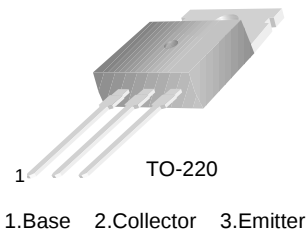


# KSC5039

KSC5039

## High Voltage Power Switch Switching Application



## NPN Silicon Transistor

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

| Symbol    | Parameter                                        | Value      | Units            |
|-----------|--------------------------------------------------|------------|------------------|
| $V_{CBO}$ | Collector-Base Voltage                           | 800        | V                |
| $V_{CEO}$ | Collector-Emitter Voltage                        | 400        | V                |
| $V_{EBO}$ | Emitter-Base Voltage                             | 7          | V                |
| $I_C$     | Collector Current (DC)                           | 5          | A                |
| $I_{CP}$  | Collector Current (Pulse)                        | 10         | A                |
| $I_B$     | Base Current                                     | 3          | A                |
| $P_C$     | Collector Dissipation ( $T_C=25^\circ\text{C}$ ) | 70         | 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         |
|---------------|----------------------------------------|-------------------------------------------------------------------------------------------------|------|------|------|---------------|
| $BV_{CBO}$    | Collector-Base Breakdown Voltage       | $I_C = 1\text{mA}, I_E = 0$                                                                     | 800  |      |      | V             |
| $BV_{CEO}$    | Collector-Emitter Breakdown Voltage    | $I_C = 5\text{mA}, I_B = 0$                                                                     | 400  |      |      | V             |
| $BV_{EBO}$    | Emitter-Base Breakdown Voltage         | $I_C = 1\text{mA}, I_C=0$                                                                       | 7    |      |      |               |
| $I_{CBO}$     | Collector Cut-off Current              | $V_{CB} = 500\text{V}, I_E = 0$                                                                 |      |      | 10   | $\mu\text{A}$ |
| $I_{EBO}$     | Emitter Cut-off Current                | $V_{EB} = 7\text{V}, I_C = 0$                                                                   |      |      | 10   | $\mu\text{A}$ |
| $h_{FE}$      | * DC Current Gain                      | $V_{CE} = 5\text{V}, I_C = 0.3\text{A}$                                                         | 10   |      |      |               |
| $V_{CE(sat)}$ | * Collector-Emitter Saturation Voltage | $I_C = 2.5\text{A}, I_B = 0.5\text{A}$                                                          |      |      | 1.5  | V             |
| $V_{BE(sat)}$ | * Base-Emitter Saturation Voltage      | $I_C = 2.5\text{A}, I_B = 0.5\text{A}$                                                          |      |      | 2.0  | V             |
| $f_T$         | Current Gain Bandwidth Product         | $V_{CE} = 5\text{V}, I_C = 0.1\text{A}$                                                         |      | 10   |      | MHz           |
| $C_{ob}$      | Output Capacitance                     | $V_{CB} = 10\text{V}, f = 1\text{MHz}$                                                          |      | 40   |      | pF            |
| $t_{ON}$      | Turn ON Time                           | $V_{CC}=150\text{V}, I_C = 2.5\text{A}$<br>$I_{B1} = -I_{B2} = 0.5\text{A}$<br>$R_L = 60\Omega$ |      |      | 1    | $\mu\text{s}$ |
| $t_{STG}$     | Storage Time                           |                                                                                                 |      |      | 3    | $\mu\text{s}$ |
| $t_F$         | Fall Time                              |                                                                                                 |      |      | 0.8  | $\mu\text{s}$ |

\* Plus test:  $PW=300\mu\text{s}$ , Duty Cycle=2% Pulsed

## Typical Characteristics

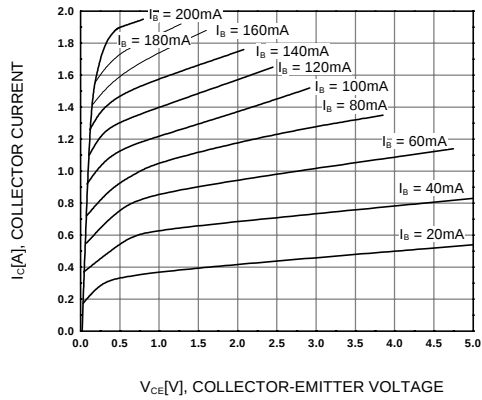


Figure 1. Static Characteristic

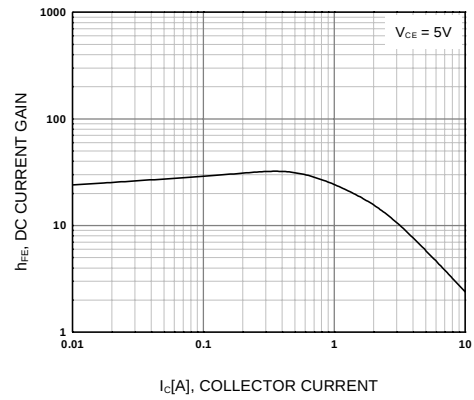


Figure 2. DC current Gain

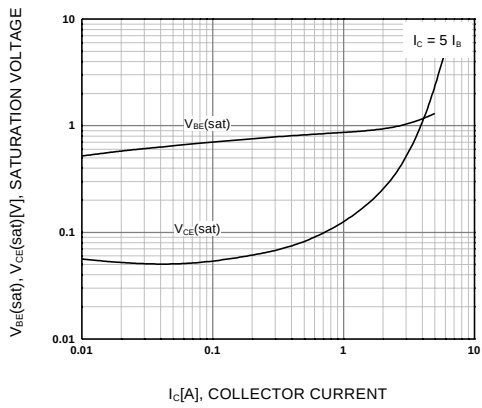


Figure 3. Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage

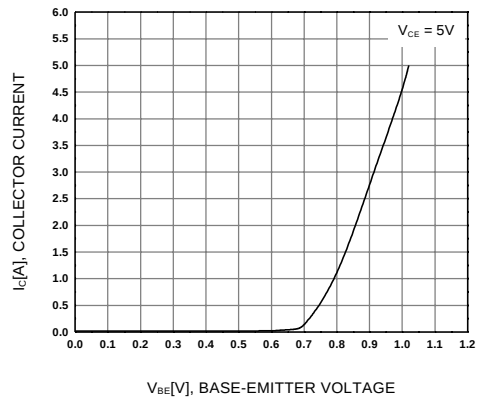


Figure 4. Base-Emitter On Voltage

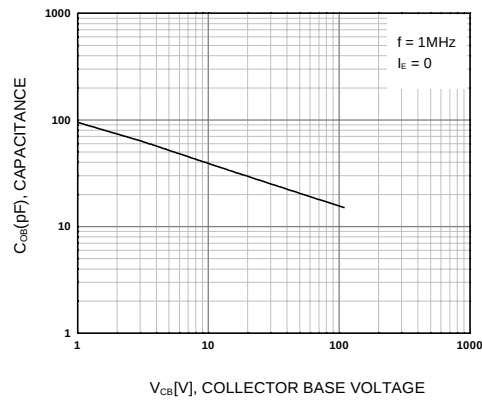


Figure 5. Collector Output Capacitance

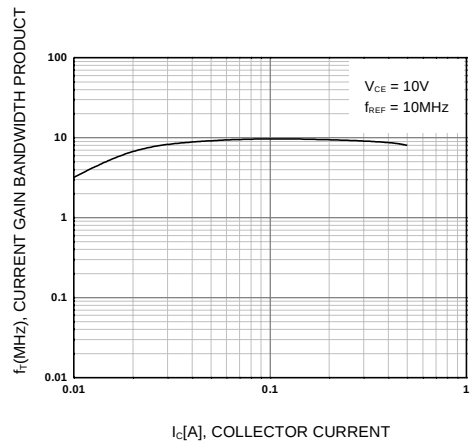


Figure 6. Current Gain Bandwidth Product

# Typical Characteristics (Continued)

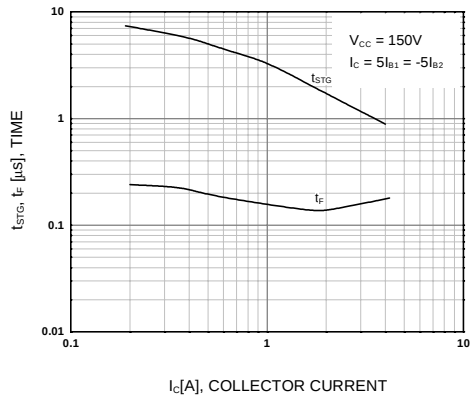


Figure 7. Switching Time

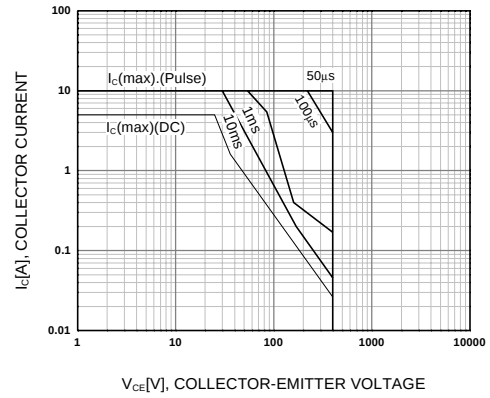


Figure 8. Safe Operating Area

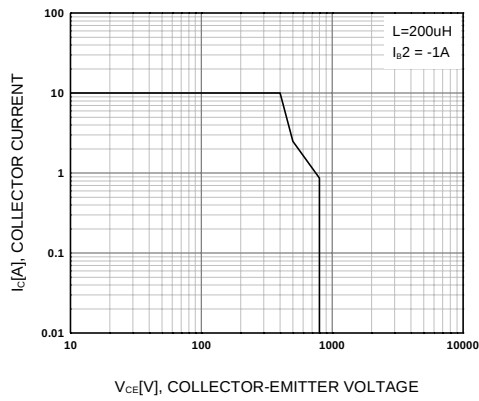


Figure 9. Reverse Bias Safe Operating Area

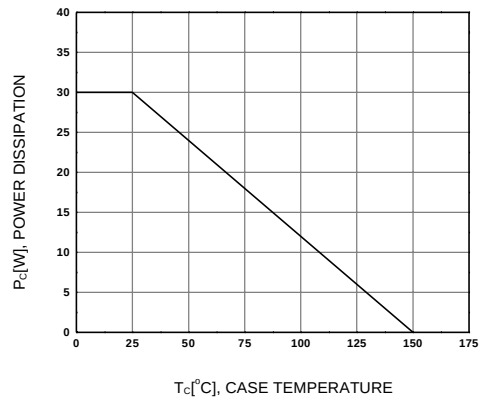
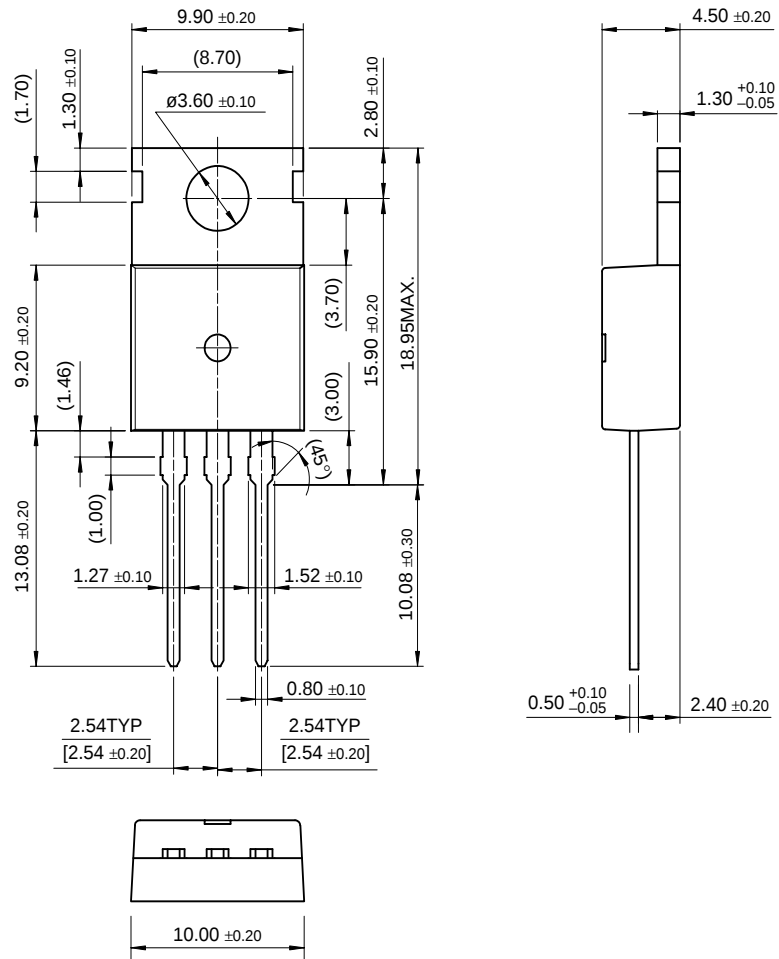


Figure 10. Power Derating

## Package Dimensions

KSC5039

### TO-220



Dimensions in Millimeters

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