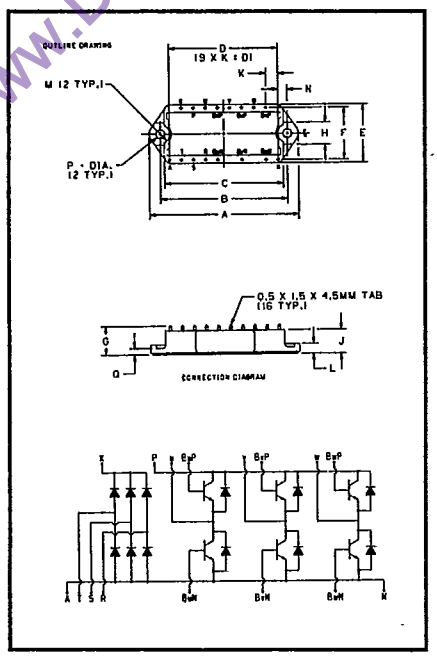
T-33-35

KMG24501HB

Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272
Powerex Europe, S.A., 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

Diode Bridge Input, High Gain Darlington Transistor Output Converter Module

10 Amperes/600 Volts



600 Volt KMG24501HB
Outline Drawing

Dimension	Inches	Millimeters
A	3.70	94.0
B	3.15	80.0
C	2.95	75.0
D	2.700	68.58
E	1.46	37.0
F	1.30	33.0
G	.71	18.0
H	.55	14.0
J	.53	13.5
K	.300	7.62
L	.24	6.0
M	.24 R	R 6.0
N	.225	5.71
P	.216 Dia.	Dia. 5.50
Q	.16	4.0

Description
Powerex Converter Modules are designed for use in switching type of converter and inverter applications. Each module consists of a six-Diode Input Rectifying Bridge, and a six-Darlington Transistor, Three Phase Output Inverter with each transistor having a reverse parallel connected high-speed diode. All chips and interconnect are isolated from the heat sinking baseplate, offering simplified system assembly and thermal management.

Features:
- ☐ Diode Input Bridge and Darlington Transistor Output Bridge in One Module
- ☐ 30A DC Output from Diode Bridge
- ☐ 10A Darlington Collector Current
- ☐ Isolated Mounting
- ☐ Planar Processes
- ☐ Discrete Fast Recovery Feed-Back Diode Around Darlingtons
- ☐ High Gain Darlington Transistors (hFE = 250)
- ☐ Terminal Compatible for P.C. Board Mounting
- ☐ Base Emitter Speed Up Diodes

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

Ordering Information
Example: Select the complete ten digit module part number from the table below — i.e. KMG24501HB is a 450 Volt $V_{CEO(SUS)}$, 600 Volt $V_{CEV(SUS)}$, 10 Ampere Collector Current Converter Module.

Type	$V_{CEO(SUS)}$ 450 Volts	Current Rating 10 Amperes	High Gain
KMG2	45	01	HB

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High Gain Darlington Transistor Output Converter Module
10 Amperes/600 Volts

Absolute Maximum Ratings, T_J=25°C unless otherwise specified

	Symbol	KMG24501HB	Units
Junction Temperature	T_J	-40 to +150	°C
Storage Temperature	T_{STG}	-40 to +125	°C
Mounting Torque, Mounting Screws (M5)		12	in-lb
Module Weight (Typical)		—	Grams
V isolation	V_{isol}	2500	Volts
Transistor Inverter Section			
Collector-Emitter Sustaining Voltage	$V_{CEO(sus)}$	450	Volts
Emitter-Base Voltage	V_{EBO}	7	Volts
Collector-Emitter Voltage (V_{BE}=-2V)	V_{CEV}	600	Volts
Collector-Base Voltage	V_{CBO}	600	Volts
Collector Current	I_C	10	Amperes
Base Current	I_b	1	Amperes
Free Wheel Diode DC Current	I_{FM}	10	Amperes
Free Wheel Diode Surge Current	I_{FSM}	100	Amperes
Diode Bridge Rectifier Section			
Repetitive Peak Blocking Voltage	V_{RRM}	800	Volts
Transient Peak Reverse Blocking Voltage	V_{RSM}	900	Volts
DC Current	I_{FM}	30	Amperes
Peak Half Cycle Surge Current (T_J=125°C)	I_{FSM}	400	Amperes
I^2t for Fusing for One Cycle	I^2t	670	A^2-sec

Electrical and Mechanical Characteristics, T_J=25°C unless otherwise specified

Characteristics		Symbol	Test Conditions	KMG24501HB Min.	Typ.	Max.	Units
Transistor Inverter Section							
Collector-Cutoff Current		I_{CEV}	$V_{CE}=V_{CEV}$, V_{BE}=-2V	—	—	1	mA
Collector-Cutoff Current		I_{CBO}	$V_{CB}=V_{CBO}$, Emitter Open	—	—	1	mA
Emitter-Cutoff Current		I_{EBO}	$V_{EB}=V_{EBO}$, Collector Open	—	—	40	mA
DC Current Gain		h_{FE}	I_C=10A, V_{CE}=2V	250	—	—	
Diode Forward Voltage		V_{FM}	I_C=-10A	—	—	1.5	Volts
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	I_C=10A, I_B=40mA	—	—	2.0	Volts
Base-Emitter Saturation Voltage		$V_{BE(sat)}$	I_C=10A, I_B=40mA	—	—	2.5	Volts
Resistive	Turn On	t_{on}	V_{CC}=300V	—	—	1.5	μs
Load	Storage Time	t_s	I_C=10A,	—	—	10	μs
Switch Times	Fall Time	t_f	I_{B1}=60mA, $-I_{B2}$=200mA	—	—	2.0	μs
Thermal Resistance		$R_{\theta JC}$	per Transistor	—	—	1.7	°C/W
Junction to Case		$R_{\theta JC}$	per Free Wheel Diode	—	—	2.8	°C/W
Thermal Resistance Case to Sink, Lubricated		$R_{\theta CS}$		—	—	0.9	°C/W
Diode Bridge Rectifier Section							
Repetitive Peak Reverse Current		I_{RRM}	$V_{RM}=V_{RRM}$, T_J=150°C	—	—	1.5	mA
Peak Forward Voltage		V_{FM}	I_{FM}=30A, T_J=25°C	—	—	1.1	Volts
Thermal Resistance Junction to Case		$R_{\theta JC}$		—	—	0.9	°C/W
Thermal Resistance Case to Sink, Lubricated		$R_{\theta CS}$		—	—	0.9	°C/W

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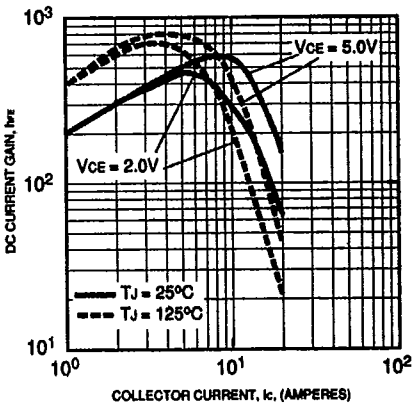
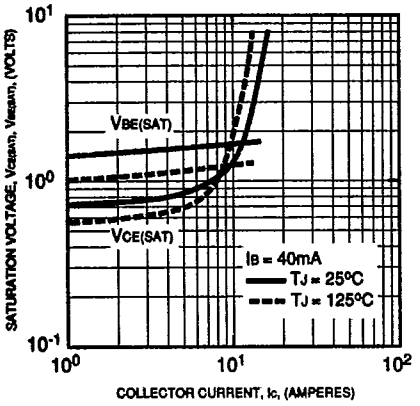
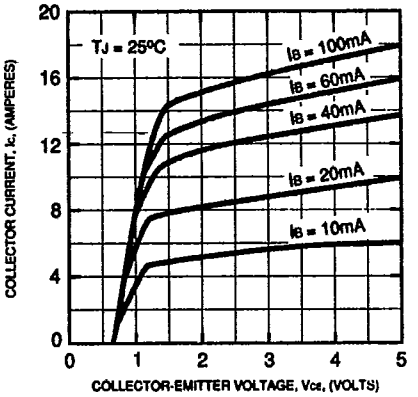
DC CURRENT GAIN (TYPICAL)



SATURATION VOLTAGE (TYPICAL)



COMMON EMITTER OUTPUT CHARACTERISTICS (TYPICAL)



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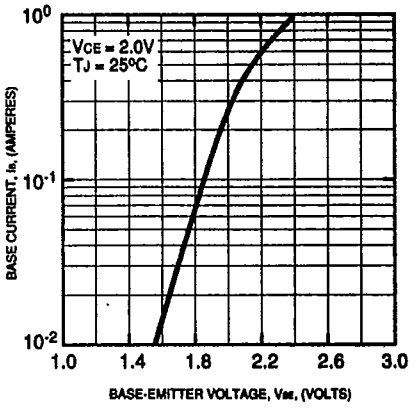
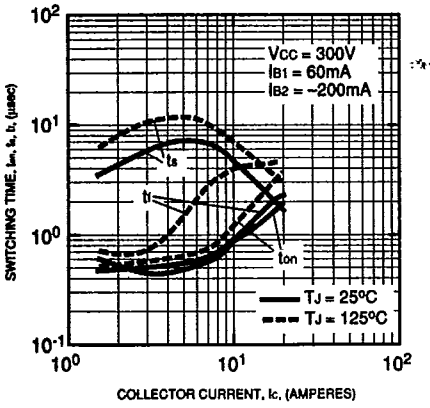
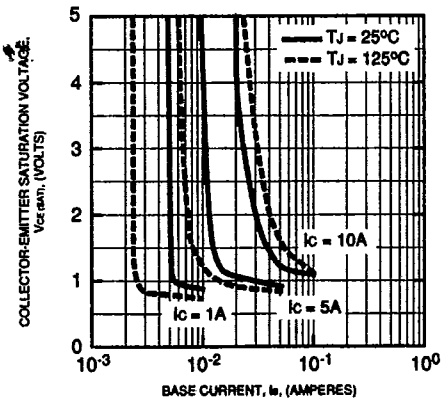


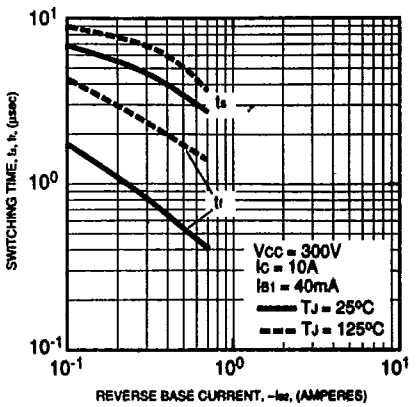
SWITCHING CHARACTERISTICS (TYPICAL)



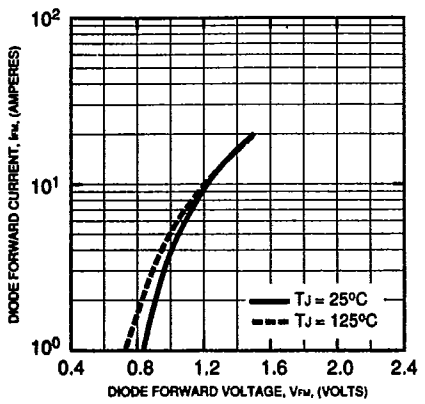
COLLECTOR-EMITTER SATURATION VOLTAGE (TYPICAL)



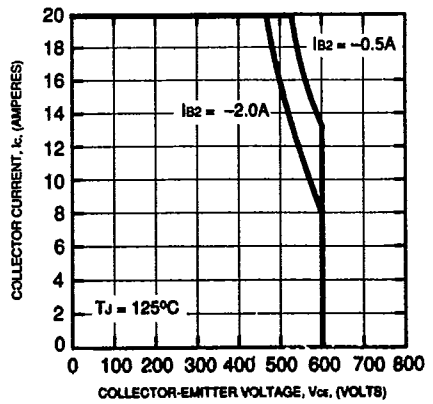
SWITCHING TIME VS. BASE CURRENT (TYPICAL)



DIODE CHARACTERISTICS (TYPICAL)



REVERSE BIAS SAFE OPERATING AREA (R.B.S.O.A.)



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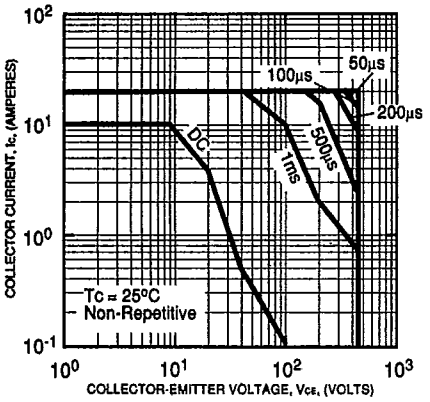
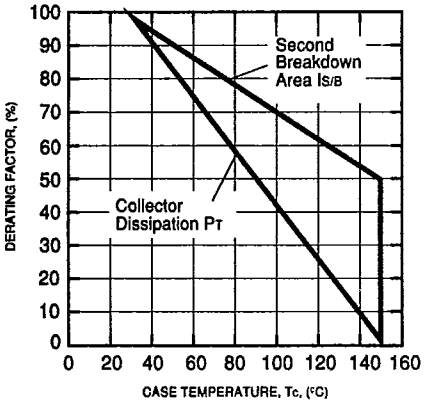
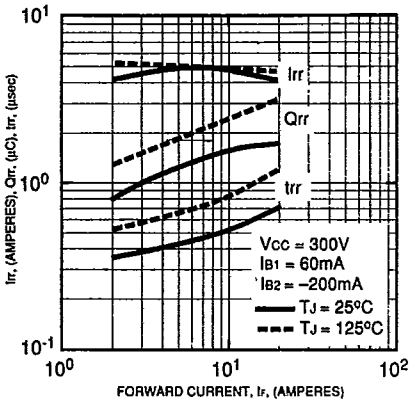
FORWARD BIAS SAFE OPERATING AREA (S.O.A.)



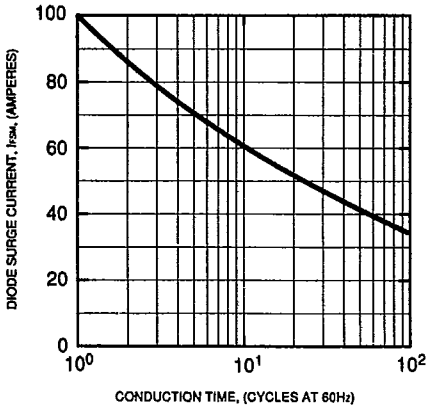
DERATING FACTOR OF S.O.A.



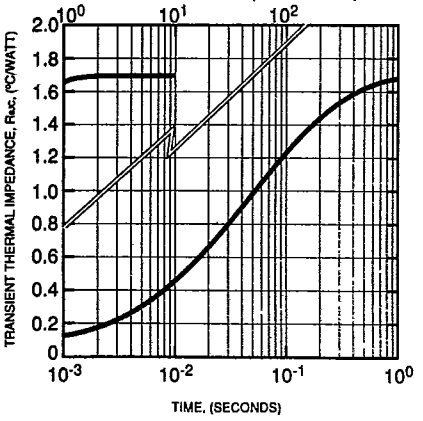
REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



DIODE FORWARD SURGE CURRENT



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (TRANSISTOR)



TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (DIODE)