

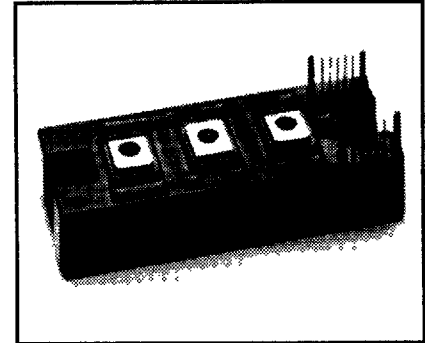
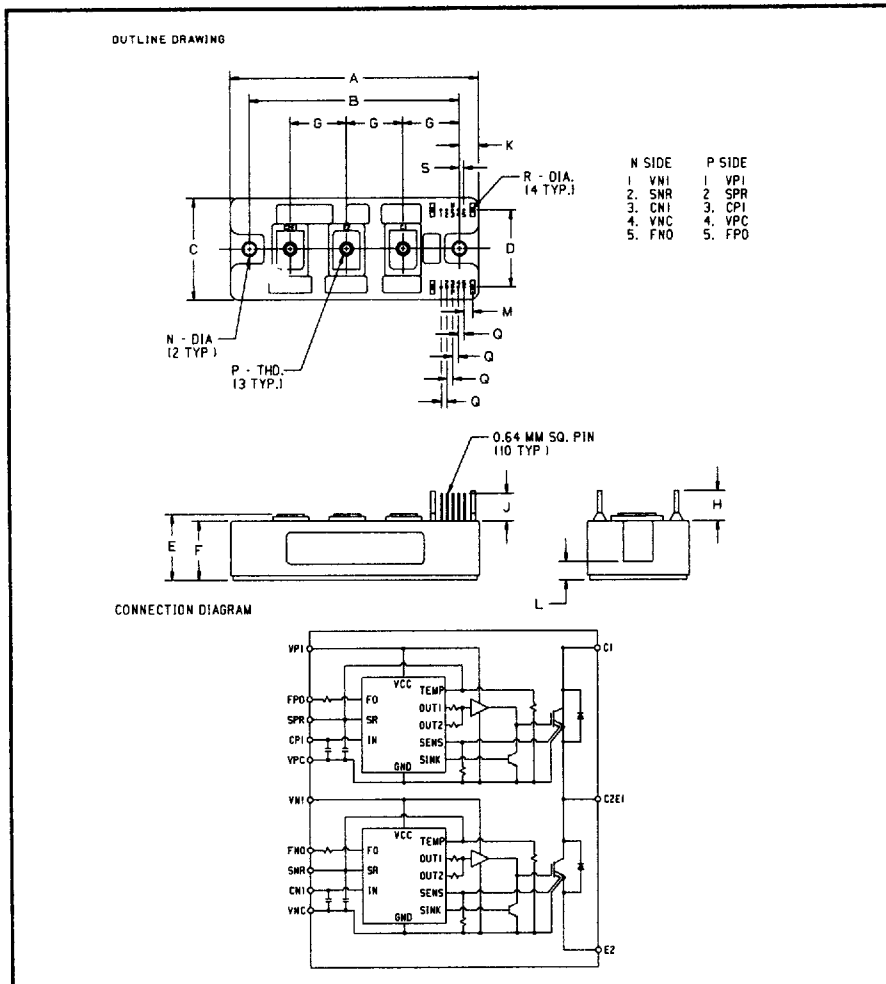


PM75DHA120

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™-3 Modules
 Single Phase
 IGBT Inverter Output
 75 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
 PM75DHA120

460 Volt Line, PM75DHA120 Outline Drawing

Dimensions	Inches	Millimeters
A	4.33	110.0
B	3.66±0.01	93.0±0.25
C	1.77	45.0
D	1.34	34.0
E	1.14+0.04/-0.02	29.0+1.0/-0.5
F	1.02	26.0
G	0.98	25.0
H	0.51	13.0
J	0.47	12.0

Dimensions	Inches	Millimeters
K	0.33	8.5
L	0.31	8.0
M	0.23	5.84
N	0.22 Dia.	5.5 Dia.
P	Metric M5	M5
Q	0.1	2.54
R	0.8 Dia.	2.0 Dia.
S	0.08	2.0



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PM75DHA120

IntelliMod-3 Modules

Single Phase IGBT Inverter Output

75 Amperes/460 Volt Line

T-57-29

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

Characteristics	Symbol	PM75DHA120	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)	—	340	Grams
Supply Voltage Protected by OC and SC ($V_D = 13.5 - 16.5\text{V}$, Inverter Part)	$V_{\text{CC(prot.)}}$	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	75	Amperes
Peak Collector Current $\pm$	I_{CP}	150	Amperes
Supply Voltage (Applied between P - N)	V_{CC}	900	Volts
Supply Voltage (Surge) Applied between P - N	$V_{\text{CC(surge)}}$	1000	Volts
Collector Dissipation	P_C	595	Watts



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Intellimod-3 Modules

Single Phase IGBT Inverter Output

75 Amperes/460 Volt Line

T-57-29

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	105	170	—	Amperes
Short Circuit Trip Level	SC	$-20^\circ\text{C} \leq T \leq 125^\circ\text{C}$, Fig. 5	150	250	—	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	$V_D = 15\text{V}$, $V_{\text{CIN}} = 5\text{V}$, $V_{N1} - V_{NC}$	—	13	20	mA
	I_D	$V_D = 15\text{V}$, $V_{\text{CIN}} = 5\text{V}$, $V_{P1} - V_{PC}$	—	13	20	mA
Input On Voltage	$V_{\text{CIN(on)}}$	Applied between	1.2	1.5	1.8	Volts
Input Off Voltage	$V_{\text{CIN(off)}}$	$C_{P1} - V_{PC}$, $C_{N1} - V_{NC}$	1.7	2.0	2.3	Volts
PWM Input Frequency	f_{PWM}	3- ϕ 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_{PR} , S_{NR})	4.5	5.1	5.6	Volts

*See Intellimod-3 Applications Data Section 4.3.



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PM75DHA120

Intellimod-3 Modules

Single Phase IGBT Inverter Output

75 Amperes/460 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}	$V_{CE} = V_{CES}$, $T_J = 25^\circ\text{C}$, 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}	$-I_C = 75\text{A}$, $V_{CIN} = 5\text{V}$, Fig. 2	—	1.8	3.0	Volts
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	$V_D = 15\text{V}$, $V_{CIN} = 0\text{V}$, $I_C = 75\text{A}$, Fig. 1	—	2.8	3.8	Volts
Collector Emitter Saturation Voltage	$V_{CE(sat)}$	$V_D = 15\text{V}$, $V_{CIN} = 0\text{V}$, $I_C = 75\text{A}$, $T_J = 125^\circ\text{C}$, Fig. 1	—	2.4	3.4	Volts
Inductive Load Switching Times	t_{on}	$V_D = 15\text{V}$, $V_{CIN} = 0\text{V}$,	0.5	1.4	2.5	μS
	t_{rr}	$V_{CC} = 600\text{V}$, $I_C = 75\text{A}$,	—	0.3	0.6	μS
	$t_{C(on)}$	$T_J = 125^\circ\text{C}$	—	0.4	1.0	μS
	t_{off}	Fig. 3	—	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	—	—	0.21	$^\circ\text{C/W}$
	$R_{th(j-c)F}$	Inverter FWD	—	—	0.47	$^\circ\text{C/W}$
Contact Thermal Resistance	$R_{th(c-f)}$	Case to Fin, Thermal Grease Applied	—	—	0.12	$^\circ\text{C/W}$

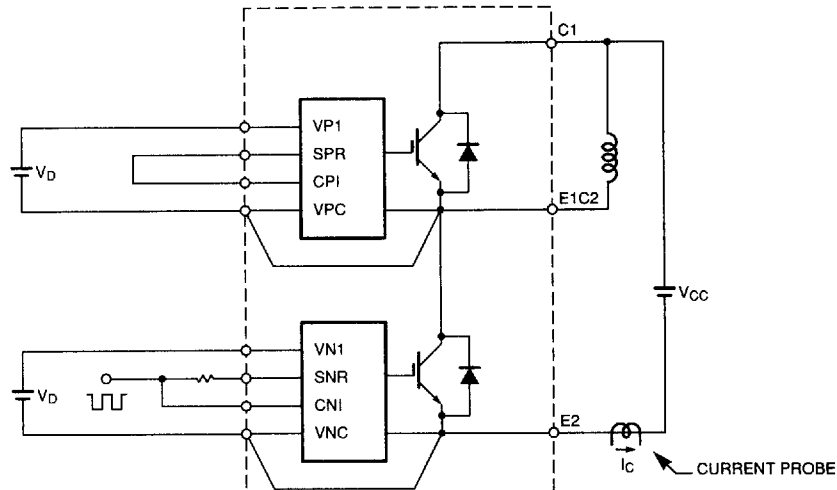
Recommended Operating Conditions

Characteristics	Symbol	Test Conditions	Value	Units
Supply Voltage	V_{CC}	Applied across C1 - E2 Terminals	0 ~ 800	Volts
	V_D	Applied between	15±1.5	Volts
		$V_{P1} - V_{PC}$, $V_{N1} - V_{NC}$		
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.

T-57-29

A) LOWER ARM SWITCHING



B) UPPER ARM SWITCHING

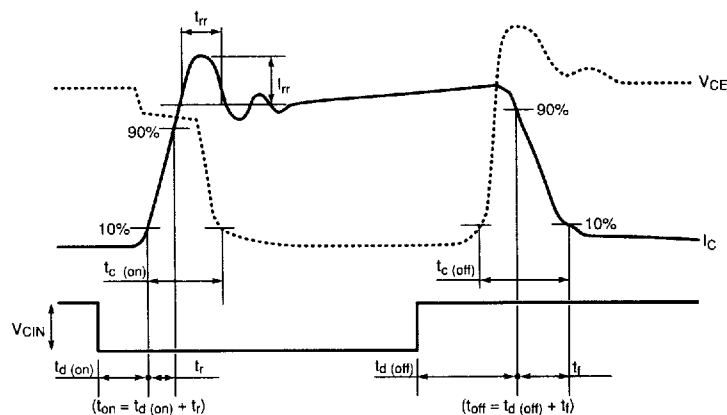
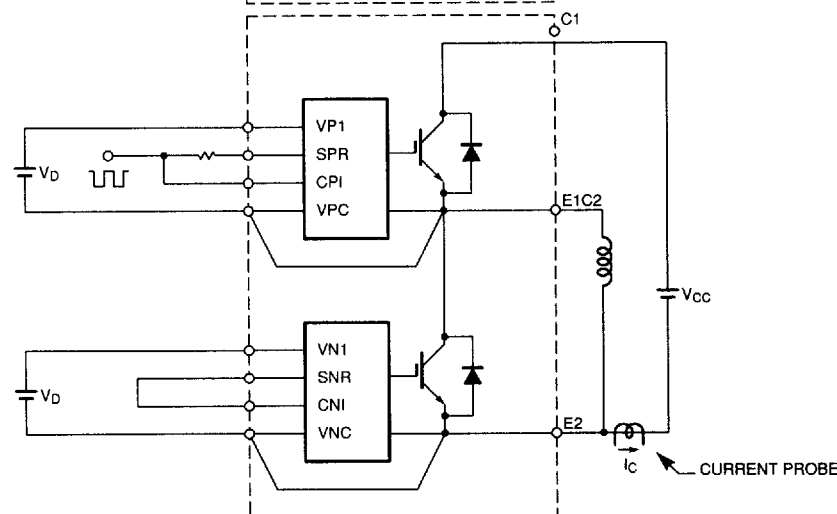


Figure 3 Switching Test



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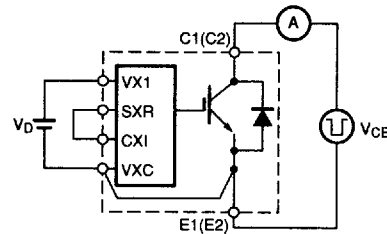


Figure 4 I_{CES} Test

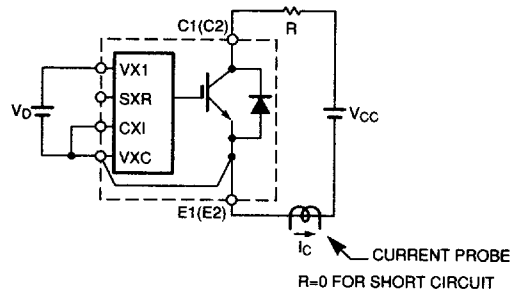


Figure 5 Over Current and Short Circuit Test