



FEATURES

- RoHS compliant
- 2800W (220Vac) Output Power
- -52V Main output, 12V standby output
- 1U sized; dimensions 11.5"x5.5"x1.6"
- 27.7 Watts per cubic inch density
- N+1 redundancy capable, including hot-docking
- Active current sharing or droop current sharing
- Over-voltage, over-current, over-temperature protection
- Internal cooling fans
- I²C Bus interface with status indicators
- Optional 1U x 19" power-shelf

PRODUCT OVERVIEW

The D1U-H-2800 is a 2800 Watt, power-factor-corrected (PFC) front-end power supply for hot-swapping redundant systems. The main output is -52V and standby output of 12V. Packaged in 1U low profile, it is designed to deliver reliable bulk power to telecom systems or any -52V distributed power architecture systems requiring high power density. The highly efficient electrical and thermal design with internal cooling fans supports reliable operation conditions. The D1U-H-2800 is designed to auto-recover from over-current and over-temperature faults. Status information is provided with front panel LEDs, logic signals and I²C management interface. Three units can be packaged into an optional 19" 1U power shelf to provide up to 8.4kW of power.

SELECTION GUIDE

| Part Number | Power Output High Line AC | Main Output | Standby Output | Airflow | Current Share |
|---------------------|---------------------------|-------------|----------------|---------------|---------------|
| D1U-H-2800-52-HB1C | 2800W | -52V | 12V | Front to back | Active |
| D1U-H-2800-52-HB1DC | 2800W | -52V | 12V | Front to back | Droop |

INPUT CHARACTERISTICS

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|-------------------------------|----------------------------|------|------|------|-------|
| Input Voltage Operating Range | | 170 | | 264 | Vac |
| Input Frequency | | 47 | 55 | 63 | Hz |
| Turn-on Input Voltage | Ramp up | 160 | | 170 | Vac |
| Turn-off Input Voltage | Ramp down | 155 | | 165 | Vac |
| Maximum Rated Input Current | 200VAC | | | 16 | Arms |
| Inrush Current | Cold start | | | 50 | Apk |
| Inrush Current | Cold start between 0-1msec | | | 100 | Apk |
| Power Factor | Output load >90% | 95% | | | |
| | Output load >50% | 75% | | | |

OUTPUT VOLTAGE CHARACTERISTICS

| Output Voltage | Parameter | Conditions | Min. | Typ. | Max. | Units |
|----------------|----------------------------|-----------------|-------|------|-------|--------|
| -52V | Voltage Set Point Accuracy | | | -52 | | Vdc |
| | Line and Load Regulation | | 51.48 | | 52.52 | |
| | Ripple Voltage & Noise | 20MHz Bandwidth | | | 520 | mV p-p |
| | Output Current | | 1 | | 54 | A |
| | Load Capacitance | | | | 6800 | µF |
| 12Vsb | Voltage Set Point Accuracy | | | 12 | | Vdc |
| | Line and Load Regulation | | 11.2 | | 12.4 | |
| | Ripple Voltage & Noise | | | | 120 | mV p-p |
| | Operating Range | | 0 | | 0.5 | A |
| | Load Capacitance | | | | 1000 | µF |

¹ Ripple and noise are measured with 0.1 µF of ceramic capacitance and 10 µF of tantalum capacitance on each of the power supply outputs. The output noise requirements apply over a 0 Hz to 20 MHz bandwidth. A short coaxial cable with 50ohm scope termination is used.



| OUTPUT CHARACTERISTICS | | | | | |
|--|--|------|------|-------|-------|
| Parameter | Conditions | Min. | Typ. | Max. | Units |
| Remote Sense | Per rail | | 250 | | mV |
| Efficiency | 220Vac | | 91.6 | | % |
| Output Rise Monotonicity | Overshoot less than 10% for all outputs, no voltage negative between 10% to 95% during ramp up | | | | |
| Start-up Time | AC ramp up | | 1.5 | | s |
| | PS_On activated | | 150 | | ms |
| Transient Response | -52V Ramp 1A/ms | | | ±2080 | mV |
| | 12Vsb Ramp 1A/ms | | | ±600 | |
| Current sharing accuracy (up to 3 in parallel) | At 100% load | | | ±10 | % |
| Hot Swap Transients | All outputs within regulation | | | | |
| Hold-up Time | | 15 | 19 | | ms |

| GENERAL CHARACTERISTICS | | | | | |
|-----------------------------|--|------|------|------|---------|
| Parameter | Conditions | Min. | Typ. | Max. | Units |
| Storage Temperature Range | Non-condensing | -40 | | 70 | °C |
| Operating Temperature Range | | 0 | | 50 | |
| Operating Humidity | Non-condensing | 10 | | 90 | % |
| Storage Humidity | | 5 | | 90 | |
| Shock | 30G non operating | | | | |
| Sinusoidal Vibration | 0.5G, 5 – 500 Hz | | | | |
| MTBF | Calculated per Bellcore at Ta=30°C | 200 | | | Khrs |
| | Demonstrated | 200 | | | Khrs |
| Acoustic | ISO 7779-1999 | | | 60 | dB LpAm |
| Safety Approvals | C-CSA-US (CSA 60950-1-03/UL60950-1, first edition), CE Mark | | | | |
| Input Fuse | Power Supply has internal 20A/250V fast blow fuse on the AC line input | | | | |
| Material Flammability | UL 94V-0 | | | | |
| Switching Frequency | 95KHz for Boost PFC Converter 145KHz for Main Output Converter 200KHz for Standby Output Converter | | | | |
| Weight | 2.3kg | | | | |

| PROTECTION CHARACTERISTICS | | | | | | |
|----------------------------|------------------|--------------|------|------|------|-------|
| Output Voltage | Parameter | Conditions | Min. | Typ. | Max. | Units |
| -52V | Over-temperature | Auto-restart | 55 | | 65 | °C |
| | Over Voltage | Latching | 55 | | 60 | V |
| | Over Current | Auto-restart | 56 | | 62 | A |
| 12Vsb | Over Voltage | Latching | 13 | | 14 | V |
| | Over Current | Latching | 0.7 | | 0.9 | A |

| 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 |
| Isolation | Output to Chassis | | | | |
| | Output to Output | | | | |
| Material Flammability | UL 94V-0 | | | | |
| Grounding | Main Output Return and Standby Output Return are connected internally to chassis. | | | | |

CONTROL SIGNALS

| Status | Conditions | Description |
|--------|-----------------|-----------------------|
| LED | Off | No AC input to all PS |
| | Flashing Yellow | Power Supply Failure |
| | Flashing Green | Main Output Absent |
| | Green | Power Supply Good |

FANS MONITORING

| Status | Conditions | Description |
|--|-------------------------------------|-----------------------------------|
| Fans monitoring is available through the I2C interface | Both fans running normally | PS_Fault0 bits 3 and 4 set to "0" |
| | One fan failed (or rotor locked) | PS_Fault0 bit 4 set to "1" |
| | Both fans failed (or rotors locked) | PS_Fault0 bits 3 and 4 set to "1" |

EMISSIONS AND IMMUNITY

| Characteristic | Description | Criteria |
|----------------------------------|--------------------------------------|---|
| Harmonics | IEC/EN 61000-3-2 | |
| Voltage Fluctuation and Flicker | IEC/EN 61000-3-3 | |
| Emission Conducted | FCC 47 CFR Parts 15/CISPR 22/EN55022 | Class A, 6dB margin |
| Emission Radiated | FCC 47 CFR Parts 15/CISPR 22/EN55022 | Class A, 6dB margin |
| ESD | IEC/EN 61000-4-2 | 4kV contact discharge |
| | | 8kV operational air discharge |
| | | 15kV non-operational air discharge |
| Electromagnetic Field | IEC/EN 61000-4-3 | |
| Electrical Fast Transients/Burst | IEC/EN 61000-4-4 | |
| Surge | IEC/EN 61000-4-5 | 1kV/2kV, Performance Criteria B |
| RF Conducted Immunity | IEC/EN 61000-4-6 | 3 Vac, 80% AM, 1kHz, Performance Criteria A |
| Magnetic Immunity | IEC/EN 61000-4-8 | 3 A/m |
| Voltage dips, interruptions | IEC/EN 61000-4-11 | |

OUTPUT CONNECTOR AND SIGNAL SPECIFICATION

DC and Signal Connector: Tyco Part # 2-6450330-8, or FCI PowerBlade # 51939-180LF

| P1 | P2 | P3 | 1 | 2 | 3 | 4 | 5 | 6 | P4 | P5 | P6 | P7 |
|-----|-----|-----|-------------|------------------|--------------|---------|----------|---------|------|------|-------------------------|-------------------------|
| AC1 | AC2 | GND | -52SNS D | PRESENT (GND) | N/C | GND | I2C-SDA | GND | -52V | -52V | -52V Return (GND) | -52V Return (GND) |
| | | | +52SNS C | GND | PS-ID2 | I2C-SCL | GND | Ishare | | | | |
| | | | GND B | PS-ID0 | GND | PS-ID1 | GND | DC_OK_L | | | | |
| | | | PUSH A | GND | +12V- AUX | GND | I2C-EN-H | PS_EN_L | | | | |

| Pin Assignment | Signal Name | Description | High Level Low Level | I Max |
|----------------------------|-------------|--|-----------------------------------|-------------|
| P1,P2 | AC1, AC2 | AC Input Voltage | | |
| P3 | GND | Input Protective Earth (GND) | | |
| P4, P5 | -52V | Main Output Voltage | | |
| P6, P7 | -52V Return | Main Output Voltage Return (connected to GND) | | |
| C1 | +52VSNS | Main Output Positive Remote Sense Line | | |
| D1 | -52VSNS | Main Output Negative Remote Sense Line | | |
| A3 | +12V-AUX | Auxiliary Output | | |
| A4, B3 | GND | Auxiliary Output Return | | |
| C6 | Ishare* | Active Load sharing bus | 0-8V | -4mA/ +5mA |
| A1 | PUSH | Hot Swap Indicator | | |
| B6 | DC_OK_L | Output Voltage within specification (10K pull-up to +5Vdc) | >2.4V, not OK 0V | -2mA / +4mA |
| A2 | PRESENT | This pin is connected to GND when unit is installed | | |
| A6 | PS_EN_L | Enable Main Output (10K pull-up to +5Vdc) | >2.4V, disabled <0.8V, enabled | -2mA / +4mA |
| D5 | I2C-SDA | I2C serial data bus | +5Vdc | |
| C4 | I2C-SCL | I2C serial clock bus | +5Vdc | |
| A5 | I2C-EN-H | Enable I2C communication bus | >2.4V, disabled <0.8V, enabled | -2mA / +4mA |
| B2 | PS-ID0 | Address Input 0, internal Pull-up to Vdd (+5Vdc) | >2.1V, <0.8V | |
| B4 | PS-ID1 | Address Input 1, internal Pull-up to Vdd (+5Vdc) | >2.1V, <0.8V | |
| C3 | PS-ID2 | Address Input 2, internal Pull-up to Vdd (+5Vdc) | >2.1V, <0.8V | |
| D3 | N/C | not used | | |
| B1, A2, A4, D4, B5, C5, D6 | GND | Connected to GND | | |

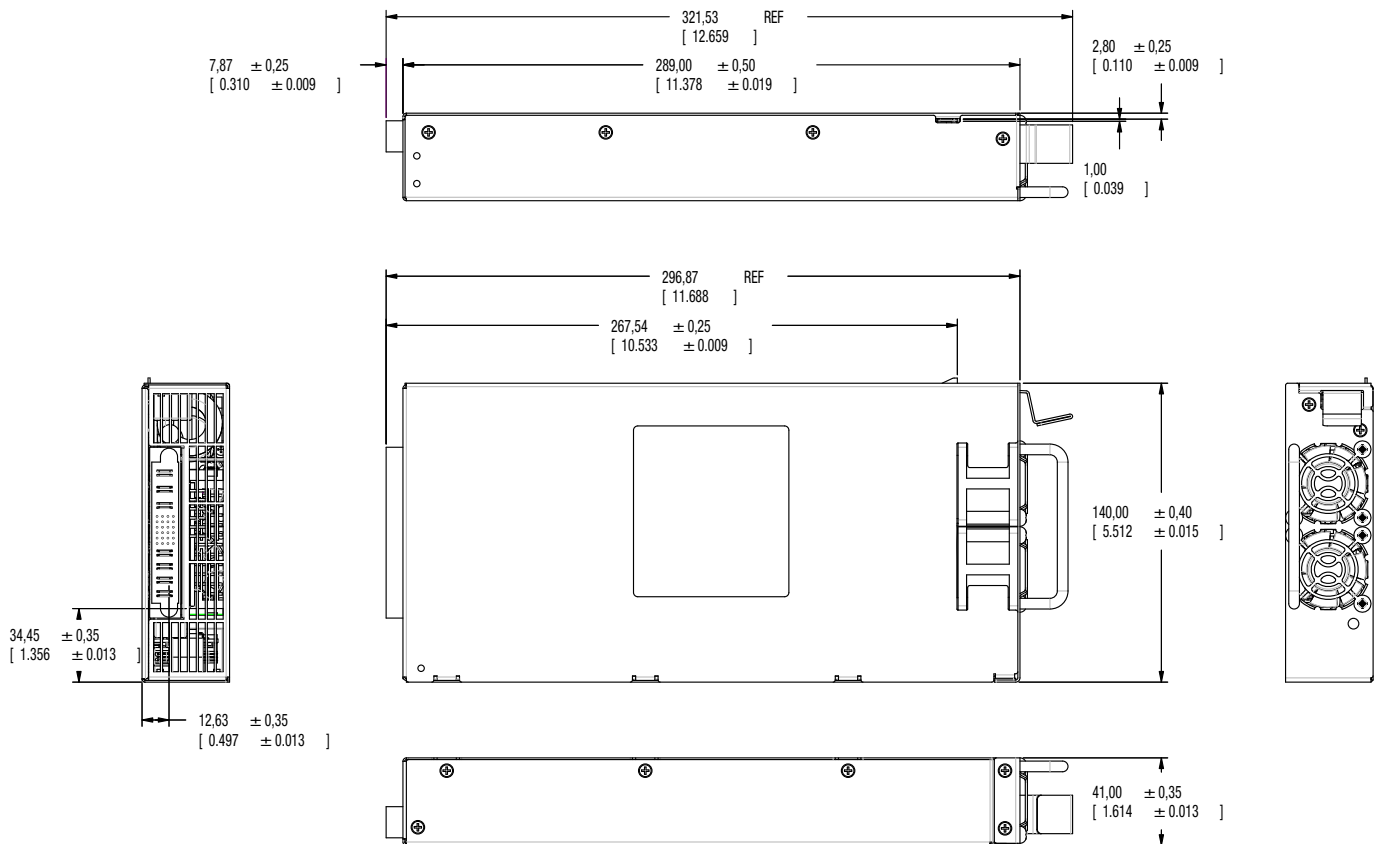
* The signal should be left floating if using the Droop Current Sharing model.

D1U MATING CONNECTORS

| -52V D1U mating connector | Press Fit | | Solder ¹ | |
|---------------------------|-----------|-------------|---------------------|--------------|
| | Straight | Right Angle | Straight | Right Angle |
| Murata Power Solutions | TBD | TBD | TBD | 36-0520031-0 |
| FCI | TBD | TBD | TBD | 51915-070LF |
| Tyco | TBD | TBD | TBD | 6450370-5 |

¹ Solder connector recommended for board thickness of <0.090

MECHANICAL DIMENSIONS - D1U4-W-1200-12-Hx



Dimensions: 11.5" L x 5.5" W x 1.6" H (41.0H x 140.0W x 289.0mm)

OPTIONAL ACCESSORIES

| Description | Part Number |
|-------------------------------|-------------|
| 52V D1U output connector card | D1U-52-CONC |

APPLICATION NOTES

| Document Number | Description |
|-----------------|--------------------------------------|
| ACAN-30 | D1U-H-2800-52 Communication Protocol |