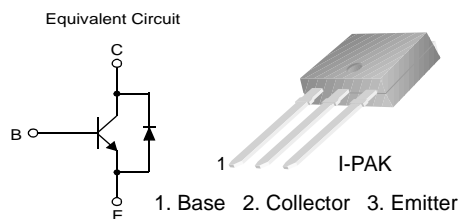


## KSC5302DI

KSC5302DI

### High Voltage & High Speed Power Switch Application

- Built-in Free-wheeling Diode makes efficient anti saturation operation  
Suitable for half-bridge light ballast Applications
- No need to interest an  $h_{FE}$  value because of low variable storage-time spread even though corner spirit
- Low base drive requirement



### 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                        | 12         | V                |
| $I_C$     | Collector Current (DC)                      | 2          | A                |
| $I_{CP}$  | *Collector Current (Pulse)                  | 5          | A                |
| $I_B$     | Base Current (DC)                           | 1          | A                |
| $I_{BP}$  | *Base Current (Pulse)                       | 2          | A                |
| $P_C$     | Power Dissipation( $T_C=25^\circ\text{C}$ ) | 25         | W                |
| $T_J$     | Junction Temperature                        | 150        | $^\circ\text{C}$ |
| $T_{STG}$ | Storage Temperature                         | - 55 ~ 150 | $^\circ\text{C}$ |

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

| Symbol          | Characteristics    |                     | Rating | Unit               |
|-----------------|--------------------|---------------------|--------|--------------------|
| $R_{\theta jc}$ | Thermal Resistance | Junction to Case    | 5.0    | $^\circ\text{C/W}$ |
| $R_{\theta ja}$ |                    | Junction to Ambient | 83.3   |                    |

**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 Cut-off Current                                       | $I_E=1\text{mA}, I_C=0$  | 12          | -                 | -           | V                                    |
| $I_{CBO}$              | Collector Cut-off Current                                     | $V_{CB}=500\text{V}, I_E=0$  | -           | -                 | 10          | $\mu\text{A}$                        |
| $I_{EBO}$              | Emitter Cut-off Current                                       | $V_{EB}=9\text{V}, I_C=0$  | -           | -                 | 10          | $\mu\text{A}$                        |
| $h_{FE1}$<br>$h_{FE2}$ | DC Current Gain   | $V_{CE}=1\text{V}, I_C=0.4\text{A}$<br>$V_{CE}=1\text{V}, I_C=1\text{A}$   | 20<br>10    | -<br>-            | -<br>-      |                                      |
| $V_{CE}(\text{sat})$   | Collector-Emitter Saturation Voltage                          | $I_C=0.4\text{A}, I_B=0.04\text{A}$<br>$I_C=1\text{A}, I_B=0.2\text{A}$  | -<br>-      | -<br>-            | 0.4<br>0.5  | V<br>V                               |
| $V_{BE}(\text{sat})$   | Base-Emitter Saturation Voltage                               | $I_C=0.4\text{A}, I_B=0.04\text{A}$<br>$I_C=1\text{A}, I_B=0.2\text{A}$  | -<br>-      | -<br>-            | 0.9<br>1.0  | V<br>V                               |
| $C_{ob}$               | Output Capacitance  | $V_{CB}=10\text{V}, f=1\text{MHz}$   | -           | -                 | 75          | pF                                   |
| $t_{ON}$               | Turn On Time  | $V_{CC}=300\text{V}, I_C=1\text{A}$  | -           | -                 | 150         | ns                                   |
| $t_{STG}$              | Storage Time  | $I_{B1}=0.2\text{A}, I_{B2}=-0.5\text{A}$<br>$R_L=300\Omega$   | -           | -                 | 2           | $\mu\text{s}$                        |
| $t_F$                  | Fall Time   |  | -           | -                 | 0.2         | $\mu\text{s}$                        |
| $t_{STG}$              | Storage Time  | $V_{CC}=15\text{V}, V_Z=300\text{V}$<br>$I_C=0.8\text{A}, I_{B1}=0.16\text{A}$<br>$I_{B2}=-0.16\text{A}$<br>$L_C=200\mu\text{H}$ | -           | -                 | 2.35        | $\mu\text{s}$                        |
| $t_F$                  | Fall Time   |  | -           | -                 | 150         | ns                                   |
| $V_F$                  | Diode Forward Voltage   | $I_F=0.4\text{A}$<br>$I_F=1\text{A}$   | -<br>-      | -<br>-            | 1.2<br>1.5  | V<br>V                               |
| $t_{rr}$               | * Reverse Recovery Time<br>( $di/dt=10\text{A}/\mu\text{s}$ ) | $I_F=0.2\text{A}$<br>$I_F=0.4\text{A}$<br>$I_F=1\text{A}$  | -<br>-<br>- | 800<br>1.0<br>1.4 | -<br>-<br>- | ns<br>$\mu\text{s}$<br>$\mu\text{s}$ |

\*Pulse Test : Pulse Width=5, Duty cycles  $\leq 10\%$

# Typical Characteristics

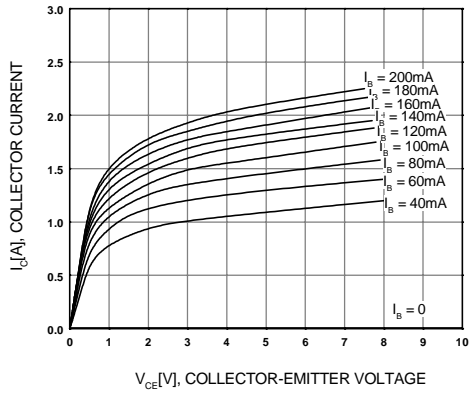


Figure 1. Static Characteristic

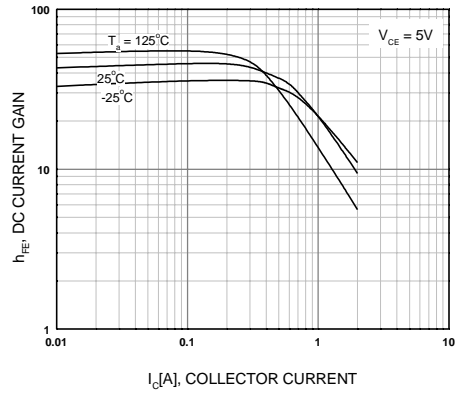


Figure 2. DC current Gain

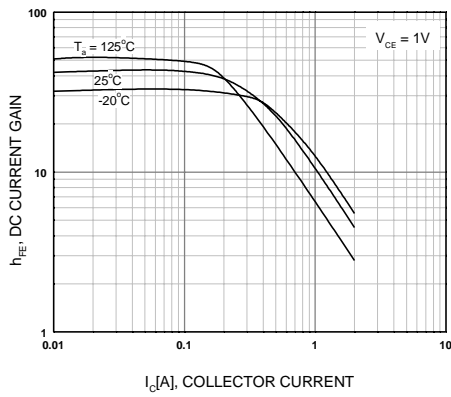


Figure 3. DC current Gain

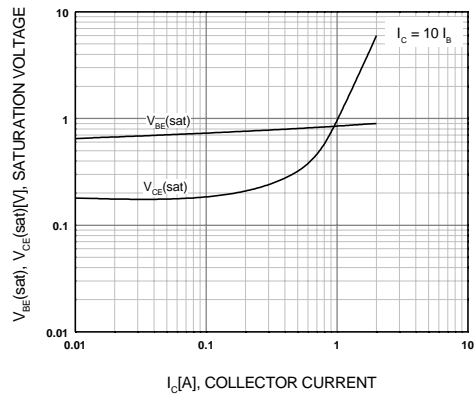


Figure 4. Collector-Emitter Saturation Voltage  
Base-Emitter Saturation Voltage

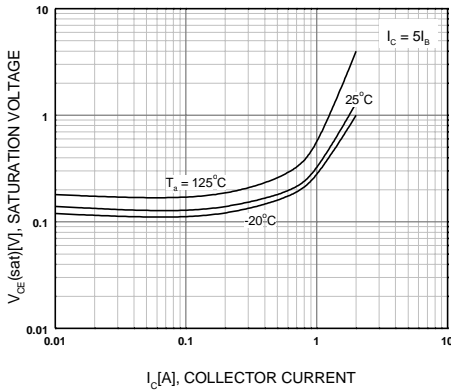


Figure 5. Collector-Emitter Saturation Voltage

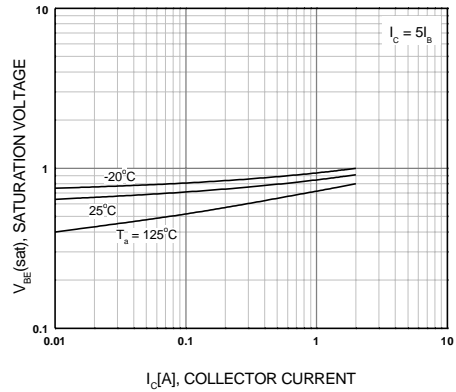


Figure 6. Base-Emitter Saturation Voltage

Typical Characteristics (Continued)

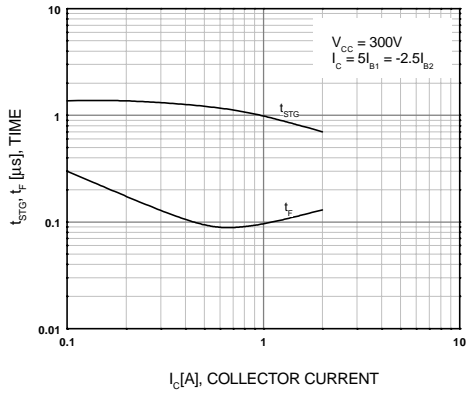


Figure 7. Switching Time

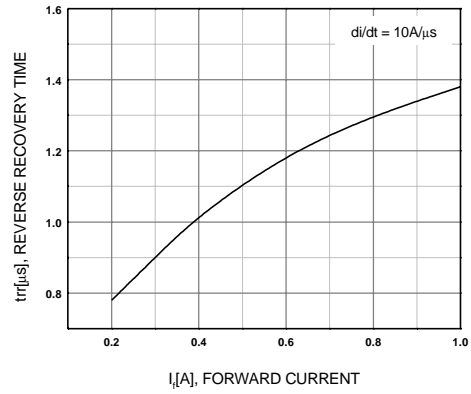


Figure 8. Forward Diode Voltage

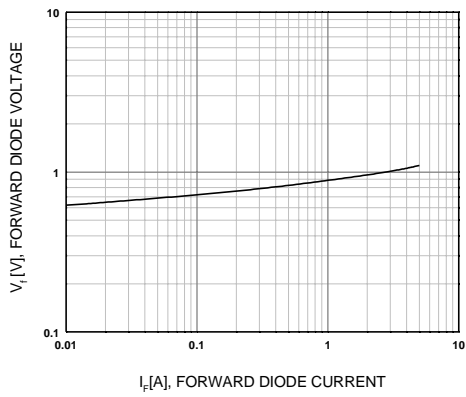


Figure 9. Reverse Recovery Time

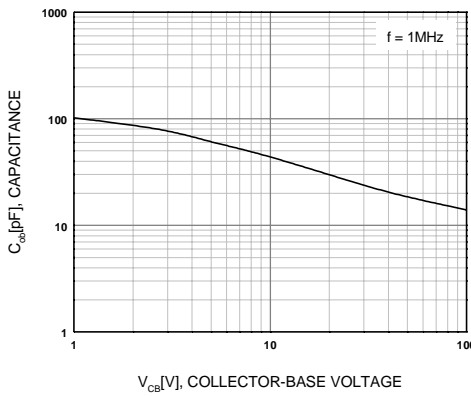


Figure 10. Collector Output Capacitance

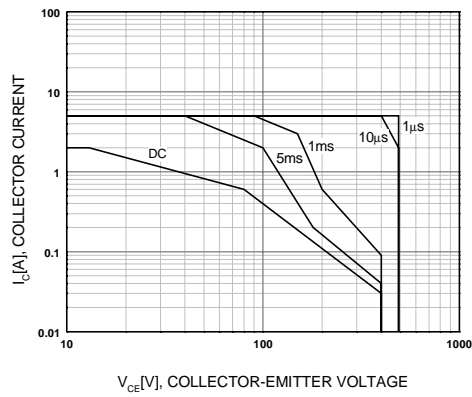


Figure 11. Safe Operating Area

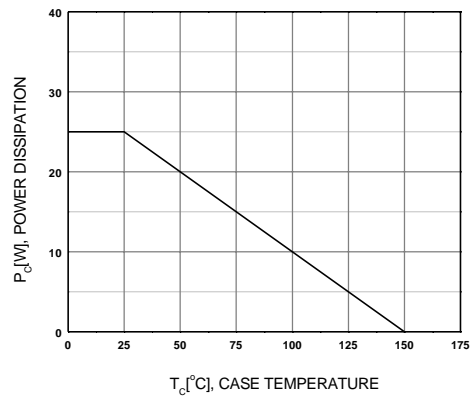
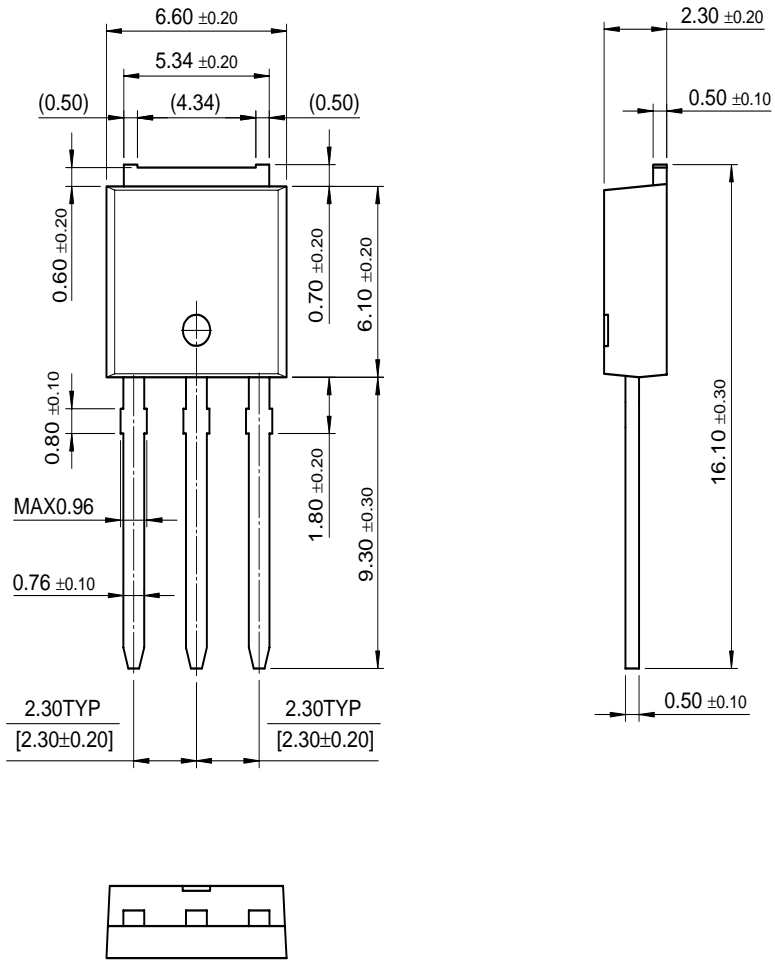


Figure 12. Power Derating

# Package Dimensions

## I-PAK



Dimensions in Millimeters

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| Bottomless <sup>™</sup>                          | FAST <sup>®</sup>               | LittleFET <sup>™</sup>         | Power247 <sup>™</sup>           | SuperSOT <sup>™</sup> -3    |
| CoolFET <sup>™</sup>                             | FAST <sup>™</sup>               | MicroFET <sup>™</sup>          | PowerTrench <sup>®</sup>        | SuperSOT <sup>™</sup> -6    |
| CROSSVOLT <sup>™</sup>                           | FRFET <sup>™</sup>              | MicroPak <sup>™</sup>          | QFET <sup>™</sup>               | SuperSOT <sup>™</sup> -8    |
| DOMET <sup>™</sup>                               | GlobalOptoisolator <sup>™</sup> | MICROWIRE <sup>™</sup>         | QS <sup>™</sup>                 | SyncFET <sup>™</sup>        |
| EcoSPARK <sup>™</sup>                            | GTO <sup>™</sup>                | MSX <sup>™</sup>               | QT Optoelectronics <sup>™</sup> | TinyLogic <sup>™</sup>      |
| E <sup>2</sup> CMOS <sup>™</sup>                 | HiSeC <sup>™</sup>              | MSXPro <sup>™</sup>            | Quiet Series <sup>™</sup>       | TruTranslation <sup>™</sup> |
| EnSigna <sup>™</sup>                             | I <sup>2</sup> C <sup>™</sup>   | OCX <sup>™</sup>               | RapidConfigure <sup>™</sup>     | UHC <sup>™</sup>            |
| Across the board. Around the world. <sup>™</sup> |                                 | OCXPro <sup>™</sup>            | RapidConnect <sup>™</sup>       | UltraFET <sup>®</sup>       |
| The Power Franchise <sup>™</sup>                 |                                 | OPTOLOGIC <sup>®</sup>         | SILENT SWITCHER <sup>®</sup>    | VCX <sup>™</sup>            |
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