



### 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		

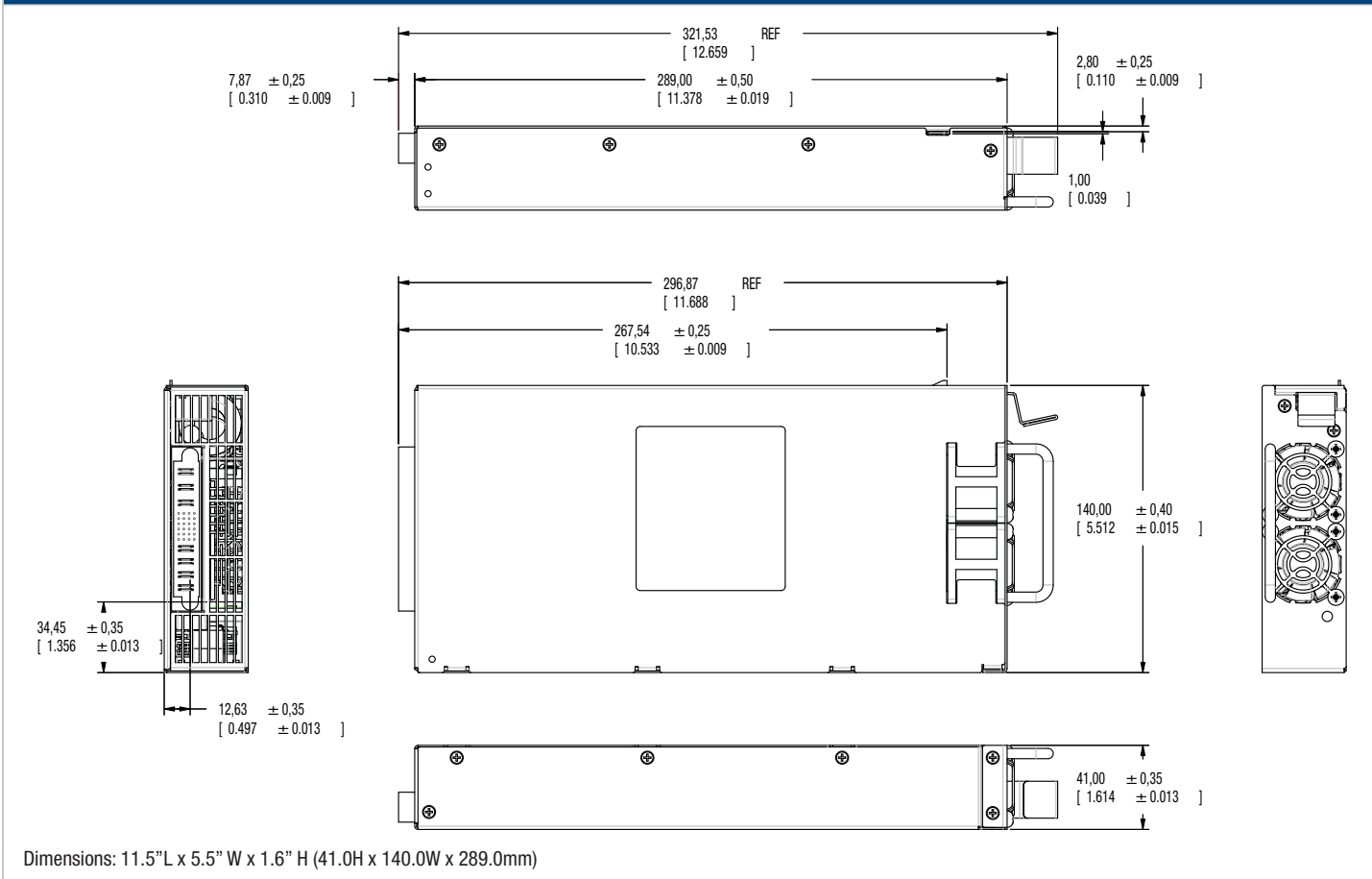
\* The signal should be left floating if using the Droop Current Sharing model.

### 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**



**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