

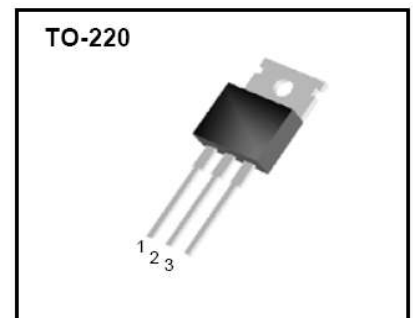
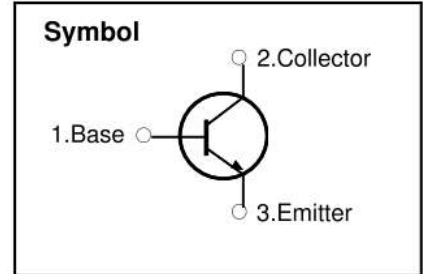
## High Voltage Fast Switching NPN

### Features

- ◆ Very High Switching Speed
- ◆ Minimum lot to lot  $h_{FE}$  Variation
- ◆ 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 ( $T_J = 25^\circ\text{C}$  unless otherwise specified)

Symbol	Parameter	Condition	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		4.0	A
$I_{CP}$	Collector pulse Current		8.0	A
$I_B$	Base Current		2.0	A
$I_{BM}$	Base Peak Current	$t_p = 5\text{ms}$	4.0	A
$P_C$	Total Dissipation at $T_C = 25^\circ\text{C}$		75	W
$T_J$	Operation Junction Temperature		- 40 ~ 150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature		- 40 ~ 150	$^\circ\text{C}$

### Thermal Characteristics

Symbol	Parameter	Ratings	Unit
$R_{\theta JC}$	Thermal Resistance Junction to Case	1.67	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	62.5	$^\circ\text{C}/\text{W}$

# SBP13005-S

Electrical Characteristics ( TC = 25°C Unless otherwise noted)

Symbol	Items	Conditions	Ratings			Unit
			Min	Typ.	Max	
$I_{CEV}$	Collector Cut-off Current ( $V_{BE} = -1.5V$ )	$V_{CE} = 700V$			1.0	mA
		$V_{CE} = 700V$ TC = 100°C			5.0	
$V_{CEO(SUS)}$	Collector-Emitter Sustaining Voltage	$I_B = 0, I_C = 10mA$	400			V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 1.0A, I_B = 0.2A$			0.5	mA
		$I_C = 2.0A, I_B = 0.5A$			0.6	
		$I_C = 4.0A, I_B = 1.0A$			1.0	
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 1.0A, I_B = 0.2A$			1.2	mA
		$I_C = 2.0A, I_B = 0.5A$			1.6	
$h_{FE}$	DC Current Gain	$I_C = 1.0A, V_{CE} = 5V$	20		40	
		$I_C = 2.0A, V_{CE} = 5V$	10		30	
$t_s$	Storage Time	$I_C = 2.0A, V_{CC} = 125V$			4.0	$\mu S$
$t_f$	Fall Time	$I_{B1} = 0.4A, I_{B2} = -0.4A$ $T_P = 25us$			0.9	

Fig. 1 DC Current Gain

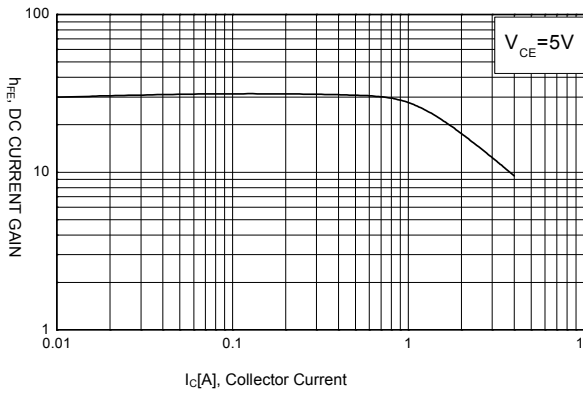


Fig. 2 Saturation Voltage

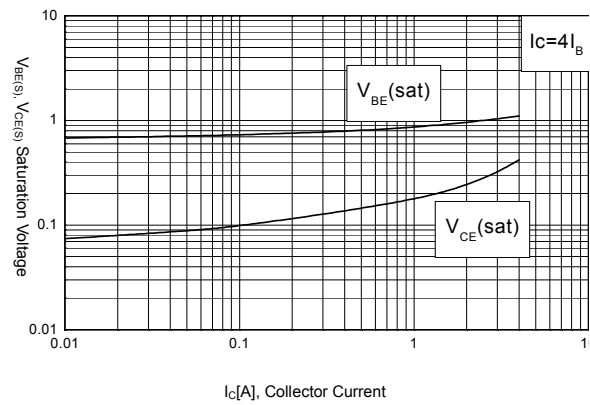


Fig. 3 Power Derating

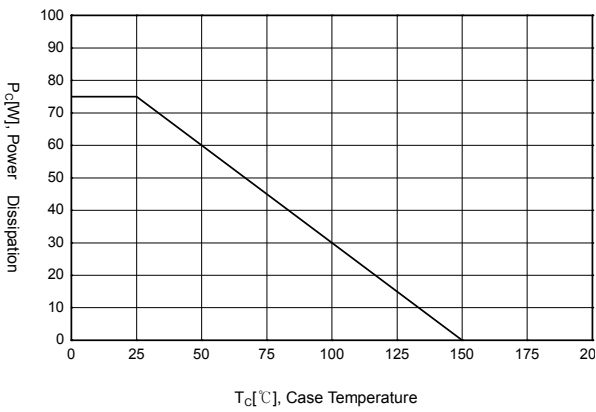


Fig. 4 Safe Operation Area

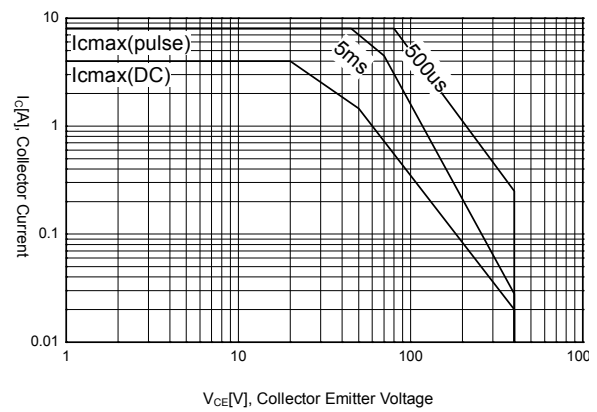
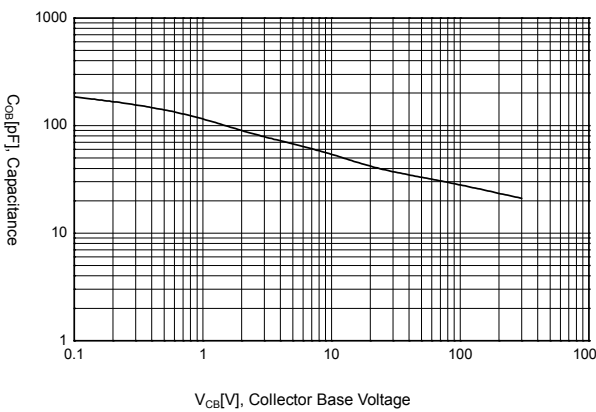


Fig. 5 Collect output capacitance



# SBP13005-S

## 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	1.25		1.55	0.049		0.061
N	0.45		0.6	0.018		0.024
O	0.6		1.0	0.024		0.039
$\phi$		3.6			0.142	

