

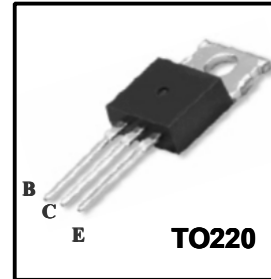
## *High Voltage Fast-Switching NPN Power Transistor*

### 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		8.0	A
$I_{CP}$	Collector pulse Current		16	A
$I_B$	Base Current		4.0	A
$I_{BM}$	Base Peak Current	$t_p = 5ms$	8.0	A
$P_C$	Total Dissipation at $T_c = 25^\circ C$		80	W
	Total Dissipation at $T_a = 25^\circ C$		2.05	
$T_J$	Operation Junction Temperature		- 40 ~ 150	$^\circ C$
$T_{STG}$	Storage Temperature		- 40 ~ 150	$^\circ C$

$T_c$ : Case temperature (good cooling)

$T_a$ : Ambient temperature (without heat sink)

### Thermal Characteristics

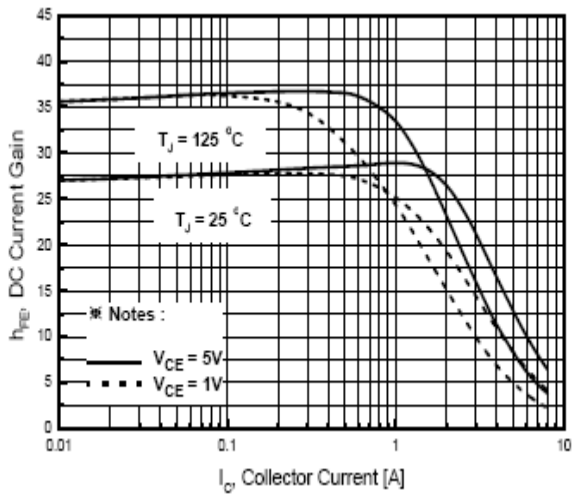
Symbol	Parameter	Value	Units
$R_{\theta Jc}$	Thermal Resistance Junction to Case	1.56	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	62.5	$^\circ C/W$

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

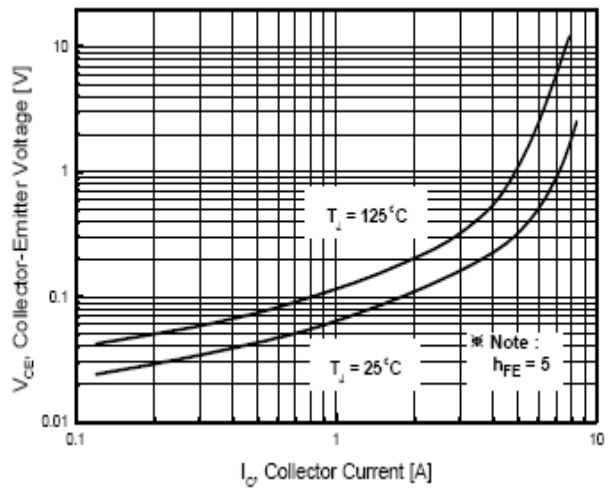
Symbol	Parameter	Test Conditions	Value			Units
			Min	Typ	Max	
$V_{CEO(sus)}$	Collector-Emitter Breakdown Voltage	$I_c=10\text{mA}, I_b=0$	400	-	-	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_c=2.0\text{A}, I_b=0.4\text{A}$	-	-	1.0	V
		$I_c=5.0\text{A}, I_b=1.0\text{A}$	-	-	2.0	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_c=8.0\text{A}, I_b=2.0\text{A}$	-	-	3.0	V
		$I_c=5.0\text{A}, I_b=1.0\text{A}$ $T_c=100^\circ\text{C}$	-	-	2.5	
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_c=2.0\text{A}, I_b=0.4\text{A}$	-	-	1.2	V
		$I_c=5.0\text{A}, I_b=1.0\text{A}$	-	-	1.6	
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_c=5.0\text{A}, I_b=1.0\text{A}$ $T_c=100^\circ\text{C}$	-	-	1.5	V
$I_{CBO}$	Collector-Base Cutoff Current ( $V_{be}=-1.5\text{V}$ )	$V_{cb}=700\text{V}$	-	-	1.0	mA
		$V_{cb}=700\text{V}, T_c=100^\circ\text{C}$	-	-	5.0	
$h_{FE}$	DC Current Gain	$V_{ce}=5\text{V}, I_c=2.0\text{A}$	10	-	40	
		$V_{ce}=5\text{V}, I_c=5.0\text{A}$	5	-	40	
$t_s$ $t_f$	Resistive Load Storage Time Fall Time	$V_{CC}=125\text{V}, I_c=5.0\text{A}$ $I_{B1}=1.0\text{A}, I_{B2}=-1.0\text{A}$ $T_p=25\mu\text{s}$	-	1.5	3.0	$\mu\text{s}$
				0.17	0.4	
$t_s$ $t_f$	Inductive Load Storage Time Fall Time	$V_{CC}=15\text{V}, I_c=5\text{A}$ $I_{B1}=1.0\text{A}, I_{B2}=-2.5\text{A}$ $L=0.35\text{mH}, V_{clamp}=300\text{V}$	-	0.8	2.0	$\mu\text{s}$
			-	0.06	0.12	
$t_s$ $t_f$	Inductive Load Storage Time Fall Time	$V_{CC}=15\text{V}, I_c=1\text{A}$ $I_{B1}=0.4\text{A}, I_{B2}=-1.0\text{A}$ $L=0.35\text{mH}, V_{clamp}=300\text{V}$ $T_c=100^\circ\text{C}$	-	1.0	3.0	$\mu\text{s}$
			-	0.07	0.15	

**Note:**

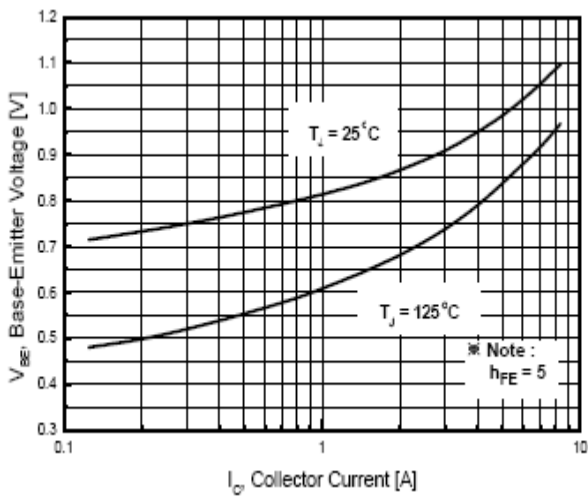
Pulse Test : Pulse width 300, Duty cycle 2%



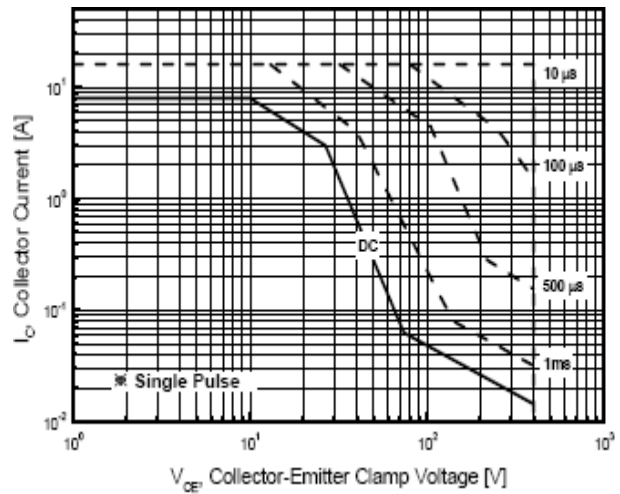
**Fig. 1 DC Current Gain**



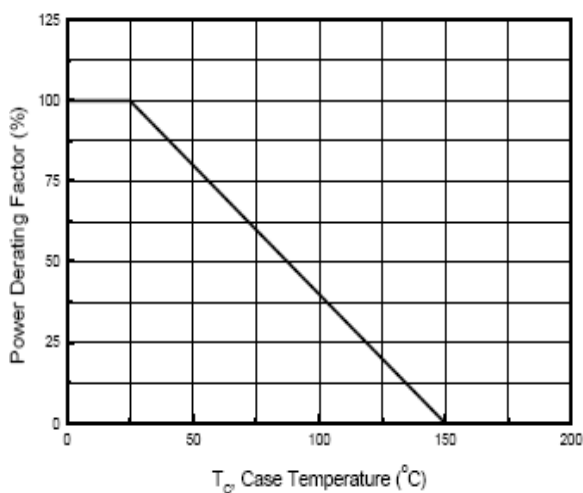
**Fig. 2 Collector-Emitter Saturation Voltage**



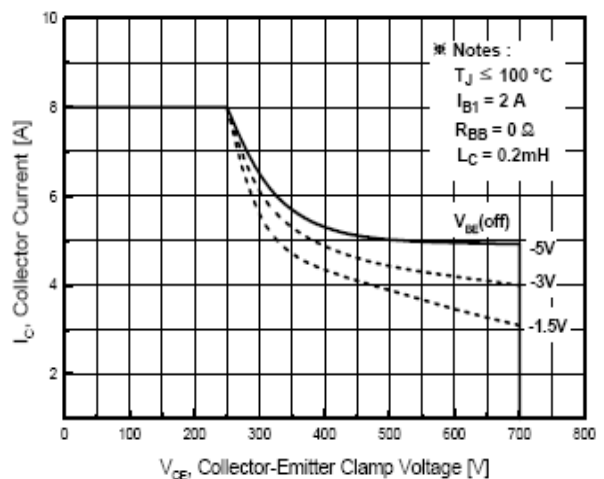
**Fig. 3 Base-Emitter Saturation Voltage**



**Fig. 4 Safe Operation Area**

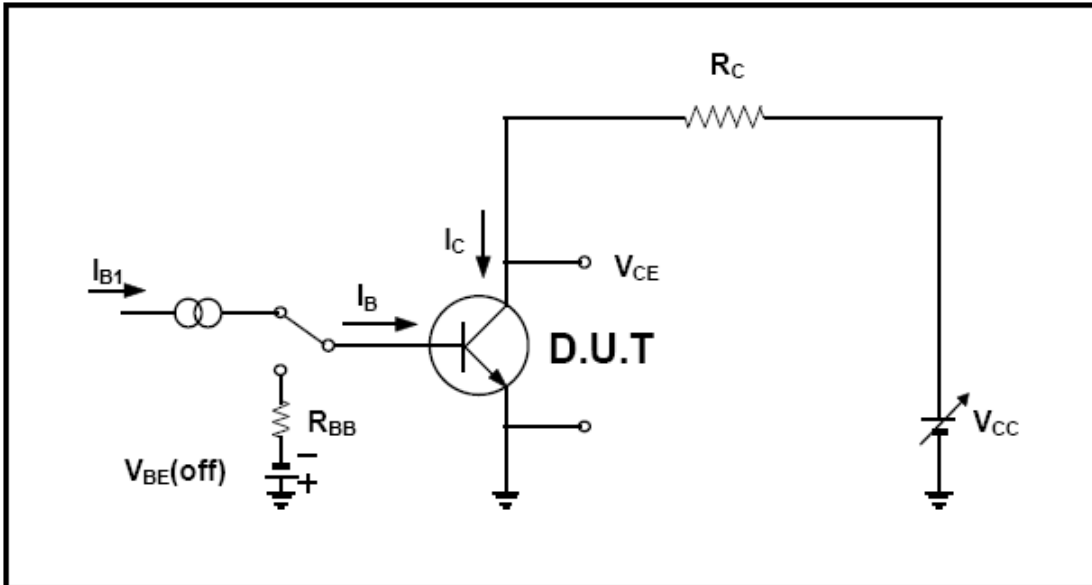


**Fig. 5 Power Derating**

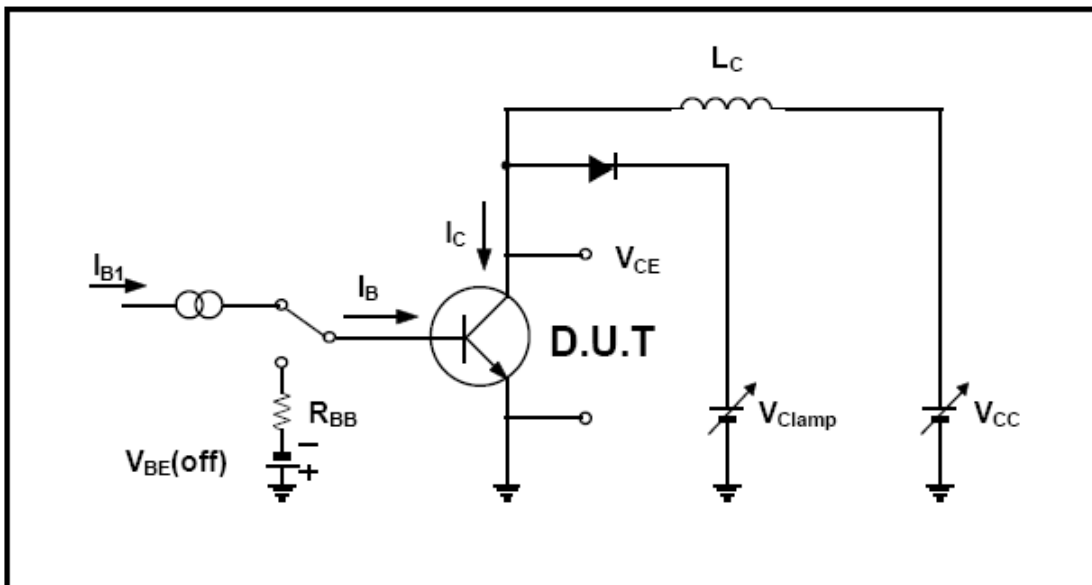


**Fig. 6 Reverse Biased Safe Operation Area**

**Resistive Load Switching Test Circuit**



**Inductive Load Switching & RBSOA Test Circuit**



## TO-220 Package Dimension

