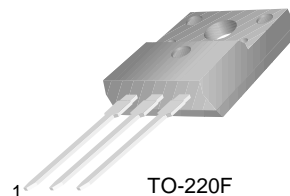


KSC3569

High Speed Switching Application

- Low Collector Saturation Voltage
- Specified of Reverse Biased SOA With Inductive Loads



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

NPN Epitaxial Silicon Transistor

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

| Symbol | Parameter | Value | Units |
|-----------|--|------------|------------------|
| V_{CBO} | Collector-Base Voltage | 500 | V |
| V_{CEO} | Collector-Emitter Voltage | 400 | V |
| V_{EBO} | Emitter-Base Voltage | 7 | V |
| I_C | Collector Current (DC) | 2 | A |
| I_{CP} | *Collector Current (Pulse) | 4 | A |
| I_B | Base Current | 1 | A |
| P_C | Collector Dissipation ($T_C=25^\circ\text{C}$) | 15 | W |
| T_J | Junction Temperature | 150 | $^\circ\text{C}$ |
| T_{STG} | Storage Temperature | - 55 ~ 150 | $^\circ\text{C}$ |

* $PW \leq 350\mu\text{s}$, Duty Cycle $\leq 10\%$

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

| Symbol | Parameter | Test Condition | Min. | Max. | Units |
|------------------------|--|--|----------|------|---------------|
| $V_{CEO(sus)}$ | Collector-Emitter Sustaining Voltage | $I_C = 0.5\text{A}$, $I_{B1} = 0.1\text{A}$, $L = 1\text{mH}$ | 400 | | V |
| $V_{CEX(sus)1}$ | Collector-Emitter Sustaining Voltage | $I_C = 0.5\text{A}$, $I_{B1} = -I_{B2} = 0.1\text{A}$ $T_a = 125^\circ\text{C}$, $L = 180\mu\text{H}$, Clamped | 450 | | V |
| $V_{CEX(sus)2}$ | Collector-Emitter Sustaining Voltage | $I_C = 1\text{A}$, $I_{B1} = -I_{B2} = 0.2\text{A}$, $T_a = 125^\circ\text{C}$, $L = 180\mu\text{H}$, Clamped | 400 | | V |
| I_{CBO} | Collector Cut-off Current | $V_{CB} = 400\text{V}$, $I_E = 0$ | | 10 | μA |
| I_{CER} | Collector Cut-off Current | $V_{CE} = 400\text{V}$, $R_{BE} = 51\Omega$ @ $T_C = 125^\circ\text{C}$ | | 1 | mA |
| I_{CEX1} | Collector Cut-off Current | $V_{CE} = 400\text{V}$, $V_{BE}(\text{off}) = -5\text{V}$ | | 10 | μA |
| I_{CEX2} | Collector Cut-off Current | $V_{CE} = 400\text{V}$, $V_{BE}(\text{off}) = -5\text{V}$ @ $T_C = 125^\circ\text{C}$ | | 1 | mA |
| I_{EBO} | Emitter Cut-off Current | $V_{BE} = 5\text{V}$, $I_C = 0$ | | 10 | μA |
| h_{FE1} h_{FE2} | * DC Current Gain | $V_{CE} = 5\text{V}$, $I_C = 0.1\text{A}$ $V_{CE} = 5\text{V}$, $I_C = 0.5\text{A}$ | 20 10 | 80 | |
| $V_{CE(sat)}$ | * Collector-Emitter Saturation Voltage | $I_C = 0.5\text{A}$, $I_B = 0.1\text{A}$ | | 1 | V |
| $V_{BE(sat)}$ | * Base-Emitter Saturation Voltage | $I_C = 0.5\text{A}$, $I_B = 0.1\text{A}$ | - | 1.2 | V |
| t_{ON} | Turn ON Time | $V_{CC} = 150\text{V}$, $I_C = 0.5\text{A}$ | | 1 | μs |
| t_{STG} | Storage Time | $I_{B1} = -I_{B2} = 0.1\text{A}$ | | 2.5 | μs |
| t_F | Fall Time | $R_L = 300\Omega$ | | 1 | μs |

* Pulse Test: $PW \leq 350\mu\text{s}$, Duty Cycles $\leq 2\%$ Pulsed

h_{FE} Classification

| Classification | R | O | Y |
|----------------|---------|---------|---------|
| h_{FE1} | 20 ~ 40 | 30 ~ 60 | 40 ~ 80 |

Typical Characteristics

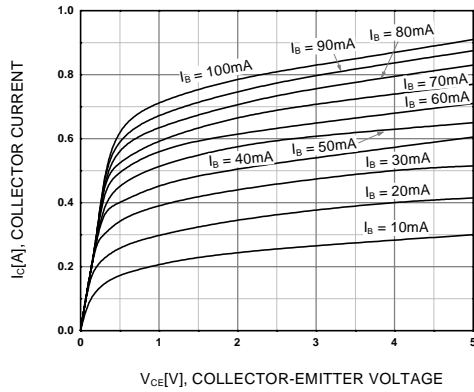


Figure 1. Static Characteristic

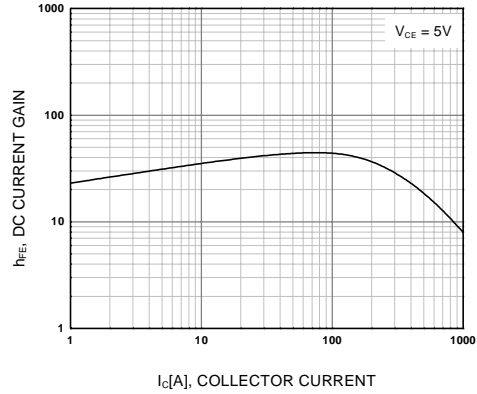


Figure 2. DC current Gain

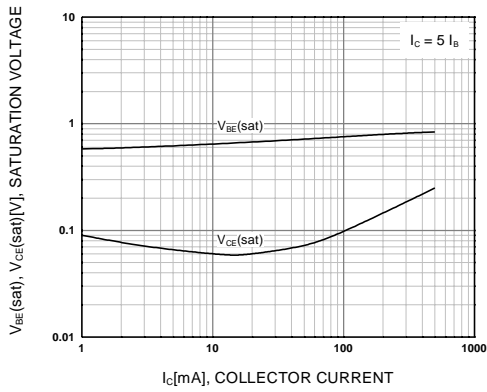


Figure 3. Base-Emitter Saturation Voltage
Collector-Emitter Saturation Voltage

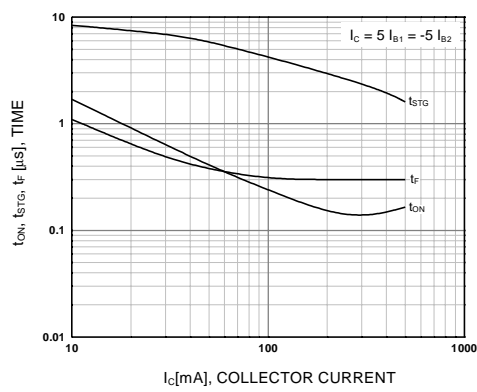


Figure 4. Switching Time

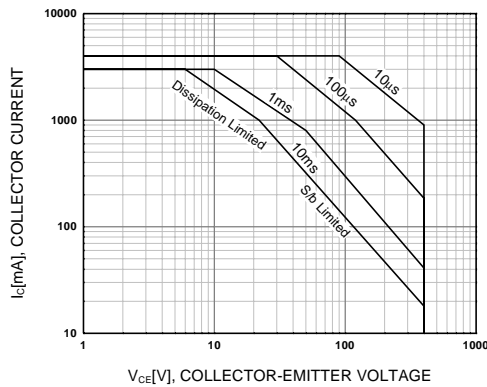


Figure 5. Safe Operating Area

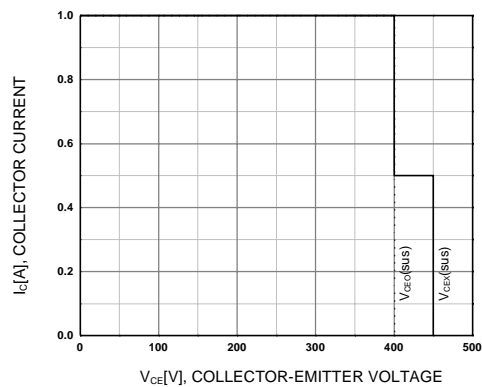


Figure 6. Reverse Bias Safe Operating Area

Typical Characteristics (Continued)

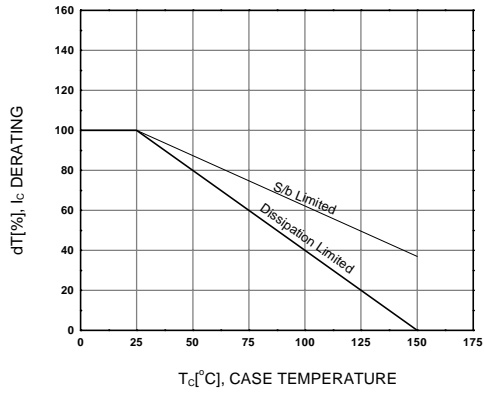


Figure 7. Derating Curve of Safe Operating Area

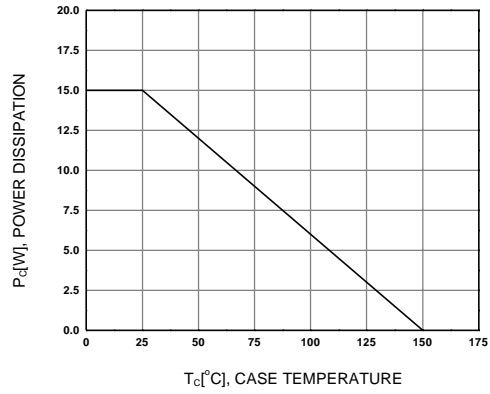
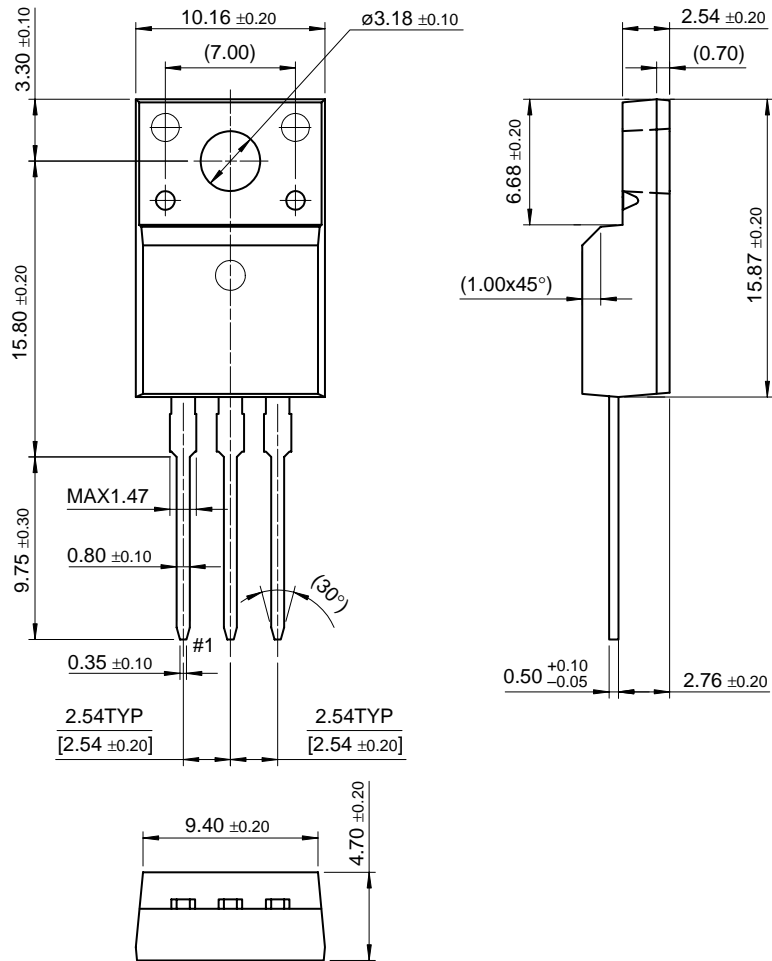


Figure 8. Power Derating

Package Dimensions

KSC3569

TO-220F



Dimensions in Millimeters

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| CROSSVOLT™ | POP™ | UHC™ |
| E ² CMOS™ | PowerTrench® | VCX™ |
| FACT™ | QFET™ | |
| FACT Quiet Series™ | QS™ | |
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