HPR2812TEX12 Power Supply

90 - 264V_{AC} Input; 12.3V_{DC} Output; 2.8KW Output Power

Description

In a compact 3.38in x 7.67in x 1.57in footprint, the OmniOn Power™ 12.3V_{DC} single-output HPR2812TE redundant power supply delivers up to 2800W with high efficiency. With its small size, the HPR2812TE series is specifically designed to handle power challenges associated with tight space and low airflow. Offering a leading 68.6W/in^3 power density in a 1U height, the HPR2812TE series addresses the requirement of a broad range of high-performance applications in communications, computing and data storage. The HPR series is designed to work in parallel operation, is capable of hot plug operation and able to work in redundancy mode. It delivers full load with 94 percent typical power efficiency at +50°C temperature operation.

Application

- Servers and storage
- Industrial equipment
- Telecommunications equipment
- Network Routers and switches

Features

- Compact size 86mm x 195 mm x 40mm (3.38 in x 7.67 in x 1.57 in) with density of 68.58 W/in^3
- Universal AC input range (90 - 264V_{AC})
- Output voltage of 12.3V
- Maximum output current of 228A @ 12.3V_{OUT} (2800W)
- High efficiency (>94% at full Load, 230$V_{AC,IN}$)
- 2800W capability for 230V input range, 50°C ambient, internal cooling
- 1250W output power at 100V_{IN} AC
- Parallel operation with hot plug capability
- Output overcurrent protection (latching)
- Overtemperature protection
- Output overvoltage protection
- Minimum of 10ms hold up time
- Active power factor corrected input
- Status LED with fault signaling
- I^{2}C communication interface with PMBus™
- Conducted EMI - meets CISPR22 (EN55022) and FCC Class A requirements
- Compliant to RoHS II EU Directive 2011/65/EU
- UL and CuL approved to UL/CSA62368-1, TUV (EN62368-1), CE Mark (for LVD) and CB Report available
- BSMI certified
- ISO** 9001 and ISO 14001 certified manufacturing facilities

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only, functional operation of the device is not implied at these or any other conditions in excess of those given in the operations sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect the device reliability.

Parameter	Device	Min	Max	Unit
Input Voltage - Continuous	All	90	264	V_{AC}
For up to 10 seconds	All	90	275	V_{AC}
Operating Ambient Temperature (Derating above ±50°C, See Thermal Considerations section)	All	-20[1]	65[2]	°C
Storage Temperature	All	-40	85	°C
Humidity (non-condensing)	All	5	95	%
Altitude	All		5000	m
Isolation Voltage - Input to output	All		3000	V_{AC}
Input to safety ground	All		1500	V_{AC}
Output to safety ground (direct connection)	All		None	V_{AC}

Electrical Specifications

Parameter	Device	Min	Typ	Max	Unit
Startup Voltage					
Low-line Operation	V_{IN}	80	87	90	V_{AC}
High-line Operation				185	
Operating Voltage Range (Phase to Neutral or Phase to Phase)					
Low-line Configuration	V_{IN}	90	100-120	179	V_{AC}
High-line Configuration		180	200-240	264	
Operating Input Voltage		90	115/230	264	
Input Source Frequency	All	47	50/60	63	Hz
Operating Current; at 110V_{AC}	I_{IN}		13.8		A_{AC}
at 230V_{AC}			13		
Input Power Factor (230V_{AC}, 50Hz, 20% to Full Load)	All	0.95			PF
Inrush Transient Current (V_{IN} = 264V_{AC}, T_{amb} = 25°C)	All		25	40	A_{Peak}
Leakage Current to earth ground (V_{IN} = 264V_{AC})	All			3.5	mA

[1] Designed to start and work at an ambient as low as -20°C but may not meet operational limits until above -5°C inlet air, and warmed up for 20 min. at ≥ 50% full load.

[2] From 50°C-65°C see derating guidelines.

Electrical Specifications (continued)

Parameter	Device	Min	Typ	Max	Unit
Output Power - @ low line input 90 - 100V_{AC} @ low line input 101 - 179V_{AC} @ high line input 180 - 264V_{AC}	P_{OUT}	1250 1400 2800			W_{DC}
Power Derating with Altitude, 2000-4000m (6562-13,123 ft) >4000m (13,123 ft)				2.0 4.0	% / 305m or 1000 ft
Power Derating with Temperature, 50°C to 65°C				2.0	%/°C
Output Voltage Setpoint	All		12.3		V_{DC}
Output Voltage Tolerance (due to set point, temperature variations, load and line regulations)	All	-2		2	%
Output Load Regulation	All		1		%V_{OUT}
Output Line Regulation			0.5		
Output Ripple and Noise - measured with 0.1µF ceramic capacitor in parallel with 10µF electrolytic capacitor. Peak-to-peak (20MHz Bandwidth)	All		120		mV_{p-p}
Dynamic Load Response - 50% to 100% load transient,1A/µs slew rate Output voltage deviation Settling Time	All		 5 500		 % µs
Output Current - @ 1250W (90 - 100V_{AC}), 12.3V @ 1400W (101 - 179V_{AC}), 12.3V @ 2800W (180 - 264V_{AC}), 12.3V	I_{out}	0		102 114 228	A_{DC}
Output Current Limit Inception	All	105		140	% $I_{O,max}$
Time to latch during over OCP			20		ms
Standby - Output set point Output current Time to Hiccup from OCP			12 2 1		V_{DC} A ms
Efficiency (Fan disabled), Titanium plus efficiency: V_{IN} = 230V_{AC}, 100% load V_{IN} = 230V_{AC}, 50% load V_{IN} = 230V_{AC}, 20% load V_{IN} = 230V_{AC}, 10% load	All		 94 96 95 92		 %
Holdup Time - V_{IN} = 230V_{AC}, 1960W load, down to 90% of $V_{o,set}$	All	10			ms
Output current sharing (50% to full load)		-5		5	%

General Specifications

Parameter	Device	Symbol	Typ	Unit
Calculated Reliability based on Telcordia SR-332 Issue 2: Method 1 Case 3 (V_{IN}=230V_{AC}, 80% full load, T_A = 40°C, 90% confidence)	All	FIT MTBF	628.4 1,591,385	FITs Hours
Weight	All		1250	g

Feature Specifications

Parameter	Device	Min	Typ	Max	Unit
Output Voltage Rise Time (from 10 to 90% of final value)	All		15		ms
Delay from Input being applied to output being in regulation	All	2		5	s
Output Overvoltage Protection	All	13.4		14.5	V_{DC}
Input Undervoltage lockout[3]					
Turn-on Threshold (100% load)	V_{IN}		86		V_{AC}
Turn-off Threshold (100% load)			81		V
Hysteresis			5		V
Maximum Output Capacitance (T_A = 25°C)	All	0		25000	µf

Digital Interface Specifications

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
PMBus™ Signal Interface Characteristics						
Input Logic High Voltage (CLK, DATA)		V	1.5		3.6	V_{DC}
Input Logic Low Voltage (CLK, DATA)		V	0		0.8	V_{DC}
Input high sourced current (CLK, DATA)		I	0		10	µs
Output Low sink Voltage (CLK, DATA, SMBALERT#)	I_{OUT} = 3.5mA	V			0.4	V_{DC}
Output Low sink current (CLK, DATA, SMBALERT#)		I	3.5			mA
Output High open drain leakage current (CLK,DATA, SMBALERT#)	V_{OUT} = 3.6V	I	0		10	µA
PMBus™ Operating frequency range		FPMB			400	KHz
Measurement System Characteristics						
Clock stretching		$T_{stretch}$			1	ms
I_{OUT} measurement range	Direct	I_{RNG}			285	A_{DC}
I_{OUT} measurement accuracy 25°C		$I_{OUT(ACC)}$	-2.5		+2.5	% of FL
V_{OUT} measurement range	Direct		0		16	V_{DC}
V_{OUT} measurement accuracy		$V_{OUT(ACC)}$	-1		+1	%
Temp measurement range	Direct	$Temp_{(RNG)}$	0		+130	°C
Temp measurement accuracy		$Temp_{(ACC)}$	-5		+5	%
V_{IN} measurement range	Direct	$V_{IN(RNG)}$	0		320	$V_{AC, RMS}$
V_{IN} measurement accuracy 25°C		$V_{IN(ACC)}$	-2		+2	%
I_{IN} measurement range	Direct	$I_{IN(RNG)}$	0		25	I_{AC}
I_{IN} measurement accuracy 25°C		$I_{IN(ACC)}$	-4		+4	% of FL
P_{IN} measurement range	Direct	$P_{IN(RNG)}$	0		3250	W
P_{IN} measurement accuracy (280W to 3250W) 25°C		$P_{IN(ACC)}$	-5		+5	%
P_{IN} measurement accuracy (0 to 280W) 25°C		$P_{IN(ACC)}$			35	W
Fan Speed measurement range	Direct		0		25000	RPM
Fan Speed accuracy range			-10		+10	%
Fan speed control range	Direct		20		100	%

Characteristic Curves

The following figures provide typical characteristics for the HPR2812TE at 25°C.

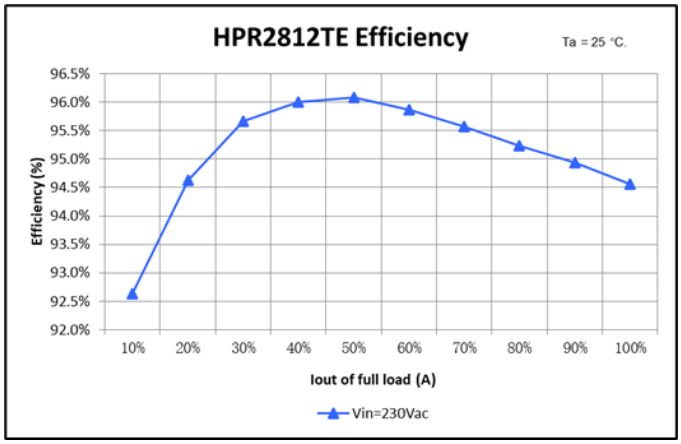


Figure 1. Converter Efficiency vs. Output Current

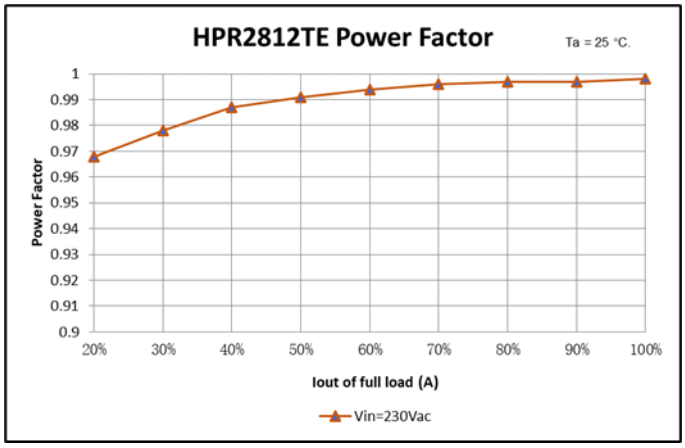


Figure 2. Power Factor vs. Load

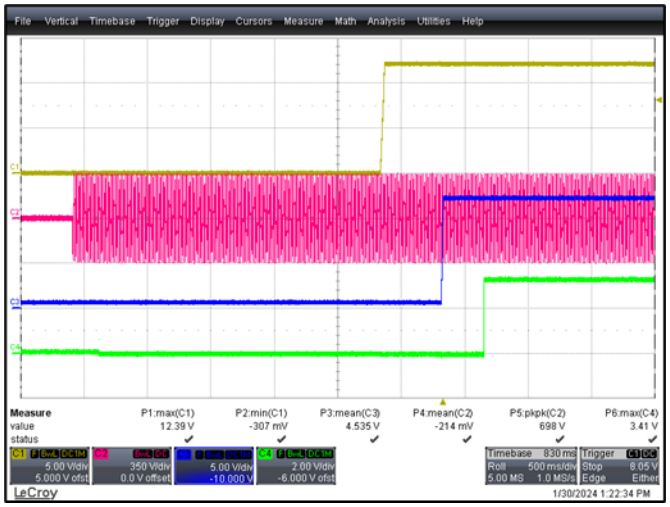


Figure 3. Turn-On AC Line 230V_{AC}, full load (500ms/div), CH1: V_{SB}, CH2: V_{IN}, CH3: V_{OUT}, CH4: DC_OK

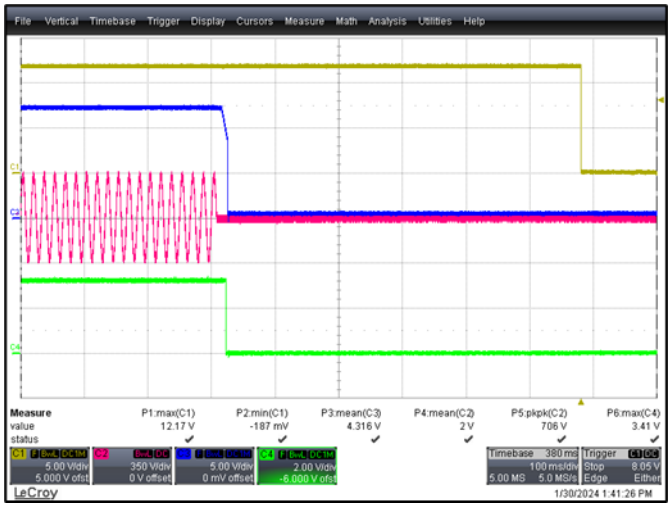


Figure 4. Turn-Off AC Line 230V_{AC}, full load (100ms/div), CH1: V_{SB}, CH2: V_{IN}, CH3: V_{OUT}, CH4: DC_OK

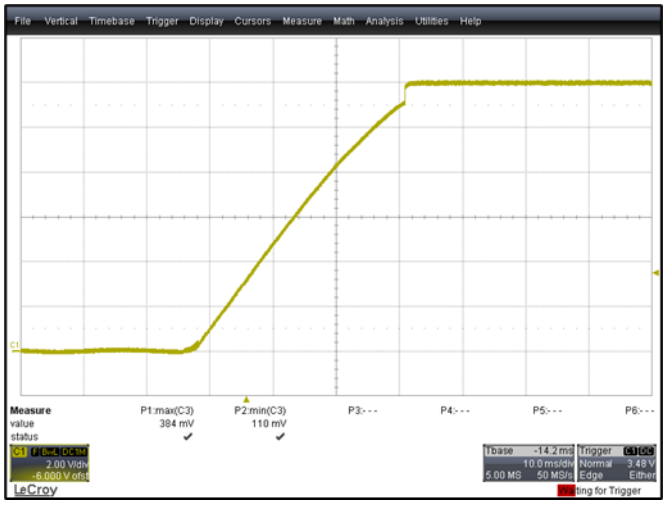


Figure 5. Turn-On AC Line 230V_{AC}, full load (10ms/div), CH1: V_{OUT}(2V/div)

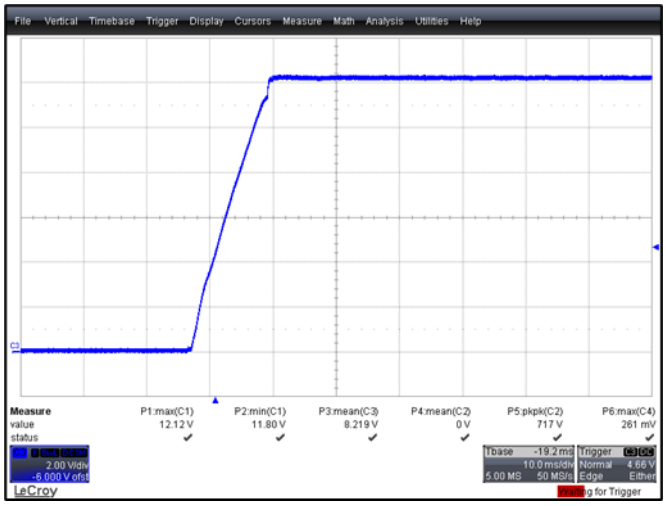


Figure 6. Turn-On AC Line 230V_{AC}, full load (10ms/div), CH3: V_{SB}(2V/div)

Characteristic Curves (continued)

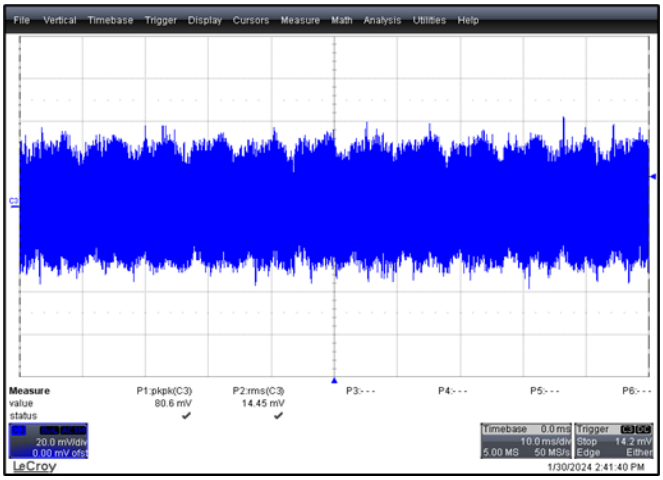


Figure 7. V_{OUT} Ripple 230V_{AC}, full load (10ms/div), CH3: V_{OUT}(20mV/div)

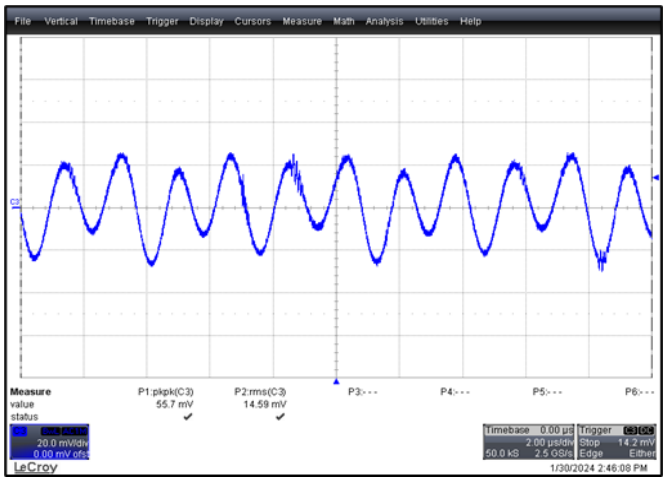


Figure 8. V_{OUT} Ripple 230V_{AC}, full load (2µs/div), CH3: V_{OUT}(20mV/div)

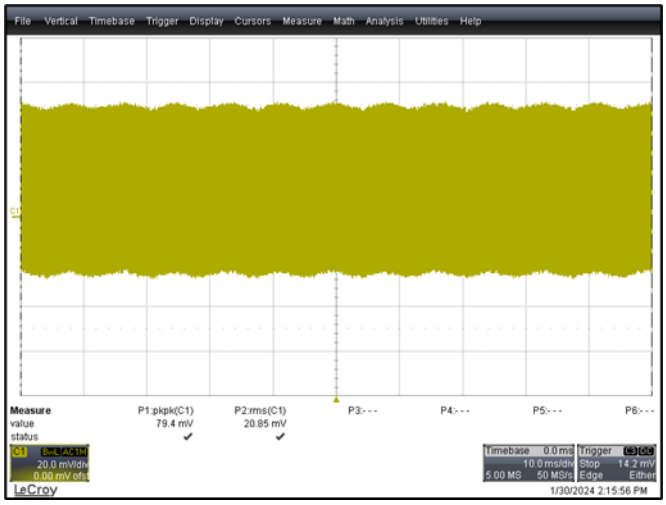


Figure 9. V_{SB} Ripple 230V_{AC}, full load (10ms/div), 20MHz bandwidth, CH1: V_{SB}(20mV/div)

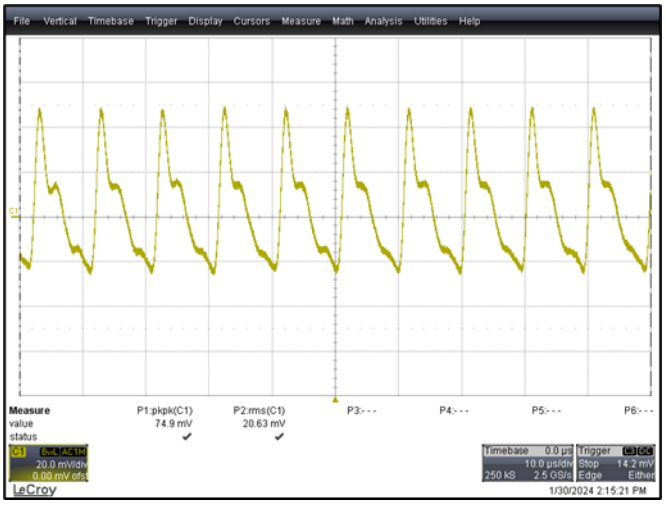


Figure 10. V_{SB} Ripple 230V_{AC}, full load (10µs/div), 20MHz bandwidth, CH1: V_{SB}(20mV/div)

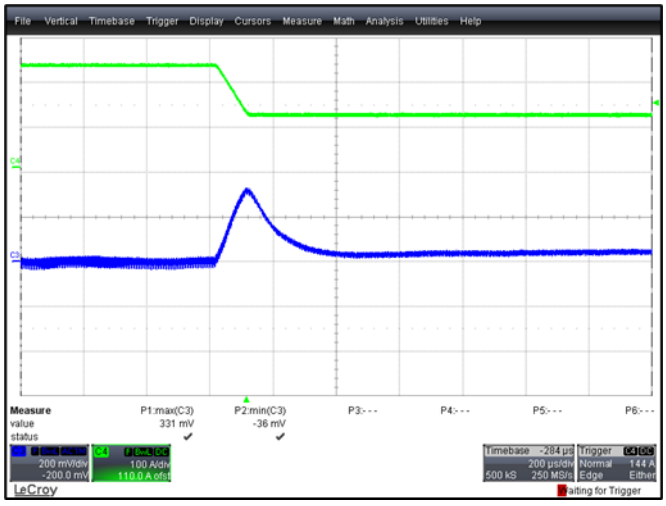


Figure 11. Load Transient V_{OUT}, 100% to 50% load, 1A/µs, (200µs/div), CH3: V_{OUT}(200mV/div), CH4: I_{OUT}(100A/div)

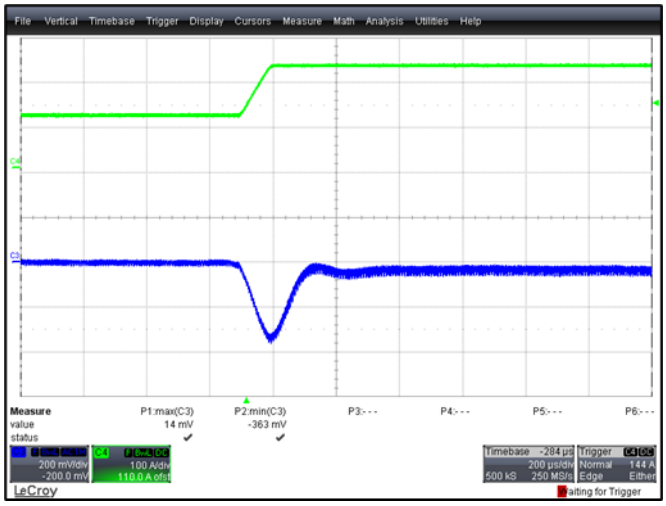


Figure 12. Load Transient V_{OUT}, 50% to 100% load, 1A/µs, (200µs/div), CH3: V_{OUT}(200mV/div), CH4: I_{OUT}(100A/div)

Characteristic Curves (continued)

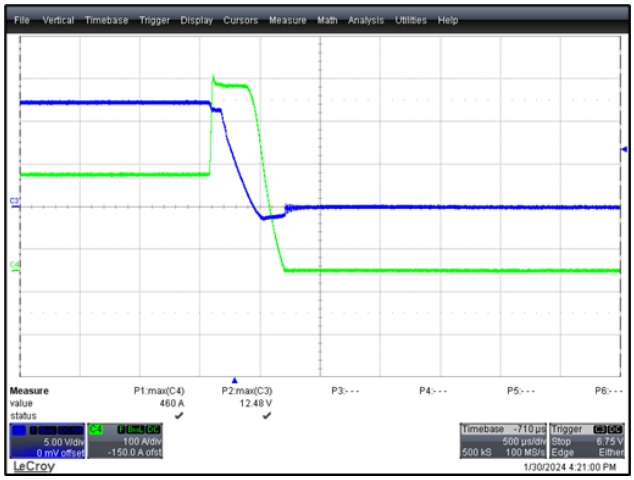


Figure 13. Short circuit on V_{OUT} (500µs/Div), full load to short circuit, CH3: V_{OUT}(5V/div), CH4: I_{OUT}(100A/div)

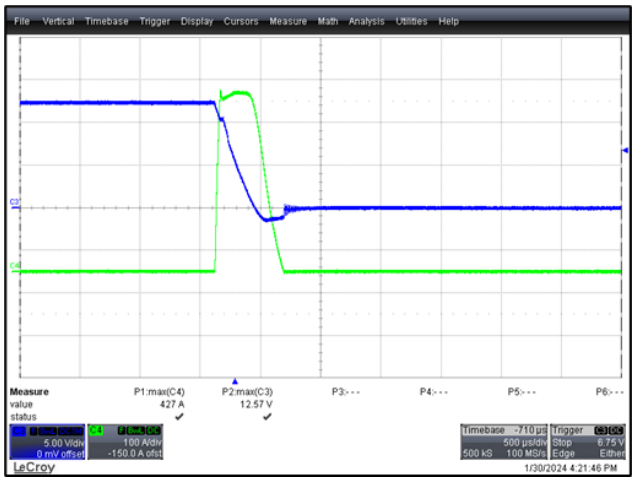


Figure 14. Short circuit on V_{OUT} (500µs/Div), no load to short circuit, CH3: V_{OUT}(5V/div), CH4: I_{OUT}(100A/div)

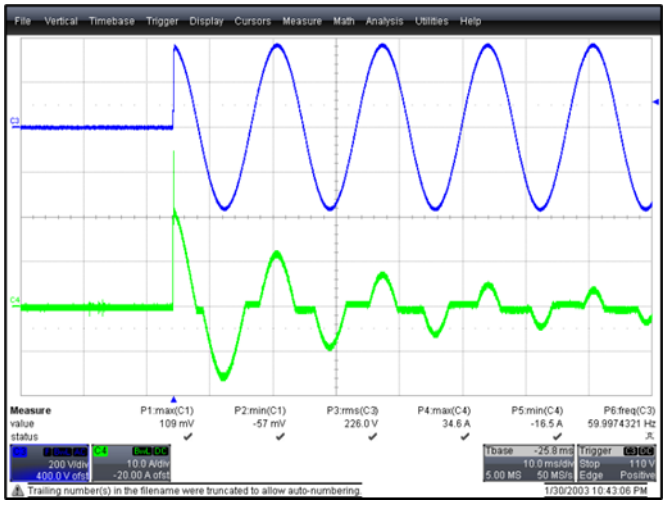


Figure 15. Inrush current, V_{IN} = 264V_{AC}, 90 phase angle, CH3: V_{IN}(200V/div), CH4: I_{IN}(10A/div)

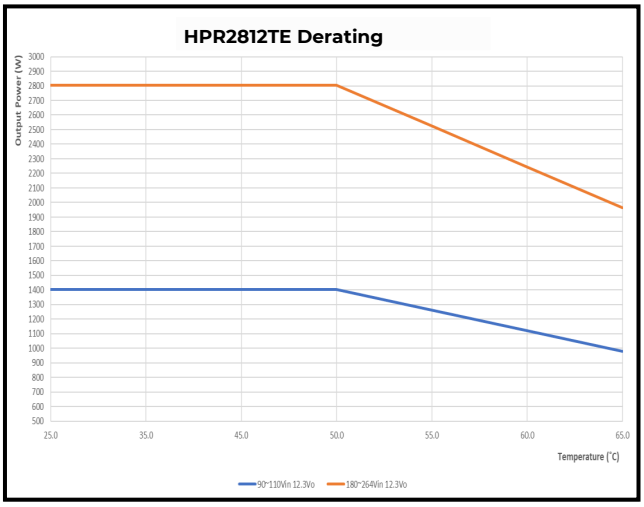


Figure 16. Derating

Environmental Specifications

Parameter	Device	Specification/Test
Radiated Emissions	All	CISPR32 Class A with 3dB margin
Conducted Emissions	All	CISPR32 Class A with 6dB margin
ESD	All	IEC61000-4-2, Level 4 Contact ±8kV & Air Discharge ±15kV Criteria A
Radiated Susceptibility[4]	All	IEC61000-4-3, Level 3, 10V/m
Electrical Fast Transient Common Mode	All	IEC61000-4-4, Level 3, ±2kV Criteria A
Surge Immunity	All	IEC61000-4-5, Level 3 2KV/1kV common mode and differential mode, unit passes criteria A (normal performance; impedance is 2 Ohms for differential and 12 Ohms for common mode)
Conducted RF Immunity	All	IEC61000-4-6, Level 3, $10V_{RMS}$
Input Voltage Dips	All	EN61000-4-11, 1) V_{IN} 230Volts, 70% Load, Dip 100%, Duration 10ms Criteria A 2) V_{IN} 230Volts, 100% Load, Dip 100%, Duration < 50 ms, V1: B; VSB: A 3) V_{IN} 230Volts, 100% Load, Dip 100%, Duration > 50 ms Criteria B
Input Harmonics	All	IEC61000-3-2
Input AC flicker	All	IEC61000-3-3
Shock and Vibration	All	Per IPC-9592B, Class II
Inrush current	All	As per ETSI EN 300 132-1

Safety Specifications

Parameter	Device	Specification/Test
Dielectric Withstand Voltage (between input and output)	All	Minimum of $1500V_{AC}$ for 1 minute
Insulation Resistance (between input and output)	All	Minimum of 5 MΩ
Safety Standards	All	Class 1, UL/CSA62368-1, TUV (EN62368-1), CE Mark (for LVD), BSMI Certified

NOTE: Within the power supply the output GND pins are connected to the chassis, which in turn is connected to the Protective Earth terminal on the AC inlet. Therefore, it is not possible to set the potential of the output return (GND) to any other than Protective Earth potential.

FRONT LEDS

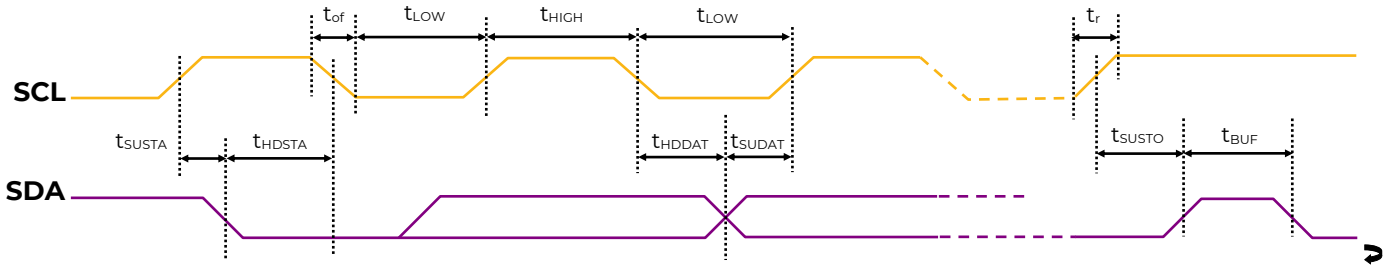
The front-end has 1 front LED showing the status of the supply. LED is bi-colored: green and yellow, and indicates DC power presence or fault situations. For the position of the LED see Table lists the different LED status.

Operating Condition	LED State
Output ON and OK	Solid GREEN
No AC power to all power supplies	OFF
AC cord unplugged or AC power lost; with a second power supply in parallel still with AC input power, Input UVP	OFF
AC present/Only 12VSB on (Standby mode)	1 Hz Blink GREEN
Power supply warning events where the power supply continues to operate; high temp, high current, slow fan	1 Hz Blink AMBER
Power supply critical event causing a shutdown; e.g. OCP, OVP, OTP, Fan Fail, Input OVP	Solid AMBER
Power supply in FW upload mode	2 Hz Blink GREEN

I²C Details

Parameter	Description	Condition	Min	Max	Unit
SCL/SDA					
V_{IL}	Input low voltage		-0.5	1.0	V
V_{IH}	Input high voltage		2.3	3.5	V
V_{hys}	Input hysteresis		0.15		V
V_{OL}	Output low voltage	3mA sink current	0	0.4	V
Tr	Rise time for SDA and SCL		20+0.1C_b[5]	300	ns
t_{of}	Output fall time ViHmin → ViLmax	10 pF < C_b[5] < 400 pF	20+0.1C_b[5]	250	ns
I_i	Input current SCL/SDA	0.1 VDD < Vi < 0.9 VDD	-10	10	µA
C_i	Internal Capacitance for each SCL/SDA			0	pF
f_{SCL}	SCL clock frequency		0	400	kHz
$R_{pull-up}$	External pull-up resistor	f_{SCL} ≤ 400 kHz		1000 ns/C_b[5]	Ω
t_{HDSTA}	Hold time (repeated) START	f_{SCL} ≤ 400 kHz	0.6		µs
t_{LOW}	Low period of the SCL clock	f_{SCL} ≤ 400 kHz	1.3		µs
t_{HIGH}	High period of the SCL clock	f_{SCL} ≤ 400 kHz	0.6		µs
t_{SUSTA}	Setup time for a repeated START	f_{SCL} ≤ 400 kHz	0.6		µs
t_{HDDAT}	Data hold time	f_{SCL} ≤ 400 kHz	0	0.9	µs
t_{SUDAT}	Data setup time	f_{SCL} ≤ 400 kHz	100		µs
t_{SUSTO}	Setup time for STOP condition	f_{SCL} ≤ 400 kHz	0.6		µs
t_{BUF}	Bus free time between STOP and START	f_{SCL} ≤ 400 kHz	1		ms

[5]C_b = Capacitance of bus line in pF, typically in the range of 10 - 400 pF.



A2	A1	A0	I²C Address	
			Power Management Bus Address	EEPROM Address
0	0	0	0XB0	0XA0
0	0	1	0XB2	0XA2
0	1	0	0XB4	0XA4
0	1	1	0XB6	0XA6
1	0	0	0XB8	0XA8
1	0	1	0XBA	0XAA
1	1	0	0XBC	0XAC
1	1	1	0XBE	0XAE

I²C Command Set

Command		Type	Size	Possible Option	Default value	Min setting range	Max setting range	Note
0x00	PAGE	RW Byte	1					
0x01	OPERATION	RW Byte	1	Option: 0x00/ 0x80 only	0x80			
0x02	ON_OFF_CONFIG	RW Byte	1		0x1D			
0x03	CLEAR_FAULTS	Write Byte	0					
0x10	WRITE_PROTECT	Write Byte	1		0x00			
0x11	STORE_DEFAULT_ALL	Write Byte	0					
0x12	RESTORE_DEFAULT_ALL	Write Byte	0					
0x19	CAPABILITY	Read Byte	1		0xB0			
0x1A	QUERY	Block W/R	1					
0x1B	SMBALERT_MASK	Block W/R	1					
0x20	VOUT_MODE	Read Byte	1		0x15			
0x21	VOUT_COMMAND	RW word	2		0x6266 (12.3V)	10.8V	13.6V	
0x35	VIN_ON	RW word	2		0xF8AE (87.0V)	87V	220V	
0x36	VIN_OFF	RW word	2		0xF8A4 (82.0V)	82V	218V	
0x3A	FAN_CONFIG	Read Byte	1		0x90			
0x3B	FAN_COMMAND	RW word	2		0x0000 (No overwrite)	20%	100%	
0x40	VOUT_OV_FAULT_LIMIT	RW word	2		0x7666 (14.8V)	10.9V	15.99V	
0x41	VOUT_OV_FAULT_ RESPONSE	Read Byte	1		0x80			
0x46	IOUT_OC_FAULT_LIMIT	RW word	2		0xF9F4 (250A)	50A	260A	
0x47	IOUT_OC_FAULT_ RESPONSE	Read Byte	1		0xC0			
0x4A	IOUT_OC_WARN_LIMIT	RW word	2		0xF9DA (237A)	40A	250A	
0x4F	OT_FAULT_LIMIT	RW word	2		0xF200 (128°C)	25°C	140°C	
0x50	OT_FAULT_RESPONSE	Read Byte	1		0xB8			
0x51	OT_WARN_LIMIT	RW word	2		0xF1D0 (116°C)	25°C	125°C	
0x79	STATUS_WORD	Read Word	2					
0x7A	STATUS_VOUT	Read Byte	1					
0x7B	STATUS_IOUT	Read Byte	1					
0x7C	STATUS_INPUT	Read Byte	1					
0x7D	STATUS_TEMP	Read Byte	1					
0x7E	STATUS_CML	Read Byte	1					
0x7F	STATUS_OTHER	Read Byte	1					
0x80	STATUS_MFR	Read Byte	1					
0x81	STATUS_FANS	Read Byte	1					

I²C Command Set (continued)

Command		Type	Size	Possible Option	Default value	Min setting range	Max setting range	Note
0x86	READ_EIN	Read Block	6					Input Energy (W-Sample) Direct Format : m=1, R=0, b=0
0x87	READ_EOUT	Read Block	6					Input Energy (W-Sample) Direct Format : m=1, R=0, b=0
0x88	READ_VIN	Read Word	2					
0x89	READ_IIN	Read Word	2					
0x8A	READ_VCAP	Read Word	2					
0x8B	READ_VOUT	Read Word	2					
0x8C	READ_IOUT	Read Word	2					
0x8D	READ_TEMP1	Read Word	2					
0x8E	READ_TEMP2	Read Word	2					
0x8F	READ_TEMP3	Read Word	2					
0x90	READ_FAN_SPEED	Read Word	2					
0x96	READ_POUT	Read Word	2					
0x97	READ_PIN	Read Word	2					
0x98	PMBUS_REVISION	Read Byte	1		0x22			
0x99	MFR_ID	Read Block	5		OMPW			
0x9A	MFR_MODEL	Read Block	18		from spec			
0x9B	MFR_REVISION	Read Block	8		from label			
0x9C	MFR_LOCATION	Read Block	12		SHANGHAI/ MATAMOROS			
0x9D	MFR_DATE	Read Block	6		YYMMDD			
0x9E	MFR_SERIAL	Read Block	18		from label			
0xA0	MFR_VIN_MIN	Read Word	2		0xF8AA (85.0V)			
0xA1	MFR_VIN_MAX	Read Word	2		0xFA12 (265.0V)			
0xA4	MFR_VOUT_MIN	Read Word	2		0x5B33 (11.4V)			
0xA5	MFR_VOUT_MAX	Read Word	2		0x64CC (12.6V)			

I²C Command Set (continued)

Command		Type	Size	Possible Option	Default value	Min setting range	Max setting range	Note
0xA6	MFR_IOUT_MAX	Read Word	2		0xF9DC (238.0A)			
0xA7	MFR_POUT_MAX	Read Word	2		0x12C8 (2848W)			
0xA8	MFR_TAMB_MAX	Read Word	2		0xF104 (65°C)			
0xA9	MFR_TAMB_MIN	Read Word	2		0xF760 (-40°C)			
0xC0	MFR_MAX_TEMP_1	Read Word	2		0xF15C (87°C)			Inlet ambient OT warning threshold
0xC1	MFR_MAX_TEMP_2	Read Word	2		0xF184 (97°C)			Oring-FET OT warning threshold
0xC2	MFR_MAX_TEMP_3	Read Word	2		0xF124 (73°C)			Outlet ambient OT warning threshold
0xC3	READ_VSTANDBY	Read Word	2					VOUT_MODE
0xC4	READ_ISTANDBY	Read Word	2					LINEAR11
0xC5	READ_REMOTE_SENSE	Read Word	2					VOUT_MODE
0xD0	READ_VINT	Read Word	2					VOUT_MODE
0xD1	READ_ISHARE	Read Word	2					LINEAR11
0xE8	MFR_COMCODE	Read Block	18		from label			
0xF5	MFR_FW_REV	Read Word	2		from label			4 hex characters,0x12 18 means v12.18
0x00	PAGE	RW Byte	1					
0X03	CLEAR_FAULTS	Write Byte	0					
0X20	VOUT_MODE	Read Byte	1		0X15			
0X79	STATUS_WORD	RW Word	2					
0X7A	STATUS_VOUT	RW Byte	1					
0X7B	STATUS_IOUT	RW Byte	1					
0X8B	READ_VOUT	Read Word	2					
0X8C	READ_IOUT	Read Word	2					
0X96	READ_POUT	Read Word	2					
0XA4	MFR_VOUT_MIN	Read Word	2		0X5B33 (11.4V)			

I²C Command Set (continued)

Command		Type	Size	Possible Option	Default value	Min setting range	Max setting range	Note
0xA5	MFR_VOUT_MAX	Read Word	2		0x64CC (12.6V)			
0XA6	MFR_IOUT_MAX	Read Word	2		0XF80A (5W)			
0xA7	MFR_POUT_MAX	Read Word	2		0xF050 (20W)			

Safety Considerations

The HPR2812TE series power supply is intended for inclusion in other equipment and the installer must ensure that it follows all the requirements of the end application. This product is only for inclusion by professional installers within other equipment and must not be operated as a stand-alone product The power supply meets Class 1, UL/CSA 62368, EN62368, with the following deviations: Nemko. UL 62368 (Recognized Component) C-UL (Canadian Approval by UL) and is certified to BSMI.

Feature Descriptions

Overcurrent Protection

To provide protection in a fault condition (output overload), the power supply is equipped with internal current limiting circuitry. At the point of current-limit inception the PSU will wait for 20ms beyond which the output will be shutdown in latched mode. The PSU can be cleared of the latched shutdown by way of recycling the input voltage or PSON_L input.

STANDBY OUTPUT overcurrent protection

On the standby output a hiccup type over current protection is implemented. This protection will shut down the standby output immediately when standby current reaches or exceeds IVSB lim. After an off-time of 1s the output automatically tries to restart. If the overload condition is removed the output voltage will reach again its nominal value. At continuous overload condition the output will repeatedly trying to restart with 1s intervals. A failure on the Standby output will shut down both Main and Standby outputs.

Overvoltage Protection

Overvoltage protection is a feature of the HPR2812TE series power supply that protects both the load and the power supply from an output overvoltage condition. When an overvoltage occurs, the power supply shuts down and latches off until the overvoltage condition is removed. It is necessary to recycle the input to restart the power supply when this protection is activated.

Overtemperature Protection

The HPR2812TE series also features overtemperature protection to provide additional protection in a fault condition. The power supply is equipped with a thermal shutdown circuit which detects excessive internal temperatures and shuts the unit down. Once the power supply goes into overtemperature shutdown, it will cool before attempting to restart.

Ishare signal

All output signals are relative to signal ground SGND in the PSU.

The HPR2812E front-ends have an active current share scheme implemented for V1. All the ISHARE current share pins need to be interconnected to activate the sharing function. If a supply has an internal fault or is not turned on, it will disconnect its ISHARE pin from the share bus. This will prevent dragging the output down (or up) in such cases.

The current share function uses an analog bus to transmit and receive current share information. The controller implements a Master/Slave current share function. The power supply providing the largest current among the group is automatically the Master. The other supplies will operate as Slaves and increase their output current to a value close to the Master by slightly increasing their output voltage. The voltage increase is limited to +250 mV. The output will share within 5% at full load.

ISHARE pins must be interconnected without any additional components. This in-/output has a 15 V Zener diode as a protection device and is disconnected from internal circuits when the power supply is switched off.

Input Under voltage Lockout

At input voltages below the input under voltage lockout limit, power supply operation will be disabled. The power supply will begin to operate at an input voltage above the under-voltage lockout turn-on threshold.

PSKILL

The PSKILL input is an active-high and normally a trailing pin in the connector and is used to disconnect the main output as soon as the power supply is being unplugged. This pin should be connected to SGND on the system. The standby output will remain on regardless of the PSKILL input state.

Feature Descriptions (continued)

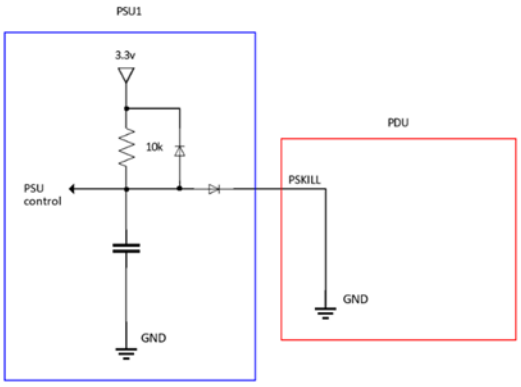


Figure 17. PSKILL connection

PSON_L

The PSON_L is an internally pulled-up (3.3V) input signal to ON/OFF the main output of the PSU. This active-low pin is also used to clear any latched fault condition. The standby output will remain on regardless of the PSON_L input state

Operation	Status
Q1 ON	PSU1 ON
Q1 OFF	PSU1 OFF

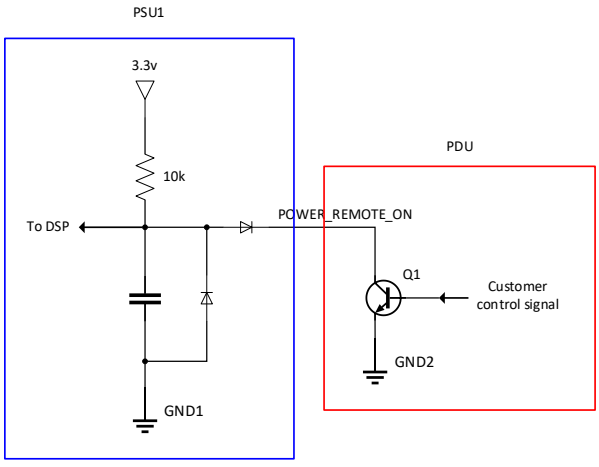


Figure 18. PSON_L connection

PRESENT_L

The PRESENT_L pin is wired to internal SGND within the power supply. This pin indicates that there is a power supply present in this system slot. An external pull-up resistor has to be added within the application.

Current into PRESENT_L should not exceed 5 mA to guarantee a low level voltage if power supply is seated.

Monitor	Status
PRESENT_L = 0V	Seated
PRESENT_L = 3.3V	NOT seated

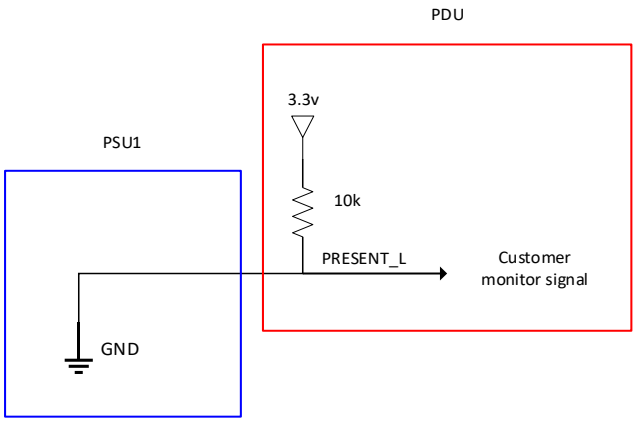


Figure 19. PRESENT_L connection

AC OK

The ACOK is an open collector output that requires an external pull-up to a maximum of 12V indicating whether the input is within the input operational range of the power supply. The ACOK signal is active-high.

Monitor	Status
AC_OK high	AC input OK
AC_OK low	AC input Fail

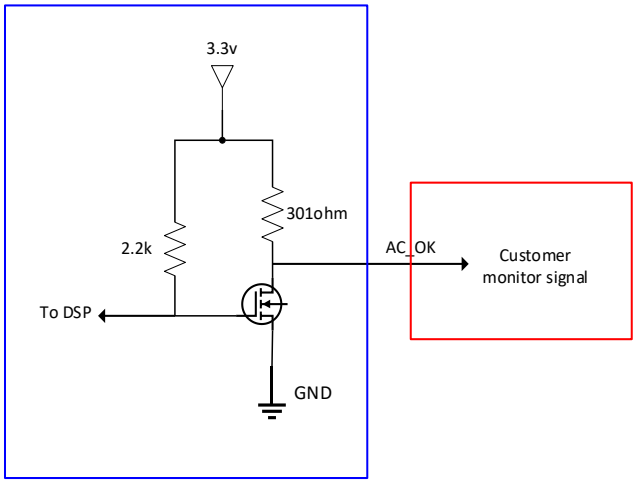


Figure 20. AC_OK connection

Feature Descriptions (continued)

PWOK

PWOK is a power OK signal and will be pulled HIGH by the power supply to indicate that all the outputs are within the regulation limits of the power supply. When any output voltage falls below regulation limits or when AC power has been removed for a time sufficiently long so that power supply operation is no longer guaranteed, PWOK will be de-asserted to a LOW state.

Monitor	Status
PW_OK high	V_{OUT} OK
PW_OK low	V_{OUT} Fail

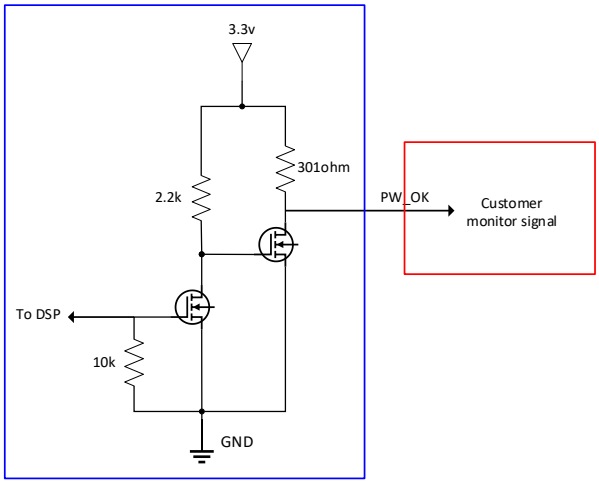


Figure 21. PWOK connection

SMB_ALERT_L

The SMB_ALERT_L signal indicates that the power supply is experiencing a problem that the system agent should investigate. The power supply can issue SMB_ALERT_L driven from either its internal micro controller (µC) or from the PMBusTM master selector.

Thermal Considerations

Considerations include ambient temperature, airflow, power supply dissipation and the need for increased reliability. A reduction in the operating temperature of the power supply will result in increased reliability. The thermal data presented is based on measurements during normal airflow.

Remote sense

Remote sense connections intended to be connected at and sense the voltage at the point of load. 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.

Mechanical Outline

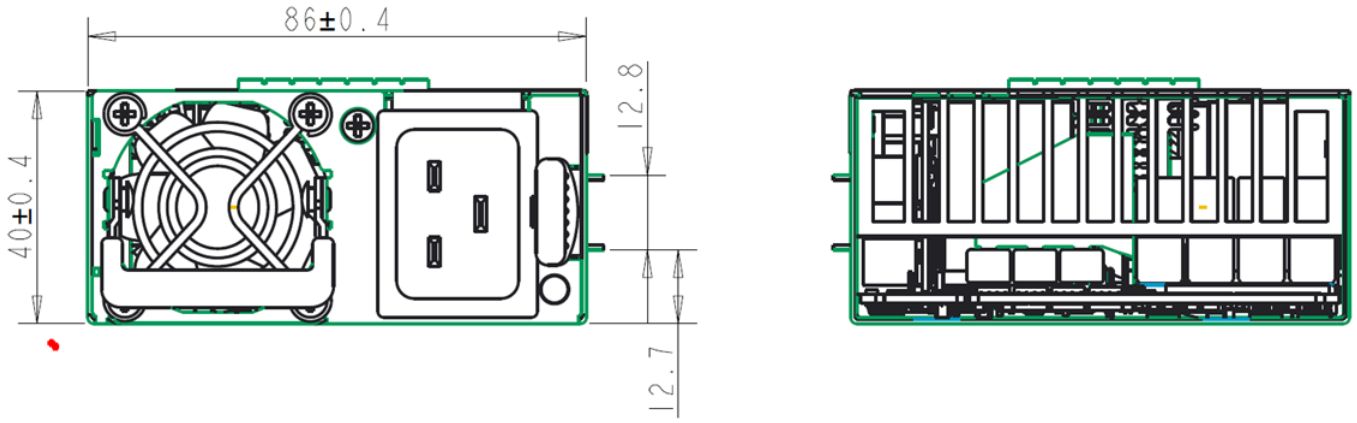
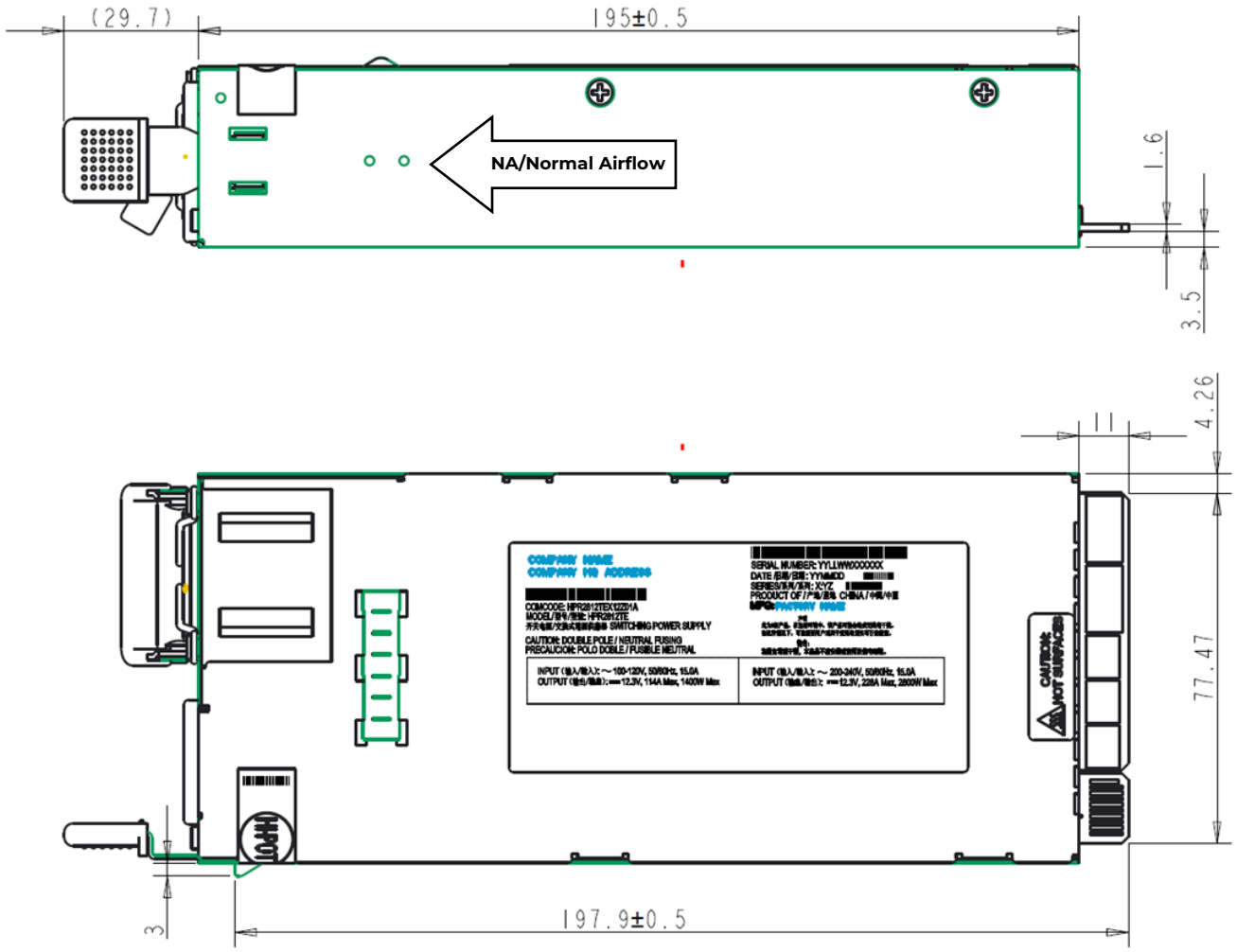


Figure 23. Mechanical Drawing - Front/Rear View



Connector Information

The AC input receptacle shall be a 3 pins IEC320 C20 inlet.
For the pin assignment of DC connector, please refer to Figure 24 and Table 1 below.
Mating connector should be FCI 10121510-480020ALF.

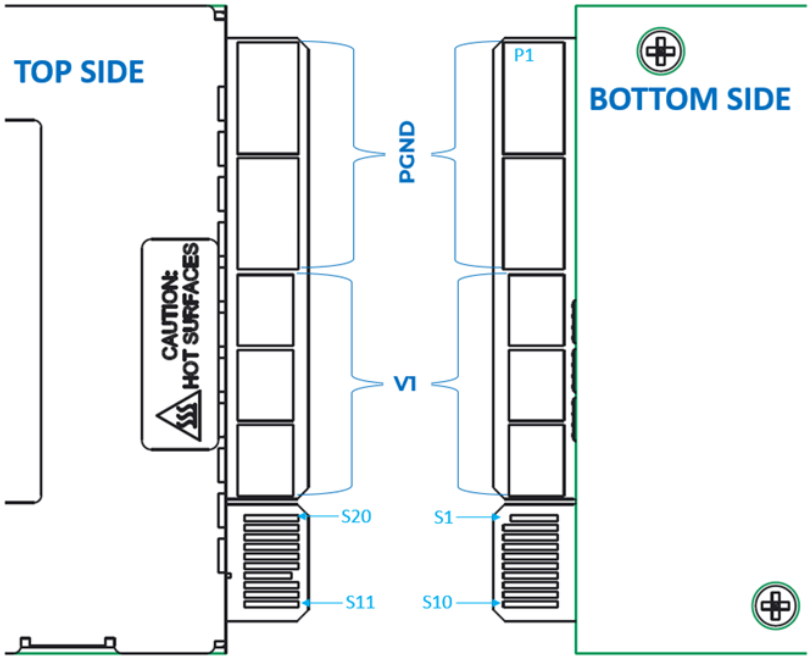


Table 1 Pin Assignment of DC Connector

Pin	Name	Description
	V1	+12 V_{DC} main output
	PGND	+12 V_{DC} main output ground
S1	PSKILL	Power supply shutdown (trailing pin)[6] : active-high
S2	ACOK	AC input OK signal: active-high
S3	SDA	I^2C DATA I^2C data signal line
S4	SCL	I^2C CLOCK I^2C clock signal line
S5	ISHARE	12 V Load Share V1 Current share bus
S6	A0	I^2C Address selection input
S7	A1	I^2C Address selection input
S8	PWOK	Power OK signal output: active-high
S9	A2	I^2C address selection input
S10	EEPROM_WP	EEPROM write protect
S11	SGND	Signal ground[7] (return)
S12	PSON_L	Power supply on input: active-low
S13	SMB_ALERT_L	SMB Alert signal output: active-high
S14	PRESENT_L	Power supply present (trailing pin): active-low
S15-16	VSB_GND	Standby Ground[6]
S17-18	VSB	Standby positive output
S19	V1_SENSE-	Main output negative sense
S20	V1_SENSE+	Main output positive sense

[6]This pin should be connected to SGND on the system.
[7]This pin should be connected to PGND on the system.
All signal pins are referred to SGND.

HPR2812TE Ordering Information

Please contact your OmniOn Power™ Sales Representative for pricing, availability and optional features.

Table 2: Device codes

Device Code	Input Voltage Range	Output Voltage	Output Current	Airflow Direction	Standby Supply	Temperature Range	Ordering Codes
HPR2812TEX12Z02A	90 – 264V_{AC}	12.3V_{DC}	228 A	Normal	12V	-20 to 65°C	HPR2812TEX12Z02A

Change History (excludes grammar & clarifications)

Revision	Date	Description of the change
1.0	12/03/2024	Initial Release
1.1	2/11/2025	Remove BIS certification (page 1 and 8).

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