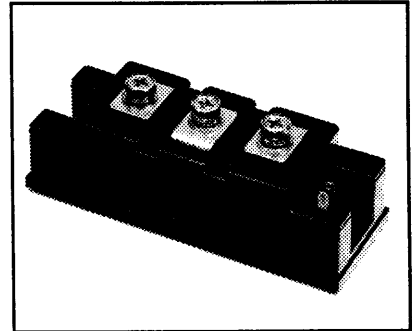
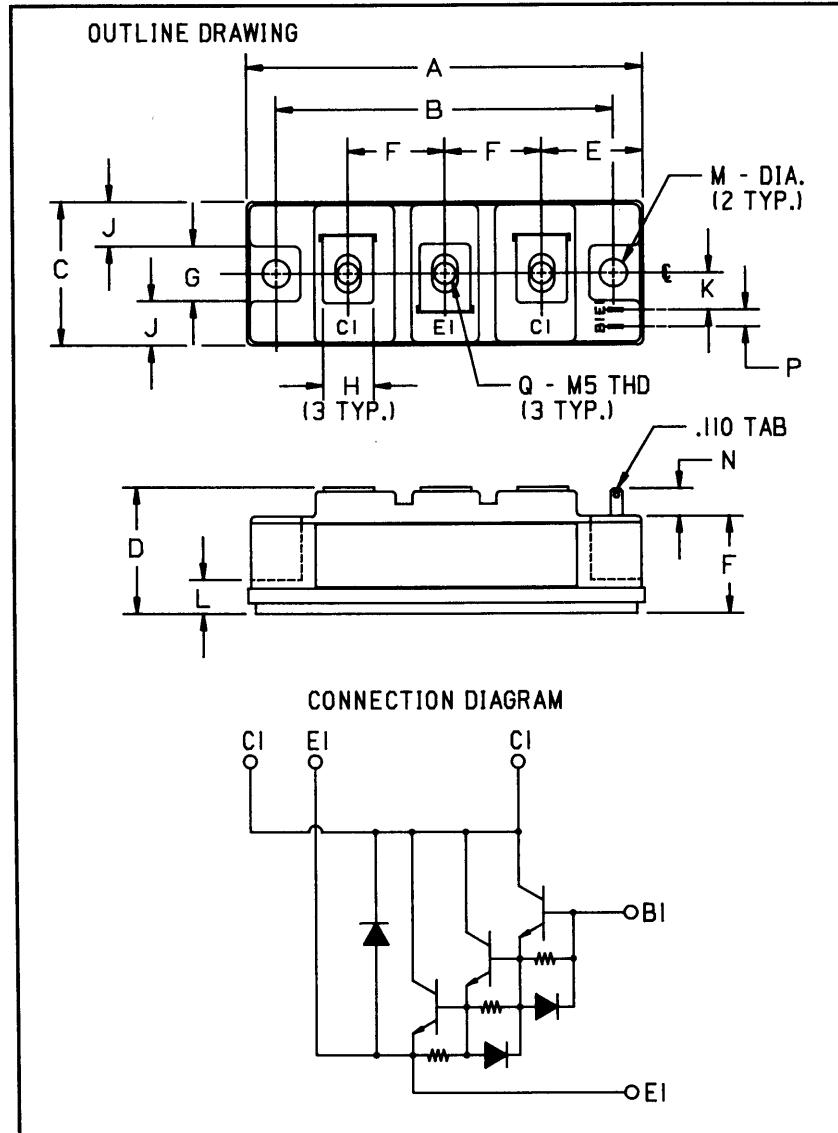


### Single Darlington Transistor Module 50 Amperes/1000 Volts



#### Description:

The Powerex Single Darlington Transistor Modules are high power devices designed for use in switching applications. The modules are isolated, consisting of one Darlington Transistor with a reverse parallel connected high-speed diode and base-to-emitter speed-up diode.

#### Features:

- ☐ Isolated Mounting
- ☐ Planar Chips
- ☐ Discrete Fast Recovery Feedback Diode
- ☐ High Gain ( $h_{FE}$ )
- ☐ TAB Quick-Connect Terminals
- ☐ Base-Emitter Speed-up Diode

#### Applications:

- ☐ Inverters
- ☐ DC Motor Control
- ☐ Switching Power Supplies
- ☐ AC Motor Control

#### Ordering Information:

Example: Select the complete eight digit module part number you desire from the table - i.e. KS221K05 is a 1000 Volt, 50 Ampere Single Darlington Module.

| Type | $V_{CE0(sus)}$<br>Volts 1000 | Current Rating<br>Amperes (X 10) |
|------|------------------------------|----------------------------------|
| KS22 | 1K                           | 05                               |

Outline Drawing

| Dimensions | Inches            | Millimeters   |
|------------|-------------------|---------------|
| A          | 3.701 Max.        | 94 Max.       |
| B          | $3.150 \pm 0.010$ | $80 \pm 0.25$ |
| C          | 1.339 Max.        | 34 Max.       |
| D          | 1.181 Max.        | 30 Max.       |
| E          | 0.945             | 24            |
| F          | 0.906             | 23            |
| G          | 0.512             | 13            |
| H          | 0.472             | 12            |

| Dimensions | Inches     | Millimeters |
|------------|------------|-------------|
| J          | 0.413      | 10.5        |
| K          | 0.344      | 8.75        |
| L          | 0.315      | 8           |
| M          | 0.256 Dia. | 6.5 Dia.    |
| N          | 0.256 Min. | 6.5 Min.    |
| P          | 0.157      | 4           |
| Q          | M5 Metric  | M5          |



Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (412) 925-7272

# KS221K05

Single Darlington Transistor Module

50 Amperes/1000 Volts

## Absolute Maximum Ratings, $T_J = 25^\circ\text{C}$ unless otherwise specified

| Ratings                                                     | Symbol         | KS221K05   | Units            |
|-------------------------------------------------------------|----------------|------------|------------------|
| Junction Temperature                                        | $T_J$          | -40 to 150 | $^\circ\text{C}$ |
| Storage Temperature                                         | $T_{stg}$      | -40 to 125 | $^\circ\text{C}$ |
| Collector-Emitter Sustaining Voltage, $V_{BE} = -2\text{V}$ | $V_{CEV(sus)}$ | 1000       | Volts            |
| Collector-Base Voltage                                      | $V_{CBO}$      | 1000       | Volts            |
| Emitter-Base Voltage                                        | $V_{EBO}$      | 7          | Volts            |
| Collector-Emitter Voltage                                   | $V_{CEV}$      | 1000       | Volts            |
| Continuous Collector Current                                | $I_C$          | 50         | Amperes          |
| Diode Forward Current                                       | $I_{FM}$       | 50         | Amperes          |
| Continuous Base Current                                     | $I_B$          | 3          | Amperes          |
| Diode Surge Current                                         | $I_{FSM}$      | 500        | Amperes          |
| Power Dissipation                                           | $P_t$          | 400        | Watts            |
| Max. Mounting Torque M5 Terminal Screws                     | —              | 17         | in.-lb.          |
| Max. Mounting Torque M6 Mounting Screws                     | —              | 26         | in.-lb.          |
| Module Weight (Typical)                                     | —              | 200        | Grams            |
| V Isolation                                                 | $V_{RMS}$      | 2500       | Volts            |

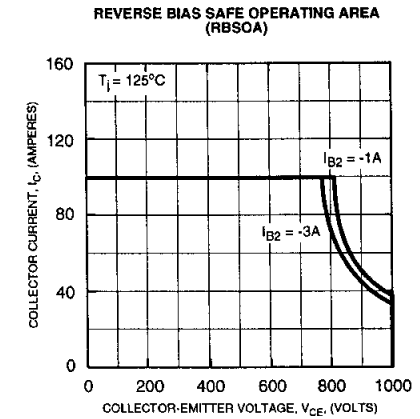
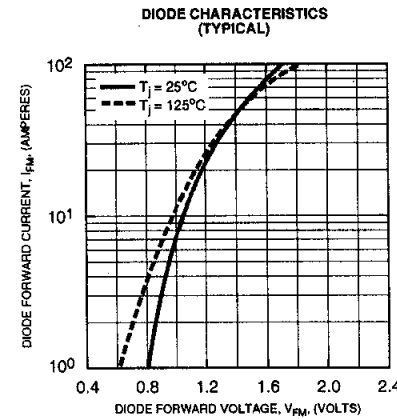
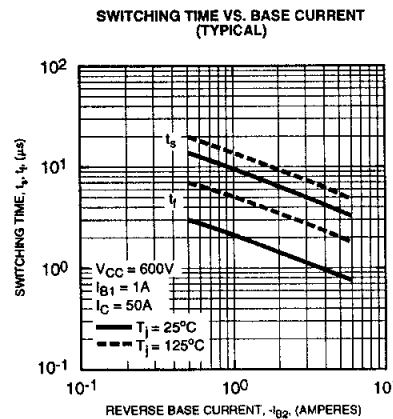
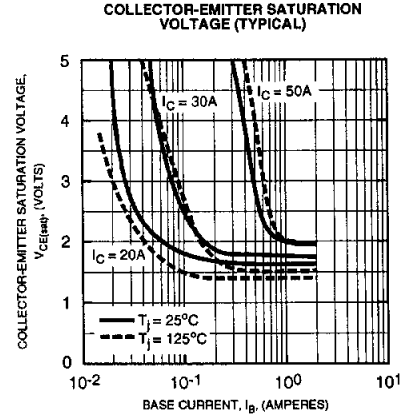
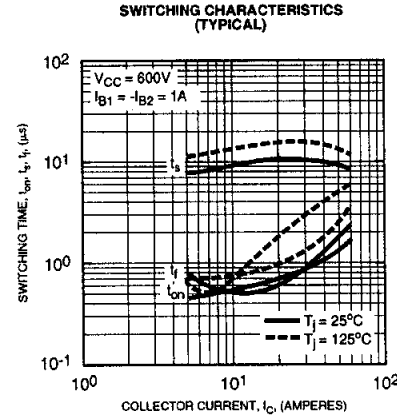
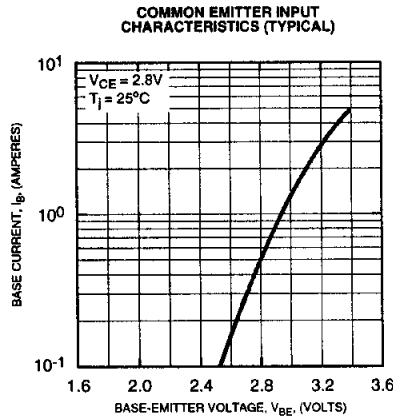
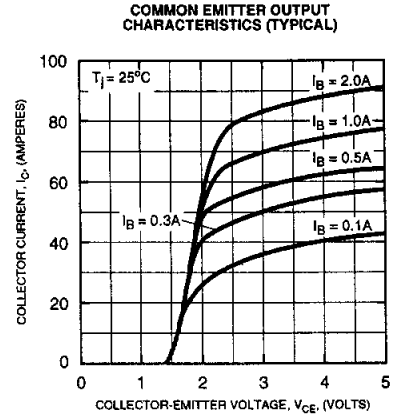
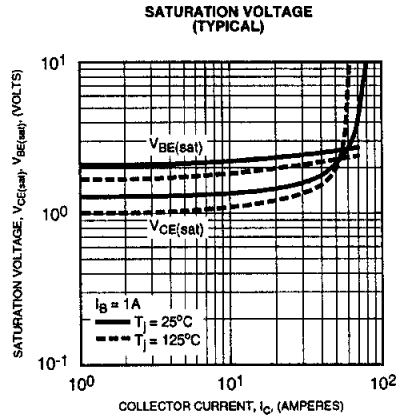
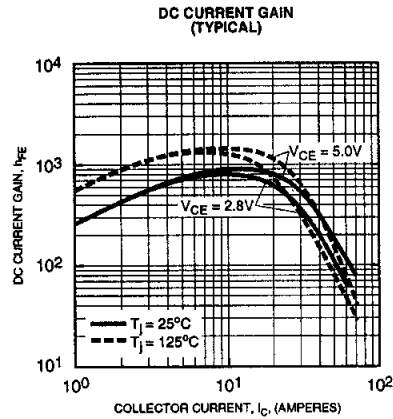
## Electrical Characteristics, $T_J = 25^\circ\text{C}$ unless otherwise specified

| Characteristics                      | Symbol        | Test Conditions                                                       | Min.                                      | Typ. | Max. | Units             |
|--------------------------------------|---------------|-----------------------------------------------------------------------|-------------------------------------------|------|------|-------------------|
| Collector Cutoff Current             | $I_{CEV}$     | $V_{CE} = 1000\text{V}, V_{BE} = -2\text{V}$                          | —                                         | —    | 1    | mA                |
|                                      |               | $V_{CE} = 1000\text{V}, V_{BE} = -2\text{V}, T_C = 125^\circ\text{C}$ | —                                         | —    | 10   | mA                |
| Emitter Cutoff Current               | $I_{EBO}$     | $V_{EB} = 7\text{V}$                                                  | —                                         | —    | 200  | mA                |
| DC Current Gain                      | $h_{FE}$      | $I_C = 50\text{A}, V_{CE} = 5\text{V}$                                | 100                                       | —    | —    | —                 |
| Diode Forward Voltage                | $V_{FM}$      | $I_{FM} = 50\text{A}$                                                 | —                                         | —    | 1.8  | Volts             |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 50\text{A}, I_B = 1\text{A}$                                   | —                                         | —    | 2.5  | Volts             |
| Base-Emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C = 50\text{A}, I_B = 1\text{A}$                                   | —                                         | —    | 3.5  | Volts             |
| Resistive                            | Turn-on       | $t_{on}$                                                              | $V_{CC} = 600\text{V}$                    | —    | —    | 2.5 $\mu\text{s}$ |
| Load                                 | Storage Time  | $t_s$                                                                 | $I_C = 50\text{A}$                        | —    | —    | 15 $\mu\text{s}$  |
| Switch Times                         | Fall Time     | $t_f$                                                                 | $I_{B1} = 1\text{A}, I_{B2} = -1\text{A}$ | —    | —    | 3.0 $\mu\text{s}$ |

## Thermal and Mechanical Characteristics, $T_J = 25^\circ\text{C}$ unless otherwise specified

| Characteristics                      | Symbol            | Test Conditions | Min. | Typ. | Max. | Units              |
|--------------------------------------|-------------------|-----------------|------|------|------|--------------------|
| Thermal Resistance, Case-to-Sink     | $R_{\theta(c-s)}$ | —               | —    | —    | 0.15 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction-to-Case | $R_{\theta(j-c)}$ | Transistor Part | —    | —    | 0.31 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction-to-Case | $R_{\theta(j-c)}$ | Diode Part      | —    | —    | 1.2  | $^\circ\text{C/W}$ |

**KS221K05**  
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 50 Amperes/1000 Volts



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