



### FEATURES

- 1200W output power
- 80 PLUS® Platinum efficiency
- 12V main output
- 3.3V and 5V standby output
- 1U height: 2.15" x 12.65" x 1.57"
- 28 Watts per cubic inch density
- N+1 redundancy capable, including hot plugging (up to 8 in parallel)
- Active current sharing on 12V main output; ORing FET
- Overvoltage, overcurrent, overtemperature protection
- Internal cooling fan (variable speed)
- PMBus™ / I<sup>2</sup>C interface with status indicators
- RoHS compliant
- Two-year warranty



Available now at  
[www.murata-ps.com/en/3d/acdc.html](http://www.murata-ps.com/en/3d/acdc.html)

### PRODUCT OVERVIEW

The D1U54P-W-1200-12-HxxPC series are 80 PLUS® Platinum efficiency 1200 watt, power factor corrected front end supplies with a 12V main output and a 3.3V (3A) or 5V (3A) standby. They have active current sharing and up to 8 supplies may be operated in parallel. The supplies may be hot plugged, they recover from overtemperature faults, and have status LEDs on their front panel in addition to logic and PMBus™ status signals. Their low profile 1U package and >28W/cubic inch power density make them ideal for delivering reliable, efficient power to servers, workstations, storage systems and other 12V distributed power systems.

#### ORDERING GUIDE

| Part Number            | Power Output High Line AC | Power Output Low Line AC | Main Output | Standby Output | Airflow       |
|------------------------|---------------------------|--------------------------|-------------|----------------|---------------|
| D1U54P-W-1200-12-HC4PC | 1200W                     | 1100W                    | 12Vdc       | 3.3Vdc         | Back to front |
| D1U54P-W-1200-12-HA4PC |                           |                          |             | 5Vdc           |               |
| D1U54P-W-1200-12-HC3PC |                           |                          |             | 3.3Vdc         | Front to back |
| D1U54P-W-1200-12-HA3PC |                           |                          |             | 5Vdc           |               |

<sup>1</sup> Refer to page 7 for alternate input connector (HxxxPTC).

<sup>2</sup> The HCxPC variants are certified for compliance to 80 PLUS® Platinum efficiency requirements.

#### INPUT CHARACTERISTICS

| Parameter                              | Conditions                      | Min. | Nom.    | Max. | Units |
|--|---------------------------------|------|---------|------|-------|
| Input Voltage Operating Range          |                                 | 90   | 115/230 | 264  | Vac   |
| Input Frequency                        |                                 | 47   | 50/60   | 63   | Hz    |
| Turn-on Input Voltage                  | Ramp up                         | 80   | 85      | 89   | Vac   |
| Turn-off Input Voltage                 | Ramp down                       | 65   | 73      | 78   | Vac   |
| Maximum current at Vin = 100Vac        | 1100W                           |      |         | 12   | Arms  |
| Inrush Current                         | Cold start between 0 to 200msec |      |         | 25   | Apk   |
| Power Factor                           | At 230Vac, full load            |      | 0.99    |      |       |
| Efficiency (230Vac) excluding fan load | 20% load                        | 90   |         |      | %     |
|  | 50% load                        | 94   |         |      |       |
|  | 100% load                       | 91   |         |      |       |

#### OUTPUT VOLTAGE CHARACTERISTICS

| Nominal Output Voltage | Parameter                           | Conditions            | Min. | Typ. | Max.   | Units  |
|------------------------|-------------------------------------|-----------------------|------|------|--------|--------|
| 12V                    | Nominal Output Voltage              |                       |      | 12   |        | Vdc    |
|                        | Output Set Point Accuracy           | 50% load; Tamb = 25°C | -0.5 |      | +0.5   | %      |
|                        | Line and Load Regulation            |                       | -1.0 |      | +1.0   |        |
|                        | Ripple Voltage & Noise <sup>3</sup> | 20MHz Bandwidth       |      |      | 150    | mV p-p |
|                        | Output Current (230Vac)             |                       | 5    |      | 100    | A      |
|                        | Output Current (120Vac)             |                       | 5    |      | 90     | A      |
| 3.3VSB                 | Load Capacitance                    |                       | 0    |      | 30,000 | µF     |
|                        | Nominal Output Voltage              |                       |      | 3.3  |        | Vdc    |
|                        | Line and Load Regulation            |                       | 3.14 |      | 3.46   |        |
|                        | Ripple Voltage & Noise <sup>3</sup> | 20MHz Bandwidth       |      |      | 75     | mV p-p |
| 5VSB                   | Output Current                      |                       |      |      | 3      | A      |
|                        | Load Capacitance                    |                       |      |      | 1000   | µF     |
|                        | Nominal Output Voltage              |                       |      | 5.0  |        | Vdc    |
|                        | Line and Load Regulation            |                       | 4.76 |      | 5.24   |        |
|                        | Ripple Voltage & Noise <sup>3</sup> | 20MHz Bandwidth       |      |      | 75     | mV p-p |
|                        | Output Current                      |                       | 0    |      | 3      | A      |
|                        | Load Capacitance                    |                       | 0    |      | 1000   | µF     |

<sup>3</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. A short coaxial cable with 50Ω scope termination is used.



| OUTPUT CHARACTERISTICS                         |  |      |      |         |       |
|--|--|------|------|---------|-------|
| Parameter                                      | Conditions                               | Min. | Typ. | Max.    | Units |
| Startup Time                                   | AC ramp up                               |      |      | 3       | s     |
| Transient Response                             | 12V, 50% load step, 1A/ $\mu$ s di/dt    |      |      | 600     | mV    |
|  | 3.3VSB, 50% load step, 1A/ $\mu$ s di/dt |      |      | 165     |       |
| Current sharing accuracy (up to 8 in parallel) | At 100% load                             |      |      | $\pm$ 7 | %     |
| Hot Swap Transients                            | All outputs remain in regulation         |      |      | 5       | %     |
| Holdup Time                                    | 100% load                                | 12   |      |         | ms    |

| ENVIRONMENTAL CHARACTERISTICS       |   |      |      |      |       |
|-------------------------------------|---|------|------|------|-------|
| Parameter                           | Conditions  | Min. | Typ. | Max. | Units |
| Storage Temperature Range           |   | -40  |      | 70   | °C    |
| Operating Temperature Range         |   | 0    |      | 60   |       |
| Operating Humidity                  | Noncondensing   | 5    |      | 90   | %     |
| Storage Humidity                    |   | 5    |      | 95   |       |
| Altitude (without derating at 40°C) |   | 3000 |      |      | m     |
| Shock                               | 30G non operating   |      |      |      |       |
| Operational Vibration               | Sine sweep; 5-150Hz, 2G;<br>random vibration, 5-500Hz, 1.11G  |      |      |      |       |
| MTBF                                | Per Telcordia SR-332 M1C1 @40°C   | 529K |      |      | hrs   |
| Safety Approval Standards           | CAN/CSA C22.2 No 60950-1-07, Am.1:2011, Am2:2014<br>UL 60950-1-2014, 2nd Ed.<br>IEC60950-1:2005 (2nd ED.)+A1:2009+A2:2013<br>EN60950-1:2006+A11+A1+A12+A2<br>CCC GB4943.1-2011<br>BSMI CN214336-1 |      |      |      |       |
| Input Fuse                          | Power Supply has internal 15A/250V fast blow fuse on the AC line input  |      |      |      |       |
| Weight                              | 3.15 lbs (1.43 kg)  |      |      |      |       |

| PROTECTION CHARACTERISTICS |                          |             |      |      |      |       |
|----------------------------|--------------------------|-------------|------|------|------|-------|
| Output Voltage             | Parameter                | Conditions  | Min. | Typ. | Max. | Units |
| 12V                        | Overtemperature (intake) | Autorestart | 70   |      | 80   | °C    |
|                            | Overvoltage              | Latching    | 13   |      | 14   | V     |
|                            | Overcurrent At 220Vac    | Hiccup      | 105  |      | 120  | A     |
|                            | Overcurrent At 110Vac    | Hiccup      | 99   |      | 117  |       |
| 3.3VSB                     | Overvoltage              | Latching    | 3.6  |      | 4.0  | V     |
|                            | Overcurrent              | Hiccup      | 3.3  |      | 4.5  | A     |
| 5VSB                       | Overvoltage              | Latching    | 5.4  |      | 6.0  | V     |
|                            | Overcurrent              | Hiccup      | 3.3  |      | 4.5  | 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            | 500  |      |      | Vdc   |

| STATUS INDICATORS AND CONTROL SIGNALS                         | GREEN              | AMBER              |
|---|--------------------|--------------------|
| Condition   | LED Status (Power) | LED Status (Fault) |
| Standby - ON; Main output - OFF; AC PRESENT                   | Blinking green     | Off                |
| Standby - ON; Main output - ON                                | Solid green        | Off                |
| Main output overcurrent, undervoltage, overvoltage            | Off                | On                 |
| FAN_FAULT; overtemperature; standby overcurrent, undervoltage | Off                | On                 |
| No AC Power   | Off                | Off                |
| Power Supply Warning Event                                    | Off                | Blinking           |

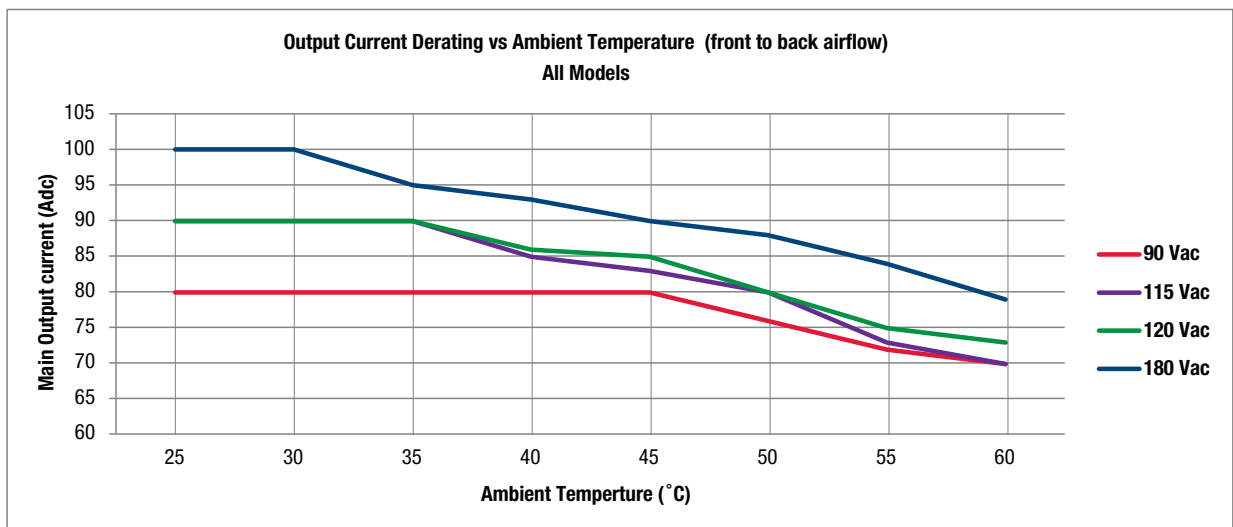
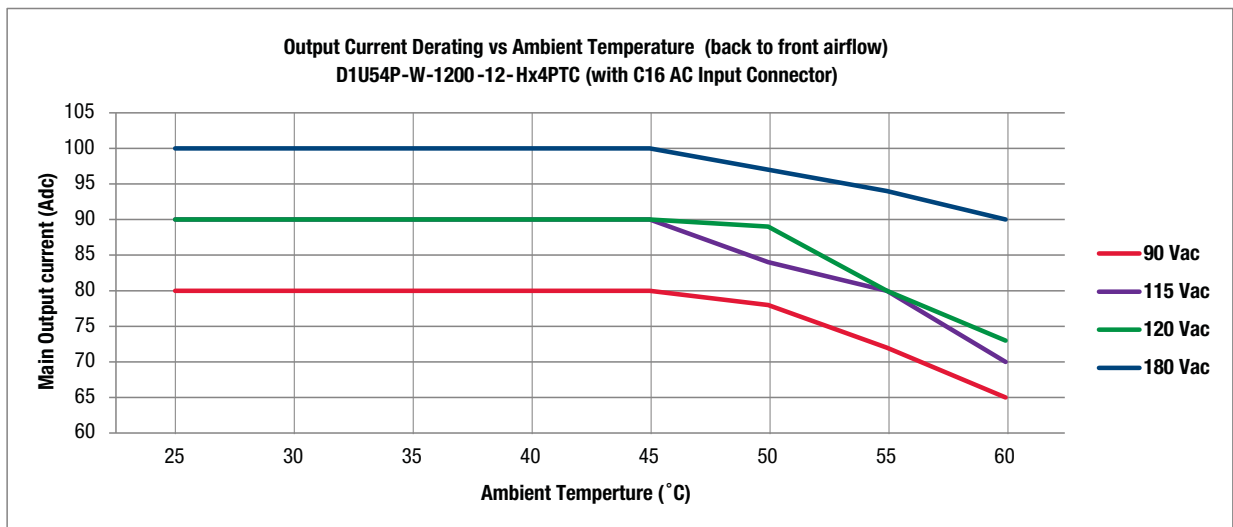
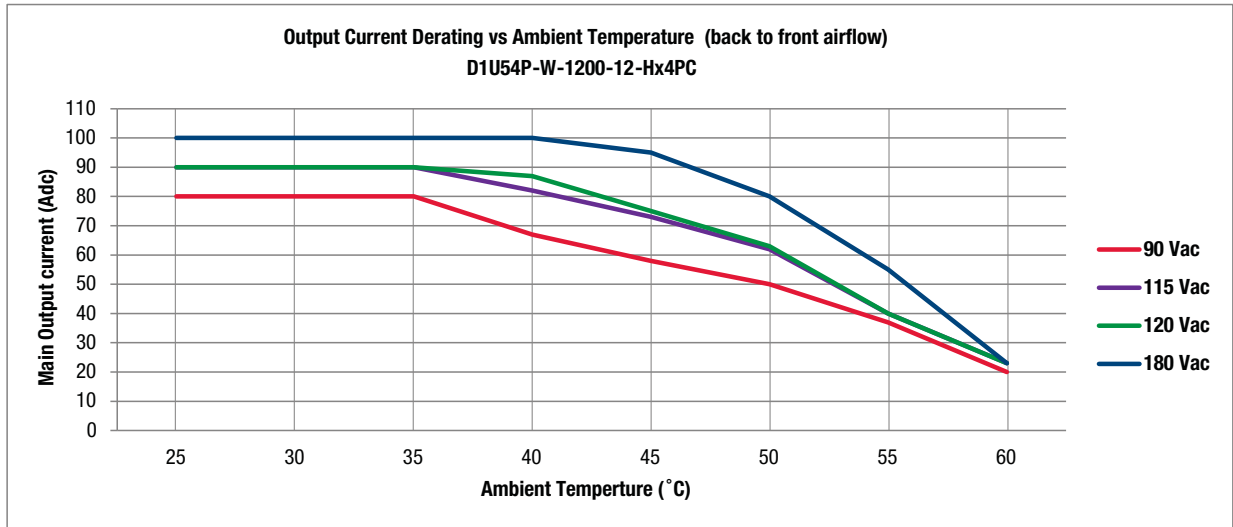
| STATUS AND CONTROL SIGNALS             |        |   |   |
|--|--------|---|---|
| Signal Name                            | I/O    | Description   | Interface Details   |
| ACOK<br>(AC Source)                    | Output | The signal output is driven high when input source is available and within acceptable limits. The output is driven low to indicate loss of input power. There is a minimum of 1ms pre-warning time before the signal is driven low prior to the PWR_OK signal going low. The power supply must ensure that this interface signal provides accurate status when AC power is lost.  | Pulled up internally via 10K to VDD. <sup>4</sup><br>A logic high >2.0Vdc<br>A logic low <0.8Vdc<br>Driven low by internal CMOS buffer (open drain output). |
| PWOK (Output OK)                       | Output | The signal is asserted, driven high, by the power supply to indicate that all outputs are valid. If any of the outputs fail then this output will be hi-Z or driven low. The output is driven low to indicate that the Main output is outside of lower limit of regulation (11.4Vdc).   | Pulled up internally via 10K to VDD. <sup>4</sup><br>A logic high >2.0Vdc<br>A logic low <0.8Vdc<br>Driven low by internal CMOS buffer (open drain output). |
| SMB_ALERT<br>(FAULT/<br>WARNING)       | Output | The signal output is driven low to indicate that the power supply has detected a warning or fault and is intended to alert the system. This output must be driven high when the power is operating correctly (within specified limits). The signal will revert to a high level when the warning/fault stimulus (that caused the alert) is removed.  | Pulled up internally via 10K to VDD. <sup>4</sup><br>A logic high >2.0Vdc<br>A logic low <0.8Vdc<br>Driven low by internal CMOS buffer (open drain output). |
| PRESENT_L<br>(Power Supply Absent)     | Output | The signal is used to detect the presence (installed) of a PSU by the host system. The signal is connected to PSU logic SGND within the power module.   | Passive connection to +VSB_Return.<br>A logic low <0.8Vdc   |
| PS_ON<br>(Power Supply Enable/Disable) | Input  | This signal is pulled up internally to the internal housekeeping supply (within the power supply). The power supply main 12Vdc output will be enabled when this signal is pulled low to +VSB_Return. In the low state the signal input shall not source more than 1mA of current. The 12Vdc output will be disabled when the input is driven higher than 2.4V, or open circuited. Cycling this signal shall clear latched fault conditions. | Pulled up internally via 10K to VDD. <sup>4</sup>   |
| PSKILL                                 | Input  | This signal is used during hot swap to disable the main output during hot swap extraction. The input is pulled up internally to the internal housekeeping supply (within the power supply). The signal is provided on a short (lagging pin) and should be connected to +VSB_Return.   | A logic high >2.0Vdc  |
| APS (Address Select)                   | Input  | An analog input that is used to set the address of the internal slave devices (EEPROM and microprocessor) used for digital communications. Connection of a suitable resistor to +VSB_Return, in conjunction with an internal resistor divider chain, will configure the required address.   | DC voltage between the limits of 0 and VDD. <sup>4</sup>  |
| SCL (Serial Clock)                     | Both   | A serial clock line compatible with PMBus™ Power Systems Management Protocol Part 1 – General Requirements Rev 1.1. No additional internal capacitance is added that would affect the speed of the bus. The signal is provided with a series isolator device to disconnect the internal power supply bus in the event that the power module is unpowered.   | VIL is 0.8V maximum<br>VOL is 0.4V maximum when sinking 3mA<br>VIH is 2.1V minimum  |
| SDA (Serial Data)                      | Both   | A serial data line compatible with PMBus™ Power Systems Management Protocol Part 1 – General Requirements Rev 1.1. The signal is provided with a series isolator device to disconnect the internal power supply bus in the event that the power module is unpowered.  | VIL is 0.8V maximum<br>VOL is 0.4V maximum when sinking 3mA<br>VIH is 2.1V minimum  |

| STATUS AND CONTROL SIGNALS |                             |   |  |
|----------------------------|-----------------------------|---|--|
| V1_SENSE<br>V1SENSE_RTN    | Input                       | <p>Remote sense connections intended to be connected at and sense the voltage at the point of load.</p> <p>The voltage sense will interact with the internal module regulation loop to compensate for voltage drops due to connection resistance between the output connector and the load.</p> <p>If remote sense compensation is not required then the voltage can be configured for local sense by:</p> <p>V1_SENSE directly connected to power blades 6 to 10 (inclusive)<br/>V1_SENSE_RTN directly connected to power blades 1 to 5 (inclusive)</p>  | <p>Compensation for up to 0.12Vdc total connection drop (output and return connections).</p> |
| ISHARE                     | Bi-Directional Analogue Bus | <p>The current sharing signal is connected between sharing units (forming an ISHARE bus). It is an input and/or an output (bi-directional analog bus) as the voltage on the line controls the current share between sharing units. A power supply will respond to a change in this voltage but a 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 8VDC at 100% load (module capability). For two identical units sharing the same 100% load this would read 4VDC for perfect current sharing (i.e. 50% module load capability per unit).</p> | <p>Analogue voltage:<br/>+8V maximum; 10K to +12V_RTN</p>                                    |

<sup>4</sup>VDD is an internal voltage rail derived from VSB and an internal housekeeping rail ("diode ORed") and is compatible with the voltage tolerances of VSB).

| EMISSIONS AND IMMUNITY                    |                                     |  |
|---|-------------------------------------|--|
| Characteristic                            | Standard                            | Compliance   |
| Input Current Harmonics                   | IEC/EN 61000-3-2                    | Complies   |
| Voltage Fluctuation and Flicker           | IEC/EN 61000-3-3                    | Complies   |
| Conducted Emissions                       | FCC 47 CFR Part 15/CISPR 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 B   |
| 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                    | 3 A/m criteria B   |
| Voltage Dips, Interruptions               | IEC/EN 61000-4-11                   | 230Vin, 100% load, Phase 0°, Dip 100% Duration 10ms (A)<br>230Vin, 50% load, Phase 0°, Dip 100% Duration 20ms (VSB:A, V1:B)<br>230Vin, 100% load, Phase 0°, Dip 100% Duration > 20ms (VSB, V1:B) |

**DERATING CURVES**



### OUTPUT CONNECTOR AND SIGNAL SPECIFICATION

|    |    |    |    |    |   |   |   |   |   |   |   |   |   |    |
|----|----|----|----|----|---|---|---|---|---|---|---|---|---|----|
| E1 | E2 | E3 | E4 | E5 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| D1 | D2 | D3 | D4 | D5 |   |   |   |   |   |   |   |   |   |    |
| C1 | C2 | C3 | C4 | C5 |   |   |   |   |   |   |   |   |   |    |
| B1 | B2 | B3 | B4 | B5 |   |   |   |   |   |   |   |   |   |    |
| A1 | A2 | A3 | A4 | A5 |   |   |   |   |   |   |   |   |   |    |

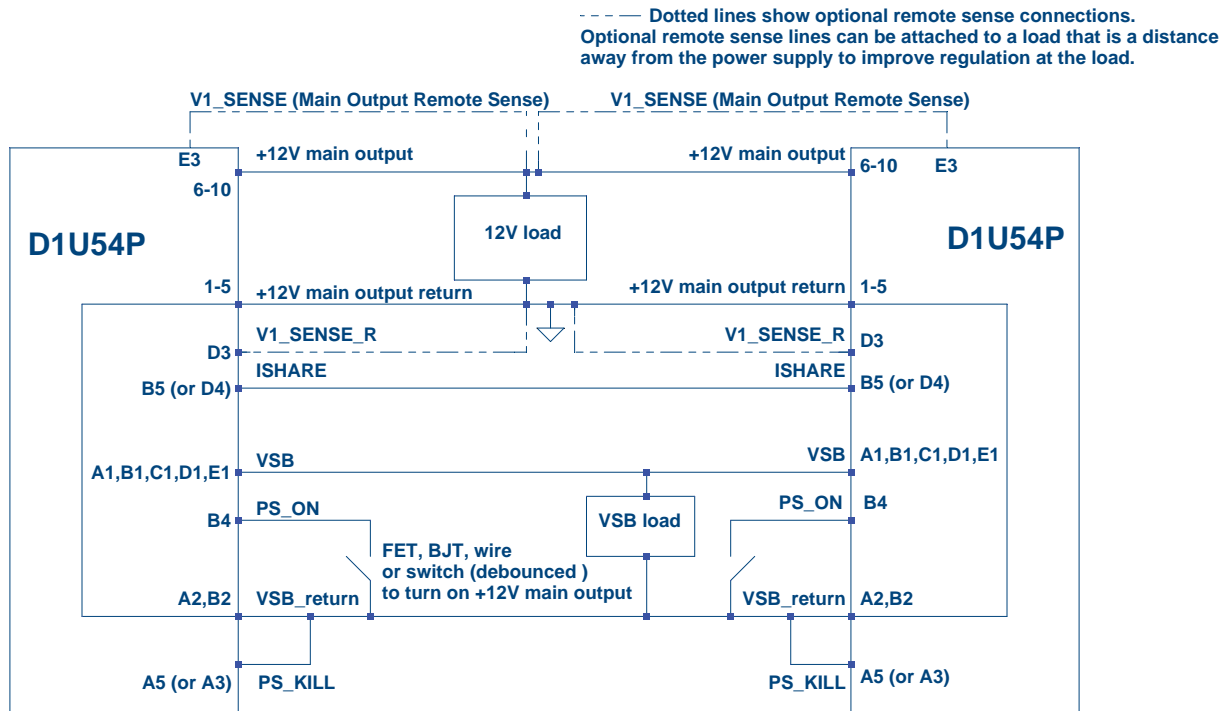
### PIN ASSIGNMENTS - D1U54P-W-1200-12-HxxPC

| Tyco PN 1926734-2 (Power Supply) |             |  |
|----------------------------------|-------------|--|
| Pin                              | Signal Name | Comments   |
| 6, 7, 8, 9, 10                   | V1          | + 12V main output  |
| 1, 2, 3, 4, 5                    | 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 return   |
| B2                               | VSB_return  | Standby return   |
| C2                               | unused      |  |
| D2                               | unused      |  |
| E2                               | unused      |  |
| A3                               | APS         | I2C address and protocol selection, (select by a pull down resistor) |
| B3                               | unused      |  |
| C3                               | SDA         | I2C data signal line   |
| D3                               | V1_SENSE_R  | - Remote Sense return  |
| E3                               | V1_SENSE    | + Remote Sense   |
| A4                               | SCL         | I2C clock signal line  |
| B4                               | PS_ON       | Remote On/Off  |
| C4                               | SMB_ALERT   | I2C alert signal   |
| D4                               | unused      |  |
| E4                               | ACOK        | AC input OK  |
| A5                               | PSKILL      | Power supply kill, short pin   |
| B5                               | ISHARE      | Current share bus, short pin   |
| C5                               | PWOK        | Power OK, short pin  |
| D5                               | unused      |  |
| E5                               | PRESENT_L   | Power supply present, short pin                                      |

### MATING CONNECTOR

| Part Number                  | Description |
|------------------------------|-------------|
| Tyco Electronics 2-1926739-5 | Right Angle |

**WIRING DIAGRAM FOR OUTPUT**



**CURRENT SHARING NOTES**

Main Output: Current sharing is achieved using the active current share method. (See wiring diagram for connection details.)

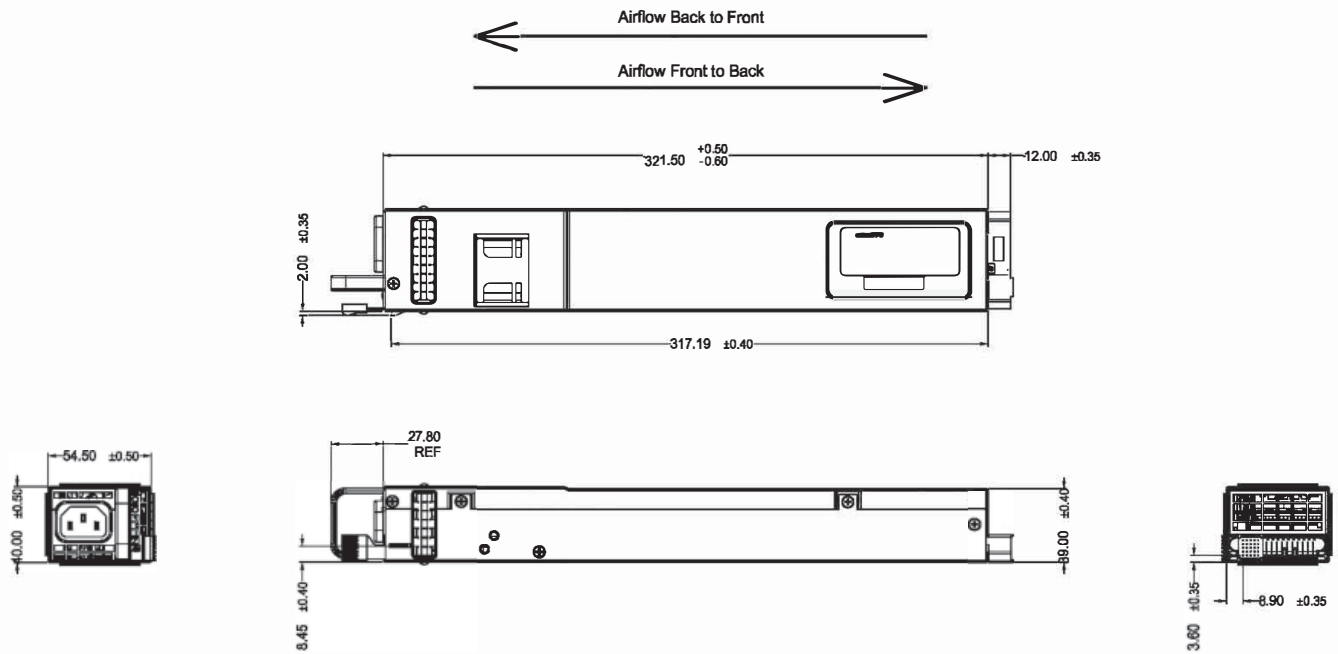
Current sharing can be achieved with or without remote sense connected to the common load.

+VSB outputs can be tied together for redundancy but total combined output power must not exceed the rated standby power. The +VSB output has internal ORing MOSFET for additional redundancy / internal short protection.

The current share pin B5 (or D4 for alternate pin out model) is a connection between the units. It is input and/or output as the voltage on the line controls the current share. A power supply will respond to a change in this voltage but a power supply can also change the voltage depending on the load drawn from it. On a single unit this would read 8V at 100% load. For two units sharing load then this should read 4V for perfect current sharing.

Up to 8 units can be paralleled together. Please consult your Murata sales representative if operation with more than 8 units in parallel is needed.

### MECHANICAL DIMENSIONS



ALL DIMENSIONS IN MM.

AC input connector: IEC 320-C14  
 Alternate input connector: IEC 320-C16 (for HxxPTC models)  
 Dimensions: 2.15" x 12.657" x 1.575" [54.5mm x 322.0mm x 40.0mm]

### OPTIONAL ACCESSORIES

| Description                      | Part Number    |
|----------------------------------|----------------|
| 12V D1U54P Output Connector Card | D1U54P-12-CONC |

### APPLICATION NOTES

| Document Number | Description                     | Link   |
|-----------------|---------------------------------|--|
| ACAN-44         | D1U54P Output Connector Card    | <a href="http://www.murata-ps.com/data/apnotes/acan-44.pdf">www.murata-ps.com/data/apnotes/acan-44.pdf</a> |
| ACAN-45         | D1U54P-x Communication Protocol | <a href="http://www.murata-ps.com/data/apnotes/acan-45.pdf">www.murata-ps.com/data/apnotes/acan-45.pdf</a> |

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 ISO 9001 and 14001 REGISTERED



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

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