



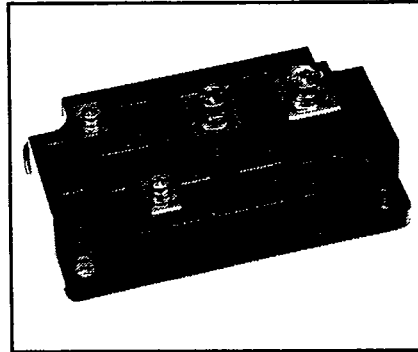
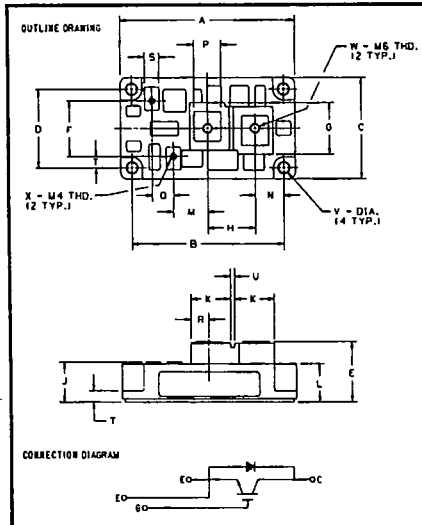
Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272
 Powerex, Europe, S.A. 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

IS621K20

T-39-31

Single IGBTMOD™ Power Module

200 Amperes/1000 Volts



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IS621K20
Outline Drawing

Dimension	Inches	Millimeters
A	4.21	107
B	3.661±.010	93±0.25
C	2.44	62
D	1.811±.010	46±0.25
E	1.42 Max.	36 Max.
F	1.34	34
G	1.18	30
H	1.14	29
J	.98 Max.	25 Max.
K	.94	24
L	.93	23.5
M	.83	21
N	.69	17.5
P	.63	16
Q	.51	13
R	.43	11
S	.35	9
T	.28	7
U	.12	3
V	.26 Dia.	Dia. 6.5
W	M6 Metric	M6
X	M4 Metric	M4

Description

Powerex IGBTMOD™ Modules are designed for use in switching applications. Each module consists of one IGBT Transistor in a single configuration with 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. IS621K20 is a 1000V (V_{CES}), 200 Ampere Single IGBTMOD™ Power Module.

Type	V_{CES} Volts	Current Rating Amperes (x10)
IS62	1K	20



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

Rating	Symbol	IS621K20	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}	1000	Volts
Gate-Emitter Voltage	V_{GES}	± 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	1500	Watts
Max. Mounting Torque M6 Terminal Screws	—	26	in.-lb.
Max. Mounting Torque M6 Mounting Screws	—	26	in.-lb.
Module Weight (Typical)	—	400	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	$V_{GE(th)}$	$I_C=20\text{mA}, V_{CE}=10V$	3.0	4.0	6.0	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C=200A, V_{GE}=15V$	—	3.5	5.0**	Volts
		$I_C=200A, V_{GE}=15V, T_J=150^\circ\text{C}$	—	3.5	**	Volts
Total Gate Charge	Q_G	$V_{CC}=600V, I_C=200A, V_{GS}=15V$	—	1500	—	nC
Diode Forward Voltage	V_{FM}	$I_C=200A, V_{GS}=0V$	—	—	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}		—	—	44000	pF
Output Capacitance	C_{oss}	$V_{GE}=0V, V_{CE}=10V, f=1\text{MHz}$	—	—	11000	pF
Reverse Transfer Capacitance	C_{res}		—	—	1100	pF
Resistive	Turn-on Delay Time	$V_{CC}=600V, I_C=200A,$	—	—	1300	ns
	Rise Time		—	—	800	ns
Switch Times	Turn-off Delay Time	$V_{GE1}=V_{GE2}=15V, R_G=6.3\Omega$	—	—	800	ns
	Fall Time		—	—	1000	ns
Diode Reverse Recovery Time	t_{rr}	$I_E=200A, di_E/dt=-400A/\mu\text{s}$	—	—	300	ns
Diode Reverse Recovery Charge	Q_{rr}	$I_E=200A, di_E/dt=-400A/\mu\text{s}$	—	4.4	—	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	—	—	0.08	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{th(j-o)}$	Per Free Wheel Diode	—	—	0.18	$^\circ\text{C/W}$
Contact Thermal Resistance	$R_{th(c-f)}$	Per Module	—	—	—	$^\circ\text{C/W}$



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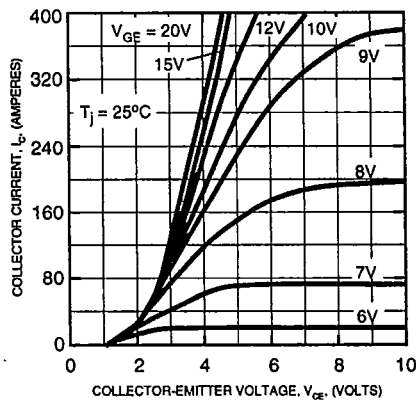
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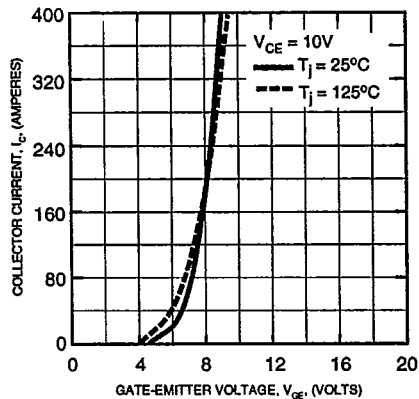
Single IGBTMOD™ Power Module

200 Amperes/1000 Volts

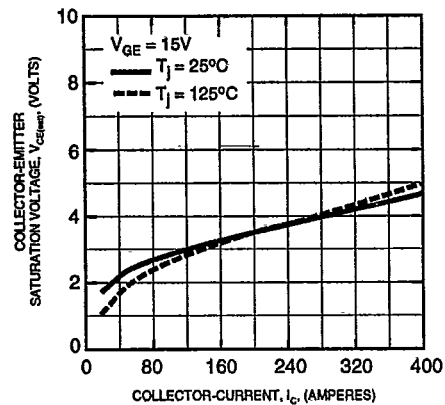
OUTPUT CHARACTERISTICS
(TYPICAL)



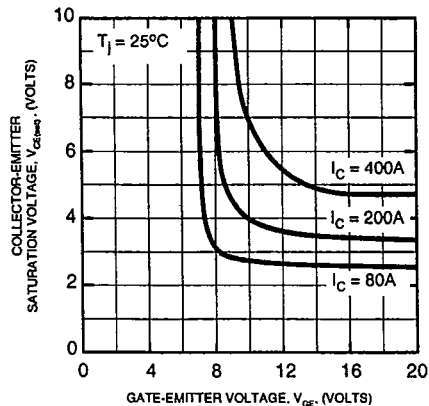
TRANSFER CHARACTERISTICS
(TYPICAL)



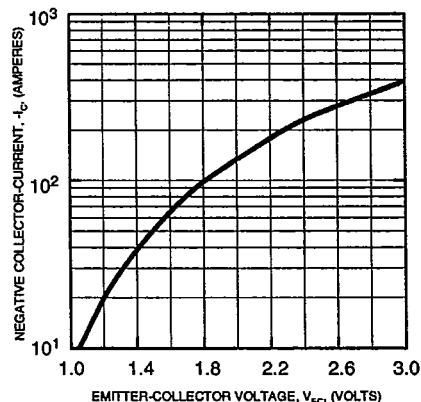
COLLECTOR-EMITTER
SATURATION VOLTAGE CHARACTERISTICS
(TYPICAL)



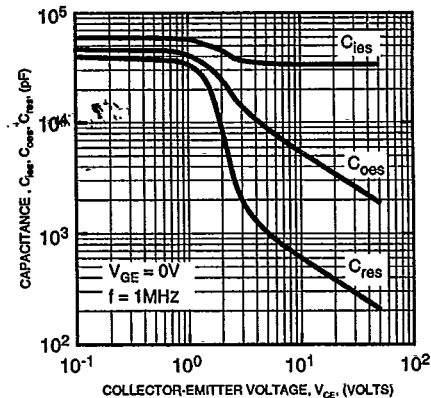
COLLECTOR-EMITTER
SATURATION VOLTAGE CHARACTERISTICS
(TYPICAL)



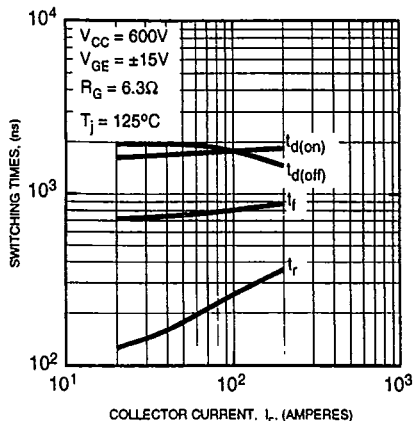
FREE-WHEEL DIODE
FORWARD CHARACTERISTICS
(TYPICAL)



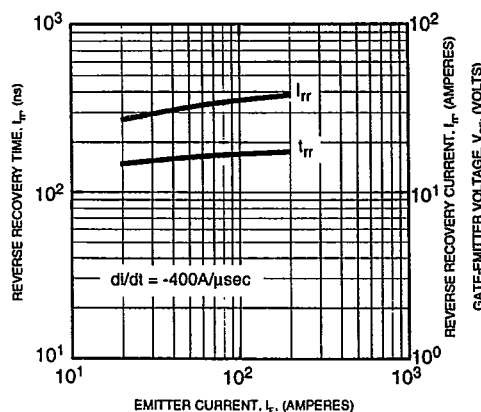
CAPACITANCE VS. V_{CE}
(TYPICAL)



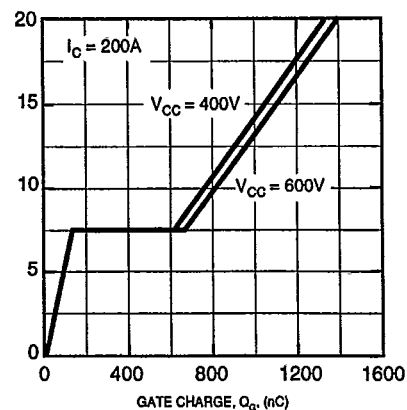
HALF BRIDGE
SWITCHING CHARACTERISTICS
(TYPICAL)



REVERSE RECOVERY CHARACTERISTICS
(TYPICAL)



GATE CHARGE, V_{GE}



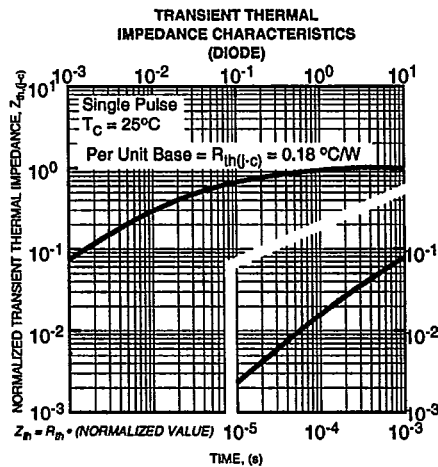
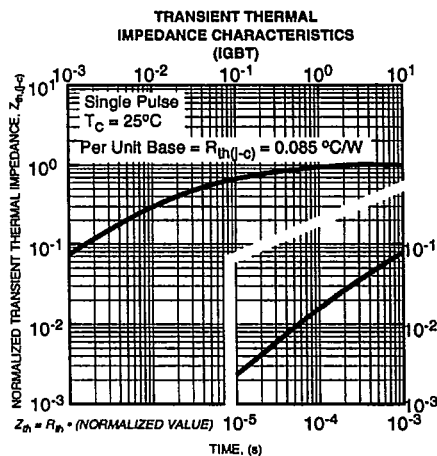


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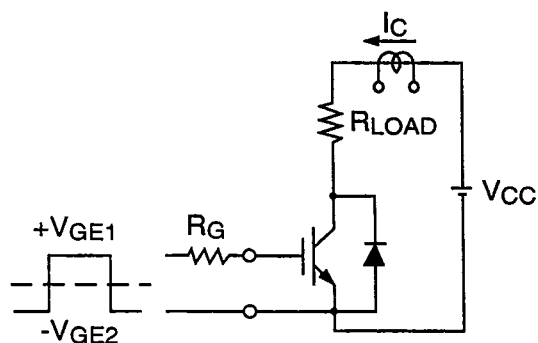
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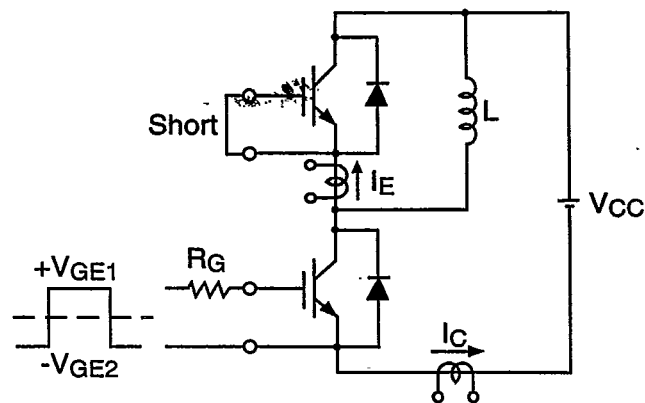
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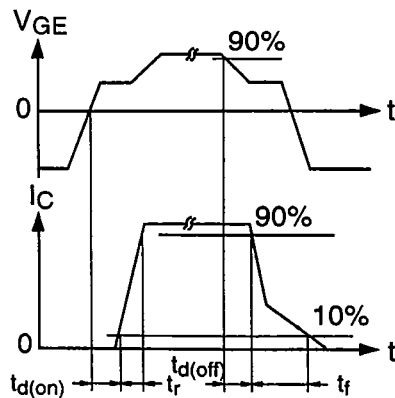
SWITCHING TIME TEST CIRCUITS & WAVEFORMS



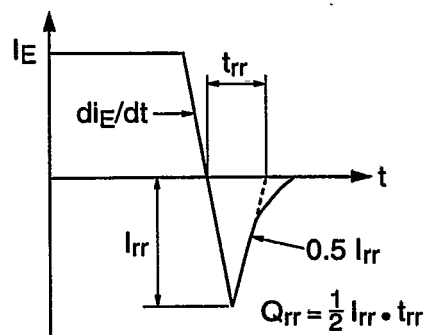
Resistance Load Switching Test Circuit



Half-Bridge Switching Test Circuit



Switching Time Test Waveforms



t_{rr} , Q_{rr} Waveforms