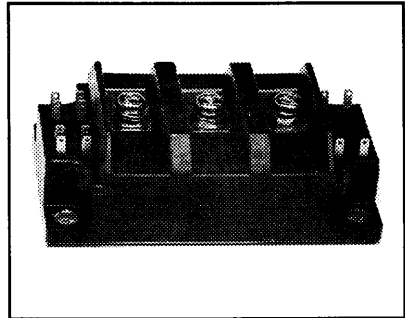
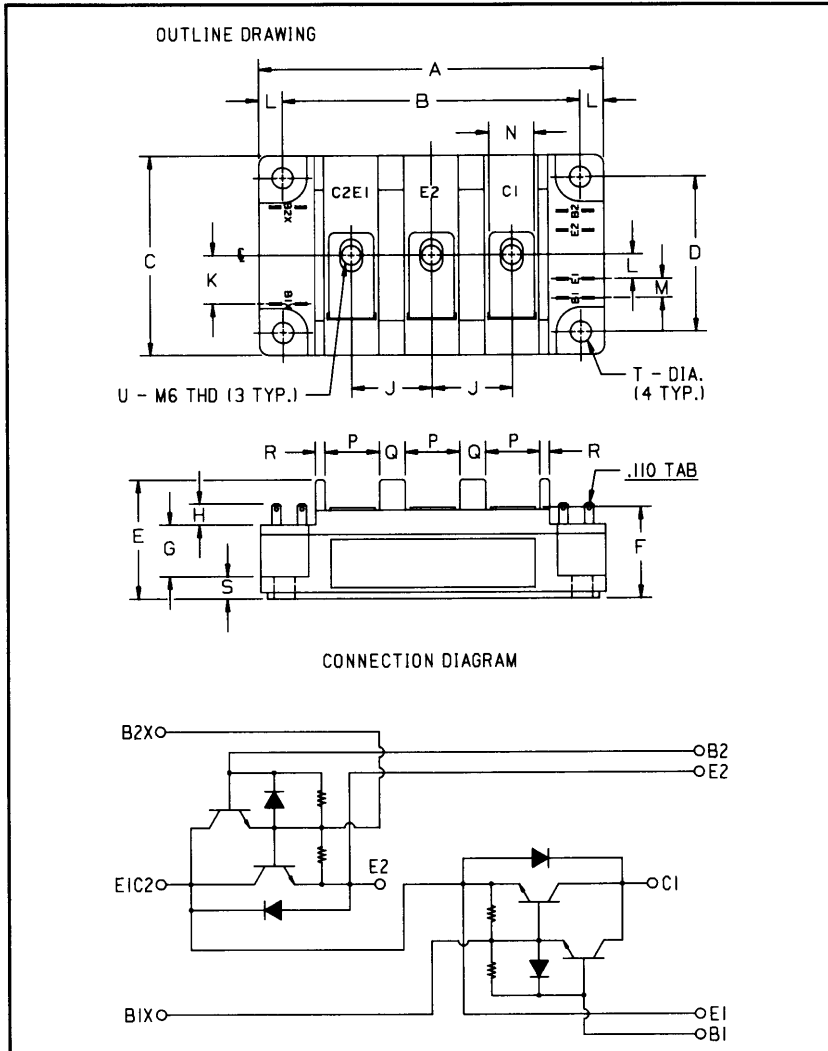


### Dual Darlington Transistor Module 200 Amperes/600 Volts



#### 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 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. KD424520 is a 450  $V_{CE0(sus)}$  (600  $V_{CEV}$ ), 200 Ampere Dual Darlington Module.

#### 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

Type	$V_{CE0(sus)}$ Volts (X 10)	Current Rating Amperes (X 10)
KD42	45	20



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

**KD424520**  
**Dual Darlington Transistor Module**  
 200 Amperes/600 Volts

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

Ratings	Symbol	KD424520	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	$V_{CEO(sus)}$	450	Volts
Collector-Emitter Sustaining Voltage, $V_{BE} = -2\text{V}$	$V_{CEV(sus)}$	600	Volts
Collector-Base Voltage	$V_{CBO}$	600	Volts
Emitter-Base Voltage	$V_{EBO}$	7	Volts
Collector-Emitter Voltage, $V_{BE} = -2\text{V}$	$V_{CEV}$	600	Volts
Continuous Collector Current	$I_C$	200	Amperes
Diode Forward Current	$I_{FM}$	200	Amperes
Continuous Base Current	$I_B$	12	Amperes
Diode Surge Current	$I_{FSM}$	2000	Amperes
Power Dissipation (Each Transistor)	$P_T$	1250	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	$I_{CEV}$	$V_{CE} = 600\text{V}, V_{BE} = -2\text{V}$	-	-	4	mA
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = 7\text{V}$	-	-	800	mA
DC Current Gain	$h_{FE}$	$I_C = 200\text{A}, V_{CE} = 2\text{V}$	75	-	-	-
Diode Forward Voltage	$V_{FM}$	$I_{FM} = 200\text{A}$	-	-	1.75	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 200\text{A}, I_B = 2.6\text{A}$	-	-	2.0	Volts
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 200\text{A}, I_B = 2.6\text{A}$	-	-	2.5	Volts
Resistive Turn-on	$t_{on}$	$V_{CC} = 300\text{V}$	-	-	2.0	$\mu\text{s}$
Load Storage Time	$t_s$	$I_C = 2050\text{A}$	-	-	12	$\mu\text{s}$
Switch Times Fall Time	$t_f$	$I_{B1} = -I_{B2} = 4.0\text{A}$	-	-	3.0	$\mu\text{s}$

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

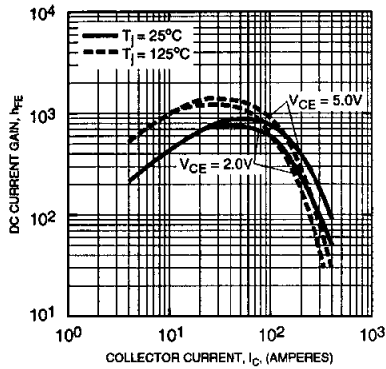
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Case-to-Sink	$R_{\theta(c-s)}$	Per Half Module	-	-	0.4	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta(j-c)}$	Transistor Part	-	-	0.12	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta(j-c)}$	Diode Part	-	-	0.33	$^\circ\text{C/W}$



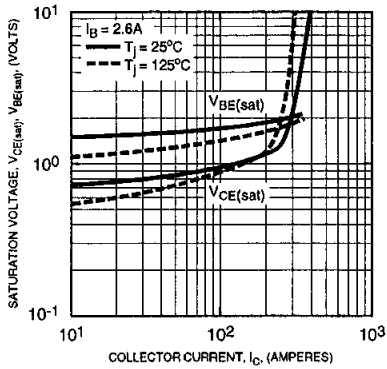
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**KD424520**  
**Dual Darlington Transistor Module**  
**200 Amperes/600 Volts**

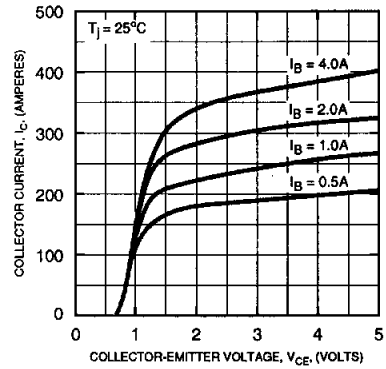
**DC CURRENT GAIN (TYPICAL)**



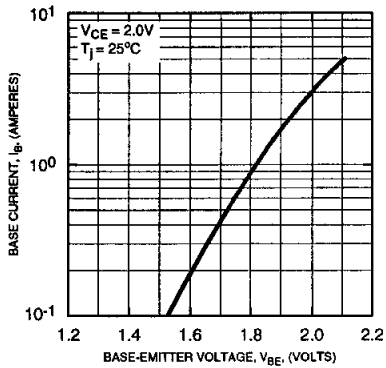
**SATURATION VOLTAGE (TYPICAL)**



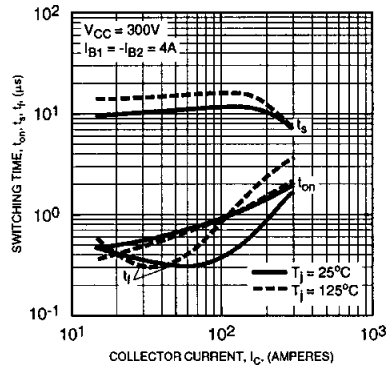
**COMMON EMITTER OUTPUT CHARACTERISTICS (TYPICAL)**



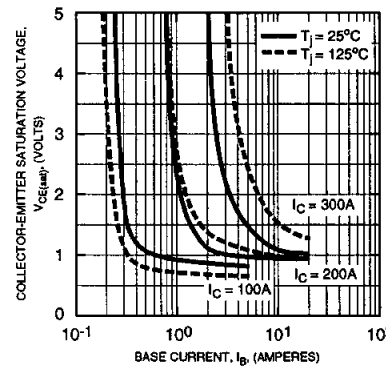
**COMMON EMITTER INPUT CHARACTERISTICS (TYPICAL)**



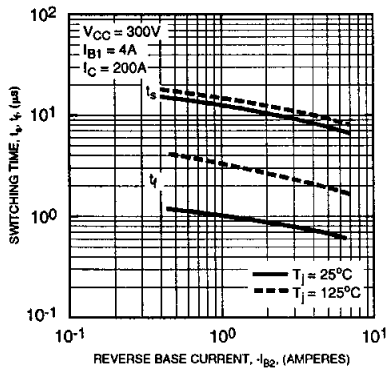
**SWITCHING CHARACTERISTICS (TYPICAL)**



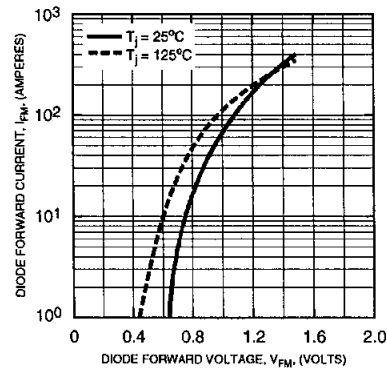
**COLLECTOR-EMITTER SATURATION VOLTAGE (TYPICAL)**



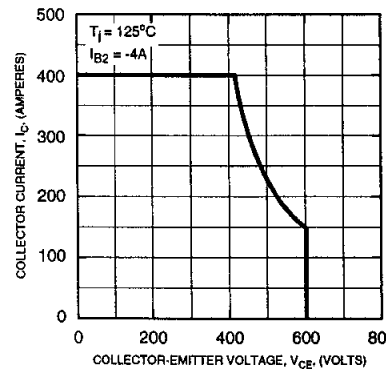
**SWITCHING TIME VS. BASE CURRENT (TYPICAL)**



**DIODE CHARACTERISTICS (TYPICAL)**



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

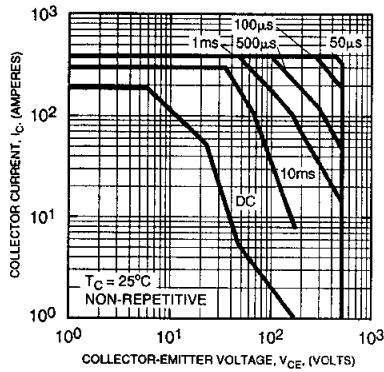




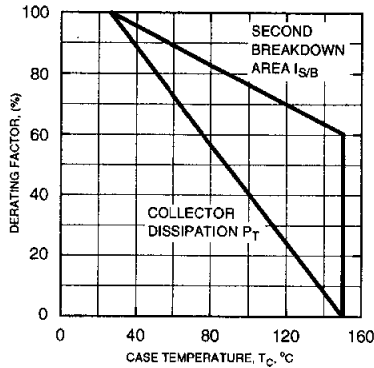
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**KD424520**  
**Dual Darlington Transistor Module**  
 200 Amperes/600 Volts

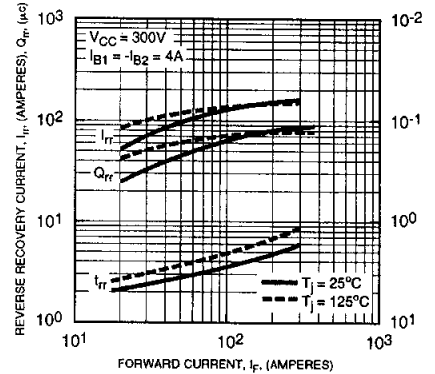
**FORWARD BIAS SAFE OPERATING AREA (SOA)**



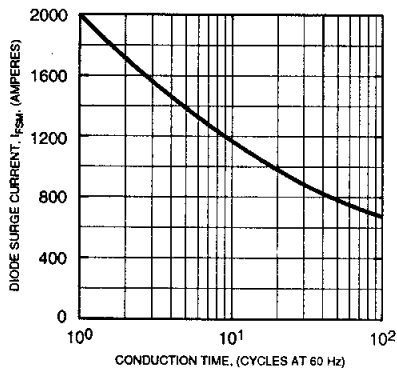
**DERATING FACTOR OF SAFE OPERATING AREA (SOA)**



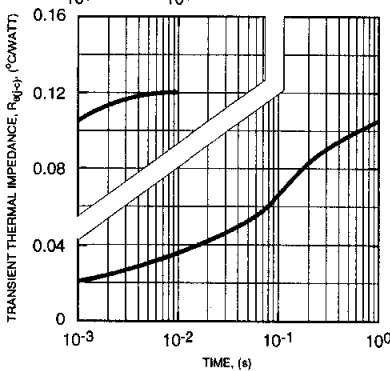
**REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)**



**DIODE FORWARD SURGE CURRENT**



**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (TRANSISTOR)**



**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (DIODE)**

