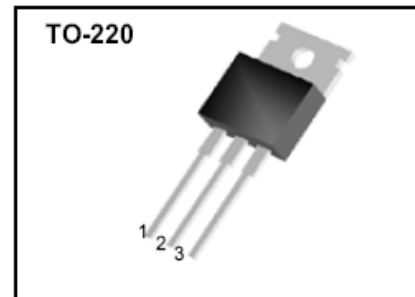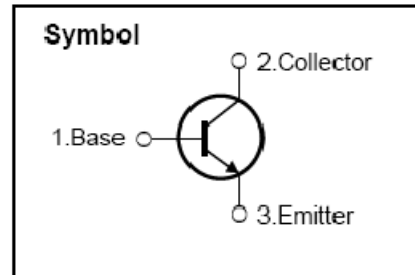# SBP13009A

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		12	A
I_{CP}	Collector pulse Current		25	A
I_B	Base Current		6.0	A
I_{BM}	Base Peak Current	$t_P = 5ms$	12	A
P_C	Total Dissipation at TC = 25℃		100	W
	Total Dissipation at TA = 25℃		2.3	
T_J	Operation Junction Temperature		- 40 ~ 150	℃
T_{STG}	Storage Temperature		- 40 ~ 150	℃

Tc: Case temperature (good cooling)

Ta: Ambient temperature (without heat sink)

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta Jc}$	Thermal Resistance Junction to Case	1.25	℃/W
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	40	℃/W

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Electrical Characteristics (T$_C$=25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Value			Units
			Min	Typ	Max	
V$_{CEO(sus)}$	Collector-Emitter Breakdown Voltage	Ic=10mA,Ib=0	400	-	-	V
V$_{CE(sat)}$	Collector-Emitter Saturation Voltage	Ic=5.0A,Ib=1.0A Ic=8.0A,Ib=1.6A Ic=12A,Ib=3.0A	-	-	0.5 1.0 1.5	V
		Ic=8.0A,Ib=1.6A Tc=100℃	-	-	2.0	V
V$_{BE(sat)}$	Base-Emitter Saturation Voltage	I Ic=5.0A,Ib=1.0A Ic=8.0A,Ib=1.6A	-	-	1.2 1.6	V
		Ic=8.0A,Ib=1.6A Tc=100℃	-	-	1.5	V
I$_{CBO}$	Collector-Base Cutoff Current (Vbe=-1.5V)	Vcb=700V Vcb=700V, Tc=100℃	-	-	1.0 5.0	mA
h$_{FE}$	DC Current Gain	Vce=5V,Ic=5.0A Vce=5V, Ic=8.0A	10 6	- -	40 40	
ts tf	**Resistive Load** Storage Time Fall Time	V$_{CC}$=125V , Ic=6.0A I$_{B1}$=1.6A , I$_{B2}$=-1.6A Tp=25μs	- 	 1.5 0.17	 3.0 0.4	μs
ts tf	**Inductive Load** Storage Time Fall Time	V$_{CC}$=15V ,Ic=5A I$_{B1}$=1.6A , Vbe(off)=5V L=0.35mH,V$_{clamp}$=300V	- -	0.8 0.04	2.0 0.1	μs
ts tf	**Inductive Load** Storage Time Fall Time	V$_{CC}$=15V ,Ic=1A I$_{B1}$=0.4A , Vbe(off)=5V L=0.2mH,Vclamp=300V Tc=100℃	- -	0.8 0.05	2.5 0.15	μs

Note:

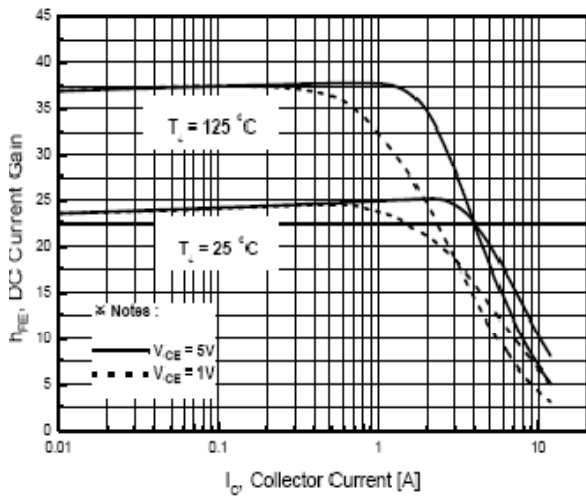Pulse Test : Pulse width 300, Duty cycle 2%

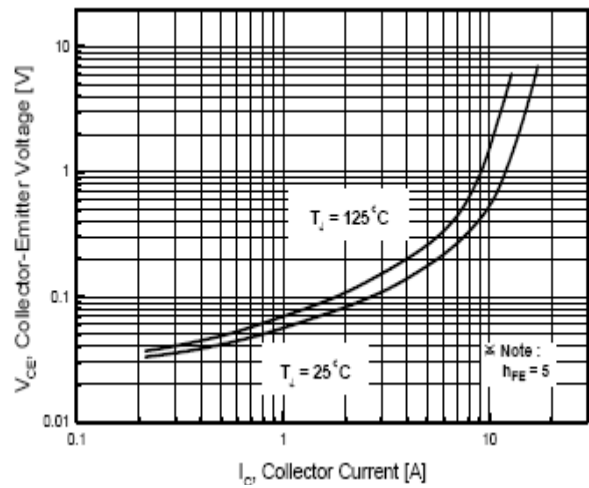Fig. 1 DC Current Gain

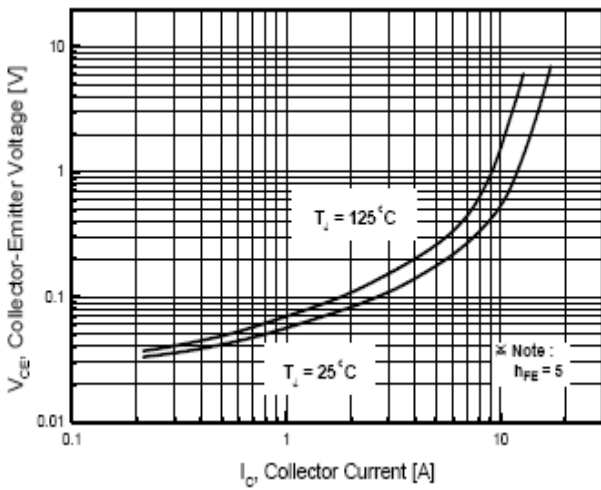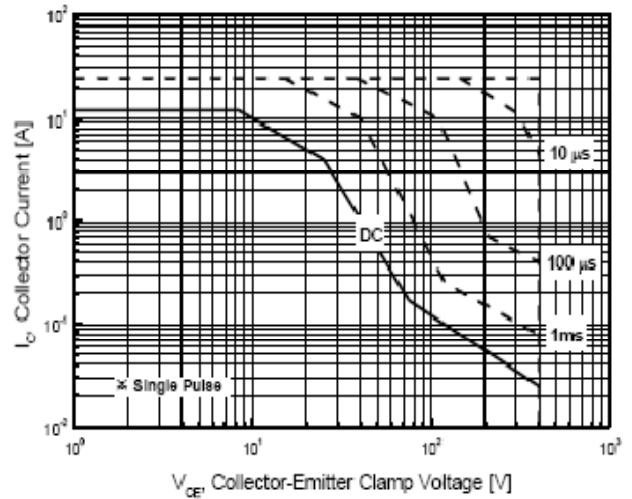Fig. 2 Collector-Emitter Saturation Voltage

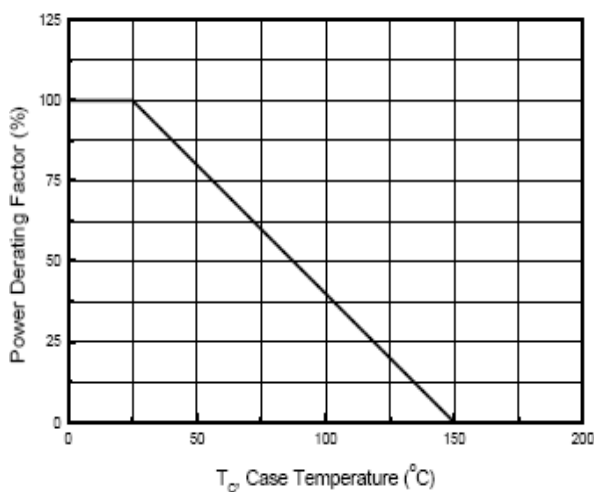Fig. 3 Base--Emitter Saturation Voltage
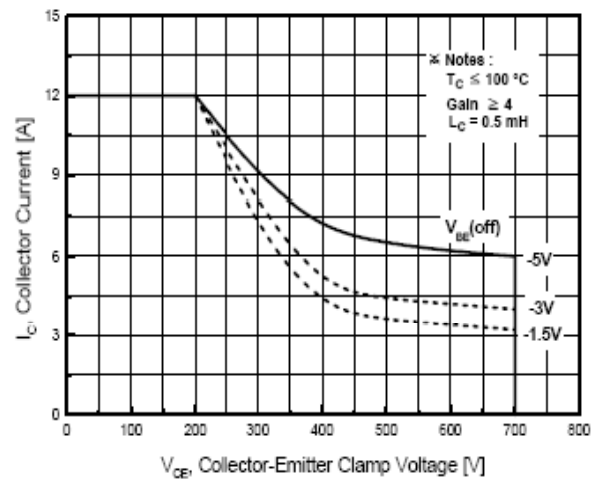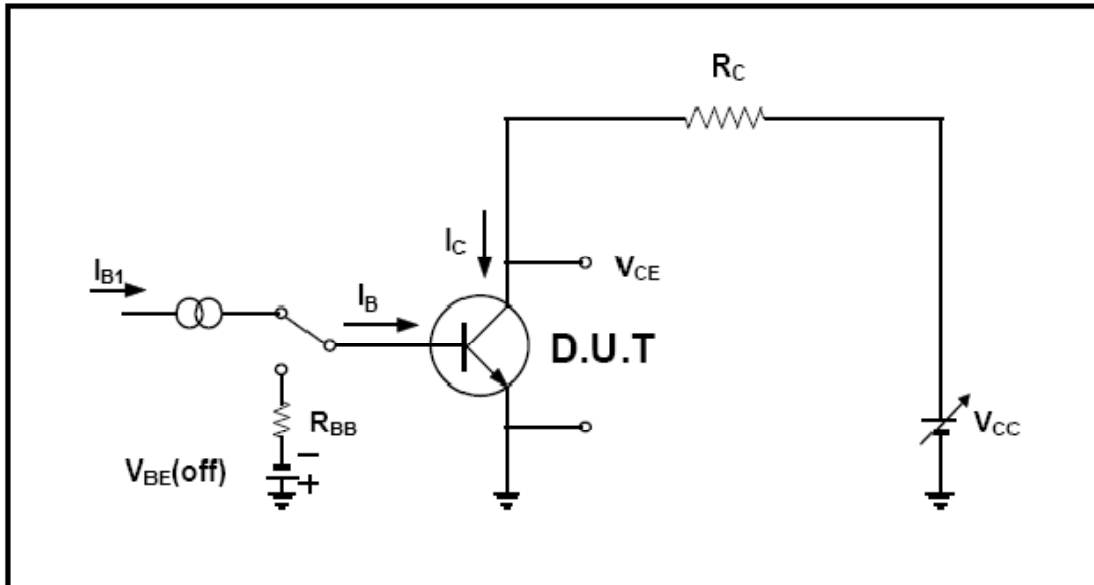

Fig. 4   Safe Operation Area

Fig.5 Power Derating
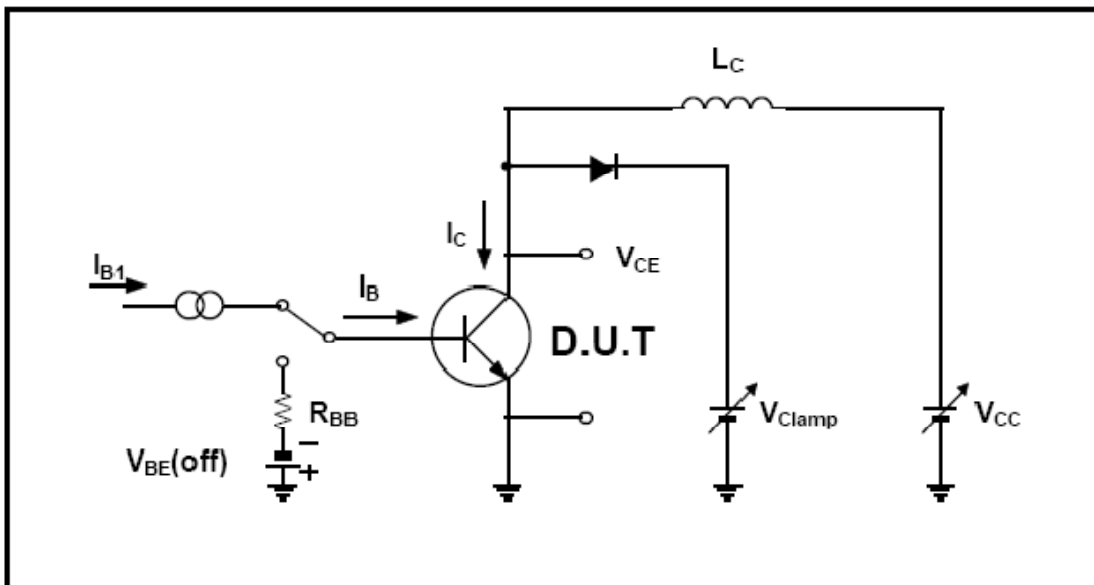

Fig.6 Reverse Biased Safe Operation Area

SBP13009A

Resistive Load Switching Test Circuit

Inductive Load Switching & RBSOA Test Circuit

TO-220 Package Dimension

Unit: mm