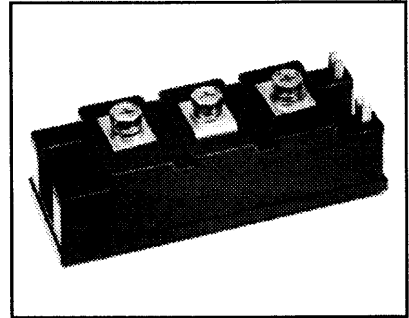
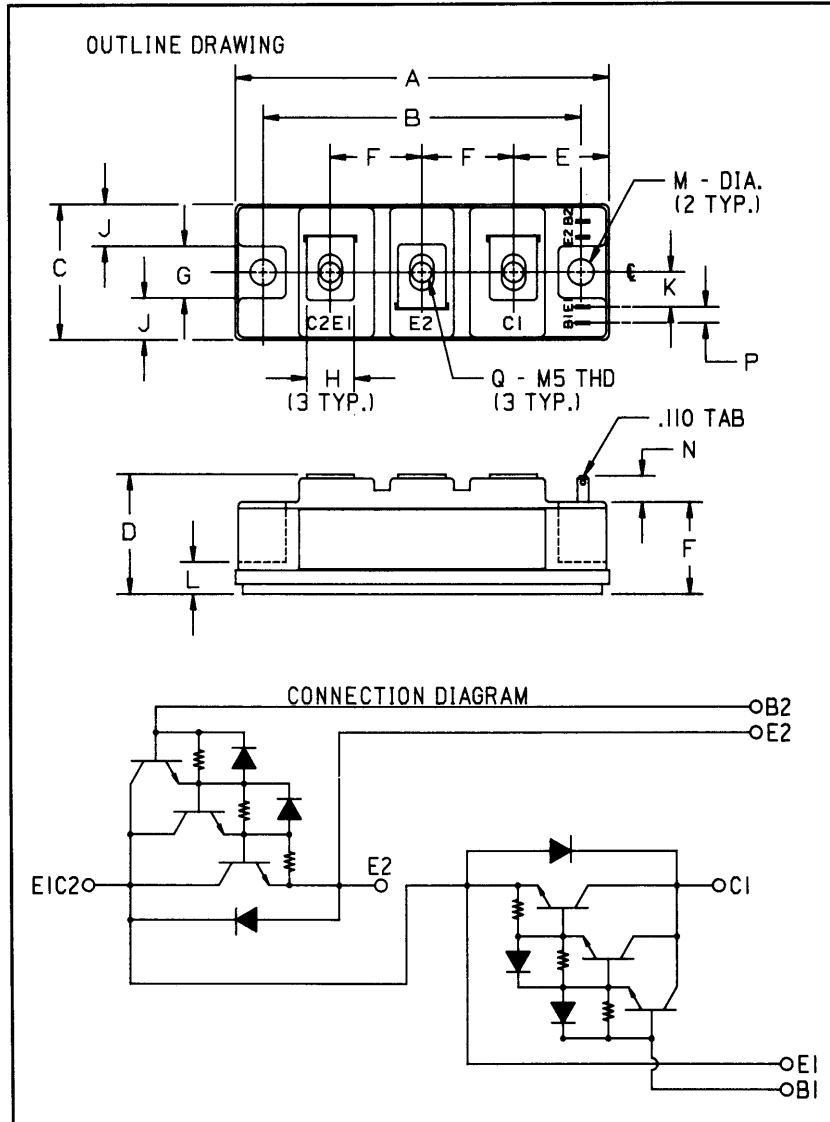


Dual Darlington Transistor Module 30 Amperes/1200 Volts



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. KD221203 is a 1200 Volt, 30 Ampere Dual Darlington Module with a gain of 75 at rated current (30 Amperes).

Outline Drawing

| Dimensions | Inches | Millimeters |
|------------|---------------|-------------|
| A | 3.701 Max. | 94 Max. |
| B | 3.150 ± 0.010 | 80 ± 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 |

| Type | $V_{CE0(sus)}$ Volts (X 100) | Current Rating Amperes (X 10) |
|------|---------------------------------|----------------------------------|
| KD22 | 12 | 03 |



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

KD221203
Dual Darlington Transistor Module
 30 Amperes/1200 Volts

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

| Ratings | Symbol | KD221203 | 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, $V_{BE} = -2\text{V}$ | $V_{CEV(sus)}$ | 1200 | Volts |
| Collector-Base Voltage | V_{CBO} | 1200 | Volts |
| Emitter-Base Voltage | V_{EBO} | 7 | Volts |
| Collector-Emitter Voltage, $V_{BE} = -2\text{V}$ | V_{CEV} | 1200 | Volts |
| Continuous Collector Current | I_C | 30 | Amperes |
| Diode Forward Current | I_{FM} | 30 | Amperes |
| Continuous Base Current | I_B | 2 | Amperes |
| Diode Surge Current | I_{FSM} | 300 | Amperes |
| Power Dissipation (Each Transistor) | P_t | 300 | Watts |
| Max. Mounting Torque M5 Terminal Screws | – | 17 | in.-lb. |
| Max. Mounting Torque M6 Mounting Screws | – | 26 | in.-lb. |
| Module Weight (Typical) | – | 210 | 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} | $V_{CE} = 1200\text{V}, V_{BE} = -2\text{V}$ | – | – | 1 | mA | |
| Emitter Cutoff Current | I_{EBO} | $V_{EB} = 7\text{V}$ | – | – | 150 | mA | |
| DC Current Gain | h_{FE} | $I_C = 30\text{A}, V_{CE} = 5\text{V}$ | 100 | – | – | – | |
| Diode Forward Voltage | V_{FM} | $I_{FM} = 30\text{A}$ | – | – | 1.5 | Volts | |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 30\text{A}, I_B = 0.6\text{A}$ | – | – | 3.0 | Volts | |
| Base-Emitter Saturation Voltage | $V_{BE(sat)}$ | $I_C = 30\text{A}, I_B = 0.6\text{A}$ | – | – | 3.5 | Volts | |
| Resistive | Turn-on | t_{on} | $V_{CC} = 600\text{V}$ | – | – | 2.5 | μs |
| Load | Storage Time | t_s | $I_C = 25\text{A}$ | – | – | 15 | μs |
| Switch Times | Fall Time | t_f | $I_{B1} = -I_{B2} = 0.6\text{A}$ | – | – | 3.0 | μs |

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

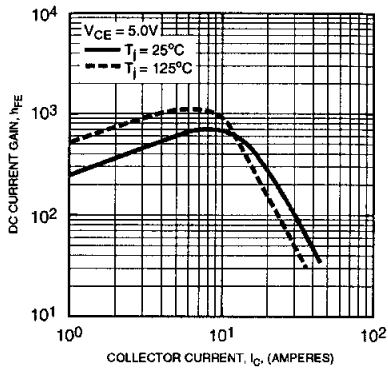
| Characteristics | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|--------------------------------------|-------------------|-----------------|------|------|------|--------------------|
| Thermal Resistance, Case-to-Sink | $R_{\theta(c-s)}$ | Per 1/2 Module | – | – | 0.15 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction-to-Case | $R_{\theta(j-c)}$ | Transistor Part | – | – | 0.4 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction-to-Case | $R_{\theta(j-c)}$ | Diode Part | – | – | 1.5 | $^\circ\text{C/W}$ |



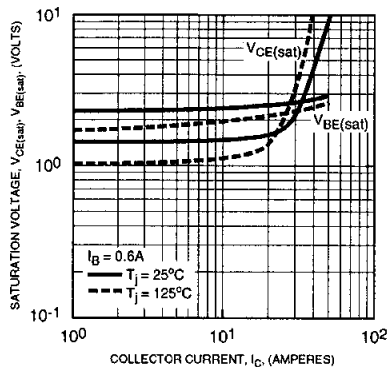
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KD221203
Dual Darlington Transistor Module
30 Amperes/1200 Volts

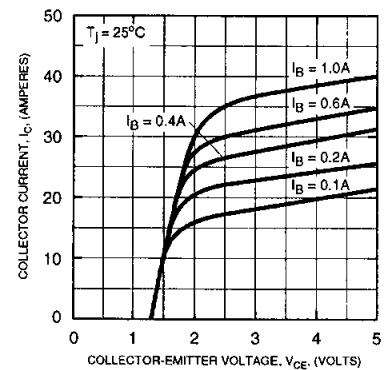
DC CURRENT GAIN (TYPICAL)



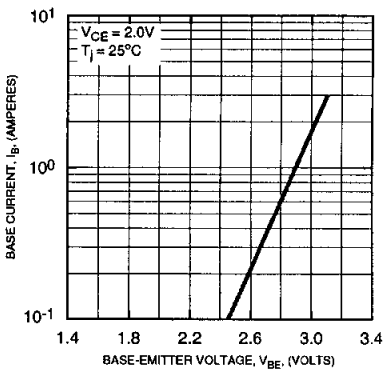
SATURATION VOLTAGE (TYPICAL)



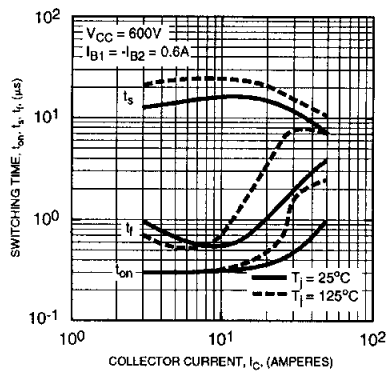
COMMON EMITTER OUTPUT CHARACTERISTICS (TYPICAL)



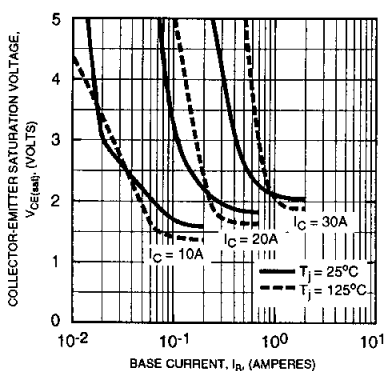
COMMON EMITTER INPUT CHARACTERISTICS (TYPICAL)



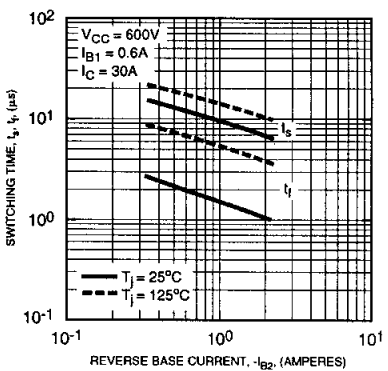
SWITCHING CHARACTERISTICS (TYPICAL)



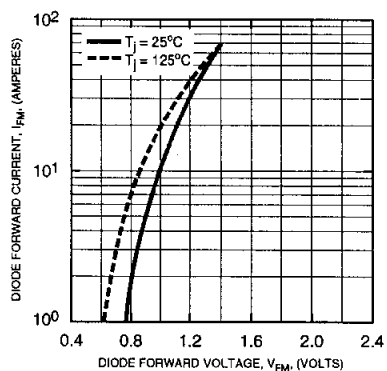
COLLECTOR-EMITTER SATURATION VOLTAGE (TYPICAL)



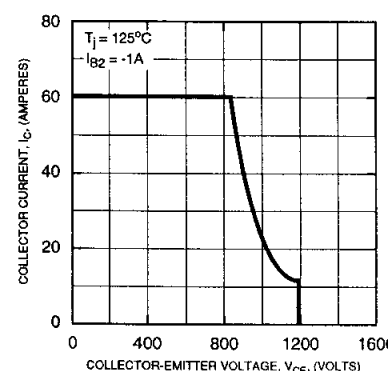
SWITCHING TIME VS. BASE CURRENT (TYPICAL)



DIODE CHARACTERISTICS (TYPICAL)



REVERSE BIAS SAFE OPERATING AREA (RBSOA)

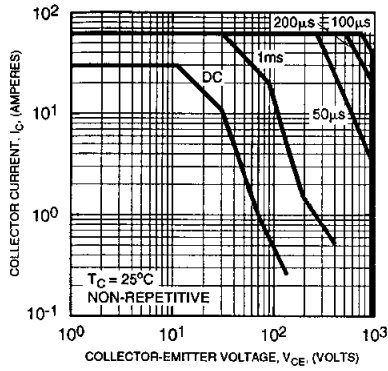




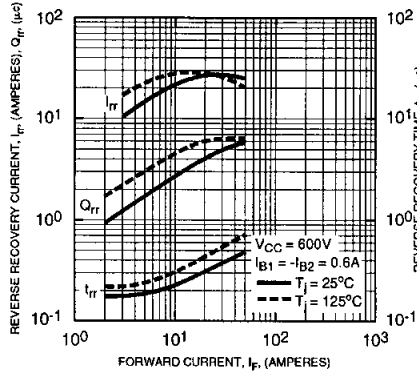
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KD221203
Dual Darlington Transistor Module
 30 Amperes/1200 Volts

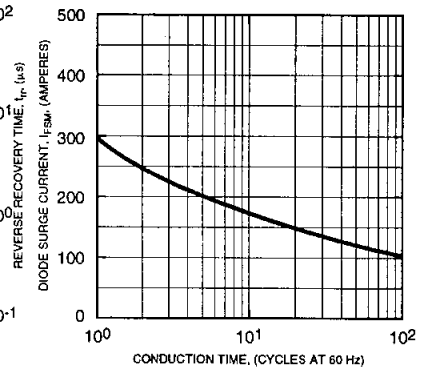
FORWARD BIAS SAFE OPERATING AREA (SOA)



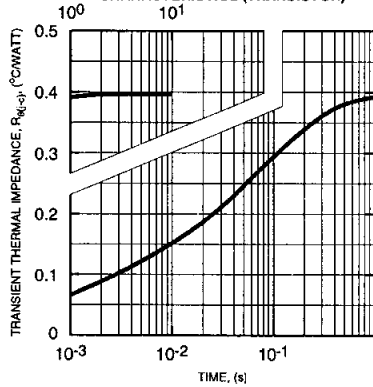
REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



DIODE FORWARD SURGE CURRENT



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (TRANSISTOR)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (DIODE)

