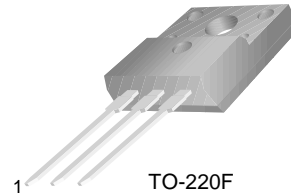




BUT11F/11AF

High Voltage Power Switching Applications



TO-220F
1.Base 2.Collector 3.Emitter

NPN Silicon Transistor

Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units
V_{CBO}	Collector-Base Voltage : BUT11F : BUT11AF	850	V
		1000	V
V_{CEO}	Collector-Emitter Voltage : BUT11F : BUT11AF	400	V
		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 ($T_C=25^\circ\text{C}$)	40	W
T_J	Junction Temperature	150	$^\circ\text{C}$
T_{STG}	Storage Temperature	- 65 ~ 150	$^\circ\text{C}$

Electrical Characteristics $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
$V_{CEO(sus)}$	* Collector-Emitter Sustaining Voltage : BUT11F : BUT11AF	$I_C = 100\text{mA}, I_B = 0$	400			V
			450			V
I_{CES}	Collector Cut-off Current : BUT11F : BUT11AF	$V_{CE} = 850\text{V}, V_{BE} = 0$ $V_{CE} = 1000\text{V}, V_{BE} = 0$			1	mA
					1	mA
I_{EBO}	Emitter Cut-off Current	$V_{BE} = 9\text{V}, I_C = 0$			10	mA
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage : BUT11F : BUT11AF	$I_C = 3\text{A}, I_B = 0.6\text{A}$ $I_C = 2.5\text{A}, I_B = 0.5\text{A}$			1.5	V
					1.5	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage : BUT11F : BUT11AF	$I_C = 3\text{A}, I_B = 0.6\text{A}$ $I_C = 2.5\text{A}, I_B = 0.5\text{A}$			1.3	V
					1.3	V
t_{ON}	Turn ON Time	$V_{CC} = 250\text{V}, I_C = 2.5\text{A}$			1	μs
t_{STG}	Storage Time	$I_{B1} = -I_{B2} = 0.5\text{A}$			4	μs
t_F	Fall Time	$R_L = 100\Omega$			0.8	μs

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

Thermal Characteristics $T_C=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Typ	Max	Units
$R_{\theta jC}$	Thermal Resistance, Junction to Case		3.125	$^\circ\text{C/W}$

Typical Characteristics

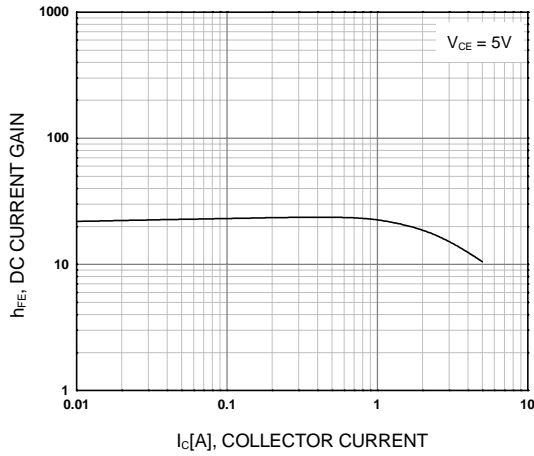


Figure 1. DC current Gain

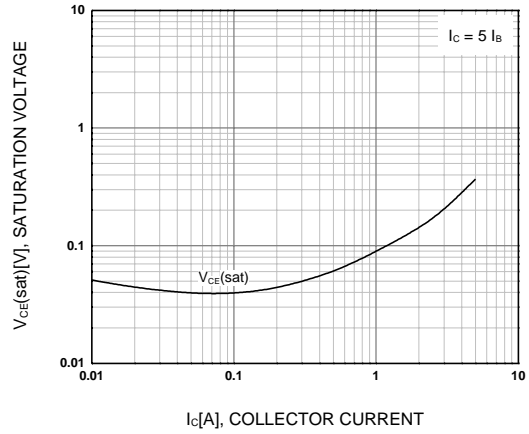


Figure 2. Collector-Emitter Saturation Voltage

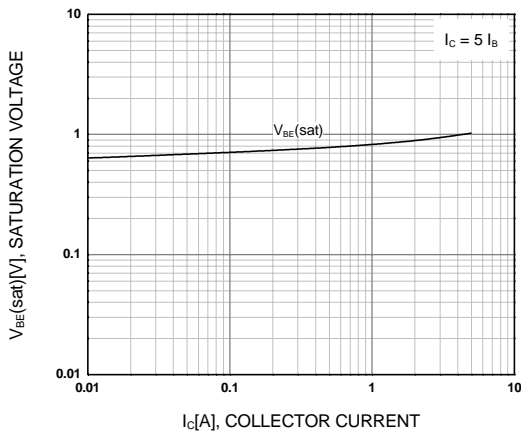


Figure 3. Base-Emitter Saturation Voltage

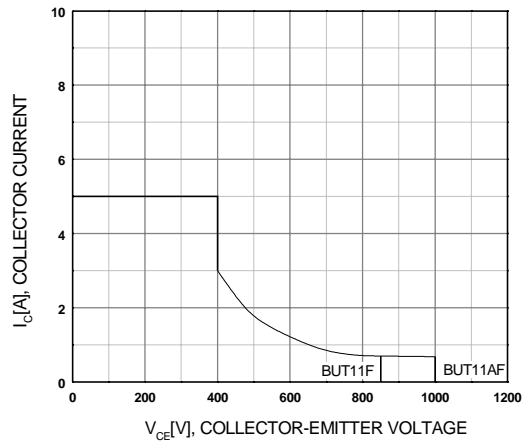


Figure 4. Reverse Biased Safe Operating Area

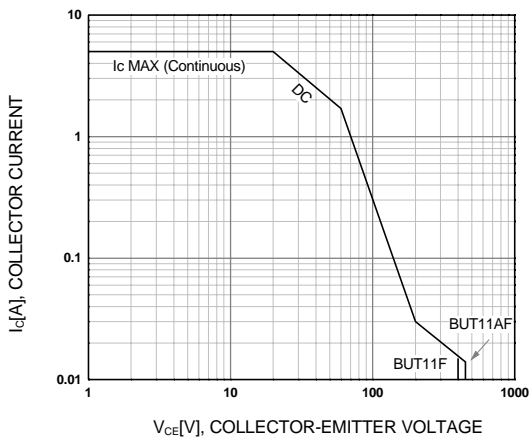


Figure 5. Safe Operating Area

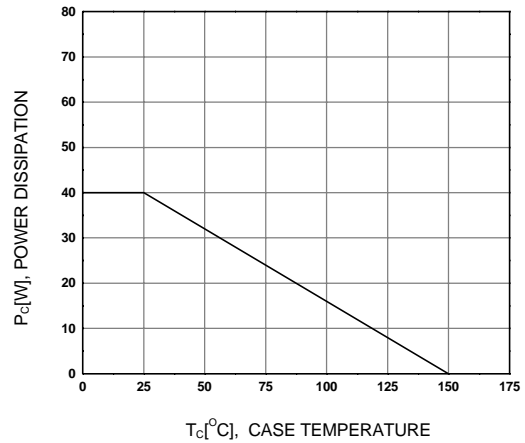
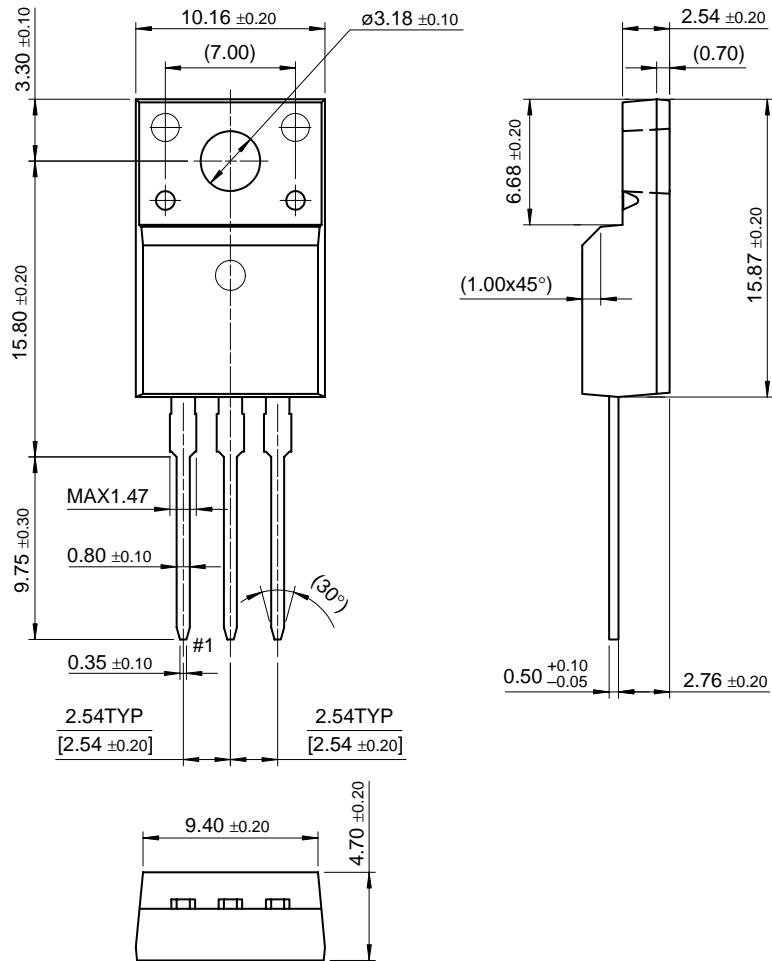


Figure 6. Power Derating

Package Dimensions

BUT11F/11AF

TO-220F



Dimensions in Millimeters

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