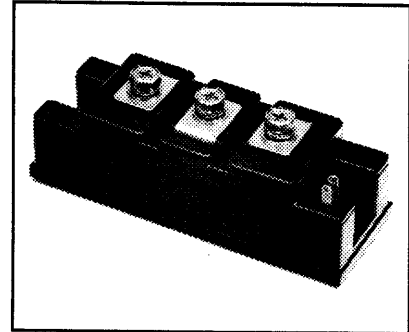
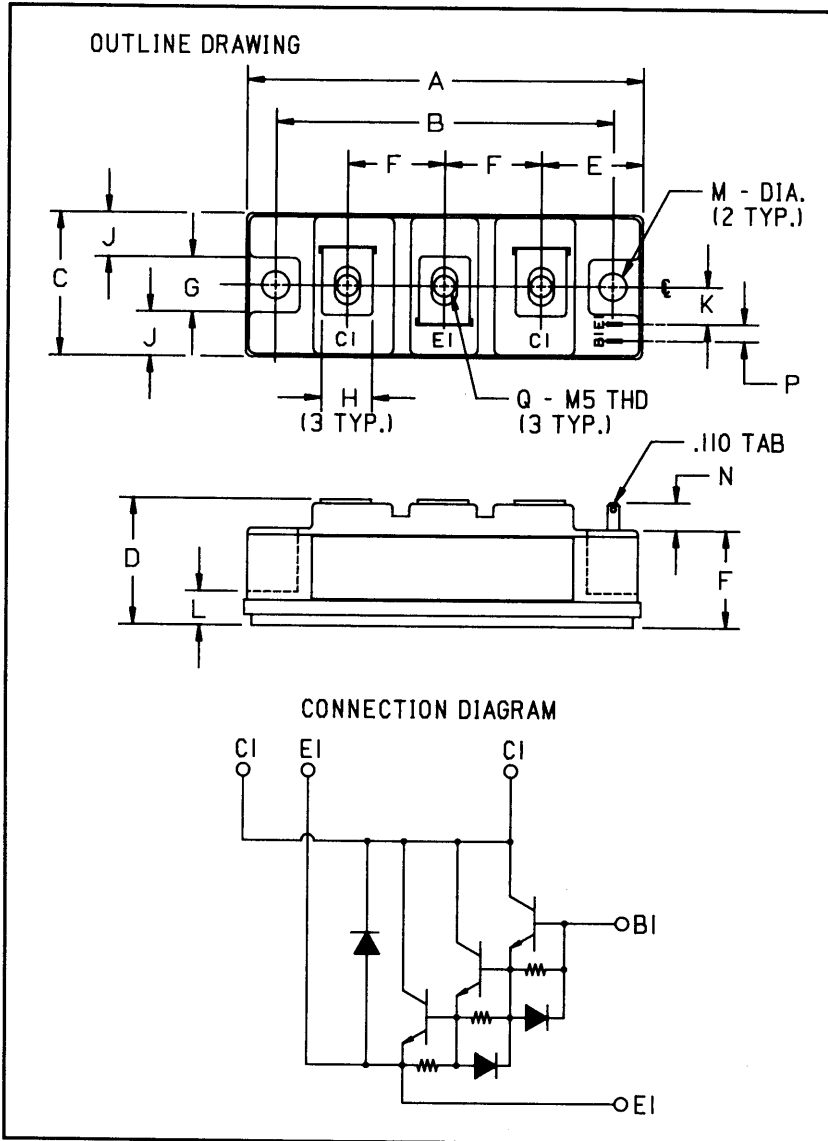


Single Darlington Transistor Module 100 Amperes/1000 Volts



Description:
The Powerex Single Darlington Transistor Modules are high power devices designed for use in switching applications. The modules are isolated, consisting of one Darlington Transistor with a reverse parallel connected high-speed diode and base-to-emitter speed-up diode.

Features:

- Isolated Mounting
- Planar Chips
- Discrete Fast Recovery Feedback Diode
- High Gain (h_{FE})
- TAB Quick-Connect Terminals
- Base-Emitter Speed-up Diode

Applications:

- Inverters
- DC Motor Control
- Switching Power Supplies
- AC Motor Control

Ordering Information:

Example: Select the complete eight digit module part number you desire from the table - i.e. KS221K10 is a 1000 Volt, 100 Ampere Single Darlington Module.

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 _{CEO(sus)} Volts (1000)	Current Rating Amperes (X 10)
KS22	1K	10



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

KS221K10
Single Darlington Transistor Module
 100 Amperes/1000 Volts

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

Ratings	Symbol	KS221K10	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, $V_{BE} = -2\text{V}$	$V_{CEV(sus)}$	1000	Volts
Collector-Base Voltage	V_{CBO}	1000	Volts
Emitter-Base Voltage	V_{EBO}	7	Volts
Collector-Emitter Voltage	V_{CEV}	1000	Volts
Continuous Collector Current	I_C	100	Amperes
Diode Forward Current	I_{FM}	100	Amperes
Continuous Base Current	I_B	5	Amperes
Diode Surge Current	I_{FSM}	1000	Amperes
Power Dissipation	P_t	800	Watts
Max. Mounting Torque M5 Terminal Screws	-	17	in.-lb.
Max. Mounting Torque M5 Mounting Screws	-	17	in.-lb.
Module Weight (Typical)	-	250	Grams
V Isolation	V_{RMS}	2500	Volts

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

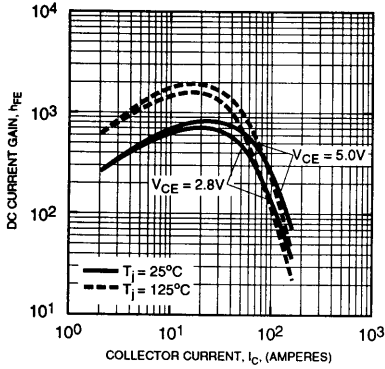
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units	
Collector Cutoff Current	I_{CEV}	$V_{CE} = 1000\text{V}, V_{BE} = -2\text{V}$	-	-	2	mA	
		$V_{CE} = 1000\text{V}, V_{BE} = -2\text{V}, T_C = 125^\circ\text{C}$	-	-	20	mA	
Emitter Cutoff Current	I_{EBO}	$V_{EB} = 7\text{V}$	-	-	400	mA	
DC Current Gain	h_{FE}	$I_C = 100\text{A}, V_{CE} = 5\text{V}$	100	-	-	-	
Diode Forward Voltage	V_{FM}	$I_{FM} = 100\text{A}$	-	-	1.8	Volts	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 100\text{A}, I_B = 2\text{A}$	-	-	2.5	Volts	
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 100\text{A}, I_B = 2\text{A}$	-	-	3.5	Volts	
Resistive	Turn-on	t_{on}	$V_{CC} = 600\text{V}$	-	-	3.0	μs
Switch Times	Fall Time	t_f	$I_{B1} = 2\text{A}, I_{B2} = -2\text{A}$	-	-	3.0	μs

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

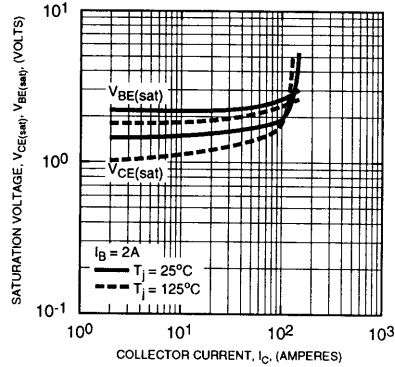
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Case-to-Sink	$R_{\theta(c-s)}$	-	-	-	0.15	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta(j-c)}$	Transistor Part	-	-	0.155	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta(j-c)}$	Diode Part	-	-	0.65	$^\circ\text{C/W}$

KS221K10
Single Darlington Transistor Module
 100 Amperes/1000 Volts

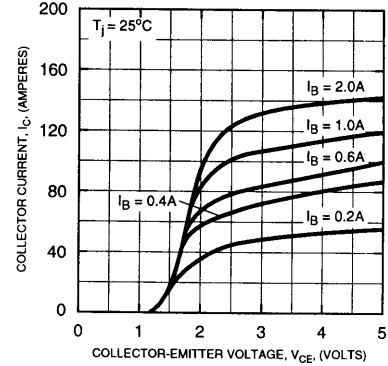
DC CURRENT GAIN (TYPICAL)



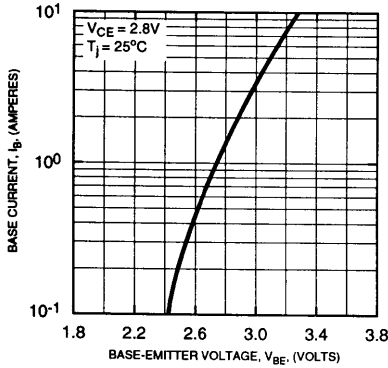
SATURATION VOLTAGE (TYPICAL)



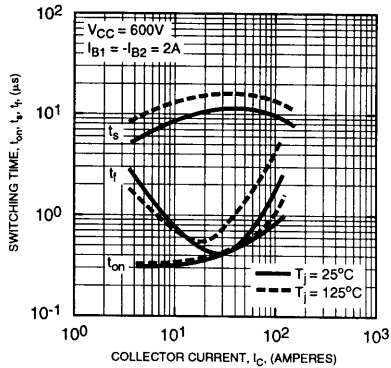
COMMON EMITTER OUTPUT CHARACTERISTICS (TYPICAL)



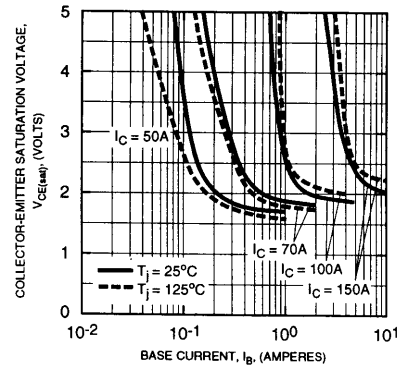
COMMON EMITTER INPUT CHARACTERISTICS (TYPICAL)



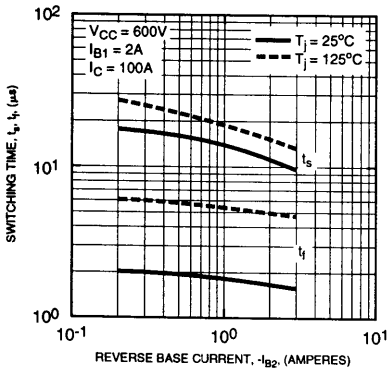
SWITCHING CHARACTERISTICS (TYPICAL)



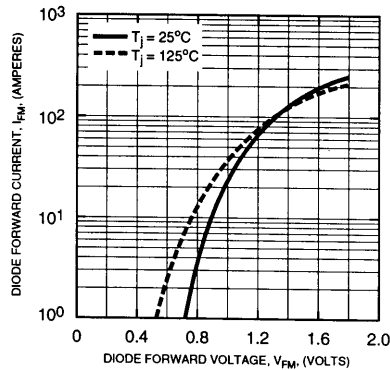
COLLECTOR-EMITTER SATURATION VOLTAGE (TYPICAL)



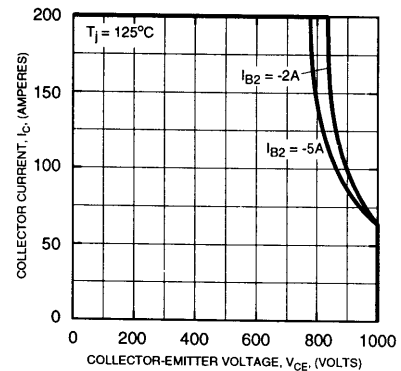
SWITCHING TIME VS. BASE CURRENT (TYPICAL)



DIODE CHARACTERISTICS (TYPICAL)

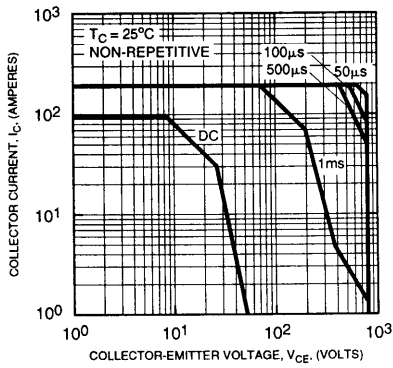


REVERSE BIAS SAFE OPERATING AREA (RBSOA)

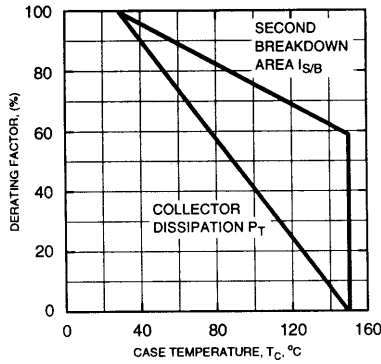


KS221K10
Single Darlington Transistor Module
 100 Amperes/1000 Volts

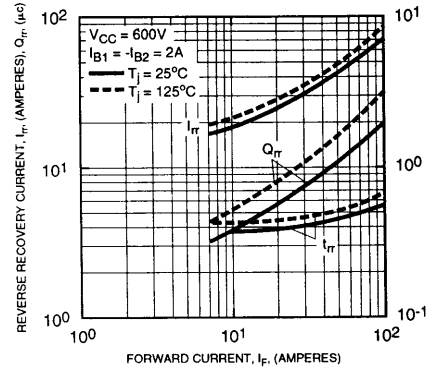
FORWARD BIAS SAFE OPERATING AREA (SOA)



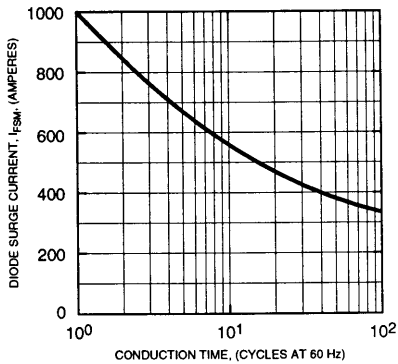
DERATING FACTOR OF SAFE OPERATING AREA (SOA)



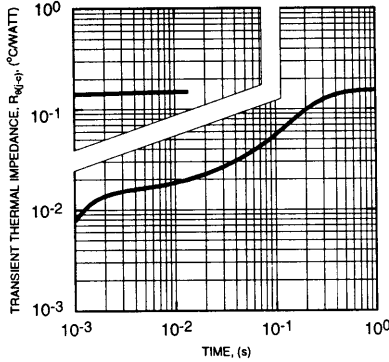
REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



DIODE FORWARD SURGE CURRENT



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (TRANSISTOR)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (DIODE)

