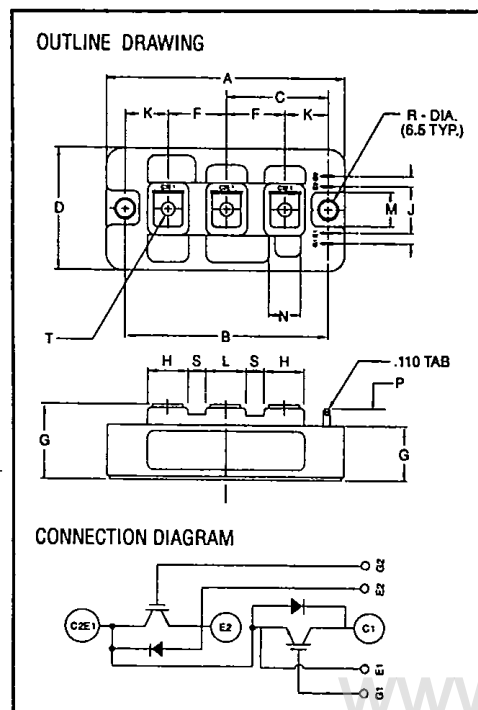


Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272

Powerex, Europe, S.A. 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

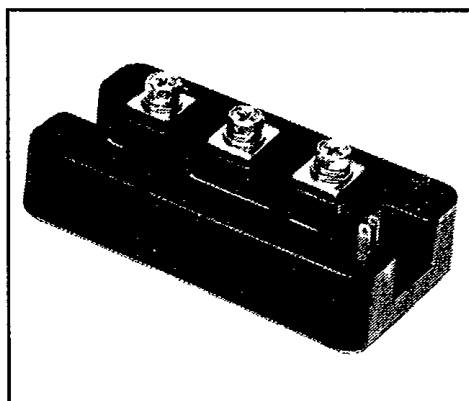
## Dual IGBTMOD™ Power Module

200 Amperes/600 Volts



**ID226020**  
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



**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.

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

ID226020  
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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	$T_{\text{sig}}$	-40 to 125	$^\circ\text{C}$
Collector-Emitter Voltage (G-E SHORT)	$V_{\text{CES}}$	600	Volts
Gate-Emitter Voltage	$V_{\text{GES}}$	$\pm 20$	Volts
Collector Current	$I_c$	200	Amperes
Peak Collector Current	$I_{\text{CM}}$	400*	Amperes
Diode Forward Current	$I_{\text{FM}}$	200	Amperes
Diode Forward Surge Current	$I_{\text{FM}}$	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
Isolation	$V_{\text{RMS}}$	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	$I_{\text{CES}}$	$V_{\text{CE}}=V_{\text{CES}}, V_{\text{GE}}=0\text{V}$	—	—	1.0	mA
Gate Leakage Current	$I_{\text{GES}}$	$V_{\text{GE}}=V_{\text{GES}}, V_{\text{CE}}=0\text{V}$	—	—	0.5	$\mu\text{A}$
Gate-Emitter Threshold Voltage	$V_{\text{GE(th)}}$	$I_c=20\text{mA}, V_{\text{CE}}=10\text{V}$	3.0	4.0	6.0	Volts
Collector-Emitter Saturation Voltage	$V_{\text{CE(sat)}}$	$I_c=200\text{A}, V_{\text{GE}}=15\text{V}$	—	3.0	5.0**	Volts
		$I_c=200\text{A}, V_{\text{GE}}=15\text{V}, T_j=150^\circ\text{C}$	—	3.2	**	Volts
Total Gate Charge	$Q_g$	$V_{\text{CC}}=300\text{V}, I_c=200\text{A}, V_{\text{GS}}=15\text{V}$	—	720	—	nC
Diode Forward Voltage	$V_{\text{FM}}$	$I_c=-200\text{A}, V_{\text{GS}}=0\text{V}$	—	—	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

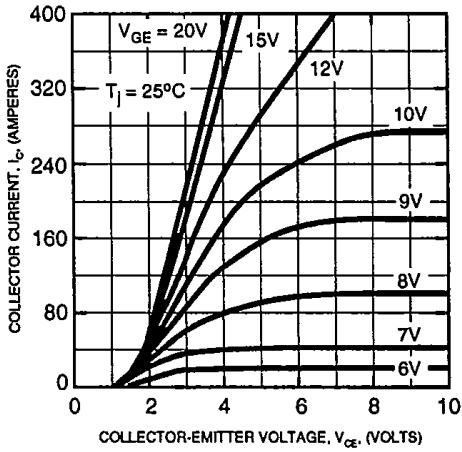
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units	
Input Capacitance	$C_{\text{ies}}$		—	—	22000	pF	
Output Capacitance	$C_{\text{oes}}$	$V_{\text{GE}}=0\text{V}, V_{\text{CE}}=10\text{V}, f=1\text{MHz}$	—	—	5400	pF	
Reverse Transfer Capacitance	$C_{\text{res}}$		—	—	540	pF	
Resistive	Turn-on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

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

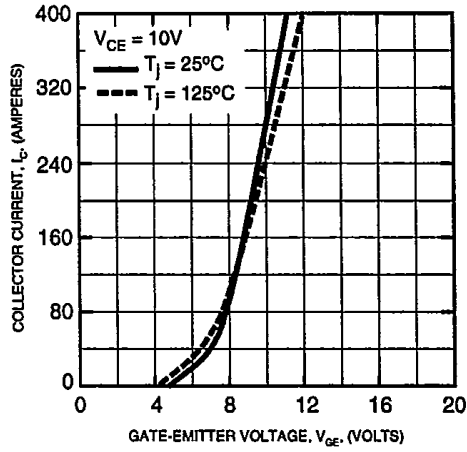
Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistance, Junction to Case	$R_{\text{th(j-c)}}$	Per IGBT	—	—	0.16	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case	$R_{\text{th(j-c)}}$	Per Free Wheel Diode	—	—	0.35	$^\circ\text{C}/\text{W}$
Contact Thermal Resistance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

ID226020  
 Dual IGBTMOD™ Power Module  
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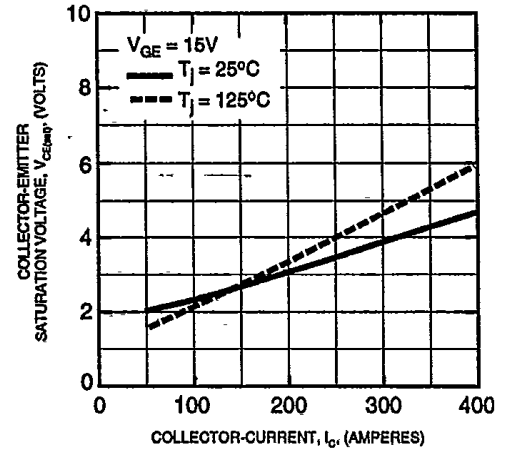
OUTPUT CHARACTERISTICS (TYPICAL)



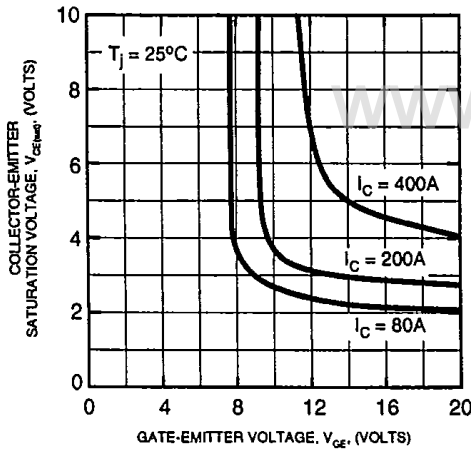
TRANSFER CHARACTERISTICS (TYPICAL)



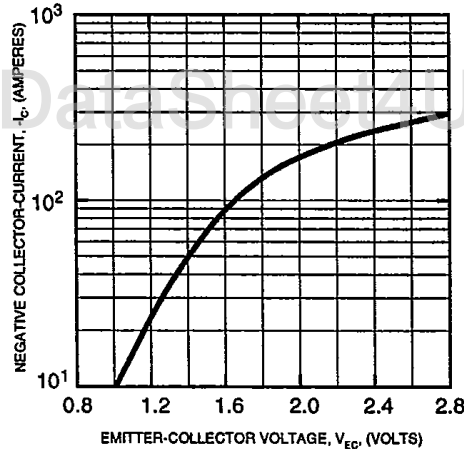
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



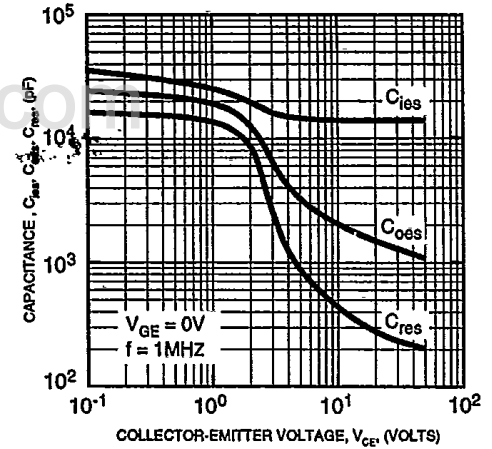
COLLECTOR-EMITTER SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



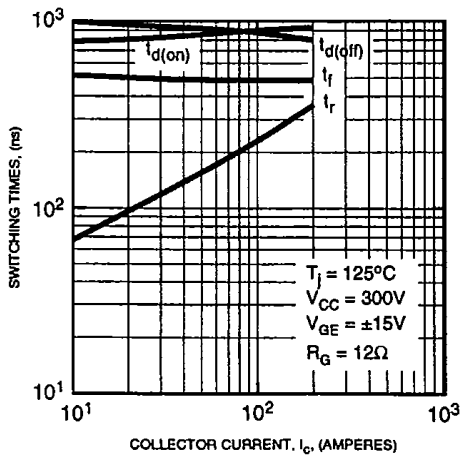
FREE-WHEEL DIODE FORWARD CHARACTERISTICS (TYPICAL)



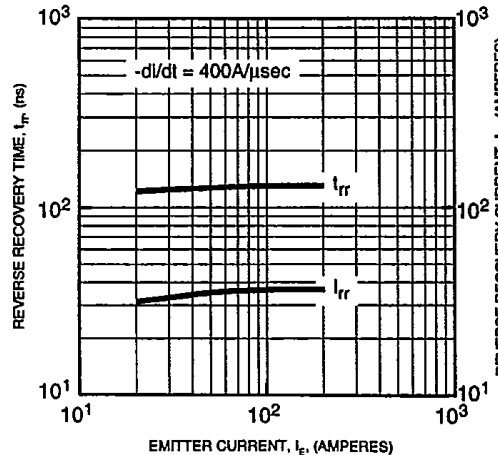
CAPACITANCE VS.  $V_{ce}$  (TYPICAL)



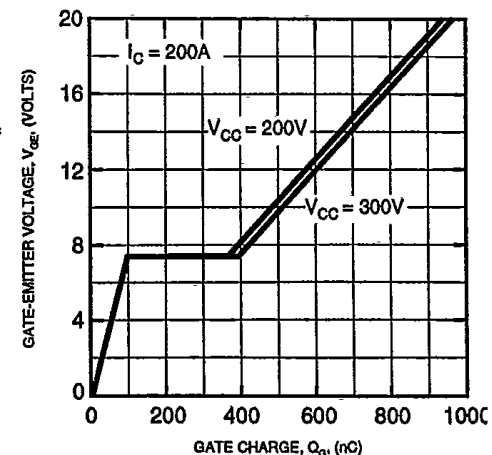
HALF-BRIDGE SWITCHING CHARACTERISTICS (TYPICAL)



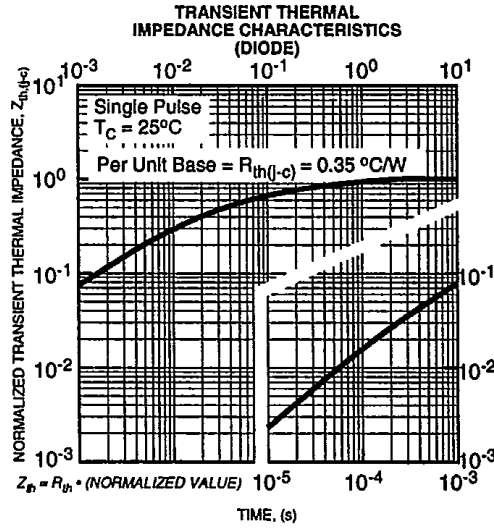
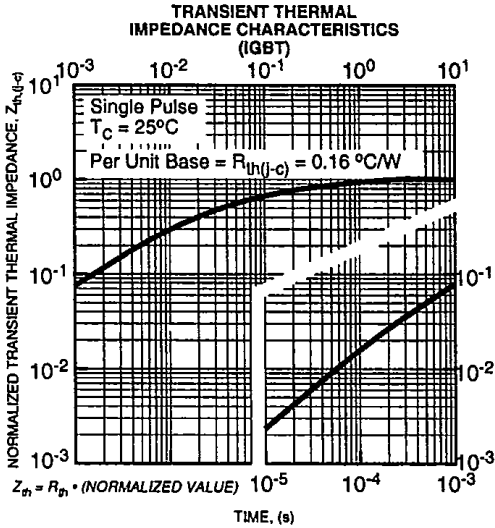
REVERSE RECOVERY CHARACTERISTICS (TYPICAL)



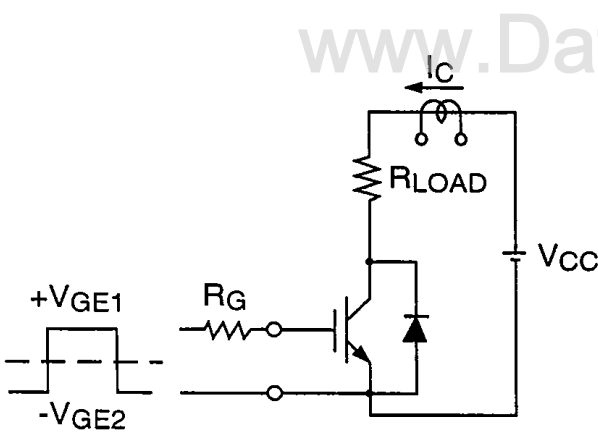
GATE CHARGE,  $V_{ge}$



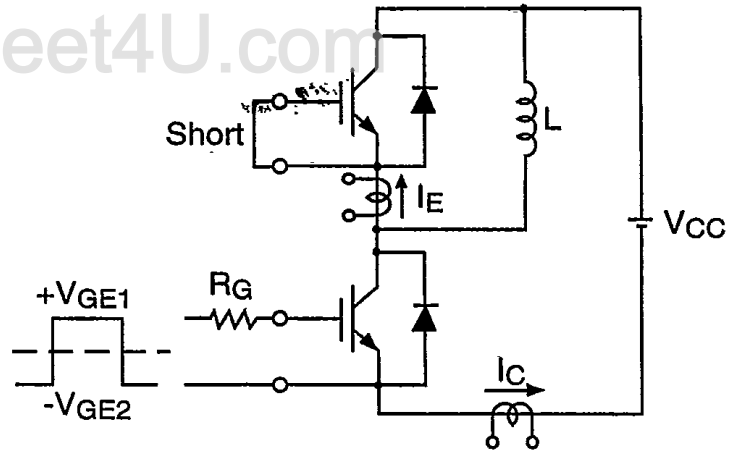
ID226020  
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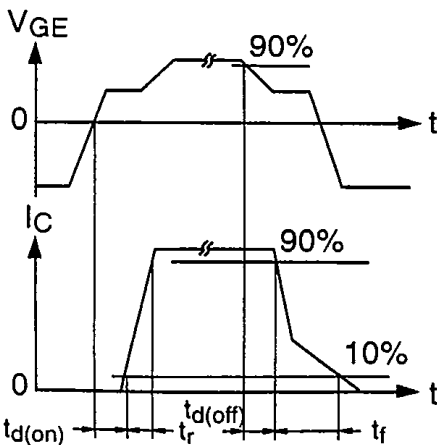
## SWITCHING TIME TEST CIRCUITS & WAVEFORMS



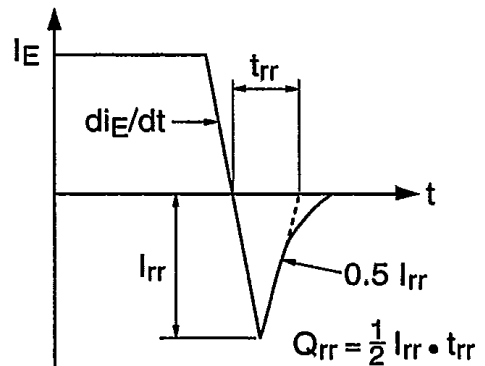
Resistance Load Switching Test Circuit



Half-Bridge Switching Test Circuit



Switching Time Test Waveforms



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