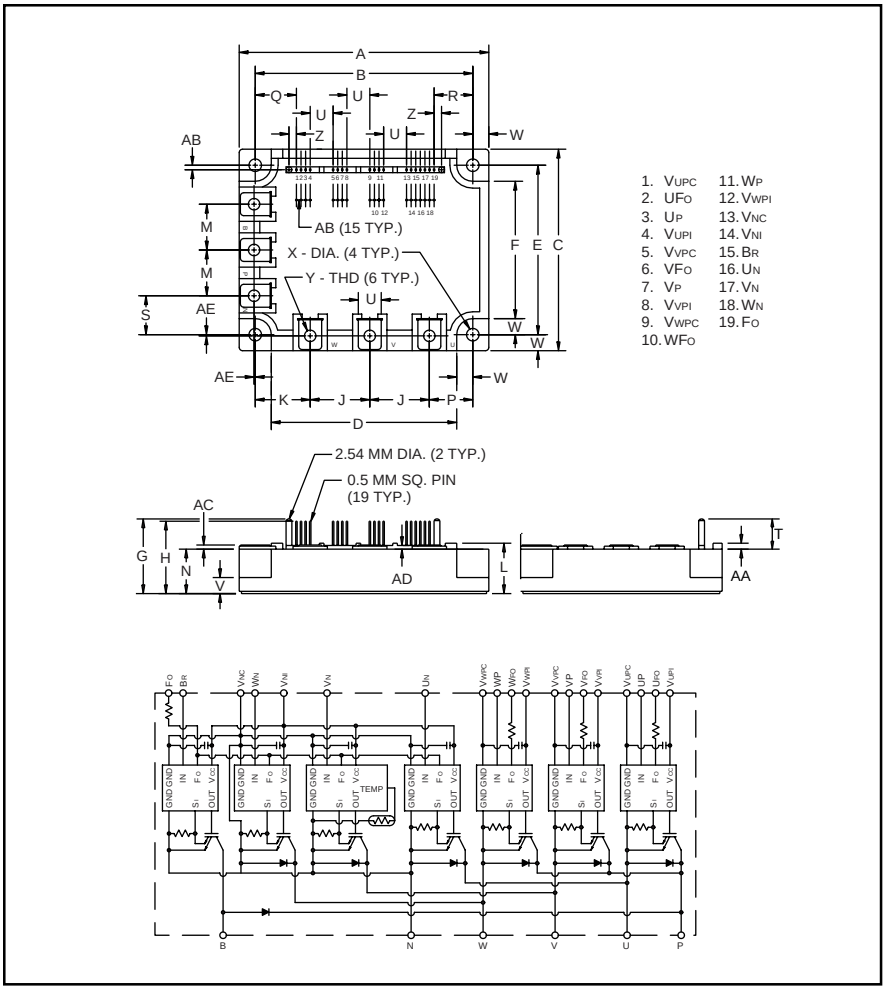
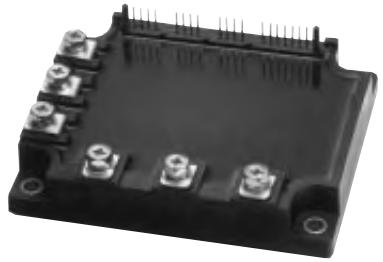
Powerex, Inc., 200 Hillis Street, Youngwood, Pennsylvania 15697-1800 (724) 925-7272

Intellimod™ Module

Three Phase + Brake
IGBT Inverter Output
75 Amperes/600 Volts





Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.29±0.04	109.0±1.0
B	3.74±0.02	95.0±0.5
C	3.46±0.04	88.0±1.0
D	3.19	81.0
E	2.91±0.02	74.0±0.5
F	2.36	60.0
G	1.28	32.6
H	1.24	31.6
J	1.02	26.0
K	0.94	24.0
L	0.87 +0.06/-0	22.0 +1.5/-0.0
M	0.79	20.0
N	0.76	19.4
P	0.75	19.0
Q	0.708	17.98

Dimensions	Inches	Millimeters
R	0.670	17.02
S	0.67	17.0
T	0.52	13.2
U	0.39	10.0
V	0.31	8.0
W	0.28	7.0
X	0.22 Dia.	Dia. 5.5
Y	Metric M5	M5
Z	0.127	3.22
AA	0.10	2.6
AB	0.08	2.0
AC	0.07	1.8
AD	0.06	1.6
AE	0.02	0.5

Description:
Powerex Intellimod™ Intelligent Power Modules are isolated base modules designed for power switching applications operating at frequencies to 20kHz. Built-in control circuits provide optimum gate drive and protection for the IGBT and free-wheel diode power devices.

Features:
- ☐ Complete Output Power Circuit
- ☐ Gate Drive Circuit
- ☐ Protection Logic
  - – Short Circuit
  - – Over Current
  - – Over Temperature
  - – Under Voltage

Applications:
- ☐ Inverters
- ☐ UPS
- ☐ Motion/Servo Control
- ☐ Power Supplies

Ordering Information:
Example: Select the complete part number from the table below -i.e. PM75RSA060 is a 600V, 75 Ampere Intellimod™ Intelligent Power Module.

Type	Current Rating Amperes	V_{CES} Volts (x 10)
PM	75	60

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PM75RSA060
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75 Amperes/600 Volts

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

Characteristics	Symbol	PM75RSA060	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 100	°C
Mounting Torque, M5 Mounting Screws	—	17	in-lb
Mounting Torque, M5 Main Terminal Screw	—	17	in-lb
Module Weight (Typical)	—	550	Grams
Supply Voltage Protected by OC and SC-(V_D = 13.5 - 16.5V, Inverter Part, T_j = 125°C)	$V_{CC(prot.)}$	400	Volts
Isolation Voltage, AC 1 minute, 60Hz Sinusoidal	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 Voltage Applied between (U_P, V_P, W_P, U_N, V_N, W_N, B_r)	V_{CIN}	20	Volts
Fault Output Supply Voltage	V_{FO}	20	Volts
Fault Output Current	I_{FO}	20	mA

IGBT Inverter Sector

Collector-Emitter Voltage (V_D = 15V, V_{CIN} = 15V)	V_{CES}	600	Volts
Collector Current, ±	I_C	75	Amperes
Peak Collector Current, ±	I_{CP}	150	Amperes
Supply Voltage (Applied between P - N)	V_{CC}	450	Volts
Supply Voltage, Surge (Applied between P - N)	$V_{CC(surge)}$	500	Volts
Collector Dissipation	P_C	312	Watts

Brake Sector

Collector-Emitter Voltage	V_{CES}	600	Volts
Collector Current, ±	I_C	30	Amperes
Peak Collector Current, ±	I_{CP}	60	Amperes
Supply Voltage (Applied between P - N)	V_{CC}	450	Volts
Supply Voltage, Surge (Applied between P - N)	$V_{CC(surge)}$	500	Volts
Collector Dissipation	P_C	208	Watts
Diode Forward Current	I_F	30	Amperes
Diode DC Reverse Voltage	$V_{R(DC)}$	600	Volts

Electrical and Mechanical Characteristics, T_j = 25°C unless otherwise specified

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
Control Sector						
Over Current Trip Level Inverter Part	OC	-20°C ≤ T ≤ 125°C	115	161	—	Amperes
Over Current Trip Level Brake Part			39	53	—	Amperes
Short Circuit Trip Level Inverter Part	SC	-20°C ≤ T ≤ 125°C	—	241	—	Amperes
Short Circuit Trip Level Brake Part			—	79	—	Amperes
Over Current Delay Time	$t_{off(OC)}$	V_D = 15V	—	10	—	µS
Over Temperature Protection	OT	Trip Level	111	118	125	°C
	OT_R	Reset Level	—	100	—	°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_{UP1}-V_{UPC}, V_{VP1}-V_{VPC}, V_{WP1}-V_{WPC}, V_{N1}-V_{NC}	13.5	15	16.5	Volts
Circuit Current	I_D	V_D = 15V, V_{CIN} = 15V, V_{N1}-V_{NC}	—	44	60	mA
		V_D = 15V, V_{CIN} = 15V, V_{XP1}-V_{XPC}	—	13	18	mA
Input ON Threshold Voltage	$V_{CIN(on)}$	Applied between	1.2	1.5	1.8	Volts
Input OFF Threshold Voltage	$V_{CIN(off)}$	U_P, V_P, W_P, U_N, V_N, W_N, B_r	1.7	2.0	2.3	Volts
PWM Input Frequency	f_{PWM}	3-∅ Sinusoidal	—	15	20	kHz
Fault Output Current	$I_{FO(H)}$	V_D = 15V, V_{FO} = 15V	—	—	0.01	mA
	$I_{FO(L)}$	V_D = 15V, V_{FO} = 15V	—	10	15	mA
Minimum Fault Output Pulse Width	t_{FO}	V_D = 15V	1.0	1.8	—	mS

Electrical and Mechanical Characteristics, T_j = 25°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°C	—	—	1.0	mA
		$V_{CE} = V_{CES}$, T_j = 125°C	—	—	10	mA
Diode Forward Voltage	V_{FM}	$-I_C$ = 75A, V_D = 15V, V_{CIN} = 5V	—	2.2	3.3	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_D = 15V, V_{CIN} = 0V, I_C = 75A	—	1.8	2.7	Volts
		V_D = 15V, V_{CIN} = 0V, I_C = 75A, T_j = 125°C	—	1.85	2.78	Volts
Inductive Load Switching Times	t_{on}	V_D = 15V, V_{CIN} = 0 ~ 115V, V_{CC} = 300V, I_C = 75A, T_j = 125°C	0.4	0.8	2.0	µS
	t_{rr}		—	0.15	0.3	µS
	$t_{C(on)}$		—	0.4	1.0	µS
	t_{off}		—	2.0	2.9	µS
	$t_{C(off)}$		—	0.5	1.0	µS
Brake Sector						
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_D = 15V, V_{CIN} = 0V, I_C = 75A, T_j = 25°C	—	2.7	3.5	Volts
		V_D = 15V, V_{CIN} = 0V, I_C = 75A, T_j = 125°C	—	3.1	4.0	Volts
Diode Forward Voltage	V_{FM}	$-I_C$ = 30A, V_D = 15V, V_{CIN} = 5V	—	1.7	2.7	Volts
Collector Cutoff Current	I_{CES}	$V_{CE} = V_{CES}$, T_j = 25°C	—	—	1	mA
		$V_{CE} = V_{CES}$, T_j = 125°C	—	—	10	mA

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Thermal Characteristics

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Units
Junction to Case Thermal Resistance	$R_{th(j-c)Q}$	Each Inverter IGBT	—	—	0.4	°C/Watt
	$R_{th(j-c)D}$	Each Inverter FWDi	—	—	1.0	°C/Watt
	$R_{th(c-f)Q}$	Each Brake IGBT	—	—	0.6	°C/Watt
	$R_{th(c-f)D}$	Each Brake FWDi	—	—	1.5	°C/Watt
Contact Thermal Resistance	$R_{th(c-f)}$	Case to Fin Per Module, Thermal Grease Applied	—	—	0.027	°C/Watt

Recommended Conditions for Use

Characteristic	Symbol	Condition	Value	Units
Supply Voltage	V_{CC}	Applied across P-N Terminals	0 ~ 400	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, B_r	0 ~ 0.8	Volts
Input OFF Voltage	$V_{CIN(off)}$		4.0 ~ V_D	Volts
PWM Input Frequency	f_{PWM}	Using Application Circuit	5 ~ 20	kHz
Minimum Dead Time	t_{DEAD}	Input Signal	≥ 2.5	µS