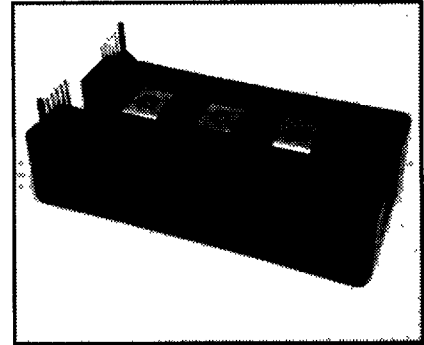
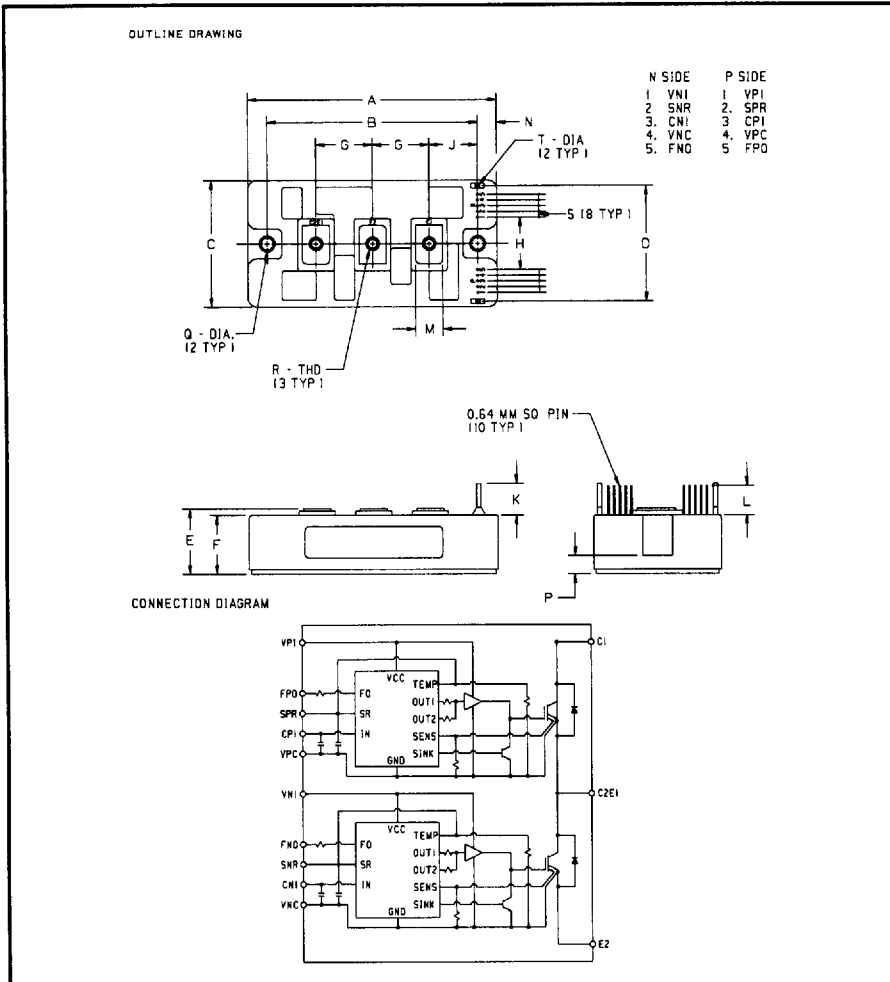


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Intellimod™-3 Modules
 Single Phase
 IGBT Inverter Output
 100 Amperes/460 Volt Line



Description

Powerex Intellimod-3 Modules are designed for applications requiring a high frequency (20kHz) 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
 PM100DHA120

460 Volt Line, PM100DHA120 Outline Drawing

Dimensions	Inches	Millimeters
A	4.33	110.0
B	3.66±0.01	93.0±0.25
C	2.2	56.0
D	2.01	51.0
E	1.14+0.04/-0.02	29.0+1.0/-0.5
F	1.02	26.0
G	0.98	25.0
H	0.9	23.0
J	0.85	21.5

Dimensions	Inches	Millimeters
K	0.55	14.0
L	0.51	13.0
M	0.47	12.0
N	0.33	8.5
P	0.31	8.0
Q	0.22 Dia.	5.5 Dia.
R	Metric M5	M5
S	0.1	2.54
T	0.8 Dia.	2.0 Dia.



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T-57-29

PM100DHA120

Intellmod-3 Modules

Single Phase IGBT Inverter Output

100 Amperes/460 Volt Line

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

Characteristics	Symbol	PM100DHA120	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 +100	$^\circ\text{C}$
Mounting Torque, M5 Mounting Screws	—	20	Kg-cm
Mounting Torque, M5 Main Terminal Screws	—	20	Kg-cm
Module Weight (Typical)	—	430	Grams
Supply Voltage Protected by OC and SC ($V_D = 13.5 - 16.5\text{V}$, Inverter Part)	$V_{CC(prot.)}$	800	Volts
Isolation Voltage AC 1 minute, 60Hz	V_{RMS}	2500	Volts

Control Sector

Supply Voltage Applied between ($V_{P1} - V_{PC}, V_{N1} - V_{NC}$)	V_D	20	Volts
Input Voltage Applied between ($C_{P1} - V_{PC}, C_{N1} - V_{NC}$)	V_{CIN}	10	Volts
Fault Output Supply Voltage Applied between ($F_{PO} - V_{PC}, F_{NO} - V_{NC}$)	V_{FO}	20	Volts
Fault Output Current (Sink Current at F_{PO}, F_{NO} Terminals)	I_{FO}	20	mA

IGBT Inverter Sector

Collector-Emitter Voltage	V_{CES}	1200	Volts
Collector Current \pm	I_C	100	Amperes
Peak Collector Current \pm	I_{CP}	200	Amperes
Supply Voltage (Applied between P - N)	V_{CC}	900	Volts
Supply Voltage (Surge) Applied between P - N	$V_{CC(surge)}$	1000	Volts
Collector Dissipation	P_C	780	Watts



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PM100DHA120
 Intellimod-3 Modules
 Single Phase IGBT Inverter Output
 100 Amperes/460 Volt 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	$-20^\circ\text{C} \leq T \leq 125^\circ\text{C}$, Fig. 5	145	230	—	Amperes
Short Circuit Trip Level	SC	$-20^\circ\text{C} \leq T \leq 125^\circ\text{C}$, Fig. 5	200	340	—	Amperes
Over Current Delay Time	$t_{\text{off(OC)}}$	$V_D = 15\text{V}$, Fig. 5	—	5	—	μS
Over Temperature Protection	OT	Trip Level	100	110	120	$^\circ\text{C}$
Over Temperature Protection	OT_R	Reset Level	85	95	105	$^\circ\text{C}$
Supply Circuit Under Voltage Protection	UV	Trip Level	11.5	12.0	12.5	Volts
Supply Circuit Under Voltage Protection	UV_R	Reset Level	—	12.5	—	Volts
Supply Voltage	V_D	Applied between $V_{P1} - V_{PC}, V_{N1} - V_{NC}$	13.5	15	16.5	Volts
Circuit Current	I_D	$V_D = 15\text{V}, V_{CIN} = 5\text{V}, V_{N1} - V_{NC}$	—	19	26	mA
	I_D	$V_D = 15\text{V}, V_{CIN} = 5\text{V}, V_{P1} - V_{PC}$	—	19	26	mA
Input On Voltage	$V_{CIN(\text{on})}$	Applied between $C_{P1} - V_{PC}, C_{N1} - V_{NC}$	1.2	1.5	1.8	Volts
Input Off Voltage	$V_{CIN(\text{off})}$		1.7	2.0	2.3	Volts
PWM Input Frequency	f_{PWM}	3- \emptyset Sinusoidal	—	15	20	kHz
Dead Time	t_{DEAD}	For each Input Pulse	4.0	—	—	μS
		Using example Interface Circuit*	6.0	—	—	μS
Fault Output Current	$I_{\text{FO(H)}}$	$V_D = 15\text{V}, V_{\text{FO}} = 15\text{V}$	—	—	0.01	mA
	$I_{\text{FO(L)}}$	$V_D = 15\text{V}, V_{\text{FO}} = 15\text{V}$	—	10	15	mA
Minimum Fault Output Pulse Width	t_{FO}	$V_D = 15\text{V}$	1.0	1.8	—	mS
SXR Terminal Output Voltage	V_{SXR}	$T_J = 125^\circ\text{C}, R_{\text{IN}} = 6.8\text{k}\Omega, (S_{\text{PR}}, S_{\text{NR}})$	4.5	5.1	5.6	Volts

*See Intellimod-3 Applications Data Section 4.3.



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T-57-29

PM100DHA120

Intellimod-3 Modules

Single Phase IGBT Inverter Output

100 Amperes/460 Volt Line

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}	$V_{CE} = V_{CES}, T_j = 25^\circ\text{C}$, Fig. 4	-	-	1	mA
Collector Cutoff Current	I_{CEX}	$V_{CE} = V_{CES}, T_j = 125^\circ\text{C}$, Fig. 4	-	-	10.0	mA
Diode Forward Voltage	V_{FM}	$-I_C = 100\text{A}, V_{CIN} = 5\text{V}$, Fig. 2	-	1.8	3.0	Volts
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	$V_D = 15\text{V}, V_{CIN} = 0\text{V}, I_C = 100\text{A}$, Fig. 1	-	2.8	3.8	Volts
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	$V_D = 15\text{V}, V_{CIN} = 0\text{V}, I_C = 100\text{A}$, $T_j = 125^\circ\text{C}$, Fig. 1	-	2.4	3.4	Volts
Inductive Load Switching Times	t_{on}	$V_D = 15\text{V}, V_{CIN} = 0\text{V}$, $V_{CC} = 600\text{V}, I_C = 100\text{A}$, $T_j = 125^\circ\text{C}$ Fig. 3	0.5	1.4	2.5	μS
	t_{rr}		-	0.3	0.6	μS
	$t_{C(on)}$		-	0.4	1.0	μS
	t_{off}		-	3.5	4.0	μS
	$t_{C(off)}$		-	0.8	1.2	μS

Thermal Characteristics

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Thermal Resistances Junction to Case	$R_{th(j-c)Q}$	Inverter IGBT	-	-	0.16	$^\circ\text{C/W}$
	$R_{th(j-c)F}$	Inverter FWD	-	-	0.35	$^\circ\text{C/W}$
Contact Thermal Resistance	$R_{th(c-f)}$	Case to Fin, Thermal Grease Applied	-	-	0.095	$^\circ\text{C/W}$

Recommended Operating Conditions

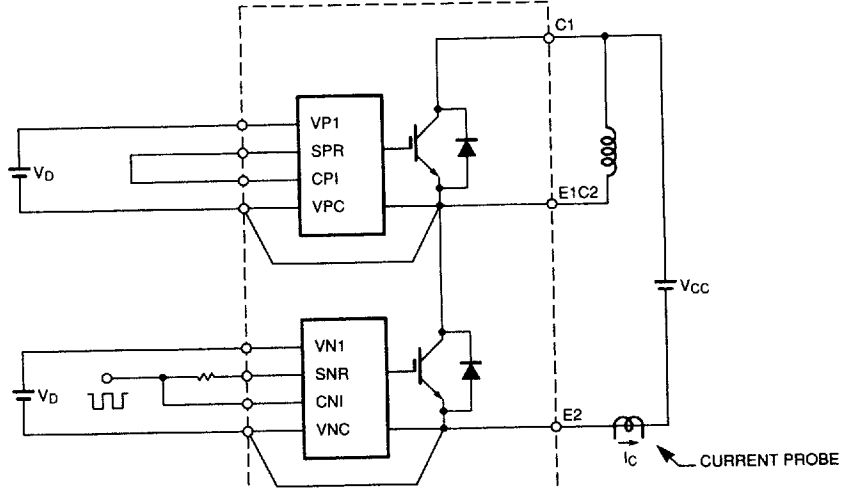
Characteristics	Symbol	Test Conditions	Value	Units
Supply Voltage	V_{CC}	Applied across C1 - E2 Terminals	0 ~ 800	Volts
	V_D	Applied between $V_{P1} - V_{PC}, V_{N1} - V_{NC}$	15 ± 1.5	Volts
Input On Voltage	$V_{CIN(on)}$	Applied between	0 ~ 0.8	Volts
Input Off Voltage	$V_{CIN(off)}$	$C_{P1} - V_{PC}, C_{N1} - V_{NC}$	4 ~ V_{SXR}	Volts
PWM Input Frequency	f_{PWM}	Using example Interface Circuit*	5 ~ 20	kHz
Minimum Dead Time	t_{DEAD}	Using example Interface Circuit*	6.0	μS

*See Intellimod-3 Applications Data Section 4.3.

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PM100DHA120
Intellimod-3 Modules
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 100 Amperes/460 Volt Line

A) LOWER ARM SWITCHING



B) UPPER ARM SWITCHING

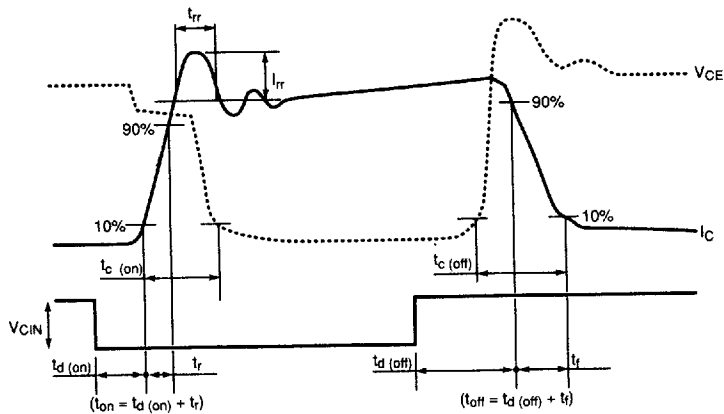
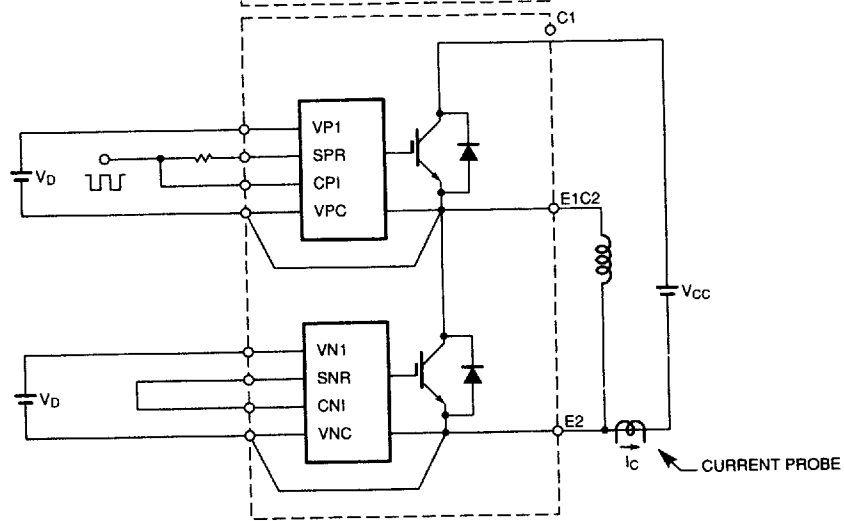


Figure 3 Switching Test

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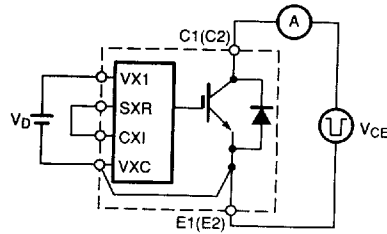


Figure 4 I_{CES} Test

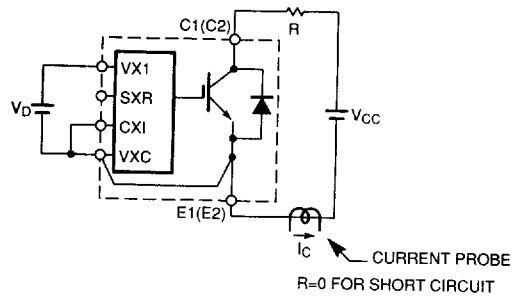


Figure 5 Over Current and Short Circuit Test