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Murata Power Solutions

D1U4CS-D-2100-5x-HA3DC

DC-DC Front End Power Supply

FEATURES

- 2100W output power
- 93% efficient at half power
- Floating 54V main output and 5V standby output
- 1U height: 4"x13.5"x1.6"
- 24.3 Watts per cubic inch density
- N+1 redundancy capable, including hot-swapping
- Droop current sharing
- Overvoltage, overcurrent, overtemperature protection
- Internal cooling fans
- PMBus™ / I²C interface with status indicators
- RoHS compliant

PRODUCT OVERVIEW

This highly efficient, 2100W, 54V (or 52.5V) output DC-DC converter is designed to deliver reliable bulk power to 54V distributed power systems, making it ideal for telecom and other high power density applications. The power supplies are N+1 redundant, hot-swappable, and have internal cooling fans. The power supply automatically recovers from overcurrent and overtemperature faults, and status information is provided through front panel LEDs, logic signals and its PMBus™ / I²C interface.

ORDERING GUIDE

Part Number	Output Power	Main Output	Standby Aux Output	Airflow	Current Share
D1U4CS-D-2100-54-HA3DC	2100W	54V	5V	Front to back	Droop
D1U4CS-D-2100-52-HA3DC	2040W	52.5V	5V	Front to back	Droop

INPUT CHARACTERISTICS

Parameter	Conditions		Min.	Nom.	Max.	Units
Input Voltage Operating Range			-40		-72	Vdc
Turn-on Input Voltage	Ramp up		-43		-44	
Turn-off Input Voltage	Ramp down		-38.5		-39.5	
Maximum Current at Vin = -40V	2100W				59	A
DC Line Inrush Peak Current					90	Apk
I²C reading accuracy	Input Power and Output Power	25% load			5	%
		50% load			4	
		100% load			2.5	
Efficiency (40Vdc - 72Vdc)	20% load			90		
	50% load			93		
	100% load			91		

OUTPUT VOLTAGE CHARACTERISTICS

Output Voltage	Parameter	Conditions	Min.	Typ.	Max.	Units
54V model	Voltage Set Point Accuracy	50% load	53.87	54	54.14	Vdc
	Line & Load Regulation		51.98		56.06	
52.5V model	Voltage Set Point Accuracy	50% load	52.36	52.5	52.63	Vdc
	Line & Load Regulation		50.49		54.54	
Main output, all models	Droop			0.075		V/Amp
	Ripple Voltage & Noise[1]	20MHz Bandwidth			500	mVp-p
	Output Current		0		40	A
	Load Capacitance		0		6800	uF
5Vaux[2]	Voltage Set Point Accuracy	50% load	4.95	5	5.05	Vdc
	Line & Load Regulation		4.808		5.196	
	Droop			0.25		V/Amp
	Ripple Voltage & Noise[1]	20MHz Bandwidth			50	mVp-p
	Output Current				0.75	A

[1] Ripple and noise are measured with 0.1 uF of ceramic capacitance and 10 uF electrolytic capacitance on each of the power supply outputs.

[2] 5Vaux is referenced to logic ground.

RoHS COMPLIANT

For full details go to www.murata-ps.com/rohs

Test Certificate and Test Report

OUTPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Rise Monotonicity	Monotonic with no overshoot				
Startup Time	DC input applied		1	3	s
	PS_On activated		150	300	ms
Transient Response	Main Output Ramp, 1A/µs 50% load step			2000	mV
	5Vaux Ramp, 1A/µs 50% load step			±200	
Current sharing accuracy (up to 8 in parallel)	At 100% load			±10	%
Holdup Time	50% load	8			ms

ENVIRONMENTAL CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Storage Temperature Range		-40		85	°C
Operating Temperature Range		-5		55	
Operating Humidity	Non-condensing	5		90	%
Storage Humidity	Non-condensing	5		95	
Altitude (without derating at 40°C)		4000			m
Altitude (without derating at 55°C)		1800			
Shock	IEC 60068-2-27				
Sinusoidal Vibration	IEC 60068-2-64				
MTBF	Telcordia SR-332 M1C1 @40°C		439K		Hours
	Demonstrated 90% confidence	300K			Hours
Acoustic				60	dB LpAm
Safety Approvals	IEC60950-1:2006/A11:2009 UL60950-1 2nd Ed. 2007-03-27, CSA22.2 N0.60950-1 2nd Ed. 2007.03, EN60690-1:2006+A11:2009 (Evaluated) CE Marking per LVD				
Input Fuse	Power Supply has internal 80A/170VDC slow blow fuse on 48V input				
Switching Frequency	160KHz for Main Output Converter 200KHz for Standby Output Converter				
Weight	4.1lbs (1.86kg)				

PROTECTION CHARACTERISTICS

Output Voltage	Parameter	Conditions	Min.	Typ.	Max.	Units
	Overtemperature (intake) (54V model only)	Autorestart	57	60	63	°C
Main Output	Overvoltage	Latching	57		60	V
	Overcurrent	Autorestart	44		48	A
5Vaux	Overvoltage	Latching		6.0	6.5	V
	Overcurrent	Autorestart	0.82		1.65	A

ISOLATION CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Insulation Safety Rating / Test Voltage	Input to Output	1414			Vdc
	Input to Chassis - Basic	1414			Vdc
Isolation	Floating outputs to Chassis	707			Vdc

STATUS INDICATOR AND CONTROL SIGNALS		
Status	Conditions	Description
Input OK LED	Green	DC input present and within range
	Blinking at 1Hz	DC input present and outside range
	Off	DC input not present
Output OK LED	Green	Outputs are present and within regulation
	Blinking at 1Hz	Power limit or overcurrent condition
Fault LED	Red	Fault condition present
	Off	No fault condition detected

See also ACAN36 for additional LED operation details.

FAN MONITORING		
Status	Conditions	Description
Fan monitoring is available through the I^2C interface	Both fans running normally	PMBus CMD E5 Byte 2 bit 3
	One fan failed (or rotor locked)	PMBus CMD E5 Byte 2 bit 3
	Both fans failed (or rotors locked)	PMBus CMD E5 Byte 2 bit 3

EMISSIONS AND IMMUNITY		
Characteristic	Standard	Compliance
Conducted Emissions	FCC 47 CFR Part 15/CISPR 22/EN55022	Class A, 6dB margin
Radiated Emissions	FCC 47 CFR Part 15/CISPR 22/EN55022	Class A, 6dB margin
ESD Immunity	IEC/EN 61000-4-2	8kV contact discharge
		15kV operational air discharge
Radiated Field Immunity	IEC/EN 61000-4-3	10 V/m, Performance Criteria A
Electrical Fast Transients/Burst Immunity	IEC/EN 61000-4-4	2kV, Performance Criteria A
Surge Immunity	IEC/EN 61000-4-5	1kV/1kV, Performance Criteria A
RF Conducted Immunity	IEC/EN 61000-4-6	10Vrms, 80% AM, 1kHz, Performance Criteria A
Magnetic Field Immunity	IEC/EN 61000-4-8	30 A/m
Ring Wave	IEC/EN 61000-4-12	1kV, Performance Criteria A

OUTPUT CONNECTOR AND SIGNAL SPECIFICATION

DC and Signal Connector:

P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	1	2	3	4	5	6	
											-I2C Reset	-Interrupt #0	Address 2	Logic GND	SCL_1	SCL_0	D
Vin	Vin	Vin	Vin	Vin	Vin	FRAME	Vout	Vout	Vout	Vout	Reserved	-Interrupt #1	Address 1	Reserved	Logic GND	Logic GND	C
-48V	-48V	-48V	-48V Rtn	-48V Rtn	-48V Rtn	GND	54V[3]	54V[3]	54V Rtn[3]	54V Rtn[3]	Reserved	-Output Enable	Address 0	-PS Present	SDA_1	SDA_0	B
											Reserved	-PS Fault	+5Vaux	Logic GND	Logic GND	Logic GND	A

Note: Connector is viewed from the rear of the PSM

Last-to-make, first-to-break shortest pin

First to make, last to break longest pin must be implemented in mating connector

DC Input: 72Vdc max.

DC Output: 54V or 52.5V

Pin Assignment	Signal Name	Description	High Level Low Level	Comments
P1,P2, P3		-48VDC Input (-)		
P4, P5, P6		-48VDC_RTN Input (+)		
P7	Frame GND	Frame ground		
P8, P9	54V[3]	Main Output Voltage (+)		
P10, P11	54VDC_RTN[3]	Main Output Voltage Return (-)		
A3	+5V-AUX	Auxiliary Output		
A2	PS_Fault	Output Voltage within specification[4]	>2.4V, OK	-50mA, open drain
B4	PS_Present	B4 is tied to logic ground inside the power supply	0V	
B2	OUT_ENABLE_L	Enable Main Output (internal 10K pull-up to +5Vdc)[5]	>3.4V, disabled <1.2V, enabled	Min 0.6V hysteresis
B6, B5	I2C-SDA_0, I2C-SDA_1	I2C serial data bus	+5Vdc	
D6, D5	I2C-SCL_0, I2C-SCL_1	I2C serial clock bus	+5Vdc	
D1	I2C Reset	I2C reset		
B3	ADD0	Address Input 0, internal Pull-up to Vdd (+5Vdc)	>2.1V, <0.8V	
C3	ADD1	Address Input 1, internal Pull-up to Vdd (+5Vdc)	>2.1V, <0.8V	
D3	ADD2	Address Input 2, internal Pull-up to Vdd (+5Vdc)	>2.1V, <0.8V	
A1, B1, C1, C4	Reserved	Reserved		
A4, A5, A6, C5, C6, D4	Logic Gnd	Connected to Logic Gnd		

[3] Output voltage setpoint is 52.5V on the D1U4CS-D-2100-52-HA3DC model

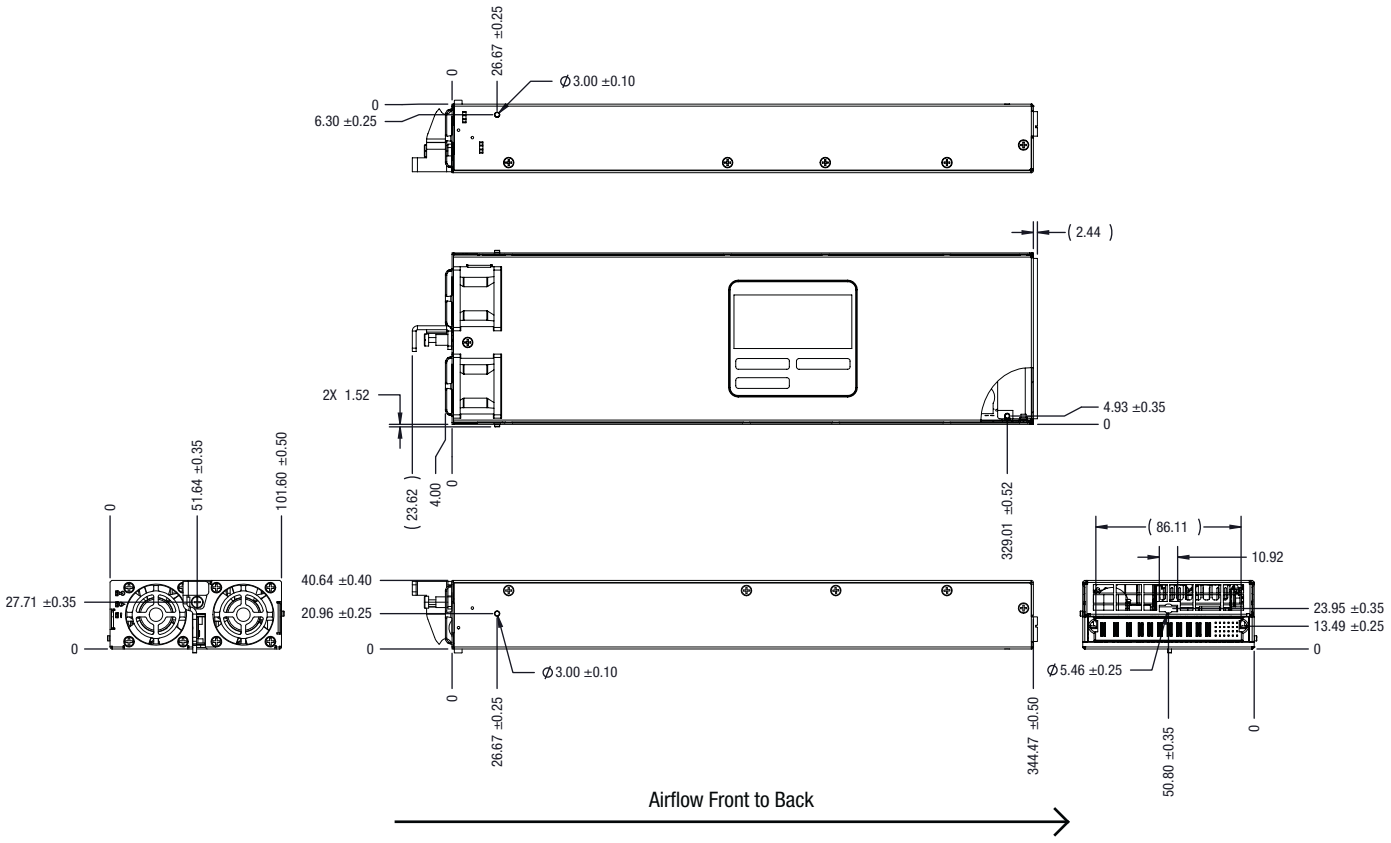
[4] See also ACAN36 for additional details on fault conditions. PS_Fault remains high when OUT_ENABLE_L is disabled and output is off.

[5] Pull OUT_ENABLE_L (pin B2) to Logic Gnd (pin A4, A5, A6, C5, C6, D4) to enable main output. Do not exceed 5.5V on OUT_ENABLE_L pin.

D1U MATING CONNECTORS

	Power Supply	Mating Connector	
		Straight	Right Angle
Tyco	6450842-2	TBD	6450882-2
FCI	10106263-B006001LF	TBD	10106265-B006002C

MECHANICAL DIMENSIONS



Dimensions: 4.00" x 13.56"x 1.61" [101.6mm x 344.47mm x 40.64mm]

OPTIONAL ACCESSORIES

Description	Part Number
54V D1U-54D output connector card	D1U4CS-54D-CONC

APPLICATION NOTES

Document Number	Description	Link
ACAN-35	D1U4CS-54D Output Connector Card	www.murata-ps.com/data/apnotes/acan-35.pdf
ACAN-36	D1U4CS-D-2100-xx-HA3xC Communication Protocol	www.murata-ps.com/data/apnotes/acan-36.pdf
ACAN-37	D1U4CS-x EEPROM Specification	www.murata-ps.com/data/apnotes/acan-37.pdf

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ISO 9001 and 14001 REGISTERED

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Refer to: http://www.murata-ps.com/requirements/