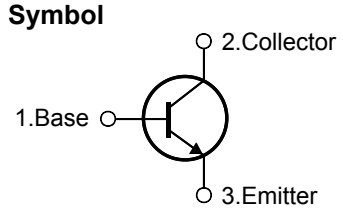
SBP13009

High Voltage Fast-Switching NPN Power Transistor

Features

- Very High Switching Speed (Typical 40ns@8.0A)
- Minimum Lot-to-Lot hFE Variation
- Low VCE(sat) (Typical 320mV@8.0A/1.6A)
- Wide Reverse Bias S.O.A

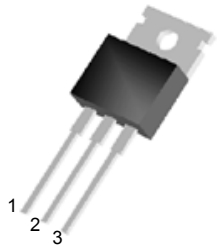
Symbol



General Description

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

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	12	A
I_{CM}	Collector Peak Current (t_P < 10 ms)	25	A
I_B	Base Current	6.0	A
I_{BM}	Base Peak Current (t_P < 10 ms)	12	A
P_C	Total Dissipation at T_C = 25 °C	100	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	1.25	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	40	°C/W

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Electrical Characteristics (T_C = 25 °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 °C	-	-	1.0 5.0	mA
$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage (I_B = 0)	I_C = 10 mA	400	-	-	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 5.0A I_B = 1.0A I_C = 8.0A I_B = 1.6A I_C = 12A I_B = 3.0A I_C = 8.0A I_B = 1.6A T_C = 100 °C	-	-	0.5 1.0 1.5 2.0	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	I_C = 5.0A I_B = 1.0A I_C = 8.0A I_B = 1.6A I_C = 8.0A I_B = 1.6A T_C = 100 °C	-	-	1.2 1.6 1.5	V
h_{FE}	DC Current Gain	I_C = 5.0A V_{CE} = 5V I_C = 8.0A V_{CE} = 5V	10 6	-	30 30	
t_s t_f	**Resistive Load** Storage Time Fall Time	I_C = 8.0A V_{CC} = 125V I_{B1} = 1.6A I_{B2} = - 1.6A T_P = 25μS	-	1.5 0.16	3.0 0.4	μS
t_s t_f	**Inductive Load** Storage Time Fall Time	V_{CC} = 15V I_C = 8.0A I_{B1}= 1.6A $V_{BE(off)}$ = 5V L_C = 0.2mH V_{clamp} = 300V	-	0.6 0.04	2.0 0.1	μS
t_s t_f	**Inductive Load** Storage Time Fall Time	V_{CC} = 15V I_C = 8.0A I_{B1}= 1.6A $V_{BE(off)}$ = 5V L_C = 0.2mH V_{clamp} = 300V T_C = 100 °C	-	0.8 0.05	2.5 0.15	μS

※ Notes :

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

Fig 1. Static Characteristics

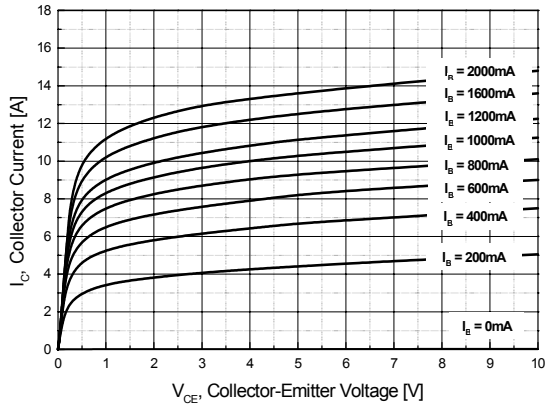


Fig 2. DC Current Gain

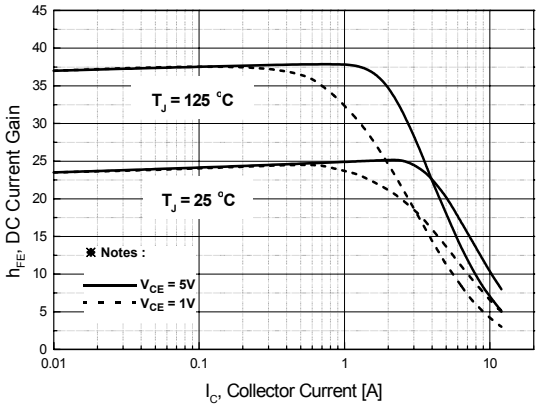


Fig 3. Collector-Emitter Saturation Voltage

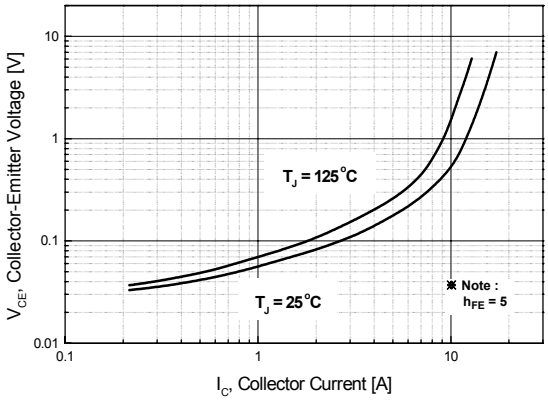


Fig 4. Base-Emitter Saturation Voltage

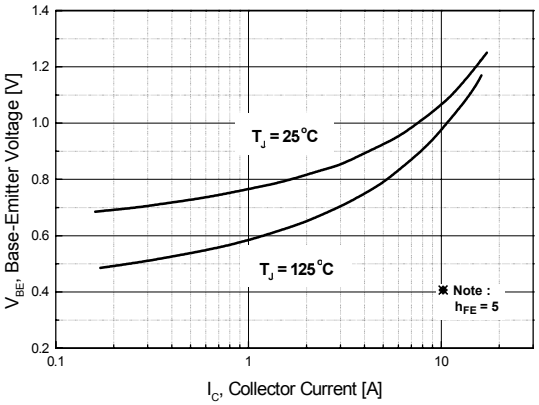


Fig 5. Resistive Load Fall Time

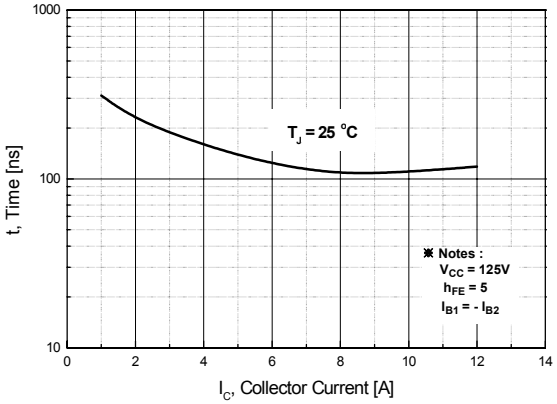


Fig 6. Resistive Load Storage Time

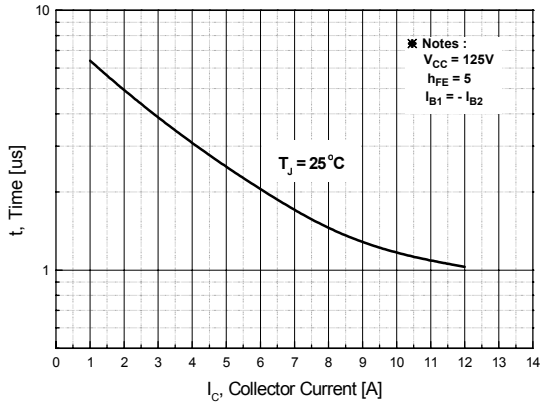


Fig 7. Safe Operation Areas

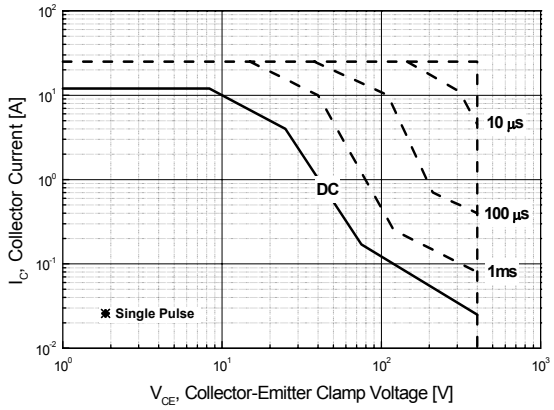


Fig 8. Reverse Biased Safe Operation Areas

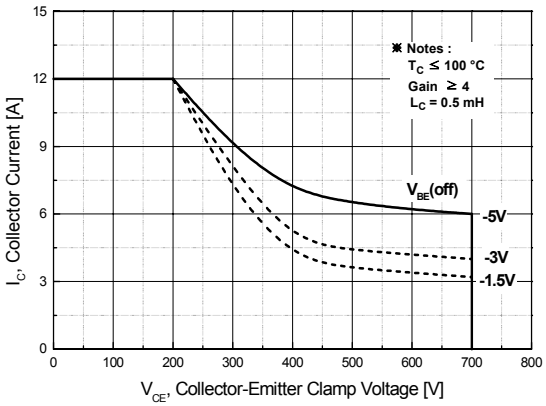
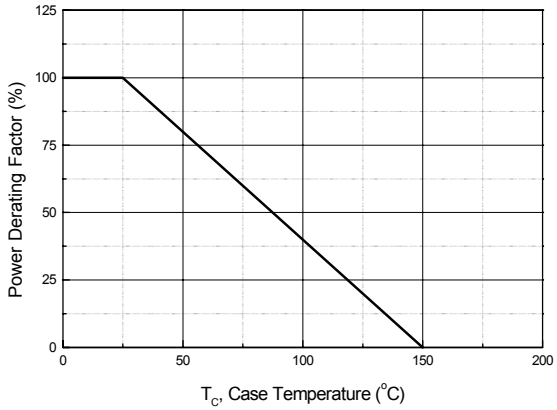
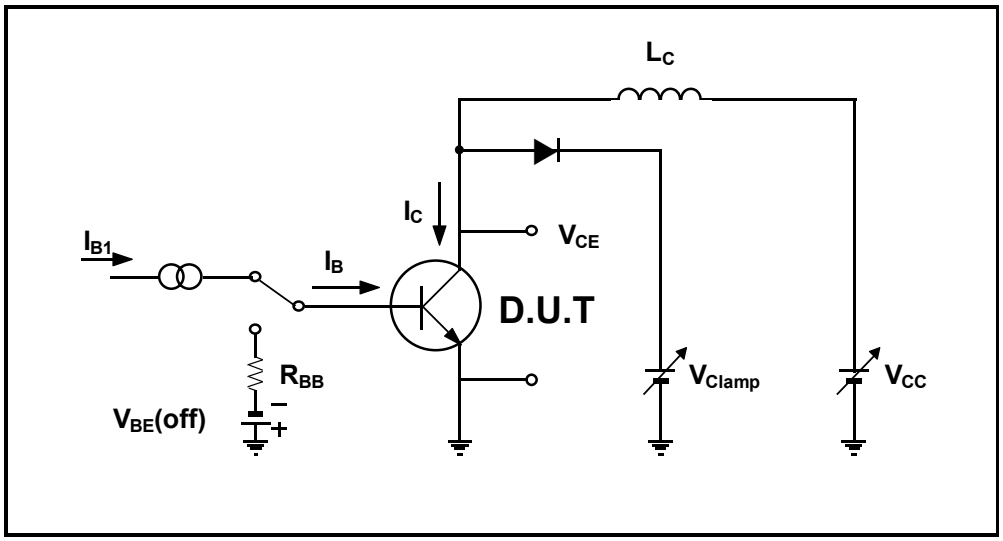


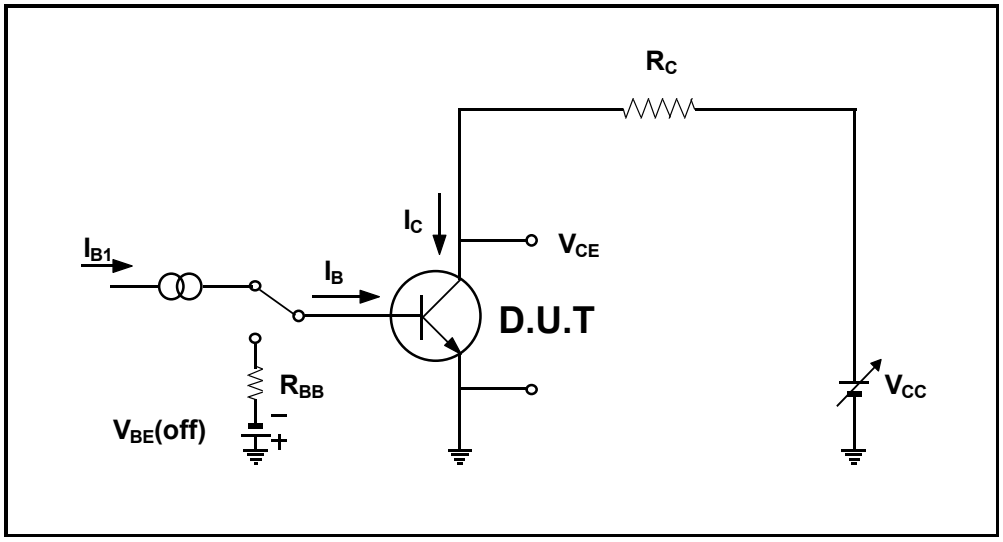
Fig 9. Power Derating Curve



Inductive Load Switching & RBSOA Test Circuit



Resistive Load Switching Test Circuit



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	

