



PRODUCT OVERVIEW

The D1U54-D-1200-12-Hx4PC series are highly efficient 1200 watt, DC input front end modules with a 12V main output and a choice of 3.3V or 5V (20W) standby rails. The power module is able to current share with up to eight (8) other power modules of the same type operating in parallel or N+1 redundancy. The supplies may be hot plugged, and include integral isolation devices.

The power modules are fully protected from overload and overvoltage and are able to auto-recover from overtemperature faults. A Status LED is provided on the front panel and additional control and status reporting is provided by hardware logic signals and via a PMBus™ digital interface.

A low profile sub 1U height enclosure provides an excellent power density of >28W/in³ that is ideal for delivering reliable, efficient power to servers; workstations; storage systems and other 12V distributed power systems, including direct operation from intermediate bus converters.

FEATURES

- 1200W output power (no derating across the full DC input voltage range)
- 1.57"(1U) x 12.65" x 2.15"
- 92% efficiency
- 12VDC Main output
- 3.3VSB or 5VSB output (20W)
- >28W/in³ power density
- N+1 Redundancy Capable; hot plug/swap (up to 8 modules in parallel)
- Active current sharing on 12V main output; integral MOSFET ORING
- Over-Voltage, Over-Current; Over-Temperature Protection
- Internal variable speed cooling fans
- PMBus™ Power Management Bus
- RoHS Compliant

ORDERING GUIDE

| Part Number | Power Output | Main Output | Standby Output | Airflow |
|-----------------------|--------------|-------------|----------------|---------------|
| D1U54-D-1200-12-HC4PC | 1200W | 12V | 3.3V | Back to Front |
| D1U54-D-1200-12-HA4PC | | | 5V | |
| D1U54-D-1200-12-HC3PC | | | 3.3V | Front to Back |
| D1U54-D-1200-12-HA3PC | | | 5V | |

INPUT CHARACTERISTICS

| Parameter | Conditions | Min | Typ | Max | Units |
|----------------------------------|--|-------|---------|-------|-------|
| DC Input Voltage Operating Range | | -40 | -48/-60 | -72 | |
| Turn-on Input Voltage | Ramp Up | -39.5 | -40 | -40.5 | Vdc |
| Turn-off Input Voltage | Ramp Down | -35.5 | -36 | -36.5 | |
| Maximum Current @ VIN = -48Vdc | 1200W | | | 40 | Adc |
| DC Input Inrush Peak Current | Cold start between 0 to 200ms | -40 | | 50 | Apk |
| | | -72 | | 100 | |
| Efficiency (-48Vdc) | 20% FL | | 90 | | % |
| | 50% FL | | 92 | | |
| | 100% FL | | 90 | | |
| Reverse polarity protection | Reversed input cables; no internal/external fuse failure | +40 | | +72 | Vdc |

OUTPUT VOLTAGE CHARACTERISTICS

| Output Voltage | Parameter | Conditions | Min. | Typical | Max. | Units |
|----------------|-------------------------------------|---------------------------|------|---------|--------|--------|
| Main 12V | Voltage Set Point | | | 12 | | Vdc |
| | Line & Load Regulation | Combined regulation | 11.6 | | 12.4 | |
| | Ripple & Noise ¹ | 20MHz Bandwidth | | | 120 | mV P-P |
| | Output Current | -40Vdc to -72Vdc DC input | 0 | | 100A | A |
| | Load Capacitance | | | | 30,000 | µF |
| 3.3VSB | Voltage Set Point | | | 3.3 | | Vdc |
| | Line & Load Regulation | Combined regulation | 3.14 | | 3.46 | |
| | Ripple Voltage & Noise ¹ | 20MHz Bandwidth | | | 120 | mV P-P |
| | Output Current | | 0 | | 6 | A |
| | Load Capacitance | | | | 10,000 | µF |
| 5VSB | Voltage Set Point | | | 5.0 | | Vdc |
| | Line & Load Regulation | | 4.76 | | 5.24 | |
| | Ripple Voltage & Noise ¹ | 20MHz Bandwidth | | | 120 | mV P-P |
| | Output Current | | 0 | | 4 | A |
| | Load Capacitance | | | | 10,000 | µF |

¹ Ripple and noise are measurements are to be performed with a parallel combination of a 0.1µF ceramic capacitor and 10µF tantalum capacitance on each of the power module output measurement nodes. A short coaxial cable from measurement point to 'scope shall be used



Available now at
www.murata-ps.com/en/3d/acdc.html



OUTPUT CHARACTERISTICS

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|--|------|-------------------------------|------|-------|
| Remote Sense (Main Output) | Overall compensation at full load; +VE & -VE connections | | | 120 | mV |
| Output Rise (Monotonic) | 10% to 95% rise time | | No positive voltage excursion | | |
| Startup Time | DC Ramp Up | | | 3 | s |
| | PS_ON activation | | 200 | | ms |
| Transient Response | 12V, 50-100% or 100-50% step load; 1A/μs slew rate | | ±600 | | mV |
| | 3.3/5VSB 50-100% or 100-50% step load 1A/μs slew rate | | ±165/250 | | |
| Current Sharing Accuracy (between sharing modules; up to 8 in parallel) | At 100% load | | | ±10 | % |
| Hot Swap Transients | | | | 5 | % |
| Hold Up Time ¹ | FL (Full Load); 48VDC nominal input prior to hold up | 1 | | | ms |

ENVIRONMENTAL CHARACTERISTICS

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|------|------|-----------|---------|
| Storage Temperature Range | Non-Condensing | -40 | | 70 | °C |
| Operating Temperature Range | 1200W Output Power | 0 | | 55 | |
| Operating Humidity | Non-Condensing | 5 | | 90 | % |
| Storage Humidity | | 5 | | 95 | |
| Altitude (no derating at 40°C) | | 3000 | | | m |
| Shock | Non-Operating | | | 30 | G |
| Sinusoidal Vibration | Operational, 0.5G; 5-500Hz | | | | |
| MTBF | Telcordia SR-332 M1C1 @ 40°C | 452 | | | K Hours |
| Safety Approvals (Standards) – Pending Submission | CSA/UL C22.2 No.60950-1-07, 2nd Ed. IEC 60950-1:2005, (2nd Edition) with Am. 1:2009 EN 60950-1:2006 + A11:2009 + A1:2010 CE Marking per LVD DIRECTIVE 2006/95/EC | | | | |
| Input Fusing | Internal 60A/170VDC fast blow fuse on the DC line input (TBC) | | | | |
| Weight | | | | 3.15/1.43 | Lbs/kg |

PROTECTION CHARACTERISTICS

| Output Voltage | Parameter | Conditions | Min. | Typ. | Max. | Units |
|----------------|------------------|---|------|------|------|-------|
| N/A | Over-Temperature | Air inlet temperature; Auto re-start | 60 | 65 | 70 | °C |
| 12V (Main) | Over-Voltage | Latching; toggle PS_ON or recycle DC input to reset | 13 | | 14 | V |
| | Over-Current | For slow overload events a constant current will be sustained for 1sec followed by a latch off that will auto reset in 5secs. For hard (short circuit) events the output will shut down within 50ms and auto restart within 200ms. This cycle will be repeated ten times at which point the output will permanently latch off. The power module will require to be reset by recycling the incoming DC source or “toggling” PS_ON. | 115 | | 135 | A |
| 3.3VSB | Over-Voltage | Latching; toggle PS_ON or recycle DC input to reset | 3.6 | | 4.0 | V |
| | Over-Current | Shutdown followed by auto-recovery | 6.5 | | 8.5 | A |
| 5VSB | Over-Voltage | Latching; toggle PS_ON or recycle DC input to reset | 5.4 | | 6.0 | V |
| | Over-Current | Shutdown followed by auto-recovery | 4.5 | | 5.5 | A |

ISOLATION CHARACTERISTICS

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---------------------------------------|----------------------------|------|------|------|-------|
| Insulation Safety Rating/Test Voltage | Input to Output - Basic | 1000 | | | Vrms |
| Isolation | Output to Chassis (Ground) | 500 | | | Vdc |

¹Assumes deployment within systems utilizing dual redundant “A” and “B” DC input feeds

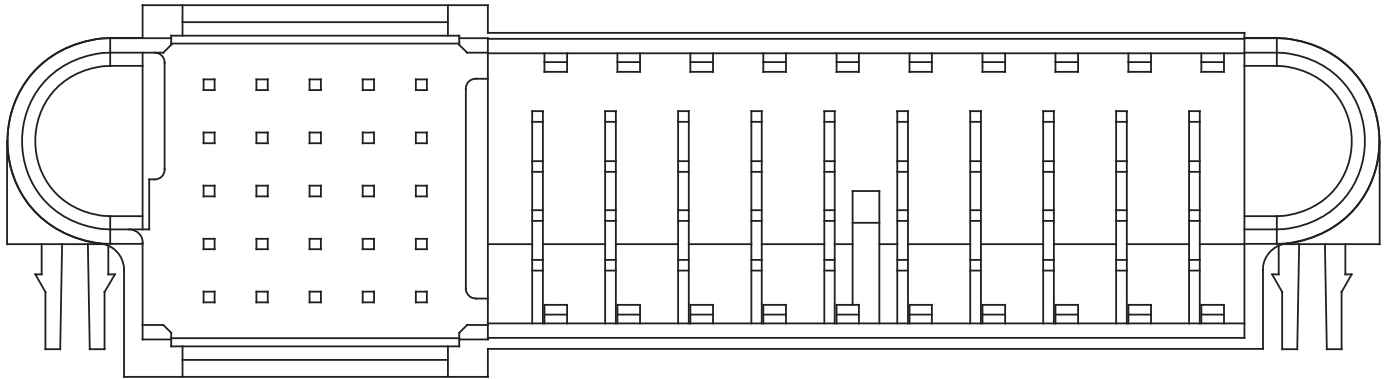
STATUS INDICATORS

| Conditions | GREEN (Power) LED Status | AMBER (Fault) LED Status |
|--|--------------------------|--------------------------|
| No incoming DC supply present; power module completely off. | LED not illuminated | LED not illuminated |
| Standby Rail ON; Main Output OFF; DC input present & correct | Blinking | LED not illuminated |
| Standby Rail ON; Main Output ON | Solid Green | |
| Main Output overcurrent; undervoltage, overvoltage warning | LED not illuminated | Solid Amber |
| FAN_FAULT; overtemperature; standby rail overcurrent, Main Output overcurrent or overvoltage | LED not illuminated | Solid Amber |
| Power Module Warning Event | LED not illuminated | Blinking |

EMISSIONS AND IMMUNITY

| Characteristic | Standard | Compliance |
|---|--|---|
| Conducted Emissions | FCC 47 CFR Part 15 CSIPR 22/EN55022 | Class A with 6dB margin |
| ESD Immunity | IEC/EN 61000-4-2; | Level 4; Criteria A |
| Radiated Field Immunity | IEC/EN 61000-4-3 | Level 3; Criteria B |
| Electrical Fast Transients/Burst Immunity | IEC/EN 61000-4-4 | Level 3; Criteria A |
| Surge Immunity | IEC/EN 61000-4-5 | Level 3; Criteria A |
| RF Conducted Immunity | IEC/EN 61000-4-6 | Level 3; Criteria A |
| Magnetic Field Immunity | IEC/EN 61000-4-8 | 3A/m; Criteria B |
| Voltage Dips & Interruptions | NEBS GR-1089-CORE Issue | Relevant sections and compliance levels TBD |

OUTPUT CONNECTOR AND SIGNAL INTERFACE



| PART NUMBER | ROWS | SIGNALS | | | | | POWERS | | | | | | | | | |
|-------------|-----------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 1926734-2 | A B C D E | <i>2</i> | <i>2</i> | <i>2</i> | <i>2</i> | <i>1</i> | <i>2</i> | <i>2</i> | <i>2</i> | <i>2</i> | <i>2</i> | <i>2</i> | <i>2</i> | <i>2</i> | <i>2</i> | <i>2</i> |
| 25S X 10P | | | | | | | | | | | | | | | | |

NB: With respect to signals columns 5, the italic "1" refers to the shortest level signal pin/power blade; the italic "2" is the "longest" signal pin. The "shortest" pins are the "last to make, first to break" in the mating sequence.

PIN ASSIGNMENTS: D1U54-D-1200-12-HxxPC

TE Connectivity 1926734-2 (Power Supply)

| Pin | Function | Description |
|----------------|---------------|--|
| 6, 7, 8, 9, 10 | V1 (+12VOUT) | +12V Main Output |
| 1, 2, 3, 4, 5 | +12V RTN/PGND | +12V Main Output Return |
| A1 | +VSB | Standby Output |
| B1 | +VSB | Standby Output |
| C1 | +VSB | Standby Output |
| D1 | +VSB | Standby Output |
| E1 | +VSB | Standby Output |
| A2 | +VSB_Return | Standby Output Return |
| B2 | +VSB_Return | Standby Output Return |
| C2 | Unused | No End User Connection |
| D2 | Unused | No End User Connection |
| E2 | Unused | No End User Connection |
| A3 | APS | I2C Address Protocol Selection (Select by appropriate pull down resistor) |
| B3 | Unused | No End User Connection |
| C3 | SDA | I2C Serial Data Line |
| D3 | V1_SENSE_R | Remote Sense Return (-VE) |
| E3 | V1_SENSE | Remote Sense (+VE) |
| A4 | SCL | I2C Serial Clock Line |
| B4 | PS_ON_L | Remote On/Off (Enable/Disable) |
| C4 | SMB_ALERT | Alert signal to host system |
| D4 | Unused | No End User Connection |
| E4 | DC_OK | DC Input Source Present & "OK" |
| A5 | PS_KILL | Power Supply "kill"; short pin |
| B5 | ISHARE | Current Share bus; short pin |
| C5 | PW_OK | Power "OK"; short pin |
| D5 | Unused | No End User Connection |
| E5 | PRESENT_L | Power Module Present; short pin |

ALTERNATIVE PIN ASSIGNMENTS: D1U54-D-1200-12-HxxC

TE Connectivity 1926734-4 (Power Supply)

| Pin | Function | Description |
|----------------|---------------|------------------------------------|
| 6, 7, 8, 9, 10 | V1 (+12VOUT) | +12V Main Output |
| 1, 2, 3, 4, 5 | +12V RTN/PGND | +12V Main Output Return |
| A1 | +VSB | Standby Output |
| B1 | +VSB | Standby Output |
| C1 | +VSB | Standby Output |
| D1 | +VSB | Standby Output |
| E1 | +VSB | Standby Output |
| A2 | +VSB_Return | Standby Output Return |
| B2 | +VSB_Return | Standby Output Return |
| C2 | Unused | No End User Connection |
| D2 | Unused | No End User Connection |
| E2 | Unused | No End User Connection |
| A3 | PS_KILL | Power Supply "kill"; short pin |
| B3 | Unused | No End User Connection |
| C3 | SDA | I ² C Serial Data Line |
| D3 | V1_SENSE_R | Remote Sense Return (-VE) |
| E3 | V1_SENSE | Remote Sense (+VE) |
| A4 | SCL | I ² C Serial Clock Line |
| B4 | PS_ON_L | Remote On/Off (Enable/Disable) |
| C4 | SMB_ALERT | Alert signal to host system |
| D4 | ISHARE | Current Share bus; short pin |
| E4 | DC_OK | DC Input Source Present & "OK" |
| A5 | A0 | I ² C LSB Address Line |
| B5 | Unused | No End User Connection |
| C5 | PW_OK | Power "OK"; short pin |
| D5 | A1 | I ² C Address Line |
| E5 | PRESENT_L | Power Module Present; short pin |

Consult Murata Sales for availability of alternative "HxxC" model variants.

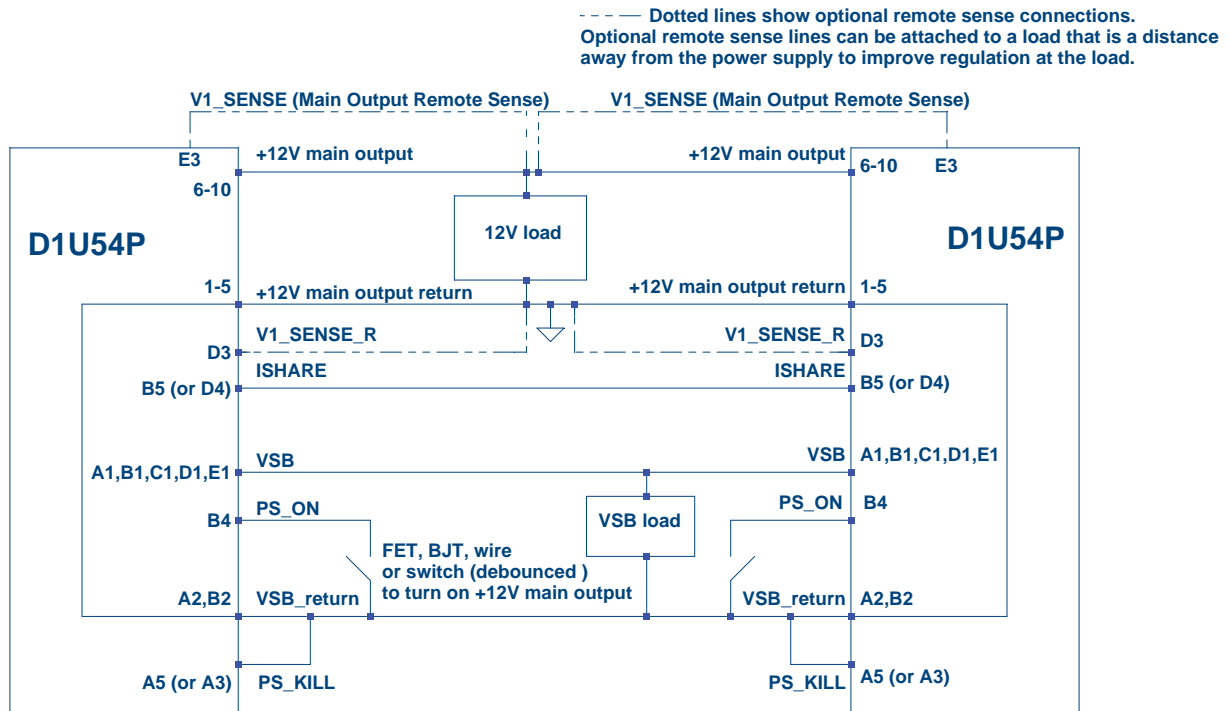
MATING CONNECTOR (OUTPUT & SIGNALS)

| Supplier | Press Fit, Straight | Press Fit, Right Angle | Solder Straight | Solder Right Angle |
|------------------------|---------------------|------------------------|-----------------|--|
| TE Connectivity (Tyco) | --- | --- | --- | 2-1926739-5 2-1926733-5 (Legacy Now Obsolete) |

DC INPUT TERMINAL BLOCK

| | | |
|-------------------|--|---------------|
| Dinkle Enterprise | 2 Way Terminal Block; 40A rating; +VE & -VE DC Input cable connections | DT-7C-B14W-02 |
|-------------------|--|---------------|

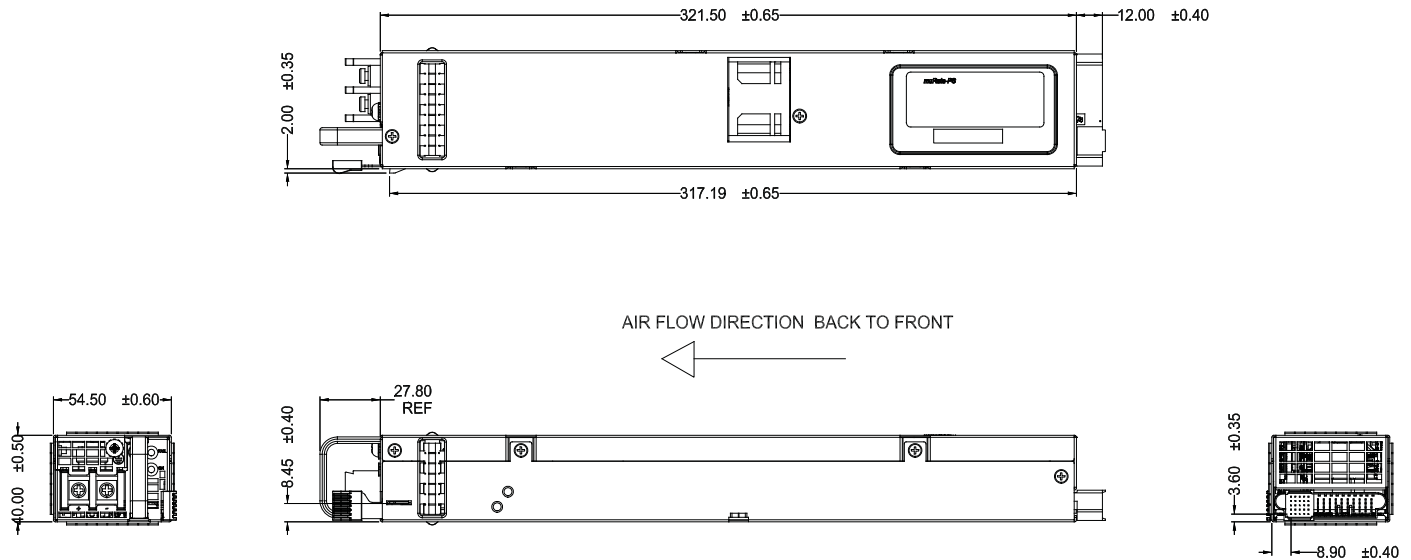
WIRING DIAGRAM FOR OUTPUT



CURRENT SHARING NOTES

1. Main 12VDC Output: Analogue active share bus. The ISHARE bus (Pin B5 or D4) must be connected on all sharing modules. It is not required that the SENSE signals are connected to the remote load for current share to operate correctly.
2. Up to eight (8) power modules can be connected in parallel (non-redundant) or N+1 configuration. The current share bus is analogue bi-directional (can source or sink current from the ISHARE bus).
The voltage of the bus would measure 8VDC for a single power module at 100% load; for two (2) modules sharing a common load the ISHARE bus voltage would be 4V for a perfect 50/50 current share scenario.
3. The VSB (Standby Output) output of the power module can also be connected in parallel; internal output isolation devices are provided however the combined available power is limited to that available from a single power module (3.3V or 5V; 20W) irrespective of the number of modules connected in parallel.

MECHANICAL DIMENSIONS



Notes

1. Dimensions: 1.57" x 12.66" x 2.15" (40.0 x 321.5mm x 54.5mm)
2. Safety earth/ground connection via separate dedicated M4 pan head screw connection (located above terminal block)

OPTIONAL ACCESSORIES

| Description | Part Number |
|--|----------------|
| D1U54-12 Output Interface Connector Card | D1U54P-12-CONC |

APPLICATION NOTES

| Document Number | Description | Link |
|-----------------|--|--|
| ACAN-44 | D1U54P-12-CONC Output Interface Connector Card | www.murata-ps.com/data/apnotes/acan-44.pdf |
| ACAN-58 | D1U54-D-12 Communications Protocol | |

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