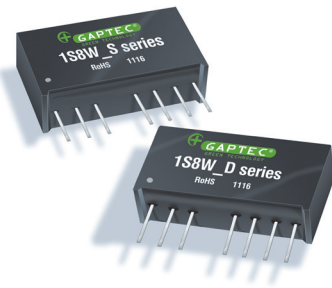


1S8W_S & 1S8W_D Series

1W - Dual/Single Output - Wide Input - Isolated & Regulated
SIP - DC-DC Converter



DC-DC Converter

1 Watt

- ⊕ 2:1 wide input voltage range
- ⊕ 1.5KVDC isolation
- ⊕ Short circuit protection (automatic recovery)
- ⊕ External On/Off control
- ⊕ High Power Density
- ⊕ Operating Temperature: -40°C to +85°C
- ⊕ Ultra-Miniature SIP Package
- ⊕ RoHS Compliance



RoHS

Common specifications	
Short circuit protection:	Continuous, automatic recovery
Temperature rise at full load:	25°C TYP
Cooling:	Free air convection
Operation temperature range:	-40°C~+85°C
Storage temperature range:	-50°C ~+125°C
Lead temperature range:	300°C MAX, 1.5mm from case for 10 sec
Storage humidity range:	< 95%
Case material:	Plastic [UL94-V0]
MTBF (MIL-HDBK-217F@25°C):	>1,000,000 hours
Weight:	4.9g

Isolation specifications					
Item	Test condition	Min	Typ	Max	Units
Isolation voltage	Tested for 1 minute, leakage current less than 1 mA	1500			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation capacitance	Input/Output, 100KHz/0.1V		120		pF

Model selection:
WCT_xxyyN##O**
W=Watt; C= Case; T=Type; **= Voltage Variation (omitted ± 10%);
xx= Vin; yy= Vout; N= Numbers of Output; ##= Isolation (kVDC); O=
output regulation

Example:
1S8W_0505S1.5RP
1=1Watt; S8= SIP8; W=wide input; 4.5 - 9Vin; 5Vout; S=Single
Output; 1.5=1500VDC; R=Regulated Output P=Short Curcuit
Protection

Note:

1. Min. load shouldn't be less than 5%, otherwise ripple maybe increased dramatically. If the product operates under min. load, it may not be guaranteed to meet all specifications listed. Operation under minimum load will not damage the converter.
2. Recommended Dual output models unbalanced load is $\leq \pm 5\%$, if the product operates $> \pm 5\%$, it may not be guaranteed to meet all specifications listed. Please contact our technical support for more details.
3. Max. Capacitive Load is tested at input voltage range and full load.
4. All specifications measured at $T_a=25^\circ\text{C}$, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
5. In this datasheet, all test methods are based on our corporate standards.
6. All characteristics are for listed models, and non-standard models may perform differently. Please contact our technical support for more details.
7. Please contact our technical support for any specific requirement.
8. Specifications of this product are subject to changes without prior notice.

The 1S8W_S & 1S8W_D series are specially designed for applications where a wide range input voltage power supplies are isolated from the input power supply in a distributed power supply system on a circuit board. For these DC-DC converters, You can reduce the design point of failure and save the development of micro power supply's manpower, material and time costs, also better ensure product quality stability, protect safety and reliability of the end of products.

These products apply to:

- 1) Where the voltage of the input power supply is wide range (voltage range $\leq 2:1$)
- 2) Where isolation is necessary between input and output (isolation voltage $\leq 1500\text{VDC}$)
- 3) Where the regulation of the output voltage and the output ripple noise are demanded

Output specifications					
Item	Test condition	Min	Typ	Max	Units
Line regulation	Input voltage from low to high, full load		± 0.2	± 0.5	%
Load regulation	5% to 100% load		± 0.4	± 0.75	%
Output voltage accuracy	5% to 100% load		± 1	± 3	%
No load output voltage accuracy	Input voltage range		± 1.5	± 5	%
Temperature coefficient	100% load		± 0.02	± 0.03	%/°C
Ripple*	20MHz Bandwidth		30	50	mVp-p
Noise*	20MHz Bandwidth		55	80	mVp-p
Transient recovery time	25% load step change		0.5	2	ms
Transient response deviation	25% load step change		± 2.5	± 5	%
Switching frequency (PFM mode)	100% load, nominal input voltage		200		KHz

* Test ripple and noise by "parallel cable" method. See detailed operation instructions at application notes.

Input specifications					
Item	Test condition	Min	Typ	Max	Units
Input filter	C				
Input surge voltage (1 sec. max.)	<ul style="list-style-type: none"> • 5VDC input • 12VDC input • 24VDC input • 48VDC input 	-0.7		12	VDC
Start-up voltage	• 5VDC input	3.5	4	4.5	VDC
	• 12VDC input	4.5	8	9	VDC
	• 24VDC input	11	16	18	VDC
	• 48VDC input	24	33	36	VDC
Ctrl ¹⁾	<ul style="list-style-type: none"> • Models ON • Models OFF 				Ctrl open or be insulated Connect high level voltage, and ensure the current into Ctrl to be 5-10mA

¹⁾ Please refer to „Application note“ as the direction for use of Ctrl.

1S8W_S & 1S8W_D Series

1W - Dual/Single Output - Wide Input - Isolated & Regulated
SIP - DC-DC Converter

EMC specifications				
EMI	CE	CISPR22/EN55022 CLASS B (External Circuit Refer to EMC recommended circuit, ②)		
EMI	RE	CISPR22/EN55022 CLASS B (External Circuit Refer to recommended circuit, ②)		
EMS	ESD	IEC/EN61000-4-2	Contact ±4KV	perf. Criteria B
EMS	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
EMS	EFT	IEC/EN61000-4-4 IEC/EN61000-4-4	±2KV ±4KV	perf. Criteria B (External Circuit Refer to EMC recommended circuit, ①) perf. Criteria B
EMS	Surge	IEC/EN61000-4-5	±2KV	perf. Criteria B (External Circuit Refer to EMC recommended circuit, ①)
EMS	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A
EMS	Voltage dips, short and interruptions immunity	IEC/EN61000-4-29	0%-70%	perf. Criteria B

Part Number	Input Voltage [VDC]			Output Voltage [VDC]	Output Current [mA]		Input current [mA, Typ.]	Reflected ripple current [mA, Typ.]	Capacitive load ²⁾ [μF, Max.]	Efficiency [%, Typ.]
	Nominal	Range	Max ¹⁾		Max	Min				
1S8W_0505S1.5RP	5	4.5-9	11	5	200	10	278	30	2200	72
1S8W_0512S1.5RP	5	4.5-9	11	12	83	4	263	30	1000	76
1S8W_0515S1.5RP	5	4.5-9	11	15	67	3	267	30	680	75
1S8W_1205S1.5RP	12	9-18	22	5	200	10	108	40	2200	77
1S8W_1209S1.5RP	12	9-18	22	9	111	6	106	40	1800	79
1S8W_1212S1.5RP	12	9-18	22	12	83	4	104	40	1000	80
1S8W_1215S1.5RP	12	9-18	22	15	67	3	104	40	680	80
1S8W_2403S1.5RP	24	18-36	40	3.3	303	15	56	55	2700	75
1S8W_2405S1.5RP	24	18-36	40	5	200	10	54	55	2200	77
1S8W_2412S1.5RP	24	18-36	40	12	83	4	51	55	1800	81
1S8W_2415S1.5RP	24	18-36	40	15	67	3	53	55	1000	79
1S8W_2424S1.5RP	24	18-36	40	24	42	2	54	55	680	77
1S8W_4805S1.5RP	48	36-75	80	5	200	10	27	70	2200	76
1S8W_4812S1.5RP	48	36-75	80	12	83	4	26	70	1000	81
1S8W_4815S1.5RP	48	36-75	80	15	67	3	26	70	680	80
1S8W_0505D1.5RP	5	4.5-9	11	±5	±100	±5	274	30	1000	73
1S8W_0512D1.5RP	5	4.5-9	11	±12	±42	±2	263	30	470	76
1S8W_0515D1.5RP	5	4.5-9	11	±15	±33	±2	267	30	330	75
1S8W_1205D1.5RP	12	9-18	22	±5	±100	±5	107	40	1000	78
1S8W_1212D1.5RP	12	9-18	22	±12	±42	±2	103	40	470	81
1S8W_1215D1.5RP	12	9-18	22	±15	±33	±2	104	40	330	80
1S8W_2405D1.5RP	24	18-36	40	±5	±100	±5	52	55	1000	80
1S8W_2412D1.5RP	24	18-36	40	±12	±42	±2	52	55	470	80
1S8W_2415D1.5RP	24	18-36	40	±15	±33	±2	52	55	330	80
1S8W_4805D1.5RP	48	36-75	80	±5	±100	±5	27	70	1000	76
1S8W_4812D1.5RP	48	36-75	80	±12	±42	±2	26	70	470	80
1S8W_4815D1.5RP	48	36-75	80	±15	±33	±2	26	70	330	80

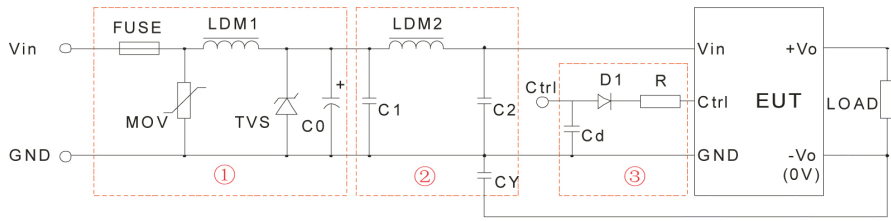
¹⁾ Absolute maximum rating without damage on the converter, but it isn't recommended;

²⁾ For dual output converter, the given value is the same for each output.

1S8W_S & 1S8W_D Series

1W - Dual/Single Output - Wide Input - Isolated & Regulated
SIP - DC-DC Converter

EMC recommended circuit



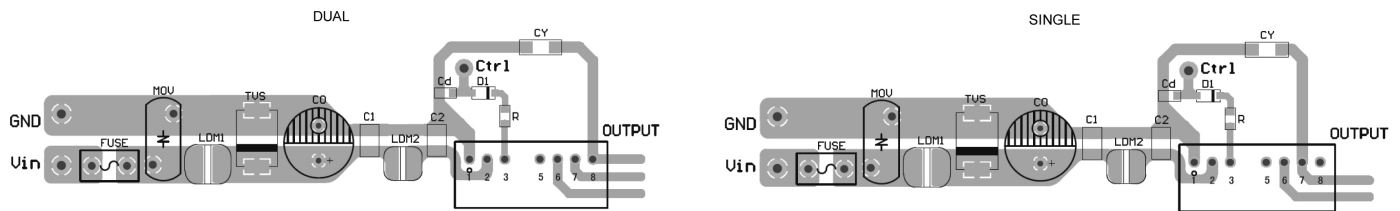
Recommended external circuit parameters:

Model	Vin: 5V	Vin: 12V	Vin: 24V	Vin: 48V
FUSE	Choose according to practical input current			
MOV	-	-	10D560	10D101
LDM1	-	-	56μH	
TVS	SMCJ13A	SMCJ28A	SMCJ48A	SMCJ90A
C0	680μF/16V	680μF/25V	120μF/50V	120μF/100V
C1	4.7μF/50V		4.7μF/100V	
LDM2	12μH			
CY1	4.7μF/50V		4.7μF/100V	
CY2	1nF/2KV			
D1	RB160M-60/1A			
R	Follows: $R = \frac{V_C - V_D - 1.0}{I_C} - 300$			
Cd	47nF/100V			

Note:

- Part ① is EMS recommended external circuit, part ② is EMI recommended external circuit. Choose according to requirements.
- V_C is the voltage to GND from Ctrl, V_D is the forward conduction voltage drop of D1, I_C is the current through Ctrl pin which is normally 5-10mA, the external circuit of Ctrl is as shown in part ③;
- If there is no recommended parameters, the model no require the external component.

EMC recommended circuit PCB layout



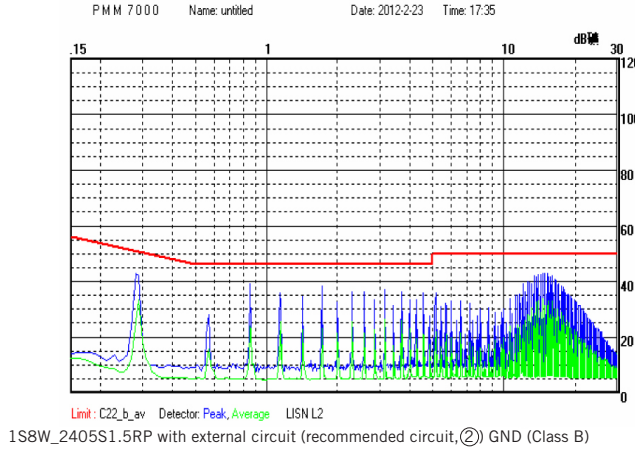
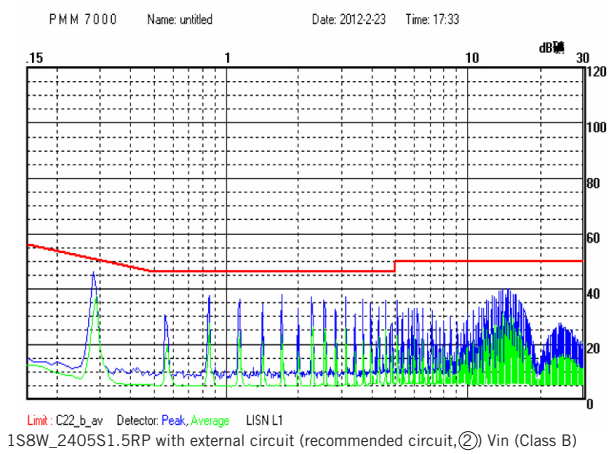
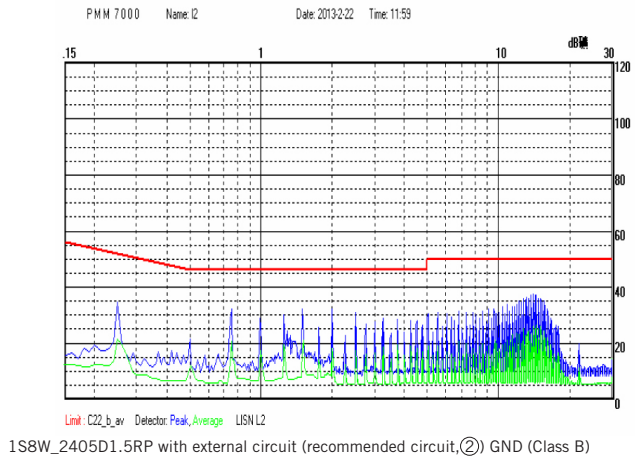
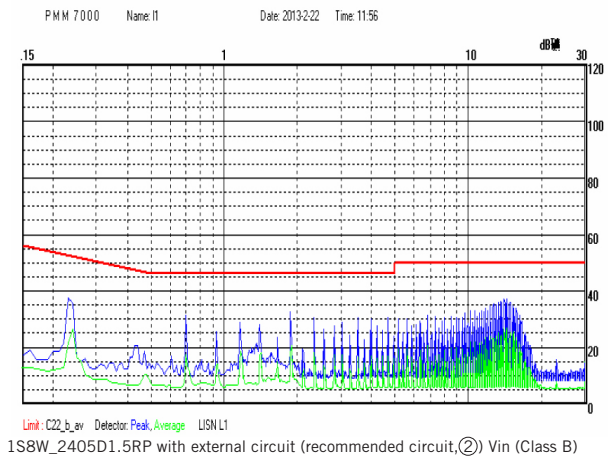
Note:

The pad space between input and output GND (CY) must ≥ 2mm.

1S8W_S & 1S8W_D Series

1W - Dual/Single Output - Wide Input - Isolated & Regulated
SIP - DC-DC Converter

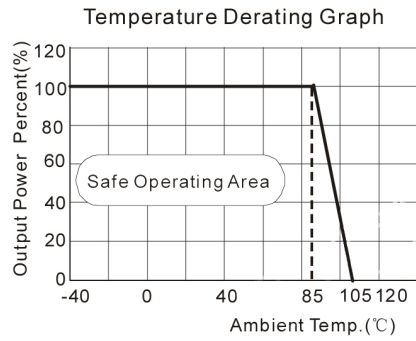
EMI test waveform (class B application circuit)



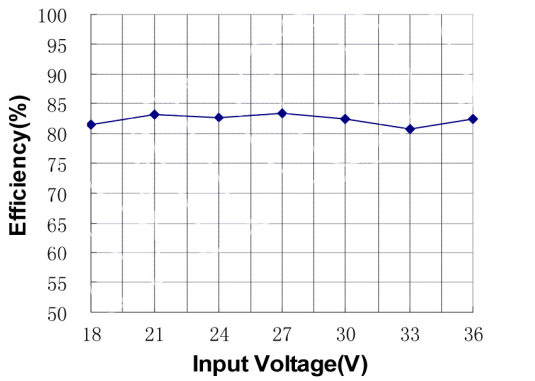
10DAW4_S & 10DAW4_D Series

10W - Dual/Single Output - 4:1 Wide Input - Isolated & Regulated DC-DC Converter

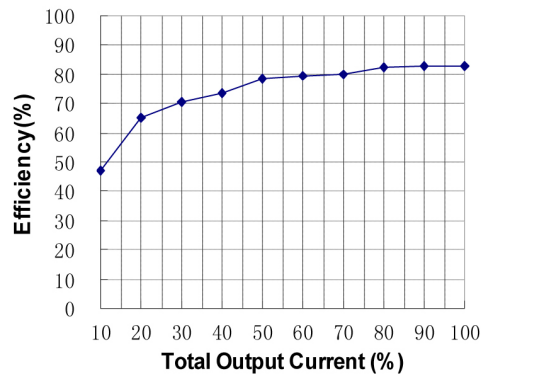
Typical characteristics



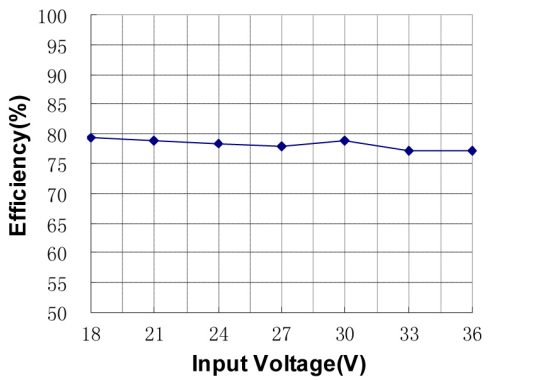
Efficiency VS Input Voltage curve (Full Load) — 1S8W_2405D1.5



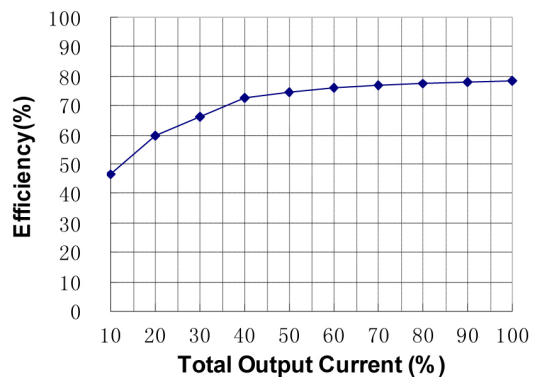
Efficiency VS Output Load curve (Vin=Vin-nominal) — 1S8W_2405D1.5



Efficiency VS Input Voltage curve (Full Load) — 1S8W_2405S1.5



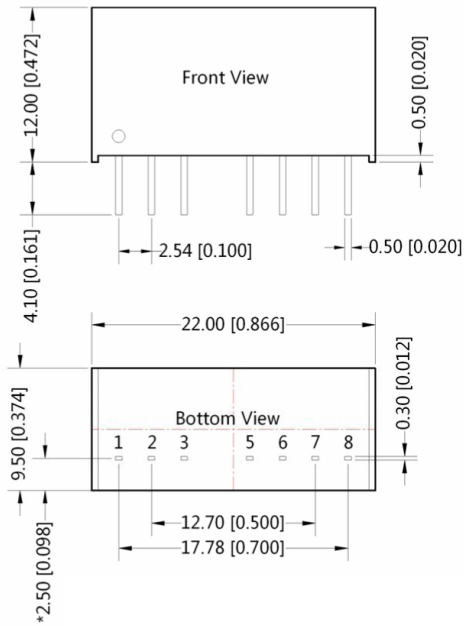
Efficiency VS Output Load curve (Vin=Vin-nominal) — 1S8W_2405S1.5



1S8W_S & 1S8W_D Series

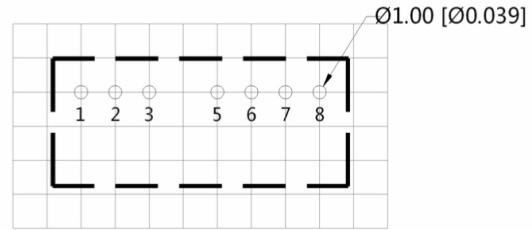
1W - Dual/Single Output - Wide Input - Isolated & Regulated
SIP - DC-DC Converter

Mechanical dimensions Recommended footprint



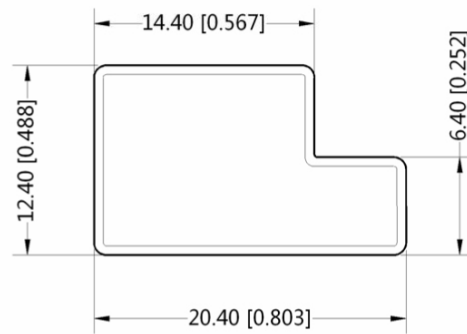
PIN CONNECTION		
Pin	Single	Dual
1	GND	GND
2	Vin	Vin
3	Ctrl	Ctrl
5	NC	NC
6	+Vo	+Vo
7	0V	0V
8	CS	-Vo

Note : NC: No connection
 Unit:mm[inch]
 Pin section tolerances:±0.10mm[±0.004inch]
 General tolerances:±0.25mm[±0.01inch]



Note : grid : 2.54*2.54mm

Tube outline



Note:
 Unit: mm[inch]
 General tolerances: ±0.50mm [±0.020inch]

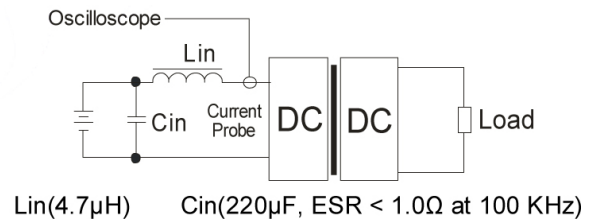
L=530mm [20.866inch]
 Tube quantity: 22pcs

L=220mm [8.661inch]
 Tube quantity: 8pcs

Test configurations

Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with an inductor Lin and Capacitor Cin to simulate source impedance.



1S8W_S & 1S8W_D Series

1W - Dual/Single Output - Wide Input - Isolated & Regulated
SIP - DC-DC Converter

Application note

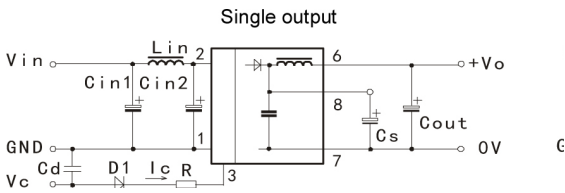
Requirement on output load

To ensure this module can operate efficiently and reliably, during operation, the minimum output load could not be less than 5% of the full load, otherwise output ripple may increase dramatically. If the actual output power is very small, please connect a resistor with proper resistance at the output end in parallel to increase the load, suppose to use the resistance of 5% rated power, or use our company's products with a lower rated output power.

Recommended circuit

All the 1S8W_S & 1S8W_D Series have been tested according to the following recommended test circuit before leaving the factory (see Figure 1).

Single Output



Dual Output

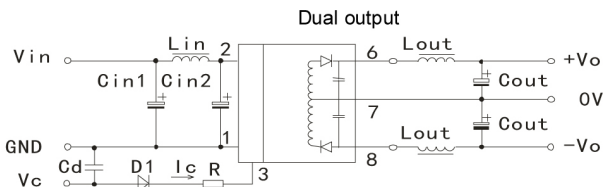


Figure 1

If you want to further decrease the input/output ripple, you can increase a capacitance-values properly or choose capacitors with low ESR. However, the capacitance of the output filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the greatest capacitance must be less than the Max. Capacitive Load.

General:	Cin:	5V,12V	100µF
		24V,48V	10µF
	Cin2:	5V,12V	47µF
		24V,48V	1µF
	Lin:	4.7µH ~12µH	
	Cs:	10µF ~ 22µF	
	Cout:	100µF (typ.)	
	Lout:	2.2µH ~10µH	
	Cd:	47µF ~ 100µF	

CTRL Terminal

When open or high impedance, the converter works well; When this pin is 'high'; the converter shuts down; It should be noted that the input current should be between 5-10mA, exceeding the maximum 20mA will cause permanent damage to the converter. The value of R Can be derived as follows:

$$R = \frac{V_C - V_D - 1.0}{I_C} - 300$$

For Detailed parameter, please refer to „EMC recommended circuit“.

Input current

When it is used in unregulated power supply, be sure that the fluctuating range of the power supply and the rippled voltage do not exceed the module standard. Input current of power supply should afford the flash startup current of this kind of DC/DC module (Figure 2).

General:	Vin=5V	Ip =450mA
	Vin=12V	Ip =220mA
	Vin=24V	Ip =110mA
	Vin=48V	Ip =55 mA

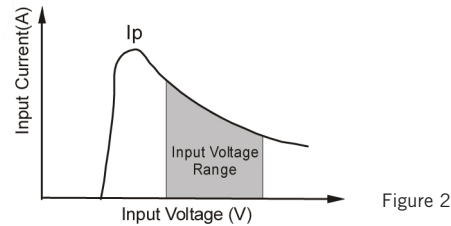


Figure 2

It is not recommended to increase the output power capability by connecting two or more converters in parallel. The product is not hot-swappable