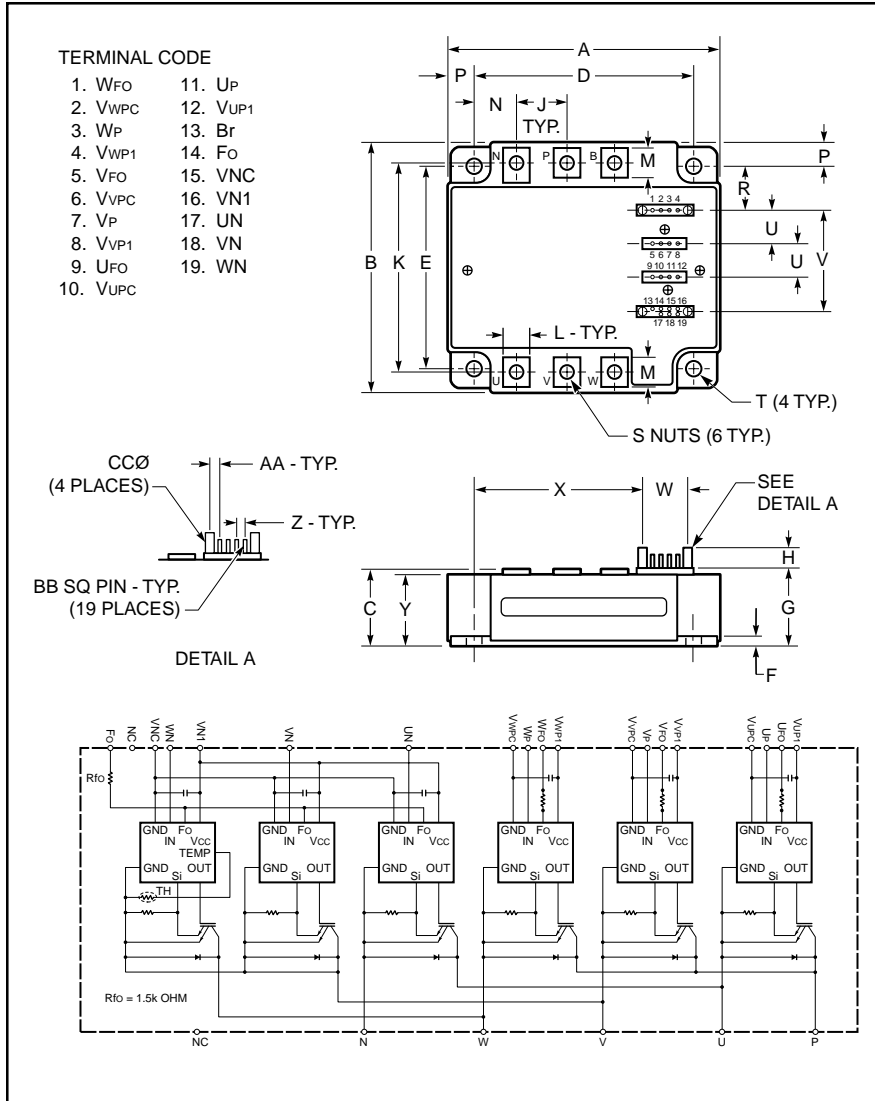


Intellimod™ Module

Three Phase
IGBT Inverter Output
100 Amperes/600 Volts



Outline Drawing and Circuit Diagram

| Dimensions | Inches | Millimeters |
|------------|------------------|----------------|
| A | 4.33 | 110.0 |
| B | 3.50 | 89.0 |
| C | 0.87 +0.04/-0.02 | 22.0 +1.0/-0.5 |
| D | 3.74±0.010 | 95.0±0.25 |
| E | 2.91±0.010 | 74.0±0.25 |
| F | 0.16 | 4.0 |
| G | 0.87 | 22.0 |
| H | 0.42 | 10.6 |
| J | 0.79 | 20.0 |
| K | 2.99±0.02 | 76.0±0.5 |
| L | 0.39 | 10.0 |
| M | 0.49 | 12.5 |
| N | 0.67 | 17.0 |

| Dimensions | Inches | Millimeters |
|------------|------------------|---------------|
| P | 0.30 | 7.5 |
| R | 0.65 | 16.5 |
| S | M5 Metric | M5 |
| T | 0.22 Dia. | Dia. 5.5 |
| U | 0.56±0.010 | 14.1±0.25 |
| V | 1.72±0.012 | 43.57±0.3 |
| W | 0.57±0.012 | 14.6±0.3 |
| X | 2.90 | 73.7 |
| Y | 0.78 | 19.7 |
| Z | 0.10±0.010 | 2.54±0.25 |
| AA | 0.137±0.010 | 3.49±0.25 |
| BB | 0.02 SQ | 0.64 SQ |
| CC | 0.12 +0.04/-0.02 | 3.0 +1.0/-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 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. PM100CVA060 is a 600V, 100 Ampere Intellimod™ Intelligent Power Module.

| Type | Current Rating Amperes | V _{CES} Volts (x 10) |
|------|---------------------------|----------------------------------|
| PM | 100 | 60 |



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

PM100CVA060
Intellimod™ Module
Three Phase IGBT Inverter Output
 100 Amperes/600 Volts

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

| Characteristics | Symbol | PM100CVA060 | 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 (Typical) | — | 17 | in-lb |
| Mounting Torque, M5 Main Terminal Screws (Typical) | — | 17 | in-lb |
| Module Weight (Typical) | — | 560 | Grams |
| Supply Voltage, Surge (Applied between P - N, Surge Value) | $V_{CC(surge)}$ | 500 | Volts |
| Supply Voltage Protected by SC ($V_D = 13.5 \sim 16.5\text{V}$, Inverter Part, $T_j = 125^\circ\text{C}$ Start) | $V_{CC(prot.)}$ | 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) | V_{CIN} | 20 | Volts |
| Fault Output Supply Voltage (Applied between F_O-V_{NC} , $*F_O-V_{PC}$) | V_{FO} | 20 | Volts |
| Fault Output Current (Sink Current at F_O Terminals) | I_{FO} | 20 | mA |

IGBT Inverter

| | | | |
|---|-----------|-----|---------|
| 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 | 100 | Amperes |
| Peak Collector Current, \pm ($T_C = 25^\circ\text{C}$) | I_{CP} | 200 | Amperes |
| Collector Dissipation ($T_C = 25^\circ\text{C}$) | P_C | 338 | Watts |



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

| Characteristics | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|---|-----------------------|--|------|------|------|------------------|
| Control Sector | | | | | | |
| Short Circuit Trip Level | SC | $-20^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$, $V_D = 15\text{V}$ | 158 | — | — | Amperes |
| Short Circuit Current Delay Time | $t_{\text{off(SC)}}$ | $V_D = 15\text{V}$ | — | 10 | — | μS |
| Over Temperature Protection | OT | Trip Level | 100 | 110 | 120 | $^\circ\text{C}$ |
| ($V_D = 15\text{V}$) | 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 |
| ($-20^\circ\text{C} \leq T_j \leq 125^\circ\text{C}$) | UV_r | Reset Level | — | 12.5 | — | 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 ON Threshold Voltage | $V_{\text{CIN(on)}}$ | Applied between U_P-V_{UPC} , V_P-V_{VPC} , | 1.2 | 1.5 | 1.8 | Volts |
| Input OFF Threshold Voltage | $V_{\text{CIN(off)}}$ | W_P-V_{WPC} , U_N , V_N , W_N-V_{NC} | 1.7 | 2.0 | 2.3 | Volts |
| 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 |

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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-Emitter Cutoff Current | I_{CES} | $V_{CE} = V_{CES}, V_D = 15\text{V}, T_j = 25^\circ\text{C}$ | — | — | 1.0 | mA |
| | | $V_{CE} = V_{CES}, V_D = 15\text{V}, T_j = 125^\circ\text{C}$ | — | — | 10.0 | mA |
| FWDi Forward Voltage | V_{EC} | $-I_C = 100\text{A}, V_D = 15\text{V}, V_{CIN} = 15\text{V}$ | — | 2.20 | 3.30 | Volts |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $V_D = 15\text{V}, V_{CIN} = 0\text{V}, I_C = 100\text{A},$ Pulsed, $T_j = 25^\circ\text{C}$ | — | 2.35 | 2.80 | Volts |
| | | $V_D = 15\text{V}, V_{CIN} = 0\text{V}, I_C = 100\text{A},$ Pulsed, $T_j = 125^\circ\text{C}$ | — | 2.55 | 3.05 | Volts |
| Inductive Load Switching Times (Upper-Lower Arm) | t_{on} | | 0.4 | 0.8 | 2.1 | μS |
| | t_{rr} | $V_D = 15\text{V}, V_{CIN} = 0\text{V} \sim 15\text{V}$ | — | 0.2 | 0.3 | μS |
| | $t_{C(on)}$ | $V_{CC} = 300\text{V}, I_C = 100\text{A},$ $T_j = 125^\circ\text{C}$ | — | 0.3 | 1.1 | μS |
| | t_{off} | | — | 1.8 | 2.9 | μS |
| | $t_{C(off)}$ | | — | 0.6 | 1.2 | μS |

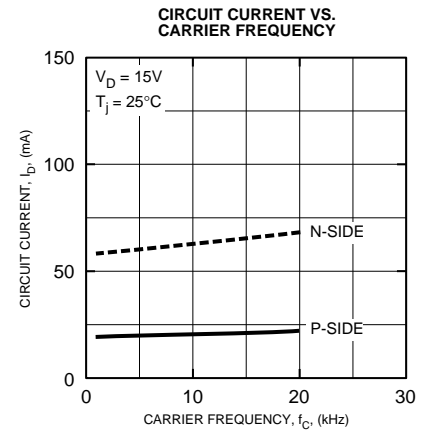
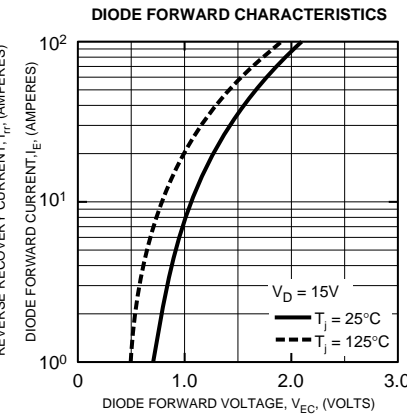
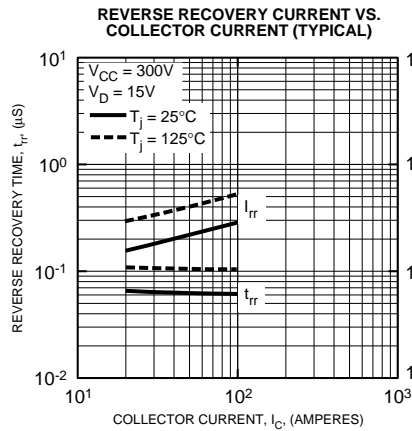
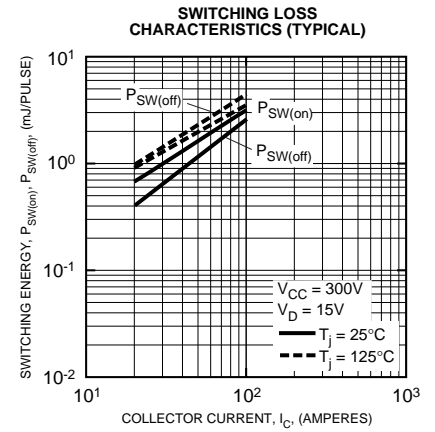
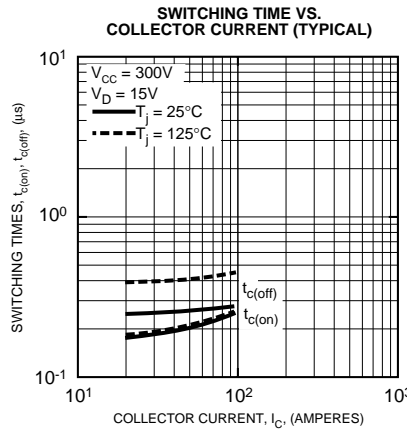
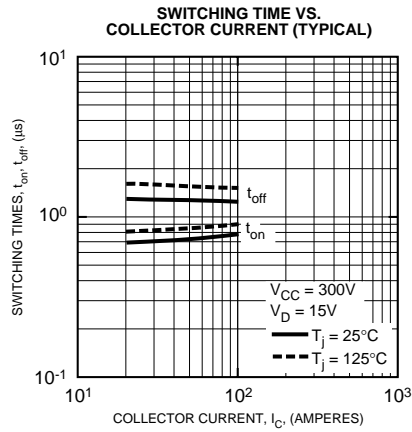
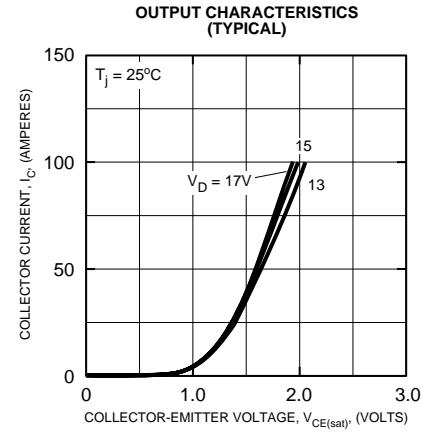
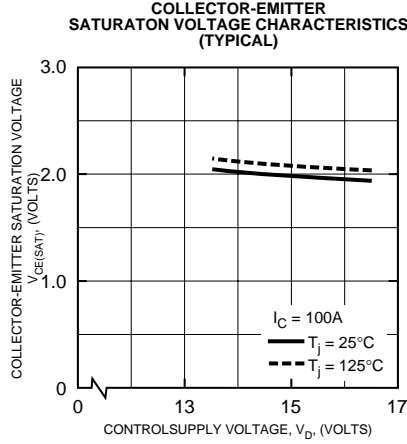
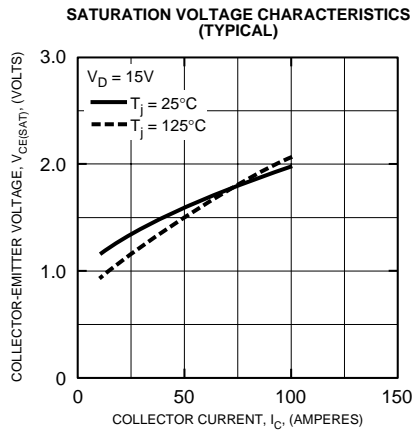
Thermal Characteristics

| Characteristic | Symbol | Condition | Min. | Typ. | Max. | Units |
|-------------------------------------|----------------|---|------|------|-------|-----------------------|
| Junction to Case Thermal Resistance | $R_{th(j-c)Q}$ | Each Inverter IGBT | — | — | 0.37 | $^\circ\text{C/Watt}$ |
| | $R_{th(j-c)D}$ | Each Inverter FWDi | — | — | 0.70 | $^\circ\text{C/Watt}$ |
| Contact Thermal Resistance | $R_{th(c-f)}$ | Case to Fin Per Module, Thermal Grease Applied | — | — | 0.027 | $^\circ\text{C/Watt}$ |

Recommended Conditions for Use

| Characteristic | Symbol | Condition | Value | Units |
|---------------------------------|-----------------|---|--------------|---------------|
| Supply Voltage | V_{CC} | Applied across P-N Terminals | ≤ 400 | Volts |
| | $V_{CE(surge)}$ | Applied across Terminals P-U, P-V, P-W, U-N, V-N, W-N | ≤ 500 | 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 | ≤ 0.8 | Volts |
| Input OFF Voltage | $V_{CIN(off)}$ | $U_P, V_P, W_P, U_N, V_N, W_N$ | ≥ 4.0 | Volts |
| Arm Shoot-Through Blocking Time | t_{DEAD} | For IPM's each Input Signal | ≥ 2.5 | μS |

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