Pictorial View is NTS, HU4C model shown. EMI Gasket details may vary; refer to mechanical outline for additional details

FEATURES

- 80 Plus® certified titanium efficiency
- 1500W continuous output power
- 35W per inch density
- IEC60320-C16 connector for maximized low line operation
- HVDC input operation (192-300Vdc)[2]
- 54.5 mm width x 40.6 mm height x 321.5 mm length
- 90-264Vac input voltage (240 Vdc[1])
- +12Vdc Main output
- Selectable 3.3/5.0Vdc standby output voltage
- N+1 redundant, hot pluggable
- Active current sharing 12V main output
- Integral ORing/isolation provided for both outputs
- Integrated variable-speed cooling fan
- Overvoltage, overtemperature, overcurrent protection
- 64K Bytes of accessible EEPROM memory
- PMBus™ 1.2 interface
- LED status indicators
- RoHS compliant
- Two-Year Warranty

[1]Deployment in national areas that accept the use of the IEC60320-C16 inlet for this input source.
[2] Where country regulations permit

Test Certificate and Test Report

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

DEVELOPMENT OVERVIEW

D1U54T-W-1500-12-HUxTC is a series of highly efficient power factor corrected front end power supplies featuring a 12Vdc main output capable of active current sharing, and a selectable 3.3Vdc or 5Vdc standby output. Hardware logic signals, LED status indicators and PMBus™ 1.2 digital communications capability and low profile 1U, 35W/cubic inch package make this series ideal for delivering reliable, efficient power to servers, workstations, storage systems and other 12V distributed power architectures.

ORDERING GUIDE

Model Number	Output Power & Nominal Input Voltage		Main Output	Standby Output[1]	Airflow
	100-120Vac	200-240Vac			
D1U54T-W-1500-12-HU3TC	836W	1500W	12.2Vdc	3.3/5Vdc	F⇨B
D1U54T-W-1500-12-HU4TC					B⇨F

[1]Selectable via signal pin connection

INPUT CHARACTERISTICS

Parameter		Conditions	Min.	Nom.	Max.	Units
Input Source Voltage, AC Operating Range		Low Line	90	100-120	140	Vac
		High Line	180	200-240	264	Vac
Input Source Voltage, DC Operating Range			192	240	300	Vdc
Input (AC) Source Frequency			47	50-60	63	Hz
Turn-on Input Voltage, AC Source		Ramp up		87	90	Vac
Turn-off Input Voltage	Low Line	Ramp down		81	85	Vac
	High Line			160	170	
Turn-on Input Voltage, DC Source		Ramp up	152	157	162	Vdc
Turn-off Input Voltage, DC Source		Ramp down	140	145	149	Vdc
Maximum current		200Vac; 1500W			9	Arms
		100Vac; 836W			10	
		240Vdc; 1500W			7.5	Adc
Inrush Current		Cold start, 90-264Vac			20	Apk

Efficiency, 230Vac; loading excluding fan 80 Plus® Titanium Certification	80PLUS® Titanium Requirements[1]			
	Loading	Efficiency	PF; W/VA	iTHD
	10% load	90%	0.90	10%
	20% load	95%	0.98	10%
	50% load	96%	0.98	5%
	100% load	93%	0.98	5%

[1]230Vac, 25°C, excludes fan power

OUTPUT VOLTAGE CHARACTERISTICS

Output	Parameter	Conditions	Min.	Typ.	Max.	Units
12V	Output Setpoint	230Vac input, 50% load; Tamb 25°C	11.97	12.00	12.03	Vdc
	Line and Load Reg.[3]	Regulation Output Voltage Variation Due to Aging, Temperature, Drift, Input, Load, etc.	11.64	12.00	12.36	Vdc
	Ripple & Noise[1]	Diff. & Com. Mode; 20MHz Bandwidth; Min Load Capacitance			120	mVpp
	Output Current	1500W 180-264Vac & 192-300Vdc	0		125	Adc
		836W; 90-180Vac	0		69.5	
	Load Capacitance		2000		30,000	µF
VSB[2]	Output Setpoint	50% load; Tamb =25°C	-1.00		-1.00	%
	Line and Load Reg.	Overall Regulation Including Load and Temperature	-5.00		+5.00	
	Ripple & Noise[1,3]	Diff. & Com. Mode; 20MHz Bandwidth; Min Load Capacitance			50	mVpp
	Output Current		0		2.0	Adc
	Load Capacitance		200		2000	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. A short coaxial cable to the scope termination is used and minimum output bus capacitance specified in above table.
[2] The VSB is selectable via a dedicated pin on the output and signal connector to be either 3.3Vdc or 5Vdc.
[3] Minimum 12V main output Load of 1A to comply with these limits.

OUTPUT CHARACTERISTICS

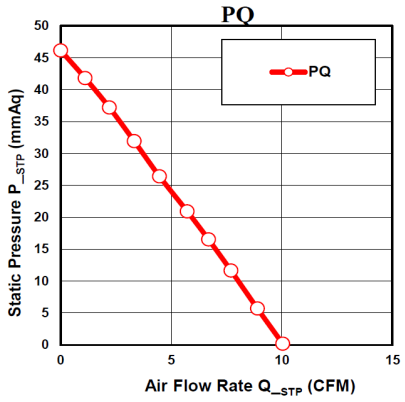
Parameter	Conditions	Min.	Typ.	Max.	Units
Startup Time	AC ramp up; delay until Main output start			3	s
Transient load response, 12V main output	Transient Response (Load Step. 50% of Full Load, Minimum Load: 5% of Full Load); 1A/µS load step slew rate; 250µS typical settling time; minimum output load capacitance	-5		+5	%
Current sharing accuracy, 12V main output	Current Sharing Accuracy for loads >25% max. load Loading ≤25% max. typically ≤5% power supply's max.		±5		
Hot Swap Transients	All outputs remain in regulation	-5		+5	
Holdup Time	100-305Vac, 100% load	10			ms

ENVIRONMENTAL CHARACTERISTICS

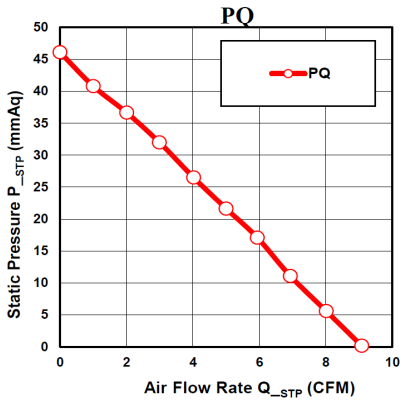
Parameter	Conditions	Min.	Typ.	Max.	Units
Storage Temperature Range		-40		85	°C
Operating Temperature Range (Sea Level)	100% full load; both airflow variants	-5		45	
Humidity	Operating; non-condensing	5		90	%
	Storage; non-condensing	5		95	
Altitude Operating [1]				3000	m
Shock	non-operating			30	
Operational Vibration	Sine sweep; 5-150Hz, 2G; random vibration, 5-500Hz, 1.11G				
MTBF	Telcordia SR332 Issue 3; Method 1 Case 1; 40°C	300K			Hrs.
Safety Approval Standards	UL60950-1, 2nd Edition, 2014-10-14 (Information Technology Equipment – safety - Part 1: General Requirements). CAN/CSA-C22.2 No. 60950-1-7, 2nd Edition 2014-10 (Information Technology Equipment - Safety - Part 1: General Requirements) CB: IEC 60950-1:2005, IEC 60950-1:2005/AMD1:2009, IEC60950-1:2005/AMD2:2013 IEC/EN 62368-1 (Planned) GB4943.1-2011(CQC) CNS14336-1 (099/09/30); CNS13438 (095/06/01) (BSMI) IEC 60950-1-2014 (EAC)				
Input Fuse	Dual fast acting 16A, 420V fuses				
Weight	1.24kg				

[1] Meets the safety compliance spacing requirements for altitude; performance based on power module outside of a system. Actual performance may vary based on effects of end-user's system backpressure.

AIRFLOW CHARACTERISTICS



Front to Back Airflow



Back to Front

PROTECTION CHARACTERISTICS

Output	Parameter	Conditions	Min.	Typ.	Max.	Units
	Over temperature (intake) [1]	Shutdown and auto-recovery	60		70	°C
Main 12V	Overvoltage	Latching[2] (Main output only, VSB output maintains operation)	13.2		13.9	Vdc
	Short-circuit	Latching[2]; percentage of full load, immediate shutdown	>160		-	%
	Overcurrent	90-140Vac (main output latch-off, VSB maintains operation)	76		91	A
		180-305Vac (main output latch-off, VSB maintains operation)	137.5		162.5	A
3.3VSB	Overvoltage	Latching[2] Main and VSB outputs	3.8		4.2	Vdc
	Overcurrent	Latching[2] both outputs	2.5		3.5	A
5.0VSB	Overvoltage	Latching[2] both outputs	5.6		6.4	Vdc
	Overcurrent	Latching[2] both outputs	2.5		3.5	A

[1] Operating the power supply module above the maximum operating temperature (see "ENVIRONMENTAL CHARACTERISTICS") is considered an abnormal condition, may negatively impact power supply life and is not recommended.
[2] Latch-off requires elimination of fault condition and then recycling either the AC input or PS_ON re-cycle to resume operation

ISOLATION CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Insulation Safety Rating / Test Voltage	Input to Output – Reinforced	3000			Vrms
	Input to Chassis – Basic	2034			

EMISSIONS AND IMMUNITY[2,3]

Characteristic	Standard	Compliance
Input Current Harmonics	IEC/EN 61000-3-2	Complies with Class A limits
Voltage Fluctuation and Flicker	IEC/EN 61000-3-3	Complies
Conducted Emissions	FCC 47 CFR Part15/CISPR22/EN55032	Class A with 6dB margin
ESD Immunity	IEC/EN 61000-4-2	±8KV Contact; ±15KV air discharge; Criteria A
Radiated Field Immunity	IEC/EN 61000-4-3	3V/m, 1KHz, 80% AM, 80MHz to 1GHz Criteria A
Electrical Fast Transients/Burst Immunity	IEC/EN 61000-4-4	Level 2 (1kV), criteria B, measured at input connector
Surge Immunity	IEC/EN 61000-4-5	Level 3 (2kV Line-Earth, 2kV Line-Line), criteria B, measured at input connector
RF Conducted Immunity	IEC/EN 61000-4-6	Level 2, 3Vrms, 1KHz, 80% AM, 150kHz to 80MHz criteria A
Magnetic Field Immunity	IEC/EN 61000-4-8	1A/m criteria A
Voltage Dips, Interruptions	IEC/EN 61000-4-11[4]	200-240Vac input; 100% load, Dip 100%, Duration 10ms (Criteria Class A) 200-240Vac input; 50% load, Dip 100% Duration 20ms (Criteria Class A) 200-240Vac input;100% load, Dip 60% Duration > 200ms Criteria Class (B) 200-240Vac input;100% load, Dip 30% Duration > 500ms (Criteria Class A) 200-240Vac input;100% load, Dip 20% Duration > 10 sec (Criteria Class A)

[1] Measured at power supply's AC input connector
[2] Installed in End User system and contingent upon final system design
[3] Radiated performance designed to meet Class A limits; however contingent on deployment; final qualification and certification testing to be performed by End User in system installation
[4] During ride-through, peak current cannot be greater than three times the operating current before ride-through

STATUS INDICATORS

Condition	Blue LED Status	Amber LED Status
Standby - ON; Main output - OFF; AC PRESENT (Standby Mode)	Blinking 1Hz	Off
Standby - ON; Main output – ON (Active Mode)	Solid	Off
Fault event (Input OVP/ Output OVP, UVP, OCP/ OTP/ Other internal fault)[1]	Off	Solid
No AC Power	Off	Off
Power Supply Warning Event[1]	Off	Blinking

[1] reported also by PMBus Status Register(s) and asserts SMB_Alert

STATUS AND CONTROL SIGNALS

Signal Name	I/O	Description	Interface Details
ACOK_H	Output	Active High signal; Indicates the status of the input voltage. Logic "High"- Input is OK Logic "Low"- Input is not OK	Pulled up via 10Kohm to an internal 3.3V rail. A logical level Low, 0-0.4Vdc;Isink =4mA A logical Level High, 2.4-3.46Vdc; 40uA max
PW_OK_H	Output	Active High signal; Indicates the status of the output voltage. Logic "High"- Output is OK Logic "Low"- Output is not OK	Pulled up internally via 1Kohm to internal 3.3Vdc rail A logic high 2.4-3.46Vdc; Isource =50uA A logical level Low, 0-0.4Vdc; Isink =4mA
SMB_ALERT_L	Output	Active Low signal alerting the system / host of the presence of a fault or warning condition. Such as OCP/OVP/UVP or fan failure. This signal may also indicate the power supply operating in an environment exceeding the specified limits. This signal coincides with LED indicators associated Warning/Fault assertion.	Pulled up internally via 4.7kohm to 3.3Vdc A logic high 2.4-3.46Vdc; Isource =50uA A logical level Low, 0-0.8Vdc; Isink =4mA
PRESENT_L	Output	This signal pin will be tied internally (within PSU) to SGND. It shall be a "Last Make, First Break" (LMFB) sequenced signal that indicates the "presence" of the installed power module.	
PSON_L	Input	The PS_ON signal can be used to turn the main 12V output on or off when the following conditions are true, with respect to VSB_RT: Logic "Low " = turn On Logic "High"- turn Off	Pulled up internally via 10Kohm to internal 3.3Vdc rail A logic high 2.0 - 3.46Vdc; Isource =4mA A logical level Low, 0-1.0Vdc; Isink =400µA

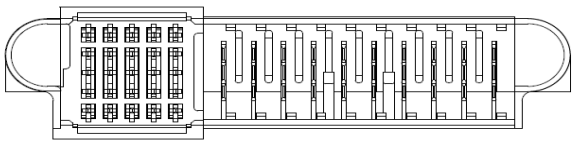
STATUS AND CONTROL SIGNALS

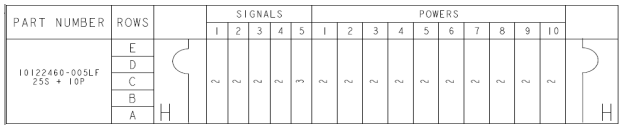
Signal Name	I/O	Description	Interface Details
PSKILL	Input	This signal is used by the PSU for main 12Vdc output power on/off processing as follows: Logic "Low" : PSU turn on main output Logic "High": PSU shutdown main output. This signal must be pulled down within the system/host to SGND via "0" OHM resistor	Pulled up via 10K to internal 3.3VDC A logic low <0.8Vdc
SCL	Both	Serial clock line compatible with PMBus™ Power Systems Management Protocol Part 1 – General Requirements Rev 1.2.	Pulled up internally via 100K ohm to internal 3.3Vdc rail A logic high 2.1 - 3.46Vdc; Isource =4mA A logical level Low, 0-0.4Vdc; Isink =400µA
SDA	Both	Serial data line compatible with PMBus™ Power Systems Management Protocol Part 1 – General Requirements Rev 1.2. The signal is provided with a series isolator device to disconnect the internal power supply bus in the event the power module is unpowered.	Pulled up internally via 100K ohm to internal 3.3Vdc rail A logic high 2.1 - 3.46Vdc; Isource =4mA A logical level Low, 0-0.4Vdc;
V1SENSE, V1SENSE_RTN & VSB_SENSE, VSB_SENSE_R	Input	Analog input/output voltage sense lines to compensate for power path voltage drop. These low-level analog signals should be isolated from digital circuit noise. When one or more remote sense lines are opened, regulation measured at the power supply output connector shall maintain the specified regulation window within ± 200mVdc. If the REMOTE SENSE+ is shorted to DC_RETURN, the 12V Main output shall enter protection and the power supply shall shut down.	Compensation for up to 0.2Vdc total connection drop (output and return connections).
ISHARE	Both	This signal is connected between sharing units forming an ISHARE bus. It is a bi-directional analog bus voltage that controls the current share between sharing units. A power module responds to changes in bus voltage but also can change the bus voltage based on the load drawn from it. For single power module, the voltage on the ISHARE signal pin (bus) would read approximately 8Vdc at 100% load of high line input. For two identical units sharing the same 100% load this would read approximately 4Vdc for perfect current sharing (i.e. 50% module load capability per unit).	Analogue voltage: +8V nominal; 0.064V/A; ISHARE sink = 0.5mA (at 4.00V) ISHARE source = 4.0mA (at 4.00V)
VSB_SEL	Input	Selects the standby voltage as follows: Left Open (no pull down)= 3.3Vdc is selected Pulled down to VSB Return = 5.0Vdc Once set and PSU operating, changing the setting will requires recycling of the input voltage to be activated.	Pulled up internally via 10K
ASP	Input	A single analog input is provided for the host system to set the address of the internal slave devices (microprocessor and EEPROM) for digital communications. By pulling down the APS signal through a resistor within the system / host specified below, these addresses can be selected.	Pulled up internally via 12.1K to 3.3Vdc

Microcontroller Address	External EEPROM Address	Resistor selection
0xB0	0xA0	820
0xB2	0xA2	2700
0xB4	0xA4	5600
0xB6	0xA6	8200
0xB8	0xA8	15000
0xBA	0xAA	27000
0xBC	0xAC	56000
0xBE	0xAE	180000

OUTPUT CONNECTOR & SIGNAL INTERFACE

Output Power and Signal: FCI PN 10122460-005LF (Power Supply Side)





Pin Description

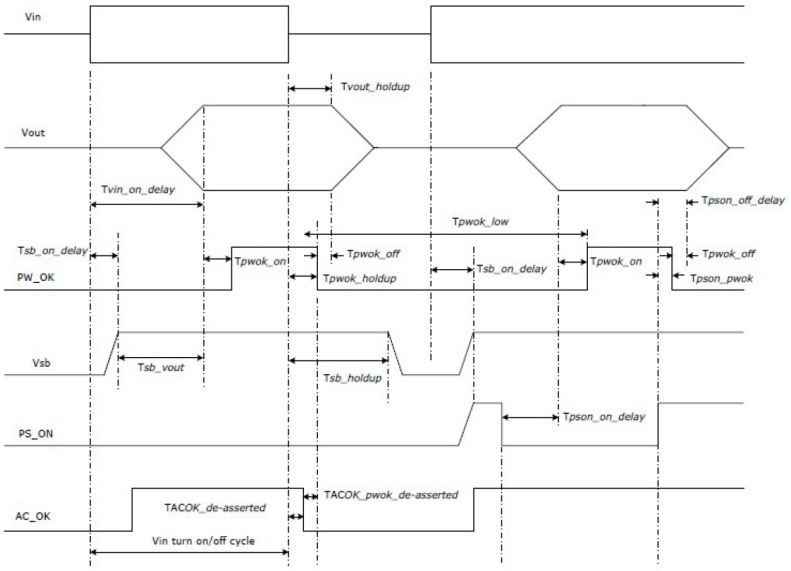
Rows:	1	2	3	4	5[1]	PGND	+12V Main
A	VSB	SGND/VSB_RTN	ASP	SCL	PSKILL_H	1,2,3,4,5[2]	6,7,8,9,10
B	VSB	SGND/VSB_RTN	N/C	PSON_L	ISHARE		
C	VSB	Reserved for future use	SDA	SMB_ALERT_L	PWOK_H		
D	VSB	VSB_SENSE_R	V1_SENSE_R	N/C	VSB SEL		
E	VSB	VSB_SENSE	V1_SENSE	ACOK_H	PRESENT_L		

[1] Pins in columns 5, are the shortest level signal pin and the "last to make, first to break" in the mating sequence.
[2] SGND/VSB_RTN are internally connected and intended to be connected to Protective Earth within the host/system

Mating Connector

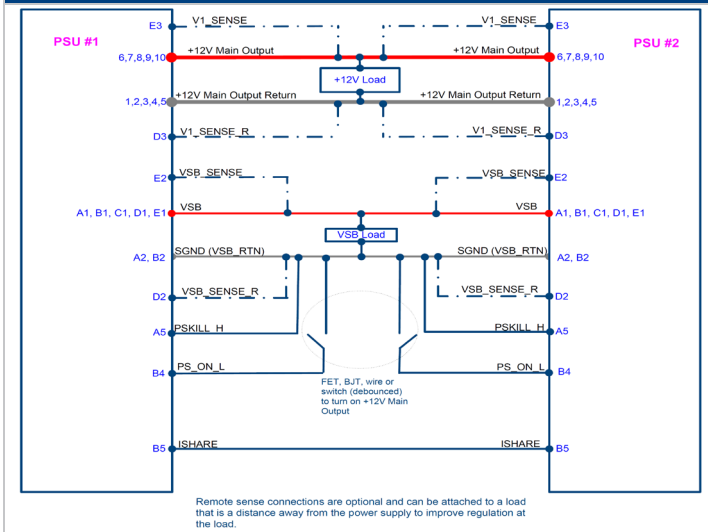
FCI 10108888-R10253SLF, right-angle

TIMING SPECIFICATIONS



Item	Description	Min	Max	unit
Tvout_rise	Output voltage rise time for 12V1	10	50	ms
	Output voltage rise time for Vsb	10	100	ms
Tsb_on_delay	Delay from Vin being applied to Vsb being within regulation		2000	ms
Tvin_on_delay	Delay from Vin being applied to 12V1 being within regulation		3000	ms
Tvout_holdup	Time of 12V output voltage stay within regulation after loss of Vin	10		ms
Tpwok_holdup	Delay from loss of Vin to de-assertion of PWOK	9		ms
Tpson_off_delay	Delay from PSON# de-asserted to power supply turning off		5	ms
Tpson_on_delay	Delay from PSON# active to output voltages within regulation limits	5	400	ms
Tpson_pwok	Delay from PSON# deactivate to PWOK being deasserted		4	ms
Tpwok_on	Delay from output voltages within regulation limits to PWOK asserted	100	500	ms
Tpwok_off	Delay from PWOK de-asserted to output voltages dropping out of regulation limits	1		ms
Tpwok_low	Duration of PWOK being in the de-asserted state during an off/on cycle using Vin or the PSON signal	100		ms
Tsb_vout	Delay from Vsb being in regulation to 0/Ps being in regulation at Vin turn on	50	1000	ms
Tsb_holdup	Time of Vsb output voltage stays within regulation after loss of Vin	100		ms
TACok_de- asserted	Delay from Vin drop being OV to de- assertion of AC OK		8	ms
PSKILL	The power supply shall turn off if the PSKILL signal is asserted		0.1	ms

1+1 WIRING DIAGRAM

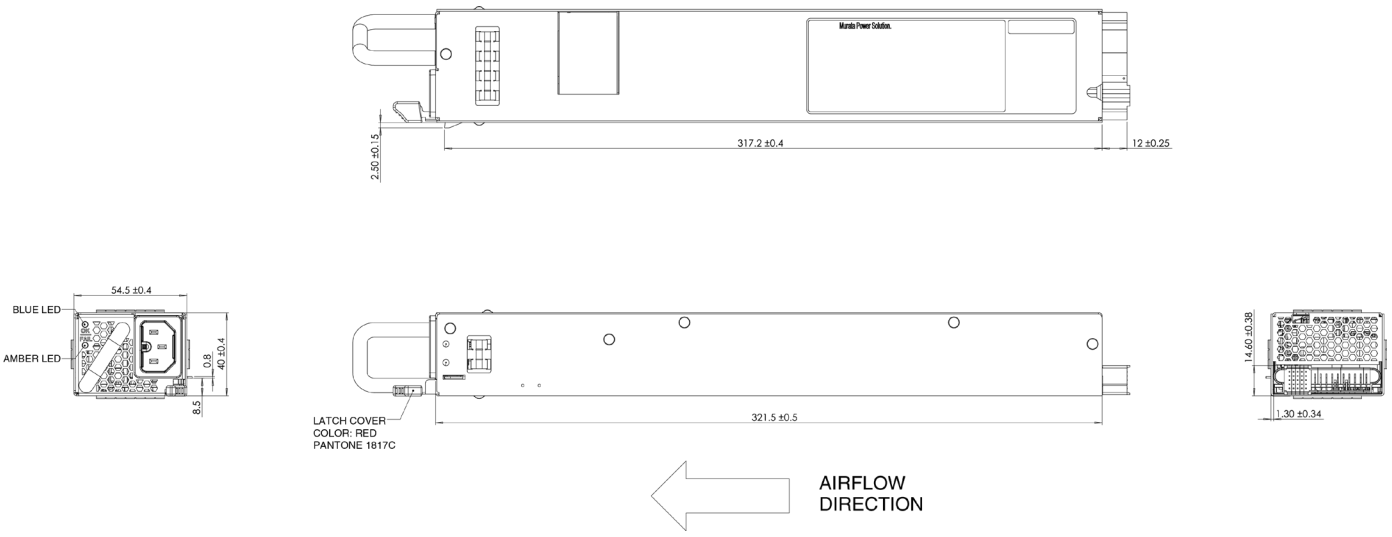


CURRENT SHARING NOTES

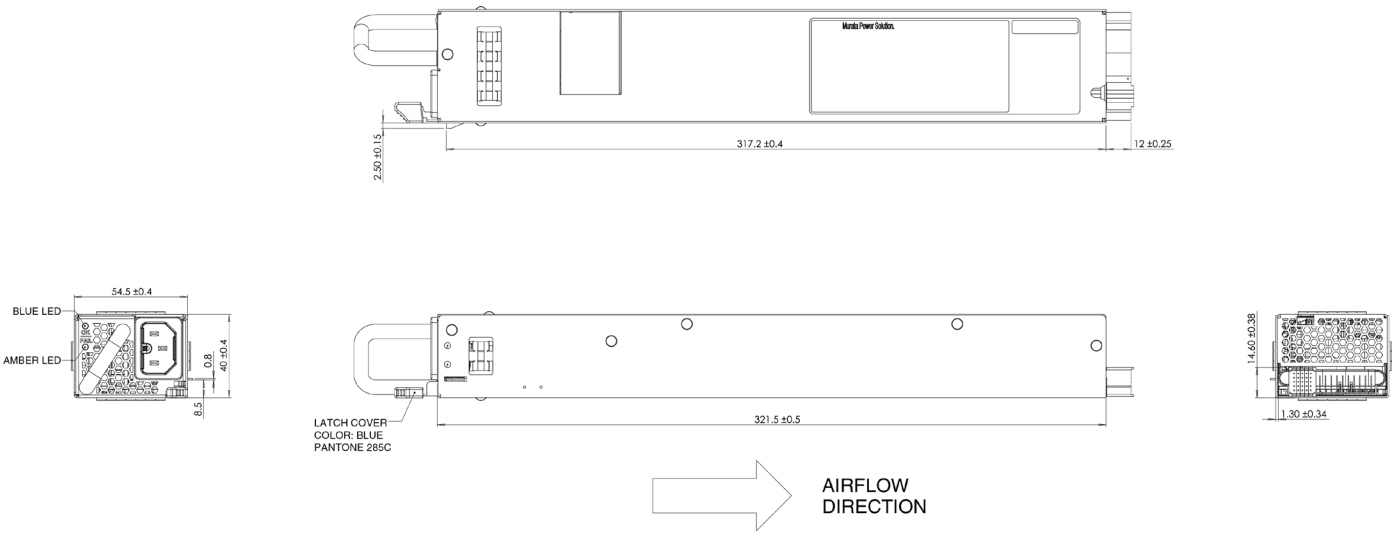
1. Main Output current sharing is achieved using the active current share method.
2. Current sharing can be achieved with or without connection of the main output sense signals to the common load.
3. +VSB Outputs can be tied together for redundancy but total combined output power must not exceed the rated standby power of a single unit. The +VSB output has an internal ORING MOSFET for additional redundancy/internal short protection.
4. Main output power of units sharing must not exceed the rated power of a single unit during power up.
5. The current sharing signal is connected between sharing units (forming an ISHARE bus). It is a bi-directional analog bus utilizing the bus voltage to control the current share between sharing units. Each power supply responds to a change in this voltage and each power supply can also change the voltage depending on the load drawn from it. On a single unit the voltage on the pin (and the common ISHARE bus would read approximately 8VDC at 100% load (power module capability). For two units sharing the same load this would read approximately 4VDC for perfect current sharing (i.e. 50% power capability per unit).
6. The load for both the main 12V and the VSB outputs at initial startup must not exceed the capability of a single unit. The main output load may be increases after steady state regulation has been achieved (approximately 3 sec).

MECHANICAL OUTLINE

D1U54T-W-1500-12-HU4C, Back to Front Airflow



D1U54T-W-1500-12-HU3C, Front to Back Airflow



1. AC input connector: IEC 60320-C16
2. This drawing is a graphical representation of the product and may not show all fine details such as molded part surface features, internal components, screw head type. Please contact Murata for 3D model for additional details
3. Dimensions in mm
4. Subject to change without notice; contact factory for latest version
5. Latch colour:
   a. D1U54T-W-1500-12-HU3TC; LATCH COVER COLOR: BLUE PANTONE 285C
   b. D1U54T-W-1500-12-HU4TC; LATCH COVER COLOR: RED PANTONE 1817C

OPTIONAL ACCESSORIES

Description	Part Number
Output Connector/Interface Card	D1U54T-12-CONC(M5803)

APPLICATION NOTES

Document Number	Description	Link
ACAN-92	D1U54T-12-CONC(M5803) Output Connector Card	https://www.murata.com/-/media/webrenewal/products/power/appnote/acan-92.ashx?la=ja-jp
ACAN-102	D1U54T-W-1500-12-HUxTC- PMBus™ Protocol	https://www.murata.com/-/media/webrenewal/products/power/appnote/acan-102.ashx?la=ja-jp

Murata Power Solutions, Inc.
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ISO 9001 REGISTERED