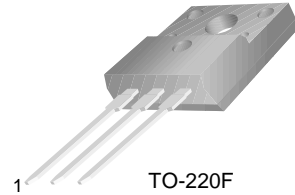


# KSE13007F

KSE13007F

## High Voltage Switch Mode Application

- High Speed Switching
- Suitable for Switching Regulator and Motor Control



TO-220F  
1.Base 2.Collector 3.Emitter

## NPN Silicon Transistor

### Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise noted

| Symbol    | Parameter  | Value      | Units            |
|-----------|--|------------|------------------|
| $V_{CBO}$ | Collector- Base Voltage                          | 700        | V                |
| $V_{CEO}$ | Collector- Emitter Voltage                       | 400        | V                |
| $V_{EBO}$ | Emitter- Base Voltage                            | 9          | V                |
| $I_C$     | Collector Current (DC)                           | 8          | A                |
| $I_{CP}$  | Collector Current (Pulse)                        | 16         | A                |
| $I_B$     | Base Current                                     | 4          | A                |
| $P_C$     | Collector Dissipation ( $T_C=25^\circ\text{C}$ ) | 40         | W                |
| $T_J$     | Junction Temperature                             | 150        | $^\circ\text{C}$ |
| $T_{STG}$ | Storage Temperature                              | - 65 ~ 150 | $^\circ\text{C}$ |

### Electrical Characteristics $T_C=25^\circ\text{C}$ unless otherwise noted

| Symbol               | Parameter                            | Test Condition   | Min.   | Typ. | Max.        | Units         |
|----------------------|--------------------------------------|--|--------|------|-------------|---------------|
| $BV_{CEO}$           | Collector-Base Breakdown Voltage     | $I_C = 10\text{mA}, I_B = 0$   | 400    |      |             | V             |
| $I_{EBO}$            | Emitter Cut-off Current              | $V_{EB} = 9\text{V}, I_C = 0$  |        |      | 1           | mA            |
| $h_{FE}$             | DC Current Gain                      | $V_{CE} = 5\text{V}, I_C = 2\text{A}$<br>$V_{CE} = 5\text{V}, I_C = 5\text{A}$                                   | 8<br>5 |      | 60<br>30    |               |
| $V_{CE}(\text{sat})$ | Collector-Emitter Saturation Voltage | $I_C = 2\text{A}, I_B = 0.4\text{A}$<br>$I_C = 5\text{A}, I_B = 1\text{A}$<br>$I_C = 8\text{A}, I_B = 2\text{A}$ |        |      | 1<br>2<br>3 | V<br>V<br>V   |
| $V_{BE}(\text{sat})$ | Base-Emitter Saturation Voltage      | $I_C = 2\text{A}, I_B = 0.4\text{A}$<br>$I_C = 5\text{A}, I_B = 1\text{A}$                                       |        |      | 1.2<br>1.6  | V<br>V        |
| $C_{ob}$             | Output Capacitance                   | $V_{CB} = 10\text{V}, f = 0.1\text{MHz}$   |        | 110  |             | pF            |
| $f_T$                | Current Gain Bandwidth Product       | $V_{CE} = 10\text{V}, I_C = 0.5\text{A}$   | 4      |      |             | MHz           |
| $t_{ON}$             | Turn On Time                         | $V_{CC} = 125\text{V}, I_C = 5\text{A}$<br>$I_{B1} = - I_{B2} = 1\text{A}$<br>$R_L = 50\Omega$                   |        |      | 1.6         | $\mu\text{s}$ |
| $t_{STG}$            | Storage Time                         |  |        |      | 3           | $\mu\text{s}$ |
| $t_F$                | Fall Time                            |  |        |      | 0.7         | $\mu\text{s}$ |

\* Pulse Test:  $PW \leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$

# Typical Characteristics

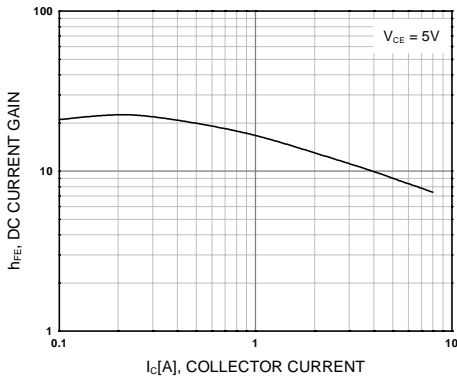


Figure 1. DC current Gain

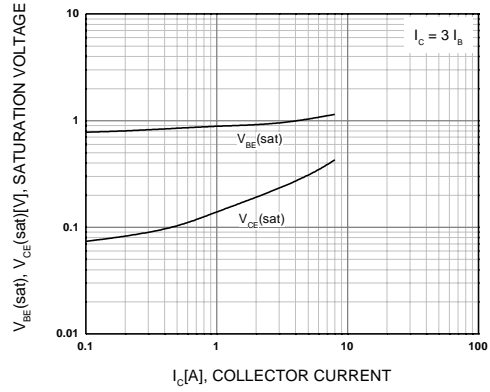


Figure 2. Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage

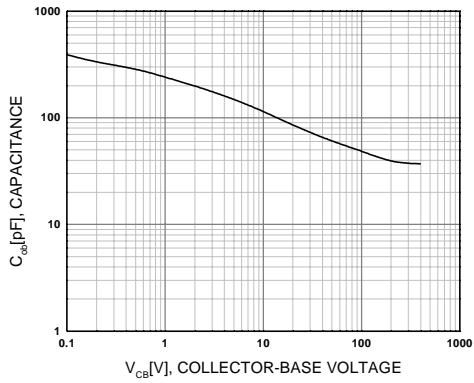


Figure 3. Collector Output Capacitance

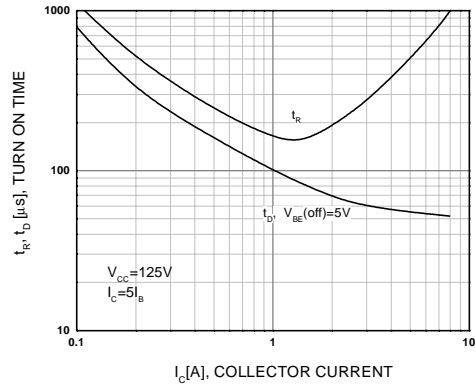


Figure 4. Turn On Time

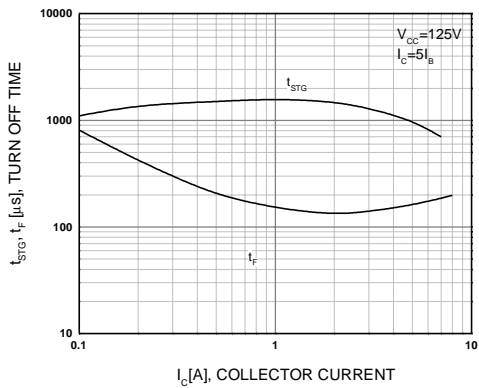


Figure 5. Turn Off Time

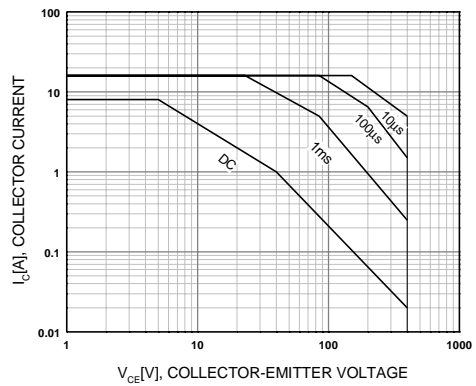


Figure 6. Safe Operating Area

### Typical Characteristics (Continued)

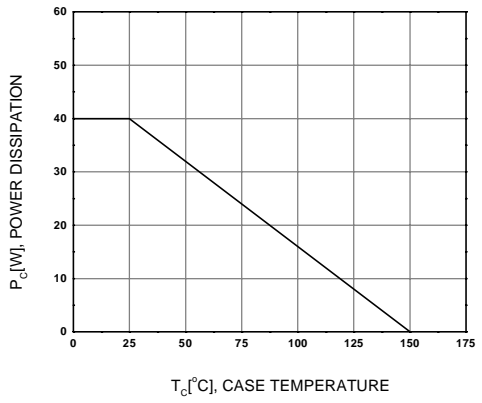


Figure 7. Power Derating

# Package Dimensions

KSE13007F

## TO-220F



Dimensions in Millimeters

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| Bottomless <sup>TM</sup>          | FRFET <sup>TM</sup>              | OPTOPLANAR <sup>TM</sup>         | SPM <sup>TM</sup>            |                   |
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| CROSSVOLT <sup>TM</sup>           | GTO <sup>TM</sup>                | POP <sup>TM</sup>                | SuperSOT <sup>TM</sup> -3    |                   |
| DOME <sup>TM</sup>                | HiSeC <sup>TM</sup>              | Power247 <sup>TM</sup>           | SuperSOT <sup>TM</sup> -6    |                   |
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