

The 4:1 input voltage 1000W DC/DC full brick converters includes trim and remote ON/OFF. Threaded through holes are provided to allow easy mounting or addition of a heatsink for extended temperature operation. The converters with high efficiency and high power density are accomplished through use of high-efficiency synchronous rectification technology, advanced electronic circuit, packaging and thermal design thus resulting in a high reliability product. Converter operates at a fixed frequency and follows conservative component de-rating guidelines.



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Features

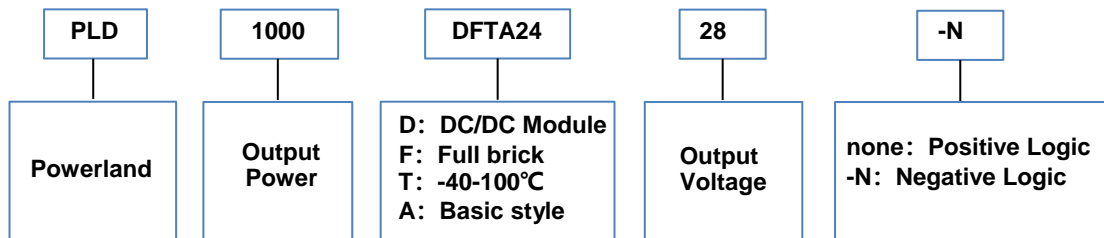
- 4:1 Input voltage range
- Small size: 119.4*63.5*13.2mm
- High power density
- High efficiency
- Excellent thermal performance with metal baseplate
- Monotonic startup into pre bias
- Remote ON/OFF
- Output trim
- Base Plate Temperature: -40°C to +100°C
- Parallel operation
- RoHS Compliance

Applications

- Industry standard footprint for mobile (12Vin), process control (24Vin), and military COTS (28Vin) applications.

Model List

Part Number Description



Model Number	Vin Range	Vin Normal	Output Power	Output Current Max	Output Voltage	Efficiency @24Vdc
PLD1000-DFTA24-12	9-36 Vdc	24Vdc	1000W	84A	12V	
PLD1000-DFTA24-24	9-36 Vdc	24Vdc	1000W	42A	24V	93.6%
PLD1000-DFTA24-28	9-36 Vdc	24Vdc	1000W	36A	28V	94.5%
PLD1000-DFTA24-48	9-36 Vdc	24Vdc	1000W	21A	48V	
PLD1000-DFTA24-53	9-36 Vdc	24Vdc	1000W	19A	53V	

Electrical Specifications

Conditions: Ta = 25 °C, Airflow = 300 LFM (1.5 m/s), Vin = 24VDC, unless otherwise specified. Specifications are subject to change without notice.

All Models					
Parameter	Notes	Min	Typ	Max	Units
Absolute Maximum Ratings					
Input Voltage	Continuous	0		40	V
	Transient (100ms)			50	V
Operating Temperature	Baseplate (100% load)	-40		100	°C
Storage Temperature		-55		125	°C
Isolation Characteristics					
Isolation Voltage	Input to Output		2250		VDC
	Input to Baseplate & Output to Baseplate		1500		VDC
Isolation Capacitance			9000		pF
Isolation Resistance		10	20		MΩ
Insulation Safety Rating			Basic		
Feature Characteristics					
Fixed Switching Frequency			200		KHz
	Input Current and Output Voltage Ripple		400		KHz
Output Voltage Trim Range	Adjustable via TRIM (Pin 12)	60		110	%
Remote Sense Compensation	Between SENSE+ and +OUT pins			1	V
Output Overvoltage Protection	Non-latching	114	122	130	%
Over temperature Shutdown	Non-latching (Vin=9V; 12V, 24/36V)	101	105	112	°C
Auto-Restart Period	Applies to all protection features	1.7	2	2.3	s
Turn-On Delay Time from Vin	Time from UVLO to VO=90% VOUT (NOM) Resistive load	480	525	550	ms
Turn-On Delay Time from ON/OFF Control	PLD1000-DFTA24-24 & PLD1000-DFTA24-28	20	30	45	ms
	PLD1000-DFTA24-48 & PLD1000-DFTA24-53	20	45	60	ms
Rise Time (Vout from 10% to 90%)	PLD1000-DFTA24-24 & PLD1000-DFTA24-28	10	20	35	ms
	PLD1000-DFTA24-48 & PLD1000-DFTA24-53	10	40	60	ms
ON/OFF Control – Positive Logic					
ON state	Pin open = ON or external voltage applied	2		12	V
Control Current				0.16	mA
OFF state	Pin shorted to -INPUT pin or low logic	0		0.8	V
Control current				0.36	mA
ON/OFF Control – Negative Logic					
ON state	Pin shorted to -INPUT pin or low logic	0		0.8	V
OFF state	Pin open = OFF or external voltage applied	2		12	V

Electrical Specifications

Conditions: $T_a = 25\text{ }^\circ\text{C}$, Airflow = 300 LFM (1.5 m/s), $V_{in} = 24\text{VDC}$, unless otherwise specified. Specifications are subject to change without notice.

PLD1000-DFTA24-24					
Parameter	Notes	Min	Typ	Max	Units
Input Characteristics					
Operating Input Voltage Range		9	24	36	V
Turn-on Threshold	Non-latching				
Turn-off Threshold		8.2	8.5	8.8	V
Lockout Hysteresis Voltage		7.7	8.0	8.3	V
Lockout Hysteresis Voltage		0.4	0.55	0.7	V
Maximum Input Current	$V_{in} = 9\text{V}$, 80% Load			98	A
	$V_{in} = 12\text{V}$, 100% Load			94	A
	$V_{in} = 24\text{V}$, Output Shorted		400		mA_{RMS}
Input Stand-by Current	Converter Disabled		5	8	mA
Input Current @ No Load	Converter Enabled		480	600	mA
Minimum Input Capacitance (external)	ESR < 0.1 Ω	1000			μF
Inrush Transient				0.19	A^2s
Input Terminal Ripple Current	20 MHz bandwidth, 100% Load		2.5		A_{RMS}
Output Characteristics					
Output Voltage Range	Over Load, Line and temperature	23.4	24.00	24.6	V
Output Voltage Set Point Accuracy	(No load)	23.76	24.00	24.24	V
Output Regulation					
Over Line	$V_{in} = 9\text{V}$ to 36V		0.05	0.15	%
Over Load	$V_{in} = 24\text{V}$, Load 0% to 100%		2.5	2.63	%
Temperature Coefficient			0.015	0.03	%/ $^\circ\text{C}$
Over voltage Protection		27.36		31.2	V
Output Ripple and Noise	Full load, 20 MHz bandwidth 470 μF /70 $\text{m}\Omega$ *2+10 μF /1210/X7R/100V		200	360	$\text{mV}_{\text{PK-PK}}$
			60	100	mV_{RMS}
External Load Capacitance	Full Load (resistive) (over operating temp range)	CEXT	1000	4700	μF
		ESR	10	100	$\text{m}\Omega$
Output Current Range	$V_{in} = 12\text{V} - 36\text{V}$	0		42	A
	$V_{in} = 9\text{V}$	0		33.5	A
Current Limit Inception	$V_{in} = 12\text{V} - 36\text{V}$	46		54.6	A
	$9\text{V} \leq V_{in} < 12\text{V}$	37		54.6	A
RMS Short-Circuit Current	Non-latching, Continuous		4	8	A_{RMS}
Parallel current sharing accuracy				10	%
Dynamic Response					
Load Change 50%-75%-50%, $di/dt = 1\text{A}/\mu\text{s}$	470 μF /70 $\text{m}\Omega$ *2+10 μF /1210/X7R/100V		480	840	$\text{mV}_{\text{P-P}}$
Load Change 50%-100%-50%, $di/dt = 1\text{A}/\mu\text{s}$	470 μF /70 $\text{m}\Omega$ *2+10 μF /1210/X7R/100V		960	1440	$\text{mV}_{\text{P-P}}$
Settling Time to 1% of V_{OUT}			800		μs
Efficiency					
100% Load	$V_{in} = 24\text{V}$	92.6	93.6	94.3	%
	$V_{in} = 12\text{V}$	91.2	92.2	93	%
50% Load	$V_{in} = 24\text{V}$	94.2	95.2	95.8	%
	$V_{in} = 12\text{V}$	93.7	94.7	95.3	%

Electrical Specifications

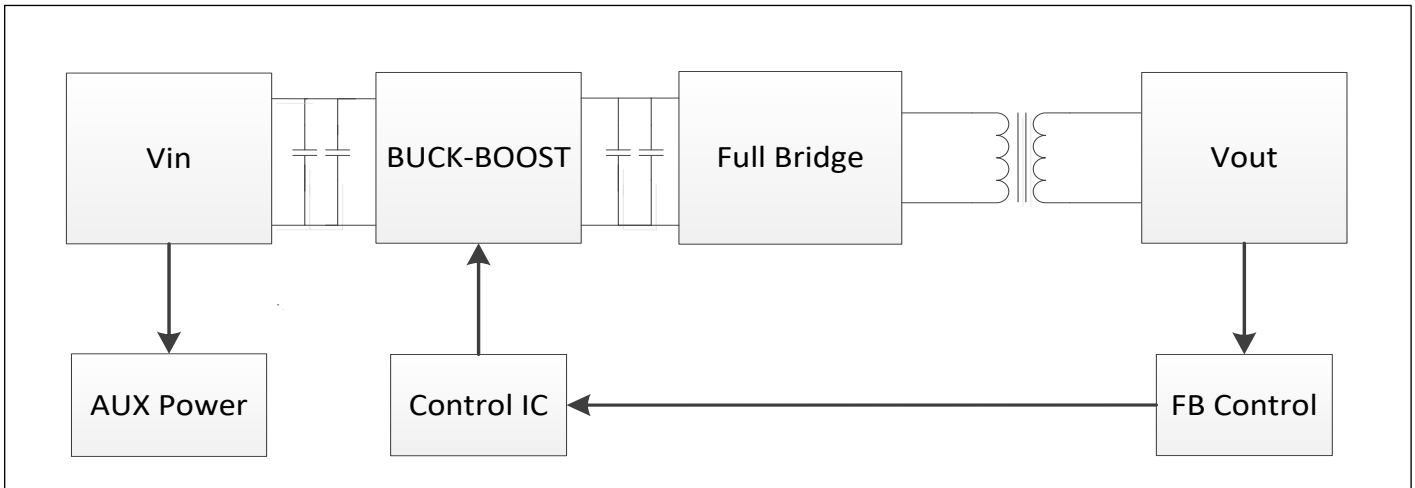
Conditions: Ta = 25 °C, Airflow = 300 LFM (1.5 m/s), Vin = 24VDC, unless otherwise specified. Specifications are subject to change without notice.

PLD1000-DFTA24-28					
Parameter	Notes	Min	Typ	Max	Units
Input Characteristics					
Operating Input Voltage Range		9	24	36	V
Turn-on Threshold	Non-latching				
Turn-off Threshold		8.2	8.5	8.8	V
Lockout Hysteresis Voltage		7.7	8.0	8.3	V
Lockout Hysteresis Voltage		0.4	0.55	0.7	V
Maximum Input Current	Vin = 9V, 80% Load			98	A
	Vin = 12V, 100% Load			94	A
	Vin = 24V, Output Shorted		400		mARMS
Input Stand-by Current	Converter Disabled		5	8	mA
Input Current @ No Load	Converter Enabled		480	600	mA
Minimum Input Capacitance (external)	ESR < 0.1 Ω	1000			μF
Inrush Transient				0.19	A ² s
Input Terminal Ripple Current	20 MHz bandwidth, 100% Load		2.5		ARMS
Output Characteristics					
Output Voltage Range	Over Load, Line and temperature	27.4	28.00	28.6	V
Output Voltage Set Point Accuracy	(No load)	27.6	28.00	28.4	V
Output Regulation					
Over Line	Vin = 9V to 36V		0.05	0.15	%
Over Load	Vin = 24V, Load 0% to 100%		2.5	2.63	%
Temperature Coefficient			0.015	0.03	%/°C
Over voltage Protection		31.9		36.4	V
Output Ripple and Noise	Full load, 20 MHz bandwidth 470uF/70mΩ*2+10 μF/1210/X7R/100V		220	380	mV _{PK-PK}
			60	100	mV _{RMS}
External Load Capacitance	Full Load (resistive) (over operating temp range)	CEXT	1000	4700	μF
		ESR	10	100	mΩ
Output Current Range	Vin = 12V – 36V	0		36	A
	Vin = 9V	0		28.8	A
Current Limit Inception	Vin = 12V – 36V	39.6		46.8	A
	9V ≤ Vin < 12V	31.7		46.8	A
RMS Short-Circuit Current	Non-latching, Continuous		4	8	ARMS
Parallel current sharing accuracy	Nx (30% ~ 100% load)			10	%
Dynamic Response					
Load Change 50%-75%-50%, di/dt = 1A/μs	Load Change 50%-75%-50%, di/dt = 1A/μs		500	1000	mVP-P
Load Change 50%-100%-50%, di/dt = 1A/μs	Load Change 50%-100%-50%, di/dt = 1A/μs		1000	1500	mVP-P
Settling Time to 1% of VOUT	Settling Time to 1% of VOUT		800		μs
Efficiency					
100% Load	Vin = 24V	93.5	94.5	95.2	%
	Vin = 12V	92.0	92.8	93.5	%
50% Load	Vin = 24V	94.6	95.4	96.2	%
	Vin = 12V	93.3	94.4	95.2	%

Environmental and Mechanical Specifications

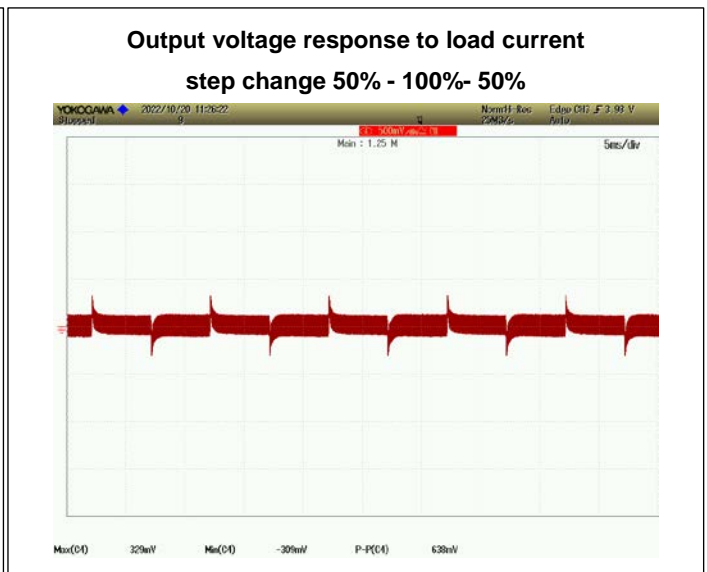
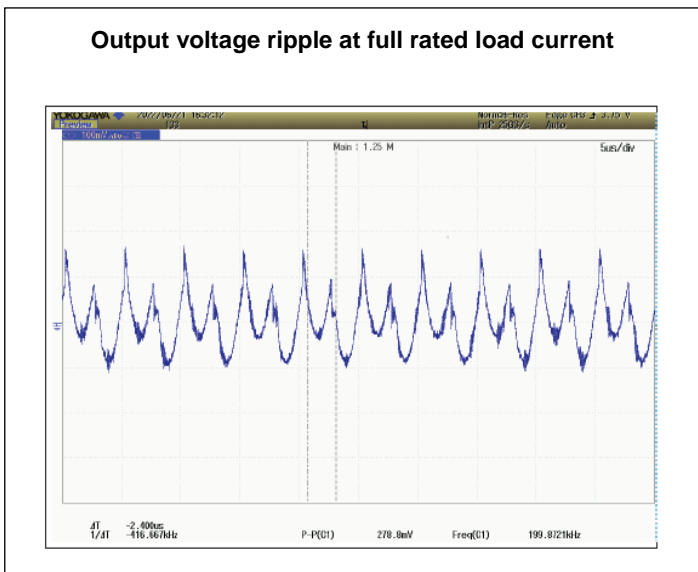
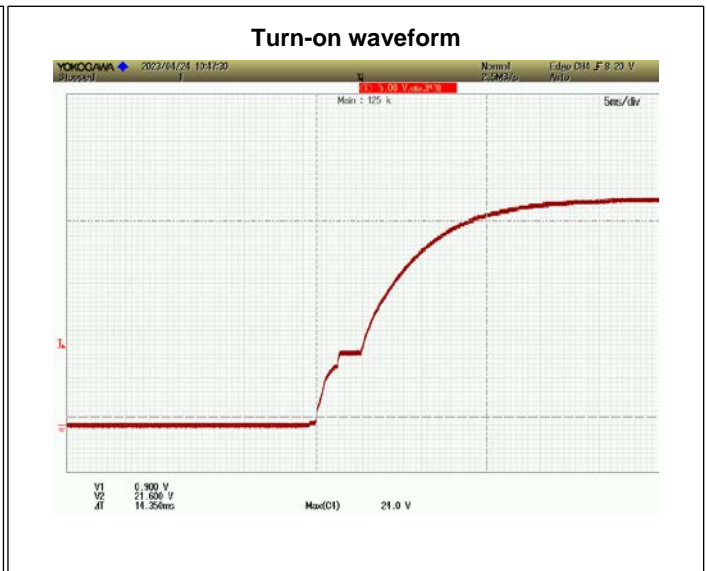
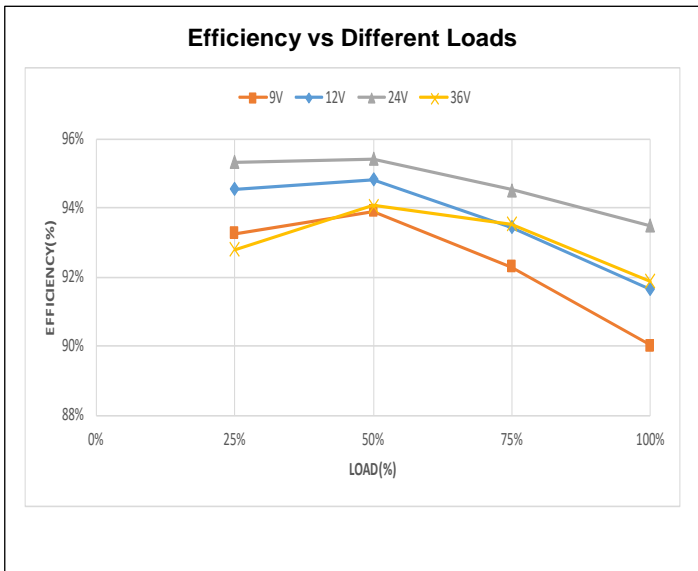
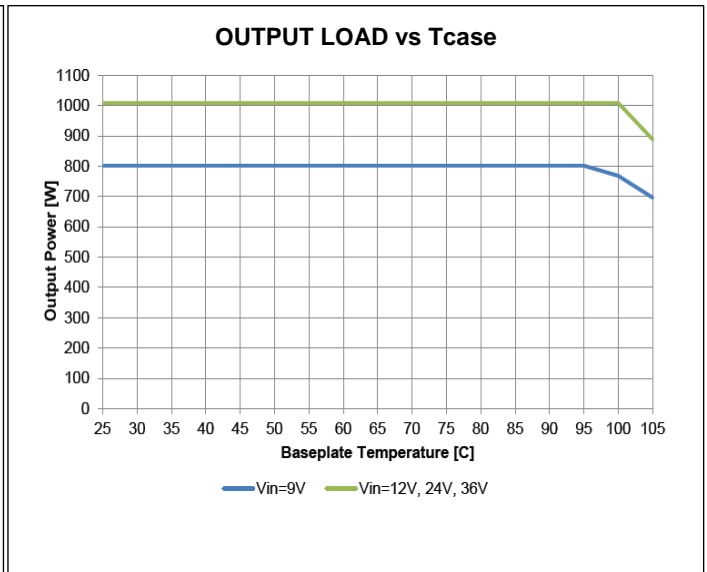
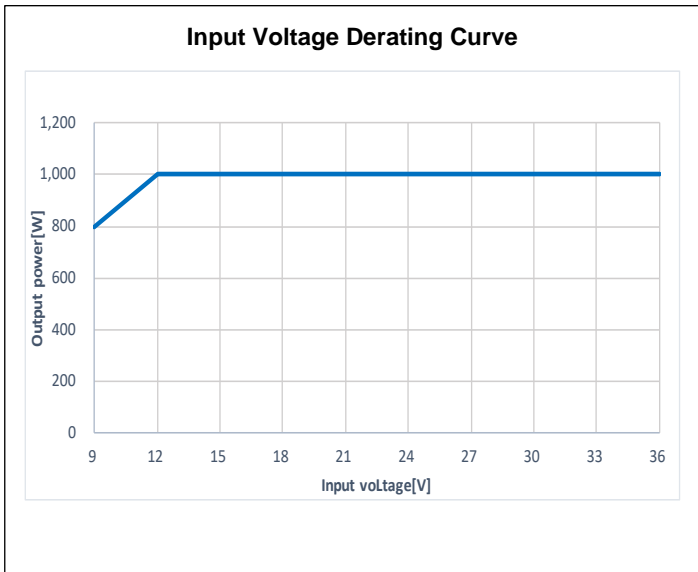
Parameter	Note	Min	Typ	Max	Units
Environmental					
Operating Humidity	Non-condensing			95	%
Storage Humidity	Non-condensing			95	%
ROHS Compliance	See Powerland Website http:// www.powerlandtech.com /RoHS.html for the complete RoHS Compliance statement				
Shock and Vibration	Designed to meet MIL-STD-810G for functional shock and vibration.				
Water Washability	Not recommended for water wash process. Contact the factory for more information.				
Mechanical					
Weight			245		Grams
Through Hole Pins Diameter	Pins 3, 3A, 4, 4A, 5, 6, 8 and 9	0.079	0.081	0.083	Inches
		2.006	2.057	2.108	mm
	Pins 1, 2, 10, 11 12and 13	0.038	0.04	0.042	Inches
		0.965	1.016	1.067	mm
Through Hole Pins Material	Pins 3, 3A, 4, 4A, 5, 6 , 8 and 9	C14500 or C1100 Copper Alloy			
	Pins 1, 2, 10, 11 and 12	Brass Alloy TB3 or "Eco Brass"			
Through Hole Pin Finish	All pins	10μ" Gold over nickel			
Case Dimension		4.7 x 2.5 x 0.52			Inches
		119.38 x 63.50 x 13.21			mm
Case Material	Plastic: Vectra LCP FIT30: ½-16 EDM Finish				
Baseplate	Material	Aluminum			
	Flatness		0.010		Inches
				0.25	
Reliability					
MTBF	Telcordia SR-332, Method I Case 1	5.4			MHrs
EMI and Regulatory Compliance					
Conducted Emissions	MIL-STD 461F CE102 with external EMI filter network				

Block Diagram



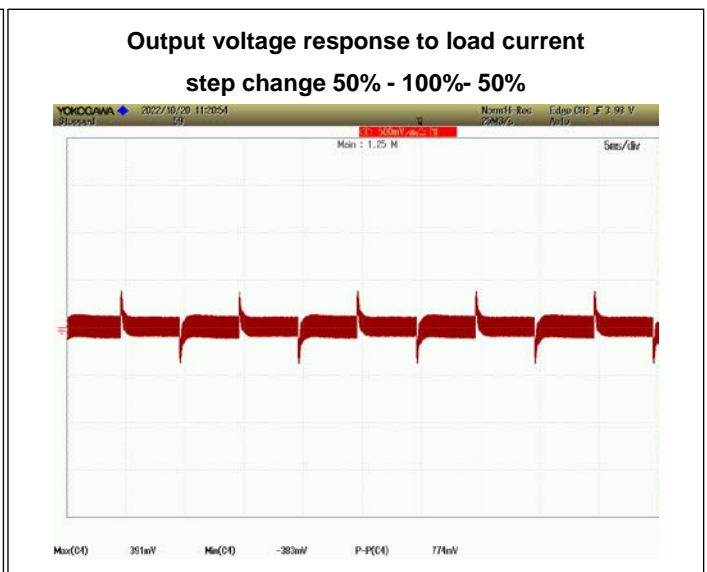
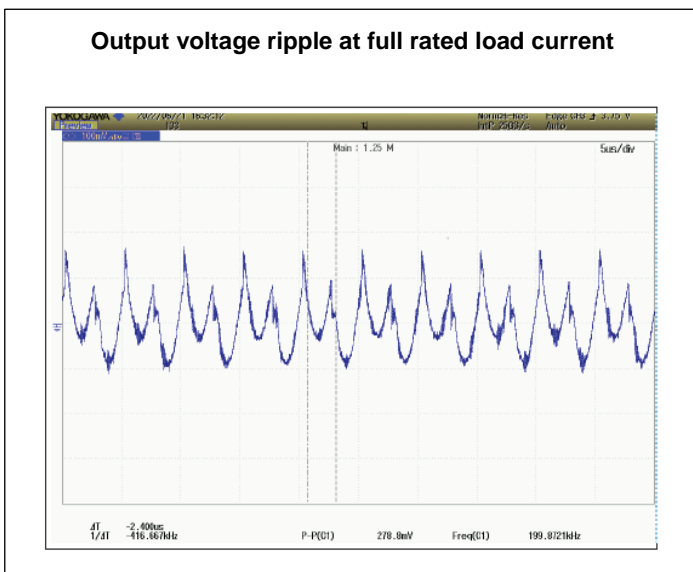
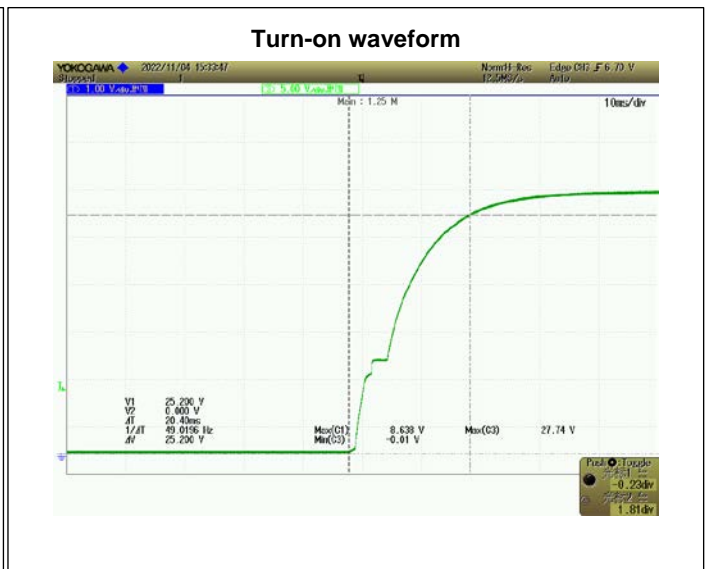
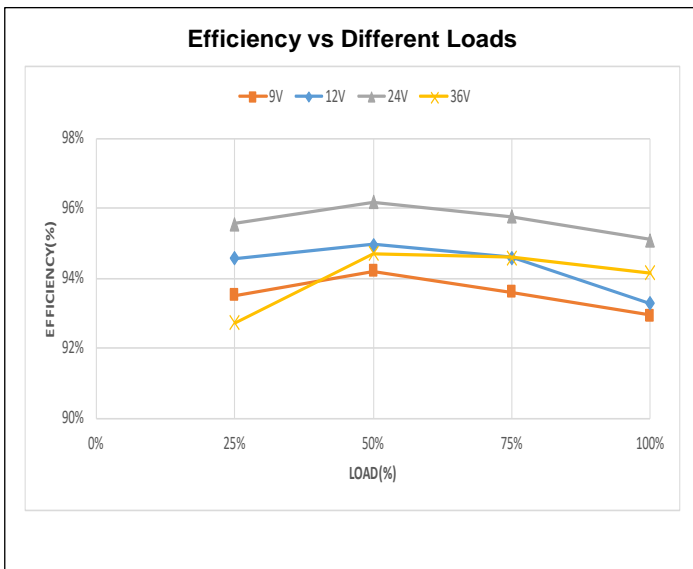
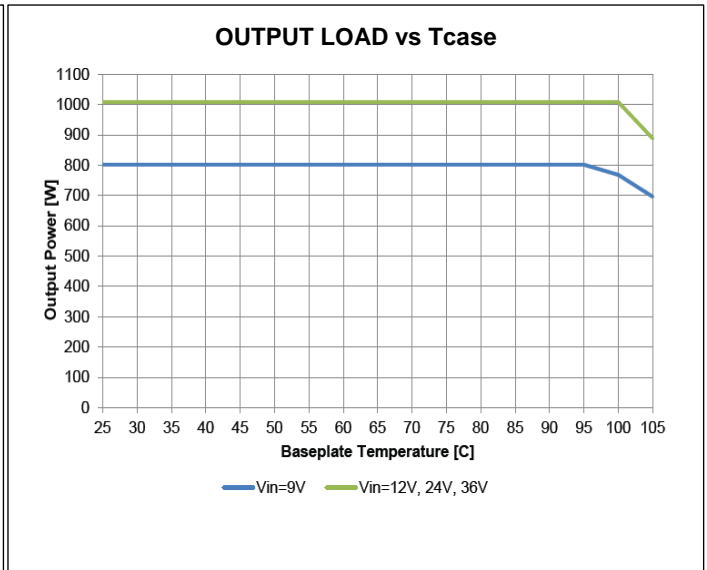
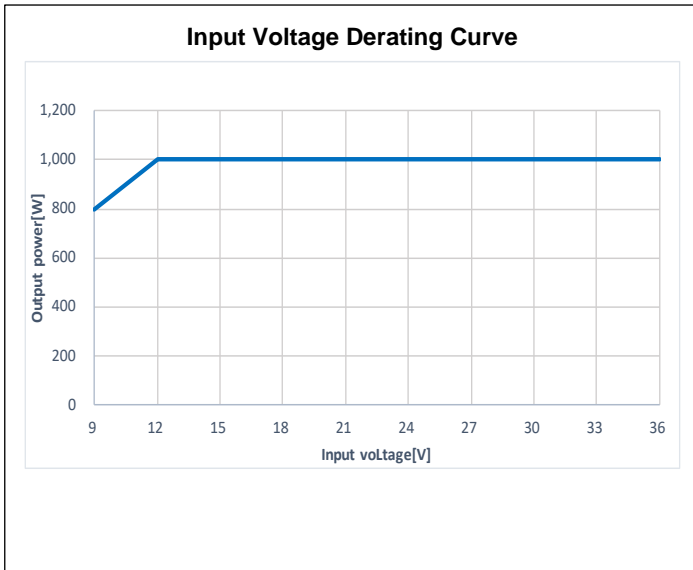
Performance Curve

PLD1000-DFTA24-24



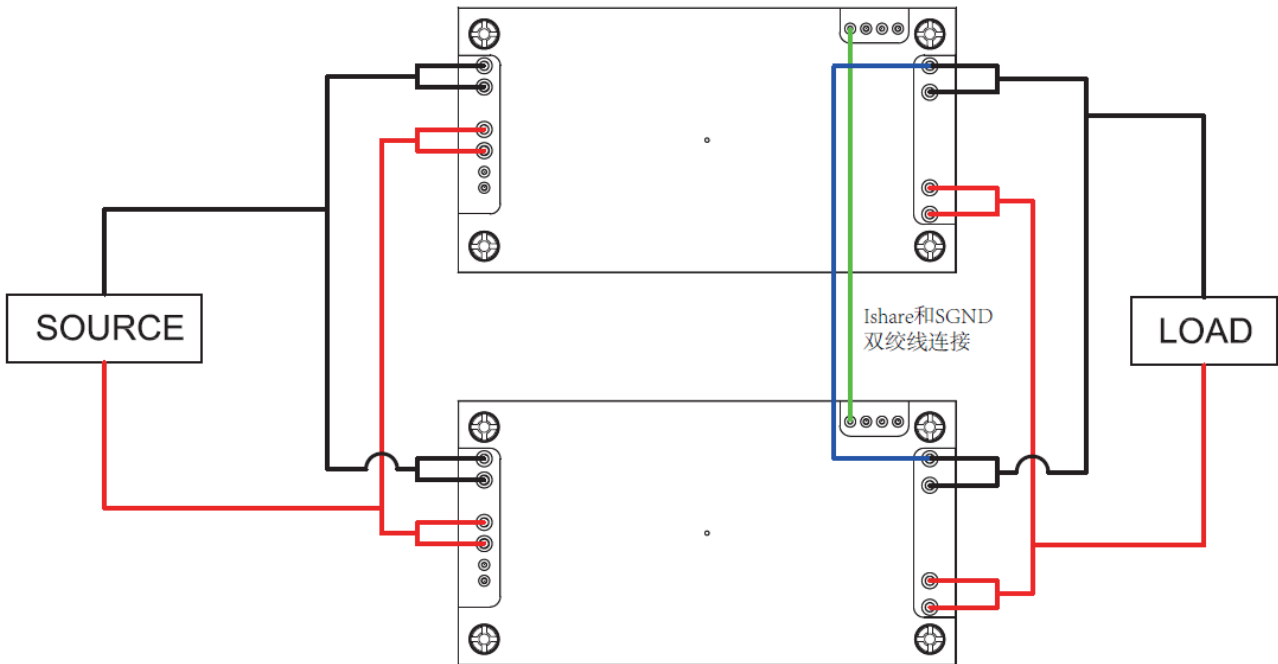
Performance Curve

PLD1000-DFTA24-28

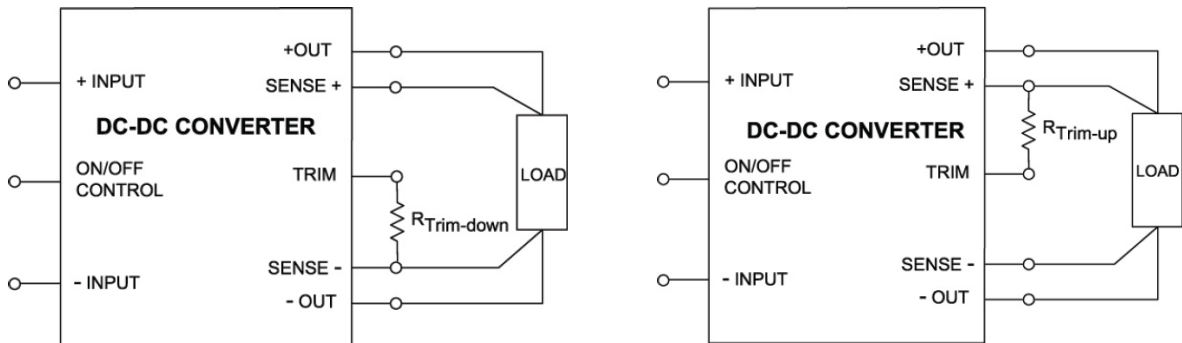


Application circuit

Circuit configuration for Parallel operation



Circuit configuration for Trim function



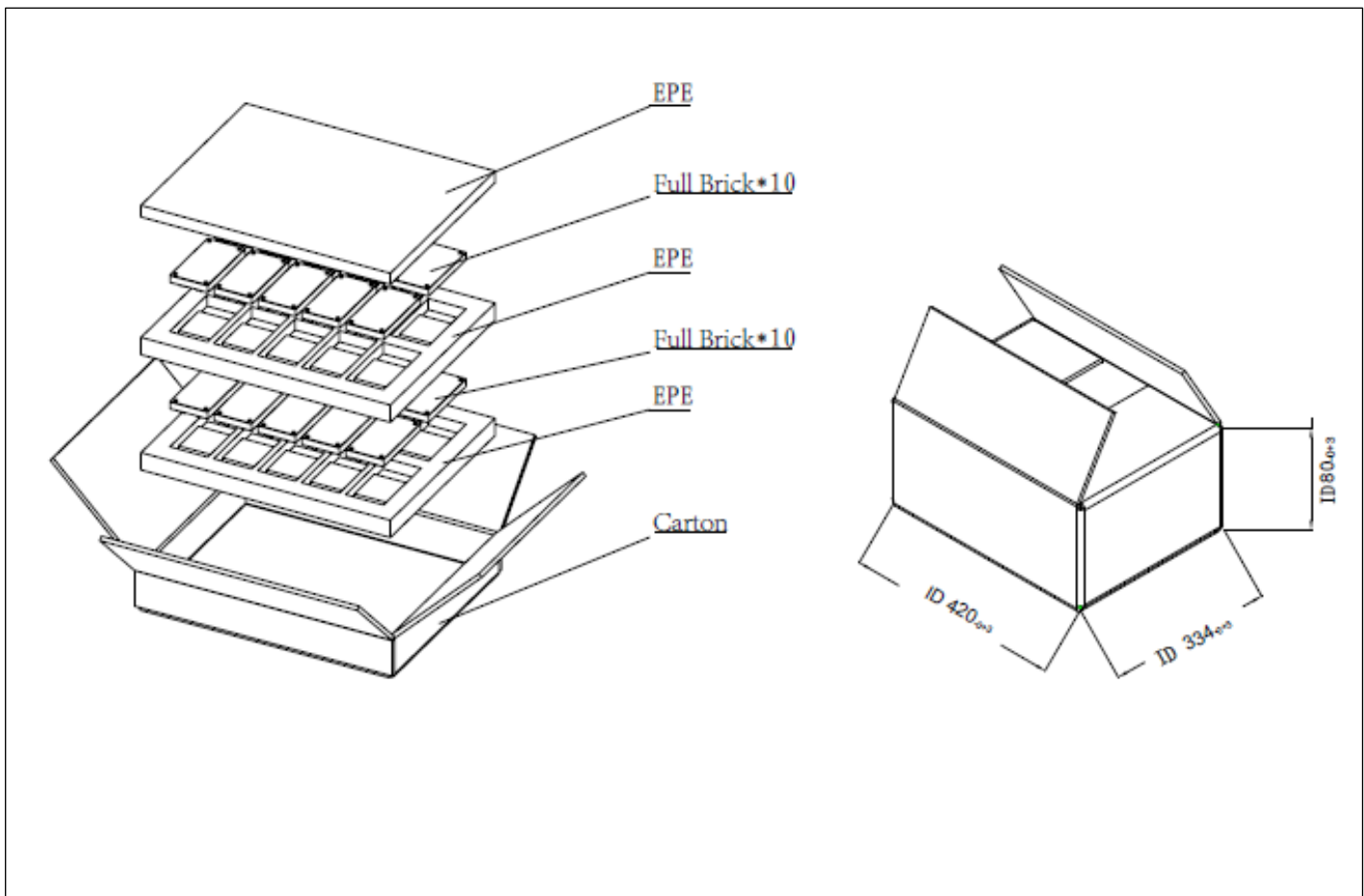
$$\Delta = \left| \frac{V_{out_req} - V_{out_normal}}{V_{out_normal}} \right|$$

$$R_{TRIM_DOWN} = 4.99 \cdot 10^3 \cdot \frac{(1 - 2\Delta)}{\Delta}$$

$$R_{TRIM_UP} = \frac{4.99 \cdot 10^3 \cdot [(1 + \Delta) \cdot (V_{nom} - 2 \cdot 1.25) + 1.25]}{1.25 \cdot \Delta}$$

Package

Carton	LxWxH =420mmx334mmx80mm
EPE	2pcs/carton LxWxH =420*334*30mm
EPE	1pcs/carton LxWxH =420*334*20mm
Full brick DC/DC converters	20pcs/carton
Net weight	245g/pcs
Gross weight	5.75kg/carton



Revision History

Change Date	Rev.	Description of Change		
		Item	From	To
2023.7.12	V1.0	First Released		

