



### 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
- I<sup>2</sup>C 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 I<sup>2</sup>C 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	
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

<sup>1</sup> 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		

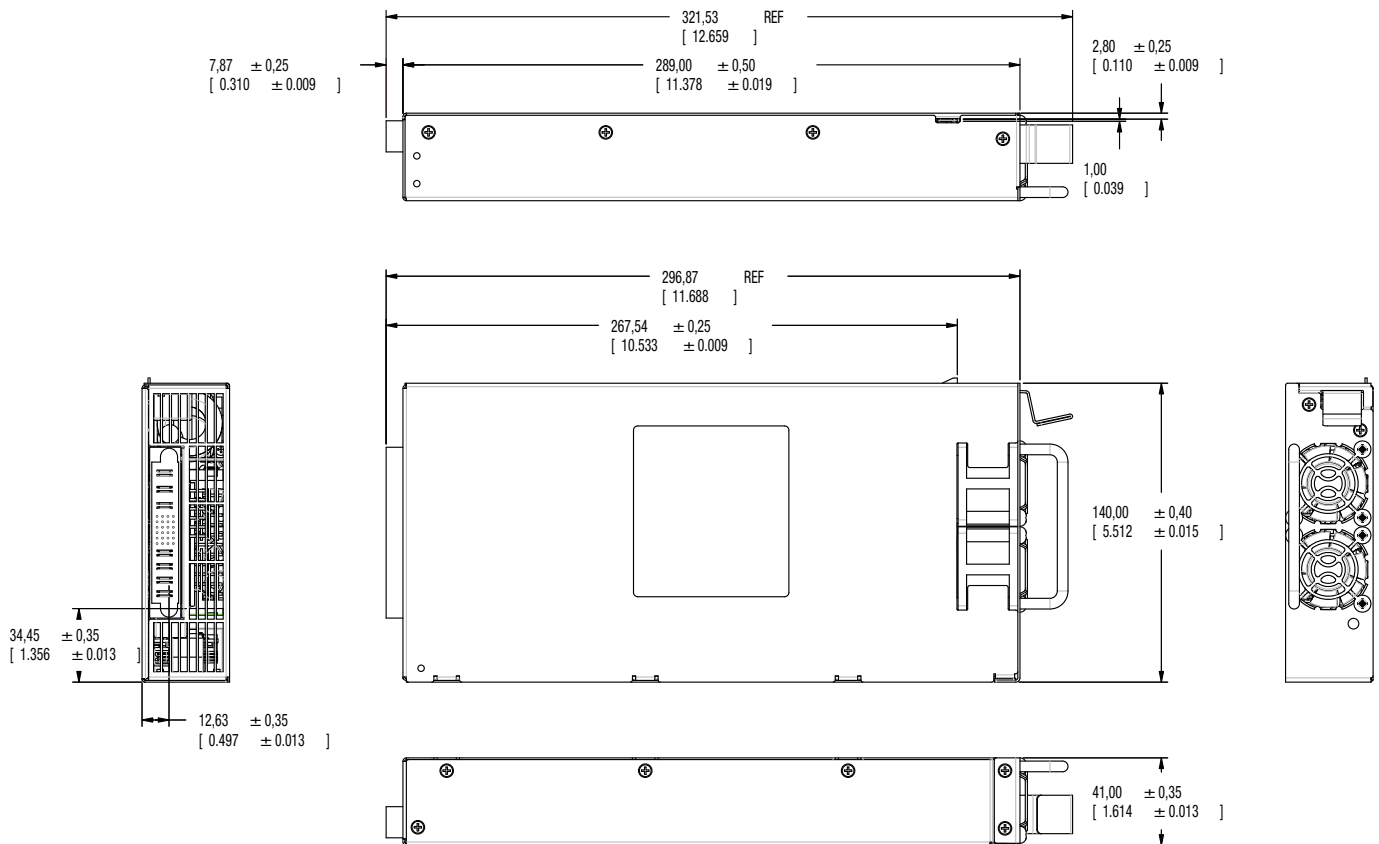
\* The signal should be left floating if using the Droop Current Sharing model.

### D1U MATING CONNECTORS

-52V D1U mating connector	Press Fit		Solder <sup>1</sup>	
	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

<sup>1</sup> 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