

KSE13009F

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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) | 12 | A |
| I_{CP} | Collector Current (Pulse) | 24 | A |
| I_B | Base Current | 6 | A |
| P_C | Collector Dissipation ($T_C=25^\circ\text{C}$) | 50 | 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 |
|----------------|--------------------------------------|---|--------|------|---------------|---------------|
| $V_{CEO(sus)}$ | Collector-Emitter Sustaining Voltage | $I_C = 10\text{mA}, I_B = 0$ | 400 | | | V |
| I_{EBO} | Emitter Cut-off Current | $V_{EB} = 7\text{V}, I_C = 0$ | | | 1 | mA |
| h_{FE} | DC Current Gain | $V_{CE} = 5\text{V}, I_C = 5\text{A}$ $V_{CE} = 5\text{V}, I_C = 8\text{A}$ | 8 6 | | 40 30 | |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C = 5\text{A}, I_B = 1\text{A}$ $I_C = 8\text{A}, I_B = 1.6\text{A}$ $I_C = 12\text{A}, I_B = 3\text{A}$ | | | 1 1.5 3 | V V V |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage | $I_C = 5\text{A}, I_B = 1\text{A}$ $I_C = 8\text{A}, I_B = 1.6\text{A}$ | | | 1.2 1.6 | V V |
| C_{ob} | Output Capacitance | $V_{CB} = 10\text{V}, f = 0.1\text{MHz}$ | | 180 | | 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 | $V_{CC} = 125\text{V}, I_C = 8\text{A}$ | | | 1.1 | μs |
| t_{STG} | Storage Time | $I_{B1} = -I_{B2} = 1.6\text{A}$ | | | 3 | μs |
| t_F | Fall Time | $R_L = 15,6\Omega$ | | | 0.7 | μs |

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

Typical Characteristics

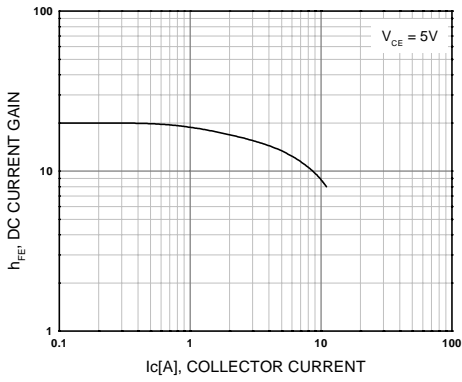


Figure 1. DC current Gain

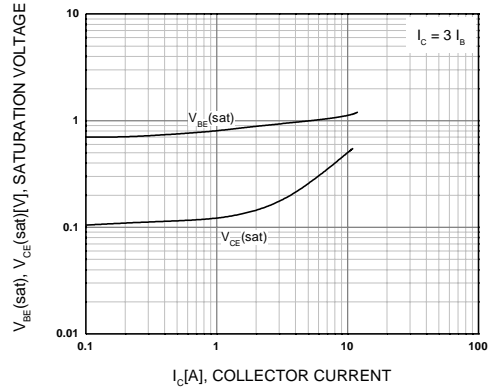


Figure 2. Base-Emitter Saturation Voltage
Collector-Emitter Saturation Voltage

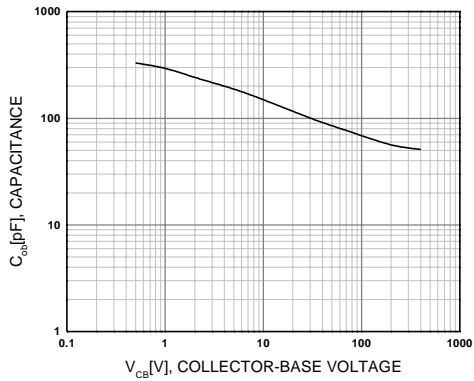


Figure 3. Collector Output Capacitance

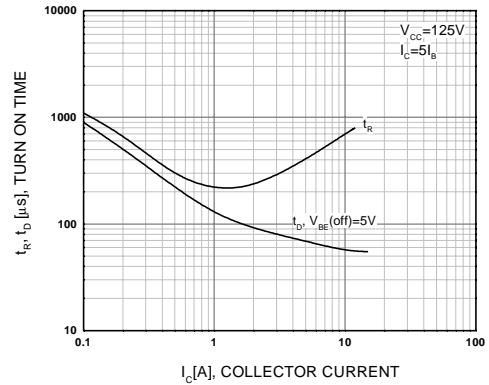


Figure 4. Turn On Time

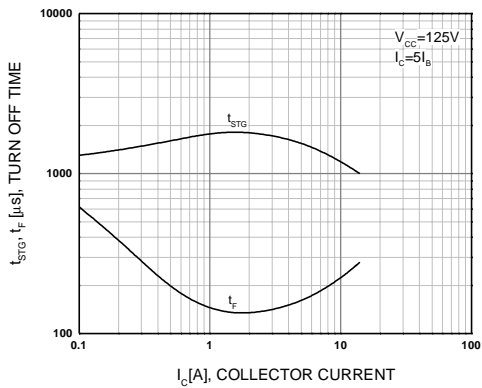


Figure 5. Turn Off Time

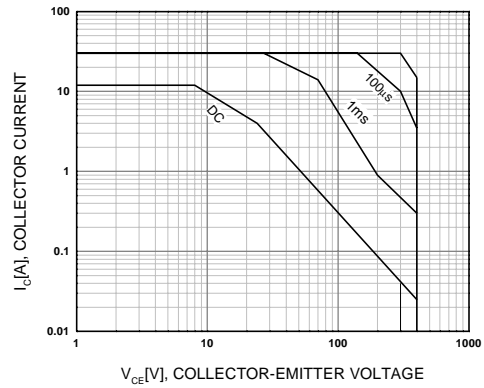


Figure 6. Safe Operating Area

Typical Characteristics (Continued)

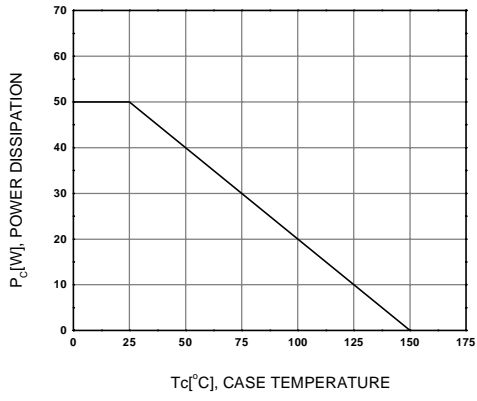


Figure 1. DC current Gain

Package Dimensions

KSE13009F

TO-220F



Dimensions in Millimeters

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|----------------------|---------------|-------------|
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| E ² CMOS™ | PowerTrench® | VCX™ |
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| FACT Quiet Series™ | QS™ | |
| FAST® | Quiet Series™ | |
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