



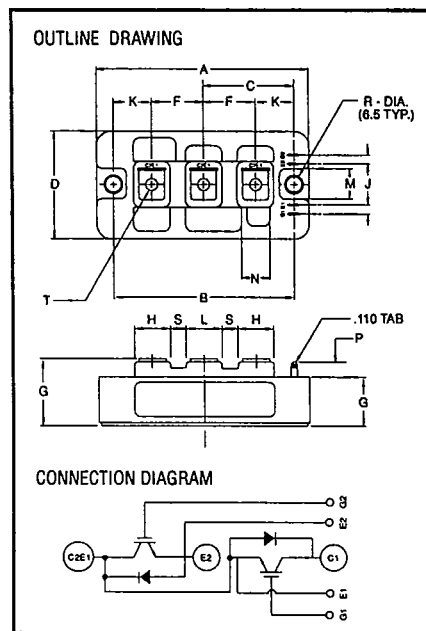
Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272
 Powerex, Europe, S.A. 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

ID221275

T-39-31

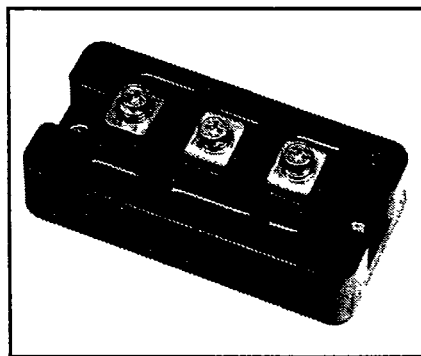
Dual IGBTMOD™ Power Module

75 Amperes/1200 Volts



ID221275
Outline Drawing

Dimension	Inches	Millimeters
A	3.70	94
B	3.150±.010	80±0.25
C	1.57	40
D	1.89	48
E	1.18 Max.	30 Max.
F	.90	23
G	.85	21.2
H	.63	16
J	.71	18
K	.67	17
L	.63	16
M	.51	13
N	.47	12
P	.3	7.5
Q	.16	4
R	.256 Dia.	Dia. 6.5
S	.28	7
T	M5 Metric	M5



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Description

Powerex IGBTMOD™ Modules are designed for use in switching applications. Each module consists of two IGBT Transistors in a half bridge configuration, with each transistor having a reverse-connected super-fast recovery free wheel diode. All components and interconnects are isolated from the heat sinking baseplate, offering simplified system assembly and thermal management.

Features:

- ☐ Low Drive Power
- ☐ Low $V_{CE(sat)}$
- ☐ Discrete Super-Fast Recovery (150ns) Free Wheel Diode
- ☐ High Frequency Operation (15-20kHz)
- ☐ Isolated Base Plate for Easy Heat Sinking

Applications:

- ☐ AC Motor Control
- ☐ Motion/Servo Control
- ☐ UPS
- ☐ Welding Power Supplies
- ☐ Laser Power Supplies

Ordering Information

Example: Select the complete eight digit part module number you desire from the table below -i.e. ID221275 is a 1200V (V_{CES}), 75 Ampere Dual IGBTMOD™ Power Module.

Type	V_{CES} Volts (x100)	Current Rating Amperes
ID22	12	75



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

Ratings	Symbol	ID221275	Units
Junction Temperature	T_J	-40 to 150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 to 125	$^\circ\text{C}$
Collector-Emitter Voltage (G-E SHORT)	V_{CES}	1200	Volts
Gate-Emitter Voltage	V_{GES}	± 20	Volts
Collector Current	I_C	75	Amperes
Peak Collector Current	I_{CM}	150*	Amperes
Diode Forward Current	I_{FM}	75	Amperes
Diode Forward Surge Current	I_{FM}	150*	Amperes
Power Dissipation	P_d	600	Watts
Max. Mounting Torque M5 Terminal Screws	—	17	in.-lb.
Max. Mounting Torque M6 Mounting Screws	—	26	in.-lb.
Module Weight (Typical)	—	270	Grams
V isolation	V_{RMS}	2500	Volts

* Pulse width and repetition rate should be such that device junction temperature does not exceed the device rating.

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Collector-Cutoff Current	I_{CES}	$V_{CE} = V_{CES}, V_{GE} = 0V$	—	—	1.0	mA
Gate Leakage Current	I_{GES}	$V_{GE} = V_{GES}, V_{CE} = 0V$	—	—	0.5	μA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C = 7.5\text{mA}, V_{CE} = 10V$	3.0	4.0	6.0	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 75A, V_{GE} = 15V$	—	3.2	5.0**	Volts
		$I_C = 75A, V_{GE} = 15V, T_J = 150^\circ\text{C}$	—	3.2	**	Volts
Total Gate Charge	Q_G	$V_{CC} = 600V, I_C = 75A, V_{GS} = 15V$	—	760	—	nC
Diode Forward Voltage	V_{FM}	$I_C = -75A, V_{GS} = 0V$	—	—	2.5	Volts

** Pulse width and repetition rate should be such that device junction temperature rise is negligible.

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance	C_{ies}	$V_{GE} = 0V, V_{CE} = 10V, f = 1\text{MHz}$	—	—	22000	pF
Output Capacitance	C_{oes}		—	—	5400	pF
Reverse Transfer Capacitance	C_{res}		—	—	540	pF
Resistive Load Switch Times	Turn-on Delay Time	$V_{CC} = 600V, I_C = 75A,$ $V_{GE1} = V_{GE2} = 15V, R_G = 17\Omega$	—	—	800	ns
	Rise Time		—	—	700	ns
	Turn-off Delay Time		—	—	800	ns
	Fall Time		—	—	1000	ns
Diode Reverse Recovery Time	t_{rr}	$I_E = 75A, di_E/dt = -150A/\mu s$	—	—	300	ns
Diode Reverse Recovery Charge	Q_{rr}	$I_E = 75A, di_E/dt = -150A/\mu s$	—	1.7	—	μC

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{th(j-c)}$	Per IGBT	—	—	0.21	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{th(j-c)}$	Per Free Wheel Diode	—	—	0.47	$^\circ\text{C/W}$
Contact Thermal Resistance	$R_{th(c-l)}$	Per Half Module	—	—	0.13	$^\circ\text{C/W}$



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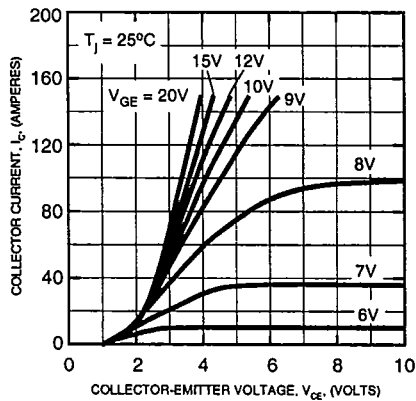
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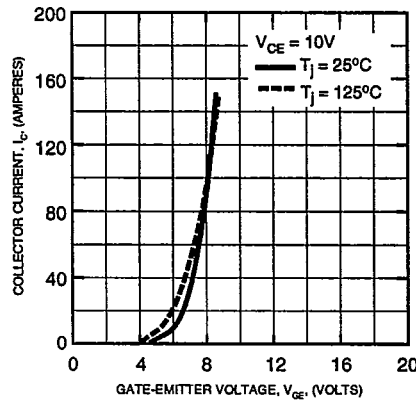
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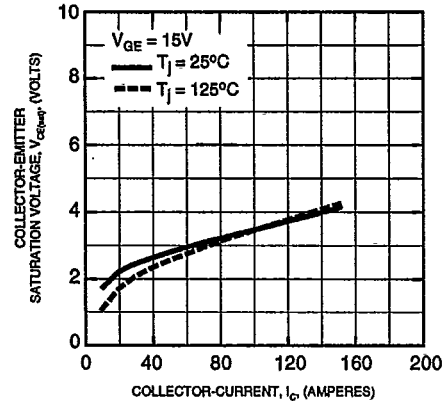
OUTPUT CHARACTERISTICS
(TYPICAL)



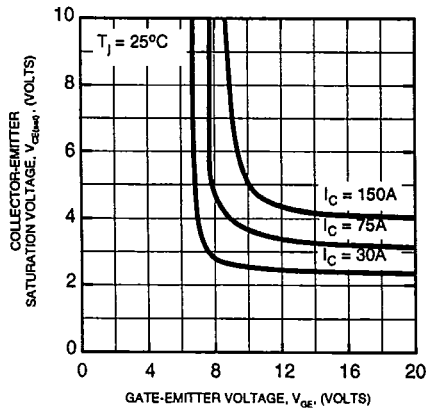
TRANSFER CHARACTERISTICS
(TYPICAL)



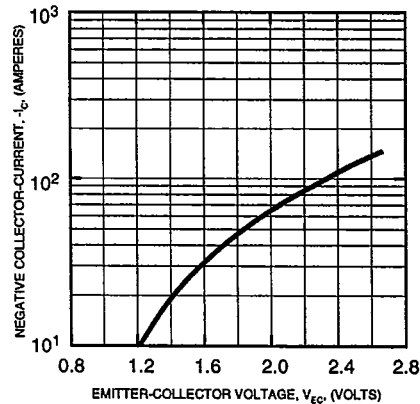
COLLECTOR-EMITTER
SATURATION VOLTAGE CHARACTERISTICS
(TYPICAL)



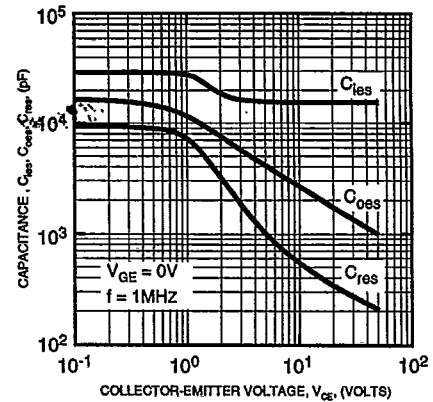
COLLECTOR-EMITTER
SATURATION VOLTAGE CHARACTERISTICS
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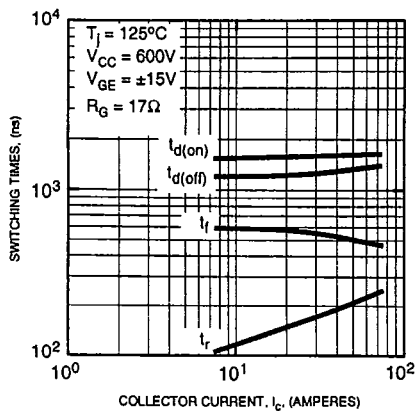
FREE-WHEEL DIODE
FORWARD CHARACTERISTICS
(TYPICAL)



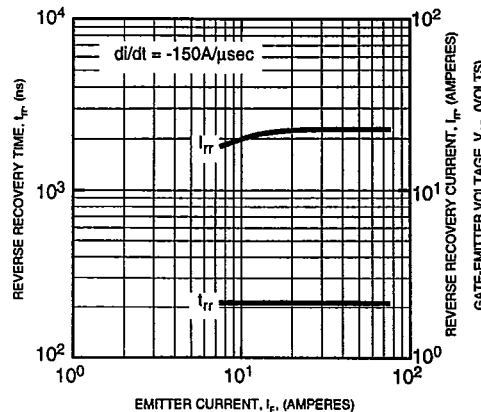
CAPACITANCE VS. V_{CE}
(TYPICAL)



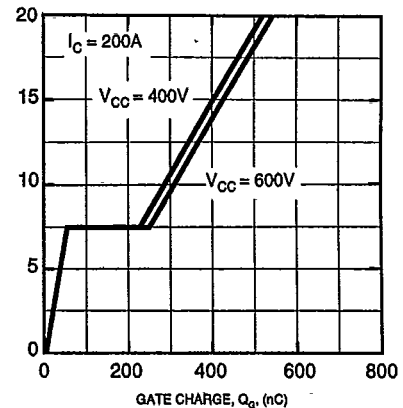
HALF-BRIDGE
SWITCHING CHARACTERISTICS
(TYPICAL)



REVERSE RECOVERY CHARACTERISTICS
(TYPICAL)



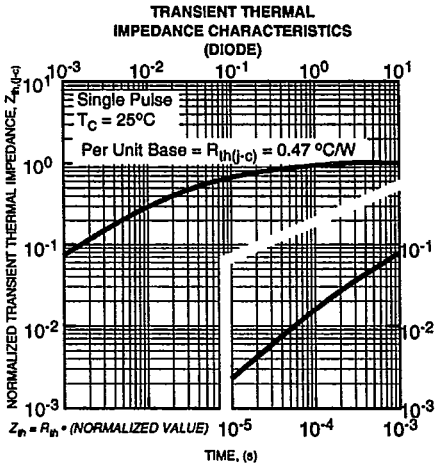
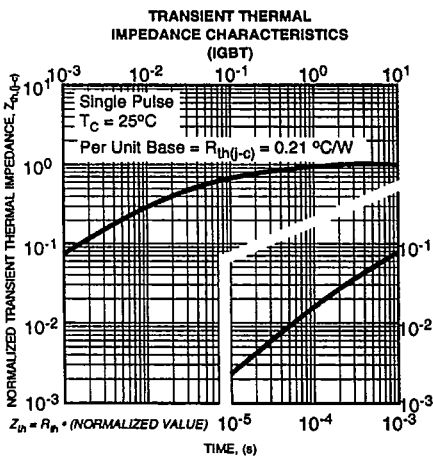
GATE CHARGE, V_{GE}



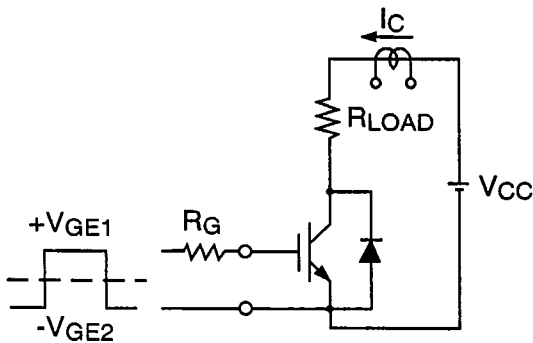


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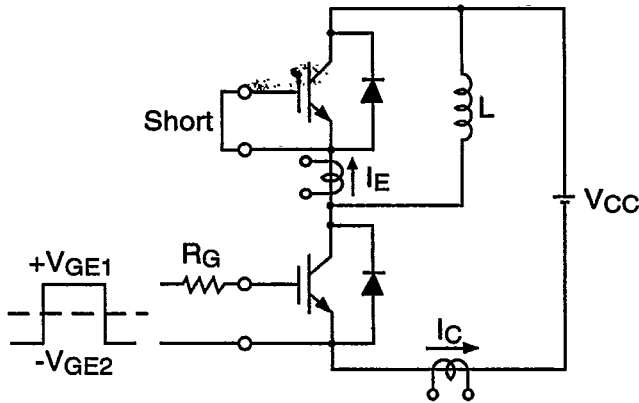
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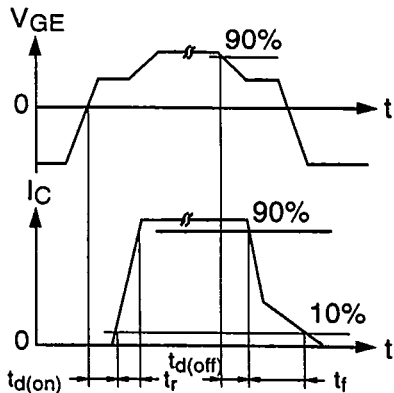
SWITCHING TIME TEST CIRCUITS & WAVEFORMS



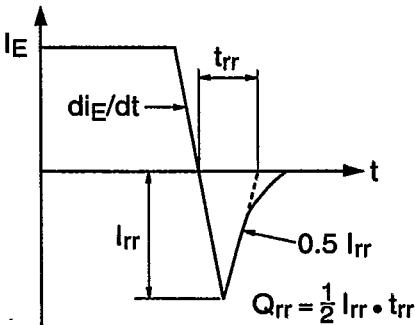
Resistance Load Switching Test Circuit



Half-Bridge Switching Test Circuit



Switching Time Test Waveforms



t_{rr}, Q_{rr} Waveforms