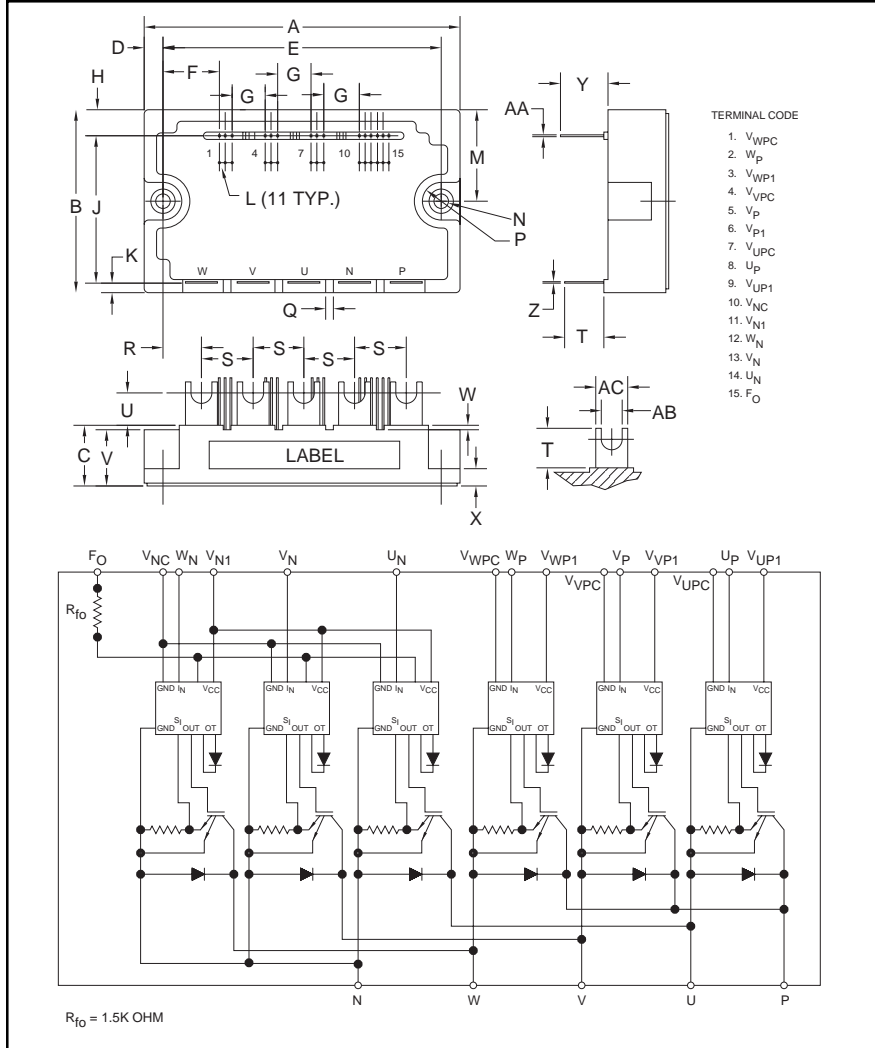


### Intellimod™ Module MAXISS Series™ Multi AXIS Servo IPM 150 Amperes/600 Volts



#### 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
  - Under Voltage
  - Over Temperature by On-Chip Temperature Sensor
- Low Loss Using 4th Generation IGBT Chip

#### Applications:

- Motion Control
- Servo Control

#### Ordering Information:

Example: Select the complete part number from the table below -i.e. PM100CBS060 is a 600V, 100 Ampere Intellimod™ Intelligent Power Module.

Type	Current Rating Amperes	V <sub>CES</sub> Volts (x 10)
PM	150	060

#### Outline Drawing and Circuit Diagram

Dimensions	Inches	Millimeters
A	4.72	120.0
B	1.97	50.0
C	1.18	30.0
D	0.3	7.0
E	4.17±0.1	106.0±0.3
F	0.94	23.79
G	0.40	10.16
H	0.34	8.5
J	1.54	39.0
K	0.10	2.5
L	0.10	2.54
M	0.98	25.0
N	5.5 Dia.	Dia 5.5
P	0.28 Rad.	Rad. 7.0

Dimensions	Inches	Millimeters
Q	0.12	3.0
R	0.59	15.0
S	0.75	19.0
T	0.39	10.0
U	0.24	6.0
V	1.10	28.0
W	0.08	2.0
X	0.26	6.5
Y	0.43	11.0
Z	0.04	1.0
AA	0.03	0.64
AB	0.20	5.0
AC	0.35	9.0

**PM150CBS060**  
**Intellimod™ Module**  
**MAXISS Series™, Multi AXIS Servo IPM**  
 150 Amperes/600 Volts

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

Characteristics	Symbol	PM150CBS060	Units
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)	—	400	Grams
Supply Voltage Protected by OC and SC ( $V_D = 13.5 - 16.5\text{V}$ , Inverter Part, $T_j = 125^\circ\text{C}$ )	$V_{CC(prot.)}$	400	Volts
Supply Voltage, Surge (Applied between P - N)	$V_{CC(surge)}$	500	Volts
Isolation Voltage, AC 1 minute, 60Hz Sinusoidal	$V_{ISO}$	2500	$V_{rms}$

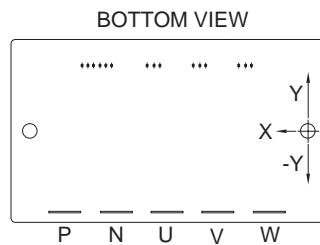
### IGBT Inverter Sector

Collector-Emitter Voltage ( $V_D = 15\text{V}$ , $V_{CIN} = 15\text{V}$ )	$V_{CES}$	600	Volts
Collector Current, $\pm$ ( $T_C = 25^\circ\text{C}$ )	$I_C$	150	Amperes
Peak Collector Current, $\pm$ ( $T_C = 25^\circ\text{C}$ )	$I_{CP}$	300	Amperes
Collector Dissipation	$P_C$	735	Watts
Power Device Junction Temperature	$T_j$	-20 to 150	$^\circ\text{C}$

### 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 ( $U_P-V_{UPC}$ , $V_P-V_{VPC}$ , $W_P-V_{WPC}$ , $U_N-V_{NC}$ , $W_N-V_{NC}$ )	$V_{CIN}$	20	Volts
Fault Output Supply Voltage (Applied between $F_O$ and $V_{NC}$ )	$V_{FO}$	$V_D + 0.5$	Volts
Fault Output Current (Sink Current at $F_O$ Terminal)	$I_{FO}$	20	mA

\* $T_C$  Measure Point (Under the Chip)



(mm)

ARM \ AXIS	$U_P$		$V_P$		$W_P$		$U_N$		$V_N$		$W_N$	
	IGBT	FWDi	IGBT	FWDi	IGBT	FWDi	IGBT	FWDi	IGBT	FWDi	IGBT	FWDi
X	83.3	83.3	41.8	41.8	16.8	16.8	70.8	70.8	54.3	54.3	29.3	29.3
Y	5.3	-4.8	5.3	-4.8	5.3	-4.8	-0.8	-10.8	-0.8	-10.8	-0.8	-10.8



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**PM150CBS060**  
**Intellimod™ Module**  
**MAXISS Series™, Multi AXIS Servo IPM**  
 150 Amperes/600 Volts

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Units
<b>IGBT Inverter Sector</b>						
Collector-Emitter Cutoff Current	$I_{CES}$	$V_{CE} = V_{CES}, V_D = 15V, T_j = 25^\circ\text{C}$	—	—	1.0	mA
		$V_{CE} = V_{CES}, V_D = 15V, T_j = 125^\circ\text{C}$	—	—	10	mA
Diode Forward Voltage	$V_{EC}$	$-I_C = 150A, V_D = 15V, V_{CIN} = 15V$	—	2.2	3.3	Volts
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_D = 15V, V_{CIN} = 0V, I_C = 150A, T_j = 25^\circ\text{C}$	—	1.7	2.3	Volts
		$V_D = 15V, V_{CIN} = 0V, I_C = 150A, T_j = 125^\circ\text{C}$	—	1.7	2.3	Volts
Inductive Load Switching Times	$t_{on}$		0.8	1.2	2.4	$\mu\text{S}$
	$t_{rr}$	$V_D = 15V, V_{CIN} = 0 \sim 15V,$	—	0.15	0.3	$\mu\text{S}$
	$t_{C(on)}$	$V_{CC} = 300V, I_C = 150A,$	—	0.4	1.0	$\mu\text{S}$
	$t_{off}$	$T_j = 125^\circ\text{C},$ Inductive Load	—	2.4	3.3	$\mu\text{S}$
	$t_{C(off)}$		—	0.5	1.0	$\mu\text{S}$
<b>Control Sector</b>						
Over Current Trip Level	OC	$T_j = -20^\circ\text{C}, V_D = 15V$	—	—	690	Amperes
		$T_j = 25^\circ\text{C}, V_D = 15V$	286	404	570	Amperes
		$T_j = 125^\circ\text{C}, V_D = 15V$	210	—	—	Amperes
Short Circuit Trip Level	SC	$-20^\circ\text{C} \leq T_j \leq 125^\circ\text{C}, V_D = 15V$	—	420	—	Amperes
Over Current Delay Time	$t_{off(OC)}$	$V_D = 15V$	—	10	—	$\mu\text{S}$
Over Temperature Protection	OT	Trip Level	135	145	155	$^\circ\text{C}$
(Detect $T_j$ of IGBT Chip)	$OT_R$	Reset Level	—	125	—	$^\circ\text{C}$
Supply Circuit Under Voltage Protection	UV	Trip Level	11.5	12.0	12.5	Volts
		Reset Level	—	12.5	—	Volts
Circuit Current	$I_D$	$V_D = 15V, V_{CIN} = 15V, V_{N1} \sim V_{NC}$	—	45	65	mA
		$V_D = 15V, V_{CIN} = 15V, V_{XP1} \sim V_{XPC}$	—	15	20	mA
Input ON Threshold Voltage	$V_{th(on)}$	Applied between $U_P \sim V_{UPC}, V_P \sim V_{VPC},$	1.2	1.5	1.8	Volts
Input OFF Threshold Voltage	$V_{th(off)}$	$W_P \sim V_{WPC}, U_N, V_N, W_N \sim V_{NC}$	1.7	2.0	2.3	Volts
Fault Output Current	$I_{FO(H)}$	$V_D = 15V, V_{FO} = 15V$	—	—	0.01	mA
		$V_D = 15V, V_{FO} = 15V$	—	10	15	mA
Minimum Fault Output Pulse Width	$t_{FO}$	$V_D = 15V$	1.0	1.8	—	mS



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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*	—	—	0.17**	°C/Watt
	$R_{th(j-c)F}$	Each FWDI*	—	—	0.27**	°C/Watt
Contact Thermal Resistance	$R_{th(c-f)}$	Case to Fin Per Module, Thermal Grease Applied	—	—	0.046	°C/Watt

\* $T_C$  measured point is just under the chips.

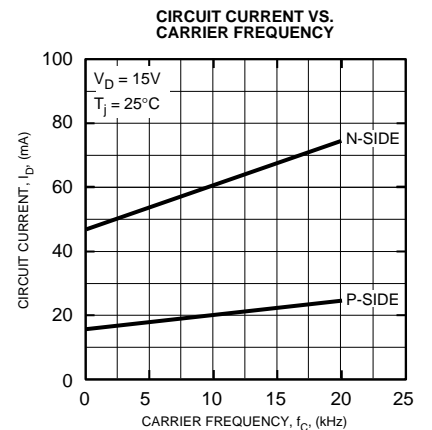
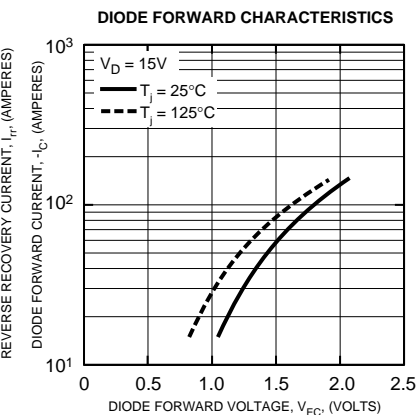
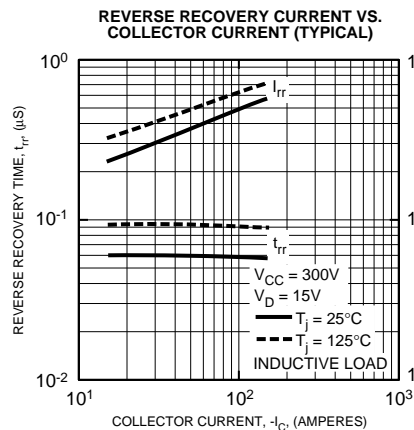
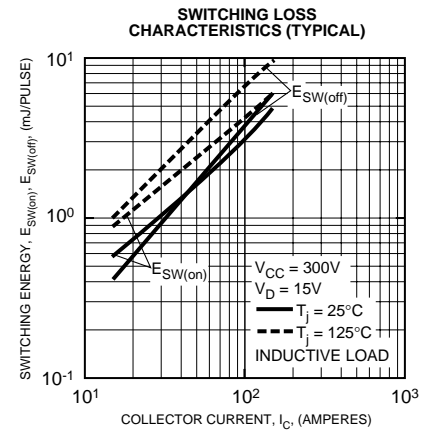
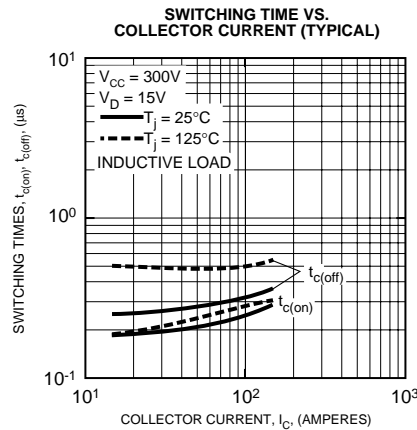
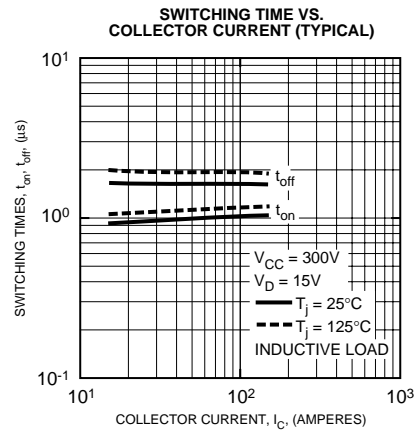
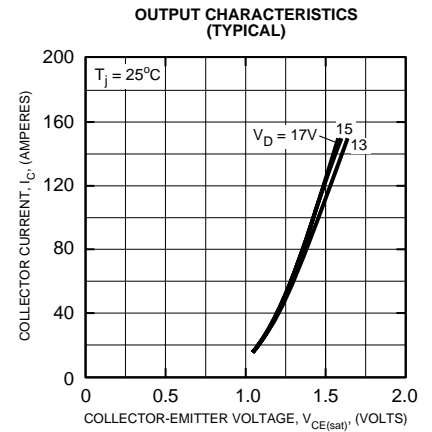
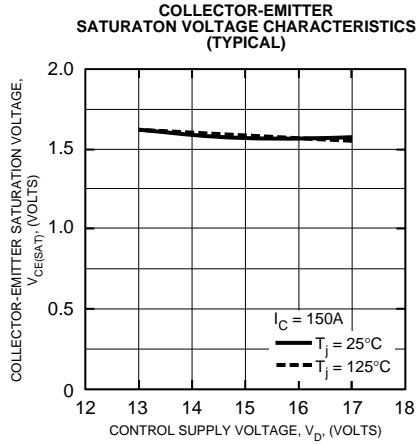
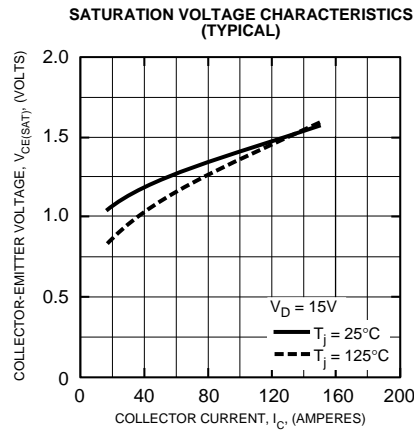
\*\*If you use this value,  $R_{th(f-a)}$  should be measured just under the chips.

### Recommended Conditions for Use

Characteristic	Symbol	Condition	Value	Units
Supply Voltage	$V_{CC}$	Applied across P-N Terminals	$\leq 400$	Volts
Control Supply Voltage*	$V_D$	Applied between $V_{UP1}-V_{U1PC}$ , $V_{VP1}-V_{V1PC}$ , $V_{WP1}-V_{W1PC}$ , $V_{N1}-V_{N1C}$	$15 \pm 1.5$	Volts
Input ON Voltage	$V_{CIN(on)}$	Applied between $U_P-V_{U1PC}$ , $V_P-V_{V1PC}$ ,	$\leq 0.8$	Volts
Input OFF Voltage	$V_{CIN(off)}$	$W_P-V_{W1PC}$ , $U_N$ , $V_N$ , $W_N-V_{N1C}$	$\geq 4.0$	Volts
PWM Input Frequency	$f_{PWM}$	Using Application Circuit	$\leq 20$	kHz
Minimum Dead Time	$t_{DEAD}$	Input Signal	$\geq 2.5$	$\mu S$

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

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