Descriptions

350W isolated，DC/DC Converter



RoHS

Features

- Wide input voltage range (2:1)
- High efficiency up to 89%
- I/O isolation test voltage: 1.5k VDC
- Output voltage adjustment Trim: 60%-110%Vo
- Output over-voltage, short-circuit, over-current protection, over-temperature protection
- Operating ambient temperature range: -40℃ to +100℃
- Industry standard 1/2 brick
- Meet EN62368 standards

Applications

- Industrial Control
- Electric Power
- Instrumentation
- Communication
- Battery powered systems

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency ② (%) Min./Typ.	Max. Capacitive Load(μF)
		Nominal	Max.①	Voltage (VDC)	Current (mA) Max./Min.		
--	DEHB350-B2412	24 (20-36)	40	12	24000/0	83/86	6800
	DEHB350-B2424	24 (20-36)	40	24	14500/0	85/87	4000
	DEHB350-B2428	24 (20-36)	40	28	12500/0	87/89	3300
	DEHB350-B2432	24 (20-36)	40	32	11000/0	87/89	2700

Note:
① Exceeding the maximum input voltage may cause permanent damage;
② Efficiency is measured in nominal input voltage and rated output load.

Specifications

Product Specifications	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load / no-load)	12V output		--	13953/30	--	mA
		24V output		--	16667/30	--	
		28V output		--	16400/30	--	
		32V output		--	16480/30	--	
	Reflected Ripple Current	Nominal input voltage, 100% load		--	300	--	
	Surge Voltage (1sec. max.)			-0.7	--	40	VDC
	Start-up Voltage			--	--	20	
	Input Filter			C filter			
	Hot Plug			Unavailable			
	Ctrl①	Module on		Ctrl pin GND or pulled low (0-1.2VDC)			
		Module off		Ctrl pin open or pulled high TTL (3.5-12VDC)			
		Input current when off		--	6	10	mA
Output Specifications	Voltage Accuracy			--	±1	±3	%
	Linear Regulation	Input voltage variation from low to high at full load		--	±0.2	±0.5	
	Load Regulation	5%-100% load		--	±0.5	±1	
	Transient Recovery Time	25% load step change		--	300	500	μs
	Transient Response Deviation			--	±5	±8	%
	Temperature Coefficient	Full load		--	--	±0.03	%/℃
	Ripple & Noise ②	20MHz bandwidth, 5%-100%Io load		--	200	300	mVp-p
	Trim			60	--	110	%
	Sense			--	--	105	
	Over-temperature Protection	Surface max. temperature		--	125	--	℃
	Over-voltage Protection	Input voltage range		Hiccup			
	Over-current Protection			110	--	190	%Io
	Short-circuit Protection			Continuous, self-recovery			
General Specifications	Isolation	Input-output	electric strength test for 1 minute with a leakage current of 1mA max.	1500	--	--	VDC
		Input-case		1500	--	--	
		Output-case	electric strength test for 1 minute with a leakage current of 5mA max.	500	--	--	VAC
	Insulation Resistance	Input-output resistance at 500VDC		1000	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100KHz/0.1V		--	1500	--	pF
	Operating Temperature Range (product surface temperature)	Forced water convection or other heat dissipation methods		-40	--	100	℃
	Storage Temperature			-55	--	125	
	Storage Humidity	Non-condensing		5	--	95	%RH

	Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	300	℃
	Vibration		10-150Hz, 5G, 0.75mm. along X, Y and Z			
	Switching Frequency	PWM mode	--	270	--	kHz
	MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours
Mechanical Specifications	Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0) & Aluminum alloy case				
	Dimensions	61.0 × 57.9 × 12.7 mm				
	Weight	81.6g (Typ.)				
	Cooling Method	Forced water convection or other heat dissipation methods, ensuring product surface temperature less than 100℃				

Note:

①The Ctrl pin voltage is referenced to input GND.

②The "Tip and barrel" method is used for ripple and noise test, Ripple & Noise at <5% load is 5%Vo max.

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 Class A (see Fig. 3 for recommended circuit)	
	RE	CISPR32/EN55032 Class A (see Fig. 3 for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2 Contact ±6KV/Air ±8KV	perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m (see Fig. 3 for recommended circuit)	perf. Criteria A
	EFT	IEC/EN61000-4-4 ±2KV (see Fig. 3 for recommended circuit)	perf. Criteria A
	Surge	IEC/EN61000-4-5 line to line ±2KV (see Fig. 3 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6 10 Vr.m.s (see Fig. 3 for recommended circuit)	perf. Criteria A

Characteristic Curve

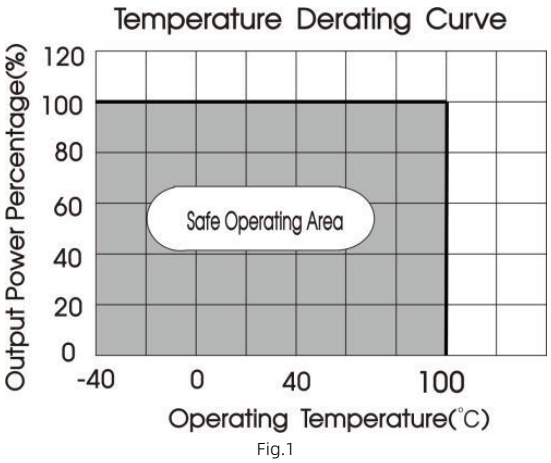
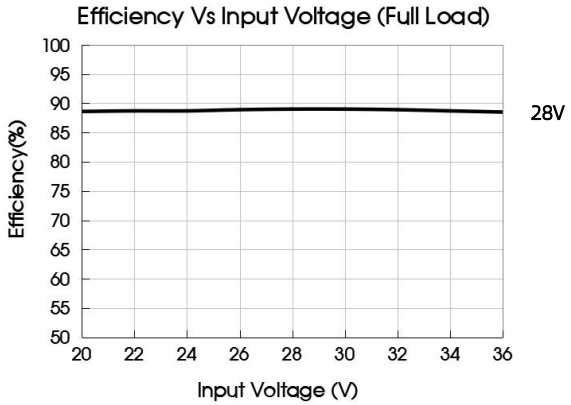
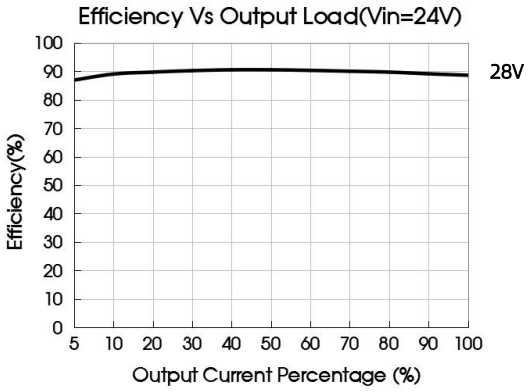


Fig.1

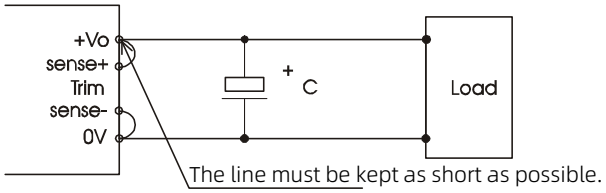
Note: Temperature derating curve is tested at nominal input voltage, operating condition is forced water convection, operating temperature is product surface temperature.





Remote Sense Application

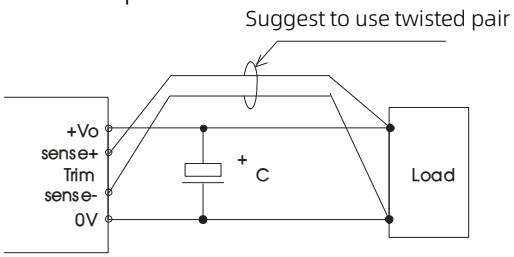
1. Remote Sense Connection if not used



Note:

1. If the sense function is not used for remote regulation the user must connect the +Sense to + Vo and -Sense to 0V at the DC-DC converter pins and will compensate for voltage drop across pins only.
2. The connections between Sense lines and their respective power lines must be kept as short as possible, otherwise they may be picking up noise, interference and/or causing unstable operation of the power module.

2. Remote Sense Connection used for Compensation



Note:

1. Using remote sense with long wires may cause unstable output, please contact technical support if long wires must be used.
2. PCB-tracks or cables/wires for Remote Sense must be kept as short as possible. Twisted pair or shielded wairs are suggested for remote compensation and must be kept as short as possible.
3. We recommend using adequate cross section for PCB-track layout and/or cables to connect the power supply module to the load in order to keep the voltage drop below 0.3V and to make sure the power supply's output voltage remains within the specified range.
4. Note that large wire impedance may cause oscillation of the output voltage and/or increased ripple. Consult technical support or factory for further advice of sense operation.

Design Reference

1. Typical application

All the DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2.

Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the specified max. capacitive load value of the product.

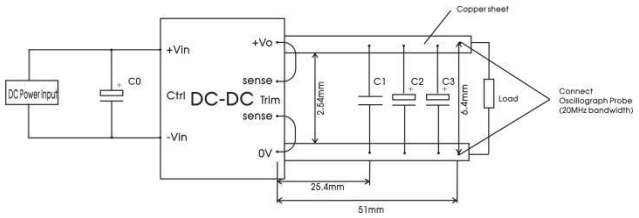


Fig. 2

Output voltage (VDC) \ Capacitor values	C0	C1	C2	C3
12	100μF /200V	1μF/25V	10μF/25V	330μF/25V
24		1μF/50V	10μF/50V	330μF/50V
28		1μF/50V	10μF/50V	330μF/50V
32		1μF/50V	10μF/50V	330μF/50V

2. EMC compliance circuit

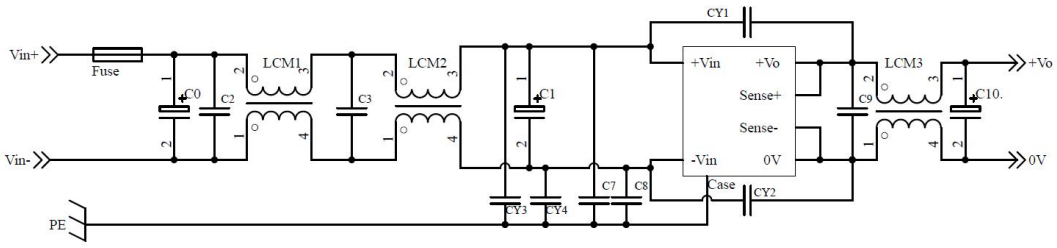
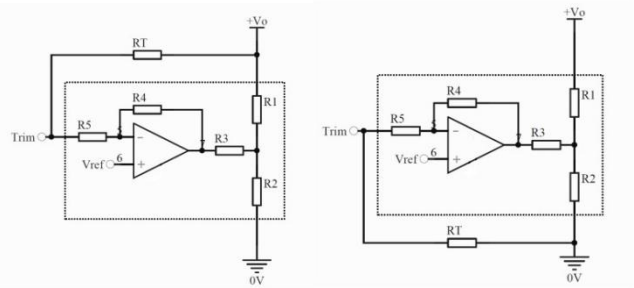


Fig. 3

Parameter description:

Components	Value
FUSE	Choose according to actual input current
C0	1000μF/100V
C1	470μF/100V
C2、C3、C9	2.2μF/250V
C7、C8	0.1μF/2000V
C10	220μF/63V
CY1、CY2、CY3、CY4	2.2nF/400VAC
LCM1	100uH/25A
LCM2	1mH/25A
LCM3	4uH/36A

3. Trim Function for Output Voltage Adjustment (open if unused)



TRIM resistor connection (dashed line shows internal resistor network)

Trim resistor calculation:

$$\text{Up:}\quad RT = \frac{(\Delta\% + 100)R_1R_4}{\Delta\% R_3} - \frac{100V_{ref}R_1R_4}{\Delta\% V_{out}R_3} - R_5$$

$$\text{Down:}\quad RT = \frac{100V_{ref}R_1R_4}{\Delta\% V_{out}R_3} - R_5$$

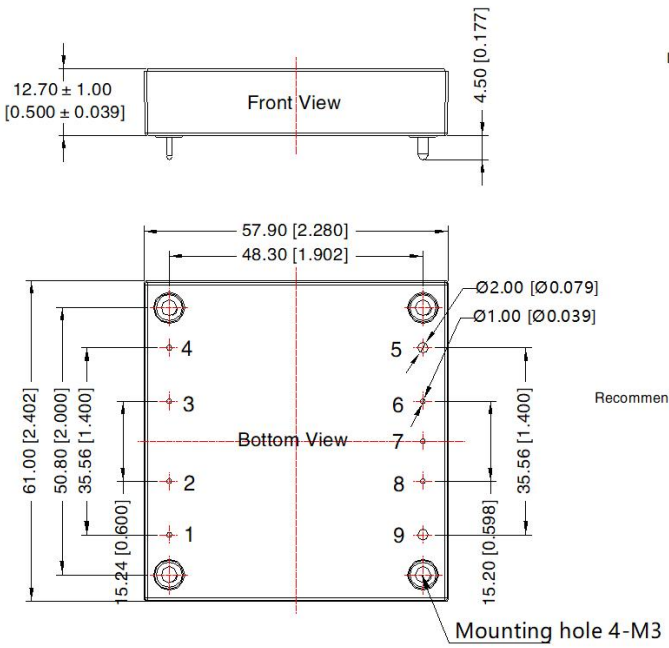
Table1

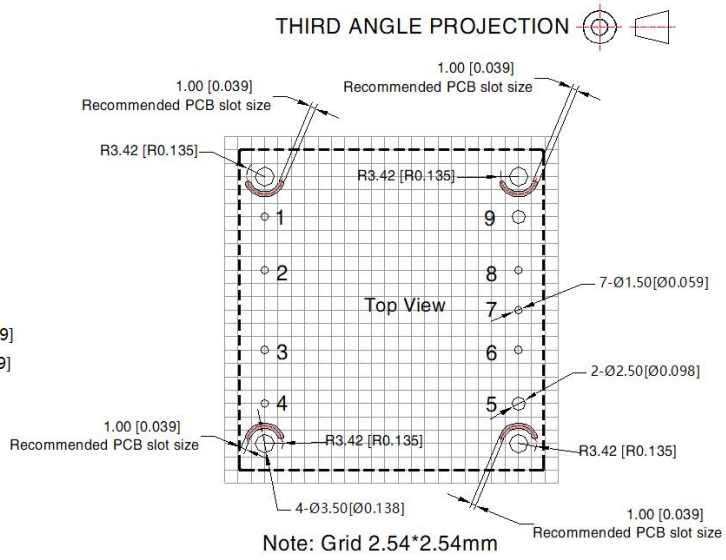
Vout(VDC)	R1(KΩ)	R3(KΩ)	R4(KΩ)	R5(KΩ)	Vref(V)
12	10.91	5	10	4.5	2.5
24	24.87	12	10	4.5	2.5
28	29.12	10	10	4.5	2.5
32	34.02	12	10	4.5	2.5

Note: Value for R1、R3、R4、R5、Vref refer to the above table 1. R_T: Resistance of Trim. △% is designed percentage of trim up or trim down.

4. The products do not support parallel connection of their output

Dimensions and Recommended Layout





Note:
Unit: mm[inch]
Pin1,2,3,4,6,7,8's diameter: 1.00[0.039]
Pin5,9's diameter: 2.00[0.079]
Pin diameter tolerances: ± 0.10[± 0.004]
General tolerances: ± 0.50[± 0.020]
Mounting hole screwing torque: Max 0.4 N.m

Pin–Out			
Pin	Mark	Pin	Mark
1	+Vin	6	Sense–
2	Ctrl	7	Trim
3	NC	8	Sense+
4	–Vin	9	+Vo
5	0V		

Note:

1. Recommend to use module with more than 5% load, if not, the ripple of the product may exceeds the specification, but does not affect the reliability of the product;
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on company corporate standards;
5. We can provide customized and matched filter modules. For details, please contact our technical staff;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.