



PRODUCT OVERVIEW

The D2U5T-H3-5000-380-HU3C is a High Efficiency 3500/5000 watt, power factor corrected three phase power supply for 230/480Vac lines with a 380V high voltage (HVDC) main output and a selectable 5V or 3.3V (20W) standby. The unit is provided with Droop Sharing and up to three (3) power modules may be operated in parallel.

The power module is hot pluggable. The module is able to protect and recover from over temperature faults, and has status LEDs on the front panel and additional logic and PMBus status signals.

Their 2U package and >16.5W/cubic inch power density make them ideal for delivering reliable, efficient power to servers, workstations, storage systems and other 380V HVDC distributed power systems. An optional power shelf is also available that accommodates up to three (3) power modules.

FEATURES

- 5KW (480Vac), 3.5KW (230Vac) Output Power
- Very High Efficiency; 95.4% @ 50% FL
- 380V High Voltage Main Output
- 3.3V or 5V Standby Output
- Nominal Dim's: 5.1"(W) x 18"(L) x 3.3" (2U)
- 16.5 watts/cubic inch power density
- N+1 redundant (including hot docking)
- Droop sharing on Main Output
- Over-voltage, over-current, over-temperature protections
- Internal cooling fan
- I2C Bus Interface with status indicators
- Optional 19" power shelf
- RoHS compliant
- Two-year warranty



Available now at:
www.murata-ps.com/en/3d/acdc.html



ORDERING GUIDE

| Model Number | Power | Main Output | Standby Output | Airflow |
|------------------------|-------|-------------|-------------------------|---------------|
| D2U5T-H3-5000-380-HU3C | 5000W | 380V | 3.3V or 5V (Selectable) | Front to Back |

INPUT CHARACTERISTICS

| Parameter | Conditions | Min | Typ | Max | Units |
|-------------------------------|-----------------------|-----|-------|-----|-------|
| Input Frequency | | 47 | 50/60 | 63 | Hz |
| Input Voltage Operating Range | Range 1 | 180 | | 264 | Vac |
| | Range 2 | 320 | | 528 | Vac |
| Turn-on Voltage (Ramp-up) | Range 1 | | 170 | | Vac |
| | Range 2 | | 280 | | Vac |
| Turn-off Voltage (Ramp-down) | Range 1 | | 150 | | Vac |
| | Range 2 | | 260 | | Vac |
| Maximum Input Current | | | 13 | | Arms |
| Inrush Current | Cold Start | | | 30 | Apk |
| Power Factor, Range 1, 60Hz | 600W, 230 Vac | | 0.992 | | |
| | 1750W (50%), 230 Vac | | 0.998 | | |
| | 3500W (100%), 230 Vac | | 0.998 | | |
| Power Factor, Range 2, 60Hz | 600W, 480 Vac | | 0.910 | | |
| | 2500W (50%), 480 Vac | | 0.995 | | |
| | 5000W (100%), 480 Vac | | 0.995 | | |

OVERALL CHARACTERISTICS

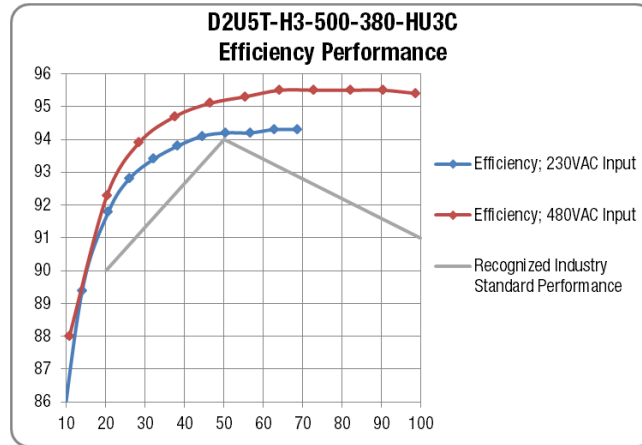
| Parameter | Conditions | Min | Typ | Max | Units |
|---------------------|----------------------|-----|------|------|-------|
| Output Power | Range 1 | | | 3500 | W |
| | Range 2 | | | 5000 | |
| Efficiency, Range 1 | 700W (20%), 230Vac | | 89.5 | | % |
| | 1750W (50%), 230Vac | | 93.6 | | |
| | 3500W (100%), 230Vac | | 94.2 | | |
| Efficiency, Range 2 | 500W (20%), 230Vac | | 92.6 | | % |
| | 2500W (50%), 230Vac | | 95.4 | | |
| | 5000W (100%), 230Vac | | 95.4 | | |

The following curves represent the achieved efficiency performance for the D2U5T-H3-5000-380-Hu3C product compared against a recognized industry standard for efficiency rating.

The D2U5T-H3-5000-380-HU3C offers performance in excess of the industry standard limit as a required percentage of loading.

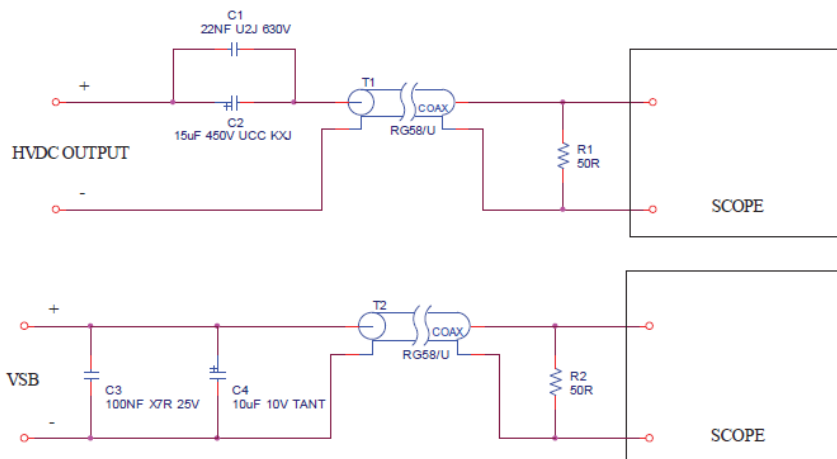
Test methodology as per Ecova Generalized Test Protocol for Calculating the Energy Efficiency of Internal AC-DC and DC-DC Power Supplies Revision 6.7

EFFICIENCY PERFORMANCE CURVES



OUTPUT VOLTAGE CHARACTERISTICS

| Output | Parameter | Conditions | Min | Typ | Max | Units | |
|-------------------------------------|-------------------------------------|-----------------------------|------|------|-------|-------------------|-----------------|
| 380V | Output Current | Range 1 | 0 | | 9.2 | A _{dc} | |
| | | Range 2 | 0 | | 13.34 | | |
| | Voltage Set Point | @4.6A Range 1 | | | 380 | | V _{dc} |
| | | @6.67A Range 2 | | | 380 | | |
| | Voltage Droop | Min to Max Current, Range 1 | | | 7 | | |
| | | Min to Max Current, Range 2 | | | 11 | | |
| | Line Regulation | | | | 0.1 | | % |
| Ripple Voltage & Noise ¹ | | | | 1 | | V _{p-p} | |
| 3.3VSB | Load Capacitance | | 100 | | 1000 | μF | |
| | | | | | | | |
| | Voltage Set Point | | | 3.3 | | V _{dc} | |
| | Line and Load Regulation | | 3.14 | | 3.46 | | |
| | Ripple Voltage & Noise ² | 20MHz Bandwidth | | | 75 | mV _{p-p} | |
| 5VSB | Output Current | | 0 | | 6 | A | |
| | | | 20 | | 1000 | μF | |
| | Load Capacitance | | | | | | |
| | Voltage Set Point | | | 5 | | V _{dc} | |
| | Line and Load Regulation | | 4.76 | | 5.24 | | |
| Ripple Voltage & Noise ² | 20MHz Bandwidth | | | | 100 | mV _{p-p} | |
| | | | | | | | |
| | | | | | | | |
| Output Current | | 0 | | 4 | A | | |
| | | 20 | | 1000 | μF | | |



¹ Ripple and noise are measured with 22nF (U2J 630V) ceramic + 15 μF (UCC KXJ) of electrolytic de-coupling capacitors at the output connector load side. A short coaxial cable with 50ohm scope termination is used.

² Ripple and noise are measured with 0.1 μF of ceramic capacitance and 10 μF of tantalum capacitance across the power supply outputs at the output connector load side. A short coaxial cable with 50ohm scope termination is used.

OUTPUT CHARACTERISTICS

| Parameter | Conditions | Min | Typ | Max | Units |
|--|--|-----|-----|-------|-------|
| Startup Time | AC ramp up | | | 3 | s |
| Transient Response | 380V, 50-100% load step, 0.1A/μs di/dt | | 15 | | Vp-p |
| | 5VSB, 50-100% load step, 1A/μs di/dt | | 250 | | mVp-p |
| | 3.3VSB, 50-100% load step, 1A/μs di/dt | | 165 | | mVp-p |
| Current sharing accuracy (up to 3 in parallel) | 380V @100% load | | | +/-10 | % |
| Hot Swap Transients | All outputs within regulation | | | | |
| Holdup Time | 380V @100% load | 25 | | | ms |
| | VSB @100% Load | 500 | | | |

GENERAL CHARACTERISTICS

| Parameter | Conditions | Min | Typ | Max | Units |
|-----------------------------|---|------|------|-----|-------|
| Storage Temperature Range | | -40 | | 70 | °C |
| Operating Temperature Range | | -15 | | 50 | °C |
| Operating Humidity | Non-condensing | 10 | | 90 | % |
| Storage Humidity | Non-condensing | 5 | | 90 | % |
| Altitude | (Without derating at 40°C) | | 3000 | | m |
| | (Without derating at 50°C) | | 1800 | | |
| Shock | 30G non-operating | | | | |
| Sinusoidal Vibration | 0.5G, 5 – 500 Hz | | | | |
| MTBF | Calculated per Telcordia SR-332 @40°C | 220K | | | hrs |
| Weight | | | 7 | | kg |
| Safety Approvals | CAN/CSA C22.2 No 60950-1-07, Am.1:2011, Am 2:2014 ANSI/UL 60950-1-2014 IEC60950-1:2005 (2nd Ed.), Am 1:2009 + Am 2:2013 EN 60950-1:2006+A11:2009 +A1:2010 +A12:2011 +A2:2013 | | | | |
| Input Fuses | Power Supply has one internal 16A/500V fast blow fuse on each of the three AC line inputs. | | | | |
| Material Flammability | UL 94V0 | | | | |

PROTECTION CHARACTERISTICS

| Output | Parameter | Conditions | Min | Typ | Max | Units |
|--------|---------------------------|--------------------|-----|-----|-----|-------|
| 380V | Over-temperature (intake) | Auto-restart | 57 | 60 | 63 | °C |
| | Over Voltage | Latching | 418 | | 445 | V |
| | Over Current Range 1 | Hiccup or Latching | 105 | | 130 | % |
| | Over Current Range 2 | Hiccup or Latching | 105 | | 130 | % |
| 3.3VSB | Over Voltage | Latching | 3.9 | | 4.3 | V |
| | Over Current | Hiccup | 6.3 | | 9 | A |
| 5VSB | Over Voltage | Latching | 5.6 | | 6.0 | V |
| | Over Current | Hiccup | 4.2 | | 6 | A |

| EMISSIONS AND IMMUNITY | | |
|---|---------------------|--|
| Characteristic | Standard | Compliance |
| Input Current Harmonics | IEC/EN 61000-3-2 | Complies |
| Conducted Emissions | FCC 47 CFR Parts 15 | Class A, 6dB margin |
| Radiated Emissions (in the application) | CISPR 22 EN55022 | Class A, 6dB margin |
| ESD Immunity | IEC/EN 61000-4-2 | Level 3 criteria A |
| Radiated Field Immunity | IEC/EN 61000-4-3 | Level 3 criteria B |
| Electrical Fast Transients/Burst Immunity | IEC/EN 61000-4-4 | Level 3 criteria A |
| Surge Immunity | IEC/EN 61000-4-5 | Level 3 criteria A |
| RF Conducted Immunity | IEC/EN 61000-4-6 | Level 3 criteria A |
| Magnetic Field Immunity | IEC/EN 61000-4-8 | 3 A/m criteria B |
| Voltage Dips & Interruptions | IEC/EN 61000-4-11 | 400Vrms Input Voltage 54V & VSB Outputs, Performance a) 100% load, Phase 0°, Dip 100% Duration 10ms 50% load, Phase 0°, Dip 100% Duration 20ms 54V & VSB Outputs, Performance b) 100% load, Phase 0°, Dip 100% Duration >10ms Any Load, Phase 0°, Dip 100% Duration >100ms |
| Voltage imbalance (Circuit will stop when input voltage imbalance exceeds 8% for more than 100ms. Unit will restart when imbalance returns below 8%) | | Any valid Input Voltage, any load 54V & VSB Outputs, Performance a) Dip 30% on single Phase or Line, Duration 100ms 54V & VSB Outputs, Performance b) Dip 30% on single Phase or Line, Duration >100ms |

| ISOLATION CHARACTERISTICS | | | | | |
|---------------------------------------|------------------------------|------|-----|-----|-------|
| Parameter | Conditions | Min | Typ | Max | Units |
| Insulation Safety Rating/Test Voltage | Input to Output – Reinforced | 3000 | | | Vrms |
| | Input to Chassis – Basic | 1500 | | | Vrms |
| | Output to Chassis – Basic | 1150 | | | Vrms |




| STATUS INDICATORS (LEDs) | | | |
|--|---|----------------------|----------------------|
| Status Indicators | Input OK (Green) | Output OK (Green) | Fault4 (Yellow) |
| AC input voltage is not present | Off | Off | Off |
| AC present and within the required operational range Standby – ON; Main Output – OFF (disabled) | Solid Green | Blinking | Off |
| AC present, but its level is not within the required operational range | Blinking Green at 1Hz rate (0.5s on, 0.5s off) | Off | Off |
| When hot-unplugging the power supply from a power shelf ³ | Blinking Green at 1Hz rate (0.5s on, 0.5s off) | Off | Off |
| AC present and within the required operational range Standby – ON and within the specified regulation range Main Output – ON and within the specified regulation range | Solid Green | Solid Green | Off |
| AC present and within the required operational range Standby – ON and within the specified regulation range Main Output – ON and within the specified regulation range Power supply is in a power limit or in an overcurrent condition. | Solid Green | Solid Green | On |
| Any warning Levels (Input UV/OV, OC, Inlet Temp, Output and STBY OV/UV, OC, OTP, FAN) | No Change | No Change | Blinking 1Hz |
| Any Fault Levels (Input UV/OV, OC, Inlet Temp, Output and STBY OV/UV, OC, OTP, FAN) | Depends on PS Status | Depends on PS Status | Depends on PS Status |

³ The Input OK LED blinks to indicate that there is still energy inside the power supply until the input bulk capacitors are completely discharged or the housekeeping circuit is shut down.

⁴ The Fault LED and PS Fault signal shall be turned on to indicate that there is one or more of the following internal faults currently detected inside the power supply:

- VSB out of range
- Output stage OT
- Fan fault
- ORING fault (Output voltage less than bus voltage)
- OC shutdown
- OT shutdown
- OV shutdown
- Input stage OT
- Fault induced shutdown occurred
- Thermal sensor fault
- Vout out of range
- PFC Boost Vbulk fault

As soon as all of the above faults are removed and the power supply operates normally, the Fault LED and PS Fault signal shall be turned off. LED Definition: Three LEDs shall be located on the front faceplate; these are:

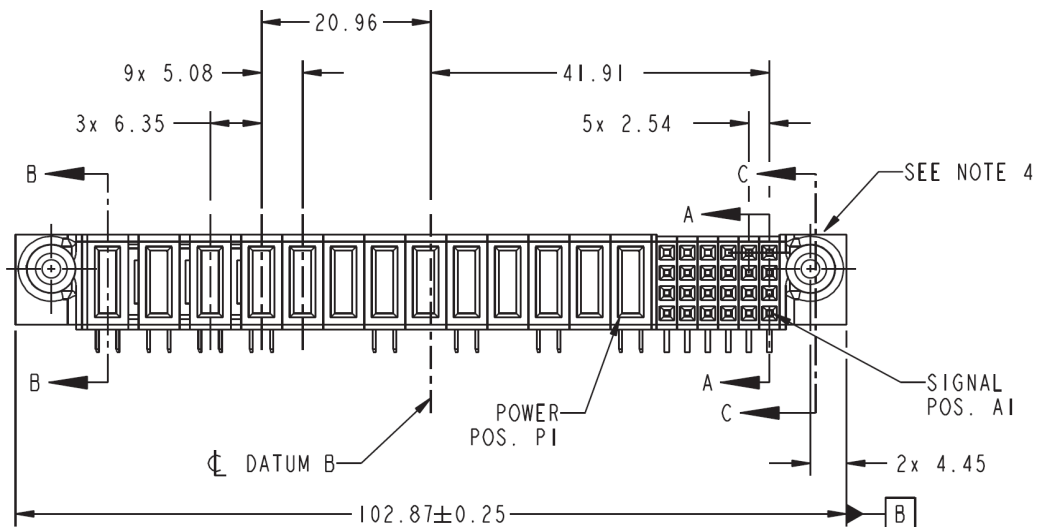
| LED | Status |
|---|----------------|
|  | Input OK = ON |
|  | Output OK = ON |
|  | Fault = ON |

| Control Signals | |
|-----------------|---|
| Signal (I/O) | Description |
| PS_ON_H | Internal 10K pull-up resistor to internal VDD. ⁵ <ul style="list-style-type: none"> ■ Leaving signal pin open = Main Output ON ■ Tying signal pin to GND = Main Output OFF. |
| PS_KILL | Short pin; internal 10K pull-up resistor to internal VDD. ⁵ <ul style="list-style-type: none"> ■ Leaving signal pin open = All Outputs off ■ Tying signal pin to GND = All Outputs enabled. |
| PS_FAULT_L | Internal 10K pull-up resistor to internal VDD. ⁵ <ul style="list-style-type: none"> ■ PSU Fault Status |
| PWR_GOOD_H | Internal 10K pull-up resistor to internal VDD. ⁵ <ul style="list-style-type: none"> ■ Main Output Status OK |
| STBY_SEL_IN | Internal 10K pull-up resistor to internal VDD. ⁵ <ul style="list-style-type: none"> ■ Leaving signal pin open = +5VSTBY ■ Tying signal pin to GND = +3V3STBY |
| AC_OK_H | Internal 10K pull-up resistor to internal VDD. ⁵ <ul style="list-style-type: none"> ■ AC OK Status |
| SMB_ALERT_L | Internal 10K pull-up resistor to internal VDD. ⁵ <ul style="list-style-type: none"> ■ SMB Alert signal output |

⁵VDD depends on Standby Voltage selection of either 3.3V or 5V.

OUTPUT CONNECTOR

Connector: FCI Power Blade Part # 51915-424



| ROW S | POWER | | | | | | | | | | | | | | SIGNAL | | | | | E1 | |
|-------|-------|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|--------|---|---|---|---|----|---|
| | E2 | P13 | P12 | P11 | P10 | P9 | P8 | P7 | P6 | P5 | P4 | P3 | P2 | P1 | 6 | 5 | 4 | 3 | 2 | | 1 |
| D | | | | | | | | | | | | | | | | | | | | | |
| C | | | | | | | | | | | | | | | | | | | | | |
| B | | | | | | | | | | | | | | | | | | | | | |
| A | | | | | | | | | | | | | | | | | | | | | |

OUTPUT CONNECTOR & SIGNAL PIN ASSIGNMENT

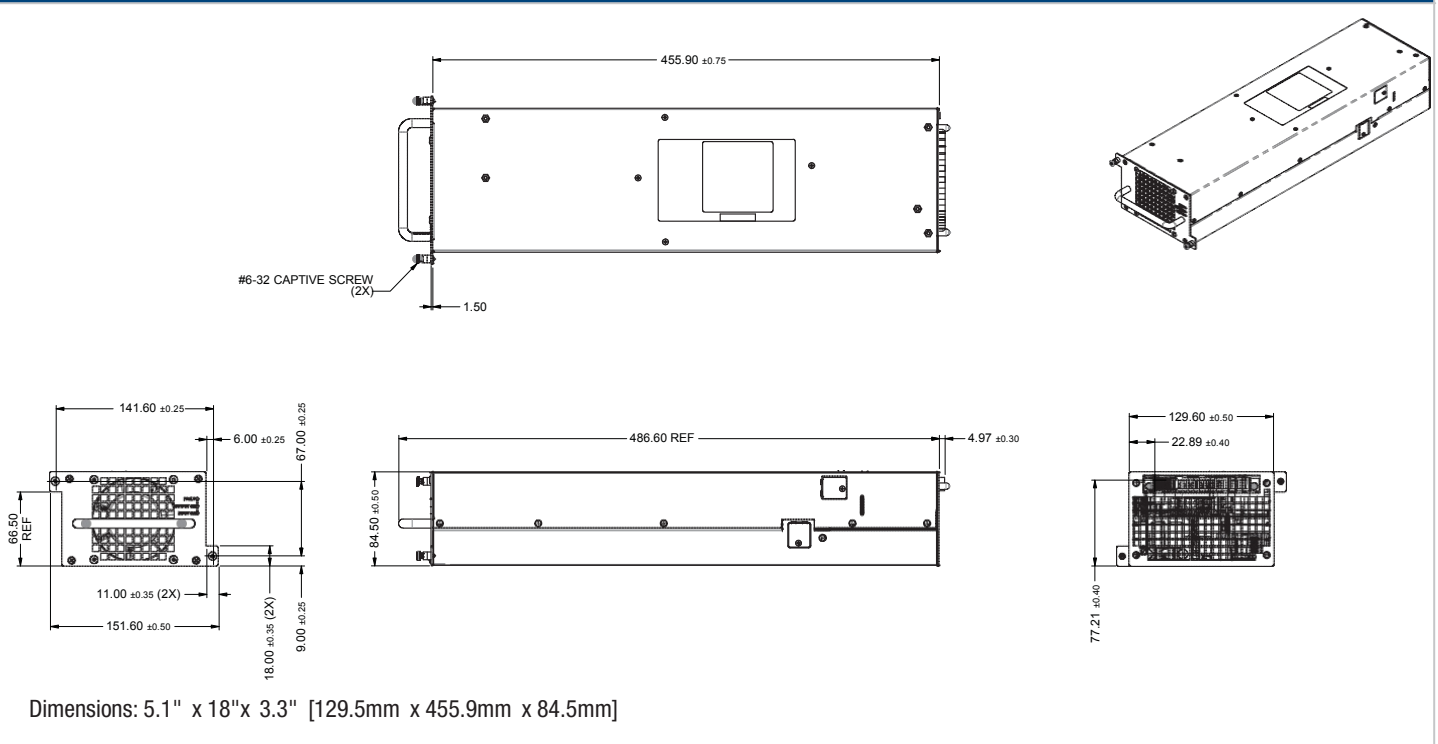
Connector: FCI Power Blade Part # 51915-424

| Power Blade Number | Signal | Function | Signal Direction |
|--------------------|------------------|---|------------------|
| P13 | -VOUT_PRE-CHARGE | Hot Swap Pre Charge | Output |
| P12 | -VOUT | 380Vdc Return | Output |
| P11 | +VOUT_PRE-CHARGE | Hot Swap Pre Charge | Output |
| P10 | +VOUT | 380Vdc | Output |
| P9 | Not fitted | - | - |
| P8 | Not fitted | - | - |
| P7 | AC1 | AC Line Voltage Ph 1 | Input |
| P6 | Not fitted | - | - |
| P5 | AC2 | AC Line Voltage Ph 2 | Input |
| P4 | Not fitted | - | - |
| P3 | AC3 | AC Line Voltage Ph 3 | Input |
| P2 | Not fitted | - | - |
| P1 | GND | Safety Ground | Input |
| Signal Pin Number | Signal | Function | Signal Direction |
| A1 | A1 | I2C Address Bit 1 Signal | Input |
| A2 | PS_FAULT_L | PSU Fault Status | Output |
| A3 | A0 | I2C Address Bit 0 Signal | Input |
| A4 | PS_PRESENT | PSU Seated into Connector | Output |
| A5 | SCL | I2C Clock Signal | Bi-Directional |
| A6 | SGND | Signal ground (return) | Output |
| B1 | A2 | I2C Address Bit 2 Signal | Input |
| B2 | PS_ON_H | Enable PSU | Input |
| B3 | +VSB | +3.3V/5V STBY Out | Output |
| B4 | SDA | I2C Data Signal | Bi-Directional |
| B5 | PS_KILL | Enable PSU Shortest pin of the connector | Input |
| B6 | VSB_RTN | VSTBY_RTN | Output |
| C1 | STBY_SEL_IN | Selects +3V3 or +5VSTBY | Input |
| C2 | AC_OK_H | AC(DC) OK Status | Output |
| C3 | +VSB | +3.3V/5V STBY Out | Output |
| C4 | +VSB | +3.3V/5V STBY Out | Output |
| C5 | VSB_RTN | VSTBY_RTN | Output |
| C6 | VSB_RTN | VSTBY_RTN | Output |
| D1 | SMB_ALERT_L | SMB Alert signal output | Output |
| D2 | PWR_GOOD_H | Power OK Status | Output |
| D3 | +VSB | +3.3V/5V STBY Out | Output |
| D4 | +VSB | +3.3V/5V STBY Out | Output |
| D5 | VSB_RTN | VSTBY_RTN | Output |
| D6 | VSB_RTN | VSTBY_RTN | Output |

MATING CONNECTOR

| Supplier | Press Fit, Straight | Press Fit, Right Angle | Solder Straight | Solder Right Angle |
|----------|---------------------|------------------------|-----------------|--------------------|
| FCI | | | | 51938-826LF |

MECHANICAL DIMENSIONS



OPTIONAL ACCESSORIES

| Description | Part Number |
|-------------------------------------|----------------|
| 12V D2U5T-380 Output Connector Card | D2U5T-380-CONC |

APPLICATION NOTES

| Document Number | Description | Link |
|-----------------|---|---|
| ACAN-62 | D2U5T-380-CONC Customer Interface Connector Card | http://power.murata.com/datasheet/?/data/apnotes/acan-62.pdf |
| ACAN-63 | PMBus™ Communication Protocol for: D2U5T-H3-5000-380-Hu3C | http://power.murata.com/datasheet/?/data/apnotes/acan-63.pdf |

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- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



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