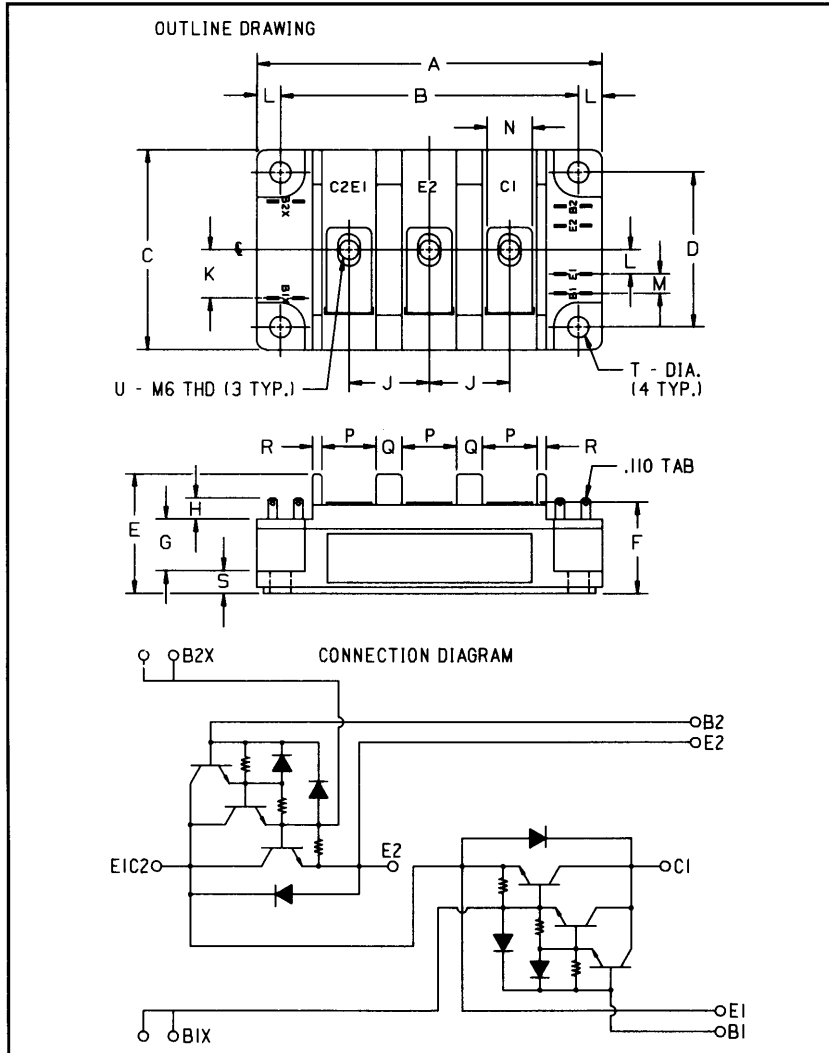


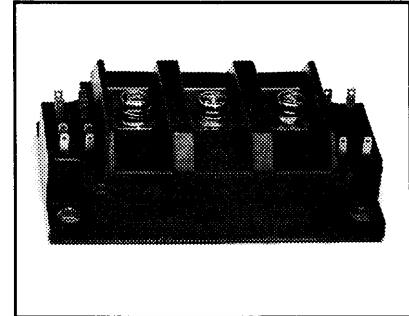
### Dual Darlington Transistor Module 150 Amperes/1000 Volts



Outline Drawing

| Dimensions | Inches        | Millimeters |
|------------|---------------|-------------|
| A          | 4.252 Max.    | 108 Max.    |
| B          | 3.661 ± 0.012 | 93 ± 0.3    |
| C          | 2.441 Max.    | 62 Max.     |
| D          | 1.890 ± 0.012 | 48 ± 0.3    |
| E          | 1.457         | 37          |
| F          | 1.181 Max.    | 30 Max.     |
| G          | 0.630         | 16          |
| H          | 0.256 Min.    | 6.5 Min.    |
| J          | 0.984         | 25          |
| K          | 0.591         | 15          |

| Dimensions | Inches     | Millimeters |
|------------|------------|-------------|
| L          | 0.295      | 7.5         |
| M          | 0.236      | 6           |
| N          | 0.551      | 14          |
| P          | 0.669      | 17          |
| Q          | 0.315      | 8           |
| R          | 0.118      | 3           |
| S          | 0.276      | 7           |
| T          | 0.256 Dia. | 6.5 Dia.    |
| U          | M6 Metric  | M6          |



#### Description:

The Powerex Dual Darlington Transistor Modules are high power devices designed for use in switching applications. The modules are isolated, consisting of two Darlington Transistors with each transistor having a reverse parallel connected high-speed diode.

#### Features:

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

#### Applications:

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

#### Ordering Information:

Example: Select the complete eight digit module part number you desire from the table - i.e. KD421K15 is a 1000 Volt, 150 Ampere Dual Darlington Module.

| Type | $V_{CE0(sus)}$<br>Volts (1000) | Current Rating<br>Amperes (X 10) |
|------|--------------------------------|----------------------------------|
| KD42 | 1K                             | 15                               |



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

**KD421K15**  
**Dual Darlington Transistor Module**  
 150 Amperes/1000 Volts

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

| Ratings   | Symbol         | KD421K15   | 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, $V_{BE} = -2\text{V}$            | $V_{CEV}$      | 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 (Each Transistor)                         | $P_t$          | 1000       | Watts            |
| Max. Mounting Torque M6 Terminal Screws                     | -              | 26         | in.-lb.          |
| Max. Mounting Torque M6 Mounting Screws                     | -              | 26         | in.-lb.          |
| Module Weight (Typical)                                     | -              | 470        | Grams            |
| V Isolation   | $V_{RMS}$      | 2500       | Volts            |

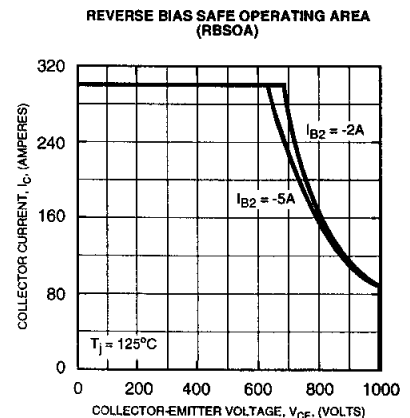
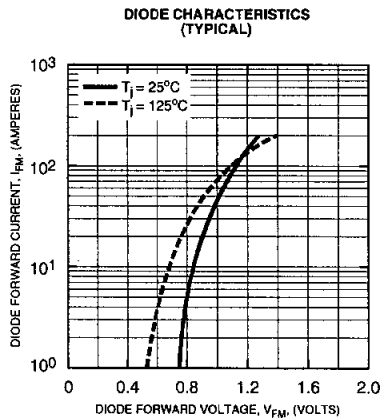
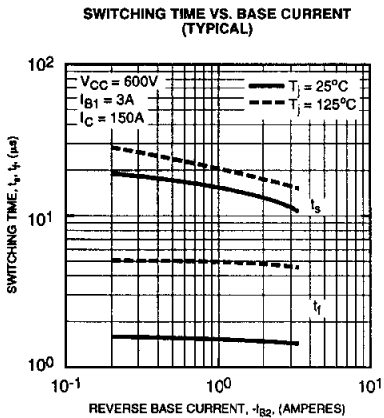
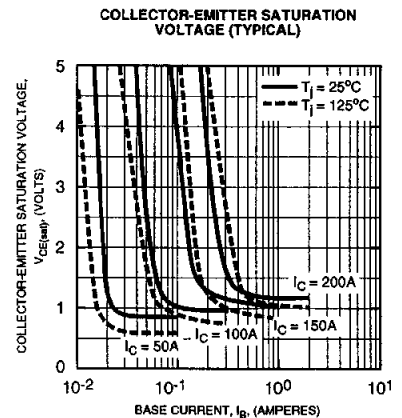
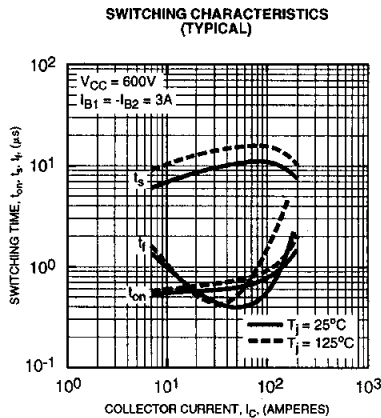
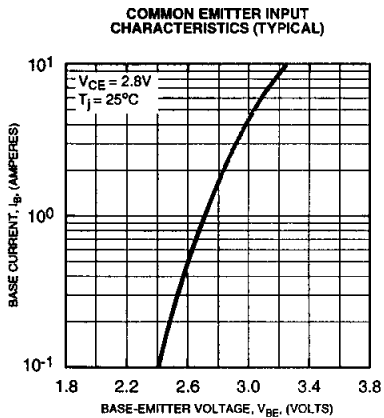
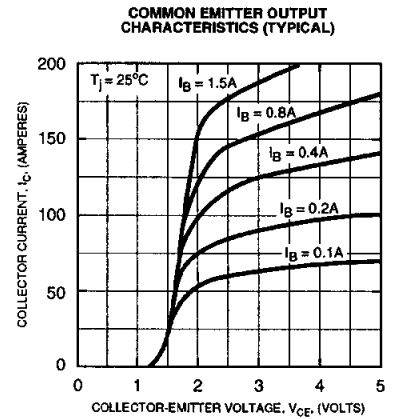
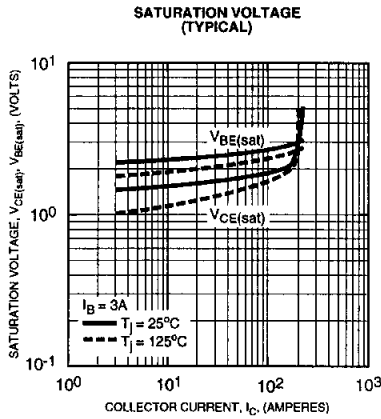
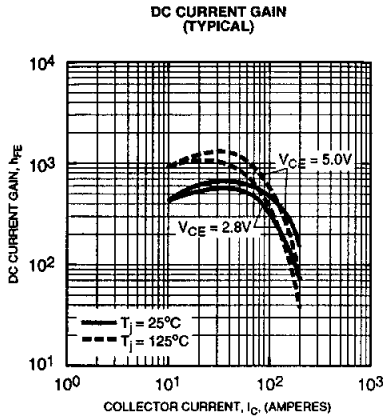
**Electrical Characteristics,  $T_j = 25\text{ }^\circ\text{C}$  unless otherwise specified**

| 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                      | $h_{FE}$      | $I_C = 150\text{A}, V_{CE} = 2.8\text{V}$                             | 75  | -                   | -    | -     |               |
|                                      |               | $I_C = 150\text{A}, V_{CE} = 5\text{V}$                               | 100                                       | -                   | -    | -     |               |
| Diode Forward Voltage                | $V_{FM}$      | $I_{FM} = 150\text{A}$  | -   | -                   | 1.8  | Volts |               |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 150\text{A}, I_B = 3\text{A}$                                  | -   | -                   | 2.5  | Volts |               |
| Base-Emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C = 150\text{A}, I_B = 3\text{A}$                                  | -   | -                   | 3.5  | Volts |               |
| Resistive                            | Turn-on       | $t_{on}$  | $V_{CC} = 600\text{V}$                    | -                   | -    | 3.0   | $\mu\text{s}$ |
|                                      | Load          | Storage Time  | $t_s$                                     | $I_C = 150\text{A}$ | -    | -     | 15            |
| Switch Times                         | Fall Time     | $t_f$   | $I_{B1} = 3\text{A}, I_{B2} = -3\text{A}$ | -                   | -    | 3.0   | $\mu\text{s}$ |

**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     | $R_{\theta(c-s)}$ | Per Half Module | -    | -    | 0.075 | $^\circ\text{C/W}$ |
| 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   | $^\circ\text{C/W}$ |

**KD421K15**  
**Dual Darlington Transistor Module**  
 150 Amperes/1000 Volts

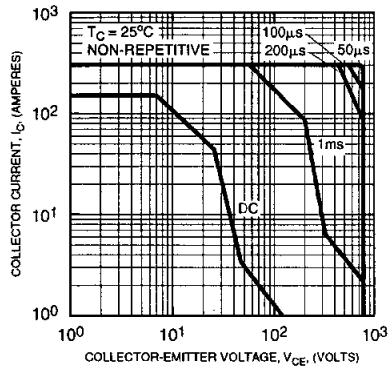




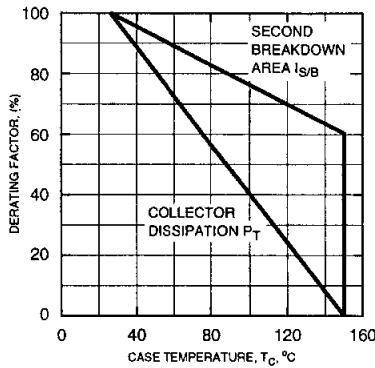
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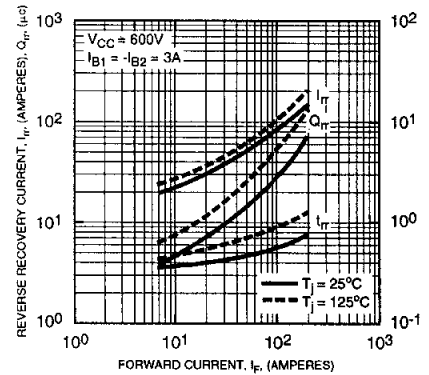
**FORWARD BIAS SAFE OPERATING AREA (SOA)**



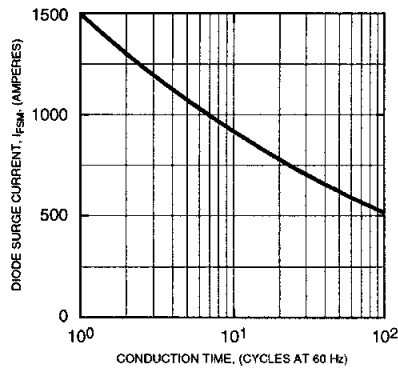
**DERATING FACTOR OF SAFE OPERATING AREA (SOA)**



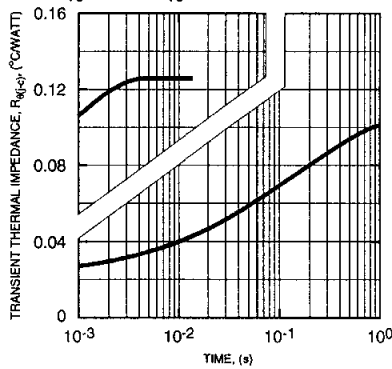
**REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)**



**DIODE FORWARD SURGE CURRENT**



**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (TRANSISTOR)**



**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (DIODE)**

