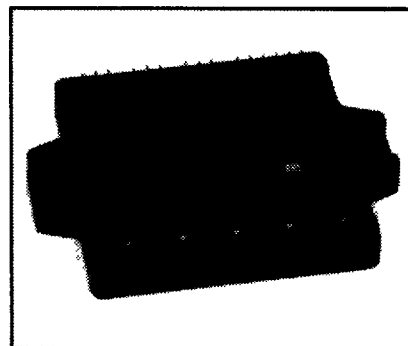
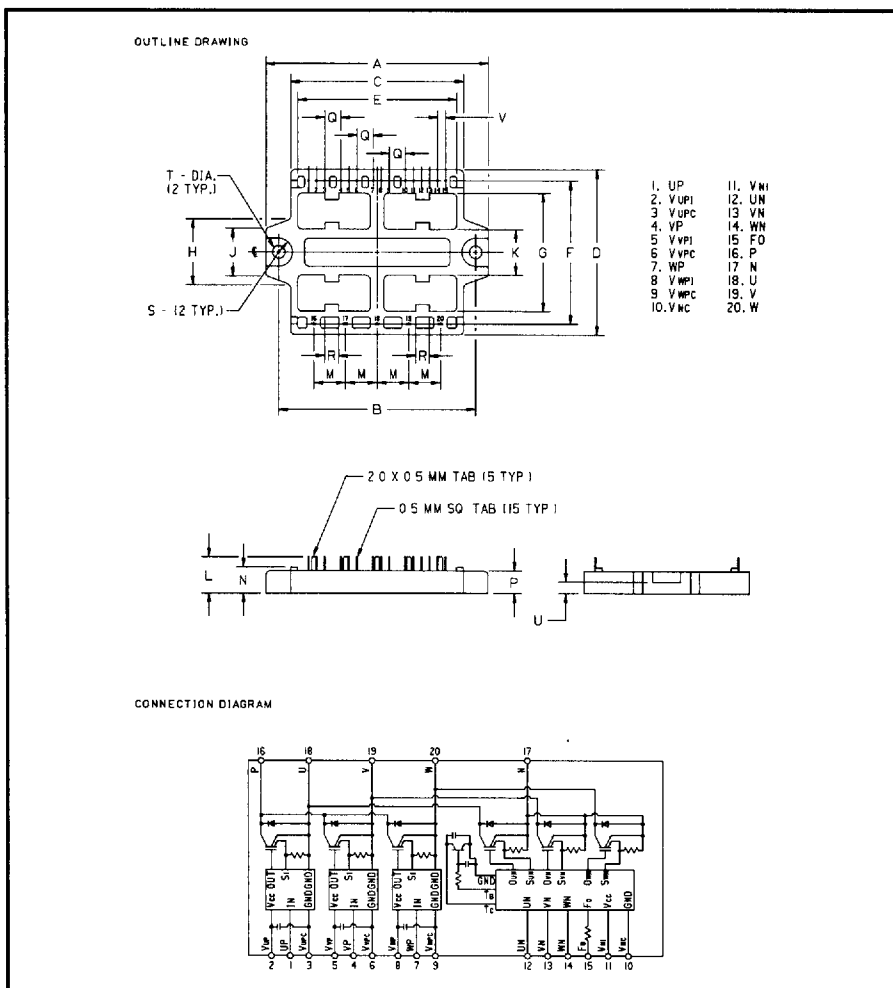


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Intellimod™-2 Modules
Three Phase
IGBT Inverter Output
20 Amperes/110-230 Volt Line



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, $T_J = 25^\circ\text{C}$ 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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PM20CEA060

Intellimod-2 Modules

Three Phase IGBT Inverter Output

20 Amperes/110-230Volt Line

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Control Sector						
Overcurrent Trip Level	OC	$T_j < 125^\circ\text{C}$, Fig. 3.7*	26	30	35	Amperes
Short Circuit Trip Level	SC	$T_j < 125^\circ\text{C}$, Fig. 3.7*	—	45	—	Amperes
Overcurrent Delay Time	$t_{\text{off(OC)}}$	$V_D = 15\text{V}$, 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 $V_{\text{UP1}} - V_{\text{UPC}}$, $V_{\text{VP1}} - V_{\text{VPC}}$, $V_{\text{WP1}} - V_{\text{WPC}}$, $V_{\text{N1}} - V_{\text{NC}}$	13	15	17	Volts
Circuit Current	I_D	$V_D = 15\text{V}$, $I_{\text{CIN}} = 0\text{mA}$, $V_{\text{N1}} - V_{\text{NC}}$, $V_{\text{XP1}} - V_{\text{XPC}}$	—	25	—	mA
	I_D	$V_D = 15\text{V}$, $I_{\text{CIN}} = 0\text{mA}$, $V_{\text{N1}} - V_{\text{NC}}$, $V_{\text{XP1}} - V_{\text{XPC}}$	—	7	—	mA
Input Bias On Current	$I_{\text{CIN(on)}}$	Sink Current at $U_P, V_P, W_P, U_N, V_N, W_N$	5	10	20	mA
Input Bias Off Current	$I_{\text{CIN(off)}}$	Sink current at	—	—	1	mA
		$U_P, V_P, W_P, U_N, V_N, W_N$	—	—	—	—
PWM Input Frequency	f_{PWM}	3- $\emptyset$ Sinusoidal	—	—	10	kHz
Dead Time	t_{DEAD}	For each Input Pulse	7.0	—	—	μS
Fault Output Current	$I_{\text{FO(H)}}$	$V_D = 15\text{V}$, $V_{\text{FO}} = 15\text{V}$	—	—	0.1	mA
	$I_{\text{FO(L)}}$	$V_D = 15\text{V}$, $V_{\text{FO}} = 15\text{V}$	—	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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Intellimod-2 Modules

Three Phase IGBT Inverter Output

20Amperes/110-230 Volt Line

T-57-29

Electrical Characteristics, $T_j = 25^\circ\text{C}$ 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}	$V_{CE} = V_{CEX}, T_j = 125^\circ\text{C}$	—	—	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	$V_{CE(sat)}$	$V_D = 15\text{V}, I_{CIN} = 10\text{mA}, I_C = 8\text{A}, T_j = 125^\circ\text{C}$	—	2.0	—	Volts
Inductive Load Switching Times	t_{on}	$V_D = 15\text{V}, I_{CIN} = 10\text{mA}, V_{CC} = 300\text{V}, I_C = 20\text{A}, T_j = 125^\circ\text{C}$	—	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	$^\circ\text{C/W}$

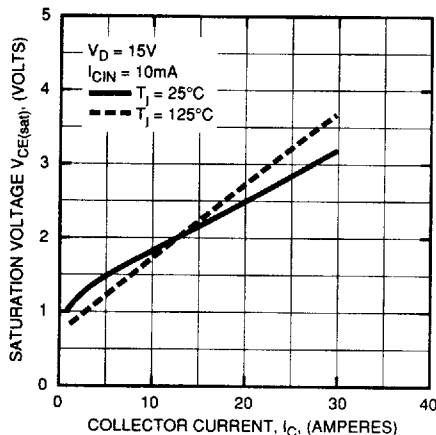
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Intellimod-2 Modules

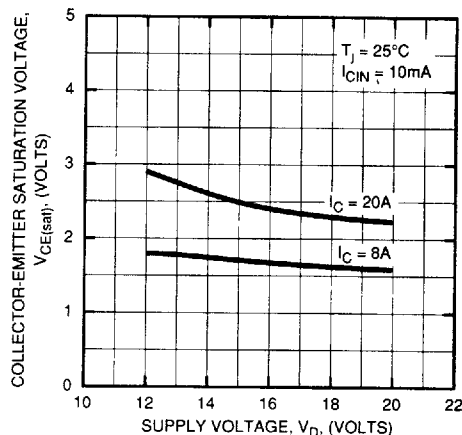
Three Phase IGBT Inverter Output

20 Amperes/110-230 Volt Line

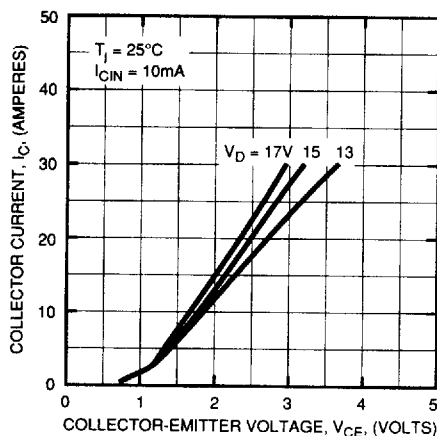
SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



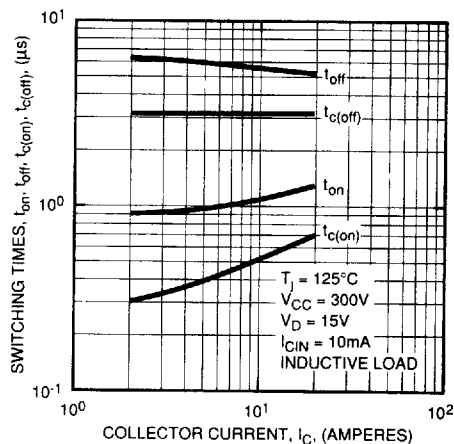
COLLECTOR-EMITTER SATURATION VOLTAGE (TYPICAL)



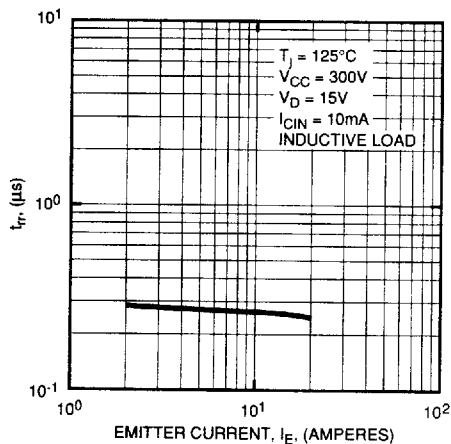
OUTPUT CHARACTERISTICS (TYPICAL)



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)

