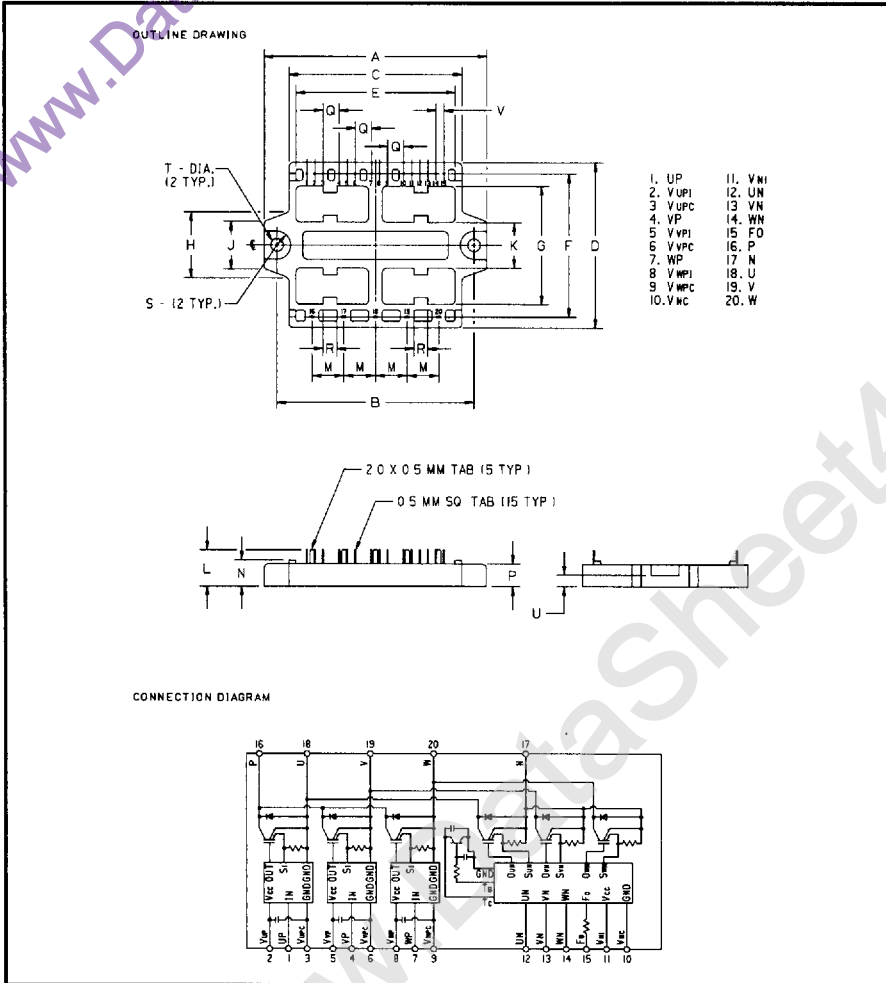




Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272
 Powerex, Europe, S.A. 428 Avenue G, Durand, BP107, 72003 Le Mans, France (43) 41.14.14

Intellimod™-2 Modules
Three Phase
IGBT Inverter Output
20 Amperes/110-230 Volt Line



Description

Powerex Intellimod-2 Modules are designed for applications requiring a high frequency output switching inverter. The modules are isolated from the baseplate, consisting of complete drive, control and protection circuitry for the IGBT inverter.

Features:

- Complete Output Power Circuit
- Gate Drive Circuit
- Protection Logic
 - Short Circuit
 - Over-Current
 - Over Temperature
 - Under Voltage

Applications:

- Inverters
- Small UPS
- Motion/Servo Control
- AC Motor Control

Ordering Information
 PM20CEA060

110-230 Volt Line, PM20CEA060 Outline Drawing

Dimensions	Inches	Millimeters
A	3.86	98.0
B	3.42	87.0
C	2.99	76.0
D	2.87	73.0
E	2.76	70.0
F	2.48	63.0
G	2.05	52.0
H	1.14	29.0
J	0.83	21.0
K	0.79	20.0

Dimensions	Inches	Millimeters
L	0.63	16.0
M	0.55	14.0
N	0.45	11.5
P	0.39	10.0
Q	0.28	7.12
R	0.24	6.0
S	0.24R	6.0R
T	0.22 Dia.	5.5 Dia.
U	0.20	5.0
V	0.14	3.56



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T-57-29

PM20CEA060
Intellimod-2 Modules
Three Phase IGBT Inverter Output
20 Amperes/110-230 Volt Line

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

Characteristics	Symbol	PM20CEA060	Units
Power Device Junction Temperature	T_J	-20 to +150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-40 to +125	$^\circ\text{C}$
Case Operating Temperature	T_C	-20 to +90	$^\circ\text{C}$
Module Weight (Typical)	—	114	Grams
Isolation Voltage AC 1 minute, 60Hz	V_{RMS}	2500	Volts

Control Sector

Supply Voltage Applied between ($V_{UP1} - V_{UPC}, V_{VP1} - V_{VPC}, V_{WP1} - V_{WPC}, V_{N1} - V_{NC}$)	V_D	20	Volts
Input Current Applied between ($U_P, V_P, W_P, U_N, V_N, W_N$)	I_{CIN}	20	mA
Input Voltage between $V_{CIN} - GND$	V_{CIN}	—	Volts
Fault Output Supply Voltage	V_{FO}	20	Volts
Fault Output Current	I_{FO}	20	mA

IGBT Inverter Sector

Collector-Emitter Voltage	V_{CES}	600	Volts
Collector Current \pm	I_C	20	Amperes
Peak Collector Current \pm	I_{CP}	40	Amperes
Free Wheel Diode DC Current	I_{FM}	20	Amperes
Supply Voltage (Applied between P - N)	V_{CC}	400	Volts
Collector Dissipation	P_C	50	Watts



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Intellimod-2 Modules

Three Phase IGBT Inverter Output

20 Amperes/110-230Volt Line

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Control Sector						
Overcurrent Trip Level	OC	$T_j < 125\text{ }^\circ\text{C}$, Fig. 3.7*	26	30	35	Amperes
Short Circuit Trip Level	SC	$T_j < 125\text{ }^\circ\text{C}$, Fig. 3.7*	-	45	-	Amperes
Overcurrent Delay Time	$t_{off(OC)}$	$V_D = 15\text{V}$, Fig. 3.7*	-	10	-	μS
Over Temperature Protectic	OT	Trip Level	90	105	120	$^\circ\text{C}$
Over Temperature Protection	OT_R	Reset Level	-	85	-	$^\circ\text{C}$
Under Voltage Protection	UV	Trip Level	11.5	12.0	12.5	Volts
Under Voltage Protection	UV_R	Reset Level	-	12.5	-	Volts
Supply Voltage	V_D	Applied between $V_{UP1} - V_{UPC}$, $V_{VP1} - V_{VPC}$, $V_{WP1} - V_{WPC}$, $V_{N1} - V_{NC}$	13	15	17	Volts
Circuit Current	I_D	$V_D = 15\text{V}$, $I_{CIN} = 0\text{mA}$, $V_{N1} - V_{NC}$, $V_{XP1} - V_{XPC}$	-	25	-	mA
	I_D	$V_D = 15\text{V}$, $I_{CIN} = 0\text{mA}$, $V_{N1} - V_{NC}$, $V_{XP1} - V_{XPC}$	-	7	-	mA
Input Bias On Current	$I_{CIN(on)}$	Sink Current at $U_P, V_P, W_P, U_N, V_N, W_N$	5	10	20	mA
Input Bias Off Current	$I_{CIN(off)}$	Sink current at $U_P, V_P, W_P, U_N, V_N, W_N$	-	-	1	mA
PWM Input Frequency	f_{PWM}	3- \emptyset Sinusoidal	-	-	10	kHz
Dead Time	t_{DEAD}	For each Input Pulse	7.0	-	-	μS
Fault Output Current	$I_{FO(H)}$	$V_D = 15\text{V}$, $V_{FO} = 15\text{V}$	-	-	0.1	mA
	$I_{FO(L)}$	$V_D = 15\text{V}$, $V_{FO} = 15\text{V}$	-	10	-	mA
Minimum Fault Output Pulse Width	t_{FO}	$V_D = 15\text{V}$	20	40	60	μS

*Figures can be found in Intellimod-2 Application Information Section.



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T-57-29

PM20CEA060

Intellimod-2 Modules

Three Phase IGBT Inverter Output

20 Amperes/110-230 Volt Line

Recommended Operating Conditions

Characteristics	Symbol	Test Conditions	Value	Units
Supply Voltage	V_{CC}	Applied across P-N Terminals	300	Volts
	V_D	Applied between $V_{UP1} - V_{UPC}$, $V_{N1} - V_{NC}$, $V_{VP1} - V_{VPC}$, $V_{WP1} - V_{WPC}$	15	Volts
Input Bias On Current	$I_{CIN(on)}$	Applied between $U_p, V_p, W_p, U_N, V_N, W_N$	10	mA
PWM Input Frequency	f_{PWM}	Using Application Circuit of Fig. 3.9*	1.5	kHz
Minimum Dead Time	t_{DEAD}	Using Application Circuit of Fig. 3.9*	8	μS

*Figures can be found in Intellimod-2 Application Information Section.



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PM20CEA060
Intellimod-2 Modules
Three Phase IGBT Inverter Output
 20Amperes/110-230 Volt Line

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
IGBT Inverter Sector						
Collector Cutoff Current	I_{CEX}	$V_{CE} = V_{CEX}$	–	–	1	mA
Collector Cutoff Current	I_{CEX}	$V_{CE} = V_{CEX}, T_j = 125\text{ }^\circ\text{C}$	–	–	10	mA
Diode Forward Voltage	V_{FM}	$I_{FM} = 20\text{A}$	–	–	2.5	Volts
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	$V_D = 15\text{V}, I_{CIN} = 10\text{mA}, I_C = 20\text{A}$	–	–	3.5	Volts
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	$V_D = 15\text{V}, I_{CIN} = 10\text{mA}, I_C = 8\text{A}, T_j = 125\text{ }^\circ\text{C}$	–	2.0	–	Volts
Inductive Load Switching Times	t_{on}	$V_D = 15\text{V}, I_{CIN} = 10\text{mA}, V_{CC} = 300\text{V}, I_C = 20\text{A}, T_j = 125\text{ }^\circ\text{C}$	–	1.0	–	μS
	t_{rr}		–	0.25	–	μS
	$t_{C(on)}$		–	1.0	–	μS
	t_{off}		–	3.5	–	μS
	$t_{C(off)}$		–	3.0	–	μS

Thermal Characteristics

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistances Junction to Case	$R_{\theta j-c}$	Inverter IGBT	–	–	2.5	$^\circ\text{C/W}$
Thermal Resistances Junction to Case	$R_{\theta j-c}$	Inverter FWD	–	–	4.5	$^\circ\text{C/W}$
Thermal Resistance Case to Sink	$R_{\theta c-s}$	Lubricated	–	–	0.5	$^\circ\text{C/W}$

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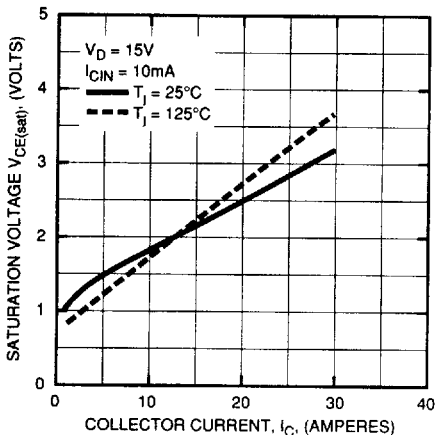
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Intellimod-2 Modules

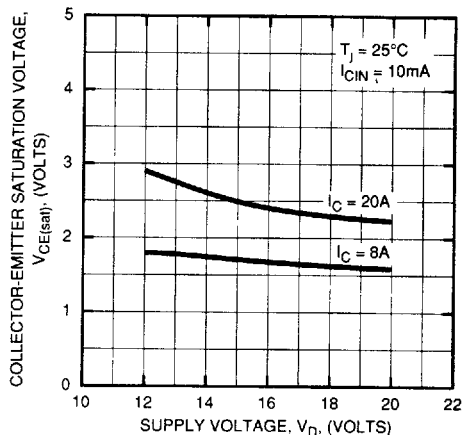
Three Phase IGBT Inverter Output

20 Amperes/110-230 Volt Line

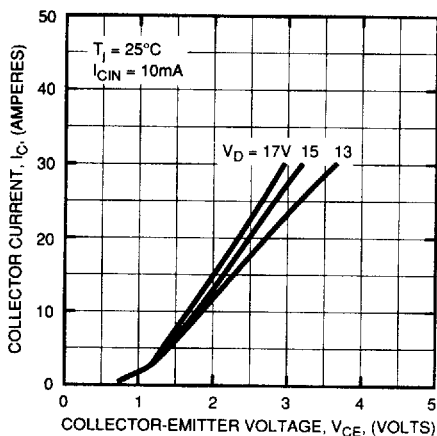
SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



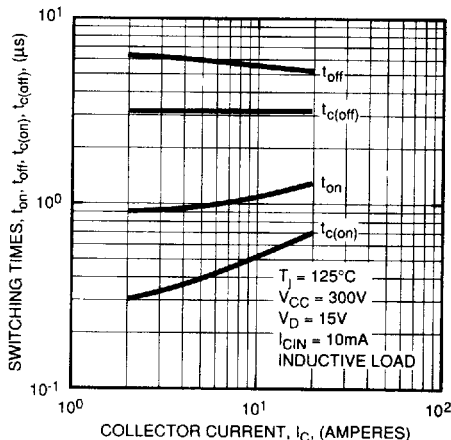
COLLECTOR-EMITTER SATURATION VOLTAGE (TYPICAL)



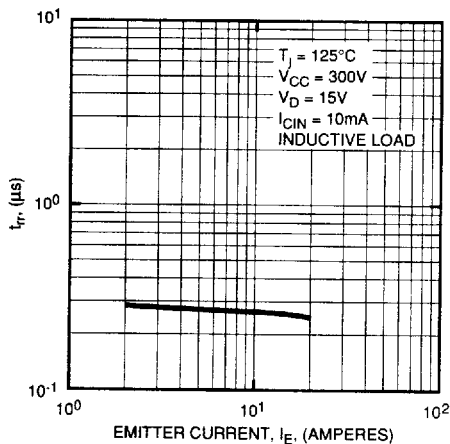
OUTPUT CHARACTERISTICS (TYPICAL)



SWITCHING TIME VS. COLLECTOR CURRENT (TYPICAL)



REVERSE RECOVERY CHARACTERISTICS OF FREE-WHEEL DIODE (TYPICAL)



REVERSE COLLECTOR CURRENT VS. EMITTER-COLLECTOR VOLTAGE (DIODE FORWARD CHARACTERISTICS) (TYPICAL)

