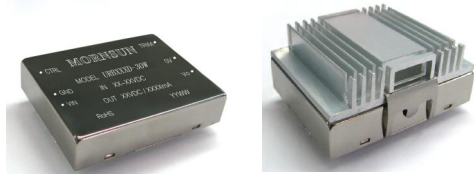


URA_D-30W&URB_D-30W Series

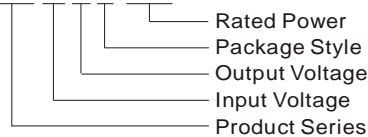
30W, WIDE INPUT, ISOLATED & REGULATED
DUAL/ SINGLE OUTPUT DIP DC-DC CONVERTER



Patent Protection RoHS

MODEL SELECTION

URB2405D-30W



PRODUCT FEATURES

- High efficiency up to 90%
- 4:1 wide input voltage range
- I/O Isolation 1500VDC
- Six-sided metal shield
- Short circuit protection (automatic recovery)
- Operating temperature: -40°C to +85°C
- Internal SMD construction
- Industry standard pinout
- MTBF > 1,000,000 hours

APPLICATION

URA_D-30W&URB_D-30W series offer 30W of output, wide input voltage: 9-36VDC, 18-75VDC, and features 1500VDC isolation, six-sided metal shield, over current and short circuit protection. All models are particularly suited to tele-communications, industrial, test equipments power etc.

PRODUCT PROGRAM

Model Number	Input Voltage(VDC)		Output Voltage (VDC)	Output Current (mA)		Input Current (mA)(typ.)		Reflected Ripple Current (mA,typ.)	Max. Capacitive Load ⁽³⁾ (μF)	Efficiency (% , typ.) @Max. Load	Approval
	Nominal (Range)	Max ⁽¹⁾		Max.	Min. ⁽²⁾	@Max. Load	@No Load				
URA2405D-30W	24 (9-36)	40	±5	±3000	±150	1450	30	30	±2000	86	
URA2412D-30W			±12	±1250	±63	1420			±1250	89	
URA2415D-30W			±15	±1000	±50	1420			±680	90	
URB2405D-30W			5	6000	300	1420	120		6000	88	
URB2412D-30W			12	2500	125		30		2500	88	
URB2415D-30W			15	2000	100		1100		90		
URA4805D-30W	48 (18-75)	80	±5	±3000	±150	1450	30	30	±2000	86	
URA4812D-30W			±12	±1250	±63	1420			±1250	87	
URA4815D-30W			±15	±1000	±50	1420			±680	87	
URB4805D-30W			5	6000	300	100	6000		88		
URB4812D-30W			12	2500	125	1420	2500		88		
URB4815D-30W			15	2000	100	30	1100		89		

Note: Add suffix "H" for heat sink mounted, for example URB2405D-30WH.

INPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units	
Under Voltage Lockout	Nominal Input (24V)	Models ON	--	--	9	VDC
		Models OFF	8	--	--	
	Nominal Input (48V)	Models ON	--	--	17.8	
		Models OFF	16	--	--	
Start-up Time		--	10	--	ms	
Ctrl*	Models ON	Ctrl leave open or connect TTL high level(3.5-12VDC)				
	Models OFF	Ctrl connect GND or low level(0-1.2VDC), input current(1mA max)				
Input Filter		π Filter				
Reverse Polarity Input Current**		--	--	2	A	
Internal Power Dissipation**		--	--	5.5	W	

Note:* The CTRL pin voltage is referenced to GND.

**If the product reverse did not seek to limit current or work does not limit the maximum power, may result in injury or permanent damage, testing is not recommended.

OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units
Output Power		1.5	--	30	W
Output Voltage Accuracy	Refer to recommended circuit	--	±1	±3	%
Load Regulation	From 10% to 100% load input	--	±0.5	±1	
Voltage Regulation	100% load, Input voltage from low to high	--	±0.2	±0.5	
Cross Regulation*	From 25% to 100% load input(Dual Output)	--	--	±5	
Transient Response Deviation	25% load step change	--	±3	±5	
Transient Recovery Time		--	300	500	
Temperature Drift	100% full load	--	±0.02	--	%/°C
Ripple & Noise*	20MHz Bandwidth	--	85	120	mVp-p
Trim		--	±10%Vo	--	VDC
Over Voltage Protection	5V output	--	6.1	--	
	12V output	--	15	--	
	15V output	--	18	--	
Over Current Protection	Input voltage range	110	130	--	%Io
Short Circuit Protection		Hiccup, continual, auto-recovery			

Note: * Dual output models unbalanced load (25/100%): ±5%Max.
 **Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	Tested for 1 minute and 1mA max	1500	--	--	VDC
Isolation Resistance	Test at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input/Output, 100KHz/1V	--	2000	--	pF
Switching Frequency	Full load, nominal input	--	400	--	KHz
MTBF	MIL-HDBK-217F @25°C	1000	--	--	K hours
Case Material		Nickel- coated copper			
Weight	Without heatsink	--	50	--	g
	With heatsink	--	70	--	

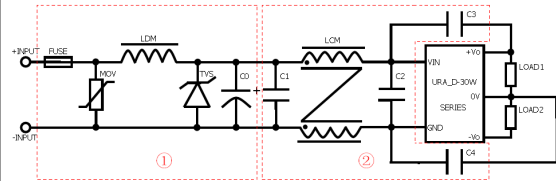
ENVIRONMENTAL SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Units
Storage Humidity		5	--	95	%
Operating Temperature	Power derating (above 55°C)	-40	--	85	°C
Storage Temperature		-55	--	125	
Temp. rise allowed at full load	Operating Temperature curve range	--	--	105	
Lead Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			

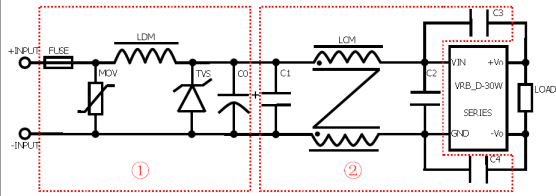
EMC SPECIFICATIONS

EMI	CE	CISPR22/EN55022 CLASS B (External Circuit Refer to Figure1、 2)			
	RE	CISPR22/EN55022 CLASS B (External Circuit Refer to Figure1、 2)			
EMS	ESD	IEC/EN61000-4-2 Contact ±4KV perf. Criteria B			
	EFT	IEC/EN61000-4-4 ±2KV perf. Criteria B (External Circuit Refer to Figure1、 2)			
	Surge	IEC/EN61000-4-5 ±2KV perf. Criteria B (External Circuit Refer to Figure1、 2)			

EMC RECOMMENDED CIRCUIT



(Figure 1)

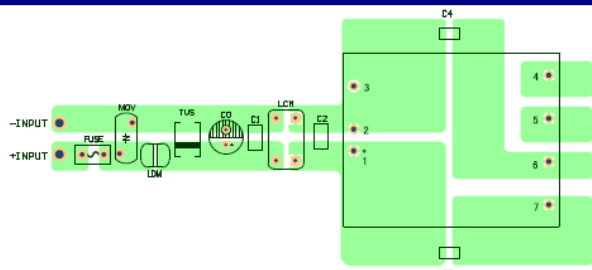


(Figure 2)

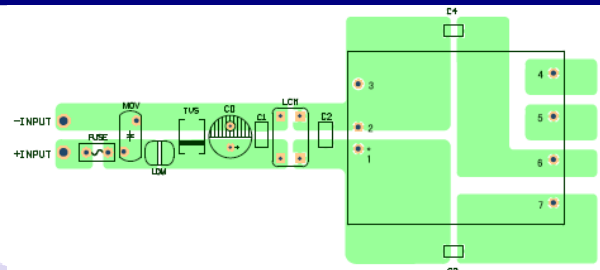
Recommended external circuit parameters	URA24_D-30W	URB24_D-30W	URA48_D-30W	URB48_D-30W
FUSE	Add based on the actual load			
MOV	560KD10		121KD10	
LDM	82μH			
TVS	SMCJ36A,1500W		SMCJ100A,1500W	
C0	680μF/50V(NCC)		680μF/100V(NCC)	
C1	105K/100V		1812 (TDK)	
LCM	232μH(0.1V 100KHZ)15T core:N5 T12*6*4 (ACME)			
C2	225K/100V		1812(TDK)	
C3、C4	102K/2000V 1210(TDK)	NO	102K/2000V 1210(TDK)	NO

Note: 1. In Figure 1、2, part①is EMS Recommended external circuit, part②is EMI recommended external circuit. Choose according to requirements.
2. If want to meet higher level of RE, add a common mode inductance after Lcm in figure 1、2: 1.5mH 20T core:A10 T12*6*4 (ACME).

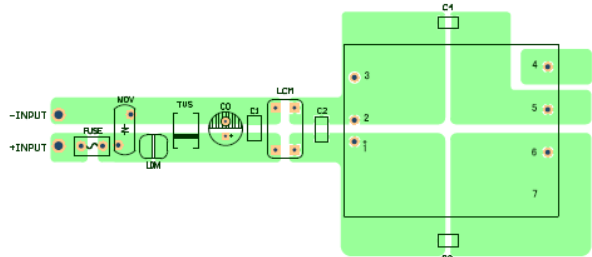
EMC RECOMMENDED CIRCUIT PCB LAYOUT



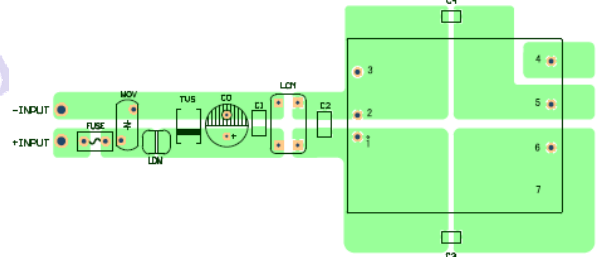
(Figure 3) URA24_D-30W Series



(Figure 4) URA48_D-30W Series

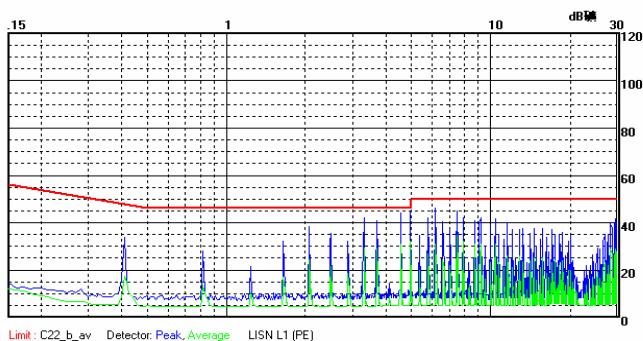


(Figure 5) URB24_D-30W Series

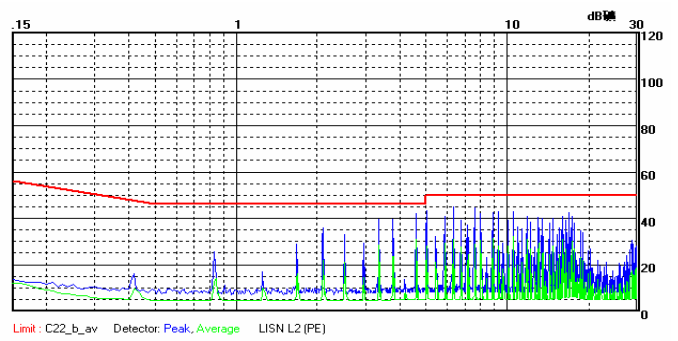


(Figure 6) URB48_D-30W Series

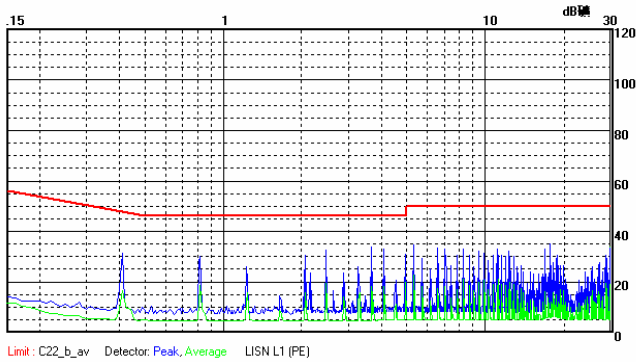
EMC TEST WAVEFORM



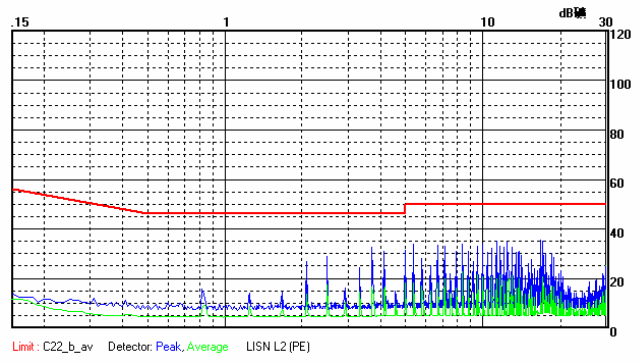
(Figure 7) URA4815D-30W CE (Positive line)



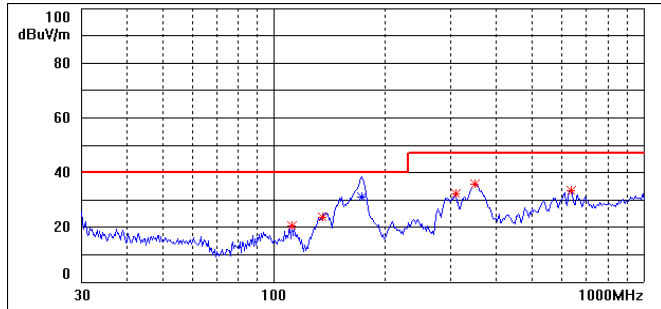
(Figure 8) URA4815D-30W CE (Negative line)



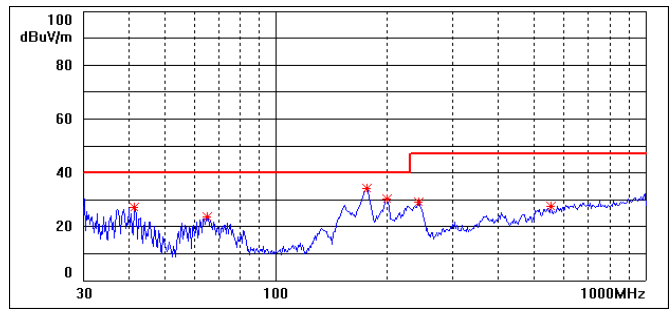
(Figure 9) URB2405D-30W CE(Positive line)



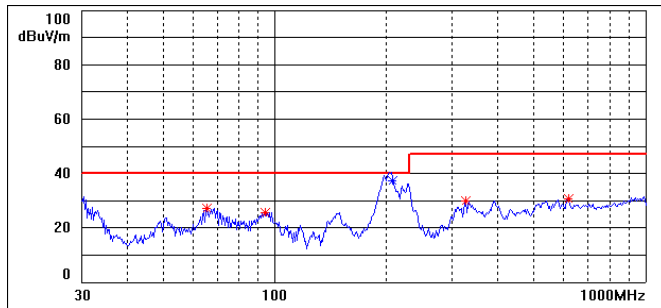
(Figure 10) URB2405D-30W CE(Negative line)



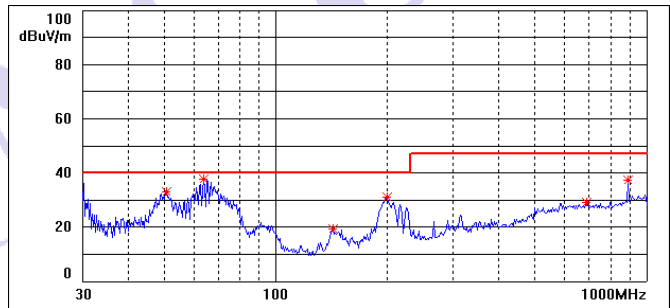
(Figure 11) URA4815D-30W RE(Horizontal)



(Figure 12) URA4815D-30W RE(Vertical)

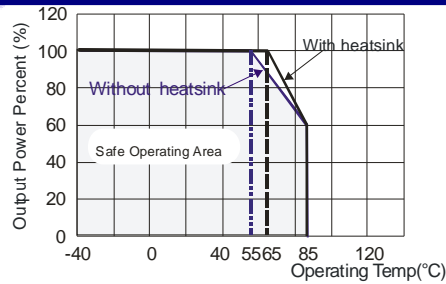


(Figure 13) URB2405D-30W RE(Horizontal)

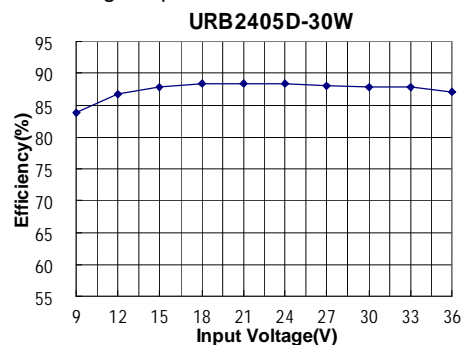
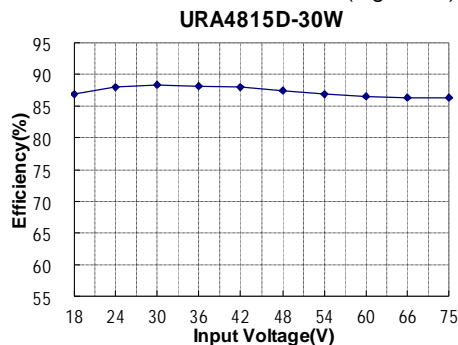


(Figure 14) URB2405D-30W RE(Vertical)

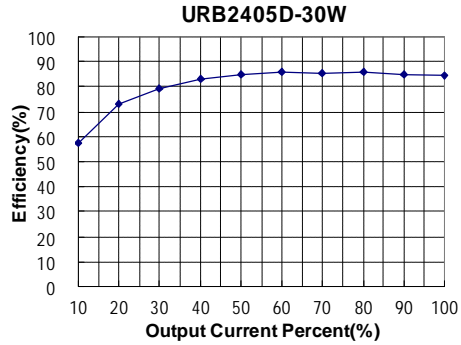
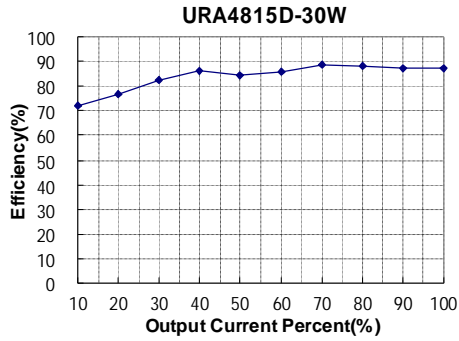
PRODUCT TYPICAL CURVE



(Figure 15) Temperature Derating Graph



(Figure 16) Efficiency VS Input Voltage curve(Full Load)



(Figure 17) Efficiency VS Output Load curve(Nominal Input)

OUTLINE DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING

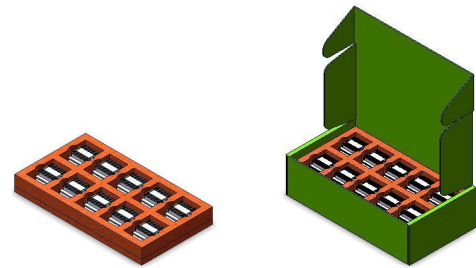
MECHANICAL DIMENSIONS		RECOMMENDED FOOTPRINT(TOP VIEW)																												
<table border="1"> <thead> <tr> <th colspan="3">FOOTPRINT DETAILS</th> </tr> <tr> <th>Pin</th> <th>Single</th> <th>Dual</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Vin</td> <td>Vin</td> </tr> <tr> <td>2</td> <td>GND</td> <td>GND</td> </tr> <tr> <td>3</td> <td>Ctrl</td> <td>Ctrl</td> </tr> <tr> <td>4</td> <td>Trim</td> <td>Trim</td> </tr> <tr> <td>5</td> <td>0V</td> <td>-Vo</td> </tr> <tr> <td>6</td> <td>+Vo</td> <td>0V</td> </tr> <tr> <td>7</td> <td>No Pin</td> <td>+Vo</td> </tr> </tbody> </table> <p>Note: Unit:mm[inch] Pin diameter tolerances:± 0.10mm[± 0.004inch] General tolerances:± 0.25mm[± 0.010inch]</p>		FOOTPRINT DETAILS			Pin	Single	Dual	1	Vin	Vin	2	GND	GND	3	Ctrl	Ctrl	4	Trim	Trim	5	0V	-Vo	6	+Vo	0V	7	No Pin	+Vo	<p>Note: Unit :mm[inch] General tolerances: ± 0.50mm[± 0.020inch] L=230mm[9.055inch] pcs/tube: 4 Inner package box dimensions:255*170*80mm Outer package carton dimensions:375*280*270mm</p>	
FOOTPRINT DETAILS																														
Pin	Single	Dual																												
1	Vin	Vin																												
2	GND	GND																												
3	Ctrl	Ctrl																												
4	Trim	Trim																												
5	0V	-Vo																												
6	+Vo	0V																												
7	No Pin	+Vo																												

HEATSINK ASSEMBLY

Notes:
Unit: mm [inch]
Tolerances: ± 0.50mm[± 0.020inch]

- If use heat sinks, make sure there is enough space for a specific size in the above graph;
- Products will be supplied with heat sinks already mounted, separate heat sinks are not available

PACKAGE DIAGRAM (WITH HEATSINK)

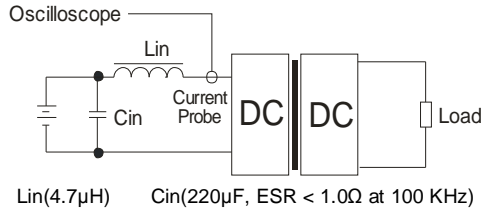


Inner package box dimensions:
L*W*H=355*192*93mm
Package quantity: 20pcs
Outer package carton dimensions:
L*W*H=405*380*305mm
Package quantity: 120pcs

TEST CONFIGURATIONS

Input Reflected-Ripple Current Test Setup

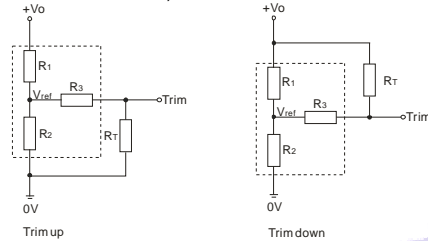
Input reflected-ripple current is measured with an inductor L_{in} and C_{in} to simulate source impedance.



(Figure 18) Input Reflected-Ripple Current Test Circuit

TRIM APPLICATION & TRIM RESISTANCE

Application circuit for TRIM (Part in broken line is the interior of models)



(Figure 19) Application circuit for TRIM

Formula for resistance of Trim

$$\begin{aligned} \text{up: } R_T &= \frac{aR_2}{R_2 - a} - R_3 & a &= \frac{V_{ref}}{V_o' - V_{ref}} \cdot R_1 \\ \text{down: } R_T &= \frac{aR_1}{R_1 - a} - R_3 & a &= \frac{V_o' - V_{ref}}{V_{ref}} \cdot R_2 \end{aligned}$$

Note: Value for R_1 , R_2 , R_3 , and V_{ref} refer to the below table1, R_T : Resistance of Trim

a : User-defined parameter, no actual meanings.
 V_o' : The trim up/down voltage.

TRIM parameter (Table 1)

V_o Parameter	5 (VDC)	12 (VDC)	15 (VDC)
$R_1(k\Omega)$	2.883	10.971	14.497
$R_2(k\Omega)$	2.864	2.864	2.864
$R_3(k\Omega)$	10	17.8	17.8
$V_{ref}(V)$	2.5	2.5	2.5

RECOMMENDED CIRCUIT

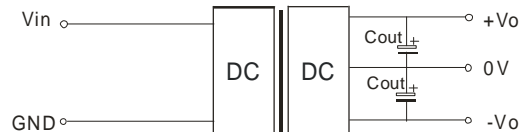
If you want to further decrease the Input surge current and output ripple, an capacitor filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 20).

It should also be noted that the capacitance of 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 recommended capacitance of its filter capacitor sees (Table 2).

Single Output



Dual Output



(Figure 20) Recommended Circuit

EXTERNAL CAPACITOR TABLE (Table 2)

Single Vout (VDC)	Cout (μ F)	Dual Vout (VDC)	Cout (μ F)
5	10	± 5	± 10
12/15	4.7	$\pm 12/\pm 15$	± 4.7

Note:

1. Input voltage can't exceed this value, or will cause the permanent damage.
2. The load shouldn't be less than 5%, otherwise ripple will increase dramatically.
3. Max. Capacitive Load is tested on Vin-nominal and full load.
4. The CTRL pin voltage is referenced to GND.
5. All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
6. In this datasheet, all the test methods of indications are based on corporate standards.
7. Only typical models listed, other models may be different, please contact our technical person for more details.
8. Specifications subject to change without notice.

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