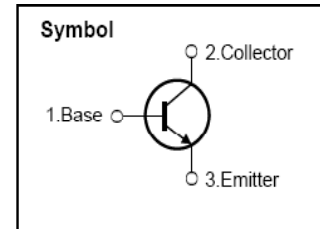
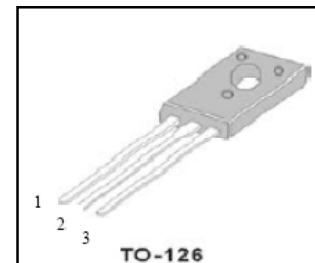


*High Voltage Fast-Switching NPN Power Transistor*
**Features**

- ◆ Very High Switching Speed
- ◆ High Voltage Capability
- ◆ Wide Reverse Bias SOA


**General Description**

This Device is designed for high voltage, High speed switching characteristics required such as lighting system, switching mode power supply.


**Absolute Maximum Ratings**

Symbol	Parameter	Test Conditions	Value	Units
$V_{CES}$	Collector-Emitter Voltage	$V_{BE} = 0$	700	V
$V_{CEO}$	Collector-Emitter Voltage	$I_B = 0$	400	V
$V_{EBO}$	Emitter-Base Voltage	$I_C = 0$	9.0	V
$I_C$	Collector Current		1.5	A
$I_{CP}$	Collector pulse Current		3.0	A
$I_B$	Base Current		0.75	A
$I_{BM}$	Base Peak Current	$t_P = 5ms$	1.5	A
$P_C$	Total Dissipation at $T_c^* = 25^\circ C$		20	W
	Total Dissipation at $T_a^* = 25^\circ C$		0.8	
$T_J$	Operation Junction Temperature		- 40 ~ 150	$^\circ C$
$T_{STG}$	Storage Temperature		- 40 ~ 150	$^\circ C$

$T_c$ : Case temperature (good cooling)

$T_a$ : Ambient temperature (without heat sink)

**Thermal Characteristics**

Symbol	Parameter	Value	Units
$R_{\theta Jc}$	Thermal Resistance Junction to Case	3.12	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	89	$^\circ C/W$

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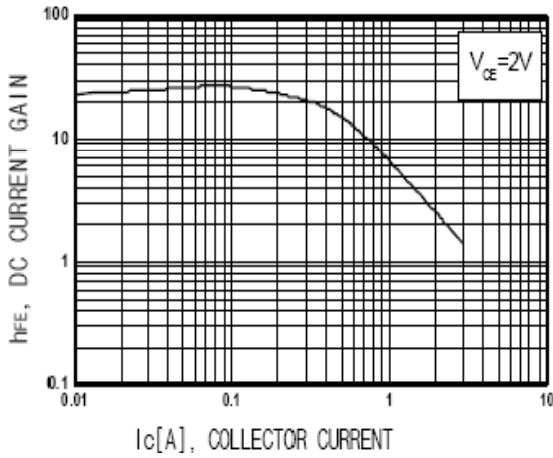
## Electrical Characteristics (T<sub>c</sub>=25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Value			Units
			Min	Typ	Max	
V <sub>CEO(sus)</sub>	Collector-Emitter Breakdown Voltage	I <sub>c</sub> =10mA, I <sub>b</sub> =0	400	-	-	V
V <sub>CE(sat)</sub>	Collector-Emitter Saturation Voltage	I <sub>c</sub> =0.5A, I <sub>b</sub> =0.1A I <sub>c</sub> =1.0A, I <sub>b</sub> =0.25A I <sub>c</sub> =1.5A, I <sub>b</sub> =0.5A	-	-	0.3 0.5 1.0	V
V <sub>BE(sat)</sub>	Base-Emitter Saturation Voltage	I <sub>c</sub> =0.5A, I <sub>b</sub> =0.1A I <sub>c</sub> =1.0A, I <sub>b</sub> =0.25A	-	-	1.0 1.2	V
I <sub>CBO</sub>	Collector-Base Cutoff Current (V <sub>be</sub> =-1.5V)	V <sub>cb</sub> =700V V <sub>cb</sub> =700V, T <sub>c</sub> =100°C	-	-	1.0 5.0	mA
h <sub>FE</sub>	DC Current Gain	V <sub>ce</sub> =2V, I <sub>c</sub> =0.5A V <sub>ce</sub> =2V, I <sub>c</sub> =1.0A	10 5	- -	30 25	
	<b>Resistive Load</b>					
t <sub>on</sub>	Turn-on Time	V <sub>CC</sub> =125V, I <sub>c</sub> =1A	-	0.2	1.0	μs
t <sub>s</sub>	Storage Time	I <sub>B1</sub> =0.2A, I <sub>B2</sub> =-0.5A T <sub>p</sub> =25μs		1.5	3.0	
t <sub>f</sub>	Fall Time			0.15	0.4	
	<b>Inductive Load</b>					
t <sub>s</sub>	Storage Time	V <sub>CC</sub> =15V, I <sub>c</sub> =1A I <sub>B1</sub> =0.2A, I <sub>B2</sub> =-0.5A L=0.35mH, V <sub>clamp</sub> =300V	-	1.2	4.0	μs
t <sub>f</sub>	Fall Time		-	0.12	0.3	
	<b>Inductive Load</b>					
t <sub>s</sub>	Storage Time	V <sub>CC</sub> =15V, I <sub>c</sub> =1A I <sub>B1</sub> =0.2A, I <sub>B2</sub> =-0.5A L=0.35mH, V <sub>clamp</sub> =300V	-	2.4	5.0	μs
t <sub>f</sub>	Fall Time	T <sub>c</sub> =100°C	-	0.15	0.4	

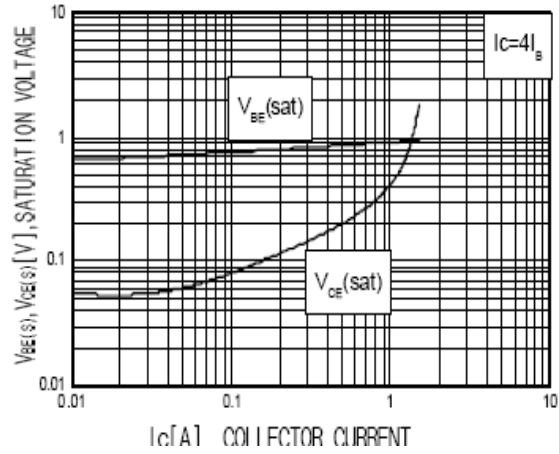
**Note:**

Pulse Test : Pulse width 300, Duty cycle 2%

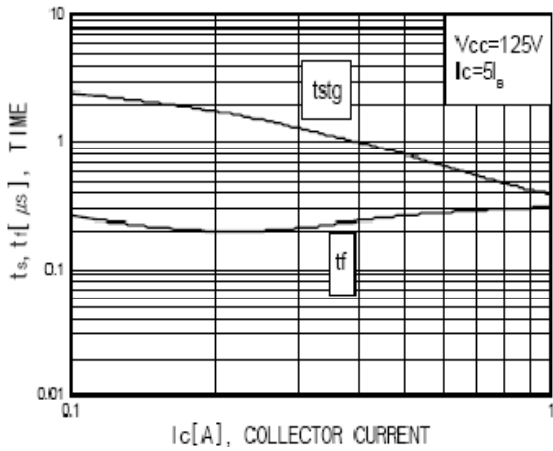
# SBR13003B3



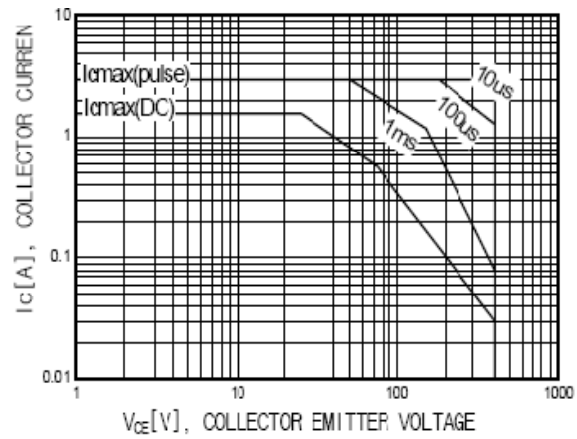
**Fig. 1 DC Current Gain**



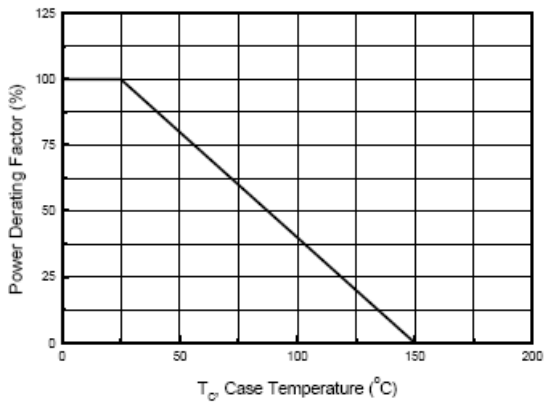
**Fig. 2 Saturation Voltage**



**Fig. 3 Switching Time**



**Fig. 4 Safe Operation Area**

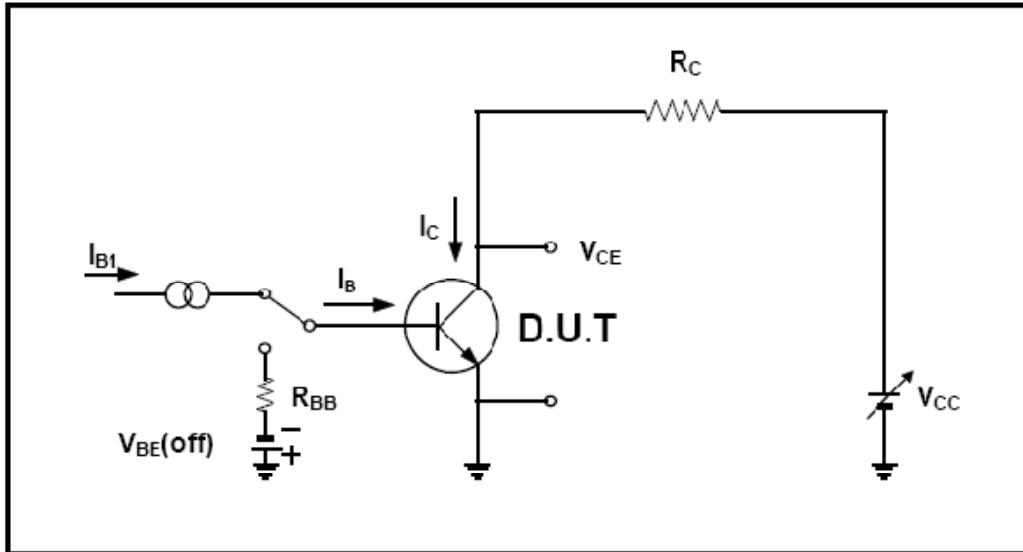


**Fig. 5 Power Derating**

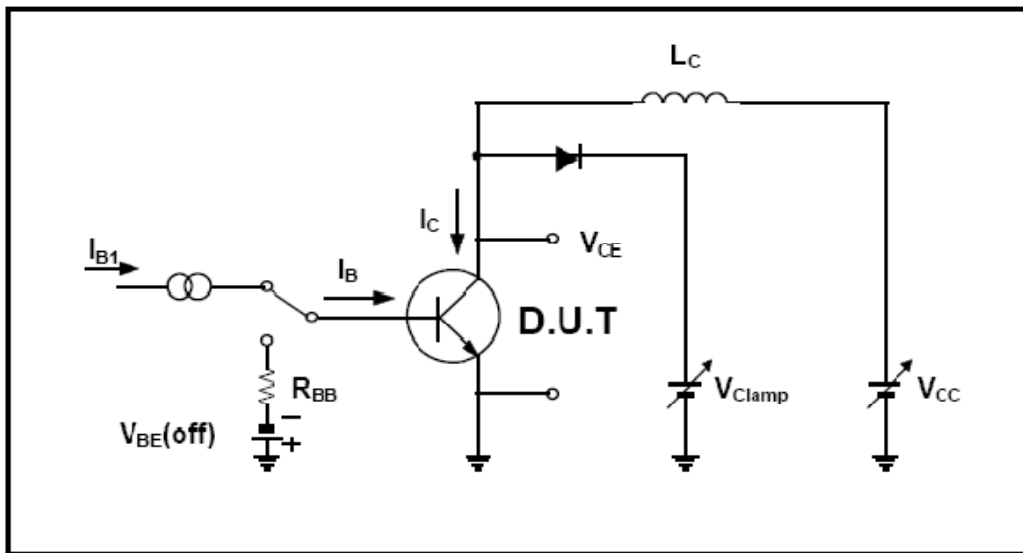


# SBR13003B3

## Resistive Load Switching Test Circuit



## Inductive Load Switching & RBSOA Test Circuit



# SBR13003B3

## TO-126 Package Dimension

Dim.	mm			Inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	7.5		7.9	0.295		0.311
B	10.8		11.2	0.425		0.441
C	14.2		14.7	0.559		0.579
D	2.7		2.9	0.106		0.114
E		3.8			0.150	
F		2.5			0.098	
G	1.2		1.5	0.047		0.059
H		2.3			0.091	
I		4.6			0.181	
J	0.48		0.62	0.019		0.024
K	0.7		0.86	0.028		0.034
L		1.4			0.055	
$\phi$		3.2			0.126	

