

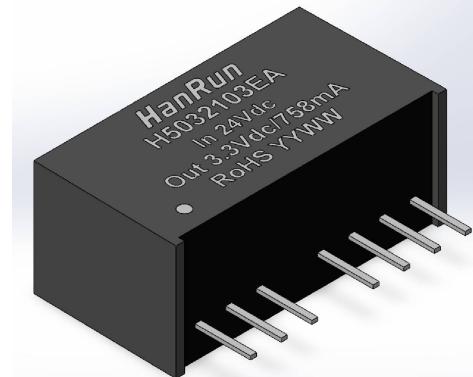
3W Isolated DC-DC Converter
Wide input voltage and regulated single output



H5032103EA

Features :

- ◆ **HanRun** transformer
- ◆ Ultra compact SIP package
- ◆ Wide 2:1 input voltage range
- ◆ Operating ambient temperature range: -40°C to +85°C
- ◆ I/O isolation test voltage: 1.5K VDC
- ◆ Low output ripple & noise
- ◆ Short circuit protection (self-recovery)
- ◆ Remote On/Off
- ◆ High power density
- ◆ Meets EN62368 standard
- ◆ RoHS Compliant



This model is isolated 3W DC-DC converter productions with a wide 2:1 input voltage range and input / output Isolation is tested with 1500VDC. The product has a relatively compact SIP-8 plastic package, and features high efficiency, operating ambient temperature of -40°C to +85°C ,remote control, and continuous short-circuit protection. The smaller size and cost-effective design make the the converter an ideal solution in communication, instruments, and industrial electronics applications.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	DC Input	18	24	36	VDC
Input Current (no load)	nominal Input Voltage, no load	-	5	10	mA
Input Current	nominal Input Voltage, 100% load	-	133	138	mA
Reflected Ripple Current	nominal input voltage, 100% load	-	55	-	mA
Surge Voltage (1sec. max.)	nominal input voltage, 100% load,	-0.3	-	50	V
Start-up Voltage		-	-	18	V
Input Filter		Capacitance filter			
Hot Plug		Unavailable			
Ctrl	Module on	Ctrl pin open (high resistance)			
	Module off	Ctrl pin pulled high (current 5-10mA typ. into Ctrl.)			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage		-	3.3	-	DCV
Output Current		38	-	758	mA
Output Voltage Accuracy	5%-100% load, input voltage range	-	-	±3	%
Line Regulation	Input voltage variation from low to high at full load	-	±0.2	±0.5	%
Load Regulation	nominal input voltage, 5%~100% load,	-	±0.6	±1	%
Transient Recovery Time	25% load step change	-	0.5	3	ms
Transient Response Deviation	25% load step change	-	±2.5	±5	%
Temperature Coefficient	Full load	-	±0.02	±0.03	%/°C

3W Isolated DC-DC Converter
Wide input voltage and regulated single output



H5032103EA

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Ripple & Noise	20MHz bandwidth	-	45	75	mVp-p
Short-circuit Protection	Continuous, self-recovery				

Note: * The "parallel cable" method is used for Ripple and Noise test.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.	1500	-	-	VDC
Insulation Resistance	Input to output,at 500VDC	1000	-	-	MΩ
Isolation capacitance	Input to output,100KHz 0.1V	-	120	-	pF
Capacitive Load	nominal input voltage, Full load	-	-	2700	uF
Efficiency	nominal input voltage,full load,	77	81	-	%
Storage Humidity	Non-condensing	5	-	95	%RH
Storage Temperature		-55	-	+125	°C
Case Temperature Rise	Ta=25°C, nominal input voltage, full load	-	25	-	°C
Operating Temperature	(see Fig. 1)	-40	-	+85	°C
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10s seconds	-	-	300	°C
Switching Frequency	nominal input voltage,full load,	-	330	-	KHz
Vibration		10-150Hz, 5G, 0.75mm. along X, Y and Z			
Safety Standard		EN 62368-1			
MTBF	MIL-HDBK-217F@25°C	1000	-	-	Khours

Physical Specifications

Casing Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)
Dimensions	22.00 × 9.50 × 12.00 mm
Weight	4.5g (typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B (see Fig. 3-② for recommended circuit)
	RE	CISPR32/EN55032 CLASS B (see Fig. 3-② for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2 Contact ±4kV
	RS	IEC/EN61000-4-3 10V/m
	EFT	IEC/EN61000-4-4 ±2kV (see Fig. 3-① for recommended circuit)
	Surge	IEC/EN61000-4-5 line to line ±2kV (see Fig. 3-① for recommended circuit)
	CS	IEC/EN61000-4-6 3 Vr.m.s
	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-29 0%, 70%

3W Isolated DC-DC Converter
Wide input voltage and regulated single output



H5032103EA

Typical Characteristic Curve:

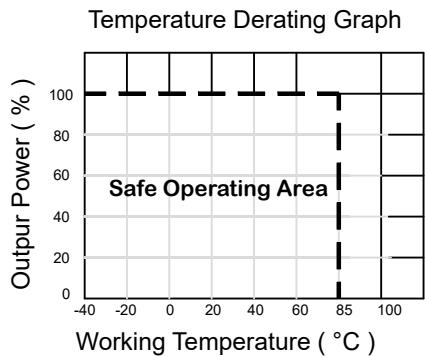


Fig. 1

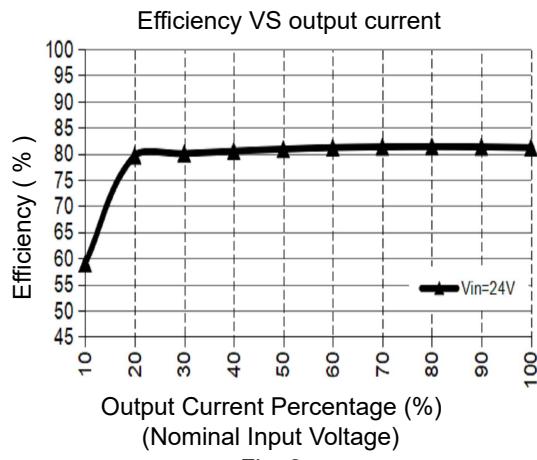


Fig. 2

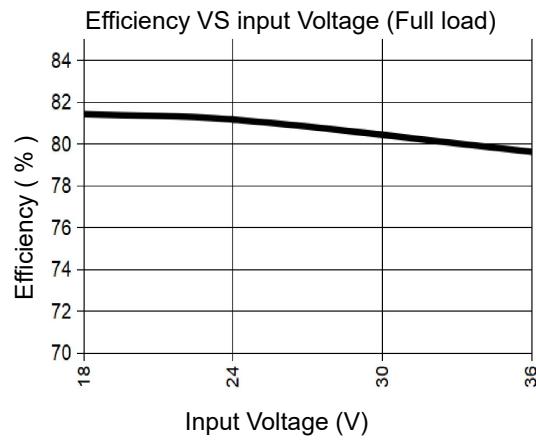


Fig. 3

Design Reference:

1. Typical application

The part is tested before delivery using the recommended circuit shown in Fig. 4

Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values C1, C2, and C3 and/or by selecting capacitors with a low ESR (equivalent series resistance). C3 is used to reduce ripple. No need to add C3, if ripple meets the demand. Appropriate filter capacitance shall be chosen, start-up problems may be caused if the capacitance is too large. For each output circuit, under the condition of safe and reliable operation, the max. capacity of its filter capacitor should be lower than the max. capacitive load.

3W Isolated DC-DC Converter

Wide input voltage and regulated single output

H5032103EA

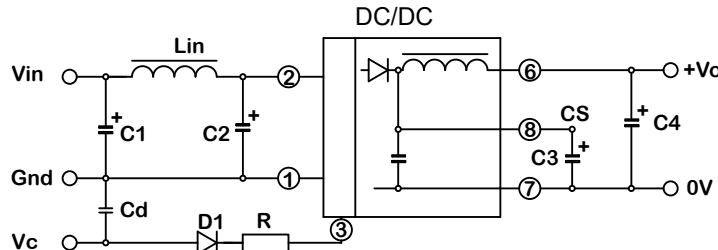


Fig. 4

Item	values
C1	10uF/100V
Lin	4.7μH-12μH
C2	1uF/100V
C3	10uF//50V -22uF/50V
C4	100uF/50V
Lout	2.2uH-10uH
Cd	47nF/100V

Table 1: Recommended input and output capacitor values

2. EMC typical recommended circuit

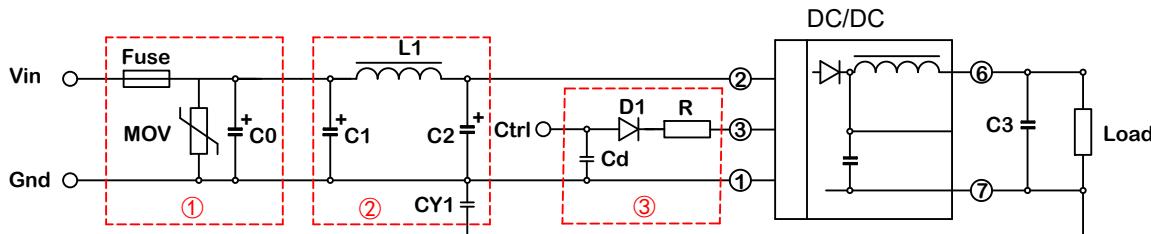


Fig. 5

Item	values
FUSE	Slow-blow, selecting based on needs
MOV	S20K30
C0	330uF/50V
C1	4.7uF/100V
C2	4.7uF/100V
C3	100uF/50V
L1	12uH
Cd	47nF/100V
D1	RB160M-60V/1A
Cy1	1nF/2KV
R	$R = \frac{V_c - V_d - 1.0}{I_c} - 300$

Table 2: Recommended EMC filter values

Note:

- ① For EMC tests we use Part ① in Fig. 5 for immunity and part ② for emissions test. Selecting based on needs.
- ② VC is the voltage of the Ctrl end relative to the GND of the input grounding; Vd is the positive-going conduction pressure drop of D1; Ic is the current flows into the Ctrl end and its value is generally 5-10mA, see Fig. 5-③ for the peripheral circuit of Ctrl end;
- ③ If there is no recommended parameters, no external component is required.

H5032103EA

3. Ctrl end

The modules are of normal output when the Ctrl end is suspended or of high resistance; the modules turn off when connecting with high level (relative to the input grounding); notice that the current flows into the pin shall be 5 - 10mA, the modules will be permanently damaged if the current exceeds its max. value (20mA in general). The value of R can be derived as follows:

$$R = \frac{Vc - Vd - 1.0}{Ic} - 300$$

4. Input current

When the electricity is provided by the unstable power supply, please make sure that the range of the output voltage fluctuation and the ripple voltage of the power supply do not exceed the indicators of the modules. Input current of power supply should afford the flash start up current of this kind of DC/DC module(see Fig. 6).

Generally: Vin=24V , lave =303mA

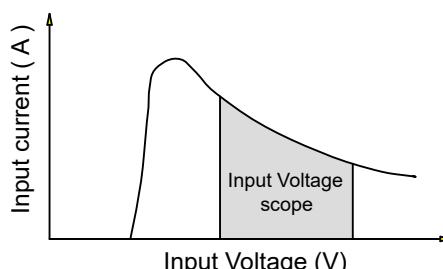


Fig. 6

5. Output load requirements

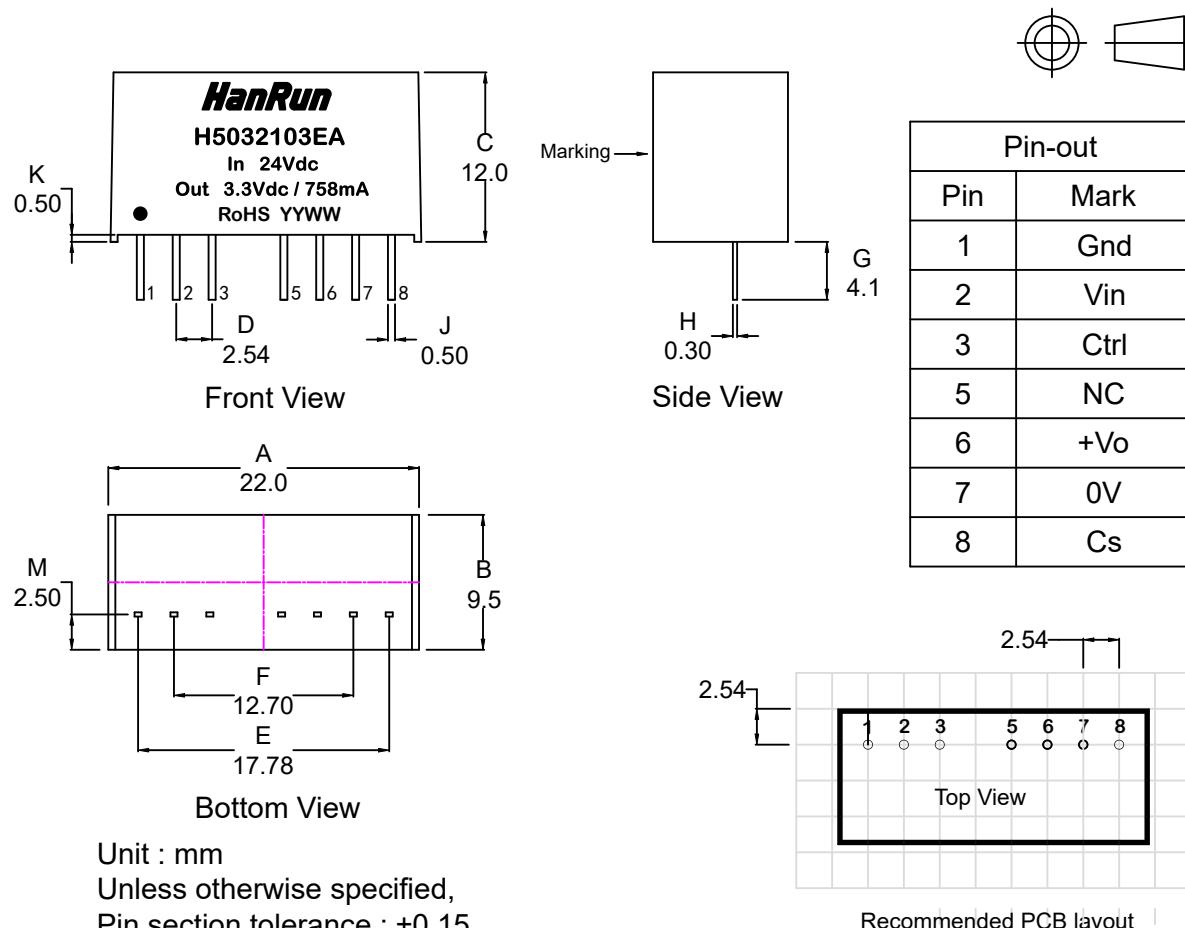
When using, the minimum load of the module output should not be less than 5% of the nominal load. In order to meet the performance parameters of this datasheet, please connect a 5% dummy load in parallel at the output end, the dummy load is generally a resistor, please note that the resistor needs to be used in derating.

3W Isolated DC-DC Converter
Wide input voltage and regulated single output



H5032103EA

Dimensions and Recommended Layout:



Notes:

- 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 $T_a=25^{\circ}\text{C}$, humidity<75%RH with nominal input voltage and rated output load;
- 4 Consider fixing with glue near the module if being used in vibration occasion;
- 5 All index testing methods in this datasheet are based on company corporate standards;