

Typical Features

- Wide input voltage range (4:1), output power 20W
- Efficiency up to 85% (Typ.)
- Output fast start up
- Continuous short circuit protection, self-recovery
- Input under voltage, output over voltage, short circuit & over current protections
- Switching frequency 350KHz
- Isolation voltage 3000VDC
- Operating temperature from -40°C to +105°C
- Good EMC performance
- Standard pin-out alignment



Application Field

DD20-48E05XXB3C3 Series --- Compact size DC-DC modular 20W converters with wide input voltage range (4:1), isolation voltage 3000VDC, operating temperature range from -40°C to 105°C. This series of products are specially designed with isolated dual outputs used for the Data transmission devices, Communication equipment, Distributed power system, Hybrid analog/digital system and Remote control system, etc.

Typical Product List

Certificate	Part No.	Input Voltage Range (VDC)		Output Voltage/Current (Vo/Io)		Input Current (mA) Typ. @ Nominal Volt.		Max. Capacitive Load	Ripple & Noise @full load, nom. Voltage		Efficiency @Full load (%)	
		Nom.	Range	Vo (VDC)	Io (mA)	Full Load	No Load	uF	(mVp-p)		Min	Typ.
									Typ.	Max		
-	DD20-48E0505B3C3	48	18-75	5/5	2000/2000	492	5	2000/2000	50	100	83	85
-	DD20-48E0512B3C3			5/12	2000/833	490	5	2000/680	50	100	83	85
-	DD20-48E0524B3C3			5/24	2000/417	488	5	2000/220	50	100	83	85

Note 1: The input voltage should not be over the max of the range, otherwise the unit could be permanently damaged.

Note 2: The maximum capacitive load is the capacitance allowed to be used when the power supply starts at full load. Same capacitive loads for both positive & negative dual outputs, the converter may not start if the capacitor exceeds this value.

Note 3: The chip could operate at jitter frequency with no load or light load to decrease no-load power consumption, so no load is not available. At least 15% load is recommended.

Input Specifications

Item	Operating conditions	Min	Typ.	Max	Unit
Reflected ripple current	Nominal input voltage	-	40	-	mA
Inrush voltage (1sec. max)		-0.7	-	100	VDC
Start-up voltage		-	-	18	VDC

Cut-off voltage		13	16	-	VDC
Turn-on delay time	Nominal input voltage, Constant-resistance load	-	20	50	mS
Input filter		Pi filter			
Hot-plug		NA			
ON/OFF Control (Ctrl*)	Turn ON the converter	No connection or connected to High level (2.5V-12VDC)			
	Turn OFF the converter	Connected to GND or low voltage level (0-1.2VDC)			
	Current value for switching off	-	2	6	mA

*Note: The voltage of Ctrl is relative to the input GND.

Output Specifications

Item	Operating conditions		Min	Typ.	Max	Unit
Output voltage accuracy	5% - 100% load	Vo1	-	±1	±3	%
		Vo2	-	±4	±6	%
	0% - 5% load	Vo1	-	±1	±3	%
		Vo2	-	±4	±6	%
Line regulation	Full input voltage range, full load	Vo1	-	±0.5	±1	%
		Vo2	-	±2	±3	%
Load regulation	5% - 100% load	Vo1	-	±0.5	±1	%
		Vo2	-	±1.5	±3	%
	0% - 5% load	Vo1	-	±3	±4	%
		Vo2	-	±3	±5	%
Cross regulation	Dual output, Vo1:50% load, Vo2:5%-100% load		-	-	±10	%
Ripple & Noise	0%-100% load, 20MHz bandwidth		-	50	100	mVp-p
Dynamic recovery time	25% rated load step, nominal input voltage		-	300	500	uS
Dynamic response deviation			-	±4	±8	%
Temperature drift coefficient	Full load		-	-	±0.03	%/°C
Over current protection	Full input voltage range		120	-	210	%Io
Over voltage protection			110	-	160	%Vo
Short circuit Protection			Hiccup, continuous, self-recovery			

General Specifications

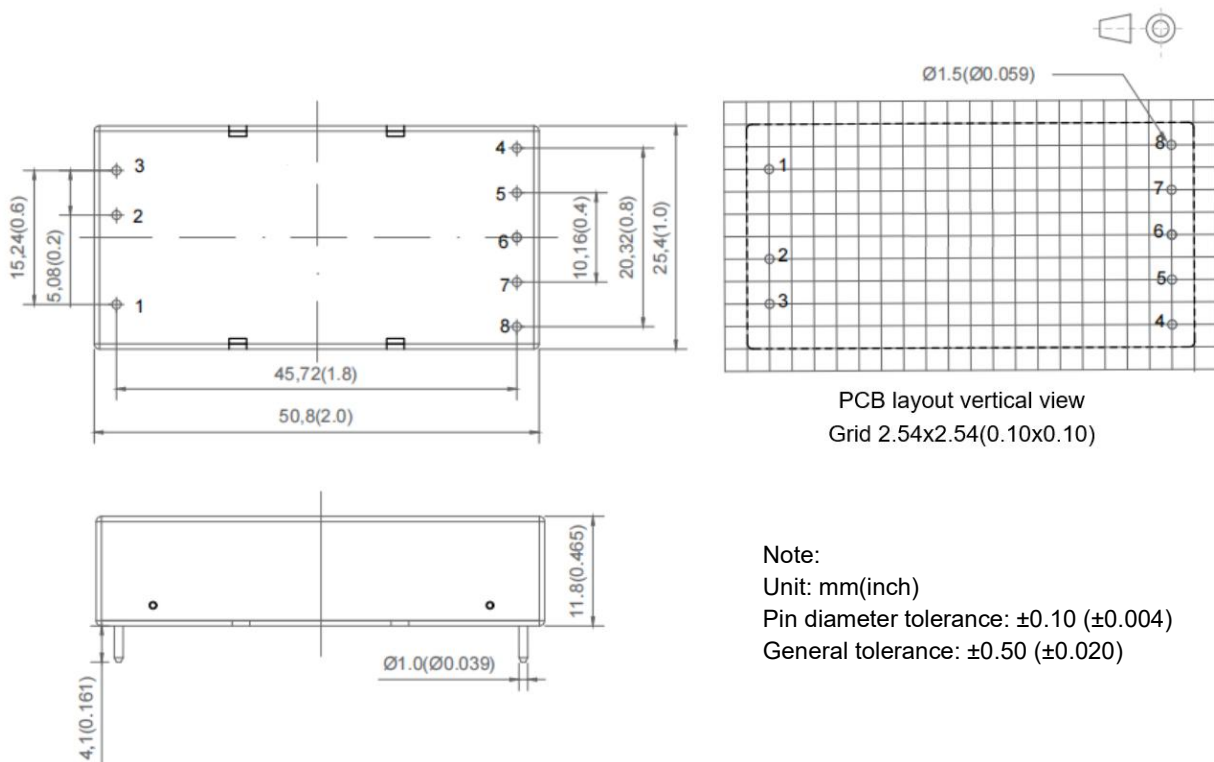
Item	Operating conditions	Min	Typ.	Max	Unit
Switching frequency	Operating mode (PWM)	-	350	-	KHz
Operating temperature	Refer to the temperature derating graph	-40	-	+105	°C
Storage temperature		-55	-	+125	
Pin soldering temperature	1.5mm from the case, 10S	-	-	300	
Relative humidity	No condensation	5	-	95	%RH
Isolation voltage	I/P-O/P, test 1min, leakage current <1mA	3000	-	-	VDC
	Vo1-Vo2, test 1min, leakage current <1mA	1500	-	-	VDC

	I/P&O/P-Case, test 1min, leakage current <1mA	1500	-	-	VDC
Insulation resistance	I/P-O/P, @500VDC	1000	-	-	MΩ
MTBF	MIL-HDBK-217F@25°C	1000	-	-	K hours
Vibration		10-150Hz, 5G, 0.75mm, along X, Y and Z			
Cooling method	Nature air				
Case material	Aluminum				
Dimensions	50.80 x 25.40 x 11.80 mm				
Unit weight	28g (Typ.)				

EMC Performance

Total Item	Sub Item	Testing standard	Performance/Class
EMC	EMI	CE	CISPR32/EN55032 CLASS B (with the Recommended EMC Circuit)
		RE	CISPR32/EN55032 CLASS B (with the Recommended EMC Circuit)
	EMS	RS	IEC/EN61000-4-3 10V/m Perf.Criteria B (with the Recommended EMC Circuit)
		CS	IEC/EN61000-4-6 3Vr.m.s Perf.Criteria B (with the Recommended EMC Circuit)
		ESD	IEC/EN61000-4-2 Contact ±4KV Perf.Criteria B (with the Recommended EMC Circuit)
		Surge	IEC/EN61000-4-5 ±2KV Perf.Criteria B (with the Recommended EMC Circuit)
		EFT	IEC/EN61000-4-4 ±2KV Perf.Criteria B (with the Recommended EMC Circuit)

Mechanical Dimensions



Pin-out Function Description

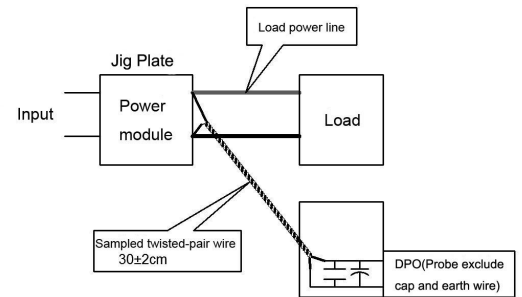
Pin No.	1	2	3	4	5	6	7	8
Function	Ctrl	GND	+Vin	+Vo2	0V2	No Pin	0V1	+Vo1

Ripple & Noise Test Instruction (Twisted Pair Method, 20MHz Bandwidth)

1. The Ripple & noise test needs 12# twisted pair cables, an oscilloscope which bandwidth should be set at 20MHz, 0.1uF polypropylene capacitor and 10uF high-frequency low-resistance electrolytic capacitors are connected in parallel with the probes (100M bandwidth). The oscilloscope should be set at the Sample Mode.

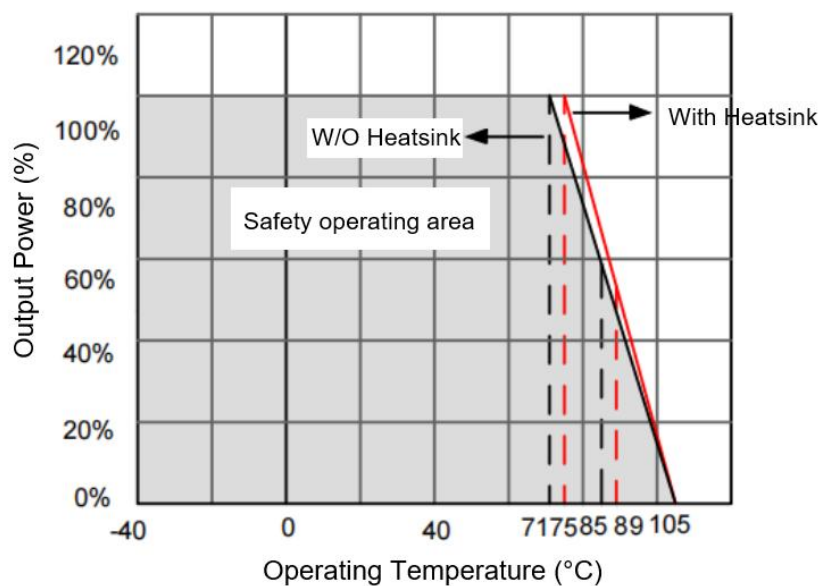
2. The test diagram is shown on the right. The converter output connects to the electronic load by the jig with cables which size should be defined according to the output current value. The twisted pair (length $30\text{cm} \pm 2\text{cm}$) should be connected in parallel with the load, the location is as close as possible to the output pins or terminals. The test can be start after input power on.

Note: Output $\geq 5\%$ load is recommended to avoid the output ripple increasing; The load imbalance of Dual outputs should be less than $\pm 5\%$ deviation.



Product Characteristics Graph

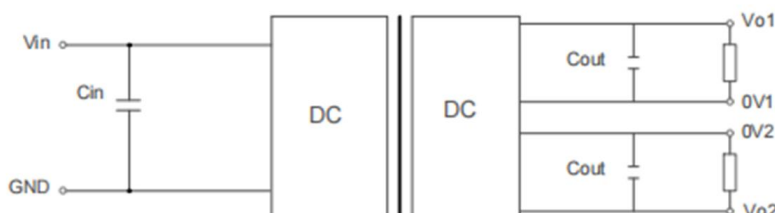
Temperature Derating Graph



Recommended Circuits Diagrams for Application

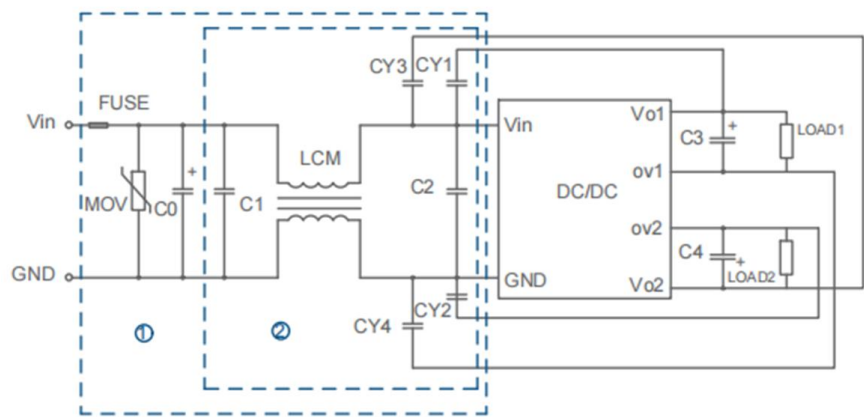
1. Typical application diagram

All this series of converters will be tested according to this circuit diagram below before shipping. The output ripple could be decreased with C_{in} & C_{out} capacitances increased, the output capacitance must be less than the maximum capacitive load.



Vo (VDC)	Cout	Cin
5	47uF/16V	100uF/100V
12	22uF/25V	
24	22uF/50V	

2. Recommended EMC circuit diagram



Component	Vin:48VDC
FUSE	TBD by the customer
C0	680μF/100V
C1, C2	4.7μF/100V
MOV	14D101K
C3, C4	Refer to typical Cout
LCM	1mH (FL2D-30-102)
CY1,CY2,CY3,CY4	Y1/102M/400VAC

Note: Part 1 circuit is for EMS test, Part 2 for EMI filtering, both can be adjusted according to the acutal situation.

3. This series of converters are not available for connecting in parallel to increase the output power.

Application Notice

- 1.The products should be used according to the specifications in this datasheet, otherwise it could be permanently damaged.
2. The product performance in this datasheet cannot be guaranteed if it works at a lower load than the minimum load defined.
3. The product performance in this datasheet cannot be guaranteed if it works at over-load condition.
4. Unless otherwise specified, all values or indicators in this datasheet are tested at Ta=25℃, humidity<75%RH, nominal input voltage and rated load (pure resistance load).
5. All values or indicators in this datasheet had been tested based on Aipupower test specifications.
- 6.The specifications are specially for the parts listed in this datasheet, any other non-standard model performances could be out of the specifications. Please contact our technician for specific requirements.
7. Aipupower can provide customization service.

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