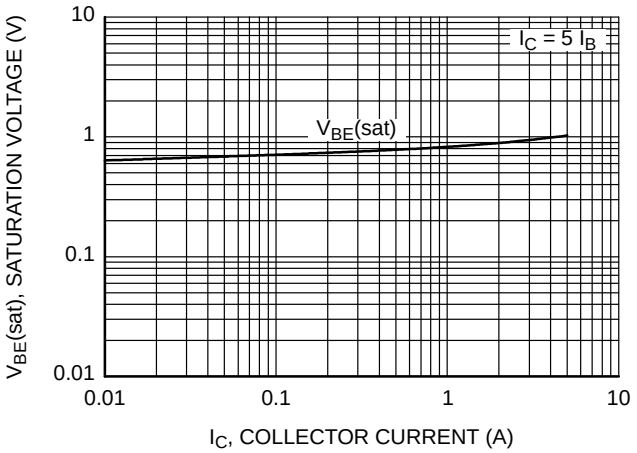


Figure 3. Base−Emitter Saturation Voltage

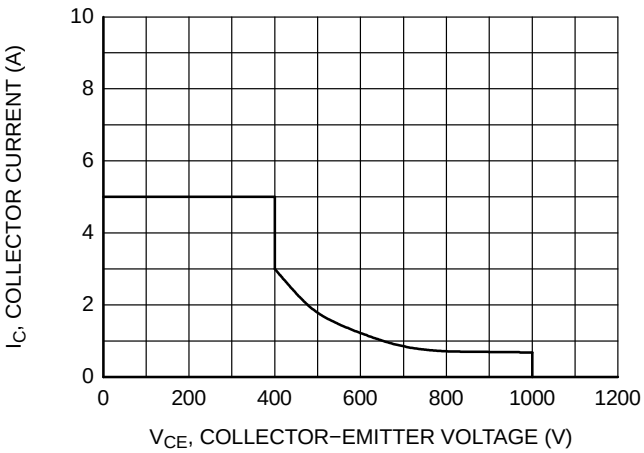


Figure 4. Reverse Biased Safe Operating Area

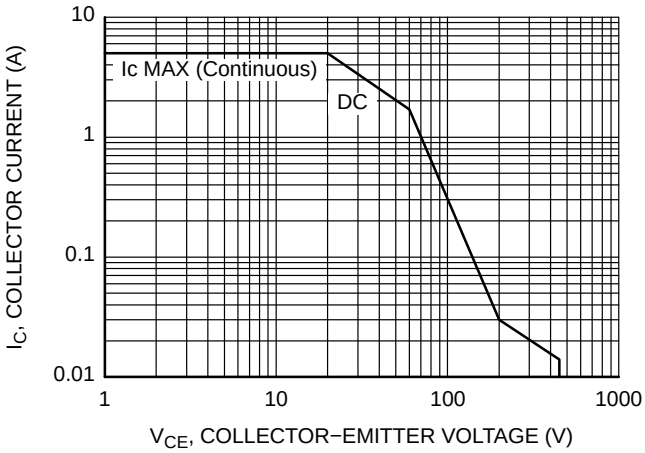


Figure 5. Safe Operating Area

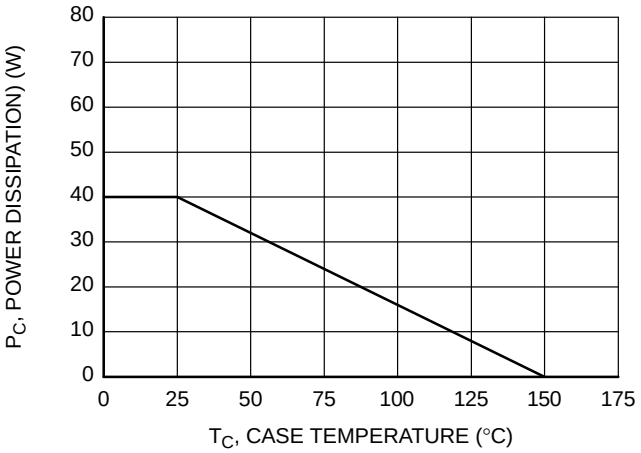
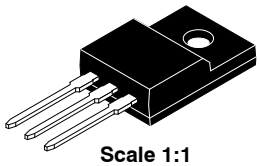


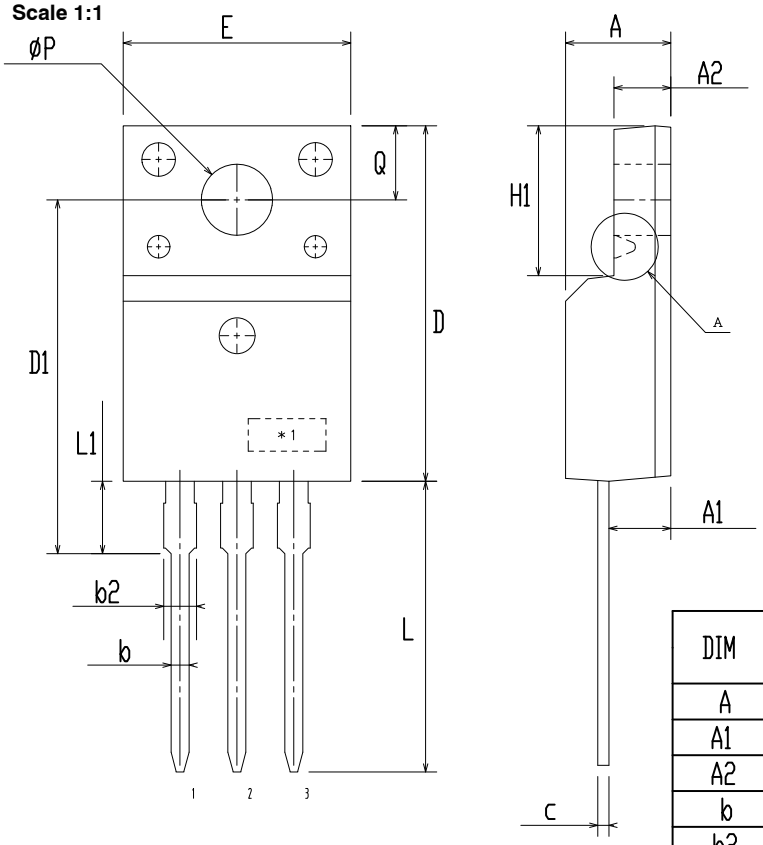
Figure 6. Power Derating

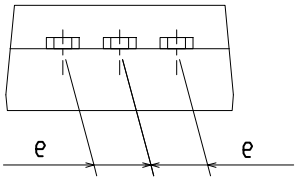
TO−220 Fullpack, 3−Lead / TO−220F−3SG
CASE 221AT
ISSUE B

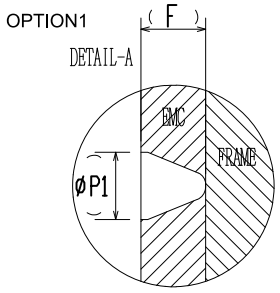
DATE 19 JAN 2021



Scale 1:1







DIM	MILLIMITERS		
	MIN	NOM	MAX
A	4.50	4.70	4.90
A1	2.56	2.76	2.96
A2	2.34	2.54	2.74
b	0.70	0.80	0.90
b2	~	~	1.47
c	0.45	0.50	0.60
D	15.67	15.87	16.07
D1	15.60	15.80	16.00
E	9.96	10.16	10.36
e	2.34	2.54	2.74
F	~	0.84	~
H1	6.48	6.68	6.88
L	12.78	12.98	13.18
L1	3.03	3.23	3.43
ø P	2.98	3.18	3.38
ø P1	~	1.00	~
Q	3.20	3.30	3.40

NOTES:
A. DIMENSION AND TOLERANCE AS ASME Y14.5-2009
B. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUCSIONS.
C. OPTION 1 - WITH SUPPORT PIN HOLE
OPTION 2 - NO SUPPORT PIN HOLE

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DESCRIPTION:	**TO−220 FULLPACK, 3−LEAD / TO−220F−3SG**		**PAGE 1 OF 1**

ADDITIONAL INFORMATION

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