

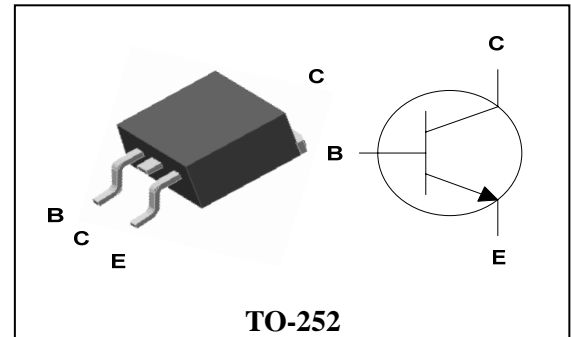
## Applications

- Power amplifier application
- High current switching application

## Features

- High speed switching
- $V_{CEO(sus)} = 400V$
- Suitable for Switching Regulator and Motor Control

## PIN Connection



## Ordering Information

Type NO.	Marking	Package Code
STD13003D	STD13003	TO-252

## Absolute Maximum Ratings

(Ta=25°C)

Characteristic	Symbol	Ratings	Unit
Collector-base voltage	$V_{CBO}$	700	V
Collector-emitter voltage	$V_{CEO}$	400	V
Emitter-base voltage	$V_{EBO}$	9	V
Collector current	$I_C$	1.5	A(DC)
	$I_{CP}^*$	3	A(Pulse)
Base current	$I_B$	0.75	A(DC)
Collector power dissipation	$P_{C(J-A)}$	1.2	W
	$P_{C(J-C)}$	15	W
Junction temperature	$T_j$	150	°C
Storage temperature	$T_{stg}$	-55 ~ 150	°C

 \* : Single pulse,  $t_p = 300 \mu s$ 

Characteristic	Symbol	Typ.	Max	Unit	
Thermal resistance	Junction-Ambient	$R_{th(J-A)}$	-	104.1	°C/W
	Junction-Case	$R_{th(J-C)}$	-	8.3	°C/W

## Electrical Characteristics

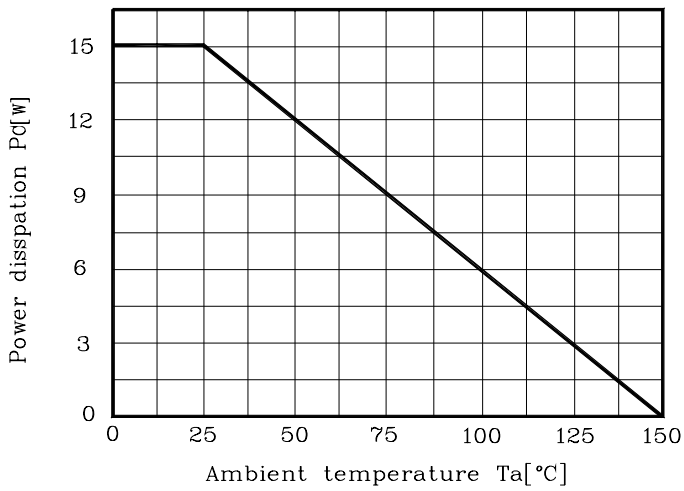
(Ta=25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Collector-emitter sustaining voltage	$V_{CE(sus)}$	$I_C=5mA, I_B=0$	400	-	-	V
Collector cut-off current	$I_{CBO}$	$V_{CB}=700V, I_E=0$	-	-	10	$\mu A$
Emitter cut-off current	$I_{EBO}$	$V_{EB}=9V, I_C=0$	-	-	10	$\mu A$
DC current gain	$h_{FE}^*$	$I_C=0.5A, V_{CE}=2V$	15	-	35	
		$I_C=1A, V_{CE}=2V$	5	-	-	
Collector-emitter saturation voltage	$V_{CE(sat)}^*$	$I_C=0.5A, I_B=0.1A$	-	-	0.5	V
		$I_C=1A, I_B=0.25A$	-	-	1	
		$I_C=1.5A, I_B=0.5A$	-	-	3	
Base-emitter saturation voltage	$V_{BE(sat)}^*$	$I_C=0.5A, I_B=0.1A$	-	-	1	V
		$I_C=1A, I_B=0.25A$	-	-	1.2	
Transition frequency	$f_T$	$V_{CB}=10V, I_C=0.1A, f=1MHz$	-	4	-	MHz
Output capacitance	$C_{ob}$	$V_{CB}=10V, I_E=0, f=0.1MHz$	-	13	-	pF
Turn on Time	$t_{on}$	<p><math>I_{B1} = -I_{B2} = 200mA</math> DUTY CYCLE <math>\leq 1\%</math></p>	-	1.1	-	$\mu S$
Storage Time	$t_{stg}$		-	4	-	
Fall Time	$t_f$		-	0.7	-	

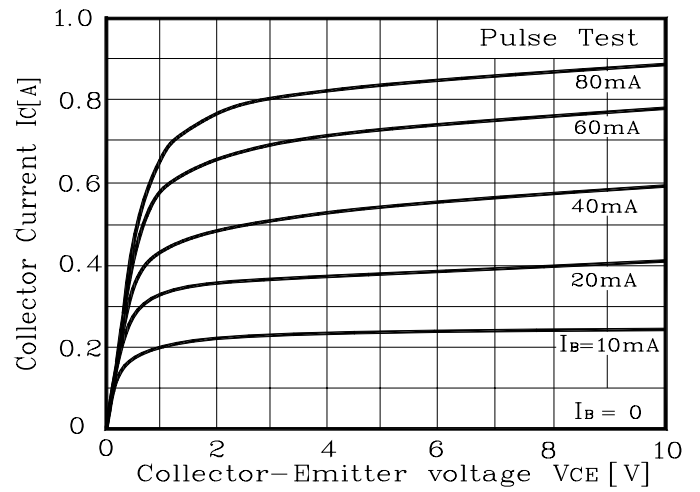
\* Pulse test:  $PW \leq 300 \mu s$ , Duty cycle  $\leq 2\%$  Pulse

## Electrical Characteristic Curves

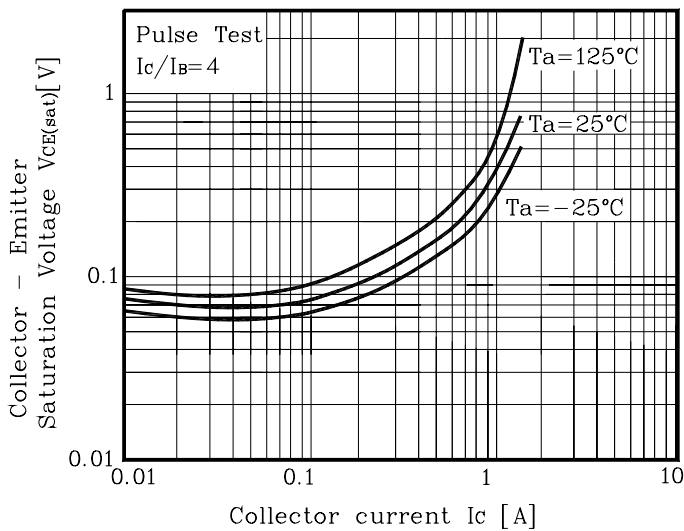
**Fig. 1  $P_C - T_a$**



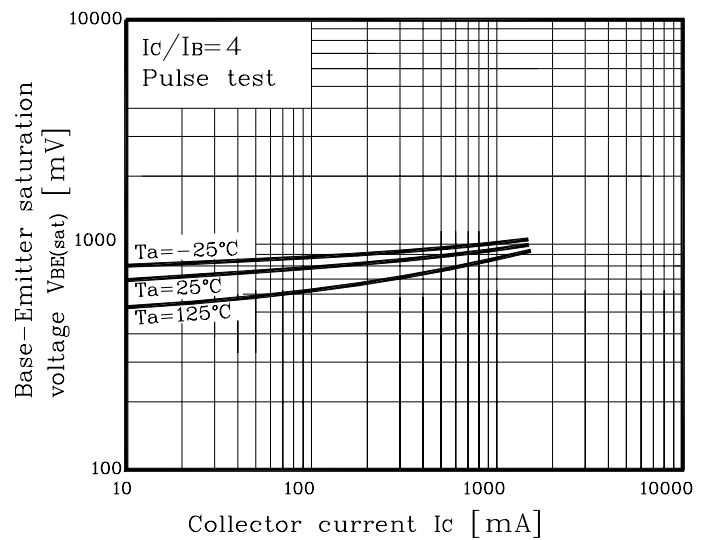
**Fig. 2  $I_C - V_{CE}$**



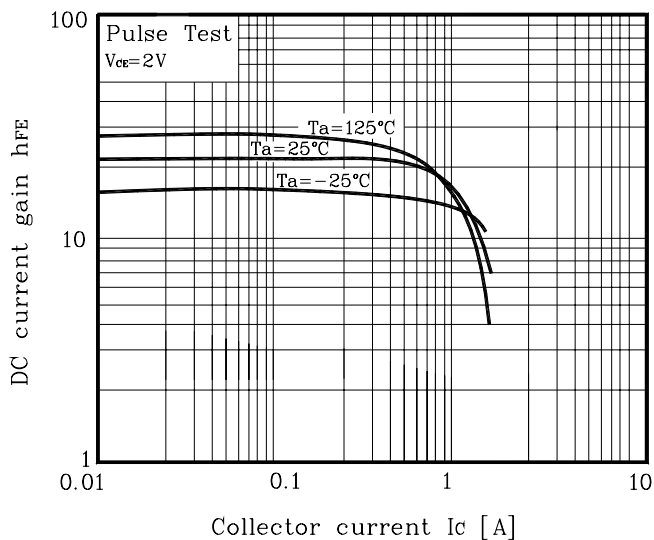
**Fig. 3  $V_{CE(sat)} - I_C$**



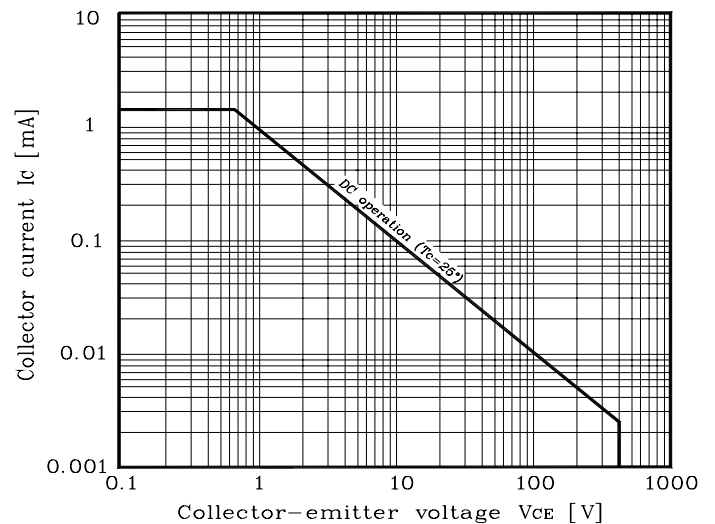
**Fig. 4  $V_{BE(sat)} - I_C$**



**Fig. 5  $h_{FE} - I_C$**



**Fig. 6 Safe operating area**



Electrical Characteristic Curves

Fig. 7 Turn on time

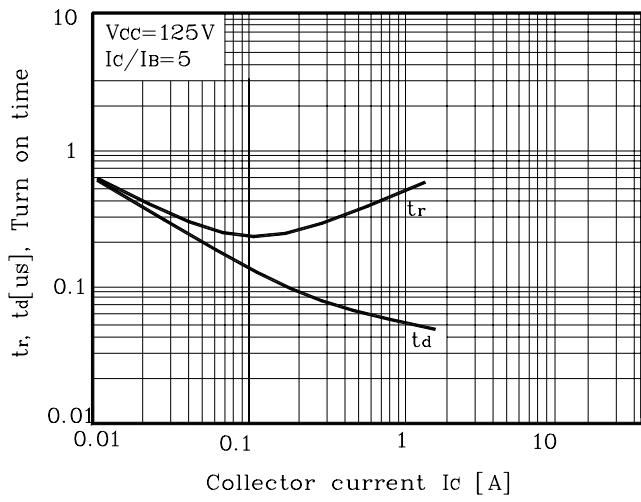
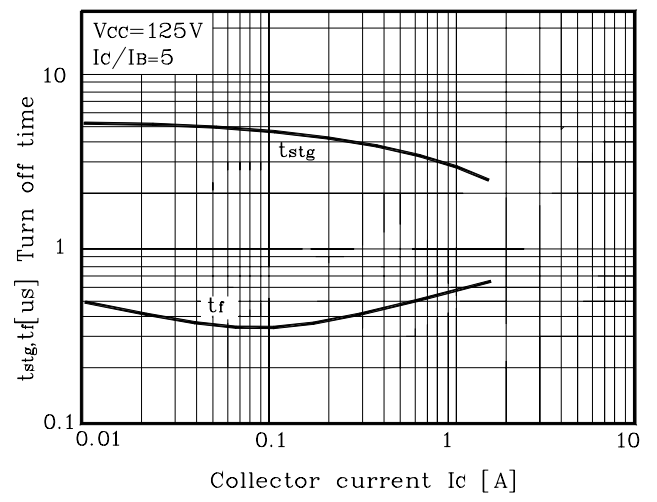
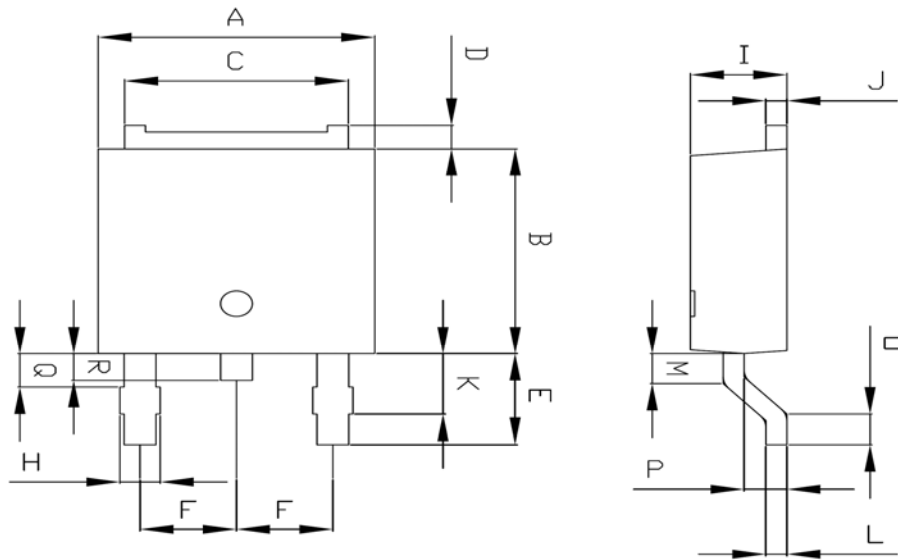


Fig. 8 Turn off time

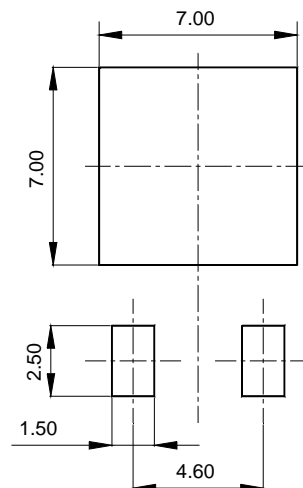


## Outline Dimension



SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	6.40	6.60	6.80	
B	5.90	6.10	6.30	
C	5.04	5.34	5.64	
D	0.50	0.70	0.90	
E	2.50	2.70	2.90	
F	2.10	2.30	2.50	
H	0.96 MAX			
I	2.20	2.30	2.40	
J	0.40	0.50	0.60	
K	1.60	1.80	2.00	
L	0.40	0.50	0.60	
M	0.81	0.91	1.01	
O	0.80	0.90	1.00	
P	0.90	1.00	1.10	
Q	0.95 MAX			
R	0.60	0.80	1.00	

※Recommend PCB solder land [Unit: mm]



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