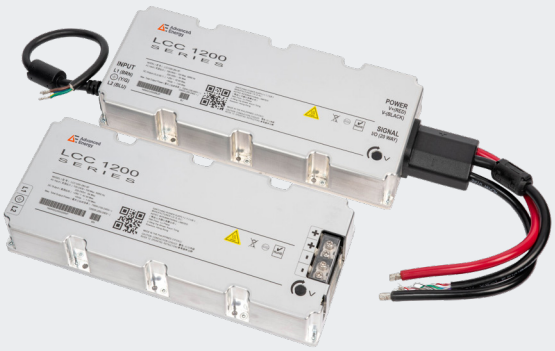
# LCC1200

1200 Watts Conduction Cooling



Advanced Energy's LCC1200 series of fully enclosed conduction cooled AC-DC power supplies comprises four models, offering main output voltages of 24 V, 28 V or 48 V. Each model also provides a 5 VDC standby output that can supply up to 1.5 A. Rated at 1200 W, these power supplies incorporate a thermal baseplate and are capable of delivering full output power over a wide operating baseplate temperature range of -40 to 85°C. For maximum applications flexibility, the main output is adjustable. The 28 V model, for example, can be adjusted from 24 to 30 V and has a maximum current rating of 42.9 A.

## AT A GLANCE

**Total Power**

1200 W

**# of Outputs**

Single

**Outputs**

24, 28, 48 VDC

PMBus® Power Management. Defined.

## SPECIAL FEATURES

- 1200 W full power at elevated temperatures
- Wide operating temperature range (-40°C to 85°C baseplate)
- Adjustable output voltage for CV mode
- Adjustable output current level for CC mode via CC_SET_POINT pin
- Operate as constant voltage source or constant current source via selector pin
- Remote output On/Off
- AC_OK; DC_OK signals
- 5 V standby voltage
- Active current share
- Conduction-cooled/fanless
- $I^2C$ / PMBus
- ITE Safety
- Active power factor correction
- Optional IP65 variant

## COMPLIANCE

- EMI Class B
- EN61000 Immunity

## SAFETY

- UL + CSA: IEC 62368-1
- Demko: IEC 62368-1
- CB Scheme: IEC 60950-1
  IEC 62368-1
- CCC
- CE Mark
- UKCA Mark

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## ELECTRICAL SPECIFICATIONS

| Input | |
|---|---|
| Input range | 90 to 264 VAC (Safety rating: 100 to 240 VAC)<br>1200 W at 180 to 264 VAC<br>800 W at 90 to 179 VAC |
| Frequency | 47 to 63 / 440 Hz (Safety rating: 50/60 Hz) |
| Input fusing | Single Fuse |
| EMI/RFI | FCC Class B, CISPR22/EN55022 Class B |
| Inrush current | ≤ 25 A peak at 264 VAC, 25°C ambient temperature, cold start, excluding X caps |
| Power factor | 0.99 typical |
| Harmonics | Meets EN61000-3-2 Class A and Class C[1] |
| Input current | < 8 Arms @ 180 VAC |
| Hold up time | 20 mS min for Main Output (230 VAC) @ 100% Load |
| Efficiency | Typical @ 230 VAC; 100% Load; 28 VDC 93.5% Efficiency at 40°C baseplate temperature (25°C ambient) |
| Leakage current | < 3.5 mA max per IEC 62368-1 Standard |
| Isolation voltage | PRI-SEC: 3,000 VAC<br>PRI-Chassis: 1,500 VAC<br>SEC-Chassis: 500 VDC |

[1] Meets Class C at 100% load.

## ELECTRICAL SPECIFICATIONS (CONTINUED)

| Output | | |
|---|---|---|
| Output Rating | See Ordering Information table | |
| Standby Output | 5.0 VDC @ 1.5 A Max | |
| Set Point | ± 0.5% | Factory set point |
| Total Regulation | Main Output: ± 2.0%<br>5 VSB: ± 5% | Combined Line / Load / Temperature |
| Rated Load | 1200 W maximum | 1200 W from -40°C to 85°C Baseplate Temp. |
| Minimum Load | 0 A | For both Main and 5 VSB Outputs |
| Output Voltage Adjust Range | See Ordering Information table | Max power limited to 1200 W |
| Output Noise | Main Output: 1.0% max p-p<br>5 VSB: 60 mV max p-p | Measured with 0.1 µF Ceramic and 10 µF Tantalum Cap, 20 MHz BW |
| Remote Sense | Compensation up to 500 mV | Pin 10: +Vout_RS / Pin4: -Vout_RS |
| Overcurrent Protection | 105 to 130% of full load current | The DC outputs shall be internally protected against output overload or short circuit applied to its output. Recovery must be automatic when the overload is removed. No damage shall result to the supply as the result of either short term or long term overloads of the outputs. To be measured under all line and load conditions. In case of continued Overload, main output will retry for 20 secs. After 20 secs retry, output will latch. Optional Constant Current mode supported up to the lowest output trim range. |
| Overvoltage Protection | 105 to 145% of Vo, nom Main Output<br>120 to 155% of 5 VSB | Latching / AC recyle or inhibit toggle required for PSU restart |
| Overtemperature Protection | > 95°C Baseplate temperature | Output shutdown / Auto-recovery |
| AC_OK | Open Collector; 0.8 VDC max / 10 mA | Active low when AC is present |
| DC_OK | Open Collector; 0.8 VDC max / 10 mA | Active low when Main Output is within regulation |
| Remote Inhibit | Contact closure | Pin 19: Open/Float = ON; Close/Ground = OFF |
| # Units in Parallel Operation | Qualified up to 3 units in parallel. Consult factory if more than 3 in parallel is required. | Pin 5: IShare pin for main output only. |
| Output dimming (adjustable current limit at CC mode) | 0-10 VDC external voltage;<br>0-100 kOhm external resistance | Consult with productsupport.ep@aei.com |

## ENVIRONMENTAL SPECIFICATIONS

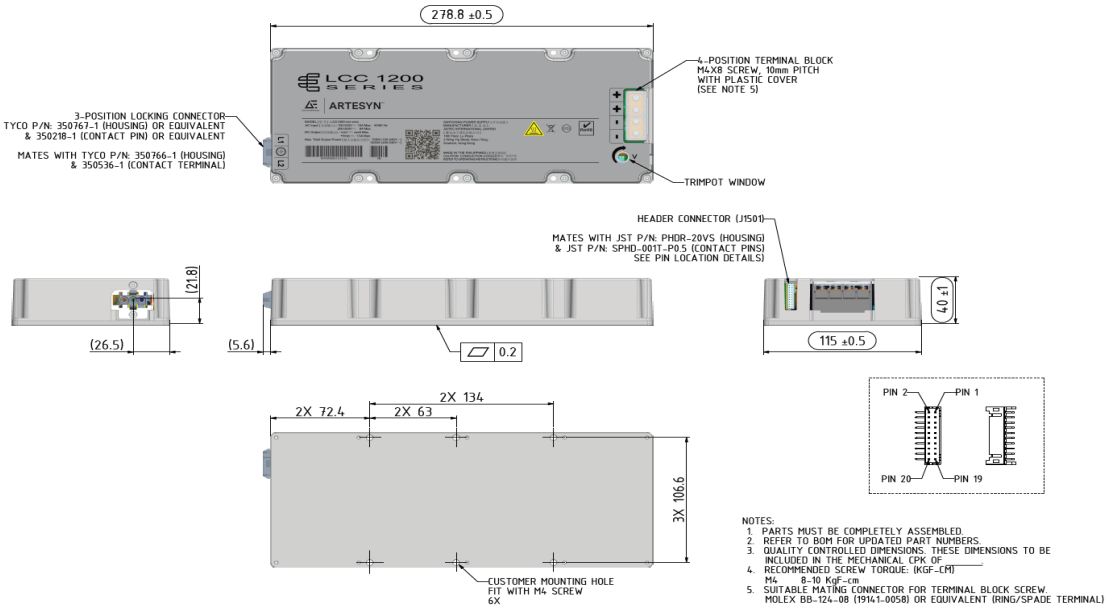
| | |
|---|---|
| Operating temperature range | -40°C to +85°C Baseplate temperature |
| Storage temperature | -40°C to +85°C |
| Humidity | 10% to 95% |
| Altitude | 16,402 ft (Operating) / 50,000 ft (Non-Operating) |
| Ingress protection | IP65 (for suffix "-4P") |
| MTBF (calculated) | >2M Hrs, 25°C per SR-332 Issue 3 |
| Electromagnetic immunity | Designed to meet EN61000-4-3, -4, -5, -8, -11 (Level 3); EN61000-4-2 (Level 4); EN55035 |

## ORDERING INFORMATION

| SERIES | Nominal Output Voltage | Trimming Range | | Setpoint | Pout, Max | Iout, Max | Output Ripple | Line/Load/ Temp Regulation | IP Rating |
|---|---|---|---|---|---|---|---|---|---|
| | | Minimum | Maximum | | | | | | |
| LCC1200-28U-4P | 28 V | 24 V | 30 V | ±0.5% | 1200 W | 42.9 A | 1.0% | 2.0% | IP65 |
| LCC1200-28U-9P | 28 V | 24 V | 30 V | ±0.5% | 1200 W | 42.9 A | 1.0% | 2.0% | IP20 |
| LCC1200-28U-4P24 | 24 V | 24 V | 24 V | ±0.5% | 1200 W | 50.0 A | 1.0% | 2.0% | IP65 |
| LCC1200-28U-9P24 | 24 V | 24 V | 24 V | ±0.5% | 1200 W | 50.0 A | 1.0% | 2.0% | IP20 |
| LCC1200-48U-4P | 48 V | 42 V | 57.6 V | ±0.5% | 1200 W | 25.0 A | 1.0% | 2.0% | IP65 |
| LCC1200-48U-9P | 48 V | 42 V | 57.6 V | ±0.5% | 1200 W | 25.0 A | 1.0% | 2.0% | IP20 |

## MECHANICAL DRAWINGS

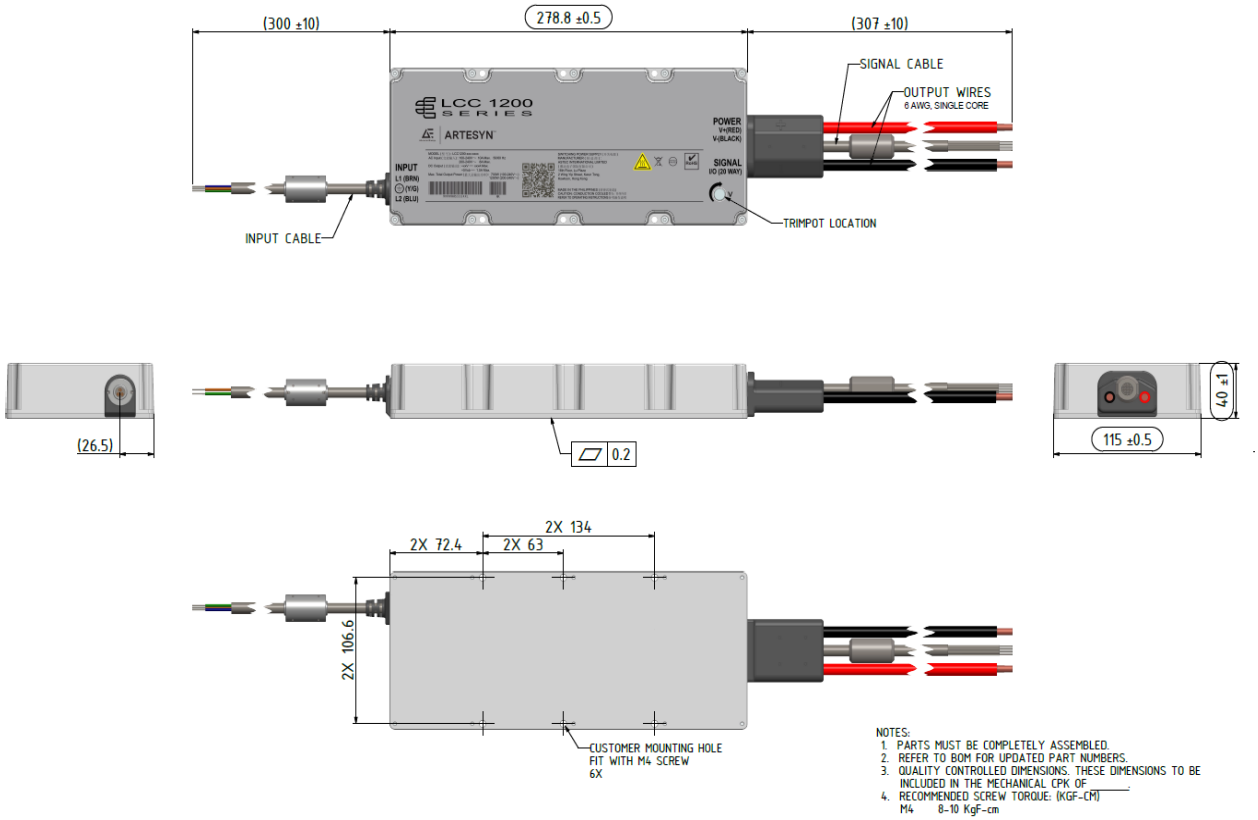
### -9P Suffix




*Weight: 9P Suffix: 1.8 kg typical
4P Suffix: 2.2 kg typical

## MECHANICAL DRAWINGS (CONTINUED)

### -4P Suffix




*Weight: 9P Suffix: 1.8 kg typical
4P Suffix: 2.2 kg typical

## PIN ASSIGNMENT (INPUT)

| | -9Px Suffix | | -4Px Suffix | |
|---|---|---|---|---|
| DESCRIPTION | DESIGNATION | NOTES | DESIGNATION | NOTES |
| Live | L1 | Mating Connector: 350766-1 (Housing); 350536-1 (Contact Terminals) | Brown | SJTW 18AWGX3C; PVC jacket; 105°C / 300 V |
| Neutral | L2 | | Blue | |
| Ground | G | | Y/GR | |

## PIN ASSIGNMENT (MAIN OUTPUT)

| | -9Px Suffix | | -4Px Suffix (48 VDC) | | -4Px Suffix (28 VDC) | |
|---|---|---|---|---|---|---|
| DESCRIPTION | DESIGNATION | NOTES | DESIGNATION | NOTES | DESIGNATION | NOTES |
| Main Output | +Vout | 4 Position Terminal Block: M4 Screw/10mm Pitch; 12kgf-cm Torque; Accepts 14-16AWG Ring Tongue - Spade Terminals MOLEX BB-124-08 (19141-0058) or EQUIVALENT | Red | 12AWGX2C; PVC jacket; 105°C / 300 V | Red | 6AWG Multi-Strand; PVC jacket; 105°C / 600 V |
| | | | Red | | | |
| Main Output Return GND | -Vout | | Black | | Black | |
| | | | Black | | | |

## PIN ASSIGNMENT

| J1501 - Signal & Control | | -9Px Suffix | | -4Px Suffix | |
|---|---|---|---|---|---|
| SIGNALS | DESCRIPTION | PIN # | NOTES | WIRE COLOR | NOTES |
| CC_CV_SELECT | Select between CC and CV Mode:<br>CC Mode - 0 V (Pull Low/Close)<br>CV Mode - 3.3 V (Pull High/Open) | 1 | J1501 Mating Connector: JST PN PHDR-20VS<br><br>Contact Pins: JST PN SPHD-001T-P0.5 | BLACK | 26AWGX20C+AL; PVC Jacket; 105°C / 300 V |
| GND | Ground | 2 | | BROWN | |
| A1 | I²C Bit Address | 3 | | RED | |
| -VOUT_RS | Remote Sense Return (Main O/P) | 4 | | ORANGE | |
| ISHARE | Load Share Voltage | 5 | | YELLOW | |
| A0 | I²C Bit Address | 6 | | GREEN | |
| SDA | Serial Data Signal ($I^2C$) | 7 | | BLUE | |
| CC_SET_POINT | Constant Current Level Adjust | 8 | | VIOLET | |
| SCL | Serial clock Signal ($I^2C$) | 9 | | GRAY | |
| +VOUT_RS | Remote Sense Positive (Main O/P) | 10 | | WHITE | |
| 5VSB | 5 V Standby (1.5 A Maximum) | 11 | | PINK | |
| 5VSB_RET | 5 V Standby Return | 12 | | LIGHT BLUE | |
| 5VSB_SENSE | For Factory Use | 13 | | WHITE/VIOLET | |
| G_DCOK_C | Global DC_OK Collector | 14 | | WHITE/YELLOW | |
| RESERVE | RESERVE | 15 | | WHITE/ORANGE | |
| G_DCOK_E | Global DCOK Emitter (GND) | 16 | | WHITE/BLACK | |
| GND | Return Ground (for the output signal and I²C communication) | 17 | | WHITE/RED | |
| G_ACOK_C | Global AC_OK Collector | 18 | | WHITE/BROWN | |
| INH_EN # | Output Inhibit_Enable Pin (turns output off) | 19 | | WHITE/GREEN | |
| RESERVE | RESERVE | 20 | | WHITE/BLUE | |

## POWER DERATING CURVES

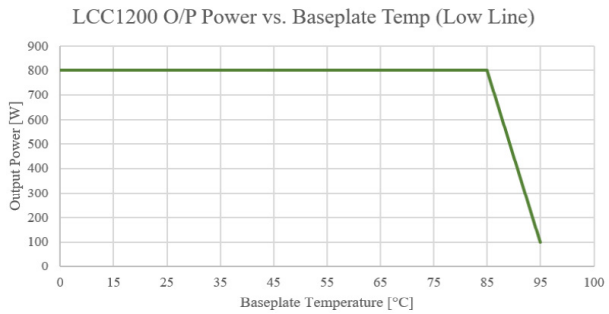



Figure 1. Output Power vs. Baseplate Temperature (90 VAC to 179 VAC)

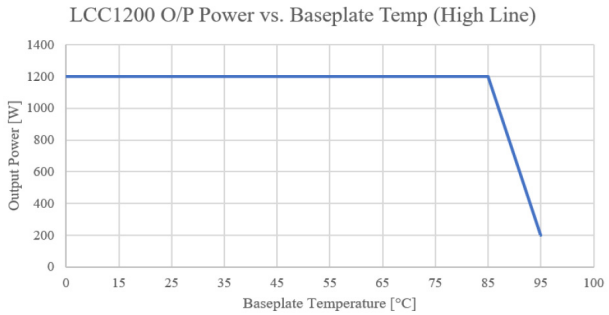



Figure 2. Output Power vs. Baseplate Temperature (180 VAC to 264 VAC)

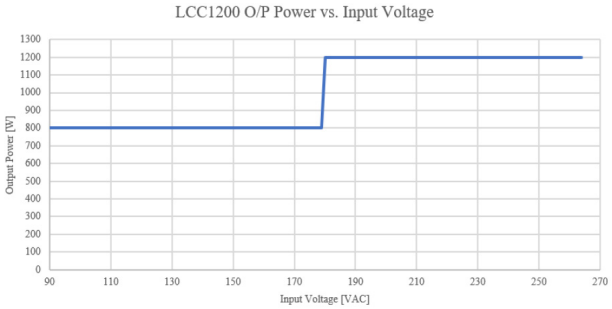



Figure 3. Output Power vs. Input Voltage

## EFFICIENCY CURVES

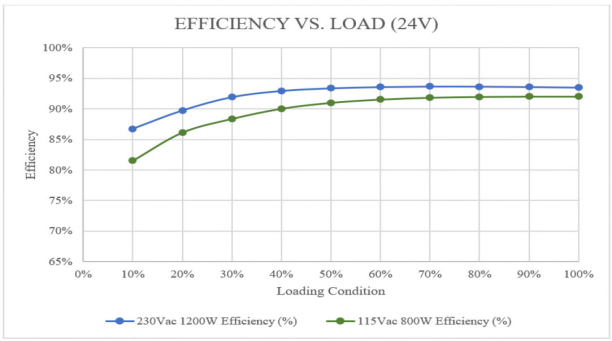



Figure 4. Efficiency Curves for LCC1200-28U with 24 V Output

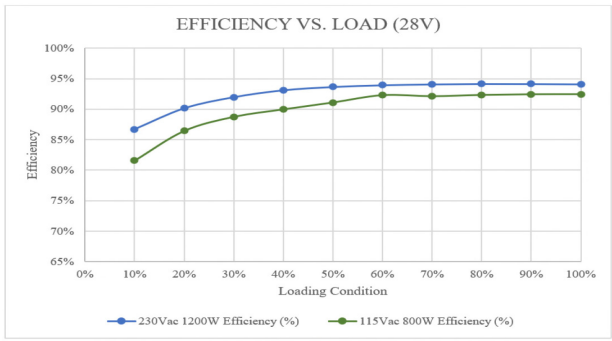



Figure 5. Efficiency Curves for LCC1200-28U with 28 V Output

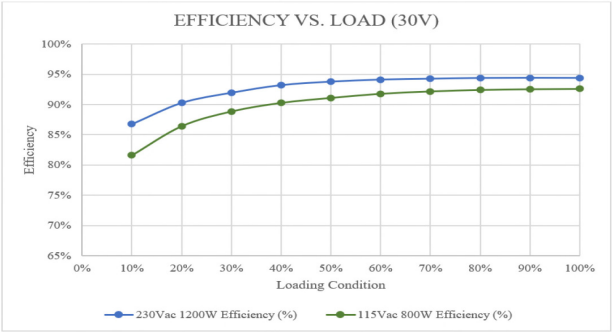



Figure 6. Efficiency Curves for LCC1200-28U with 30 V Output

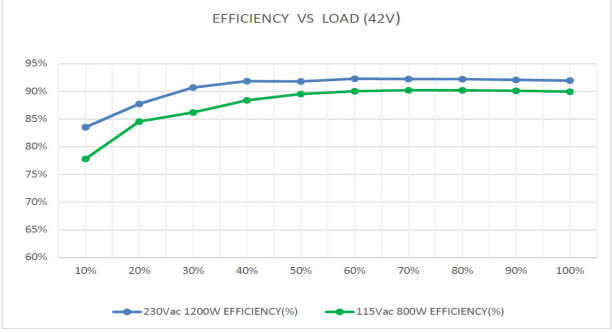



Figure 7. Efficiency Curves for LCC1200-48U with 42 V Output

## EFFICIENCY CURVES

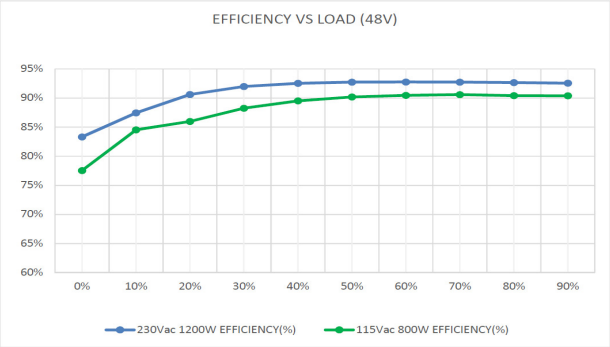
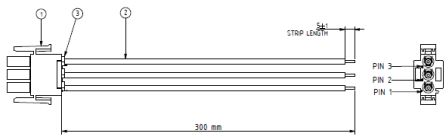
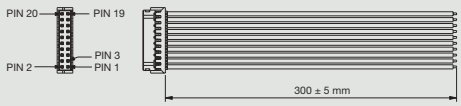
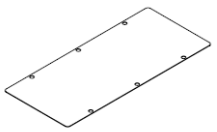
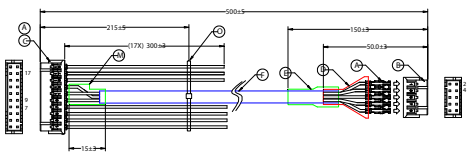



Figure 8. Efficiency Curves for LCC1200-48U with 48 V Output




Figure 9. Efficiency Curves for LCC1200-48U with 57.6 V Output

## ACCESSORIES

| Orderable Part Number | Description | Diagram/Picture |
|---|---|---|
| 70-841-030 | For Suffix "-9P" AC Input Mating Connector Cable Assembly (w/ 0.3 m wire length) |  |
| 73-788-001 | J1501 (20 Pin Control Signal) Mating Connector with 0.3 m wires attached for "-9P" suffix |  |
| 70-841-037 | Pre-Cut thermal insulator (Laird TFLEX HR220FG) |  |
| 73-769-002 | USB to I²C High Speed Adaptor for PMBus Communication |  |
| 73-769-007 | J1501 (20 Pin) Mating connector with 10 Pin header termination for use with 73-769-002 |  |

## ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than four decades to perfecting power for its global customers. AE designs and manufactures highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes.

Our products enable customer innovation in complex applications for a wide range of industries including semiconductor equipment, industrial, manufacturing, telecommunications, data center computing, and medical. With deep applications know-how and responsive service and support across the globe, we build collaborative partnerships to meet rapid technological developments, propel growth for our customers, and innovate the future of power.

PRECISION | POWER | PERFORMANCE | TRUST

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