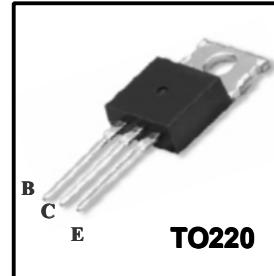


### *High Voltage Fast-Switching NPN Power Transistor*

#### **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 and inverters motor controls

#### **Absolute Maximum Ratings**

Symbol	Parameter	Test Conditions	Value	Units
$V_{CES}$	Collector-Emitter Voltage	$V_{BE} = 0$	600	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		24	A
$I_B$	Base Current		6.0	A
$I_{BM}$	Base Peak Current	$t_P = 5\text{ms}$	12	A
$P_c$	Total Dissipation at $T_C = 25^\circ\text{C}$		100	W
$T_J$	Operation Junction Temperature		150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature		- 65 ~ 150	$^\circ\text{C}$

#### **Thermal Characteristics**

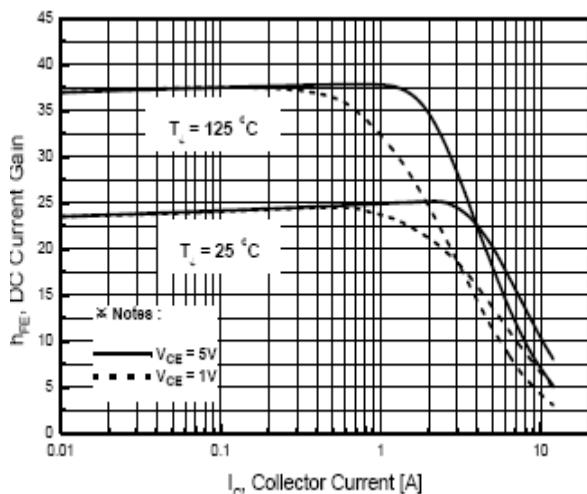
Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance Junction to Case	1.25	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	40	$^\circ\text{C/W}$

**Electrical Characteristics** ( $T_c=25^\circ C$  unless otherwise noted)

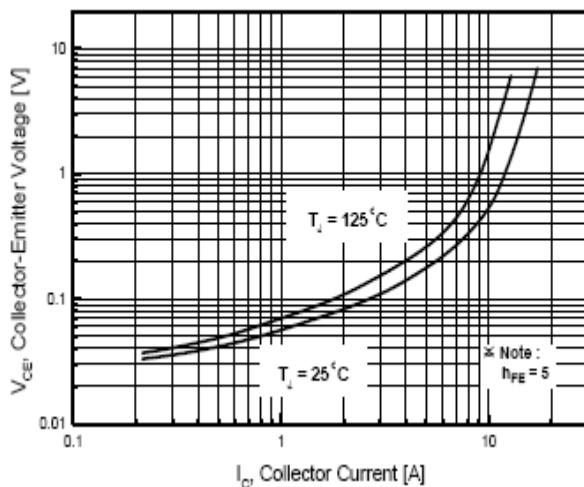
Symbol	Parameter	Test Conditions	Value			Units
			Min	Typ	Max	
$V_{CEO(sus)}$	Collector-Emitter Breakdown Voltage	$I_c=10mA, I_b=0$	400	-	-	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_c=5.0A, I_b=1.0A$	-	-	1.0	V
		$I_c=8.0A, I_b=1.6A$			1.5	
		$I_c=12A, I_b=3.0A$			3.0	
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_c=5.0A, I_b=1.0A$	-	-	1.2	V
		$I_c=8.0A, I_b=1.6A$			1.6	
$I_{CBO}$	Collector-Base Cutoff Current ( $V_{be}=-1.5V$ )	$V_{cb}=600V$	-	-	100	nA
$h_{FE}$	DC Current Gain	$V_{ce}=5V, I_c=5.0A$	8	-	40	
		$V_{ce}=5V, I_c=8.0A$	6	-	-	
$t_s$ $t_f$	Resistive Load Storage Time Fall Time	$V_{cc}=125V, I_c=6.0A$ $I_{B1}=1.6A, I_{B2}=-1.6A$ $T_p=25\mu s$	-	1.5 0.17	3.0 0.4	$\mu s$
$t_s$ $t_f$	Inductive Load Storage Time Fall Time	$V_{cc}=15V, I_c=5A$ $I_{B1}=1.6A, V_{be(off)}=5V$ $L=0.35mH, V_{clamp}=300V$	- -	0.8 0.04	2.0 0.1	$\mu s$
$t_s$ $t_f$	Inductive Load Storage Time Fall Time	$V_{cc}=15V, I_c=1A$ $I_{B1}=0.4A, V_{be(off)}=5V$ $L=0.2mH, V_{clamp}=300V$ $T_c=100^\circ C$	- -	0.8 0.05	2.5 0.15	$\mu s$

**Note:**

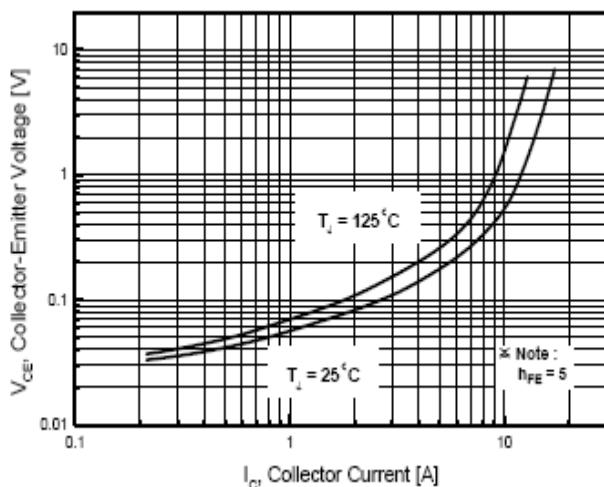
Pulse Test : Pulse width 300, Duty cycle 2%



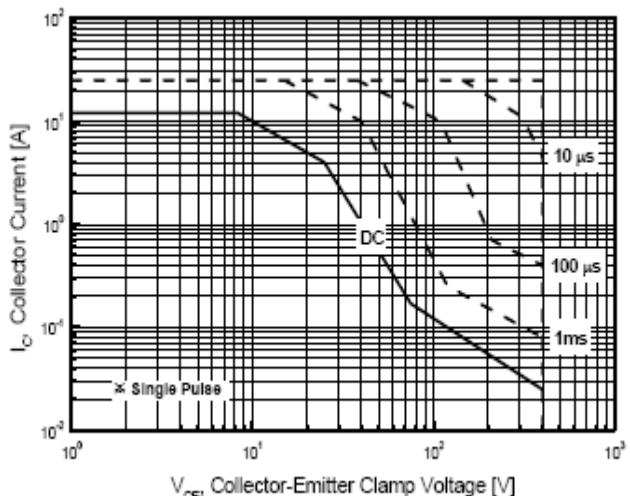
**Fig. 1 DC Current Gain**



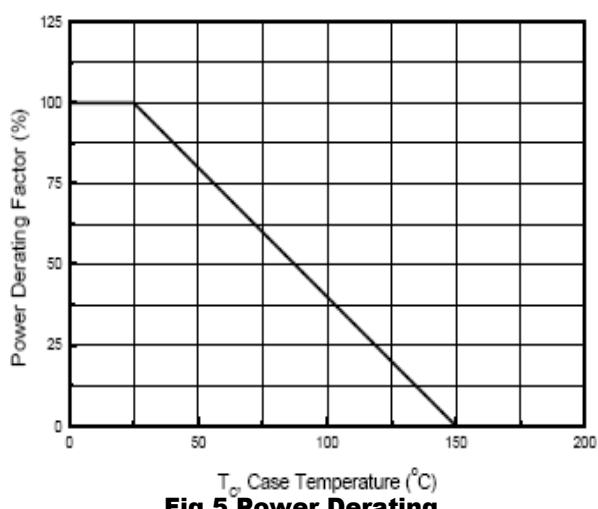
**Fig. 2 Collector-Emitter Saturation Voltage**



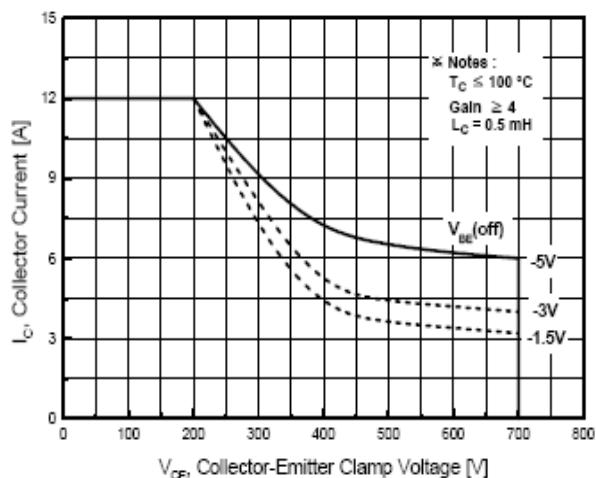
**Fig. 3 Base-Emitter Saturation Voltage**



**Fig. 4 Safe Operation Area**

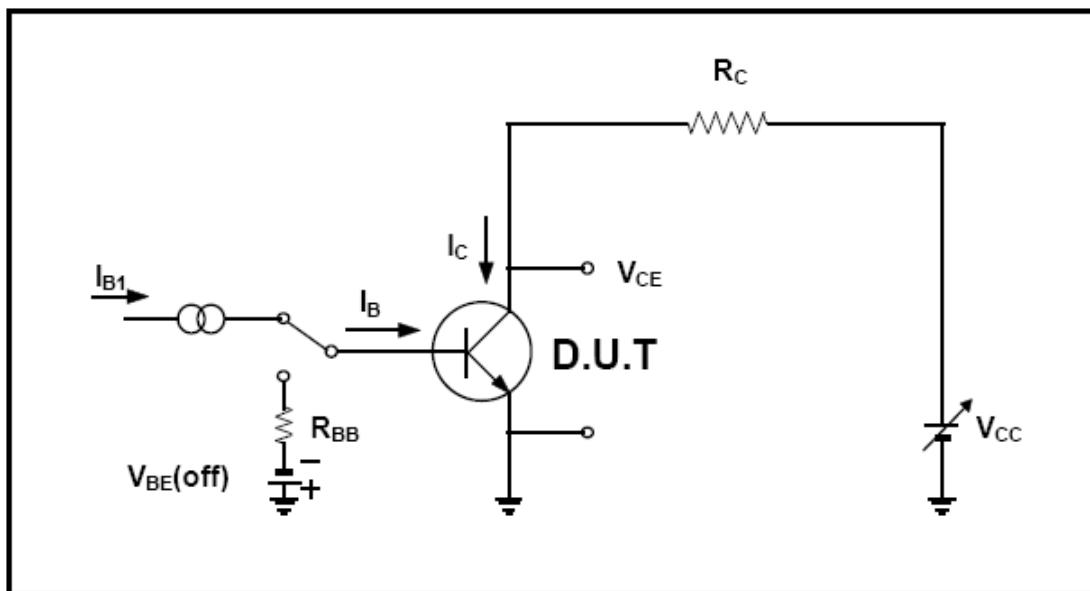


**Fig. 5 Power Derating**

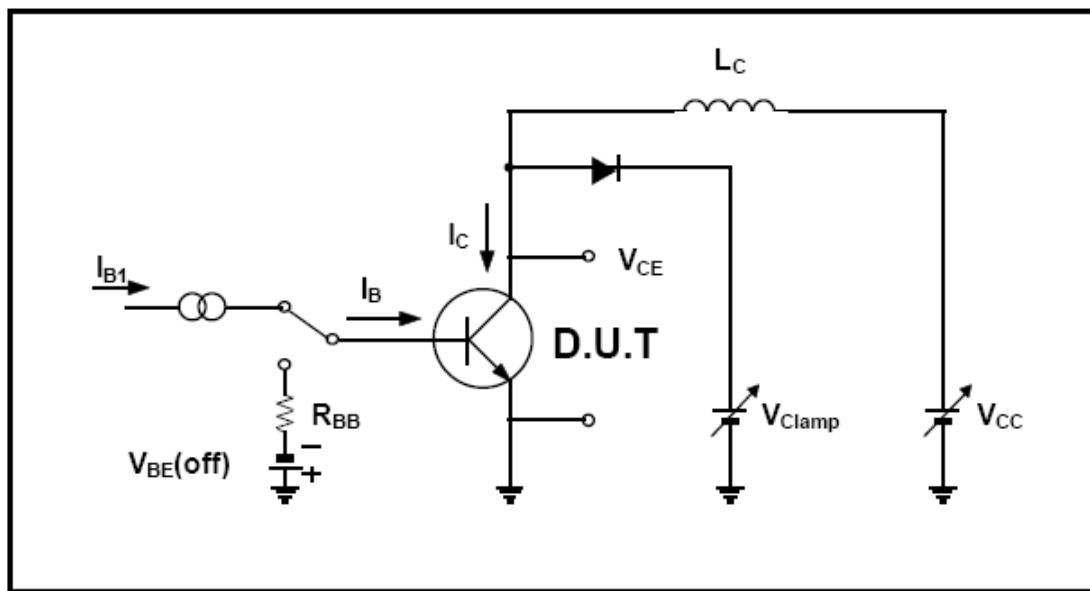


**Fig. 6 Reverse Biased Safe Operation Area**

### Resistive Load Switching Test Circuit



### Inductive Load Switching & RBSOA Test Circuit



**TO-220 Package Dimension**