

**isc Silicon NPN Power Transistor**

**BUT11AF**

**DESCRIPTION**

- High Voltage
- High Speed Switching

**APPLICATIONS**

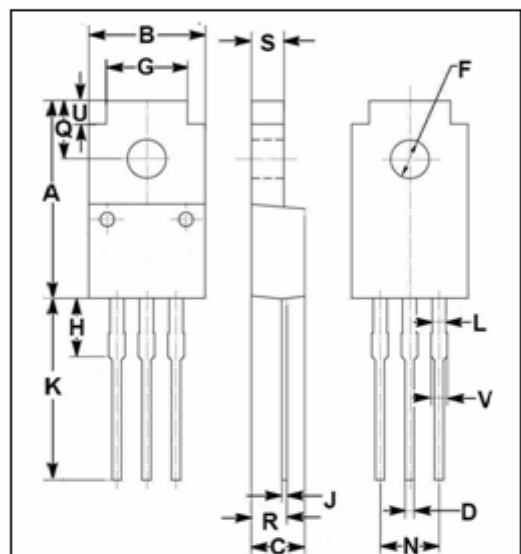
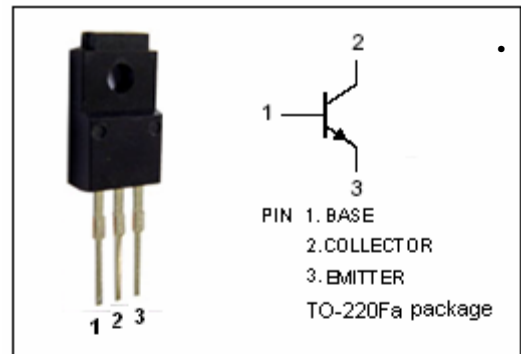
- Converters
- Inverters
- Switching regulators
- Motor control systems

**ABSOLUTE MAXIMUM RATINGS (T<sub>a</sub>=25°C)**

SYMBOL	PARAMETER	VALUE	UNIT
V <sub>CBO</sub>	Collector-Base Voltage	1000	V
V <sub>CEO</sub>	Collector-Emitter Voltage	450	V
V <sub>EBO</sub>	Emitter-Base Voltage	9	V
I <sub>C</sub>	Collector Current-Continuous	5	A
I <sub>CM</sub>	Collector Current-Peak	10	A
I <sub>B</sub>	Base Current	2	A
I <sub>BM</sub>	Base Current-Peak	4	A
P <sub>C</sub>	Collector Power Dissipation @T <sub>C</sub> =25°C	40	W
T <sub>j</sub>	Junction Temperature	150	°C
T <sub>stg</sub>	Storage Temperature Range	-65~150	°C

**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	MAX	UNIT
R <sub>th j-c</sub>	Thermal Resistance, Junction to Case	3.125	K/W



DIM	mm	
	MIN	MAX
A	16.85	17.15
B	9.90	10.10
C	4.35	4.65
D	0.75	0.80
F	3.20	3.40
G	6.90	7.10
H	5.15	5.45
J	0.45	0.75
K	13.35	13.65
L	1.10	1.30
N	4.98	5.18
Q	4.85	5.15
R	2.95	3.25
S	2.70	2.90
U	1.75	2.05
V	1.30	1.50

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## ELECTRICAL CHARACTERISTICS

 $T_C=25^{\circ}\text{C}$  unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP.	MAX	UNIT
$V_{CE(SUS)}$	Collector-Emitter Sustaining Voltage	$I_C=0.1\text{A}; I_B=0$	450			V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=2.5\text{A}; I_B=0.5\text{A}$			1.5	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C=2.5\text{A}; I_B=0.5\text{A}$			1.3	V
$I_{CES}$	Collector Cutoff Current	$V_{CE}=1000\text{V}; V_{BE}=0$			1.0	mA
$I_{EBO}$	Emitter Cutoff Current	$V_{EB}=9\text{V}; I_C=0$			10	mA
$h_{FE-1}$	DC Current Gain	$I_C=5\text{mA}; V_{CE}=5\text{V}$	10		35	
$h_{FE-2}$	DC Current Gain	$I_C=0.5\text{A}; V_{CE}=5\text{V}$	10		35	

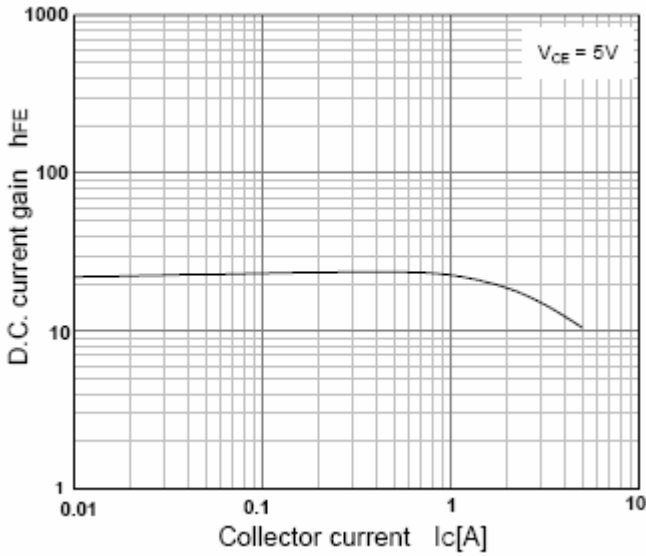
Switching Times; Resistive Load

$t_{on}$	Turn-on Time	$I_C=2.5\text{A}; I_{B1}=-I_{B2}=0.5\text{A}$ $V_{CC}=250\text{V}; R_L=100\Omega$			1.0	$\mu\text{s}$
$t_s$	Storage Time				4.0	$\mu\text{s}$
$t_f$	Fall Time				0.8	$\mu\text{s}$

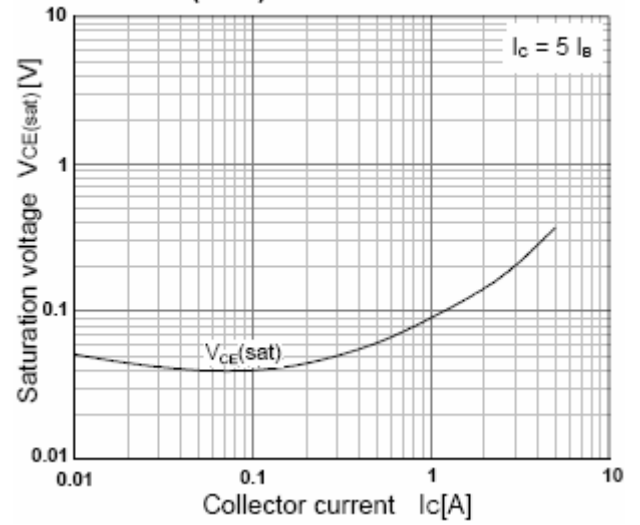
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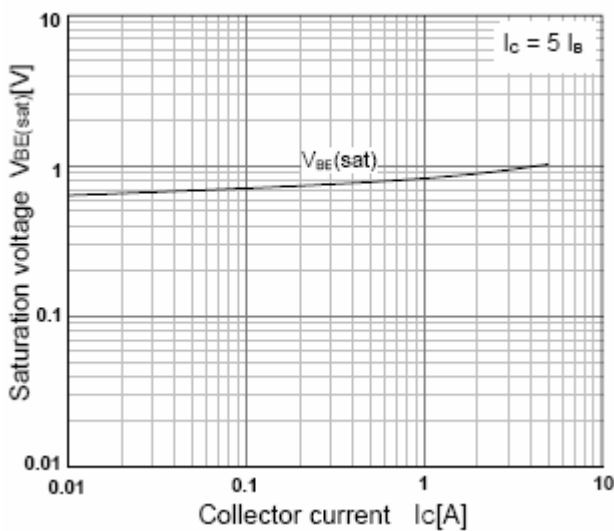
**$h_{FE}$ - $I_c$  Characteristics**



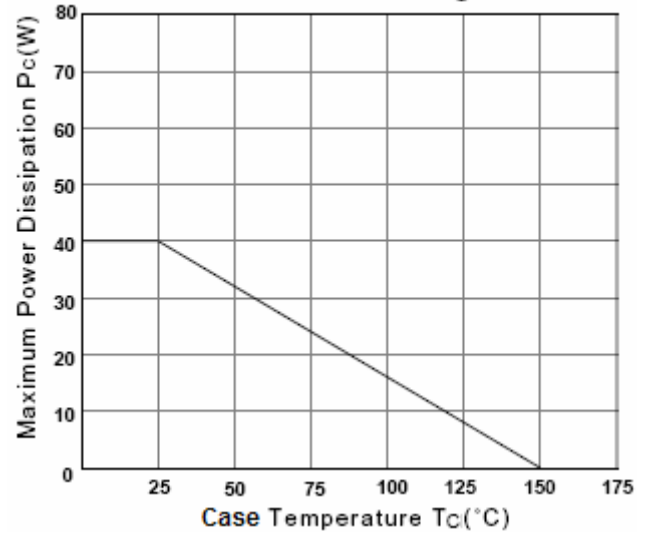
**$V_{CE(sat)}$ - $I_c$  Characteristics**



**$V_{BE(sat)}$ - $I_c$  Characteristics**



**Power Derating**



**Safe Operating Area**

