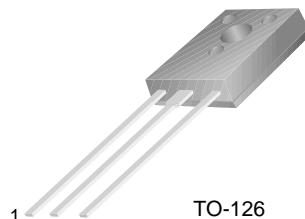


**High Speed  
High Voltage Switching Industrial Use**



TO-126  
1. Emitter 2. Collector 3. Base

**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)                           | 0.5        | A                |
| $I_{CP}$  | *Collector Current (Pulse)                       | 1          | A                |
| $I_B$     | Base Current (DC)                                | 0.25       | A                |
| $P_C$     | Collector Dissipation ( $T_a=25^\circ\text{C}$ ) | 1          | W                |
| $P_C$     | Collector Dissipation ( $T_C=25^\circ\text{C}$ ) | 10         | W                |
| $T_J$     | Junction Temperature                             | 150        | $^\circ\text{C}$ |
| $T_{STG}$ | Storage Temperature                              | - 55 ~ 150 | $^\circ\text{C}$ |

\*  $PW \leq 300\mu\text{s}$ , 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   | $I_C = 0.3\text{A}$ , $I_{B1} = 0.06\text{A}$ , $L = 10\text{mH}$   | 400      |      | V             |
| $V_{CEX(sus)1}$        | Collector-Emitter Sustaining Voltage   | $I_C = 0.3\text{A}$ , $I_{B1} = -I_{B2} = 0.06\text{A}$<br>$V_{BE(off)} = -5\text{V}$ , $L = 10\text{mH}$ , Clamped                 | 450      |      | V             |
| $V_{CEX(sus)2}$        | Collector-Emitter Sustaining Voltage   | $I_C = 0.6\text{A}$ , $I_{B1} = 0.2\text{A}$ , $I_{B2} = -0.06\text{A}$<br>$V_{BE(off)} = -5\text{V}$ , $L = 10\text{mH}$ , Clamped | 400      |      | V             |
| $I_{CBO}$              | Collector Cut-off Current              | $V_{CB} = 400\text{V}$ , $I_E = 0$  |          | 10   | $\mu\text{A}$ |
| $I_{CER}$              | 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              | $V_{CE} = 400\text{V}$ , $R_{BE(off)} = -1.5\text{V}$   |          | 10   | $\mu\text{A}$ |
| $I_{CEX2}$             | Collector Cut-off Current              | $V_{CE} = 400\text{V}$ , $R_{BE(off)} = -1.5\text{V}$<br>@ $T_C = 125^\circ\text{C}$  |          | 1    | mA            |
| $I_{EBO}$              | Emitter Cut-off Current                | $V_{EB} = 5\text{V}$ , $I_C = 0$  |          | 10   | $\mu\text{A}$ |
| $h_{FE1}$<br>$h_{FE2}$ | * DC Current Gain                      | $V_{CE} = 5\text{V}$ , $I_C = 0.05\text{A}$<br>$V_{CE} = 5\text{V}$ , $I_C = 0.3\text{A}$   | 20<br>10 | 80   |               |
| $V_{CE(sat)}$          | * Collector-Emitter Saturation Voltage | $I_C = 0.3\text{A}$ , $I_B = 0.06\text{A}$  |          | 1    | V             |
| $V_{BE(sat)}$          | * Base-Emitter Saturation Voltage      | $I_C = 0.3\text{A}$ , $I_B = 0.06\text{A}$  |          | 2    | V             |
| $t_{ON}$               | Turn ON Time                           | $V_{CC} = 150\text{V}$ , $I_C = 0.3\text{A}$  |          | 1    | $\mu\text{s}$ |
| $t_{STG}$              | Storage Time                           | $I_{B1} = -I_{B2} = 0.06\text{A}$ , $R_L = 500\Omega$<br>$PW = 50\mu\text{s}$ , Duty Cycle $\leq 2\%$                               |          | 2.5  | $\mu\text{s}$ |
| $t_F$                  | Fall Time                              |   |          | 1    | $\mu\text{s}$ |

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

**$h_{FE}$  Classification**

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

# Typical Characteristics

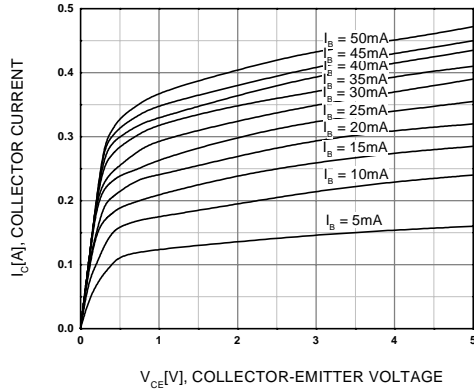


Figure 1. Static Characteristic

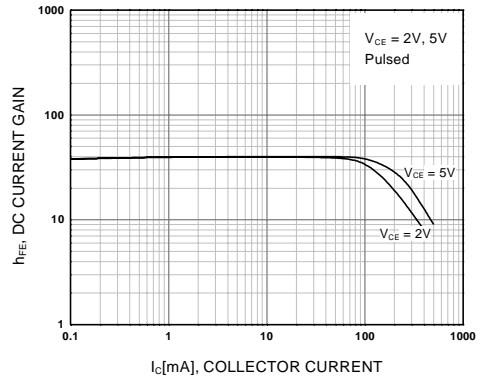


Figure 2. DC current Gain

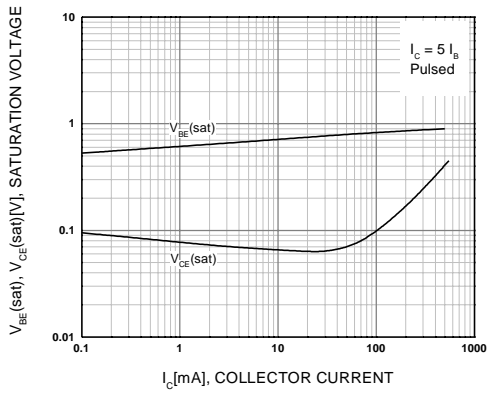


Figure 3. Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage

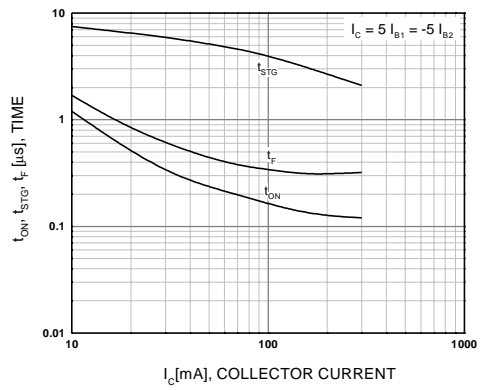


Figure 4. Switching Time

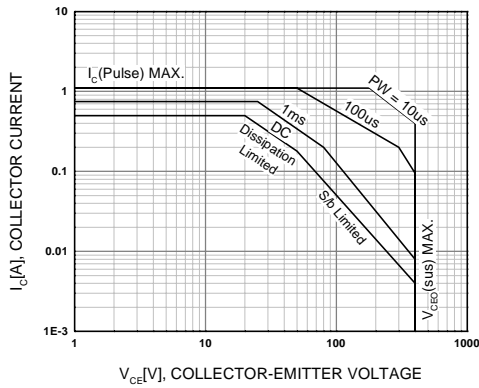


Figure 5. Safe Operating Area

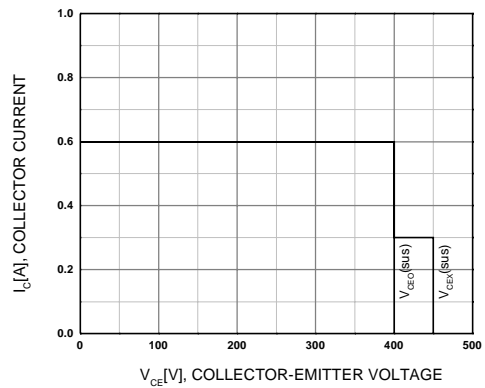


Figure 6. Reverse Bias Safe Operating Area

### Typical Characteristics (Continued)

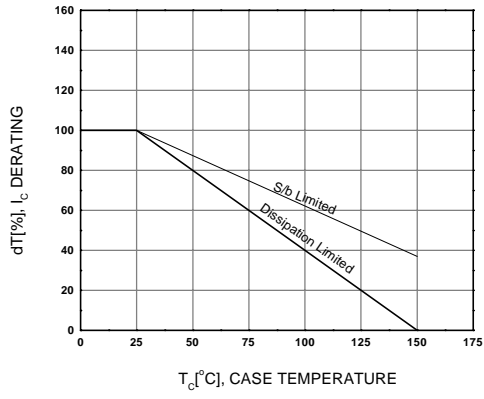


Figure 7. Derating Curve of Safe Operating Area

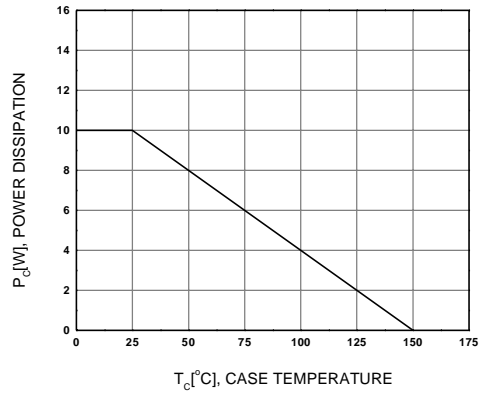


Figure 8. Power Derating

# Package Dimensions

KSC2752

## TO-126



Dimensions in Millimeters

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|----------------------|---------------|-------------|
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| Bottomless™          | ISOPLANAR™    | SyncFET™    |
| CoolFET™             | MICROWIRE™    | TinyLogic™  |
| CROSSVOLT™           | POP™          | UHC™        |
| E <sup>2</sup> CMOS™ | PowerTrench®  | VCX™        |
| FACT™                | QFET™         |             |
| FACT Quiet Series™   | QS™           |             |
| FAST®                | Quiet Series™ |             |
| FASTr™               | SuperSOT™-3   |             |
| GTO™                 | SuperSOT™-6   |             |

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