

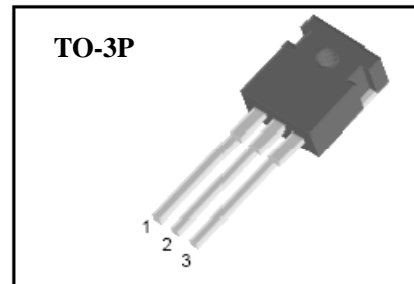
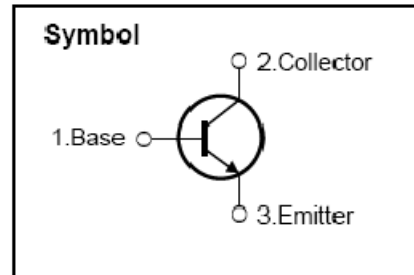
## High Voltage Fast-Switching NPN Power Transistor

### 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 $T_c = 25^\circ C$		130	W
	Total Dissipation at $T_a = 25^\circ C$		2.3	
$T_J$	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	0.96	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	40	$^\circ C/W$

# D209L

## Electrical Characteristics (T<sub>c</sub>=25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Value			Units
			Min	Typ	Max	
V <sub>CEO(sus)</sub>	Collector-Emitter Breakdown Voltage	I <sub>c</sub> =10mA, I <sub>b</sub> =0	400	-	-	V
V <sub>CE(sat)</sub>	Collector-Emitter Saturation Voltage	I <sub>c</sub> =5.0A, I <sub>b</sub> =1.0A I <sub>c</sub> =8.0A, I <sub>b</sub> =1.6A I <sub>c</sub> =12A, I <sub>b</sub> =3.0A	-	-	0.5 1.0 1.5	V
		I <sub>c</sub> =8.0A, I <sub>b</sub> =1.6A T <sub>c</sub> =100°C	-	-	2.0	V
V <sub>BE(sat)</sub>	Base-Emitter Saturation Voltage	I <sub>c</sub> =5.0A, I <sub>b</sub> =1.0A I <sub>c</sub> =8.0A, I <sub>b</sub> =1.6A	-	-	1.2 1.6	V
		I <sub>c</sub> =8.0A, I <sub>b</sub> =1.6A T <sub>c</sub> =100°C	-	-	1.5	V
I <sub>CBO</sub>	Collector-Base Cutoff Current (V <sub>be</sub> =-1.5V)	V <sub>cb</sub> =700V V <sub>cb</sub> =700V, T <sub>c</sub> =100°C	-	-	1.0 5.0	mA
h <sub>FE</sub>	DC Current Gain	V <sub>ce</sub> =5V, I <sub>c</sub> =5.0A V <sub>ce</sub> =5V, I <sub>c</sub> =8.0A	10 6	- -	40 40	
t <sub>s</sub> t <sub>f</sub>	<b>Resistive Load</b> Storage Time Fall Time	V <sub>CC</sub> =125V, I <sub>c</sub> =6.0A I <sub>B1</sub> =1.6A, I <sub>B2</sub> =-1.6A T <sub>p</sub> =25μs	-	1.5 0.16	3.0 0.4	μs
	<b>Inductive Load</b> Storage Time Fall Time	V <sub>CC</sub> =15V, I <sub>c</sub> =5A I <sub>B1</sub> =1.6A, V <sub>be(off)</sub> =5V L=0.35mH, V <sub>clamp</sub> =300V	- -	0.6 0.04	2.0 0.1	μs
t <sub>s</sub> t <sub>f</sub>	<b>Inductive Load</b> Storage Time Fall Time	V <sub>CC</sub> =15V, I <sub>c</sub> =1A I <sub>B1</sub> =0.4A, V <sub>be(off)</sub> =5V L=0.2mH, V <sub>clamp</sub> =300V T <sub>c</sub> =100°C	- -	0.8 0.05	2.5 0.15	μs

**Note:**

Pulse Test : Pulse width 300, Duty cycle 2%

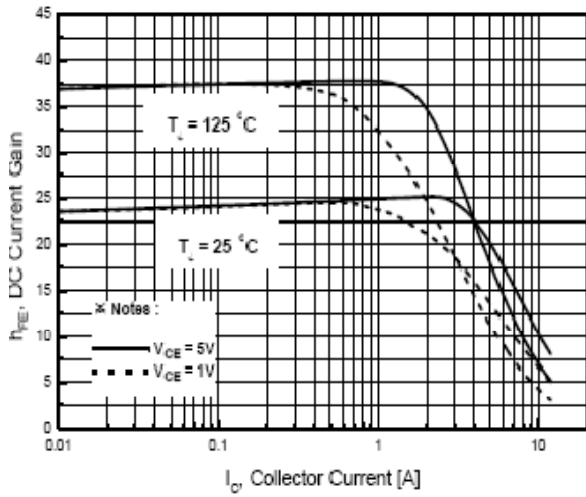


Fig. 1 DC Current Gain

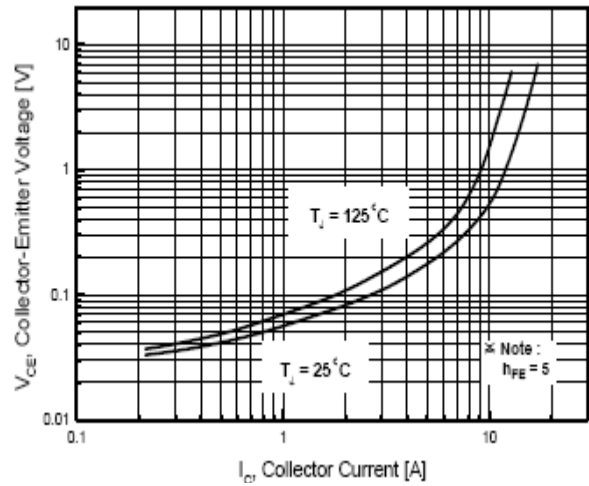


Fig. 2 Collector-Emitter Saturation Voltage

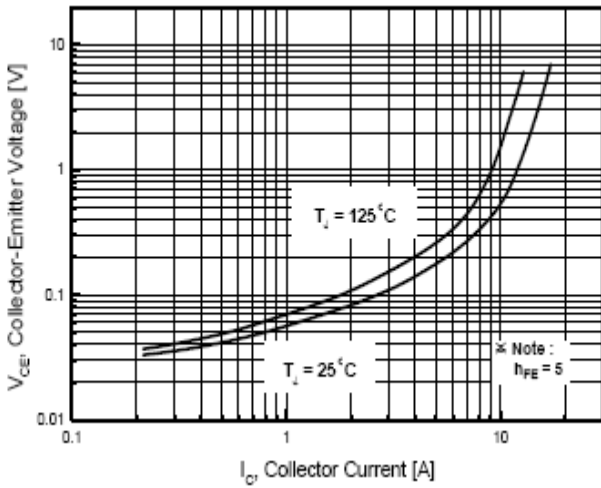


Fig. 3 Base-Emitter Saturation Voltage

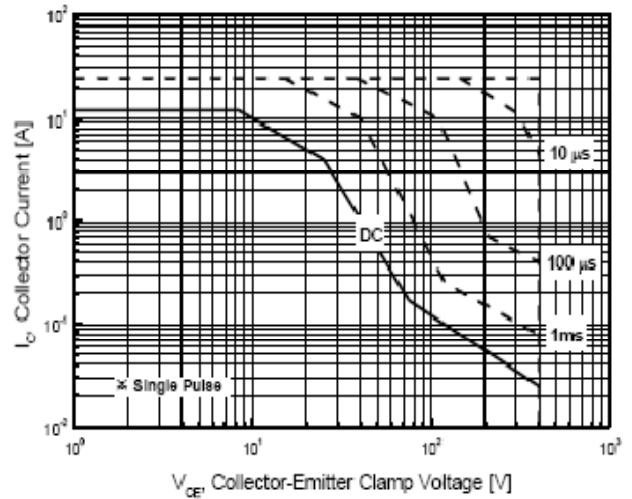


Fig. 4 Safe Operation Area

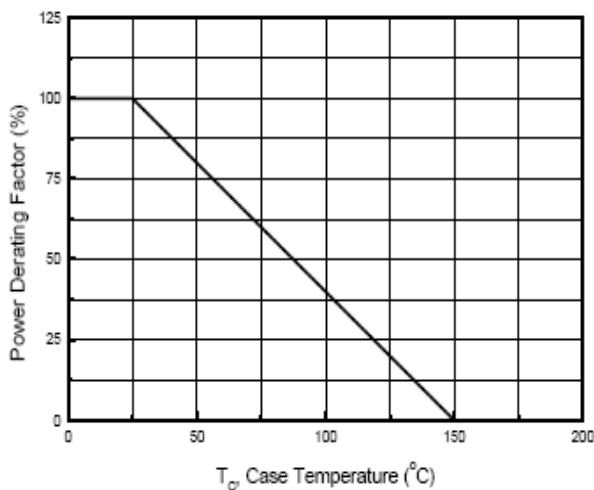


Fig. 5 Power Derating

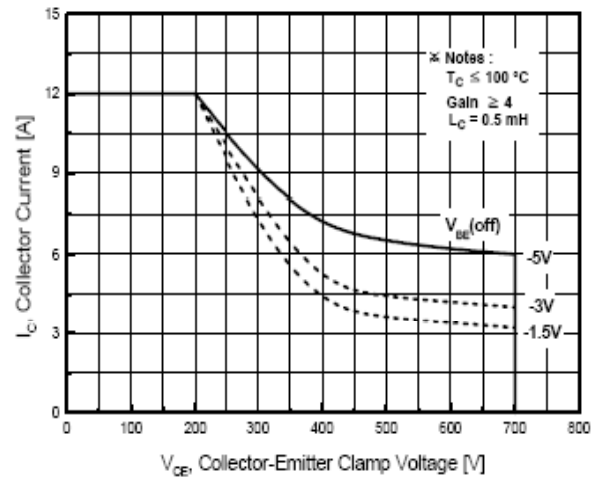
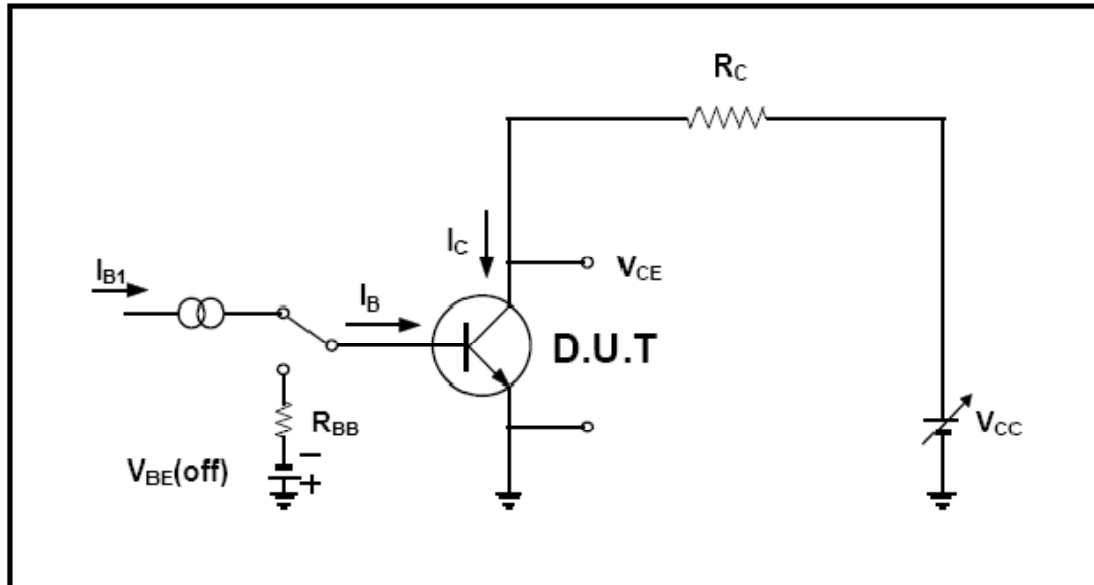
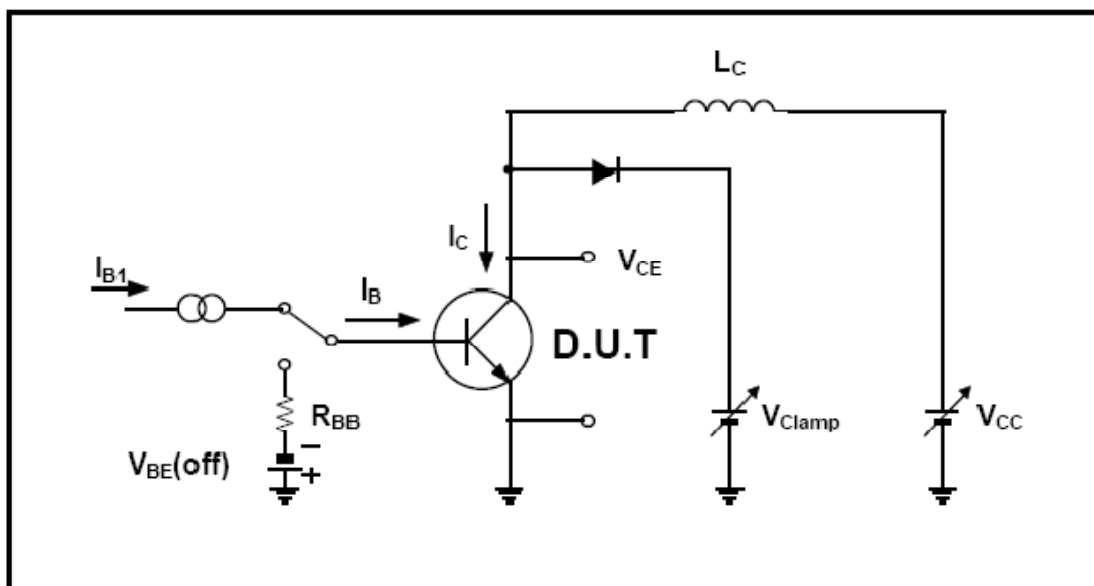


Fig. 6 Reverse Biased Safe Operation Area

## Resistive Load Switching Test Circuit



## Inductive Load Switching & RBSOA Test Circuit



## TO-3P(B) Package Dimension

Unit: mm

