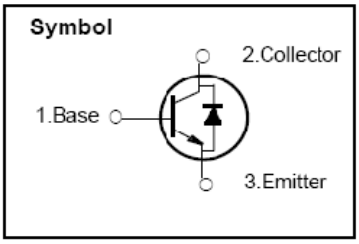
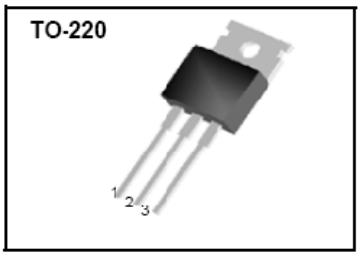
High Voltage Fast-Switching NPN Power Transistor

Features

- Very High Switching Speed
- High Voltage Capability
- Wide Reverse Bias SOA
- Built-in free wheeling diode





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℃		2.2	
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

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
f_T	Current Gain Bandwidth Product	I_C=0.5A ,V_{CE}=10V	4	-	-	MHz
V_F	Diode Forward Voltage	I_F=2A	-	-	2.5	V
C_{OB}	Output Capacitance	I_C=0.5A ,V_{CE}=10V	-	6.5		pF

Note:

Pulse Test : Pulse width 300, Duty cycle 2%

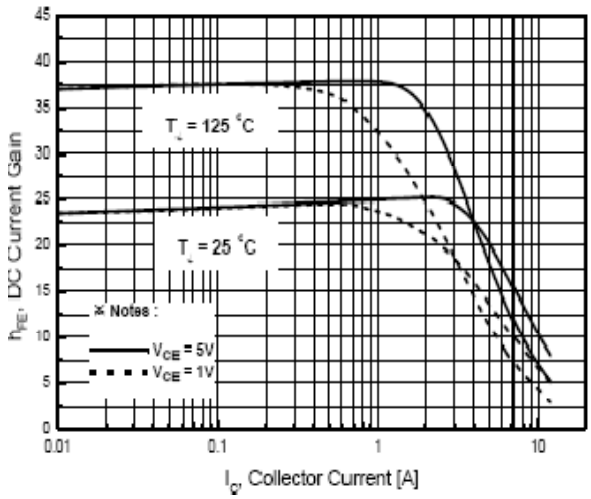


Fig. 1 DC Current Gain

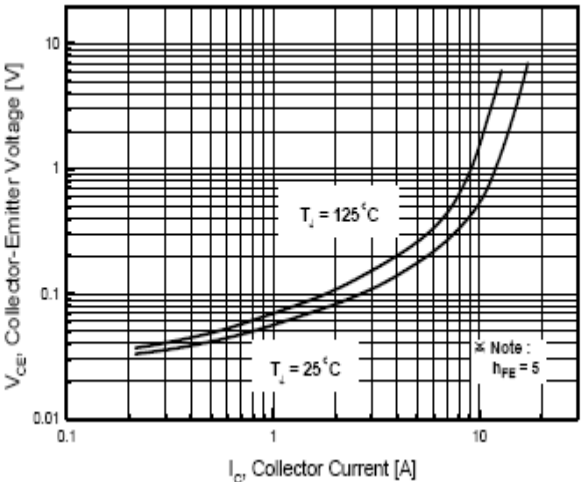


Fig. 2 Collector-Emitter Saturation Voltage

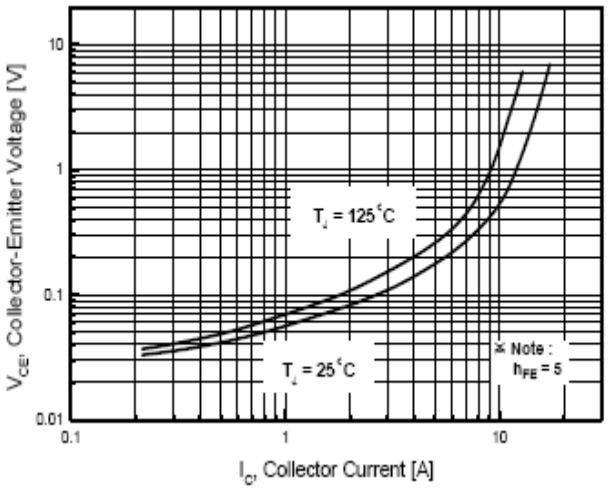


Fig. 3 Base--Emitter Saturation Voltage

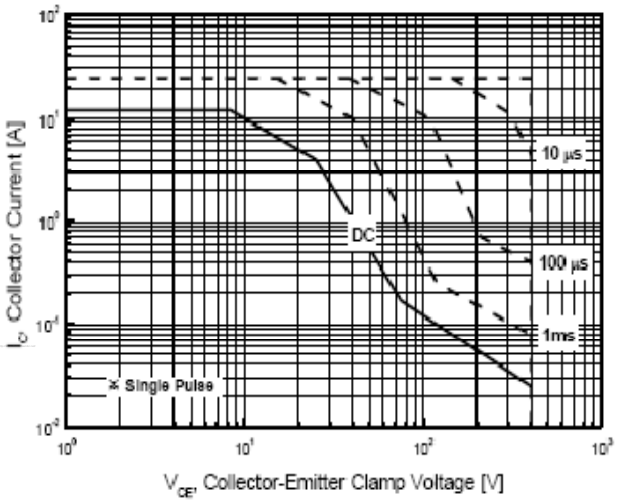


Fig. 4 Safe Operation Area

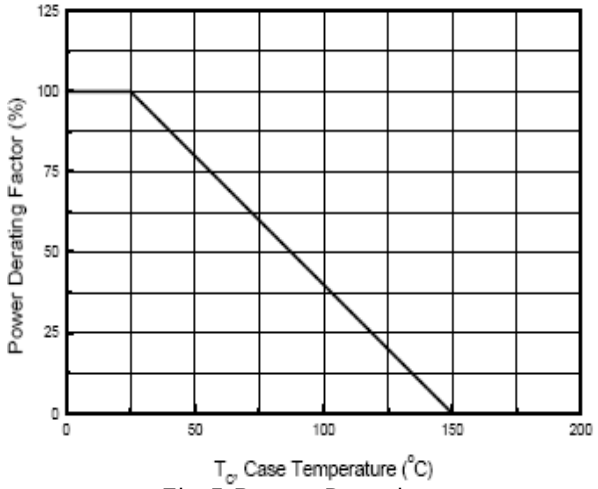


Fig.5 Power Derating

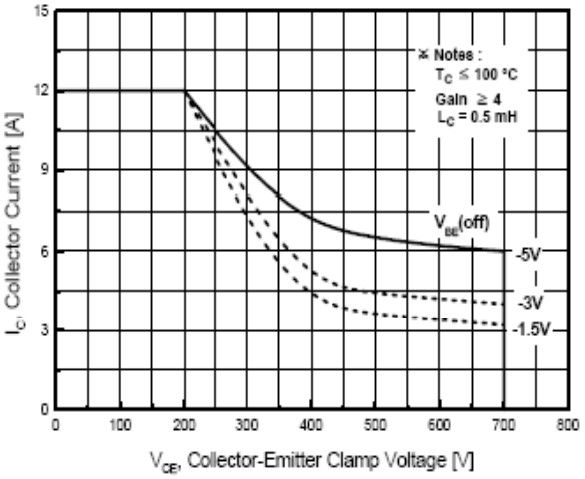
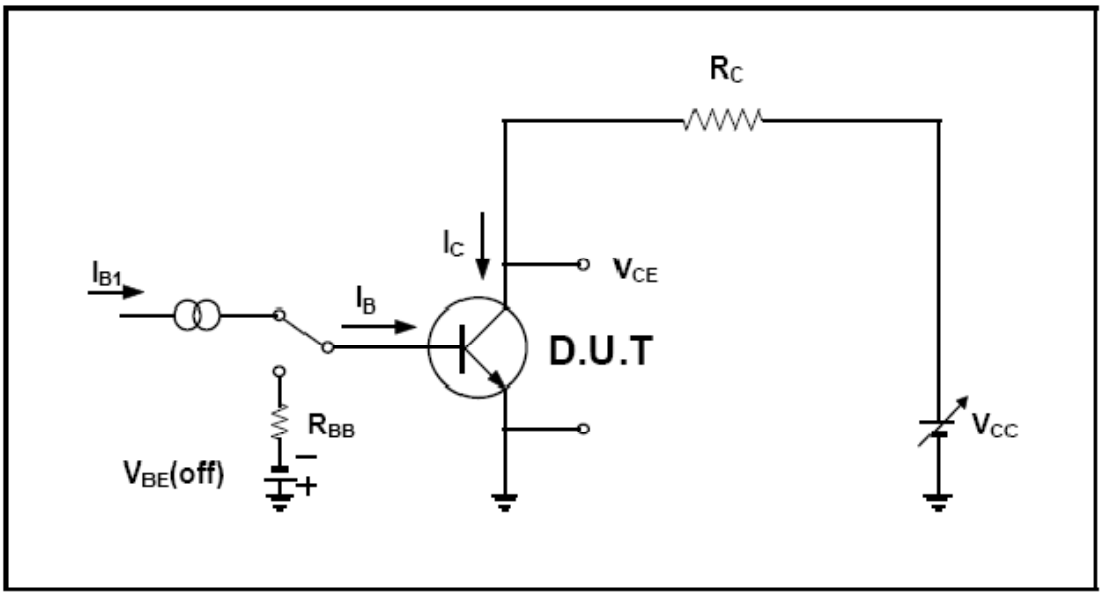
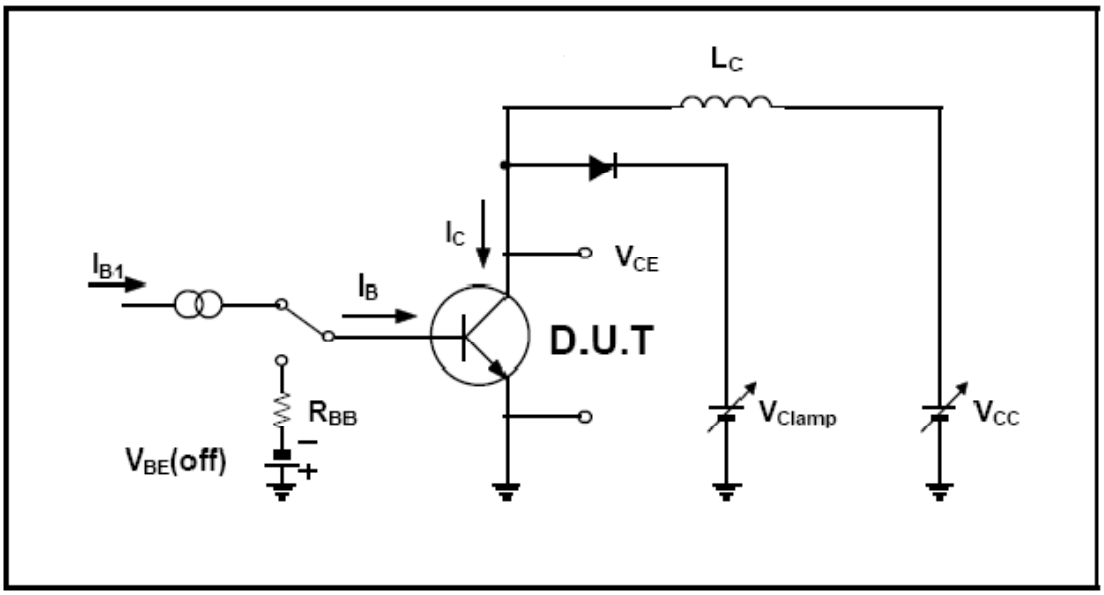


Fig.6 Reverse Biased Safe Operation Area

Resistive Load Switching Test Circuit



Inductive Load Switching & RBSOA Test Circuit



TO-220 Package Dimension

Unit: mm