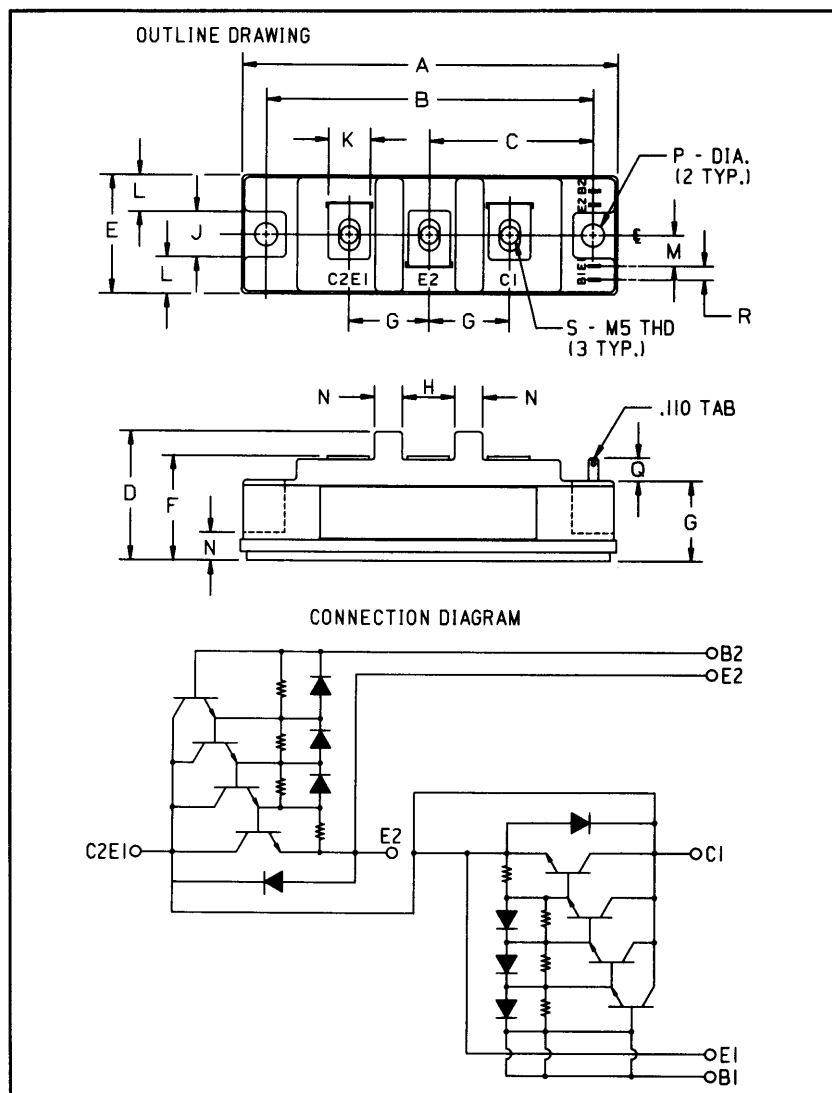


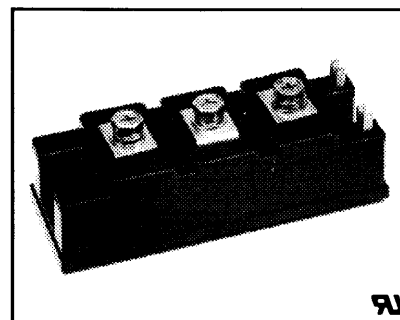
High-Beta Dual Darlington Transistor Module 50 Amperes/1000 Volts



Outline Drawing

Dimensions	Inches	Millimeters
A	4.25 Max.	108 Max.
B	3.661 ± 0.012	93 ± 0.3
C	1.83	46.5
D	1.46	37
E	1.34 Max.	34 Max.
F	1.18 Max.	30 Max.
G	0.90	23
H	0.59	15
J	0.51	13

Dimensions	Inches	Millimeters
K	0.47	12
L	0.41	10.5
M	0.344	8.75
N	0.31	8
P	0.256 Dia.	6.5 Dia.
Q	0.256 Min.	6.5 Min.
R	0.16	4
S	M5 Metric	M5



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. KD221K05HB is an 850 $V_{CE0(sus)}$ (1000 V_{CEV}), 50 Ampere High-Beta Dual Darlington Module with a gain of 750 at rated current (50 Amperes).

Type	$V_{CE0(sus)}$ Volts (1000)	Current Rating Amperes (X 10)	High Beta
KD22	1K	05	HB



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

KD221K05HB

High-Beta Dual Darlington Transistor Module

50 Amperes/1000 Volts

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

Ratings	Symbol	KD221K05HB	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	$V_{\text{CEO(sus)}}$	850	Volts
Collector-Emitter Sustaining Voltage, $V_{\text{BE}} = -2\text{V}$	$V_{\text{CEV(sus)}}$	1000	Volts
Collector-Base Voltage	V_{CBO}	1000	Volts
Emitter-Base Voltage	V_{EBO}	7	Volts
Collector-Emitter Voltage, $V_{\text{BE}} = -2\text{V}$	V_{CEV}	1000	Volts
Continuous Collector Current	I_C	50	Amperes
Diode Forward Current	I_{FM}	50	Amperes
Continuous Base Current	I_B	3	Amperes
Diode Surge Current	I_{FSM}	500	Amperes
Power Dissipation (Each Transistor)	P_t	400	Watts
Max. Mounting Torque M4 Terminal Screws	—	17	in.-lb.
Max. Mounting Torque M5 Mounting Screws	—	26	in.-lb.
Module Weight (Typical)	—	250	Grams
V Isolation	V_{RMS}	2500	Volts

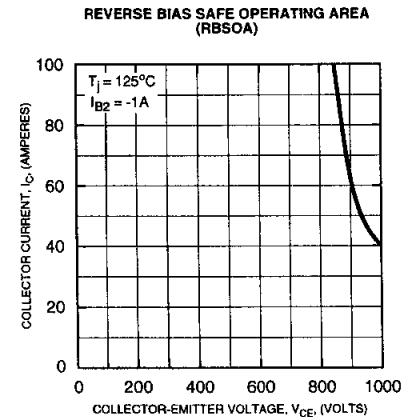
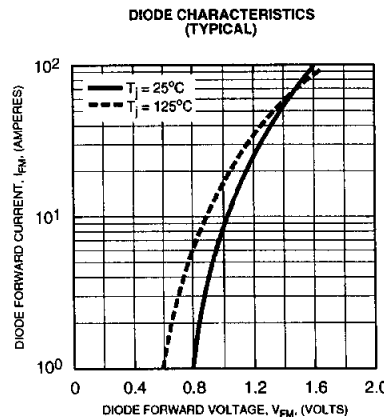
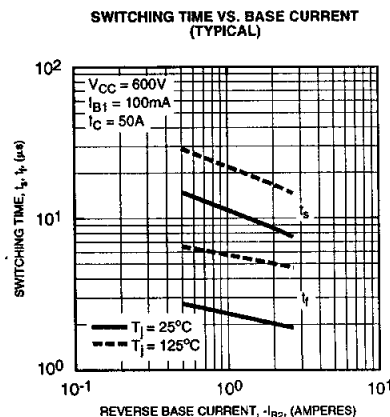
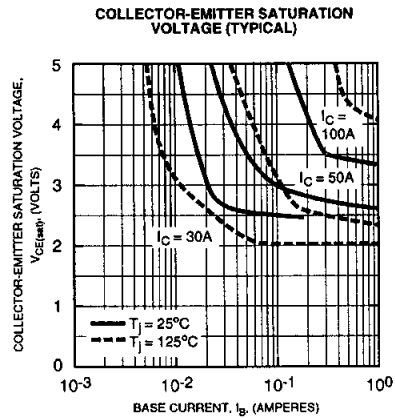
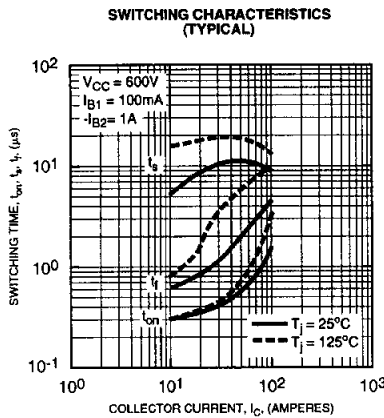
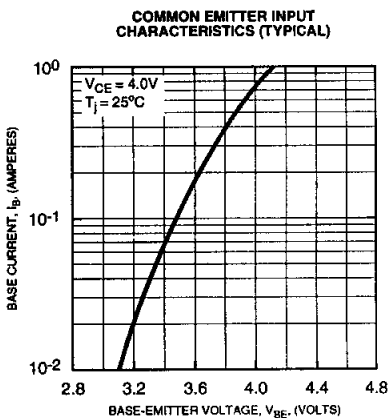
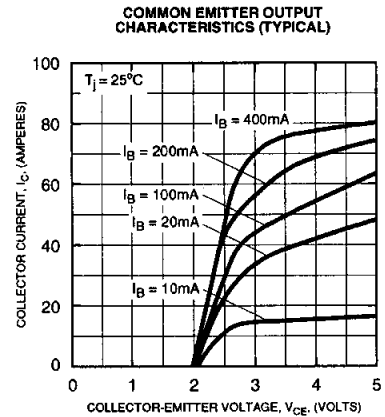
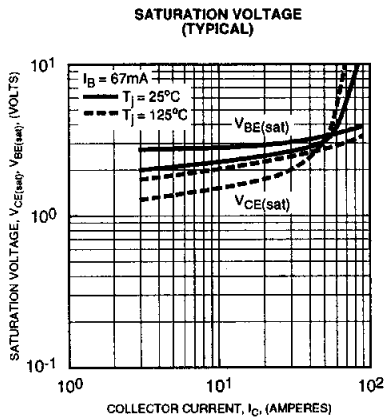
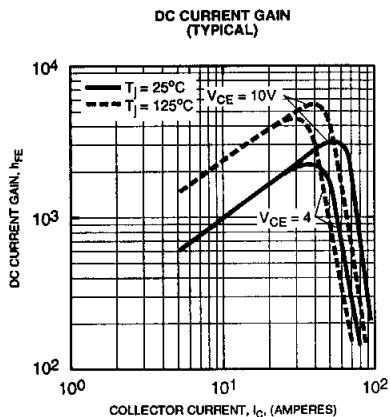
Electrical Characteristics, $T_J = 25^\circ\text{C}$ unless otherwise specified

Characteristics		Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector Cutoff Current		I_{CEV}	$V_{\text{CE}} = 1000\text{V}$, $V_{\text{BE}} = -2\text{V}$	—	—	5	mA
Emitter Cutoff Current		I_{EBO}	$V_{\text{EB}} = 7\text{V}$	—	—	50	mA
DC Current Gain		h_{FE}	$I_{\text{C}} = 50\text{A}$, $V_{\text{CE}} = 4.0\text{V}$	750	—	—	—
Diode Forward Voltage		V_{FM}	$I_{\text{FM}} = 50\text{A}$	—	—	1.8	Volts
Collector-Emitter Saturation Voltage		$V_{\text{CE(sat)}}$	$I_{\text{C}} = 50\text{A}$, $I_{\text{B}} = 67\text{mA}$	—	—	4.0	Volts
Base-Emitter Saturation Voltage		$V_{\text{BE(sat)}}$	$I_{\text{C}} = 50\text{A}$, $I_{\text{B}} = 67\text{mA}$	—	—	4.0	Volts
Resistive	Turn-on	t_{on}	$V_{\text{CC}} = 600\text{V}$	—	—	2.5	μs
Load	Storage Time	t_{s}	$I_{\text{C}} = 50\text{A}$	—	—	15	μs
Switch Times	Fall Time	t_{f}	$I_{\text{B1}} = 0.1\text{A}$, $I_{\text{B2}} = -1.0\text{A}$	—	—	3.0	μs

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

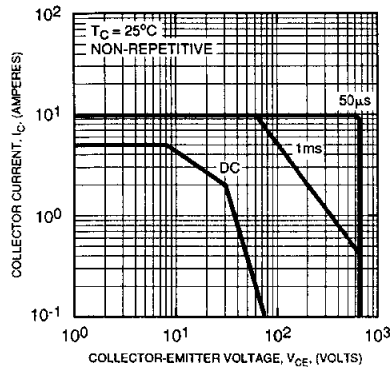
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Case-to-Sink	$R_{\theta(\text{c-s})}$	Per 1/2 Module	—	—	0.13	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta(\text{j-c})}$	Transistor Part	—	—	0.31	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta(\text{j-c})}$	Diode Part	—	—	1.2	$^\circ\text{C/W}$

KD221K05HB
High-Beta Dual Darlington Transistor Module
50 Amperes/1000 Volts

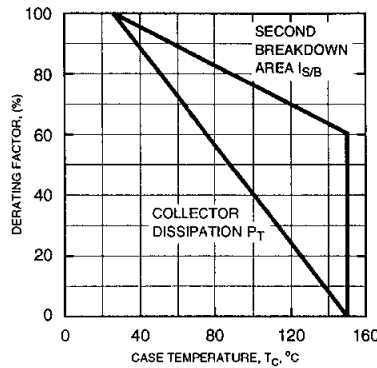


KD221K05HB
High-Beta Dual Darlington Transistor Module
 50 Amperes/1000 Volts

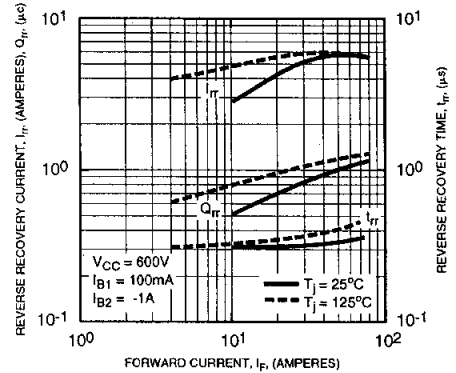
FORWARD BIAS SAFE OPERATING AREA (SOA)



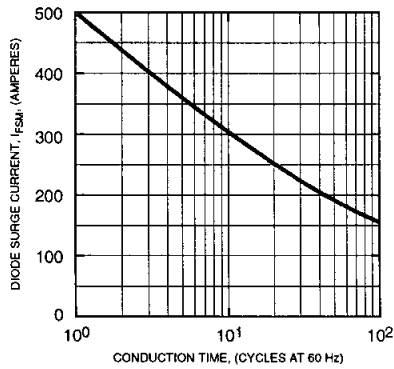
DERATING FACTOR OF SAFE OPERATING AREA (SOA)



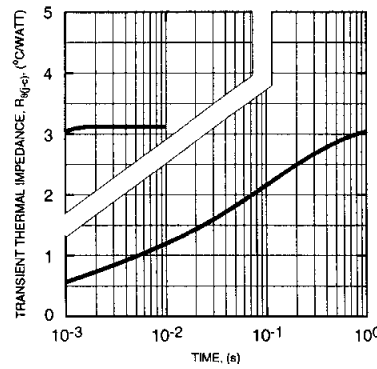
REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



DIODE FORWARD SURGE CURRENT



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (TRANSISTOR)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (DIODE)

