DC-DC High-Power Bidirectional Power Supply

60V/80V/100A, 2KW Input 12－56V/24－72V Power Board, Withstand Voltage 80V

Instructions

For the 95V withstand version, only the **VH+** terminal can work at around 90V; the VL port remains unchanged with the same functions.High voltage difference and high power current require more derating.The recommended maximum boost voltage difference ratio is about **4**.

Typical Performance (YF-BK/ST80V100A)

- Non-isolated synchronous bidirectional buck/boost power supply
- Wide input range: VH = 22–75V, VL = 12–56V
- Peak efficiency > 98%
- Over-current protection, short-circuit protection, auto-recovery
- Remote ON/OFF, forward/reverse control
- Thermostatic fan, over-temperature protection, under-voltage & over-voltage protection
- Buck mode: VL voltage and current adjustable
- Boost mode: VH input current adjustable, output voltage adjustable
- External analog control for voltage and current
- Optional input/output voltage meters
- Optional fast transient response (for load applications)
- CVIN function for solar panels or fuel cells (VH terminal)
- Aluminum substrate with high thermal conductivity; natural cooling up to 20W (ambient 25°C); constant-frequency MEI for easy prediction
- Power up to 2000W (VL=24V) / 3000W (VL=36–72V); interleaved parallel up to 200A

Unless otherwise specified, all tests are performed at input 48V, output 24V, pure resistive load, and 25° C room temperature.Specifications subject to change without notice.

Absolute Maximum Ratings

Item	Min	Typ	Max	Unit	Notes
Input voltage VH	-1	-	80.0	V	Continuous
Output voltage VL	-1	-	60.0	V	-
Power shutdown interface EN	-0.7	-	30	V	-
Fan interface current limit	-	0.5	-	A	-

Item	Min	Typ	Max	Unit	Notes
Storage temperature	-45	-	125	℃	-
Withstand voltage (aluminum substrate & power pins)	300	-	500	V	Non-isolated
Max torque of screw terminals	2	-	3	N·m	-
Potentiometer rotation life	-	200	-	cycles	-

Recommended Operating Parameters

Item	Min	Typ	Max	Unit
Input voltage VH	-	24.0	72.0	V
Input current VH	-	40.0	60.0	A
Output voltage VL	12.0	-	48.0	V
Output current VL	-	80	100.0	A

Technical Specifications

Buck Mode (VH+ = Input, VL+ = Output)

Item	Min	Typ	Max	Unit	Notes
VH+ voltage tracking adjustment range	26	-	72	V	Buck only
VH input operating voltage	24	36	75	V	-
VH input under-voltage shutdown (adjustable)	19.0	19.2	19.5	V	Shutdown after protection
VH input UV hysteresis	0.96×Vu	Vu	1.04×Vu	V	Vu = set UV value
VH input over-voltage protection (adjustable)	75.0	76.2	76.5	V	Auto-recovery

Item	Min	Typ	Max	Unit	Notes
VH input OV hysteresis	0.96×Vu	Vu	1.04×Vu	V	Vu = set OV value
VH input current range	-	40.0	60.0	A	VH/VL > 2
VH input current limit	-	-	80	A	-
No-load control input current (single board)	1.5	2.0	3.0	mA	Discontinuous mode
Standby current (total power off)	0.08	0.1	0.15	mA	-
VL output voltage adjustment	5.0	-	56	V	-
VL output over-voltage protection	57.0	57.6	57.9	V	-
VL output current range	0	80	100	A	-
VL output current adjustment	5.0	-	110	A	<5A unstable
VL output current limit	-	110	110	A	-
Output voltage regulation (Io=80A)	0.995×Vu	Vu	1.05×Vu	V	Vu = no-load voltage
Output voltage ripple (PK-PK)	80	120	150	mV	48V→24V/80A
Load step (Vo=24V/100A, 0 - 100% Io, CCM)	2.0	2.4	3.0	V	-
Recovery time	0.5	0.7	-	ms	<2% Vout

Item	Min	Typ	Max	Unit	Notes
Output overshoot (Io=100A, load 100%–10%)	1.6	2.0	2.0	V	–
Recovery time	0.5	0.8	1.0	ms	<1% Vout
Start-up time	–	110	120	ms	Power-on to stable output
Output soft-start time	100	110.0	–	ms	Extendable on request
VL+ short-circuit current	–	–	130	A	–

Boost Mode (VH+ NOT shortable)

Item	Min	Typ	Max	Unit	Notes
VL input operating voltage	12	–	56	V	–
VL input over-voltage protection (adjustable)	57.0	57.6	57.9	V	–
VL input OV hysteresis	0.95×Vu	Vu	1.05×Vu	V	Vu = set OV value
VL input current range	–	80	110	A	Derate at high voltage/power
VL input current adjustment	5	80	120.0	A	Within boost range
VL input current limit	–	120	121	A	–
No-load input current	1.5	2.0	3.0	mA	Discontinuous mode
Standby current (total power off)	0.08	0.1	0.15	mA	–

Item	Min	Typ	Max	Unit	Notes
VH output voltage adjustment	20.0	-	72.0	V	-
VH output over-voltage protection	75.0	76.2	76.5	V	Auto-recovery
VH output current range	-	40.0	60.0	A	Only VL input current adjustable
VH output current limit	-	-	80.0	A	-
Output voltage regulation	0.995×Vu	Vu	1.05×Vu	V	Vu = no-load voltage
Output voltage ripple (PK-PK)	120	150	200	mV	24V→48V/30A
Load step (Vo=48V/30A, 0 - 100% Io, CCM)	1.5	2.0	2.2	V	-
Recovery time	0.8	1	-	ms	<2% Vout
Output overshoot (Io=50A, load 100% - 0%)	1.5	2.0	2.2	V	-
Recovery time	0.8	1.0	2.0	ms	<1% Vout
Start-up time	-	110	120	ms	Power-on to stable output
Output soft-start time	100	110.0	-	ms	Extendable on request
Output short-circuit current	-	-	8	A	VH short forbidden in boost

Conversion Efficiency

Condition	Min	Typ	Max	Unit
65V→24V (2KW)	97.2	97.5	-	%
48V→24V (2KW)	97.4	98.0	-	%
48V→14V (1KW)	96.6	96.7	96.8	%
12V→48V (1KW)	96.0	96.2	96.4	%
24V→48V (2KW)	97.8	98.0	98.2	%
24V→72V (2KW)	96.8	97.1	97.3	%

Other Characteristics

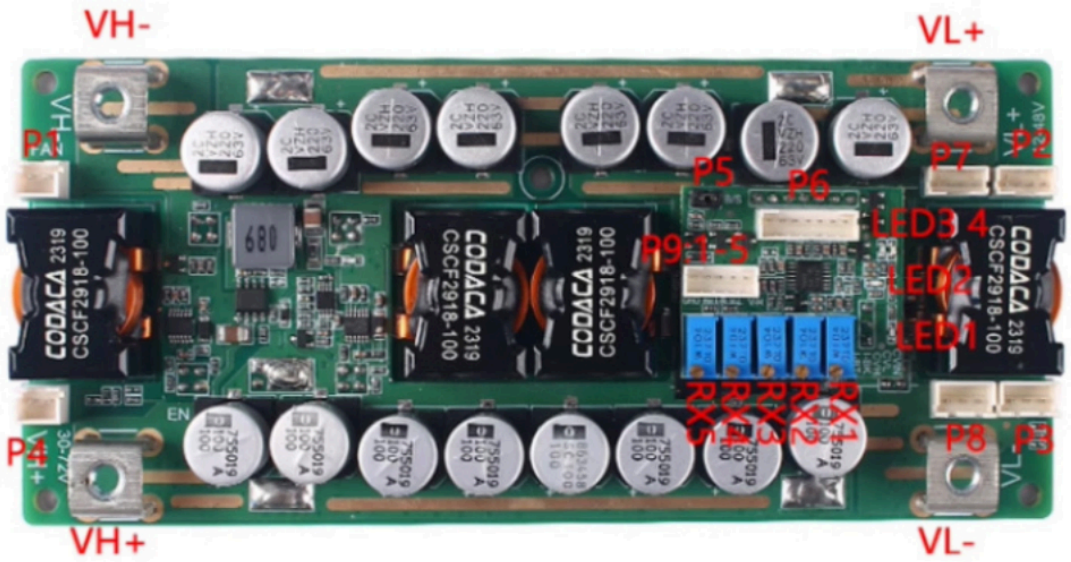
Item	Min	Typ	Max	Unit	Notes
Switching frequency	180	185	190	kHz	-
Buck voltage ratio (VH/VL)	2	-	10	times	-
Boost voltage ratio (VL/VH)	2	-	4	times	-
EN disable valid voltage	0	-	1.0	V	Pull-low only
Fan terminal voltage	11.5	11.7	12.2	V	VH+ >14V
Fan terminal supply current	0.3	-	0.5	A	-
Over-temperature protection	85	-	95	℃	Aluminum plate
Power supply operating temperature	-45	25	85	℃	-
Main controller temperature	-45	-	125	℃	-

Item	Min	Typ	Max	Unit	Notes
Electrolytic capacitor temperature	-	-	105	℃	-
Storage temperature	-20	25	85	℃	-
Cooling method	-	-	-	-	Natural ≤10W; fan cooling >20W
Dimensions	-	170×75×23	-	mm	-
Weight	-	365	-	g	-
Optional heatsink	-	188×77×16	-	mm	285g

Notes

1. This DC-DC is not an ideal constant-current source. Load equivalent resistance shall not be too low.To ensure stability, voltage after current limiting shall exceed 90% of no-load voltage (limited by minimum duty cycle).
2. In boost mode, keep **VH–VL >5V** when adjusting current limit (limited by maximum duty cycle).Boost mode is direct-pass when off; current limiting unavailable, **short-circuit forbidden**.
3. Keep operating voltage away from UV/OV thresholds to avoid tripping caused by cable voltage drop or fluctuations.
4. Fast transient response may cause oscillation with batteries in charging applications (normal); parameters can be modified.Discontinuous mode: very low standby current (inductor noise <20A).Continuous mode: good dynamics for loads but higher no-load loss.Do not connect high-voltage batteries incorrectly in buck charging (risk of reverse boost damage).
5. Current limit **cannot be below 5A**. Buck limits VL output current; boost limits VL input current.
6. For charging: add ideal diode to prevent back-feed; add fuse on VH to prevent short-circuit.
7. Prolonged over-current on VL may cause overheating (especially poor mounting).Use parallel copper lugs for full-load applications.
8. Adjust start-up time if input power-up is slow (e.g., AC adapter).Recommend power-on first, then connect load.
9. Dynamic response measured in continuous mode (≈×2 in discontinuous mode); not required for charging.
10. Some parameters can be adjusted for different applications.

Board Label & Function Description



Label	Function	Description
VH+	High-voltage positive	Input in buck; output in boost
VH- / VL-	Input/output negative	Common ground; connect VL- only to reduce loss
VL+	Low-voltage positive	Input in boost; output in buck; polarity must be correct
RX1	VH voltage tracking	25 turns = 22-72V (CW increase); buck only
RX2	VL voltage adjust	25 turns = 5-56V (CW increase); buck only
RX3	VH voltage adjust	25 turns = 20-72V (CW increase); boost only
RX4	VL output current adjust	5-110A (CW increase); buck only
RX5	VL input current adjust	CW increase; boost only; output current = Pin / Vout
P1	Fan power	12V/0.3A thermostatic; **not shortable**

Label	Function	Description
P2	VL voltage meter (optional)	7-segment display; 12V/0.3A output
P3	VH voltage meter (optional)	7-segment display; 12V/0.3A output
P4	EN enable	Pull low to shutdown; float = power on
P5	Buck/boost select	Short = buck; float = boost; control interval >50ms
P6–P8	Parallel ports	For factory parallel to 200A; user not use
P9-1	Control signal GND	Common ground for external signals
P9-2	External mode switch	Pull low = buck; float = boost; remove P5 cap
P9-3	External current control	0–2.5V = 10–180A; RX4/RX5 fully CW
P9-4	VL voltage control	0–2.4V = 0–56V; RX2 centered/CCW
P9-5	VH voltage control	0–2.4V = 22–74V; RX3 centered/CCW
LED1	Main power indicator	On = main controller powered
LED2	CVIN indicator	On = CVIN valid for solar/fuel cell
LED3/LED4	Mode indicator	Green = buck; Red = boost
LED5	Aux 12V indicator	On = 12V normal; powers controller, fan, meters
RM1	Mode selection resistor	Solder = continuous mode; default = discontinuous

Important Warnings

1. Buck/boost potentiometers are controlled independently.
2. Input source must supply >100A to avoid collapse or damage (Pin > Pout at all times).
3. Input source start-up time < board start-up time.

4. Input wires must be short and low-resistance to avoid oscillation.
5. Do not connect diodes in series on input (risk of over-voltage damage).
6. Use electronic load in **CR mode**; **CC mode forbidden**.
7. Adjust voltage with a small resistive load for accuracy.
8. Unidirectional use: adjustable UV shutdown; bidirectional use: set **VH UV only**.

Under-Voltage Shutdown Setting

- Bidirectional application: set **VH UV only** (VL UV will disable VH power-on).
- Default VH UV: V = ((R1+R3)/10 +1) ×1.2 = 11.52V (R1=R3=43K)
- Boost-only application: VL UV: V = ((R2+R3)/10 +1) ×1.2V(Only one of R1/R2 can be used.)

Custom & Support

Professional manufacturer of power supplies, amplifiers, motor controllers.Customization supported.