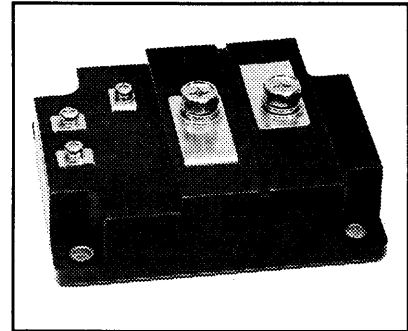
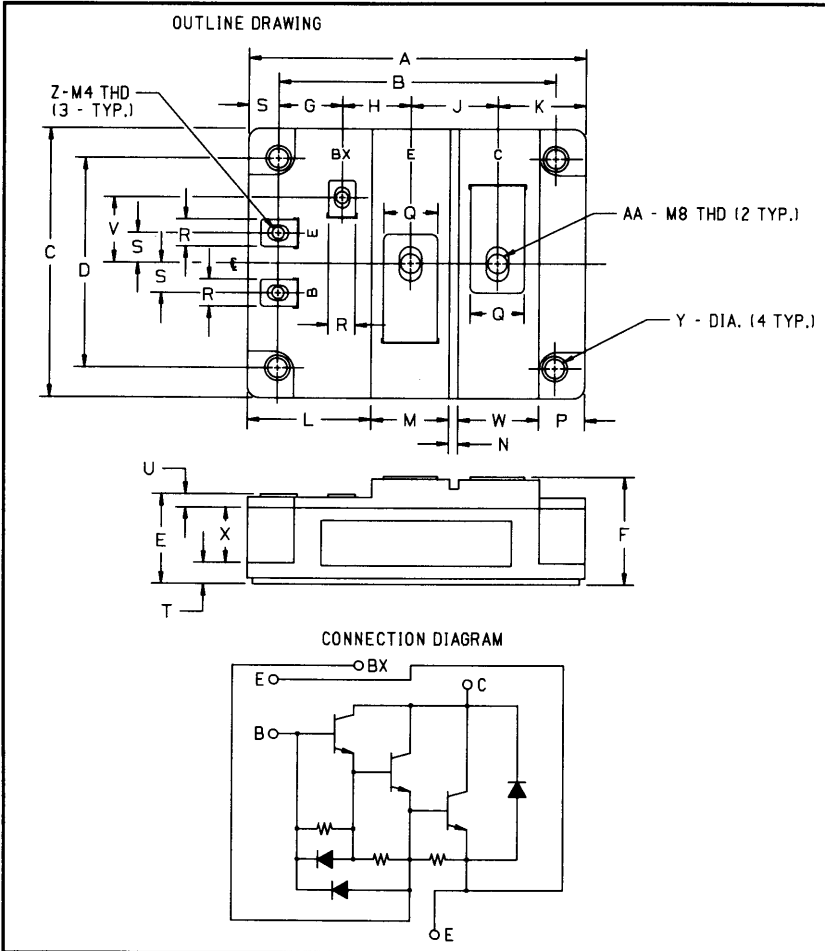


### Single Darlington Transistor Module 400 Amperes/1000 Volts



#### 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 ( $h_{FE}$ )
- 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. KS621K40 is a 1000 Volt, 400 Ampere Single Darlington Module.

#### Outline Drawing

Dimensions	Inches	Millimeters
A	4.449 Max.	113 Max.
B	3.661 ± 0.012	93 ± 0.3
C	3.543 Max.	90 Max.
D	2.756 ± 0.012	70 ± 0.3
E	1.181 Max.	30 Max.
F	1.417 Max.	36 Max.
G	0.846	21.5
H	0.906	23
J	1.142	29
K	1.161	29.5
L	1.634	41.5
M	1.024	26
N	0.118	3

Dimensions	Inches	Millimeters
P	0.610	15.5
Q	0.709	18
R	0.354	9
S	0.394	10
T	0.276	7
U	0.177	4.5
V	0.866	22
W	1.063	27
X	0.728	18.5
Y	0.256 Dia.	6.5 Dia.
Z	M4 Metric	M4
AA	M8 Metric	M8

Type	V <sub>CEO(sus)</sub> Volts (1000)	Current Rating Amperes (X 10)
KS62	1K	40



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

**KS621K40**  
**Single Darlington Transistor Module**  
 400 Amperes/1000 Volts

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

Ratings	Symbol	KS621K40	Units
Junction Temperature	$T_j$	-40 to 150	$^\circ\text{C}$
Storage Temperature	$T_{\text{stg}}$	-40 to 125	$^\circ\text{C}$
Collector-Emitter Sustaining Voltage, $V_{BE} = -2\text{V}$	$V_{CEV(\text{sus})}$	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	$I_C$	400	Amperes
Diode Forward Current	$I_{FM}$	400	Amperes
Continuous Base Current	$I_B$	20	Amperes
Diode Surge Current	$I_{FSM}$	4000	Amperes
Power Dissipation	$P_t$	3120	Watts
Max. Mounting Torque M8 Terminal Screws (E, C)	-	95	in.-lb.
Max. Mounting Torque M4 Terminal Screws (B, Bx, E)	-	12	in.-lb.
Max. Mounting Torque M6 Mounting Screws	-	26	in.-lb.
Modular Weight (Typical)	-	870	Grams
V Isolation	$V_{RMS}$	2500	Volts

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

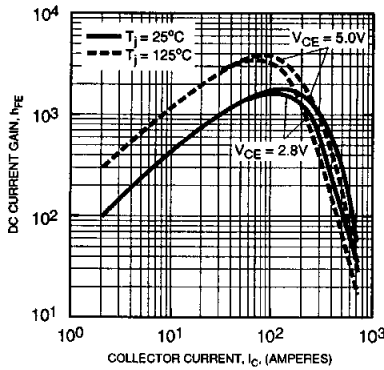
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector Cutoff Current	$I_{CEV}$	$V_{CE} = 1000\text{V}, V_{BE} = -2\text{V}$	-	-	8	mA
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = 7\text{V}$	-	-	600	mA
DC Current Gain	$h_{FE}$	$I_C = 400\text{A}, V_{CE} = 2.8\text{V}$	75	-	-	-
Diode Forward Voltage	$V_{FM}$	$I_{FM} = 400\text{A}$	-	-	1.8	Volts
Collector-Emitter Saturation Voltage	$V_{CE(\text{sat})}$	$I_C = 400\text{A}, I_B = 8\text{A}$	-	-	2.5	Volts
Base-Emitter Saturation Voltage	$V_{BE(\text{sat})}$	$I_C = 400\text{A}, I_B = 8\text{A}$	-	-	3.5	Volts
Resistive Turn-on	$t_{\text{on}}$	$V_{CC} = 600\text{V}$	-	-	3.0	$\mu\text{s}$
Load Storage Time	$t_s$	$I_C = 400\text{A}$	-	-	16	$\mu\text{s}$
Switch Times Fall Time	$t_f$	$I_{B1} = I_{B2} = -8\text{A}$	-	-	3.0	$\mu\text{s}$

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

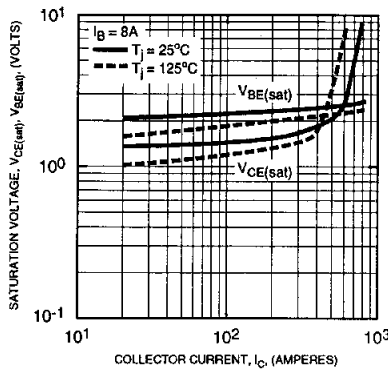
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Case-to-Sink	$R_{\theta(\text{c-s})}$	-	-	-	0.02	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta(\text{j-c})}$	Transistor Part	-	-	0.04	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta(\text{j-c})}$	Diode Part	-	-	0.175	$^\circ\text{C/W}$

**KS621K40**  
**Single Darlington Transistor Module**  
**400 Amperes/1000 Volts**

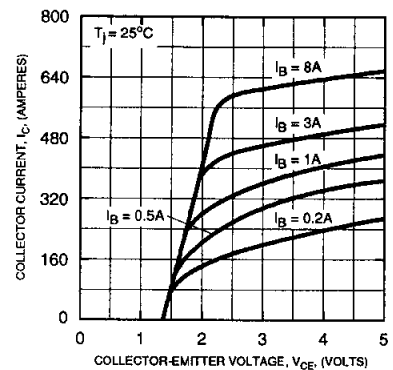
**DC CURRENT GAIN (TYPICAL)**



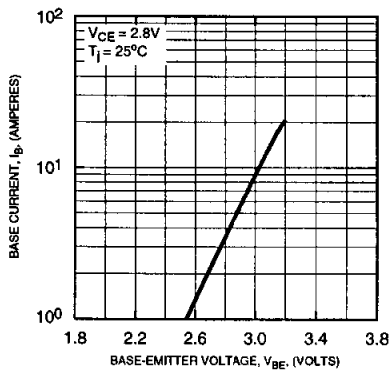
**SATURATION VOLTAGE (TYPICAL)**



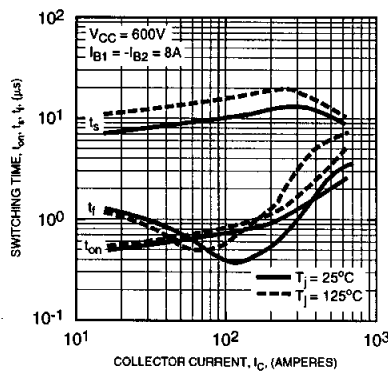
**COMMON EMITTER OUTPUT CHARACTERISTICS (TYPICAL)**



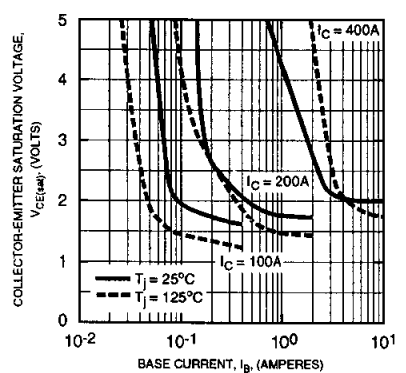
**COMMON EMITTER INPUT CHARACTERISTICS (TYPICAL)**



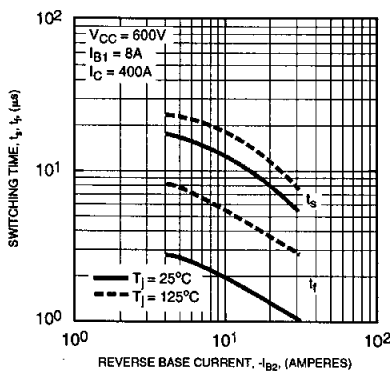
**SWITCHING CHARACTERISTICS (TYPICAL)**



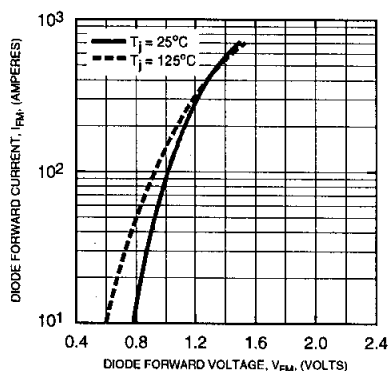
**COLLECTOR-EMITTER SATURATION VOLTAGE (TYPICAL)**



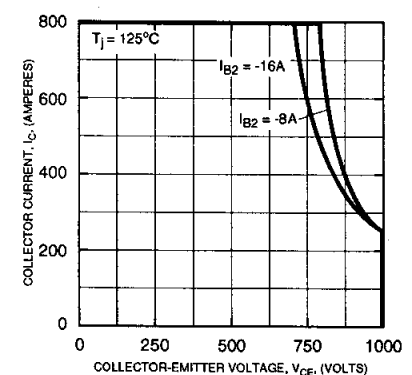
**SWITCHING TIME VS. BASE CURRENT (TYPICAL)**



**DIODE CHARACTERISTICS (TYPICAL)**

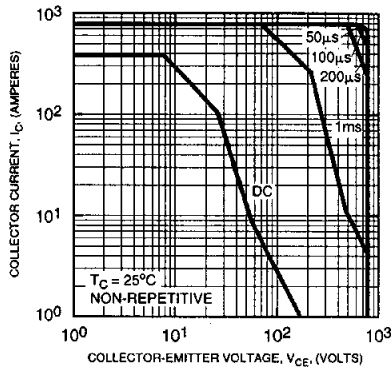


**REVERSE BIAS SAFE OPERATING AREA (RBSOA)**

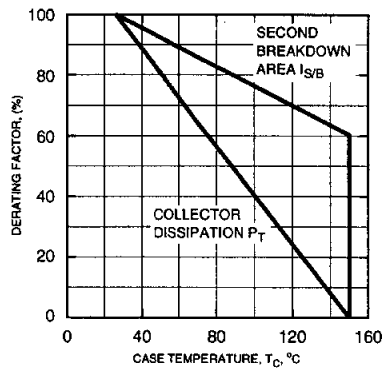


**KS621K40**  
**Single Darlington Transistor Module**  
 400 Amperes/1000 Volts

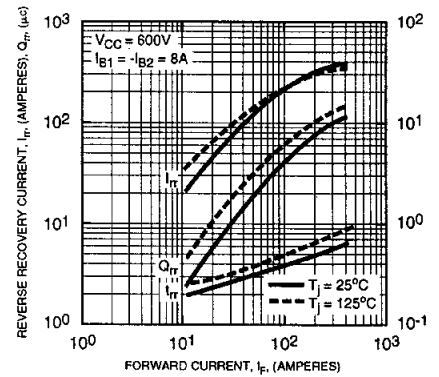
**FORWARD BIAS SAFE OPERATING AREA (SOA)**



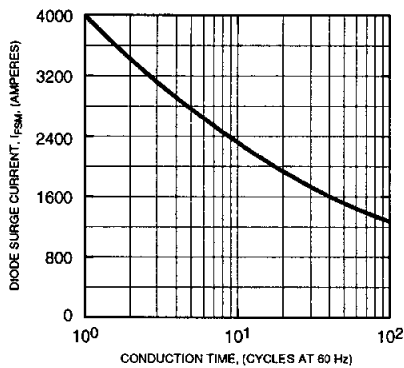
**DERATING FACTOR OF SAFE OPERATING AREA (SOA)**



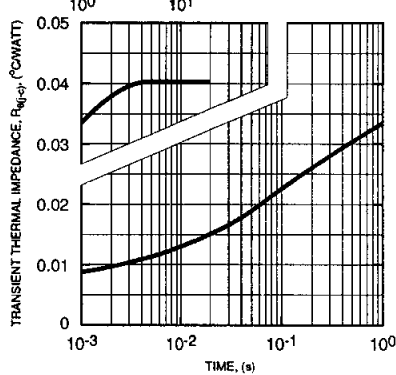
**REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)**



**DIODE FORWARD SURGE CURRENT**



**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (TRANSISTOR)**



**TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (DIODE)**

