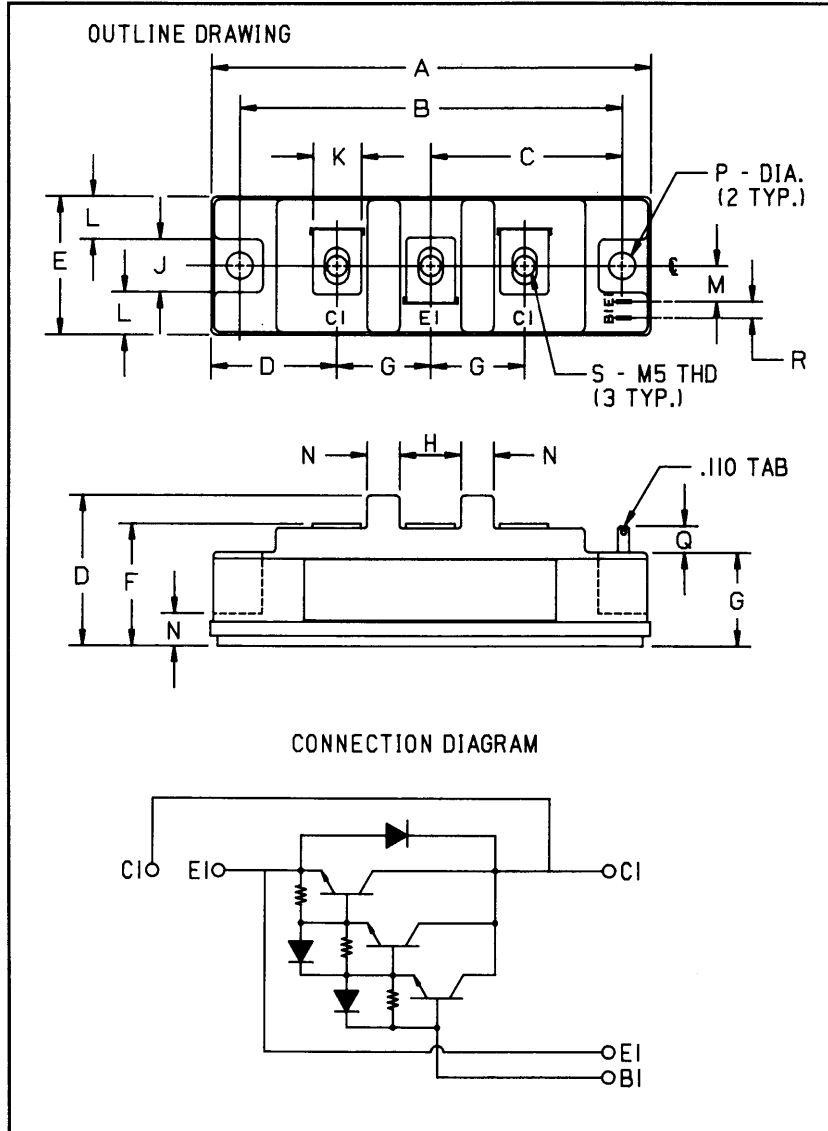


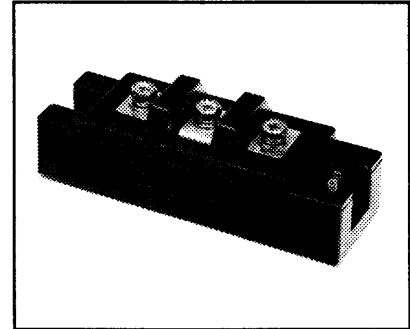
Single Darlington Transistor Module 150 Amperes/1000 Volts



Outline Drawing

| Dimensions | Inches | Millimeters |
|------------|---------------|-------------|
| A | 4.252 Max. | 108 Max. |
| B | 3.661 ± 0.012 | 93 ± 0.3 |
| C | 1.831 | 46.5 |
| D | 1.457 | 37 |
| E | 1.339 Max. | 34 Max. |
| F | 1.181 Max. | 30 Max. |
| G | 0.906 | 23 |
| H | 0.591 | 15 |
| J | 0.512 | 13 |

| Dimensions | Inches | Millimeters |
|------------|------------|-------------|
| K | 0.472 | 12 |
| L | 0.413 | 10.5 |
| M | 0.344 | 8.75 |
| N | 0.315 | 8 |
| P | 0.256 Dia. | 6.5 Dia. |
| Q | 0.256 Min. | 6.5 Min. |
| R | 0.157 | 4 |
| S | M5 Metric | M5 |



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. KS221K15 is a 1000 Volt, 150 Ampere Single Darlington Module.

| Type | $V_{CE0(sus)}$ Volts (1000) | Current Rating Amperes (X 10) |
|------|--------------------------------|----------------------------------|
| KS22 | 1K | 15 |



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

KS221K15
Single Darlington Transistor Module
 150 Amperes/1000 Volts

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

| Ratings | Symbol | KS221K15 | 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 | 150 | Amperes |
| Diode Forward Current | I_{FM} | 150 | Amperes |
| Continuous Base Current | I_B | 8 | Amperes |
| Diode Surge Current | I_{FSM} | 1500 | Amperes |
| Power Dissipation | P_t | 1000 | Watts |
| Max. Mounting Torque M5 Terminal Screws | - | 17 | in.-lb. |
| Max. Mounting Torque M6 Mounting Screws | - | 26 | in.-lb. |
| Module Weight (Typical) | - | 250 | Grams |
| V Isolation | V_{RMS} | 2500 | Volts |

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

| Characteristics | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|--------------------------------------|---------------|---|------|------|------|---------------|
| Collector Cutoff Current | I_{CEV} | $V_{CE} = 1000\text{V}, V_{BE} = -2\text{V}$ | - | - | 2 | mA |
| | | $V_{CE} = 1000\text{V}, V_{BE} = -2\text{V}, T_C = 125^\circ\text{C}$ | - | - | 20 | mA |
| Emitter Cutoff Current | I_{EBO} | $V_{EB} = 7\text{V}$ | - | - | 400 | mA |
| DC Current Gain | h_{FE} | $I_C = 150\text{A}, V_{CE} = 5\text{V}$ | 100 | - | - | - |
| Diode Forward Voltage | V_{FM} | $I_{FM} = 150\text{A}$ | - | - | 1.8 | Volts |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 150\text{A}, I_B = 2\text{A}$ | - | - | 2.5 | Volts |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | $I_C = 150\text{A}, I_B = 2\text{A}$ | - | - | 3.5 | Volts |
| Resistive Turn-on | t_{on} | $V_{CC} = 600\text{V}$ | - | - | 3.0 | μs |
| Load Storage Time | t_s | $I_C = 150\text{A}$ | - | - | 15 | μs |
| Switch Times Fall Time | t_f | $I_{B1} = 2\text{A}, I_{B2} = -2\text{A}$ | - | - | 3.0 | μs |

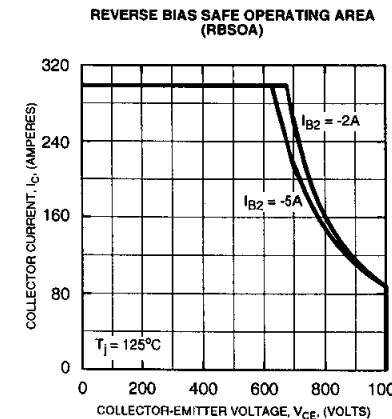
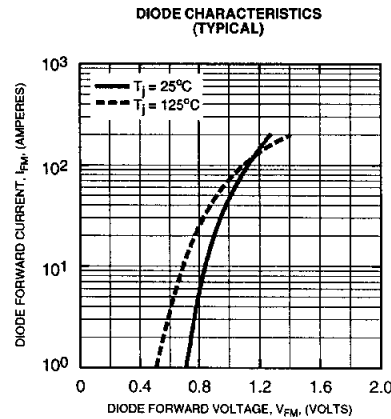
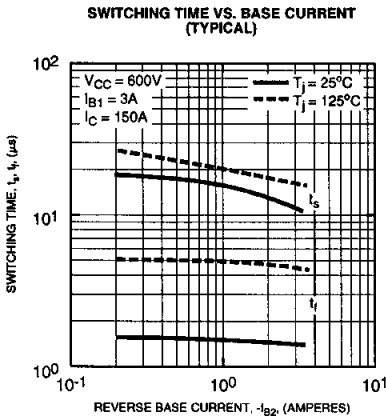
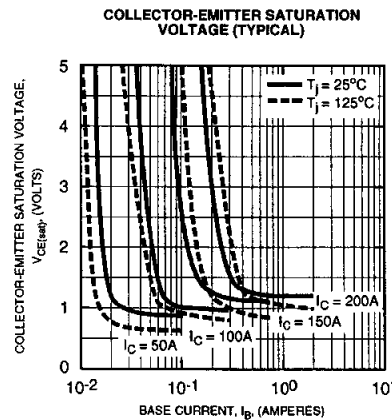
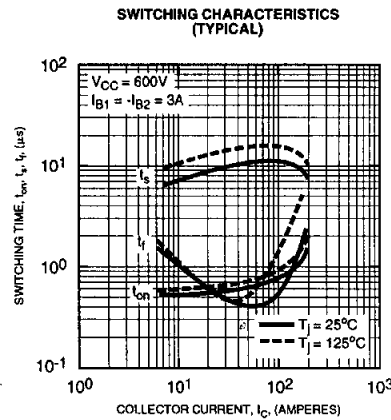
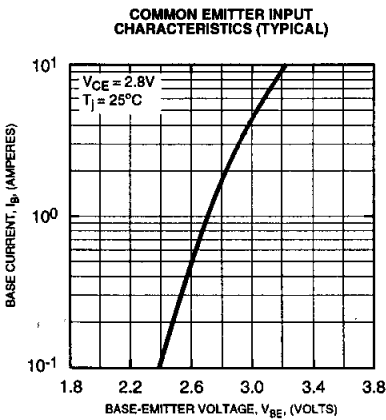
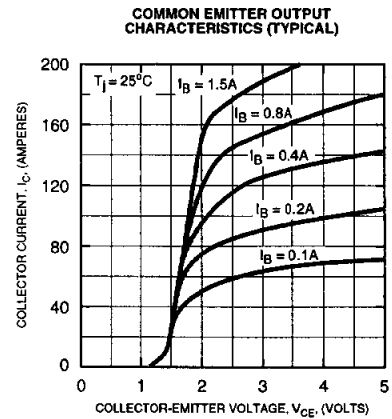
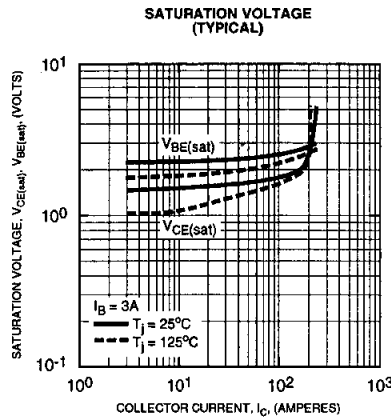
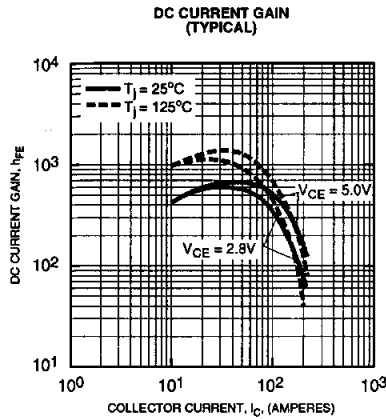
Thermal and Mechanical Characteristics, $T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified

| Characteristics | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|--------------------------------------|-------------------|-----------------|------|------|-------|--------------------|
| Thermal Resistance, Case-to-Sink | $R_{\theta(c-s)}$ | - | - | - | 0.13 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction-to-Case | $R_{\theta(j-c)}$ | Transistor Part | - | - | 0.125 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction-to-Case | $R_{\theta(j-c)}$ | Diode Part | - | - | 0.6 | $^\circ\text{C/W}$ |



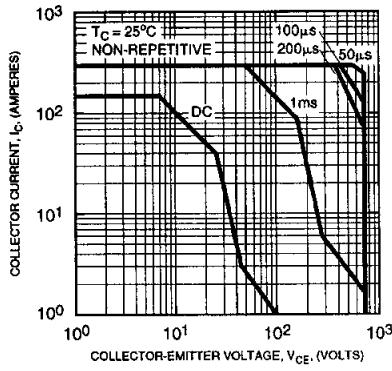
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KS221K15
Single Darlington Transistor Module
 150 Amperes/1000 Volts

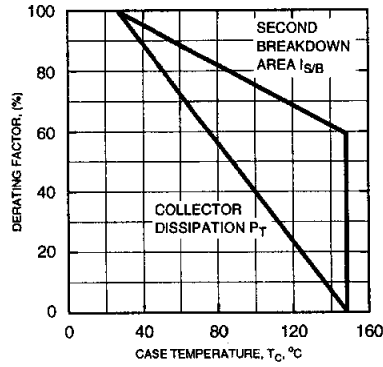


KS221K15
Single Darlington Transistor Module
 150 Amperes/1000 Volts

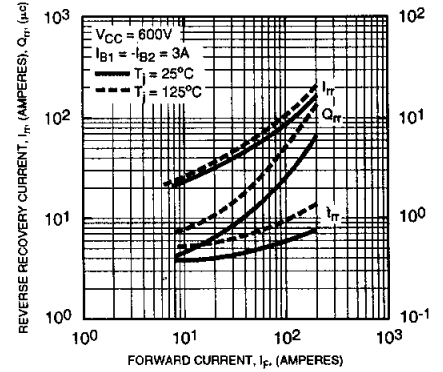
FORWARD BIAS SAFE OPERATING AREA (SOA)



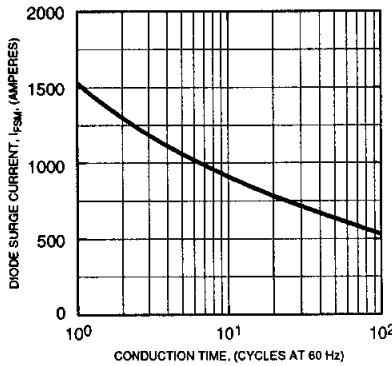
DERATING FACTOR OF SAFE OPERATING AREA (SOA)



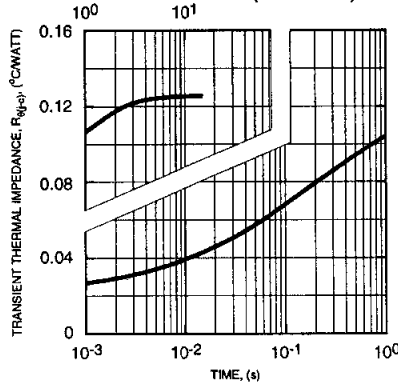
REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



DIODE FORWARD SURGE CURRENT



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (TRANSISTOR)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (DIODE)

