3000W Bi-directional DC/DC Converter Data Sheet

Description:

Green Watt/Powerland's 3kW bi-directional DC/DC power supply is designed with extended protection functions, the next-generation semiconductor power devices, and the extraordinary thermal management. The bi-directional energy flow with CAN communication interface makes the converter feasible for a wide variety of electric vehicles.

Features:

- DC/DC Bidirectional Energy Flow
- High Efficiency
- Built-in All-Around Protections
- EMC Comply with UN ECE R10, UL 2202
- Liquid Cooling
- Design for High Temperature and Humidity
- IP65 Ingress Grade
- CAN Communication

General Specifications (Detailed Specs are Below this Table)	
Model	**EVDB-380-3000-12** (PLD3000-BDGA400-12)
Low Voltage DC to High Voltage DC	
Input Voltage	10.5~14.5V
Max. Input Current	250A
Output Voltage	270~420V (380V Typical)
Output Current	12A
Output Power	3000W
Efficiency (	94% Typ., Min is 88% over operating range
High Voltage DC to Low Voltage DC	
Input Voltage	270~420V (380V Typical)
Max. Input Current	6.2A
Output Voltage	10.5~14.5V
Output Current	143A
Output Power	1500W
Efficiency	93%
Common Specifications	
Communication	CAN
Ingress Protection	IP65
Working Temperature	-40~60°C
Cooling	Liquid Cooling Required by Customer

EMI	Comply with UN ECE R10, UL 2202
Isolation	Comply with J2344
Dimensions (LxWxH)	264x190x46mm
Weight	2.5 kg

Down-conversion Mode, HV Side Input Characteristics for Operation

Input	Description / Condition / Note	Min.	Typ.	Max.
Voltage	HV side can tolerate voltages up to 500Vdc	270 Vdc	340 Vdc	400 Vdc
Current	Continuous operation			12 Adc
Inrush Current	@ 380 Vdc input		10 A	30 A
OVP*		401 Vdc	410 Vdc	419 Vdc
OVP Recover	Hysteresis: 5.0 Vdc (typ.)	396 Vdc	405 Vdc	414 Vdc
UVP*		251 Vdc	260 Vdc	269 Vdc
UVP Recover	Hysteresis: 5.0 Vdc (typ.)	256 Vdc	265 Vdc	274 Vdc
OCP*		14 Adc	15 Adc	16 Adc
SCP*			Yes	

Down-conversion Mode, LV Side Output Characteristics for Operation

Output	Description / Condition / Note	Min.	Typ.	Max.
Voltage	Resting: 12.7 VDC, Operating: 14.3 VDC	10.5 Vdc	14.3 Vdc	14.5 Vdc
Voltage Accuracy	Full scale accuracy: +/-0.143 Vdc	-1.0%		+1.0%
Current	Refer to Fig. 1	0 Adc		143 Adc
Current Accuracy	Full scale accuracy: +/-3.5 Adc	-3.0%		+3.0%
Power	Refer to Fig. 2, De-rating	0 W		1500 W
Ripple / Noise*	@+14.3V / 105A			350 mVp-p
On-off Control	Controlled by CAN		Yes	
Turn-on Delay	After CAN enable signal is applied			1 s
Turn-on Overshoot				5%
Dynamic Response**				1 s
Efficiency	@300V, 14.3V, ⩾ 50% Load; Refer to Fig. 1		94%	
OVP***		15.5 Vdc	16 Vdc	16.5 Vdc
OVP Recover	Hysteresis: 1.0 Vdc (typ.)	14.5 Vdc	15 Vdc	15.5 Vdc
UVP***		8.5 Vdc	9.0 Vdc	9.5 Vdc
UVP Recover	Hysteresis: 1.0 Vdc (typ.)	9.5 Vdc	10.0 Vdc	10.5 Vdc
OCP***		160 Adc	170 Adc	180 Adc
SCP***			Yes	
OTP***	Baseplate temperature, ≥ 2 sec	85 ° C		
OTP Recover	Hysteresis: 10 ° C (typ.)			95 ° C

** Measured at the output edge of power supply, measuring setup described below. Measurements will be made with an oscilloscope set to 20MHz-bandwidth limit. The outputs will be bypassed with one 0.1uF ceramic cap (type X7R) and one 10uF (low ESR) electrolytic capacitor.*

*** Controlled via CAN, the converter can be operated either in current mode or voltage mode (in both directions) of the output, and the power can be transferred in either direction. The converter is able to respond to changes in current set-point, voltage set-point, or power transfer direction within 1 sec.*

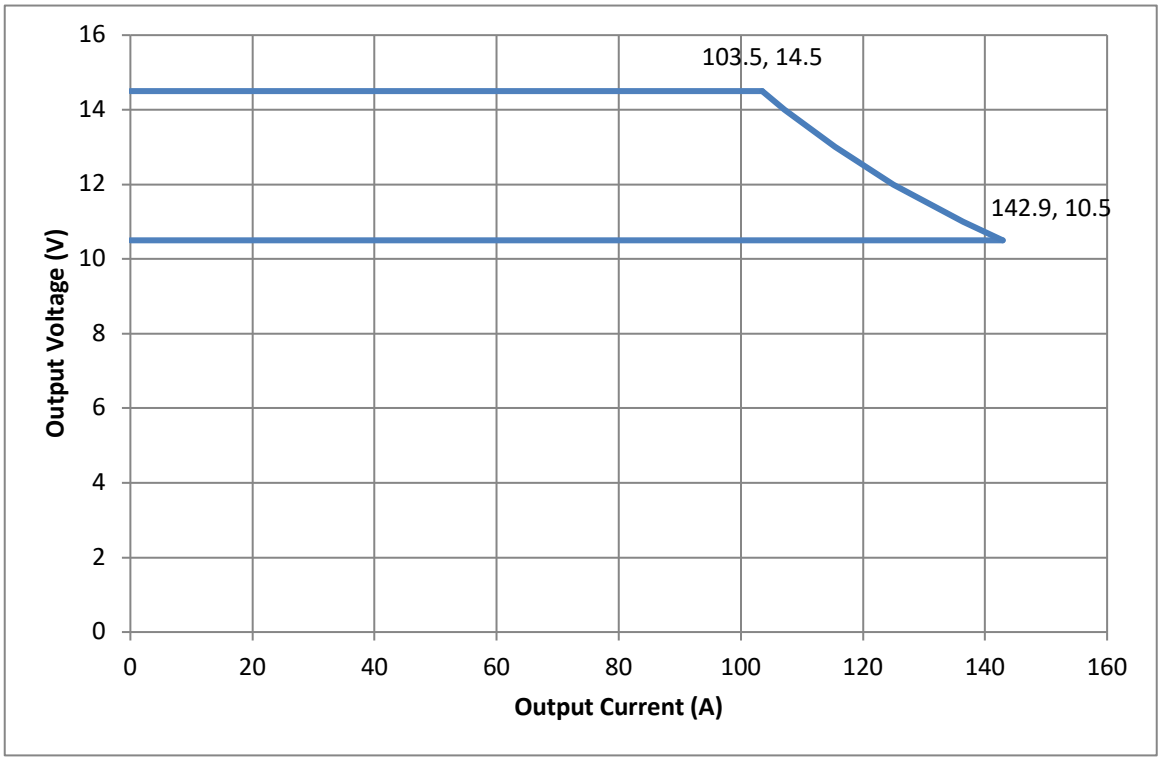
**** Latch with fault reporting via CAN. Fault can be cleared via CAN.*

In down-conversion mode, the LV output continuous output current is 142.9 Adc @10.5 Vdc, and 103.5 Adc @ 14.5 Vdc. Voltage lower than 10.5 Vdc, or higher than 14.5 Vdc, will trig the UVP or OVP. It will trig OCP when the output current is larger than the maximum output current.

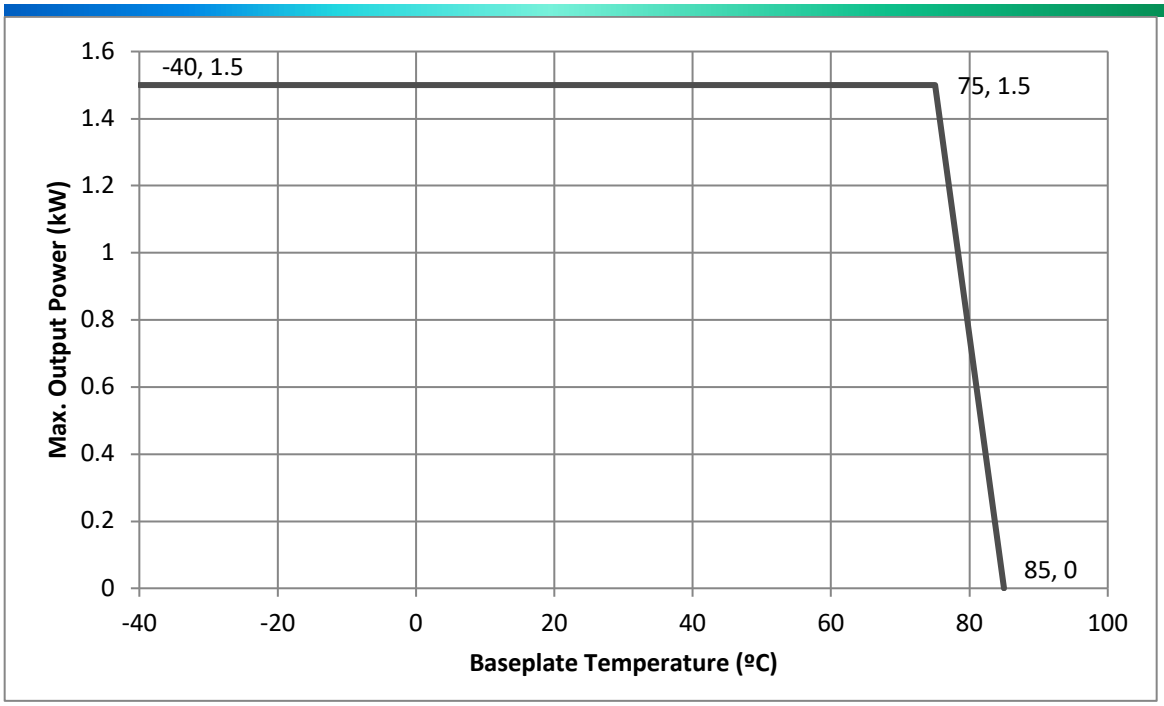
Notes: Specification is subject to change without notice. Model in parenthesis is factory number.

LV Output I-V Characteristic

The converter can maintain 1500 W full power operation when the baseplate temperature is below 75 °C. The output power will be de-rated automatically when the baseplate temperature is higher than 75 °C, and shut down when the baseplate temperature is higher than 85 °C.



Output Power De-rating vs. Baseplate Temperature



Typical Efficiency Curve (@HV 420 Vdc)