KODENSHI AUK

# STD13007

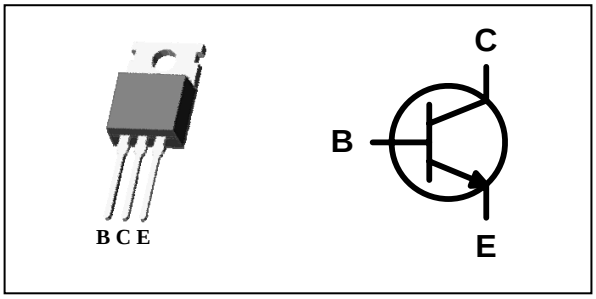
**NPN Silicon Power Transistor**

## SWITCHING REGULATOR APPLICATIONS

### Features

- High speed switching
- High Collector Voltage : $V_{CBO}$ = 700V
- Suitable for Switching Regulator and Motor Control

### PIN Connection




### Ordering Information

| Type NO. | Marking | Package Code |
|---|---|---|
| STD13007 | STD13007 | TO-220AB |

### Absolute maximum ratings

**(Ta=25°C)**

| Characteristic | Symbol | Rating | 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) | $I_C$ | 8 | A |
| Collector current (Pulse) | $I_{CM}$ | 16 | A |
| Base current (DC) | $I_B$ | 4 | A |
| Collector Power dissipation (Tc=25℃) | $P_C$ | 80 | W |
| Junction temperature | $T_j$ | 150 | °C |
| Storage temperature | $T_{stg}$ | -55~150 | °C |

| Characteristic | | Symbol | Typ. | Max | Unit |
|---|---|---|---|---|---|
| Thermal resistance | Junction-case | $R_{th(J-C)}$ | - | 1.56 | ℃/W |
| | Junction-ambient | $R_{th(J-a)}$ | - | 83.3 | |

## Electrical Characteristics (Ta=25°C)

| Characteristic | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Collector-Emitter sustaining voltage | $BV_{CEO(sus)}$ | $I_C$=10mA, $I_B$=0 | 400 | - | - | V |
| Emitter cut-off current | $I_{EBO}$ | $V_{EB}$=9V, $I_C$=0 | - | - | 1 | mA |
| DC Current gain | $h_{FE}$* | $I_C$=2A, $V_{CE}$=5V※ | 10 | - | 45 | |
| | | $I_C$=5A, $V_{CE}$=5V | 5 | - | 30 | |
| Collector-Emitter saturation voltage | $V_{CE(sat)}$* | $I_C$=2A, $I_B$=0.4A | - | - | 1 | V |
| | | $I_C$=5A, $I_B$=1A | - | - | 2 | |
| | | $I_C$=8A, $I_B$=2A | - | - | 3 | |
| Base-Emitter saturation voltage | $V_{BE(sat)}$* | $I_C$=2A, $I_B$=0.4A | - | - | 1.2 | V |
| | | $I_C$=5A, $I_B$=1A | - | - | 1.6 | |
| Transition frequency | $f_T$ | $V_{CE}$=10V, $I_C$=0.5A, f=1MHz | - | 14 | - | MHz |
| Output capacitance | $C_{ob}$ | $V_{CB}$=10V, $I_E$=0, f=0.1MHz | - | 80 | - | pF |
| Turn on Time | $t_{on}$ | $V_{CC}$=125V, $I_C$=5A<br>$I_{B1}$=-$I_{B2}$=1A | - | 1.6 | - | μs |
| Storage Time | $t_{stg}$ | | - | 3 | - | |
| Fall Time | $t_f$ | | - | 0.7 | - | |

* Pulse test: PW≤300 μs, Duty cycle≤2%.

※$h_{FE}$ rank / A : 10~30, B : 25~45

## Electrical Characteristic Curves

**Fig. 1 $P_C$ - $T_C$**

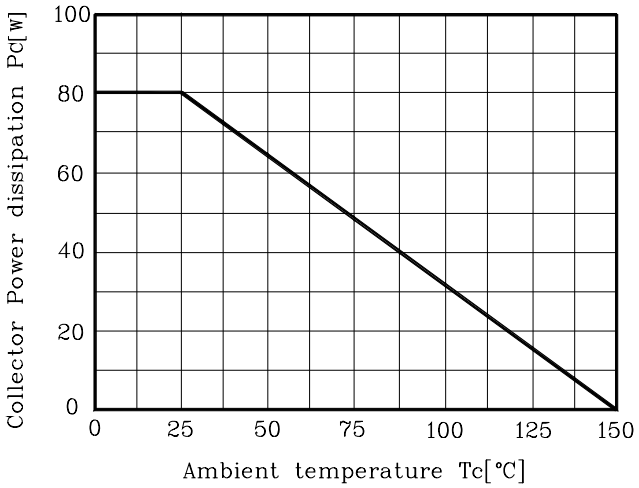



**Fig. 2 $V_{BE(sat)}$ , $V_{CE(sat)}$ - $I_C$**

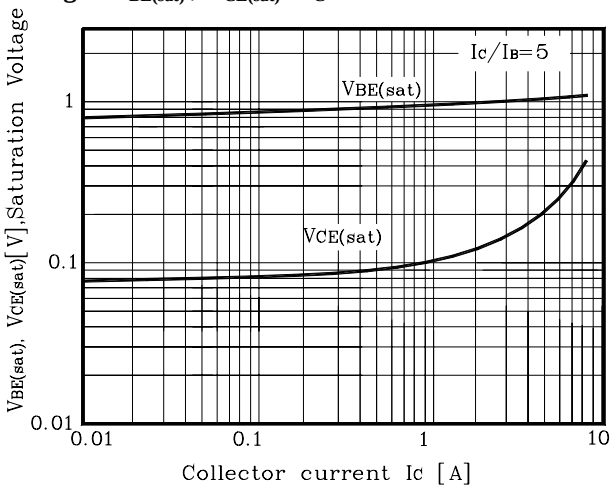



**Fig. 3 $h_{FE}$-$I_C$**

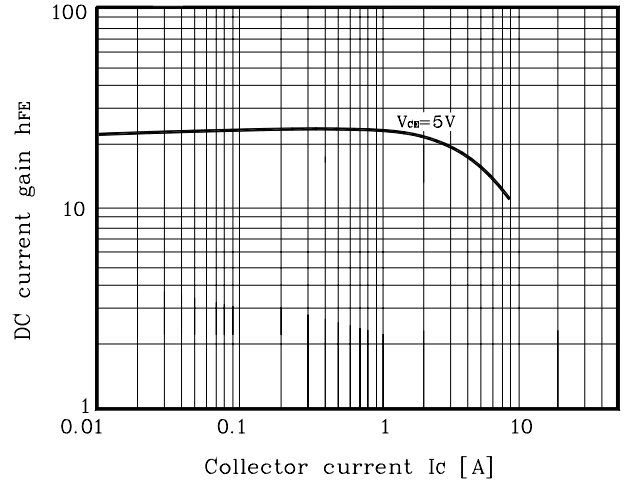



**Fig. 4 $t_f$ , $t_{stg}$ - IC**

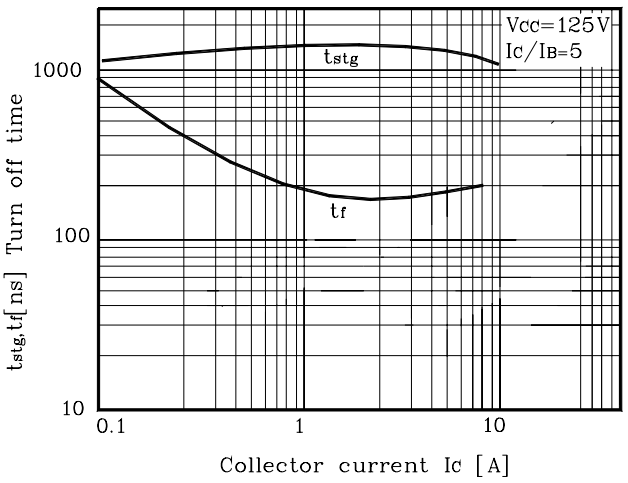



**Fig. 5 td , tr - IC**

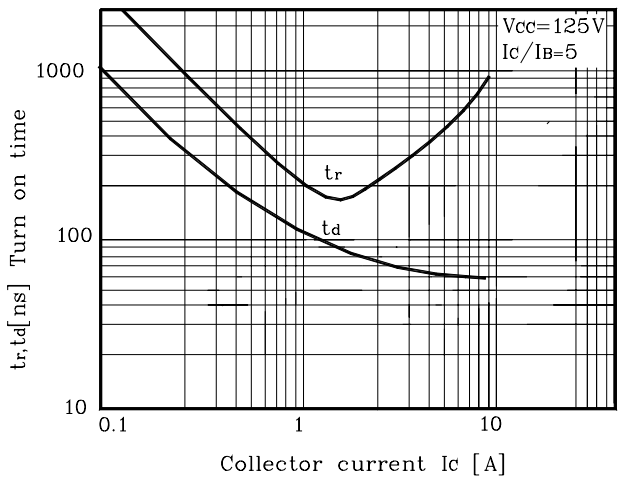
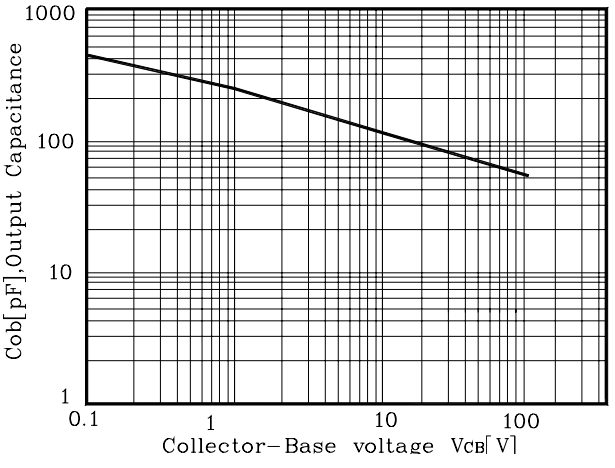
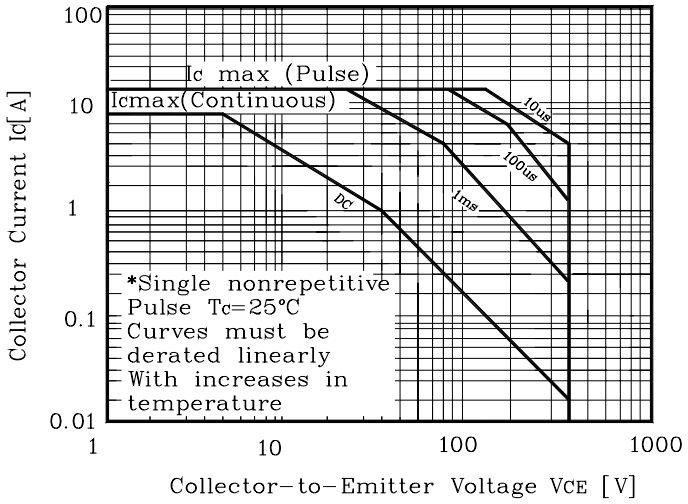



**Fig. 6 Cob - $V_{CB}$**

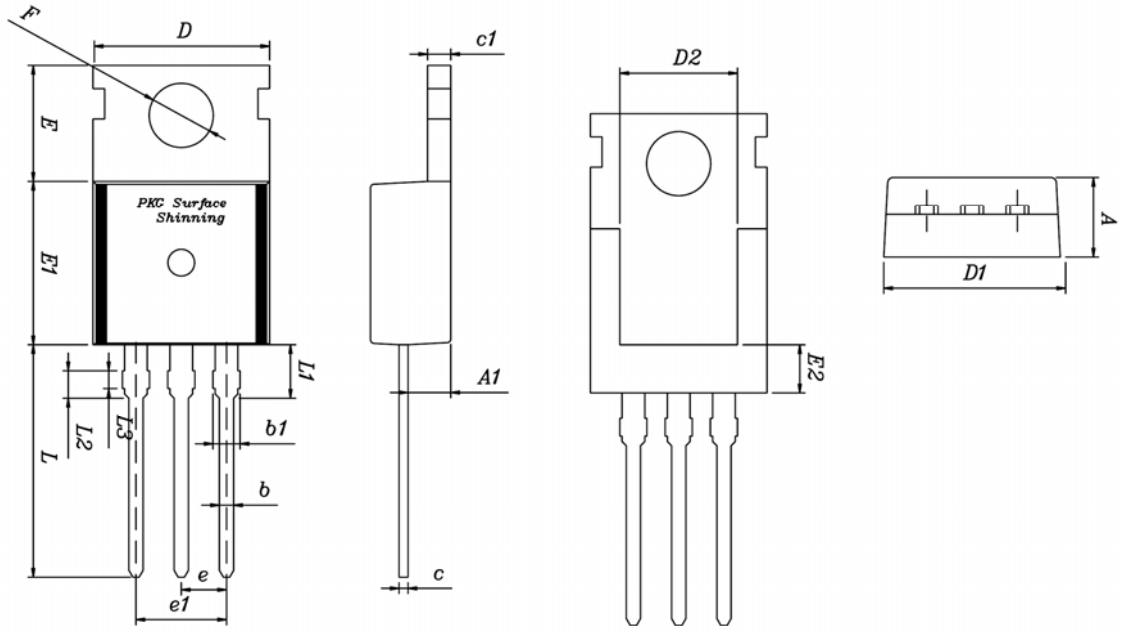


## Electrical Characteristic Curves

**Fig. 7 Safe Operating Area**



## Outline Dimension




| SYMBOL | MILLIMETERS | | | NOTE |
|---|---|---|---|---|
| | MINIMUM | NOMINAL | MAXIMUM | |
| A | 4.35 | 4.50 | 4.65 | |
| A1 | 2.20 | 2.40 | 2.60 | |
| b | 0.65 | 0.80 | 0.95 | |
| b1 | 1.42 | 1.52 | 1.62 | |
| C | 0.40 | 0.50 | 0.60 | |
| C1 | 1.20 | 1.30 | 1.40 | |
| D | 9.80 | 10.00 | 10.20 | |
| D1 | 9.85 | 10.00 | 10.15 | |
| D2 | 6.40 | 6.60 | 6.80 | |
| E | 6.30 | 6.50 | 6.70 | |
| E1 | 9.05 | 9.20 | 9.35 | |
| E2 | 2.50 | 2.70 | 2.90 | |
| F | 3.50 | 3.60 | 3.70 | |
| e | 2.34 | 2.54 | 2.64 | |
| e1 | 4.88 | 5.08 | 5.28 | |
| L | 12.68 | 13.08 | 13.48 | |
| L1 | 2.80 | 3.00 | 3.20 | |
| L2 | 1.49 | 1.54 | 1.59 | |
| L3 | 0.95 | 1.00 | 1.05 | |

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