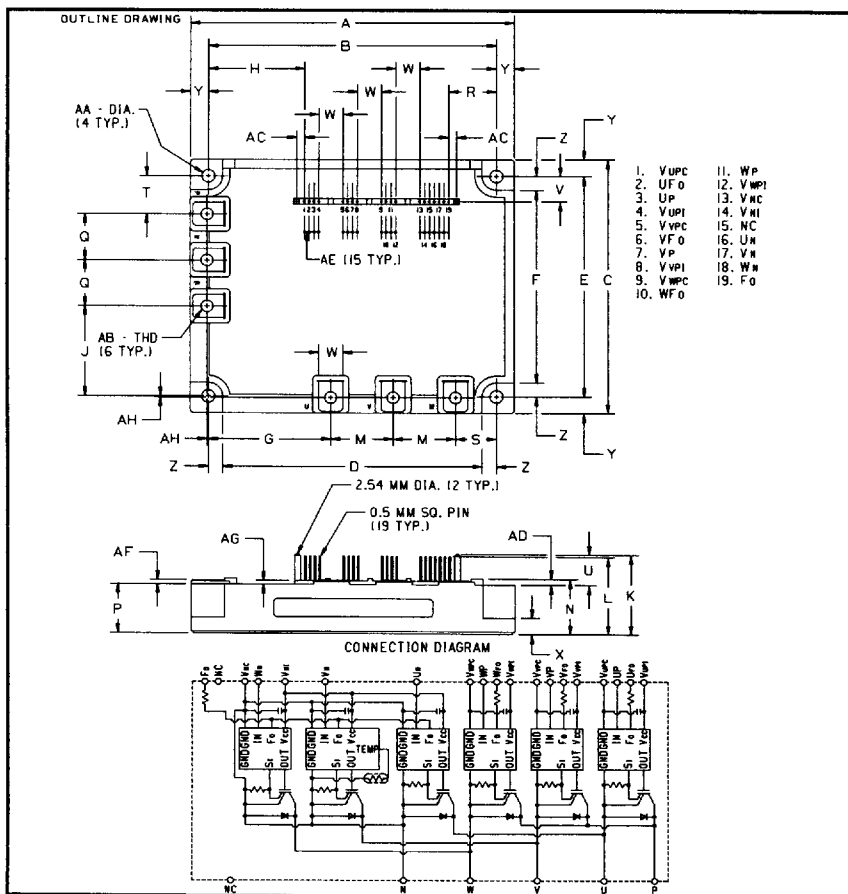


Intellimod™ Modules

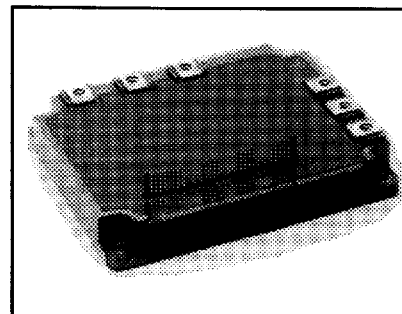
Three Phase
IGBT Inverter Output
100 Amperes/1200 Volts



PM100CSA120 Outline Drawing

Dimensions	Inches	Millimeters
A	5.31 ± 0.04	135.0 ± 1.0
B	4.74 ± 0.02	120.5 ± 0.5
C	4.33 ± 0.04	110.0 ± 1.0
D	4.27	108.5
E	3.76 ± 0.02	95.5 ± 0.5
F	3.29	83.5
G	2.01	51.0
H	1.602	40.68
J	1.54	39.0
K	1.37	34.7
L	1.33	33.7
M	1.02	26.0
N	0.95 +0.06/-0.0	24.1 +1.5/-0.0
P	0.85	21.5
Q	0.79	20.0
R	0.780	19.82

Dimensions	Inches	Millimeters
S	0.69	17.5
T	0.65	16.5
U	0.52	13.2
V	0.43	11.0
W	0.39	10.0
X	0.31	8.0
Y	0.285	7.5
Z	0.24	6.0
AA	0.22 Dia.	Dia. 5.5
AD	Metric M5	M5
AC	0.128	3.22
AD	0.10	2.6
AE	0.08	2.0
AF	0.07	1.8
AG	0.06	1.6
AH	0.02	0.5



Description:

Powerex Intellimod 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:

PM100CSA120



Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272

PM100CSA120
Intellimod™ Modules
Three Phase IGBT Inverter Output
100 Amperes/1200 Volts

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

Characteristics	Symbol	PM100CSA120	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)	—	920	Grams
Supply Voltage Protected by OC and SC ($V_D = 13.5 - 16.5\text{V}$, Inverter Part, $T_j = 125^\circ\text{C}$)	$V_{\text{CC(prot.)}}$	800	Volts
Isolation Voltage, AC 1 minute, 60Hz	V_{RMS}	2500	Volts

Control Sector

Supply Voltage Applied between ($V_{\text{UP1}}-V_{\text{UPC}}, V_{\text{VP1}}-V_{\text{VPC}}, V_{\text{WP1}}-V_{\text{WPC}}, V_{\text{N1}}-V_{\text{NC}}$)	V_D	20	Volts
Input Voltage Applied between ($U_P, V_P, W_P, U_N, V_N, W_N$)	V_{CIN}	20	Volts
Fault Output Supply Voltage (Applied between F_O and V_C)	V_{FO}	20	Volts
Fault Output Current	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)	$V_{\text{CC(surge)}}$	1000	Volts
Collector Dissipation	P_C	595	Watts

PM100CSA120
Intellimod™ Modules
Three Phase IGBT Inverter Output
100 Amperes/1200 Volts

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Control Sector						
Over Current Trip Level Inverter Part	OC	$-20^\circ\text{C} \leq T \leq 125^\circ\text{C}$	145	230	—	Amperes
Short Circuit Trip Level Inverter Part	SC	$-20^\circ\text{C} \leq T \leq 125^\circ\text{C}$	—	340	—	Amperes
Over Current Delay Time	$t_{\text{off(OC)}}$	$V_D = 15\text{V}$	—	10	—	μs
Over Temperature Protection	OT	Trip Level	111	118	125	$^\circ\text{C}$
	OT_R	Reset Level	—	100	—	$^\circ\text{C}$
Supply Circuit Under Voltage Protection	UV	Trip Level	11.5	12.0	12.5	Volts
	UV_R	Reset Level	—	12.5	—	Volts
Supply Voltage	V_D	Applied between $V_{\text{UP1}}-V_{\text{UPC}}$, $V_{\text{VP1}}-V_{\text{VPC}}$, $V_{\text{WP1}}-V_{\text{WPC}}$, $V_{\text{N1}}-V_{\text{NC}}$	13.5	15	16.5	Volts
Circuit Current	I_D	$V_D = 15\text{V}$, $V_{\text{CIN}} = 15\text{V}$, $V_{\text{N1}}-V_{\text{NC}}$	—	40	55	mA
		$V_D = 15\text{V}$, $V_{\text{CIN}} = 15\text{V}$, $V_{\text{XP1}}-V_{\text{XPC}}$	—	13	18	mA
Input Bias ON Voltage	$V_{\text{CIN(on)}}$	Applied between	1.2	1.5	1.8	mA
Input Bias OFF Voltage	$V_{\text{CIN(off)}}$	$U_P, V_P, W_P, U_N, V_N, W_N$	1.7	2.0	2.3	mA
PWM Input Frequency	f_{PWM}	3- ϕ Sinusoidal	—	15	20	kHz
Dead Time	t_{DEAD}	For each Input Pulse	2.5	—	—	μs
		Using App. Circuit Optocoupler's Input Signal $I_F = 12\text{mA}$	4.5	—	—	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

PM100CSA120
Intellimod™ Modules
Three Phase IGBT Inverter Output
100 Amperes/1200 Volts

Electrical and Mechanical 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_{CES}	$V_{CE} = V_{CES}, T_j = 25^\circ\text{C}$	—	—	1.0	mA
		$V_{CE} = V_{CES}, T_j = 125^\circ\text{C}$	—	—	10	mA
Diode Forward Voltage	V_{FM}	$-I_C = 100\text{A}, V_D = 15\text{V}, V_{CIN} = 0\text{V}$	—	2.5	3.5	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_D = 15\text{V}, V_{CIN} = 15\text{V}, I_C = 100\text{A}$	—	2.5	3.5	Volts
		$V_D = 15\text{V}, V_{CIN} = 15\text{V}, I_C = 100\text{A}, T_j = 125^\circ\text{C}$	—	2.2	3.2	Volts
Inductive Load Switching Times	t_{on}		0.5	1.0	2.5	μS
	t_{rr}	$V_D = 15\text{V}, V_{CIN} = 0 \sim 15\text{V}$	—	0.15	0.3	μS
	$t_{C(on)}$	$V_{CC} = 600\text{V}, I_C = 100\text{A}$	—	0.4	1.0	μS
	t_{off}	$T_j = 125^\circ\text{C}$	—	2.0	3.0	μS
	$t_{C(off)}$		—	0.7	1.2	μS

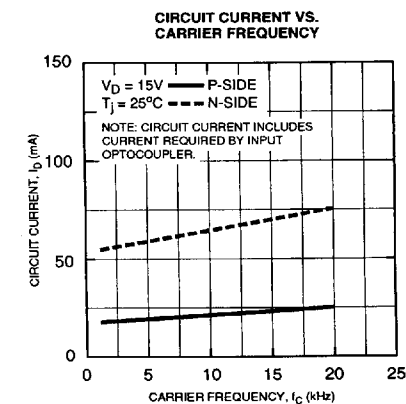
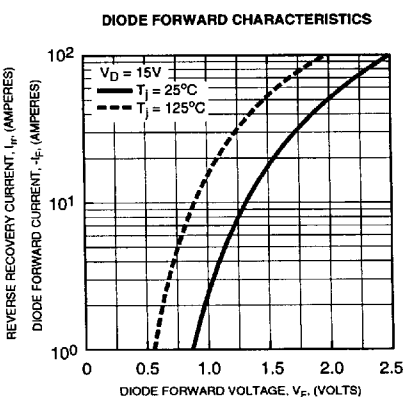
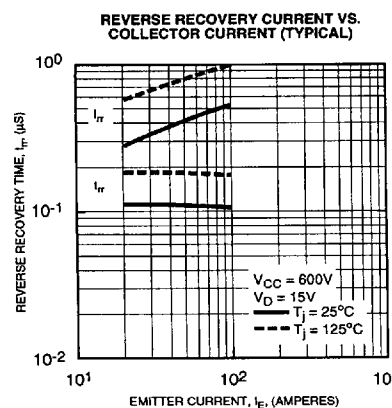
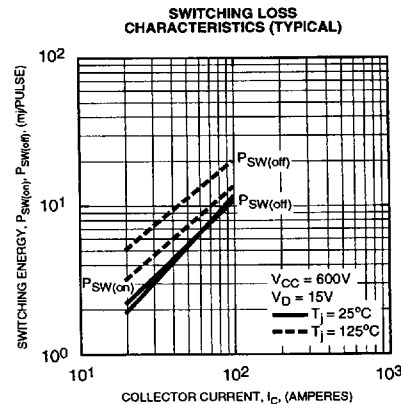
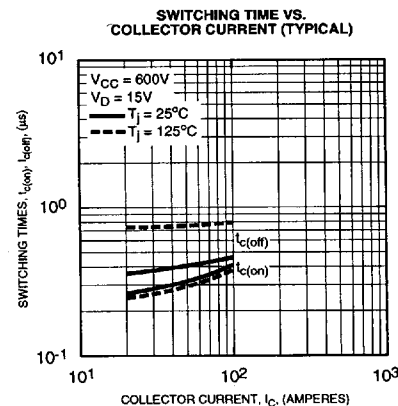
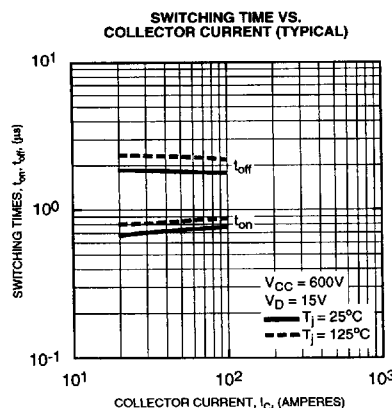
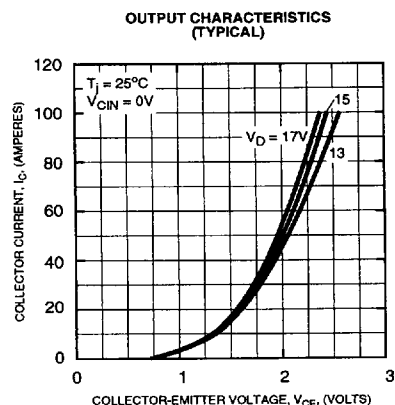
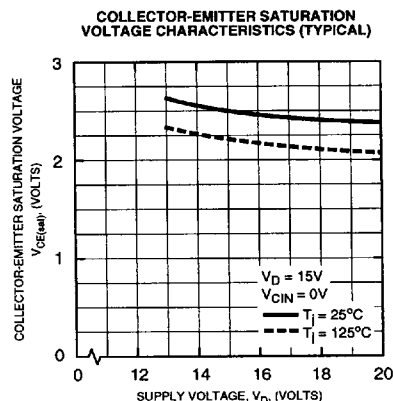
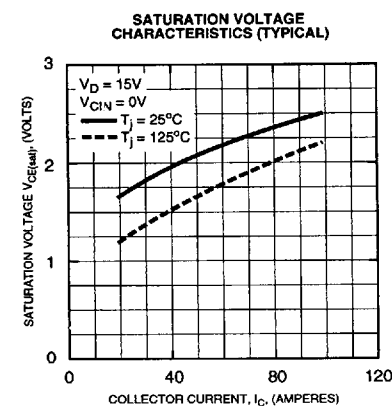
Thermal Characteristics

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Units
Junction to Case Thermal Resistance	$R_{th(j-c)Q}$	Inverter IGBT Part	—	—	0.21	$^\circ\text{C/Watt}$
	$R_{th(j-c)F}$	Inverter FWD	—	—	0.35	$^\circ\text{C/Watt}$
Contact Thermal Resistance	$R_{th(c-f)}$	Case to Fin, Thermal Grease Applied	—	—	0.018	$^\circ\text{C/Watt}$

Recommended Conditions for Use

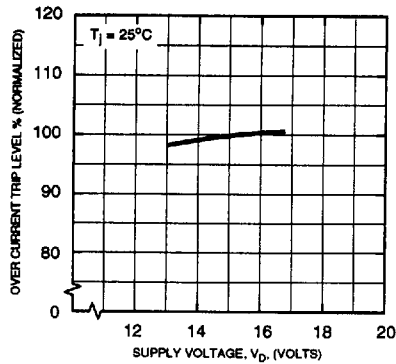
Characteristic	Symbol	Condition	Value	Units
Supply Voltage	V_{CC}	Applied across P-N Terminals	0 ~ 800	Volts
	V_D	Applied between $V_{UP1}-V_{UPC}, V_{N1}-V_{NC}, V_{VP1}-V_{VPC}, V_{WP1}-V_{WPC}$	15 ± 1.5	Volts
Input ON Voltage	$V_{CIN(on)}$	Applied between $U_P, V_P, W_P, U_N, V_N, W_N$	0 ~ 0.8	Volts
Input OFF Voltage	$V_{CIN(off)}$		$4.0 \sim V_D$	Volts
PWM Input Frequency	f_{PWM}	Using Application Circuit	5 ~ 20	kHz
Minimum Dead Time	t_{DEAD}	Using Application Circuit Optocoupler's Input Signal	4.5	μS

PM100CSA120
Intellimod™ Modules
Three Phase IGBT Inverter Output
100 Amperes/1200 Volts

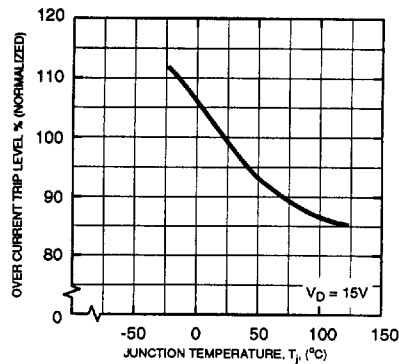


PM100CSA120
IntelliMod™ Modules
Three Phase IGBT Inverter Output
100 Amperes/1200 Volts

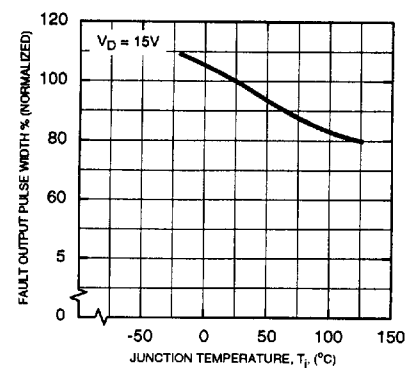
OVER CURRENT TRIP LEVEL VS.
SUPPLY VOLTAGE (TYPICAL)



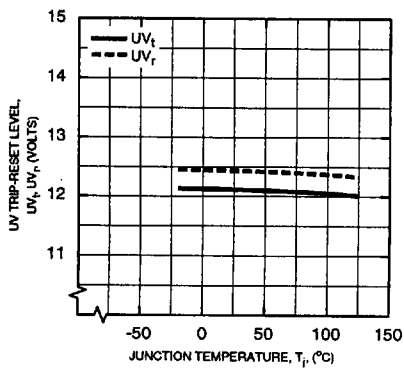
OVER CURRENT TRIP LEVEL
TEMPERATURE DEPENDENCY (TYPICAL)



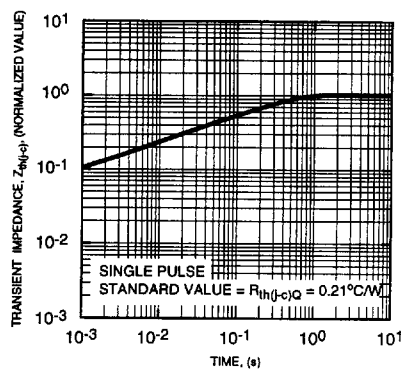
FAULT OUTPUT PULSE WIDTH VS.
TEMPERATURE (TYPICAL)



CONTROL SUPPLY VOLTAGE TRIP-RESET
LEVEL TEMPERATURE DEPENDENCY
(TYPICAL)



TRANSIENT THERMAL
IMPEDANCE CHARACTERISTICS
(IGBT REGION)



TRANSIENT THERMAL
IMPEDANCE CHARACTERISTICS
(FWDI REGION)

