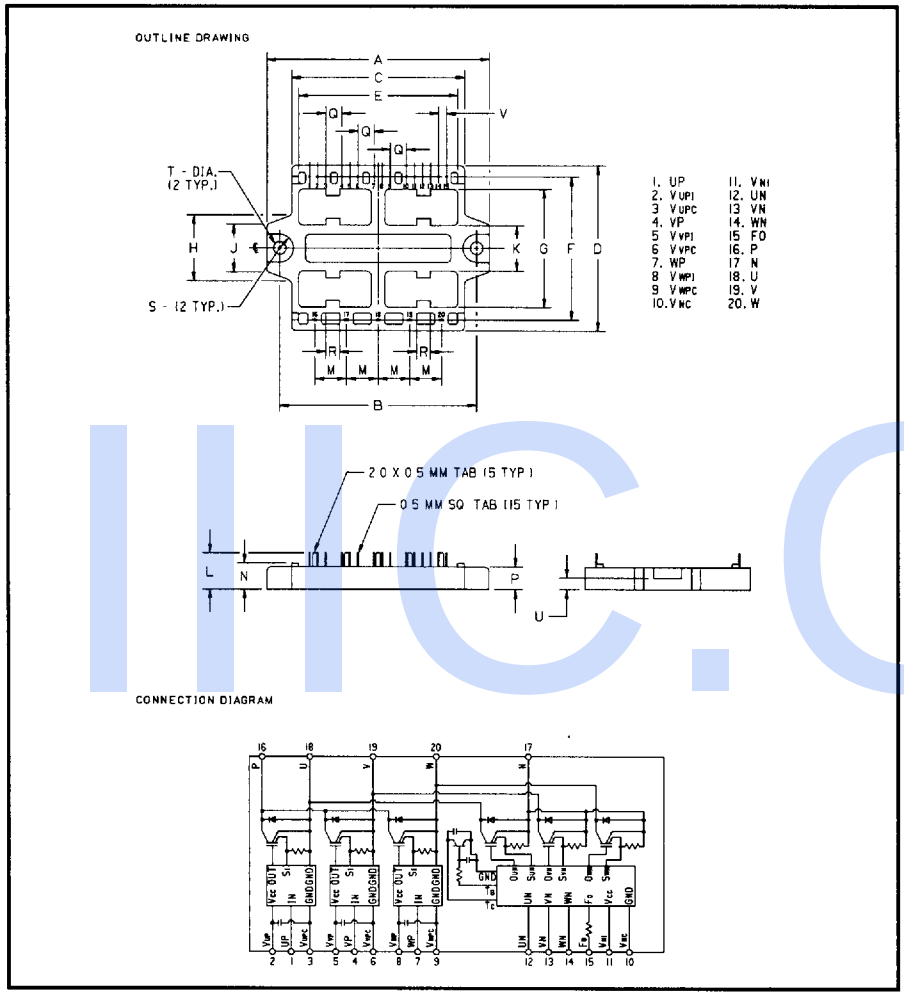
PM20CEA060

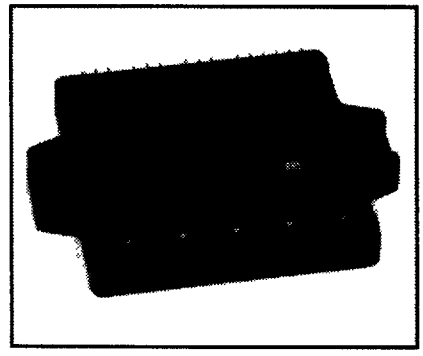
T-57-29

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



110-230 Volt Line, PM20CEA060 Outline Drawing



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

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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20 Amperes/110-230 Volt Line

Absolute Maximum Ratings, T_j= 25 °C unless otherwise specified

Characteristics	Symbol	PM20CEA060	Units
Power Device Junction Temperature	T_j	-20 to +150	°C
Storage Temperature	T_{STG}	-40 to +125	°C
Case Operating Temperature	T_C	-20 to +90	°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 ±	I_C	20	Amperes
Peak Collector Current ±	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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20 Amperes/110-230Volt Line

Electrical Characteristics, T_j = 25 °C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Control Sector						
Overcurrent Trip Level	OC	T_j < 125 °C, Fig. 3.7*	26	30	35	Amperes
Short Circuit Trip Level	SC	T_j < 125 °C, Fig. 3.7*	–	45	–	Amperes
Overcurrent Delay Time	$t_{off(OC)}$	V_D = 15V, Fig. 3.7*	–	10	–	µS
Over Temperature Protectic	OT	Trip Level	90	105	120	°C
Over Temperature Protection	OT_R	Reset Level	–	85	–	°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 = 15V, I_{CIN} = 0mA, V_{N1} - V_{NC}, V_{XP1} - V_{XPC}	–	25	–	mA
	I_D	V_D = 15V, I_{CIN} = 0mA, 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-Ø Sinusoidal	–	–	10	kHz
Dead Time	t_{DEAD}	For each Input Pulse	7.0	–	–	µS
Fault Output Current	$I_{FO(H)}$	V_D = 15V, V_{FO} = 15V	–	–	0.1	mA
	$I_{FO(L)}$	V_D = 15V, V_{FO} = 15V	–	10	–	mA
Minimum Fault Output Pulse Width	t_{FO}	V_D = 15V	20	40	60	µS

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

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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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Electrical Characteristics, T_j = 25 °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 °C	–	–	10	mA
Diode Forward Voltage	V_{FM}	I_{FM} = 20A	–	–	2.5	Volts
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	V_D = 15V, I_{CIN} = 10mA, I_C = 20A	–	–	3.5	Volts
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	V_D = 15V, I_{CIN} = 10mA, I_C = 8A, T_j = 125 °C	–	2.0	–	Volts
Inductive Load Switching Times	t_{on}	V_D = 15V, I_{CIN} = 10mA, V_{CC} = 300V, I_C = 20A, T_j = 125 °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	$R_{\theta j\text{-}c}$	Inverter IGBT	–	–	2.5	°C/W
Thermal Resistances Junction to Case	$R_{\theta j\text{-}c}$	Inverter FWD	–	–	4.5	°C/W
Thermal Resistance Case to Sink	$R_{\theta c\text{-}s}$	Lubricated	–	–	0.5	°C/W

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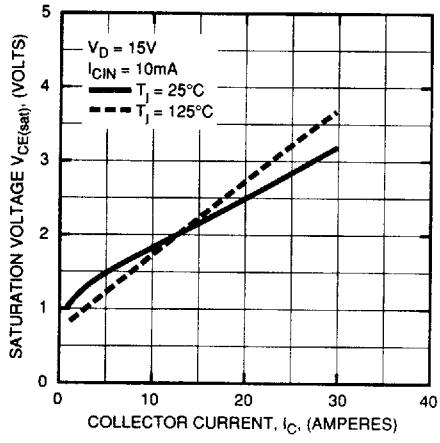
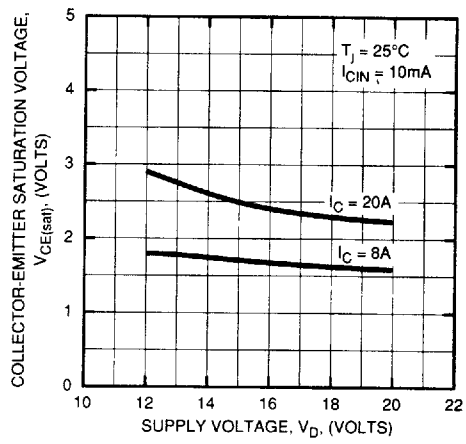
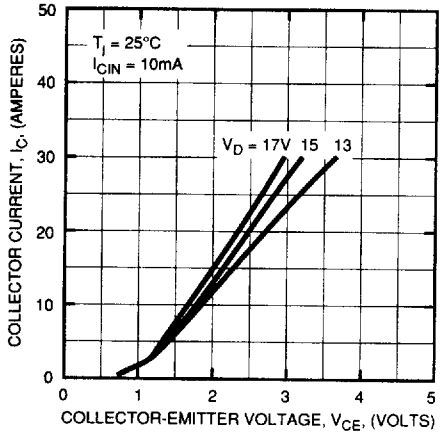
SATURATION VOLTAGE CHARACTERISTICS (TYPICAL)



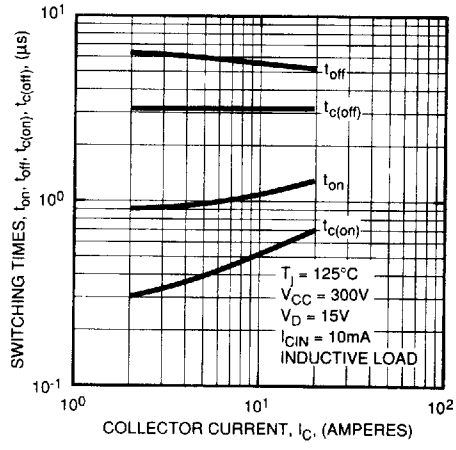
COLLECTOR-EMITTER SATURATION VOLTAGE (TYPICAL)



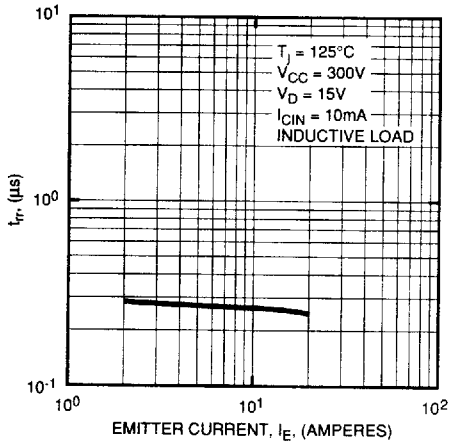
OUTPUT CHARACTERISTICS (TYPICAL)



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)