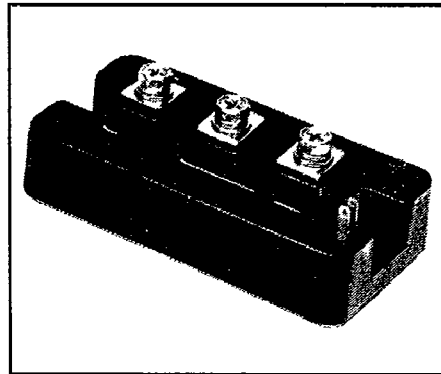
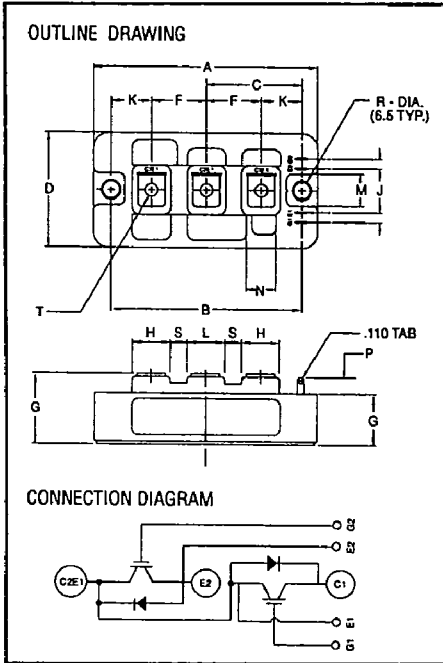


Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272  
 Powerex, Europe, S.A. 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

### Dual IGBTMOD™ Power Module 200 Amperes/600 Volts



**ID226020**  
 Dual IGBTMOD™ Power Module  
 200 Amperes/600 Volts

#### 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. ID226020 is a 600V ( $V_{CES}$ ), 200 Ampere Dual IGBTMOD™ Power Module.

#### ID226020 Outline Drawing

Dimension	Inches	Millimeters
A	3.70	94
B	3.150 ± 0.10	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

Type	$V_{CES}$ Volts (x10)	Current Rating Amperes (x10)
ID22	60	20



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

Ratings	Symbol	ID226020	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)	$V_{CES}$	600	Volts
Gate-Emitter Voltage	$V_{GES}$	$\pm 20$	Volts
Collector Current	$I_C$	200	Amperes
Peak Collector Current	$I_{CM}$	400*	Amperes
Diode Forward Current	$I_{FM}$	200	Amperes
Diode Forward Surge Current	$I_{FM}$	400*	Amperes
Power Dissipation	$P_d$	780	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	$\mu\text{A}$
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$I_C=20\text{mA}, V_{CE}=10V$	3.0	4.0	6.0	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=200\text{A}, V_{GE}=15V$	—	3.0	5.0**	Volts
		$I_C=200\text{A}, V_{GE}=15V, T_j=150^\circ\text{C}$	—	3.2	**	Volts
Total Gate Charge	$Q_G$	$V_{CC}=300V, I_C=200\text{A}, V_{GS}=15V$	—	720	—	nC
Diode Forward Voltage	$V_{FM}$	$I_C=-200\text{A}, V_{GS}=0V$	—	—	2.5	Volts

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

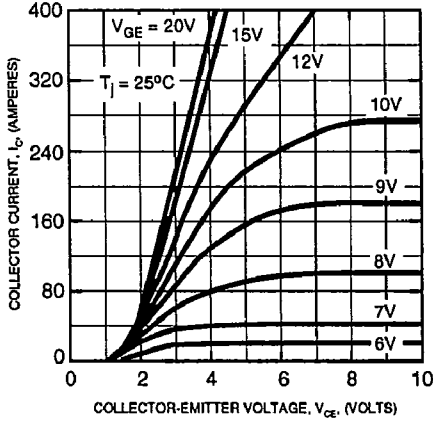
**Dynamic Electrical Characteristics,  $T_j = 25^\circ\text{C}$  unless otherwise specified**

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Input Capacitance	$C_{ies}$		—	—	22000	pF
Output Capacitance	$C_{oes}$	$V_{GE}=0V, V_{CE}=10V, f=1\text{MHz}$	—	—	5400	pF
Reverse Transfer Capacitance	$C_{res}$		—	—	540	pF
Resistive Load	Turn-on Delay Time	$V_{CC}=300V, I_C=200\text{A}, V_{GE1}=V_{GE2}=15V, R_G=13\Omega$	—	—	800	ns
	Rise Time					
Switch Times	Turn-off Delay Time	$V_{CC}=300V, I_C=200\text{A}, V_{GE1}=V_{GE2}=15V, R_G=13\Omega$	—	—	700	ns
	Fall Time					
Diode Reverse Recovery Time	$t_{rr}$	$I_E=200\text{A}, di_E/dt=-400\text{A}/\mu\text{s}$	—	—	200	ns
Diode Reverse Recovery Charge	$Q_{rr}$	$I_E=200\text{A}, di_E/dt=-400\text{A}/\mu\text{s}$	—	2.6	—	$\mu\text{C}$

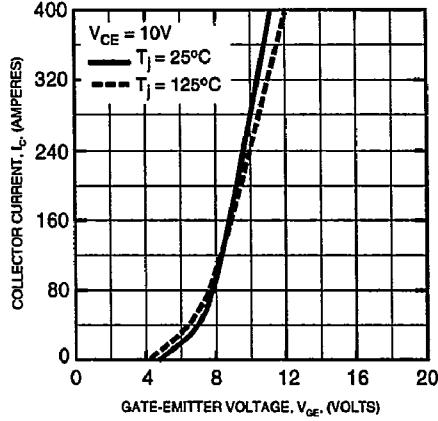
**Thermal and Mechanical Characteristics,  $T_j = 25^\circ\text{C}$  unless otherwise specified**

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{th(j-c)}$	Per IGBT	—	—	0.16	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case	$R_{th(j-c)}$	Per Free Wheel Diode	—	—	0.35	$^\circ\text{C}/\text{W}$
Contact Thermal Resistance	$R_{th(c-l)}$	Per Half Module	—	—	0.13	$^\circ\text{C}/\text{W}$

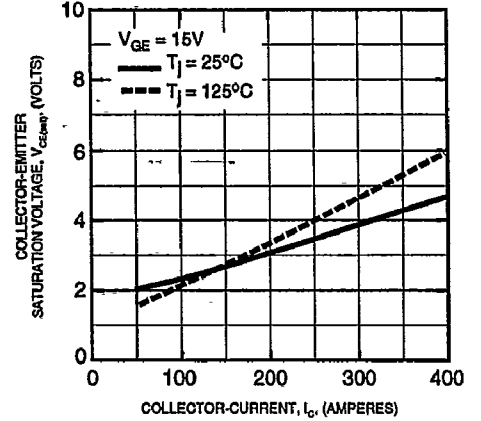
OUTPUT CHARACTERISTICS (TYPICAL)



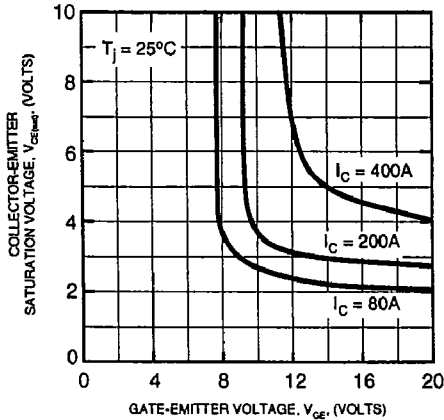
TRANSFER CHARACTERISTICS (TYPICAL)



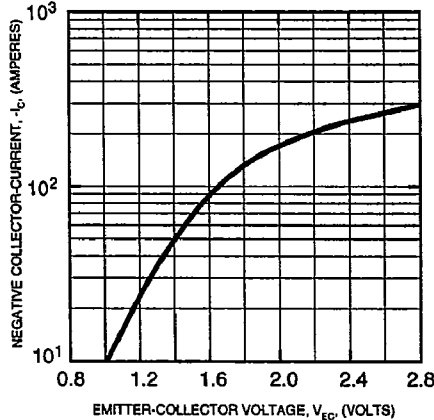
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



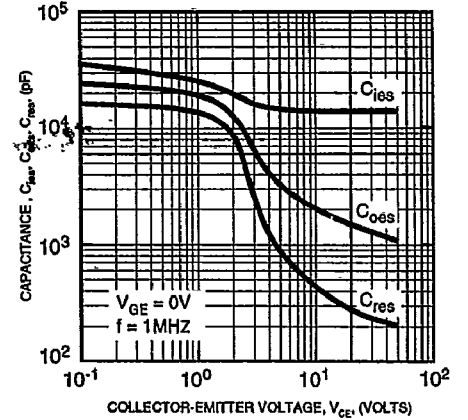
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



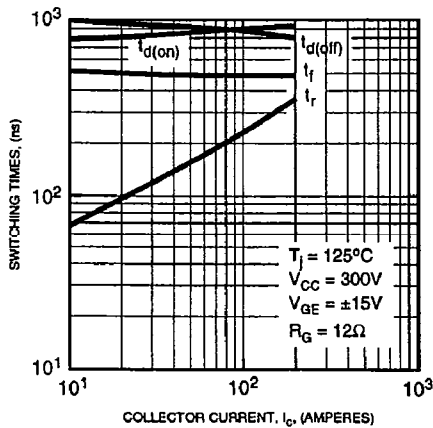
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



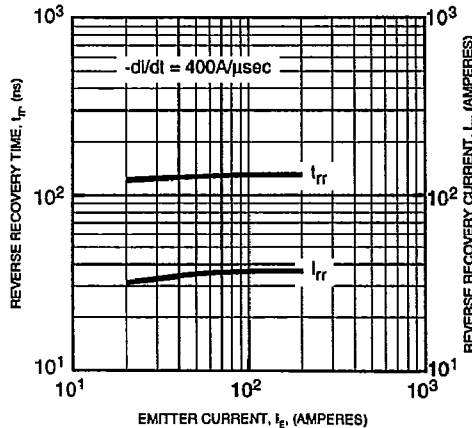
CAPACITANCE VS.  $V_{ce}$  (TYPICAL)



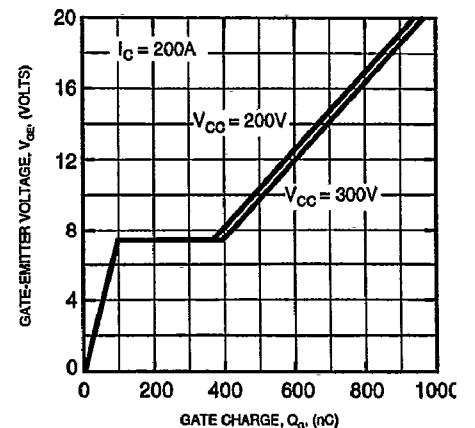
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



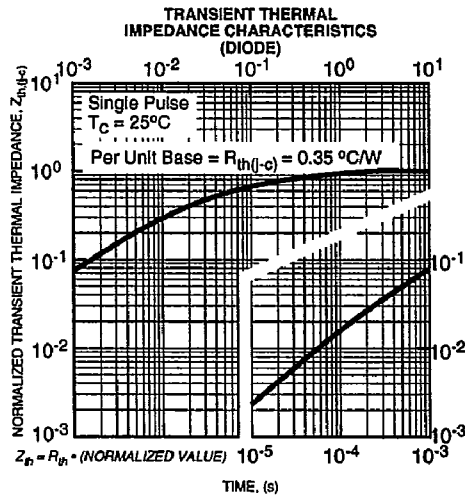
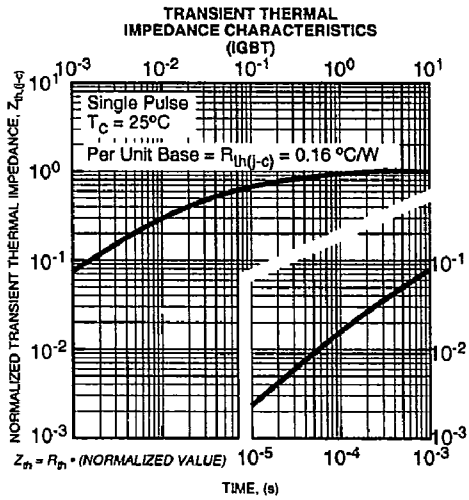
REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



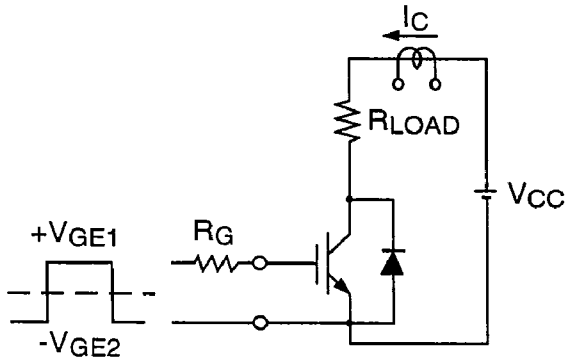
GATE CHARGE,  $V_{ge}$



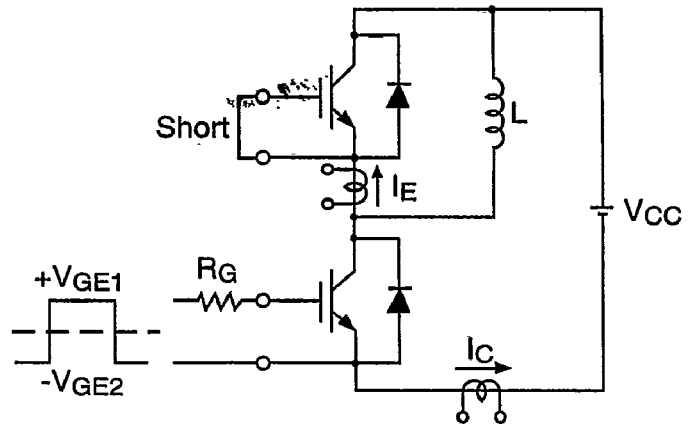
ID226020  
 Dual IGBTMOD™ Power Module  
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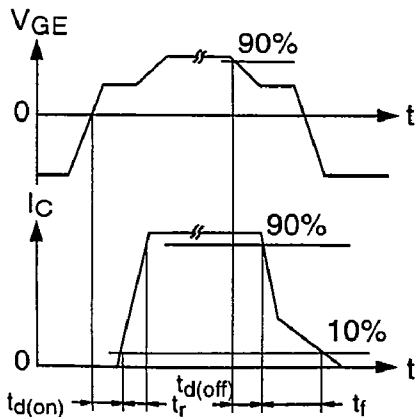
## SWITCHING TIME TEST CIRCUITS & WAVEFORMS



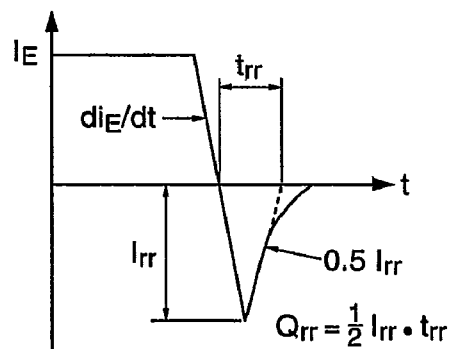
Resistance Load Switching Test Circuit



Half-Bridge Switching Test Circuit



Switching Time Test Waveforms



$t_{rr}$ ,  $Q_{rr}$  Waveforms