

High Voltage Fast-Switching NPN Power Transistor

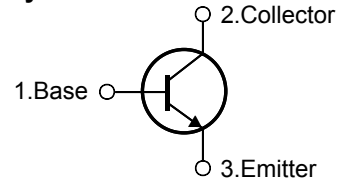
Features

- Very High Switching Speed (Typical 60ns@5.0A)
- Minimum Lot-to-Lot hFE Variation
- Low VCE(sat) (Typical 390mV@5.0A/1.0A)
- Wide Reverse Bias S.O.A

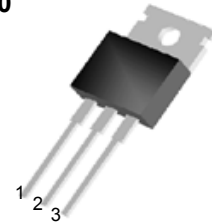
General Description

This device is designed for high voltage, high speed switching characteristic required such as switching mode power supply.

Symbol



TO-220



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	8.0	A
I_{CM}	Collector Peak Current ($t_p < 5$ ms)	16	A
I_B	Base Current	4.0	A
I_{BM}	Base Peak Current ($t_p < 5$ ms)	8.0	A
P_C	Total Dissipation at $T_C = 25$ °C	80	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	1.56	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	°C/W

SBP13007-H2

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	$I_C = 2.0A$ $I_B = 0.4A$ $I_C = 5.0A$ $I_B = 1.0A$ $I_C = 8.0A$ $I_B = 2.0A$ $I_C = 5.0A$ $I_B = 1.0A$ $T_C = 100\text{ }^{\circ}\text{C}$	-	-	0.5 1.0 2.5 2.5	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 2.0A$ $I_B = 0.4A$ $I_C = 5.0A$ $I_B = 1.0A$ $I_C = 5.0A$ $I_B = 1.0A$ $T_C = 100\text{ }^{\circ}\text{C}$	-	-	1.2 1.6 1.5	V
h_{FE}	DC Current Gain	$I_C = 2.0A$ $V_{CE} = 5V$ $I_C = 5.0A$ $V_{CE} = 5V$	10 5	-	40 40	
t_s t_f	Resistive Load Storage Time Fall Time	$I_C = 5.0A$ $V_{CC} = 125V$ $I_{B1} = 1.0A$ $I_{B2} = -1.0A$ $T_P = 25\mu s$	-	1.5 0.17	3.0 0.4	μs
t_s t_f	Inductive Load Storage Time Fall Time	$V_{CC} = 15V$ $I_C = 5.0A$ $I_{B1} = 1.0A$ $I_{B2} = -2.5A$ $L_C = 0.35mH$ $V_{clamp} = 300V$	-	0.8 0.06	2.0 0.12	μs
t_s t_f	Inductive Load Storage Time Fall Time	$V_{CC} = 15V$ $I_C = 5.0A$ $I_{B1} = 1.0A$ $I_{B2} = -2.5A$ $L_C = 0.35mH$ $V_{clamp} = 300V$ $T_C = 100\text{ }^{\circ}\text{C}$	-	1.0 0.07	3.0 0.15	μs

※ Notes :

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



Fig 1. Static Characteristics

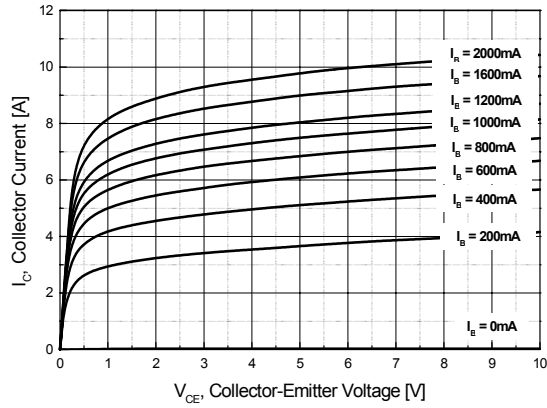


Fig 2. DC Current Gain

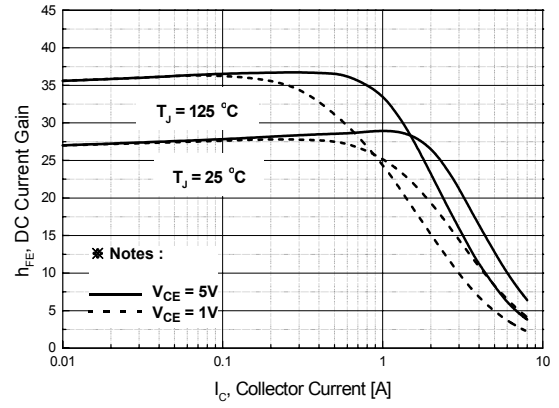


Fig 3. Collector-Emitter Saturation Voltage

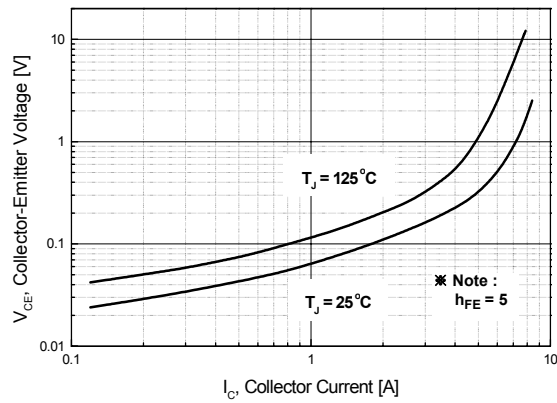


Fig 4. Base-Emitter Saturation Voltage

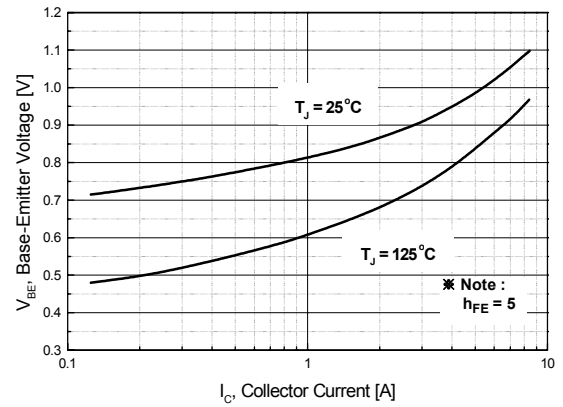


Fig 5. Resistive Load Fall Time

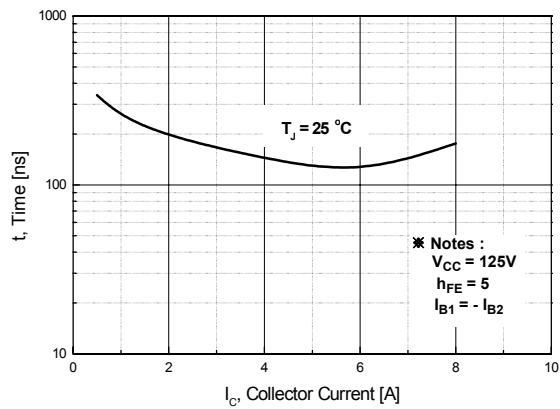
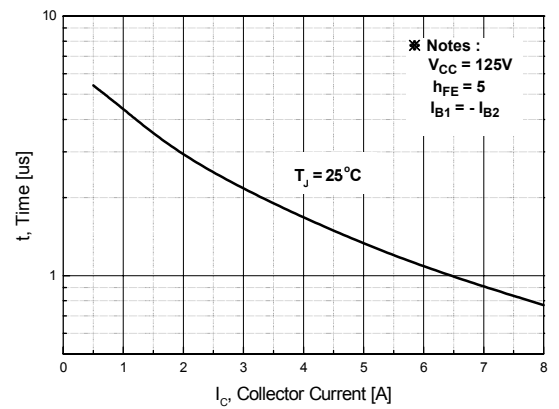


Fig 6. Resistive Load Storage Time



SBP13007-H2

Fig 7. Safe Operation Areas

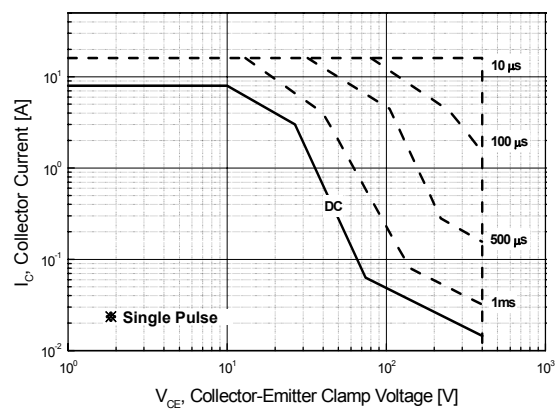


Fig 8. Reverse Biased Safe Operation Areas

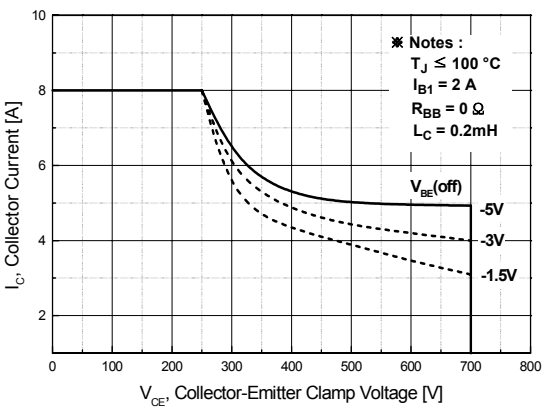
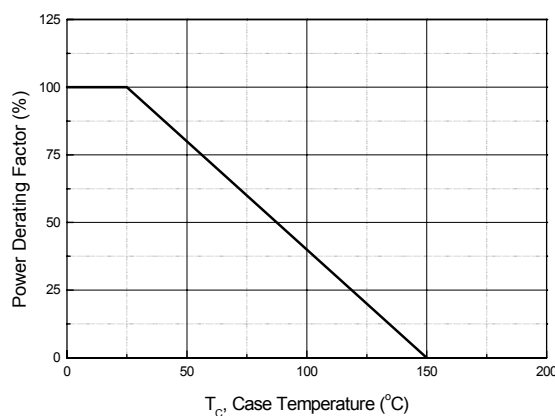
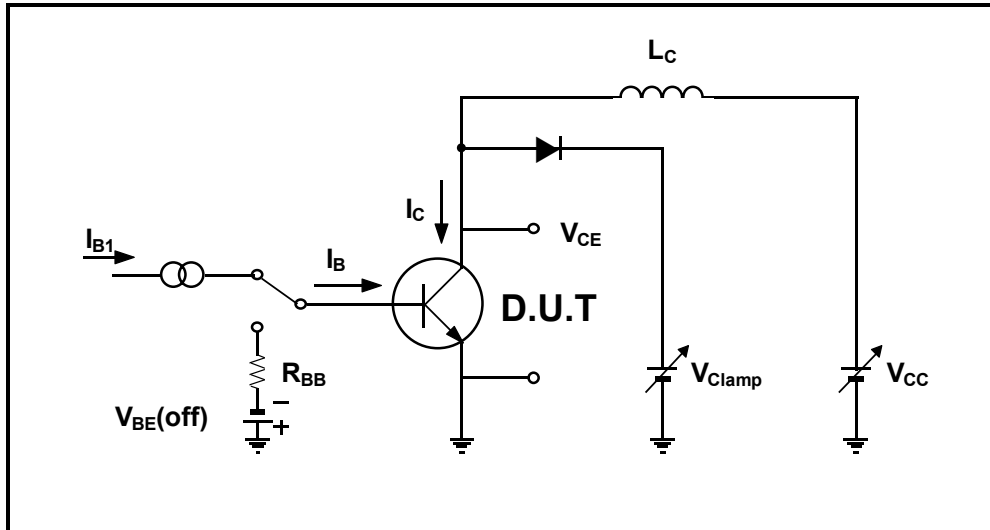


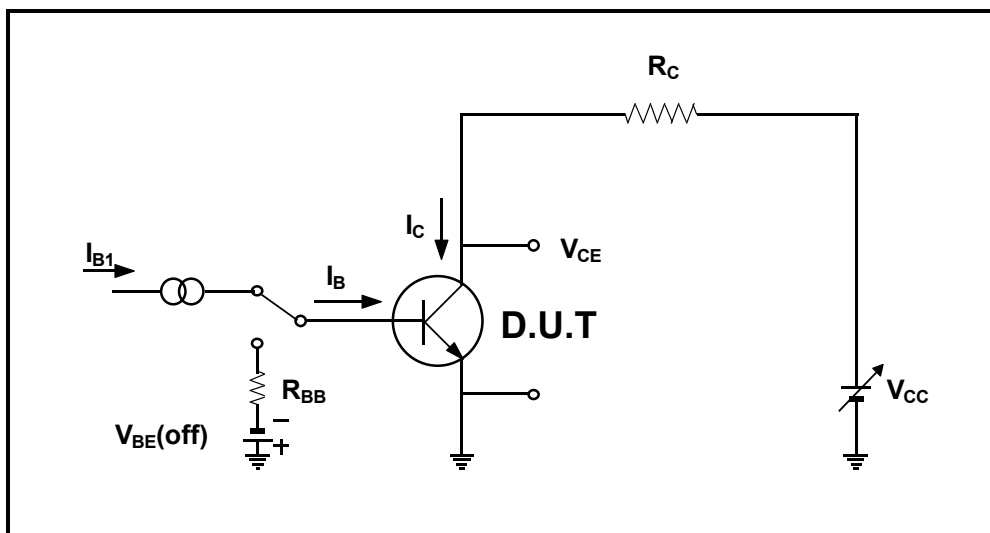
Fig 9. Power Derating Curve



Inductive Load Switching & RBSOA Test Circuit



Resistive Load Switching Test Circuit



SBP13007-H2

TO-220 Package Dimension

Dim.	mm			Inch		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	9.7		10.1	0.382		0.398
B	6.3		6.7	0.248		0.264
C	9.0		9.47	0.354		0.373
D	12.8		13.3	0.504		0.524
E	1.2		1.4	0.047		0.055
F		1.7			0.067	
G		2.5			0.098	
H	3.0		3.4	0.118		0.134
I	1.25		1.4	0.049		0.055
J	2.4		2.7	0.094		0.106
K	5.0		5.15	0.197		0.203
L	2.2		2.6	0.087		0.102
M	1.42		1.62	0.056		0.064
N	0.45		0.6	0.018		0.024
O	0.7		0.9	0.027		0.035
ϕ		3.6			0.142	

