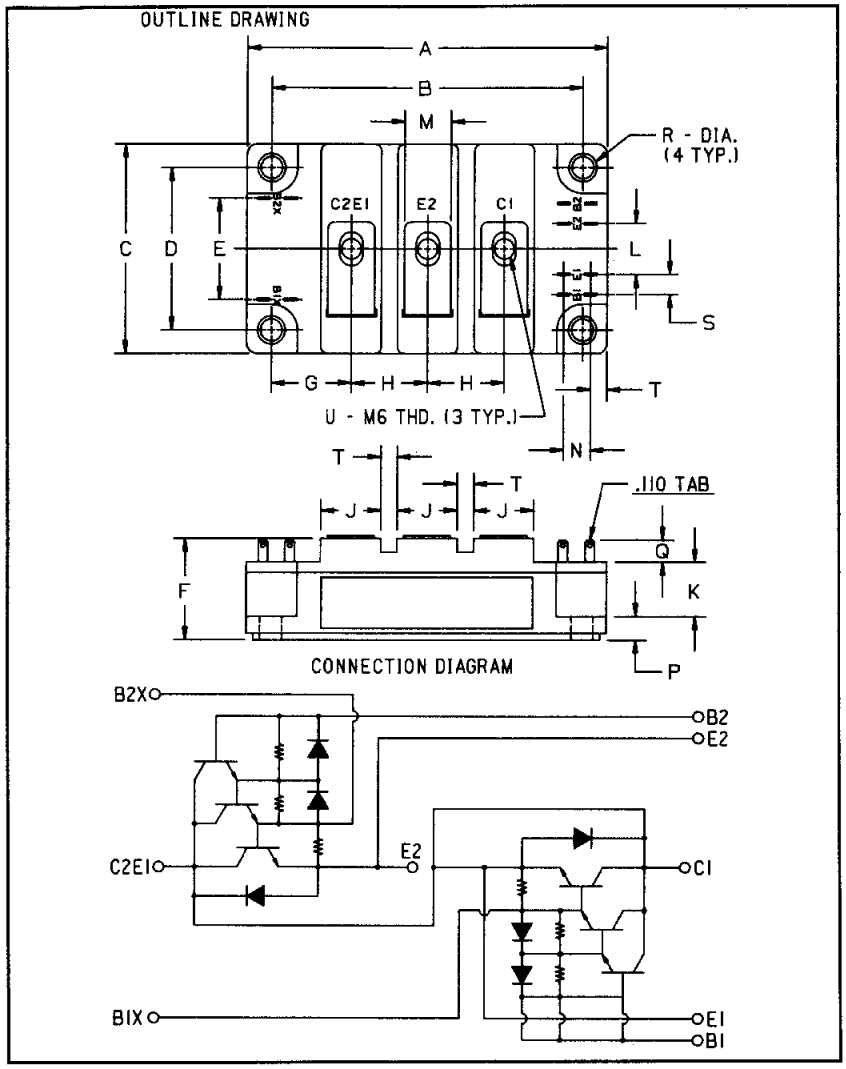
Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (412) 925-7272

High-Beta Dual Darlington Transistor Module
200 Amperes/600 Volts



Outline Drawing

Dimensions	Inches	Millimeters
A	4.25 Max.	108 Max.
B	3.661 ± 0.01	93 ± 0.25
C	2.44 Max.	62 Max.
D	1.890 ± 0.01	48 ± 0.25
E	1.18	30
F	1.18 Max.	30 Max.
G	0.92	23.5
H	0.90 Min.	23 Min.
J	0.71	18
K	0.63	16

Dimensions	Inches	Millimeters
L	0.59	15
M	0.55	14
N	0.31	8
P	0.28	7
Q	0.25 Min.	6.5 Min.
R	0.25 Dia.	6.5 Dia.
S	0.24	6
T	0.20	5
U	M6 Metric	M6

Description:
The Powerex High-Beta 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
- ☐ Very High Gain (h_{FE})
- ☐ Quick Connect Signal Terminals
- ☐ Base-Emitter Speed-up Diodes
- ☐ UL Recognized

Applications:
- ☐ AC Motor Control
- ☐ DC Motor Control
- ☐ Switching Power Supplies
- ☐ Inverters

Ordering Information:
Example: Select the complete ten digit module part number you desire from the table - i.e. KD424520HB is a 450 $V_{CEO(sus)}$ (600 V_{CEV}), 200 Ampere High-Beta Dual Darlington Module with a gain of 750 at rated current (200 Amperes).

Type	$V_{CEO(sus)}$ Volts (X 10)	Current Rating Amperes (X 10)	High Beta
KD42	45	20	HB

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KD424520HB
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Absolute Maximum Ratings, T_j = 25 °C unless otherwise specified

Ratings	Symbol	KD424520HB	Units
Junction Temperature	T_j	-40 to 150	°C
Storage Temperature	T_{stg}	-40 to 125	°C
Collector-Emitter Sustaining Voltage	$V_{CEO(sus)}$	450	Volts
Collector-Emitter Sustaining Voltage, V_{BE} = -2V	$V_{CEV(sus)}$	600	Volts
Collector-Base Voltage	V_{CBO}	600	Volts
Emitter-Base Voltage	V_{EBO}	7	Volts
Collector-Emitter Voltage, V_{BE} = -2V	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	1240	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 °C unless otherwise specified

Characteristics		Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector Cutoff Current		I_{CEV}	V_{CE} = 600V, V_{BE} = -2V	–	–	4	mA
Emitter Cutoff Current		I_{EBO}	V_{EB} = 7V	–	–	300	mA
DC Current Gain		h_{FE}	I_C = 200A, V_{CE} = 2.5V	750	–	–	–
Diode Forward Voltage		V_{FM}	I_{FM} = 200A	–	–	1.8	Volts
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	I_C = 200A, I_B = 260mA	–	–	2.5	Volts
Base-Emitter Saturation Voltage		$V_{BE(sat)}$	I_C = 200A, I_B = 260mA	–	–	3.0	Volts
Resistive	Turn-on	t_{on}	V_{CC} = 300V	–	–	2.5	µs
Load	Storage Time	t_s	I_C = 200A	–	–	10	µs
Switch Times	Fall Time	t_f	I_{B1} = 0.4A, I_{B2} = -4.0A	–	–	2.0	µs

Thermal and Mechanical Characteristics, T_j = 25 °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	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta(j-c)}$	Transistor Part	–	–	0.1	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta(j-c)}$	Diode Part	–	–	0.33	°C/W

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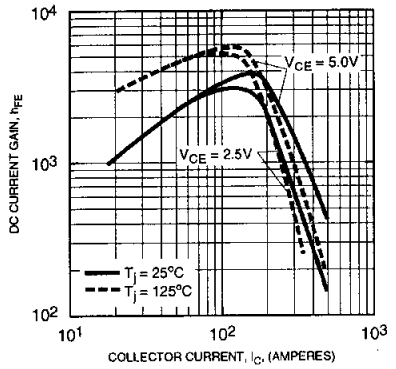
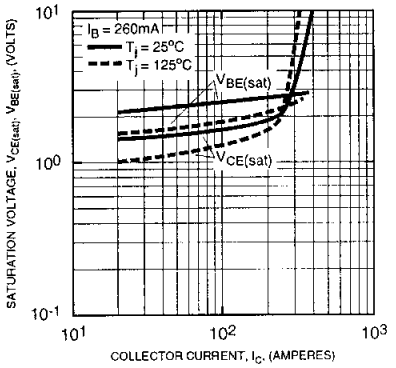
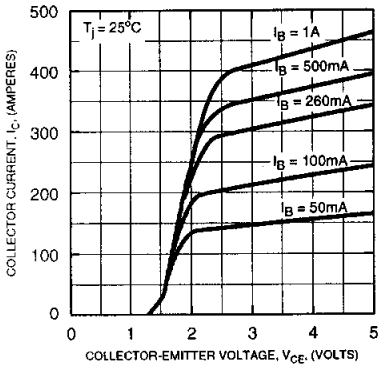
DC CURRENT GAIN (TYPICAL)



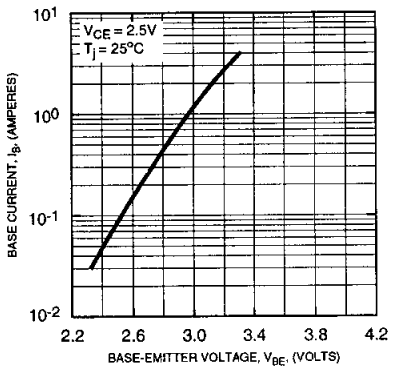
SATURATION VOLTAGE (TYPICAL)



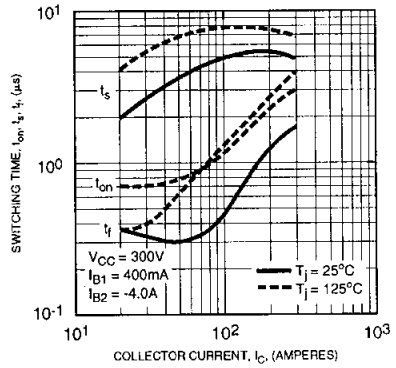
COMMON EMITTER OUTPUT CHARACTERISTICS (TYPICAL)



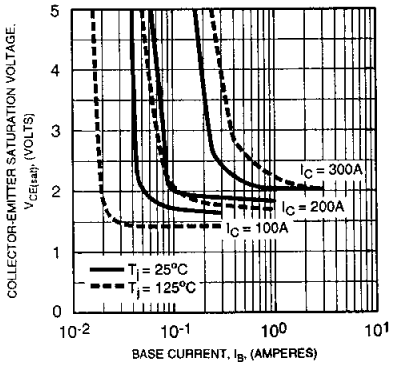
COMMON EMITTER INPUT CHARACTERISTICS (TYPICAL)



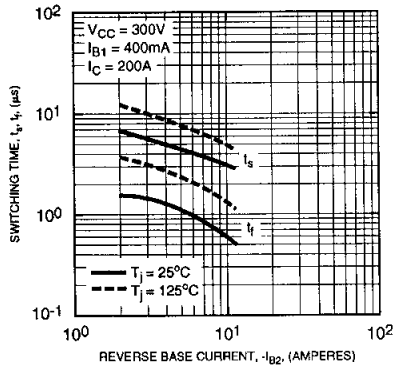
SWITCHING CHARACTERISTICS (TYPICAL)



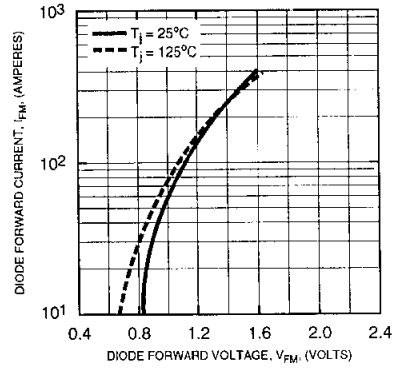
COLLECTOR-EMITTER SATURATION VOLTAGE (TYPICAL)



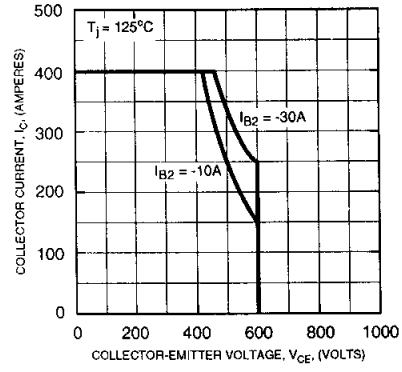
SWITCHING TIME VS. BASE CURRENT (TYPICAL)



DIODE CHARACTERISTICS (TYPICAL)



REVERSE BIAS SAFE OPERATING AREA (RBSOA)



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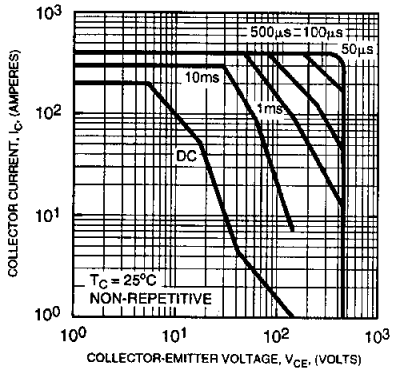
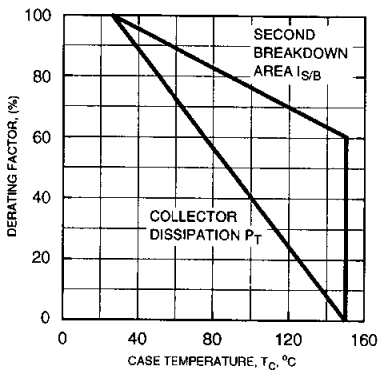
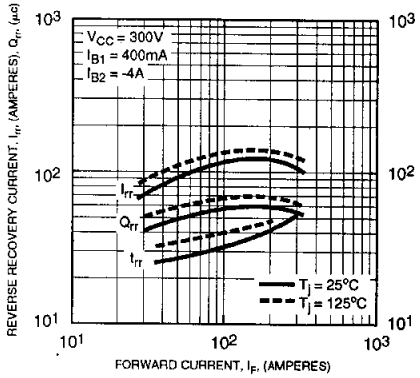
FORWARD BIAS SAFE OPERATING AREA (SOA)



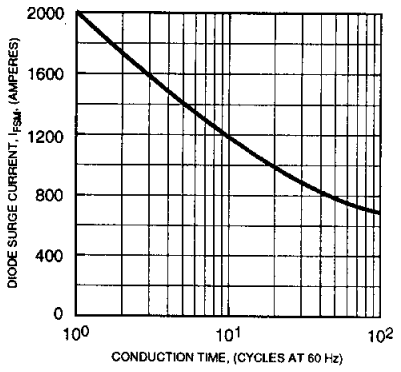
DERATING FACTOR OF SAFE OPERATING AREA (SOA)



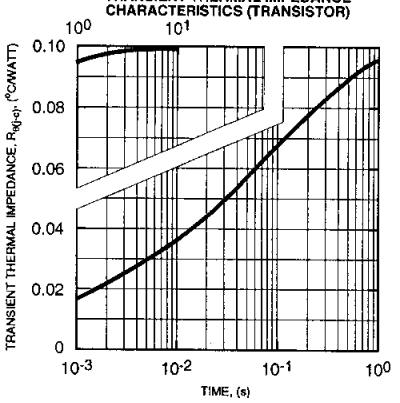
REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



DIODE FORWARD SURGE CURRENT



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (TRANSISTOR)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (DIODE)