

The 4:1 input voltage 250W DC/DC converters includes 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

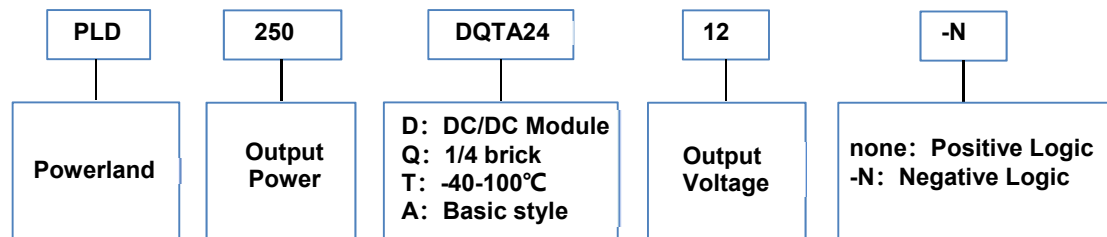
- 4:1 Input voltage range
- Small size: 60.7*39.1*13.2mm
- High power density
- High efficiency
- Excellent thermal performance with metal baseplate
- Monotonic startup into pre bias
- Remote ON/OFF
- Temperature Range -40°C to +100°C Available
- RoHS Compliance

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 |
|------------------|-----------|------------|--------------|--------------------|----------------|-------------------|
| PLD250-DQTA24-12 | 9-36 Vdc | 24Vdc | 250W | 21A | 12V | 93% |
| PLD250-DQTA24-24 | 9-36 Vdc | 24Vdc | 250W | 10.5A | 24V | |
| PLD250-DQTA24-28 | 9-36 Vdc | 24Vdc | 250W | 9A | 28V | |

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 | | | 4500 | | 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 | This function is not provided | | NA | | V |
| Remote Sense Compensation | This function is not provided | | NA | | V |
| Output Overvoltage Protection | Non-latching | 117 | 124 | 130 | % |
| Over temperature Shutdown | Non-latching (Vin=9V; 12V, 24/36V) | 101 | 108 | 115 | °C |
| Auto-Restart Period | Applies to all protection features | 450 | 500 | 550 | ms |
| Turn-On Delay Time from Vin | Time from UVLO to VO=90% VOUT (NOM) Resistive load | 480 | 517 | 540 | ms |
| Turn-On Delay Time from ON/OFF Control | Time from UVLO to VO=90% VOUT (NOM) Resistive load | 20 | 27 | 35 | ms |
| Rise Time (Vout from 10% to 90%) | VOUT from 10% to 90% | 10 | 17 | 25 | 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

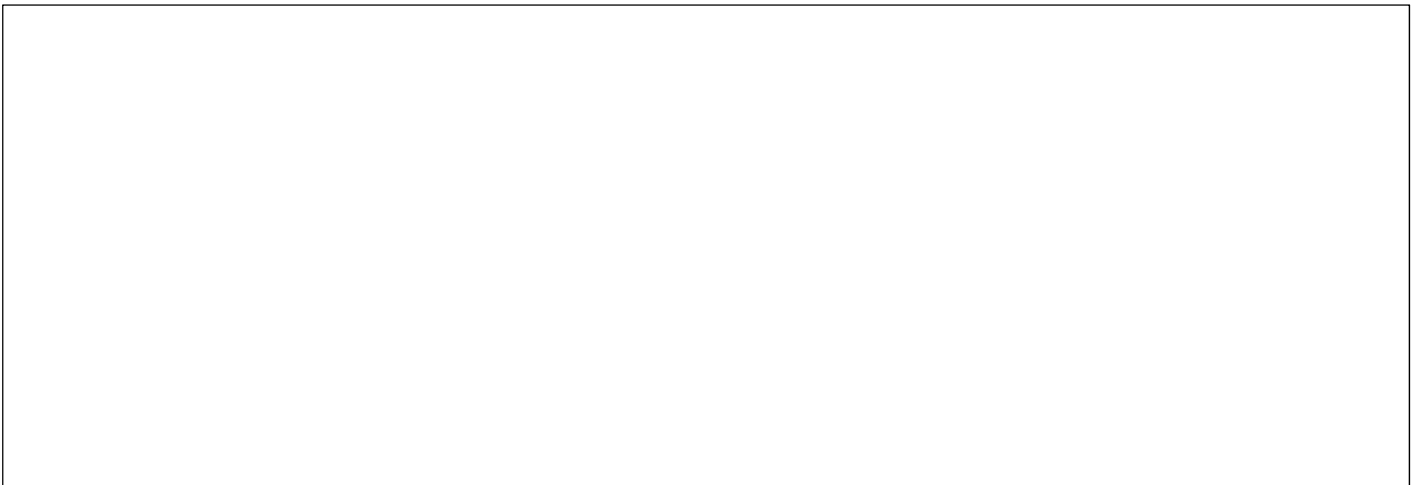
Conditions: Ta = 25 °C, Airflow = 300 LFM (1.5 m/s), Vin = 24VDC, unless otherwise specified. Specifications are subject to change without notice.

| PLD250-DQTA24-12 | | | | | |
|---|---|-------|-------|-------|------------------|
| 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 | | | 26 | A |
| | Vin = 12V, 100% Load | | | 12 | A |
| | Vin = 24V, Output Shorted | | 75 | | mARMS |
| Input Stand-by Current | Converter Disabled | | 5 | 8 | mA |
| Input Current @ No Load | Converter Enabled | | 120 | 150 | mA |
| Minimum Input Capacitance (external) | ESR < 0.1 Ω | 470 | | | μF |
| Inrush Transient | | | 0.4 | 1 | A ² s |
| Input Terminal Ripple Current | 20 MHz bandwidth, 100% Load | | 5 | | ARMS |
| Output Characteristics | | | | | |
| Output Voltage Range | Over Load, Line and temperature | 11.64 | 12.00 | 12.36 | V |
| Output Voltage Set Point Accuracy | (No load) | 11.88 | 12.00 | 12.12 | V |
| Output Regulation | | | | | |
| Over Line | Vin = 9V to 36V | | 0.2 | 1 | % |
| Over Load | Vin = 24V, Load 0% to 100% | | 0.2 | 1 | % |
| Temperature Coefficient | | | 0.02 | 0.03 | %/03 |
| Over voltage Protection | | 13.2 | | 15.6 | V |
| Output Ripple and Noise | Full load, 20 MHz bandwidth 560uF/70ma*2+10 μF/1210/X7R/100V | | 120 | 180 | mVPK-P |
| | | | 30 | 60 | mVRMS |
| External Load Capacitance | Full Load (resistive) (over operating temp range) | CEXT | 330 | 2200 | μF |
| | | ESR | 10 | 100 | mΩ |
| Output Current Range | Vin = 12V – 36V | 0 | | 21 | A |
| | Vin = 9V | 0 | | 16.6 | A |
| Current Limit Inception | Vin = 12V – 36V | 23 | 25 | 27.3 | A |
| | 9V 3= 12V – 36 | 18.3 | | 27.3 | A |
| RMS Short-Circuit Current | Non-latching, Continuous | | 2.5 | 5 | ARMS |
| Dynamic Response | | | | | |
| Load Change 50%-75%-50%, di/dt = 1A/μs | 560uF/70mΩ*2+10 μF/1210/X7R/100V | | ±250 | ±400 | mVP-P |
| Load Change 50%-100%-50%, di/dt = 1A/μs | 560uF/70mΩ*2+10 μF/1210/X7R/100V | | ±400 | ±600 | mVP-P |
| Settling Time to 1% of VOUT | | | 800 | | μs |
| Efficiency | | | | | |
| 100% Load | Vin = 24V | 92.6 | 93.6 | 94.4 | % |
| | Vin = 12V | 91.5 | 92.5 | 93.3 | % |
| 50% Load | Vin = 24V | 93.6 | 94.6 | 95.4 | % |
| | Vin = 12V | 93.2 | 94.2 | 95 | % |

Environmental and Mechanical Specifications

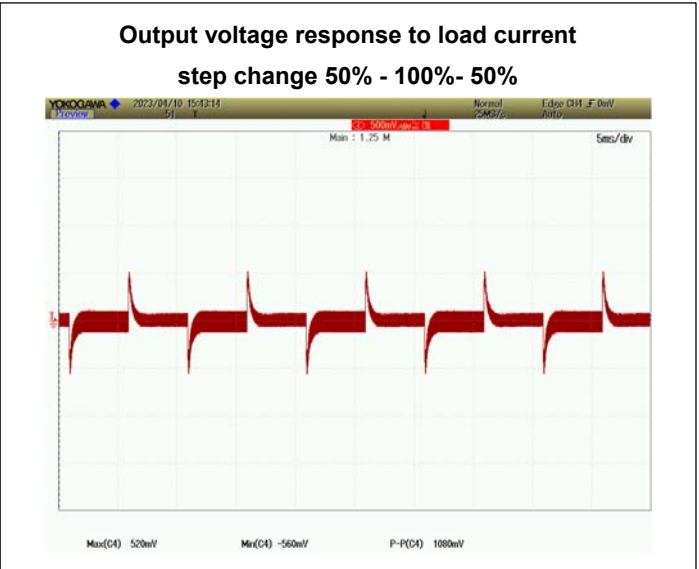
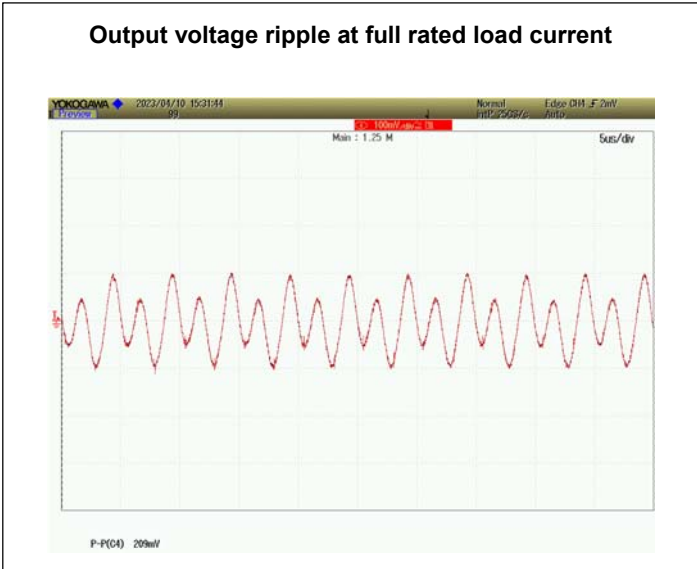
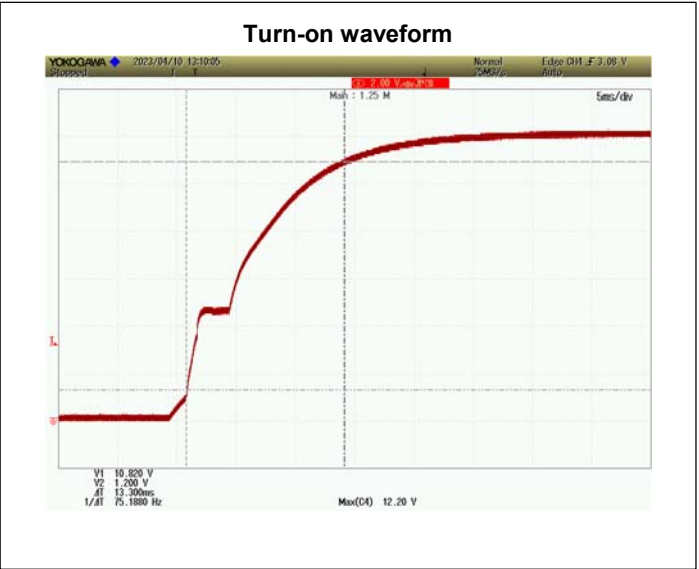
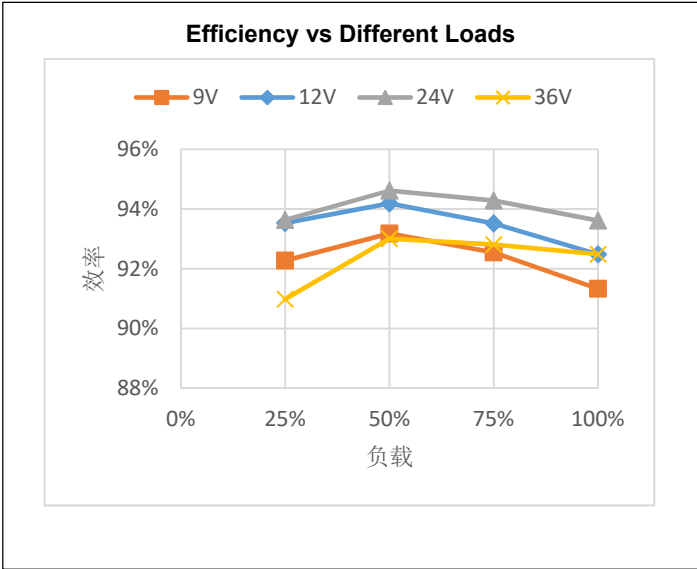
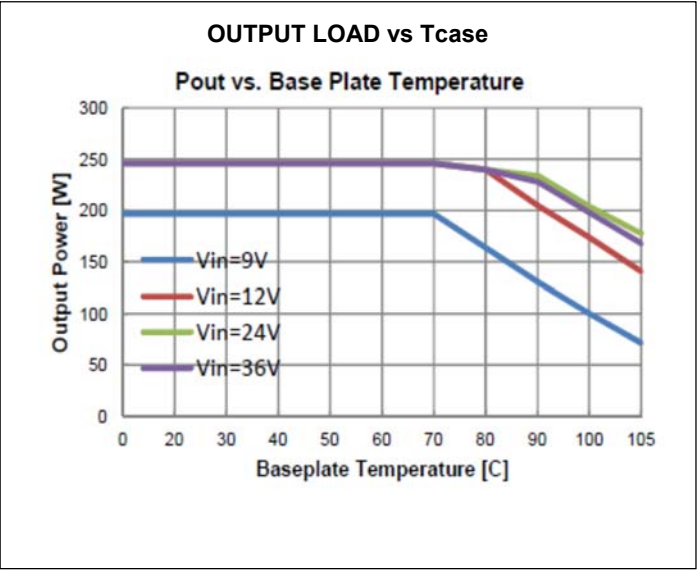
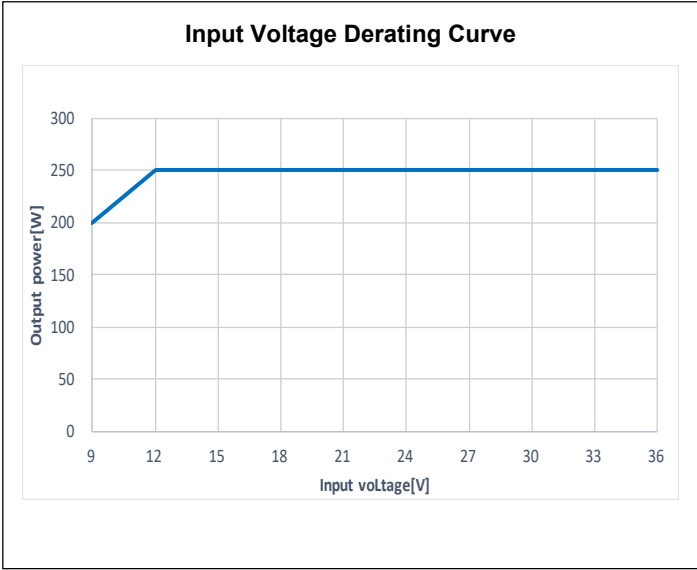
| Parameter | Note | Min | Typ | Max | Units |
|--------------------------------------|--|--------------------------------|-------|-------|--------|
| Environmental | | | | | |
| Operating Humidity | Non-condensing | | | 95 | % |
| Storage Humidity | Non-condensing | | | 95 | % |
| ROHS Compliance | 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 | | | 80 | | Grams |
| Through Hole Pins Diameter | Pins 1,2 and 3 | 0.038 | 0.04 | 0.042 | Inches |
| | | 0.965 | 1.016 | 1.067 | mm |
| | Pins 3 and 7 | 0.058 | 0.06 | 0.062 | Inches |
| | | 1.473222 | 1.524 | 1.575 | mm |
| Through Hole Pin Material | All pins | Brass Alloy TB3 or "Eco Brass" | | | |
| Through Hole Pin Finish | All pins | 10μ" Gold over nickel | | | |
| Case Dimension | | 1.54*2.39*0.52 | | | Inches |
| | | 39.116*60.706*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

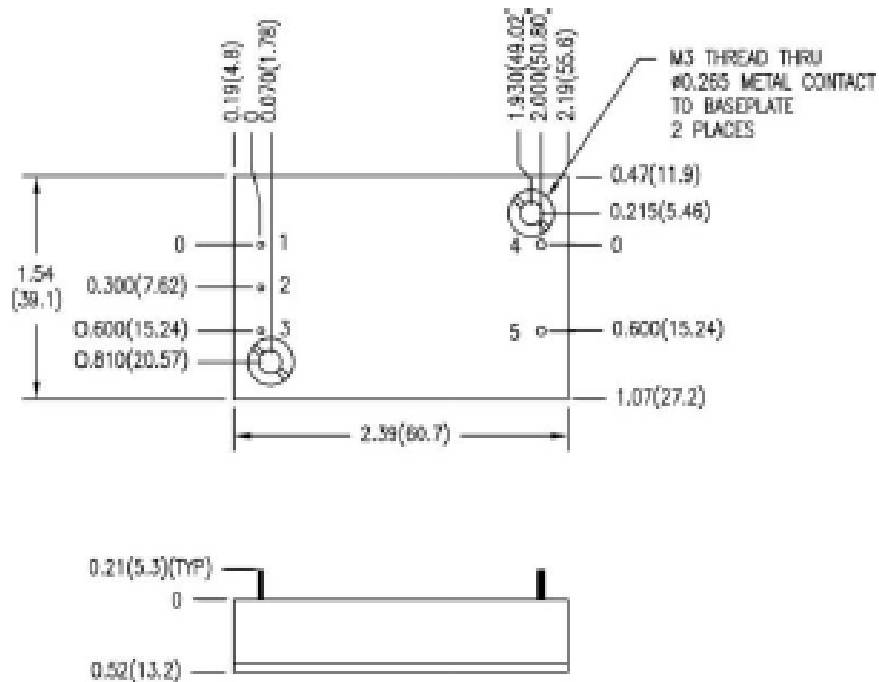


Performance Curve

PLD250-DQTA24-12



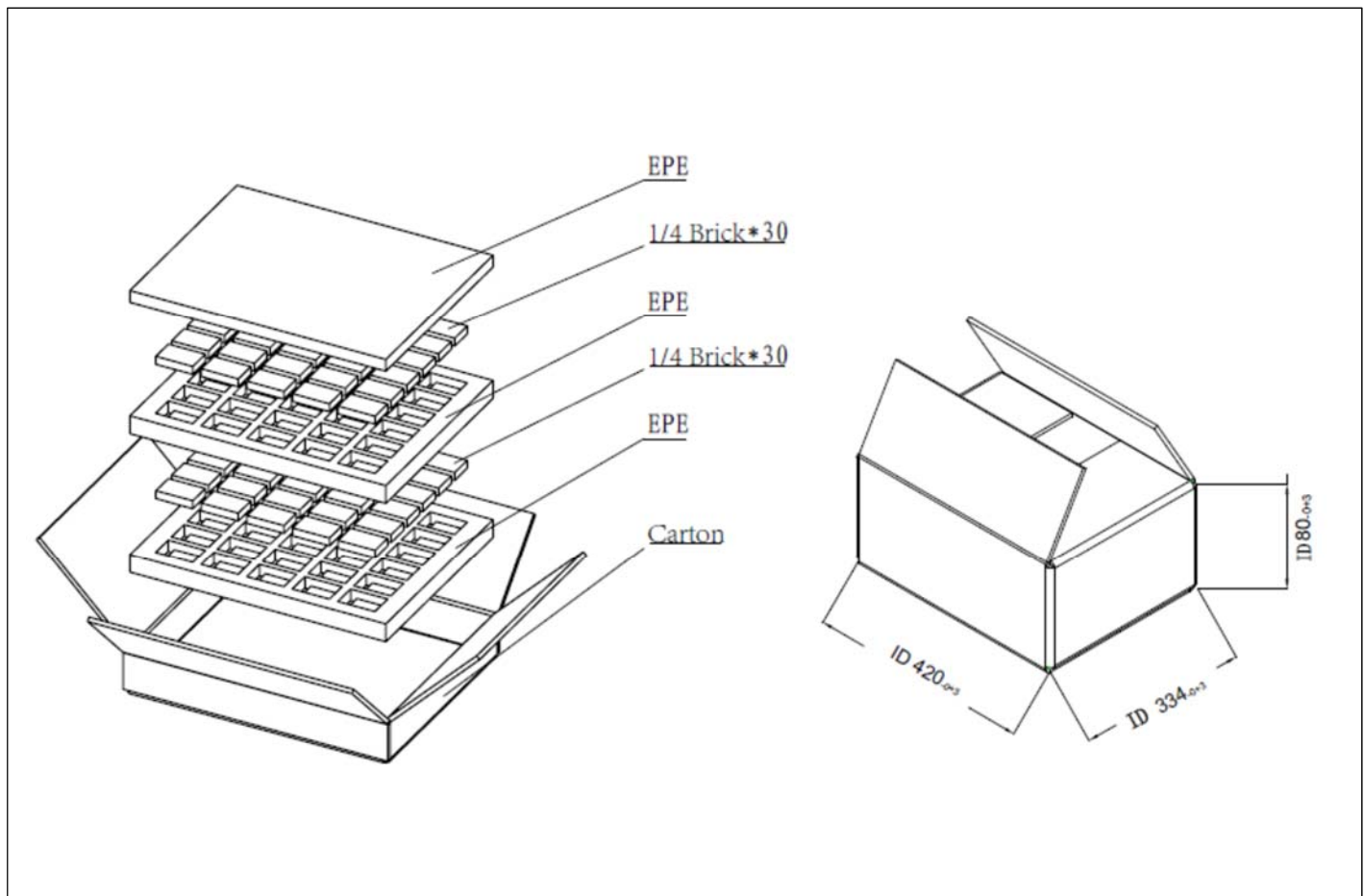
Mechanical Specification



| Pin | Lable | Function |
|-----|--------|--|
| 1 | -INPUT | Negative Input Voltage |
| 2 | ON/OFF | TTL input with internal pull up, referenced to -INPUT, used to turn converter on and off |
| 3 | +INPUT | Positive Input Voltage |
| 4 | -OUT | Negative output voltage |
| 5 | +OUT | Positive output voltage |

Package

| | |
|----------------------------|---------------------------------|
| Carton | L×W×H =420mm×334mm×80mm |
| EPE | 2pcs/carton L×W×H =420*334*30mm |
| EPE | 1pcs/carton L×W×H =420*334*20mm |
| 1/4 brick DC/DC converters | 60pcs/carton |
| Net weight | 80 g/pcs |
| Gross weight | 5.7 kg/carton |



Revision History

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