

SWITCHING REGULATOR APPLICATIONS

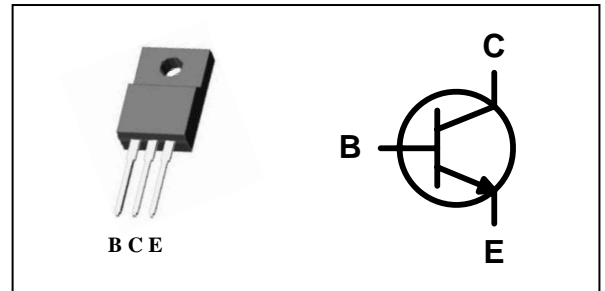
Features

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

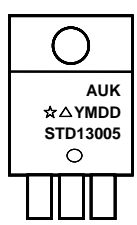
Ordering Information

Type NO.	Marking	Package Code
STD13005F	STD13005	TO-220F-3L

PIN Connection



Marking Diagram

	<p>Column 1 : Manufacturer</p> <p>Column 2 : Production Information</p> <ul style="list-style-type: none"> - ☆ : h_{FE} rank - △ : Factory Management Code - YMDD : Date Code (Year, Month, Date) <p>Column 3 : Device Code</p>
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Absolute maximum ratings

 (T_c=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 (DC)	I_C	4	A
Collector current (Pulse)	I_{CM}	8	A
Base current (DC)	I_B	2	A
Base current (Pulse)	I_{BM}	4	A
Total Power dissipation (T _c = 25 °C)	P_D	30	W
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-55~ 150	°C

Characteristic		Symbol	Typ.	Max	Unit
Thermal resistance	Junction-case	$R_{th(J-C)}$	-	4.16	°C/W
	Junction-ambient	$R_{th(J-a)}$	-	62.5	

Electrical Characteristics

(Tc=25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Collector-Emitter sustaining voltage	$V_{CE(sus)}$	$I_C=10mA, I_B=0$	400	-	-	V
Collector cut-off current	I_{CEV}	$V_{CEV} = \text{Rated Value}$ $V_{BE(off)} = 1.5V$	-	-	1	mA
Emitter cut-off current	I_{EBO}	$V_{EB} = 9V, I_C = 0$	-	-	1	mA
DC Current gain	h_{FE}^*	$I_C = 1A, V_{CE} = 5V^{**}$	15	-	40	
		$I_C = 2A, V_{CE} = 5V$	8	-	40	
Collector-Emitter saturation voltage	$V_{CE(sat)}^*$	$I_C = 1A, I_B = 0.2A$	-	-	0.5	V
		$I_C = 2A, I_B = 0.5A$	-	-	0.6	
		$I_C = 4A, I_B = 1A$	-	-	1	
Base-Emitter saturation voltage	$V_{BE(sat)}^*$	$I_C = 1A, I_B = 0.2A$	-	-	1.2	V
		$I_C = 2A, I_B = 0.5A$	-	-	1.6	
Transition frequency	f_T	$V_{CB} = 10V, I_C = 0.5A, f = 1MHz$	-	4	-	MHz
Output capacitance	C_{ob}	$V_{CB} = 10V, I_E = 0, f = 0.1MHz$	-	65	-	pF
Turn on Time	t_{ON}	$V_{CC} = 125V, I_C = 2A, R_L = 62.5\Omega$ $I_{B1} = -I_{B2} = 0.4A$	-	0.8	-	μs
Storage Time	t_{STG}		-	4	-	
Fall Time	t_F		-	0.9	-	

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

** h_{FE} rank / A : 15~30, B : 25~40

Electrical Characteristic Curves

Fig. 1 $P_D - T_C$

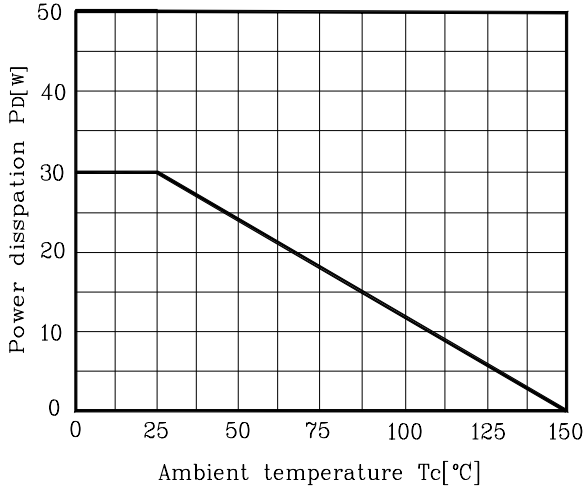


Fig. 2 $V_{BE(sat)}, V_{CE(sat)} - I_C$

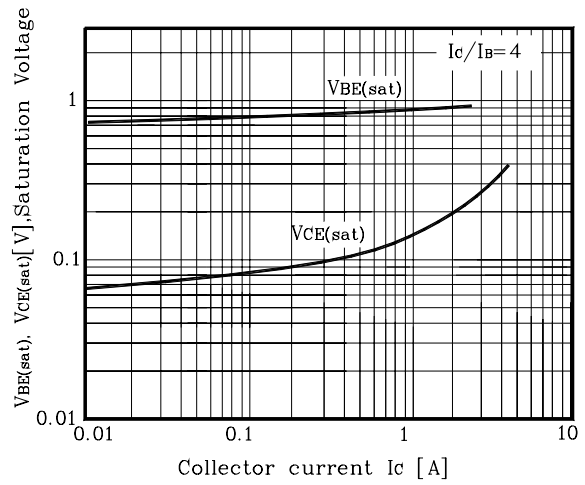


Fig. 3 $h_{FE} - I_C$

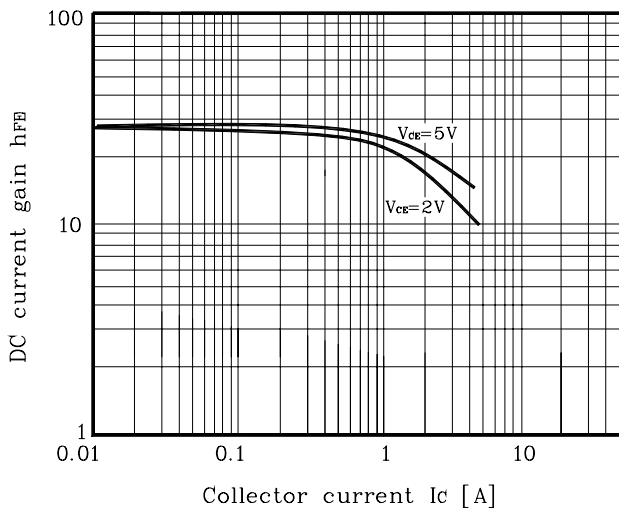


Fig. 4 Turn off time

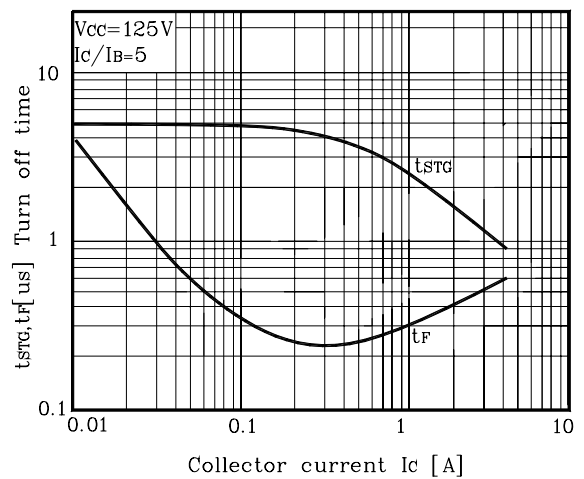


Fig. 5 Turn on time

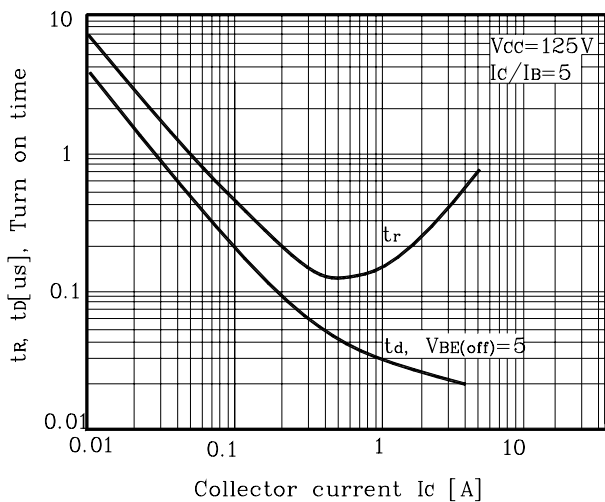
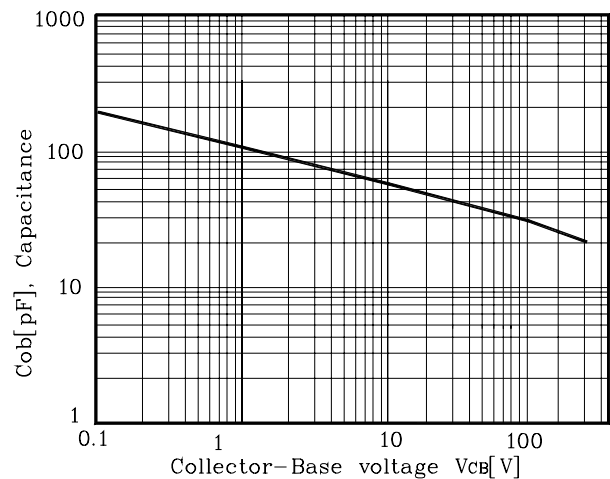


Fig. 6 Capacitance



Electrical Characteristic Curves

Fig. 7 Forward Safe Operating Area

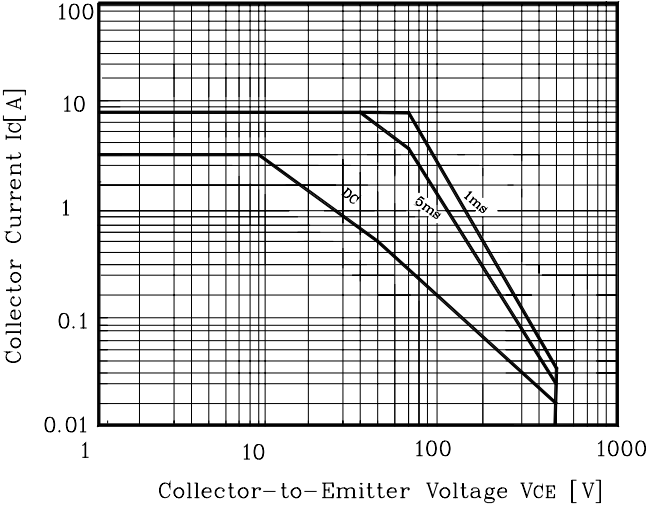
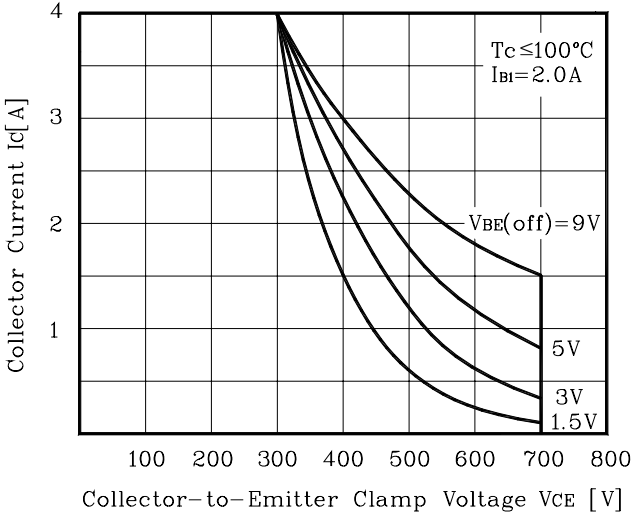
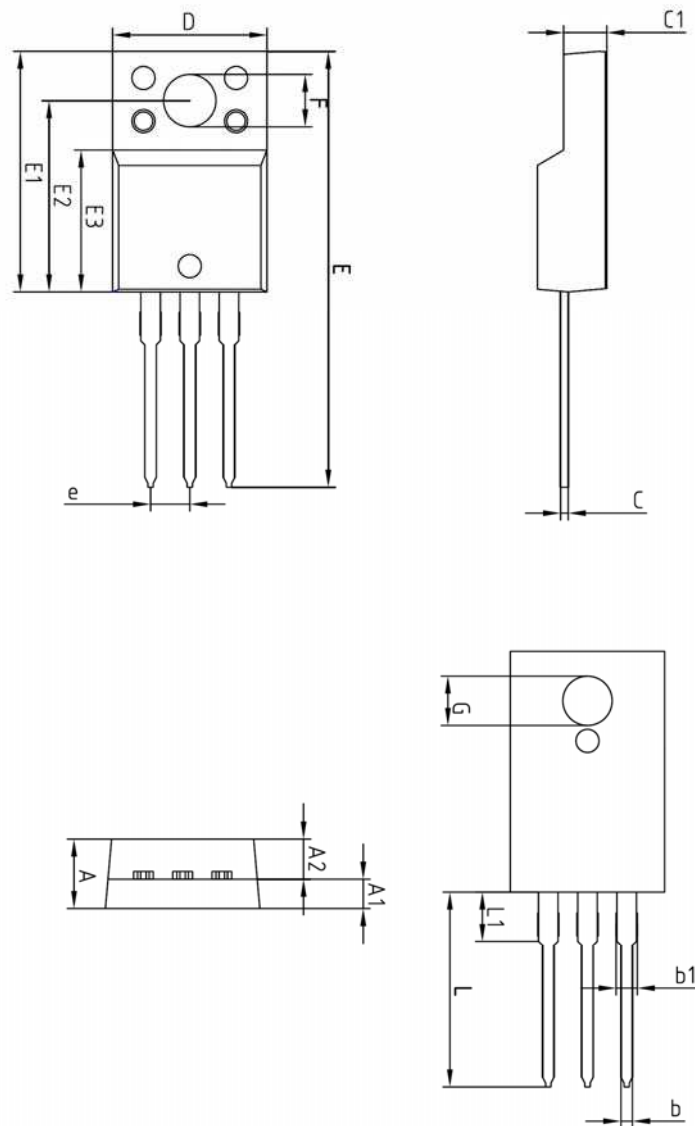


Fig. 8 Reverse Safe Operating Area



Outline Dimension



SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	-	-	4.60	
A1	2.45	2.50	2.55	
A2	1.95	2.00	2.05	
b	0.65	0.75	0.85	
b1	1.07	1.27	1.47	
C	0.40	0.50	0.60	
C1	2.70	2.80	2.90	
D	9.90	10.00	10.10	
E	28.00	-	28.60	
E1	15.50	15.60	15.70	
E2	12.30	12.40	12.50	
E3	9.15	9.20	9.25	
F	3.30	3.40	3.50	
G	3.10	3.20	3.30	
e	2.54 BSC			
L	12.40	-	13.00	
L1	3.46 BSC			

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