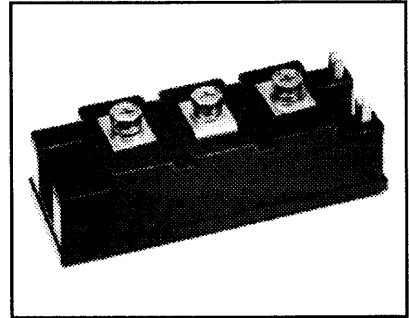
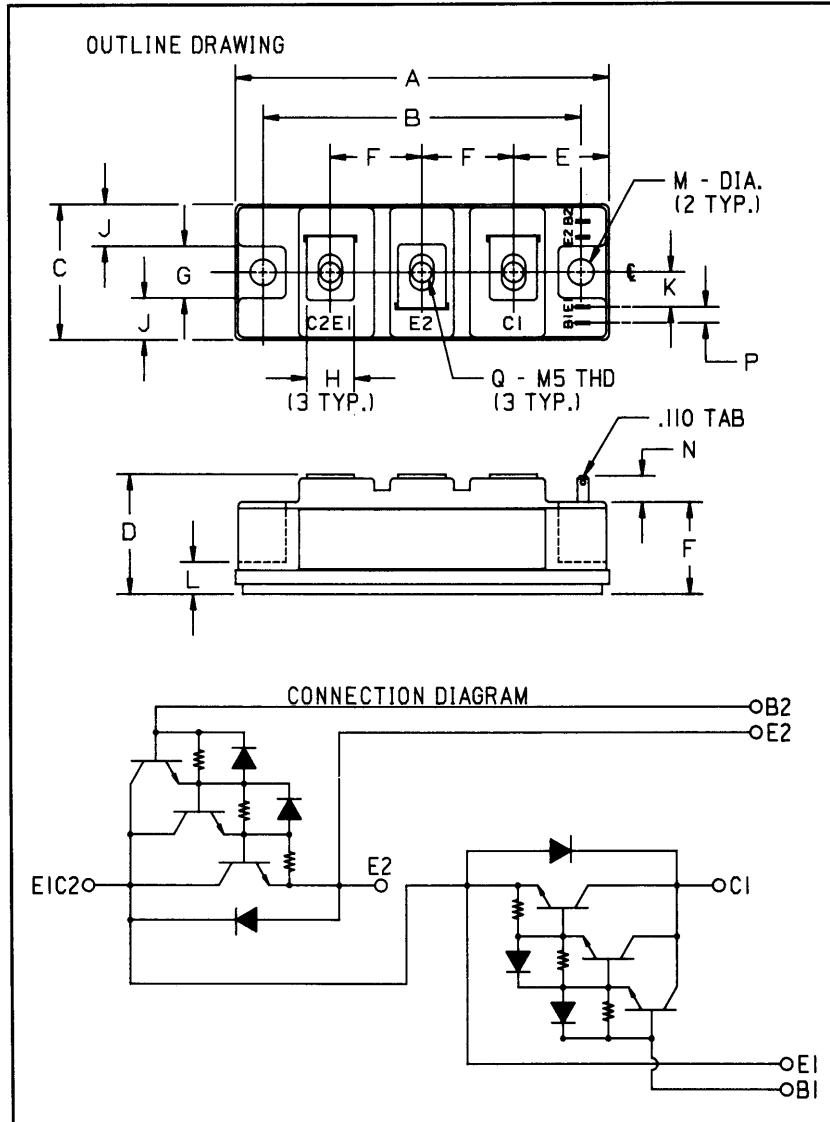


### Dual Darlington Transistor Module 30 Amperes/1200 Volts



#### 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	$\mu\text{s}$
Load	Storage Time	$t_s$	$I_C = 25\text{A}$	–	–	15	$\mu\text{s}$
Switch Times	Fall Time	$t_f$	$I_{B1} = -I_{B2} = 0.6\text{A}$	–	–	3.0	$\mu\text{s}$

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

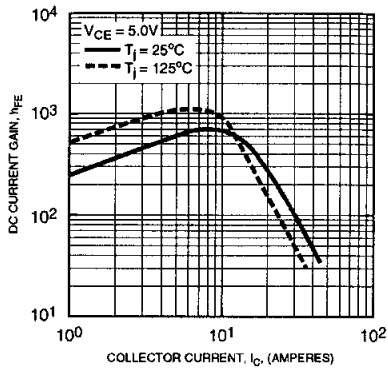
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Case-to-Sink	$R_{\theta(c-s)}$	Per 1/2 Module	–	–	0.15	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta(j-c)}$	Transistor Part	–	–	0.4	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta(j-c)}$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



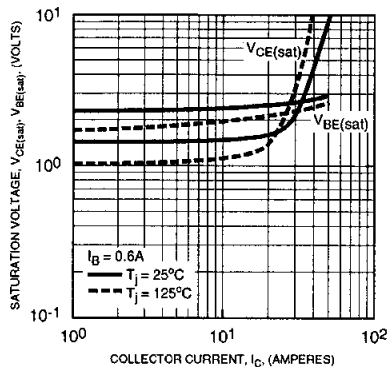
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**KD221203**  
**Dual Darlington Transistor Module**  
**30 Amperes/1200 Volts**

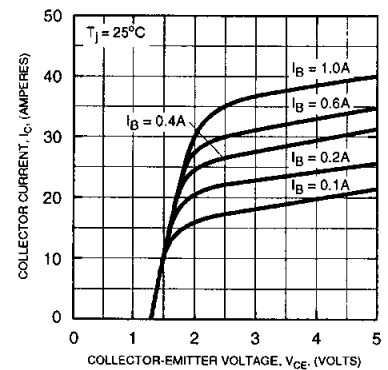
**DC CURRENT GAIN (TYPICAL)**



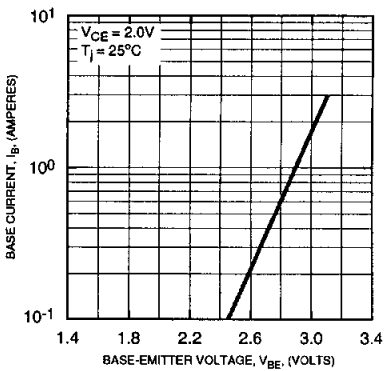
**SATURATION VOLTAGE (TYPICAL)**



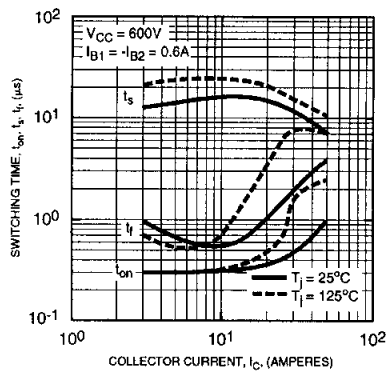
**COMMON EMITTER OUTPUT CHARACTERISTICS (TYPICAL)**



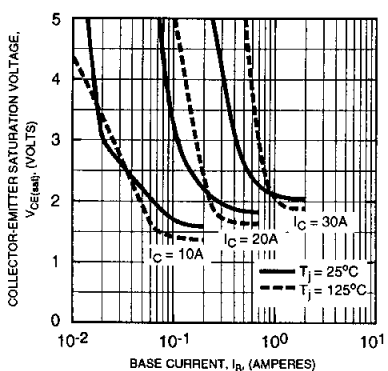
**COMMON EMITTER INPUT CHARACTERISTICS (TYPICAL)**



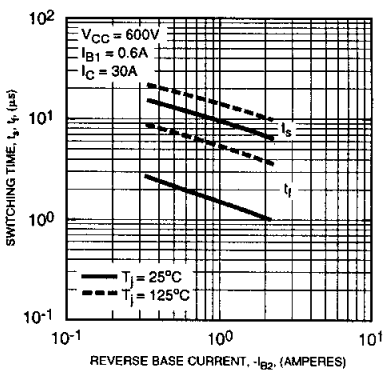
**SWITCHING CHARACTERISTICS (TYPICAL)**



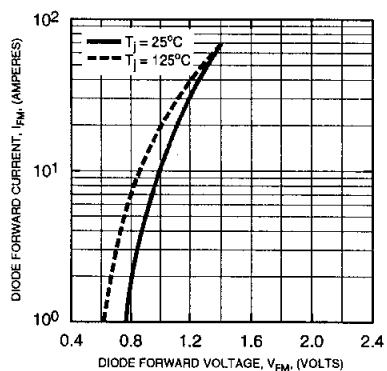
**COLLECTOR-EMITTER SATURATION VOLTAGE (TYPICAL)**



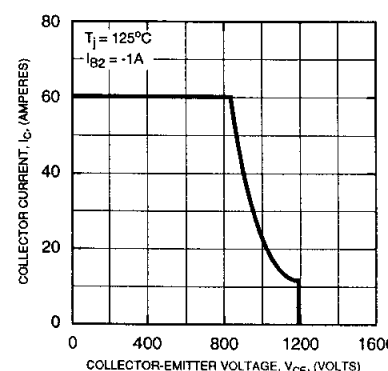
**SWITCHING TIME VS. BASE CURRENT (TYPICAL)**



**DIODE CHARACTERISTICS (TYPICAL)**



**REVERSE BIAS SAFE OPERATING AREA (RBSOA)**

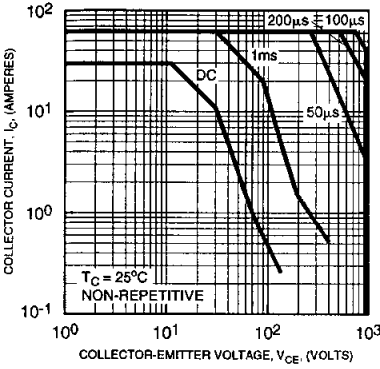




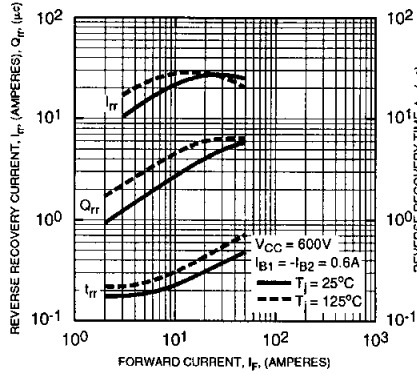
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**KD221203**  
**Dual Darlington Transistor Module**  
 30 Amperes/1200 Volts

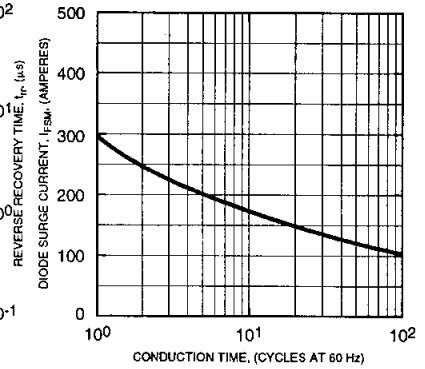
**FORWARD BIAS SAFE OPERATING AREA (SOA)**



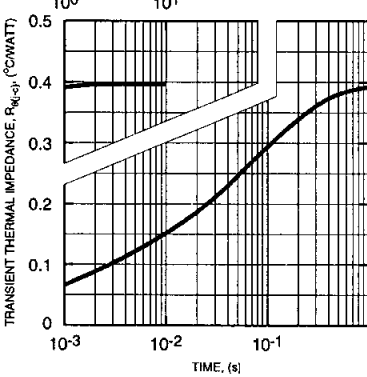
**REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)**



**DIODE FORWARD SURGE CURRENT**



**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (TRANSISTOR)**



**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (DIODE)**

