



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

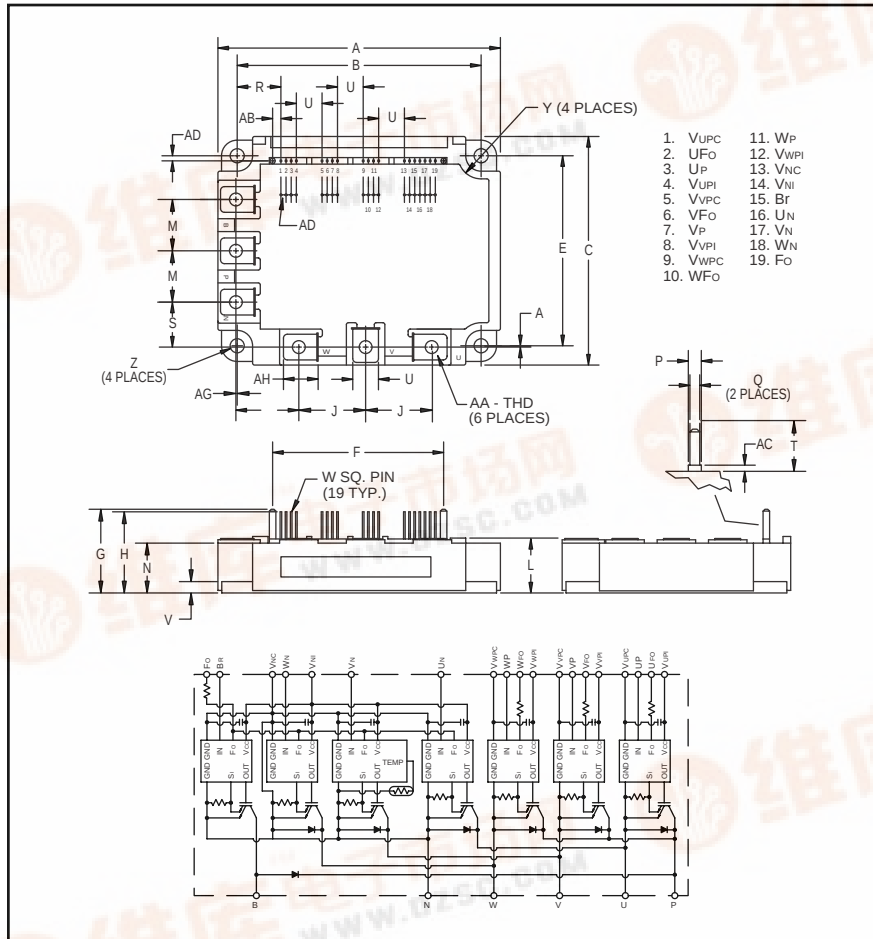
PM75RSD120

Intellimod™ Module

Three Phase + Brake

IGBT Inverter Output

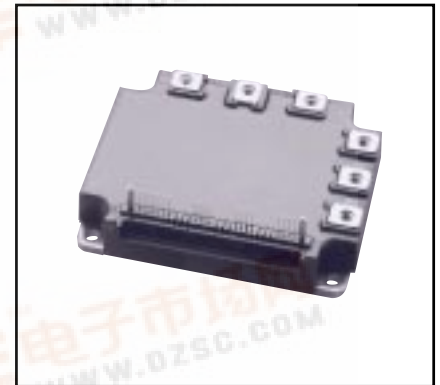
75 Amperes/1200 Volts



Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.33±0.04	110.0±1.0
B	3.74±0.02	95.0±0.5
C	3.50±0.04	89.0±1.0
E	2.91±0.02	74.0±0.5
F	2.62	66.44
G	1.28	32.6
H	1.24	31.6
J	1.02	26.0
K	0.94	24.0
L	0.87 +0.04/-0.02	22.0 +1.0/-0.5
M	0.79	20.0
N	0.76	19.4
P	0.18	4.5
Q	0.10	2.54

Dimensions	Inches	Millimeters
R	0.67	17.02
S	0.67	17.02
T	0.52	13.2
U	0.39	10.0
V	0.16	4.0
W	0.02	0.5
Y	0.24 Rad.	Rad. 6.0
Z	0.22 Dia.	Dia. 5.5
AA	M5	M5
AB	0.13	3.22
AC	0.06	1.6
AD	0.08±0.02	2.0±0.5
AG	0.020.01	0.5±0.3
AH	0.47	12.0



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
- ☐ Low Loss Using 4th Generation IGBT Chip

Applications:

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

Ordering Information:

Example: Select the complete part number from the table below -i.e. PM75RSD120 is a 1200V, 75 Ampere Intellimod™ Intelligent Power Module.

Type	Current Rating Amperes	V _{CE} Volts (x 10)
PM	75	120





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

Characteristics	Symbol	PM75RSD120	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	—	31	in-lb
Mounting Torque, M5 Main Terminal Screws	—	31	in-lb
Module Weight (Typical)	—	560	Grams
Supply Voltage Protected by OC and SC ($V_D = 13.5 - 16.5\text{V}$, Inverter Part) $T_j = 125^\circ\text{C}$ Start	$V_{\text{CC(prot.)}}$	800	Volts
Isolation Voltage, AC 1 minute, 60Hz Sinusoidal	V_{ISO}	2500	Volts

IGBT Inverter Sector

Collector-Emitter Voltage ($V_D = 15\text{V}$, $V_{\text{CIN}} = 15\text{V}$)	V_{CES}	1200	Volts
Collector Current, $\pm$ ($T_C = 25^\circ\text{C}$)	I_C	75	Amperes
Peak Collector Current, $\pm$ ($T_C = 25^\circ\text{C}$)	I_{CP}	150	Amperes
Supply Voltage (Applied between P - N)	V_{CC}	800	Volts
Supply Voltage, Surge (Applied between P - N)	$V_{\text{CC(surge)}}$	1000	Volts
Collector Dissipation ($T_C = 25^\circ\text{C}$)	P_C	416	Watts

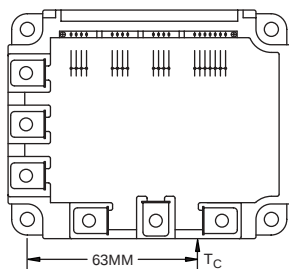
IGBT Brake Sector

Collector-Emitter Voltage ($V_D = 15\text{V}$, $V_{\text{CIN}} = 15\text{V}$)	V_{CES}	1200	Volts
Collector Current, $\pm$ ($T_C = 25^\circ\text{C}$)	I_C	25	Amperes
Peak Collector Current, $\pm$ ($T_C = 25^\circ\text{C}$)	I_{CP}	50	Amperes
FWDi Rated DC Reverse Voltage ($T_C = 25^\circ\text{C}$)	$V_{\text{R(DC)}}$	1200	Volts
FWDi Forward Current ($T_C = 25^\circ\text{C}$)	I_F	25	Amperes
Collector Dissipation ($T_C = 25^\circ\text{C}$)	P_C	290	Watts

Control Sector

Supply Voltage Applied between ($V_{\text{UP1-VUPC}}$, $V_{\text{VP1-VVPC}}$, $V_{\text{WP1-VWPC}}$, $V_{\text{N1-VNC}}$)	V_D	20	Volts
Input Voltage Applied between (U_P-V_{UPC} , V_P-V_{VPC} , W_P-V_{WPC} , U_N , V_N , W_N , B_I-V_{NC})	V_{CIN}	20	Volts
Fault Output Supply Voltage Applied between ($U_{\text{FO-VUPC}}$, $V_{\text{FO-VVPC}}$, $W_{\text{FO-VWPC}}$, $FO-V_{\text{NC}}$)	V_{FO}	20	Volts
Fault Output Current (U_{FO} , V_{FO} , W_{FO} , FO)	I_{FO}	20	mA

* T_C Measure Point





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75 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°C, V _D = 15V	—	—	1.0	mA
		V _{CE} = V _{CES} , T _j = 125°C, V _D = 15V	—	—	10	mA
Diode Forward Voltage	V _{EC}	-I _C = 75A, V _D = 15V, V _{CIN} = 15V	—	2.5	3.5	Volts
Collector-Emitter Saturation Voltage	V _{CE(sat)}	V _D = 15V, V _{CIN} = 0V, I _C = 75A, Pulsed, T _j = 25°C	—	2.4	3.2	Volts
		V _D = 15V, V _{CIN} = 0V, I _C = 75A, Pulsed, T _j = 125°C	—	2.1	2.8	Volts
Inductive Load Switching Times	t _{on}	V _D = 15V, V _{CIN} = 0 ~ 15V V _{CC} = 600V, I _C = 75A T _j = 125°C, Inductive Load	0.5	1.0	2.5	μS
	t _{rr}		—	0.15	0.3	μS
	t _{C(on)}		—	0.4	1.0	μS
	t _{off}		—	2.5	3.5	μS
	t _{C(off)}		—	0.7	1.2	μS
IGBT Brake Sector						
Collector Cutoff Current	I _{CES}	V _{CE} = V _{CES} , T _j = 25°C, V _D = 15V	—	—	1.0	mA
		V _{CE} = V _{CES} , T _j = 125°C, V _D = 15V	—	—	10	mA
FWDi Forward Voltage	V _{FM}	I _F = 25A	—	2.5	3.5	Volts
Collector-Emitter Saturation Voltage	V _{CE(sat)}	V _D = 15V, V _{CIN} = 0V, I _C = 25A, Pulsed, T _j = 25°C	—	2.8	3.8	Volts
		V _D = 15V, V _{CIN} = 0V, I _C = 25A, Pulsed, T _j = 125°C	—	2.5	3.5	Volts
Control Sector						
Over Current Trip Level Inverter Part (V _D = 15V)	OC	T _j = 25°C	156	238	—	Amperes
		T _j = 125°C	105	—	—	Amperes
Over Current Trip Level Brake Part	OC	-20°C ≤ T _j ≤ 125°C, V _D = 15V	37	—	—	Amperes
Short Circuit Trip Level Inverter Part	SC	-20°C ≤ T _j ≤ 125°C, V _D = 15V	—	250	—	Amperes
Short Circuit Trip Level Brake Part			—	125	—	Amperes
Over Current Delay Time	t _{off(OC)}	V _D = 15V	—	10	—	μS
Over Temperature Protection (V _D = 15V) (Lower Arm)	OT	Trip Level	111	118	125	°C
	OT _R	Reset Level	—	100	—	°C
Supply Circuit Under Voltage Protection (-20 ≤ T _j ≤ 125°C)	UV	Trip Level	11.5	12.0	12.5	Volts
	UV _R	Reset Level	—	12.5	—	Volts
Circuit Current	I _D	V _D = 15V, V _{CIN} = 15V, V _{N1} -V _{NC}	—	60	82	mA
		V _D = 15V, V _{CIN} = 15V, V _{XP1} -V _{XPC}	—	15	20	mA
Input ON Threshold Voltage	V _{CIN(on)}	Applied between U _P -V _{UPC} , V _P -V _{VPC} ,	1.2	1.5	1.8	Volts
Input OFF Threshold Voltage	V _{CIN(off)}	W _P -V _{WPC} , U _N , V _N , W _N , B _R -V _{NC}	1.7	2.0	2.3	Volts
Fault Output Current*	I _{FO(H)}	V _D = 15V, V _{CIN} = 15V	—	—	0.01	mA
	I _{FO(L)}	V _D = 15V, V _{CIN} = 15V	—	10	15	mA
Minimum Fault Output Pulse Width*	t _{FO}	V _D = 15V	1.0	1.8	—	mS

*Fault output is given only when the internal OC, SC, OT and UV protections schemes of either upper or lower arm device operate to protect it.



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Thermal Characteristics

Characteristic	Symbol	Condition	Min.	Typ.	Max.	Units
Junction to Case Thermal Resistance	$R_{th(j-c)Q}$	Each IGBT	—	—	0.30	°C/Watt
Inverter Part	$R_{th(j-c)F}$	Each FWDi	—	—	0.47	°C/Watt
	$R_{th(j-c')Q}$	Each IGBT*	—	—	0.17**	°C/Watt
	$R_{th(j-c')F}$	Each FWDi*	—	—	0.27**	°C/Watt
Junction to Case Thermal Resistance	$R_{th(j-c)Q}$	Each IGBT	—	—	0.43	°C/Watt
Brake Part	$R_{th(j-c)F}$	Each FWDi	—	—	1.00	°C/Watt
	$R_{th(j-c')Q}$	Each IGBT*	—	—	0.30**	°C/Watt
	$R_{th(j-c')F}$	Each FWDi*	—	—	0.64**	°C/Watt
Contact Thermal Resistance	$R_{th(c-f)}$	Case to Fin Per Module, Thermal Grease Applied	—	—	0.027	°C/Watt

* T_C measured point is just under the chips.

**If you use this value, $R_{th(f-a)}$ should be measured just under the chips.

Recommended Conditions for Use

Characteristic	Symbol	Condition	Value	Units
Supply Voltage	V_{CC}	Applied across P-N Terminals	0 ~ 800	Volts
Control Supply Voltage***	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_{UPC} , V_P - V_{VPC} ,	0 ~ 0.8	Volts
Input OFF Voltage	$V_{CIN(off)}$	W_P - V_{WPC} , U_N , V_N , W_N , B_r - V_{NC}	4.0 ~ V_D	Volts
PWM Input Frequency	f_{PWM}	Using Application Circuit	0 ~ 20	kHz
Minimum Dead Time	t_{DEAD}	Input Signal	≥ 3.0	μS

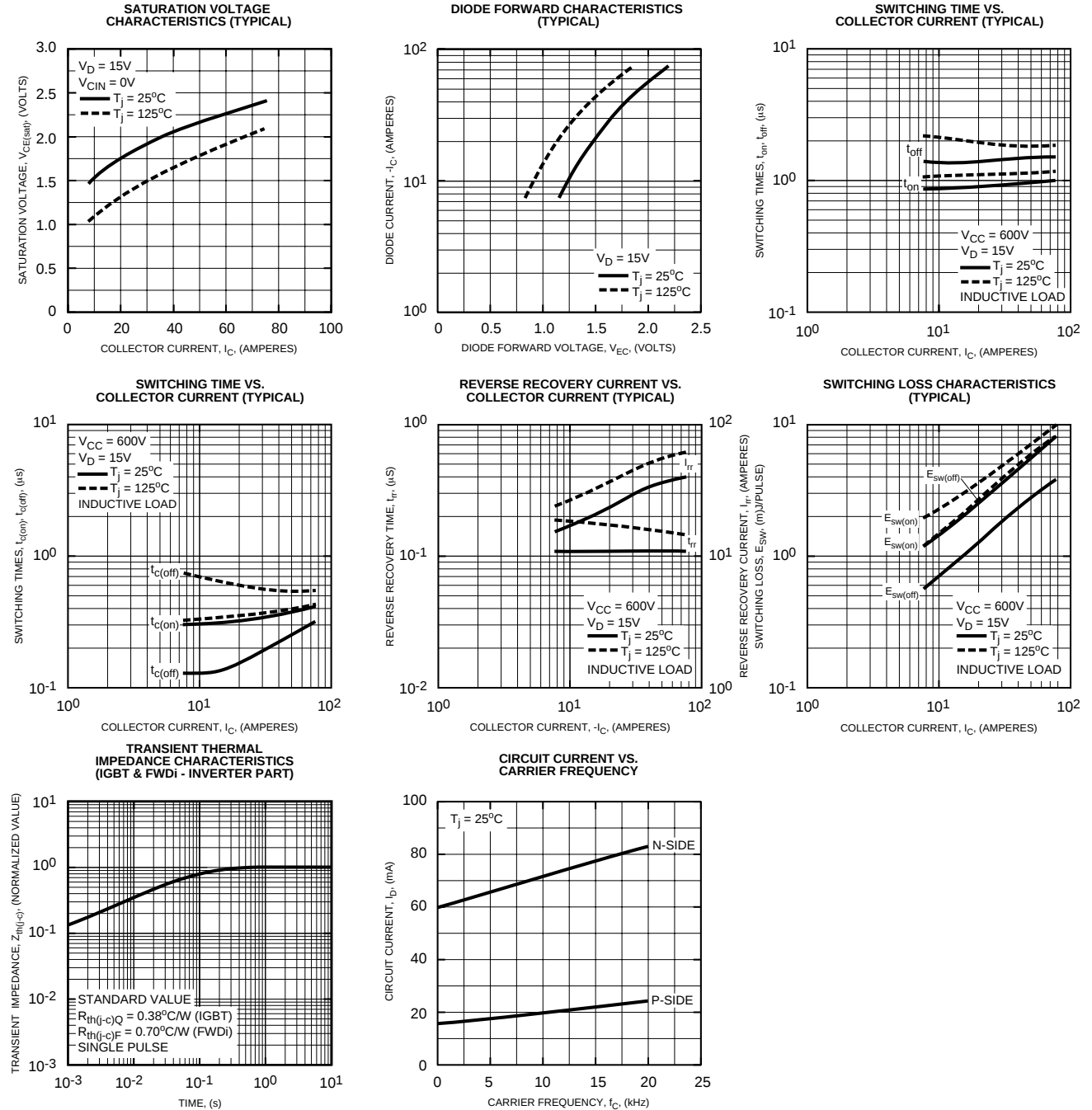
***With ripple satisfying the following conditions: $dv/dt \leq \pm 5v/\mu s$, Variation ≤ 2V peak to peak.



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Inverter Part





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Brake Part

