

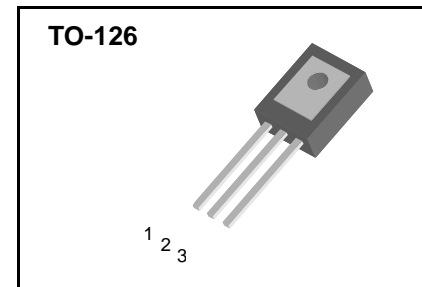
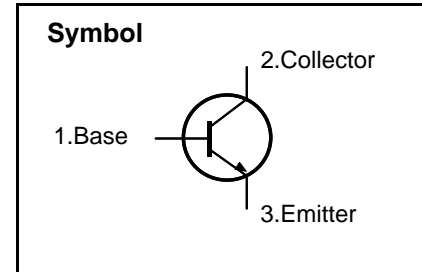
## High Voltage Fast-Switching NPN Power Transistor

### Features

Very High Switching Speed (Typical 120ns@1.0A)  
 Minimum Lot-to-Lot  $h_{FE}$  Variation  
 Low  $V_{CE(sat)}$  (Typical 200mV@1.0A/0.25A)  
 Wide Reverse Bias S.O.A

### General Description

This device is designed for high voltage, high speed switching characteristic required such as lighting system, switching regulator, inverter and deflection circuit.



### Absolute Maximum Ratings

Symbol	Parameter	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
$I_{CM}$	Collector Peak Current ( $t_P < 5$ ms )	3.0	A
$I_B$	Base Current	0.75	A
$I_{BM}$	Base Peak Current ( $t_P < 5$ ms )	1.5	A
$P_C$	Total Dissipation at $T_C = 25$ °C	40	W
$T_{STG}$	Storage Temperature	- 65 ~ 150	°C
$T_J$	Max. Operating Junction Temperature	150	°C

### Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	3.12	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	89	°C/W

# SBR13003A

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

Symbol	Parameter	Condition	Min	Typ	Max	Units
$I_{CEV}$	Collector Cut-off Current ( $V_{BE} = -1.5V$ )	$V_{CE} = 700V$ $V_{CE} = 700V$ $T_C = 100\text{ }^\circ\text{C}$	-	-	1.0 5.0	mA
$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage ( $I_B = 0$ )	$I_C = 10\text{ mA}$	400	-	-	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 0.5A$ $I_B = 0.1A$ $I_C = 1.0A$ $I_B = 0.25A$ $I_C = 1.5A$ $I_B = 0.5A$	-	-	0.3 0.5 1.0	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 0.5A$ $I_B = 0.1A$ $I_C = 1.0A$ $I_B = 0.25A$	-	-	1.0 1.2	V
$h_{FE}$	DC Current Gain	$I_C = 0.5A$ $V_{CE} = 2V$ $I_C = 1.0A$ $V_{CE} = 2V$	10 5	-	30 25	
$t_{on}$ $t_s$ $t_f$	<b>Resistive Load</b> Turn-On Time Storage Time Fall Time	$I_C = 1.0A$ $V_{CC} = 125V$ $I_{B1} = 0.2A$ $I_{B2} = -0.2A$ $T_P = 25\mu s$	-	0.2 1.5 0.15	1.0 3.0 0.4	$\mu s$
$t_s$ $t_f$	<b>Inductive Load</b> Storage Time Fall Time	$V_{CC} = 15V$ $I_C = 1.0A$ $I_{B1} = 0.2A$ $I_{B2} = -0.5A$ $L = 0.35mH$ $V_{clamp} = 300V$	-	2.0 0.12	4.0 0.3	$\mu s$
$t_s$ $t_f$	<b>Inductive Load</b> Storage Time Fall Time	$V_{CC} = 15V$ $I_C = 1.0A$ $I_{B1} = 0.2A$ $I_{B2} = -0.5A$ $L = 0.35mH$ $V_{clamp} = 300V$ $T_C = 100\text{ }^\circ\text{C}$	-	2.4 0.15	5.0 0.4	$\mu s$

### Notes :

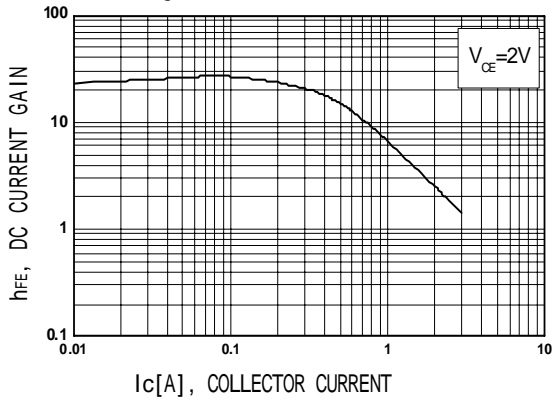
Pulse Test : Pulse width 300 $\mu s$ , Duty cycle 2%

SBR13003A-1 Hfe 13-20( $I_C = 0.5A$   $V_{CE} = 2V$ )

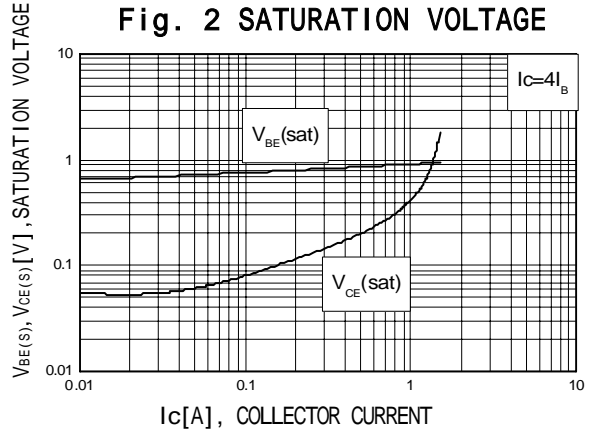
SBR13003A-2 Hfe 18-26( $I_C = 0.5A$   $V_{CE} = 2V$ )



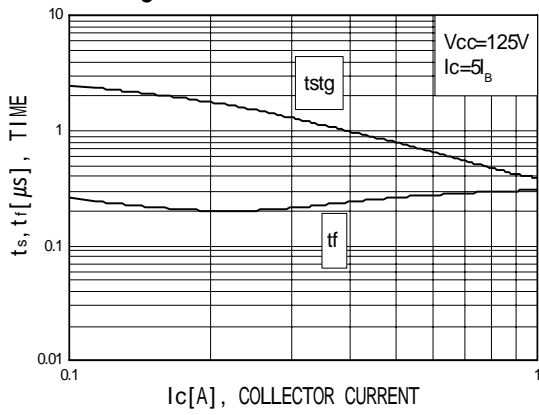
**Fig.1 DC CURRENT GAIN**



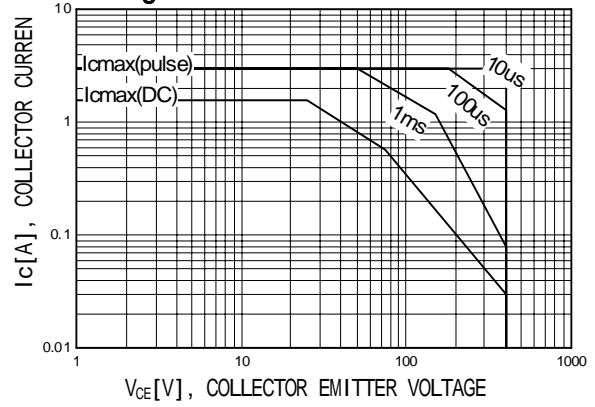
**Fig. 2 SATURATION VOLTAGE**



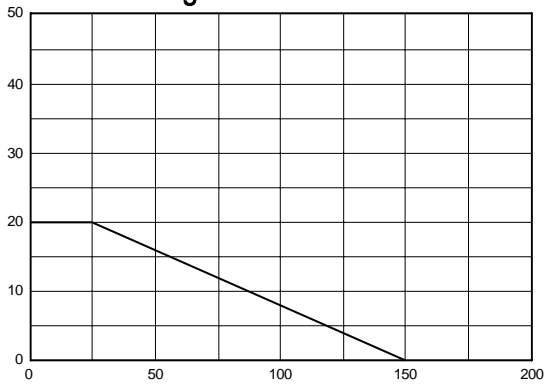
**Fig.3. SWICING TIME**



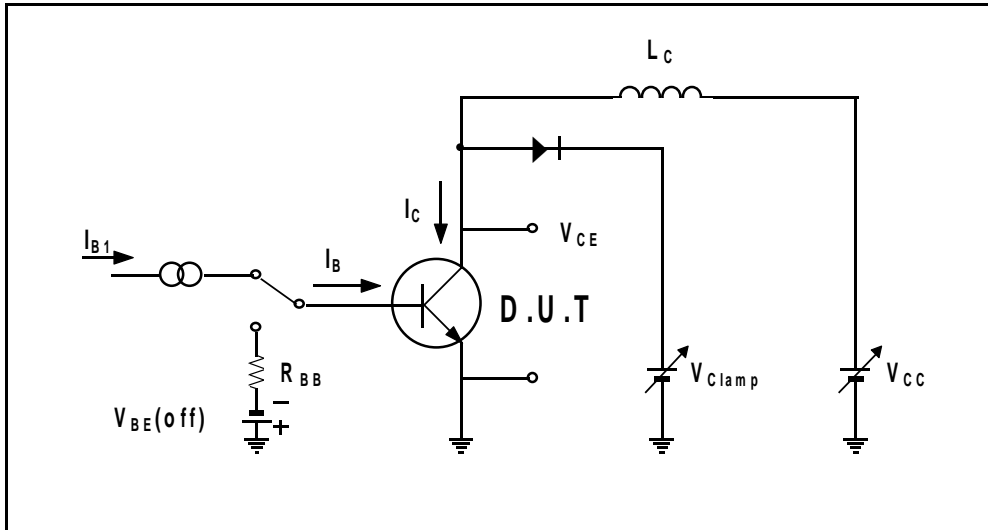
**Fig. 4 SAFE OPERATING AREA**



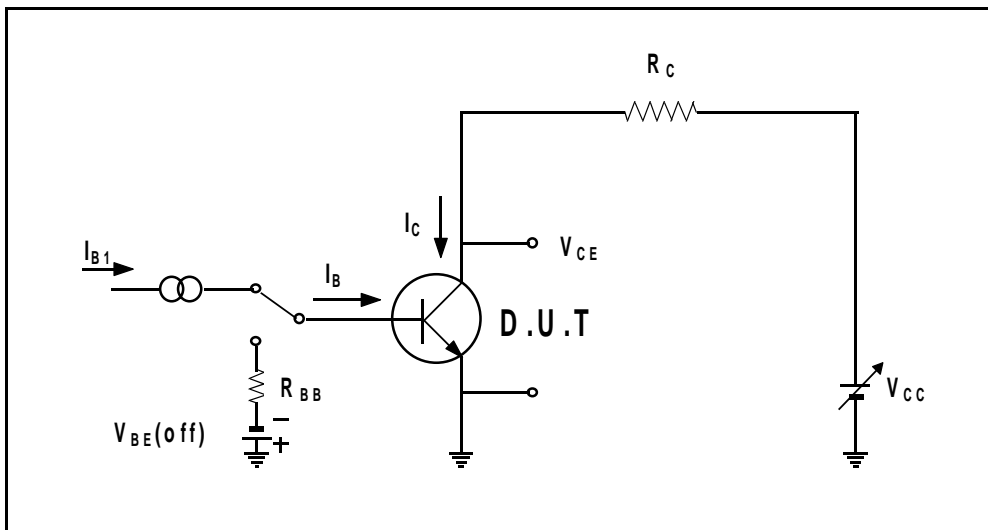
**Fig. 5 POWER DERATING**



## Inductive Load Switching & RBSOA Test Circuit



## Resistive Load Switching Test Circuit



# SBR13003A

## 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	
		3.2			0.126	

