MORNSUN®

URA_D-30W&URB_D-30W SERIES

30W,4:1WIDE INPUT, ISOLATED & REGULATED DUAL/ SINGLE OUTPUT DIP DC-DC CONVERTER

Patent Protection RoHS

FEATURES

- Efficiency up to 90%
- 4:1 wide input voltage range
- 1500VDC isolation
- Six-sided metal shield
- Short circuit protection (automatic recovery)
- Operating temperature: -40°C to +85°C
- Industry standard pinout

PART NUMBER SYSTEM

URB2405D-30W

- Rated Power
- Package
- Output Voltage
- Input Voltage
- Product Series

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 suitable for industrial, telecommunication, electric power, test equipments applications.

SELECTION GUIDE

Model	Input Voltage(VDC)		Output Voltage (VDC)	Output Current (mA)		Input Current (mA)(typ.)		Reflected Ripple Current (mA,typ.)	Max. Capacitive Load# (μF)	Efficiency (%, typ.) @Max. Load	Approval
	Nominal (Range)	Max*		Max.	Min.	@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				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		2000	86	
URA4812D-30W			±12	±1250	±63	1420			1250	87	
URA4815D-30W			±15	±1000	±50				680	87	
URB4805D-30W			5	6000	300	1420	100		6000	88	
URB4812D-30W			12	2500	125		30		2500	88	
URB4815D-30W			15	2000	100				1100	89	

Note: 1. *Input voltage can't exceed this value, or will cause the permanent damage. # For each output.
2. Add suffix "H" for heat sink mounted, for example URB2405D-30WH.

INPUT SPECIFICATIONS

Item	Test Conditions		Min.	Typ.	Max.	Unit
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 (Models OFF)		--	--	1	mA
Input Filter			Pi Filter			

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

OUTPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
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	μs
Temperature Drift	100% 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: 1.* Dual output models unbalanced load (25/100%): ±5%Max.
2.**Test ripple and noise by "parallel cable" method. See detailed operation instructions at *DC-DC Application Notes* .

COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Tested for 1 minute and leakage current less than 1 mA	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℃	1000	--	--	K hours
Case Material		Aluminum Alloy			
Weight	Without heatsink	--	40	--	g
	With heatsink	--	52	--	

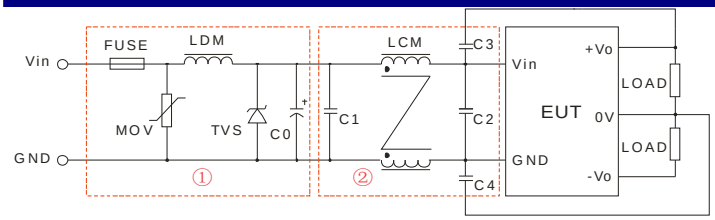
ENVIRONMENTAL SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage Humidity	Non condensing	5	--	95	%
Operating Temperature	Power derating (above 55℃)	-40	--	85	°C
Storage Temperature		-55	--	125	
The Max. Case Temperature	Operating Temperature curve range	--	--	105	
Lead Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			

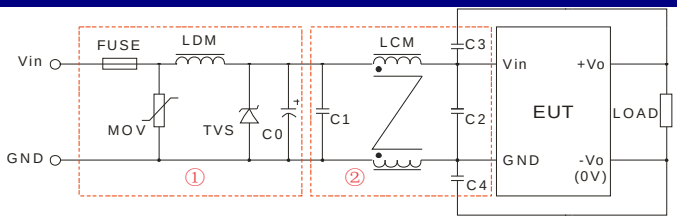
EMC SPECIFICATIONS

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

EMC RECOMMENDED CIRCUIT



URA_D-30W



URB_D-30W

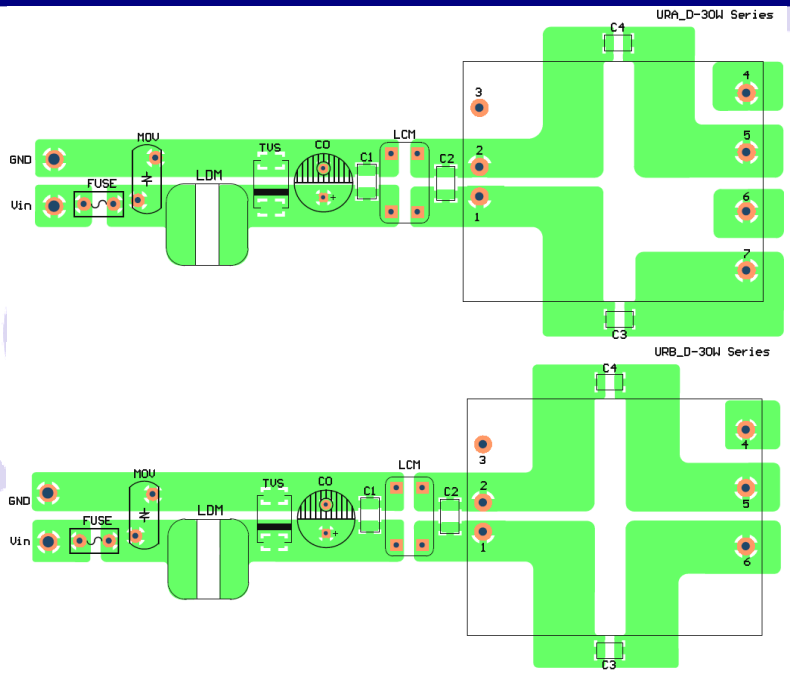
(Figure 1)

Recommended external circuit parameters:

Model	URA24_D-30W	URB24_D-30W	URA48_D-30W	URB48_D-30W
FUSE	Choose according to practical input current			
MOV	S10K35		S10K60	
LDM	56μH			
TVS	SMCJ48A		SMCJ90A	
C0	680μF/50V		680μF/100V	
C1	1μF /100V			
LCM	1mH(0.1V 100KHZ)15T core:TS7 T12*6*4			
C2	2.2μF /100V			
C3、C4	0.1nF/2KV	--	0.1nF/2KV	--

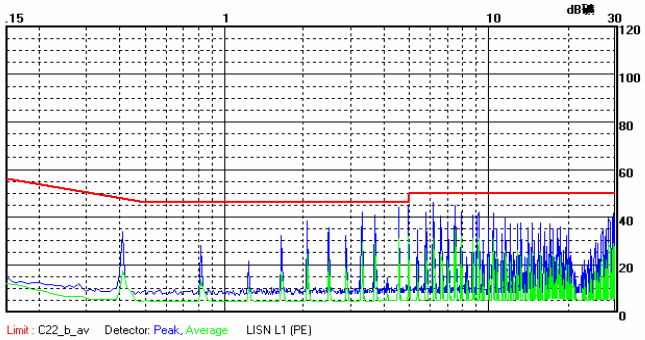
Note: 1. In Figure 1, part①is EMS Recommended external circuit, part②is EMI recommended external circuit. Choose according to requirements.
2. If want to meet higher level of RE, add a common mode inductance after Lcm in figure 1: 1.5mH 20T core:A10 T12*6*4 .

EMC RECOMMENDED CIRCUIT PCB LAYOUT

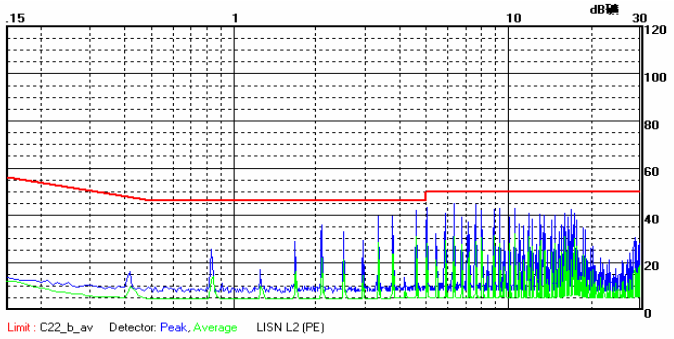


(Figure 2)

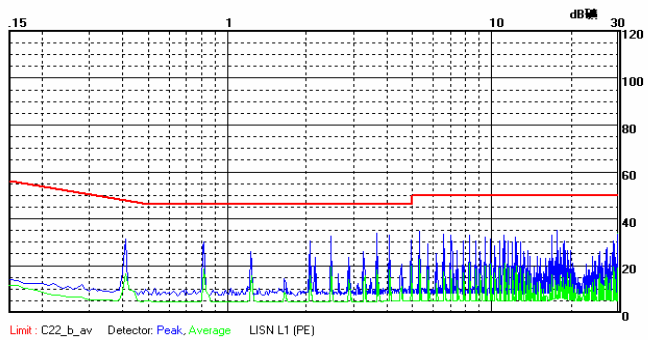
EMC TEST WAVEFORM (CLASS B APPLY CIRCUIT)



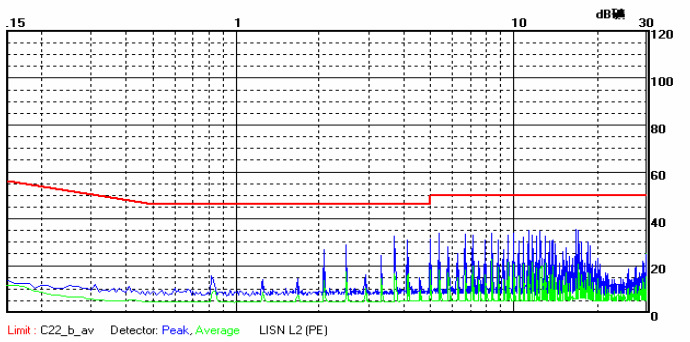
URA4815D-30W CE (Positive line)



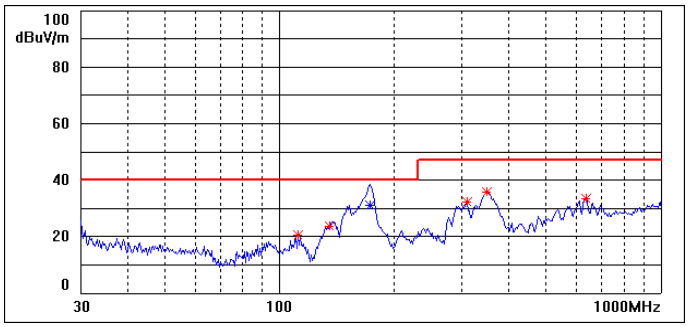
URA4815D-30W CE (Negative line)



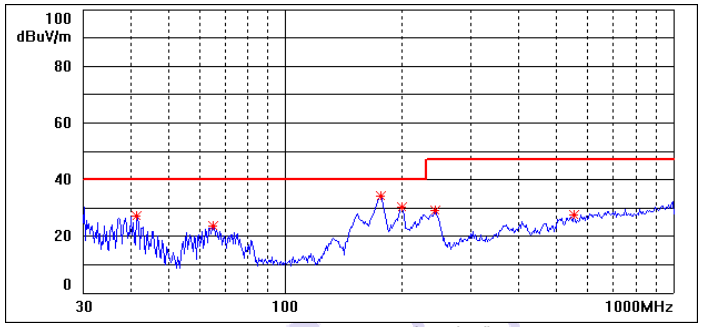
URB2405D-30W CE(Positive line)



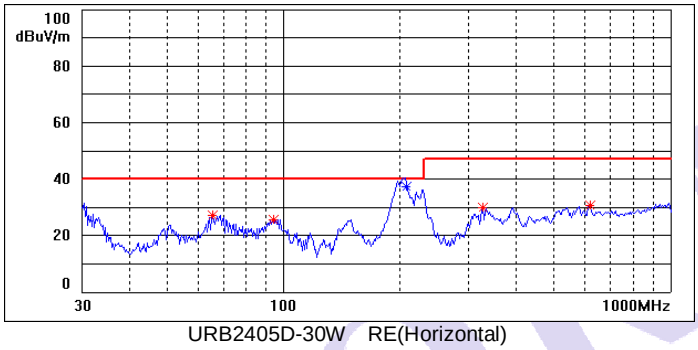
URB2405D-30W CE(Negative line)



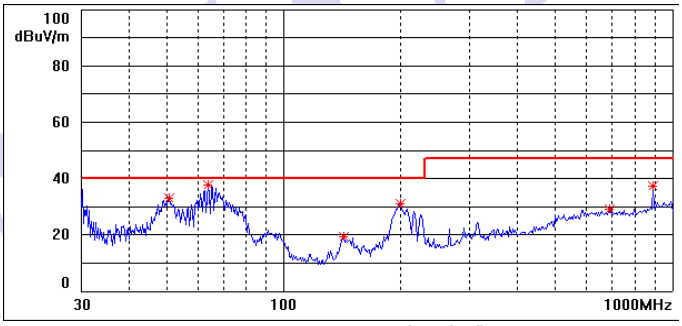
URA4815D-30W RE(Horizontal)



URA4815D-30W RE(Vertical)

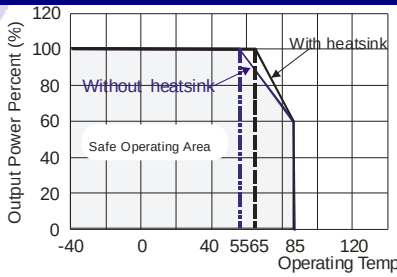


URB2405D-30W RE(Horizontal)

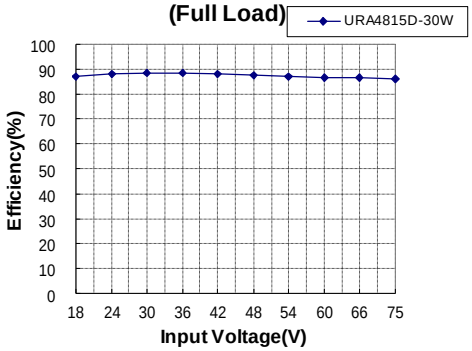


URB2405D-30W RE(Vertical)

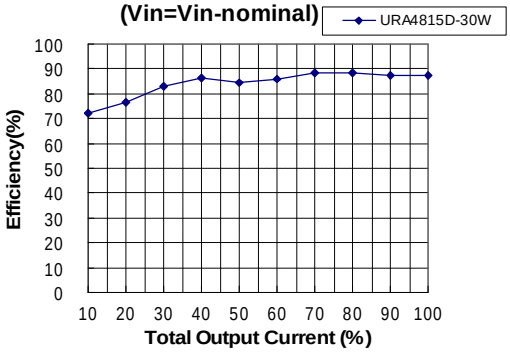
PRODUCT TYPICAL CURVE

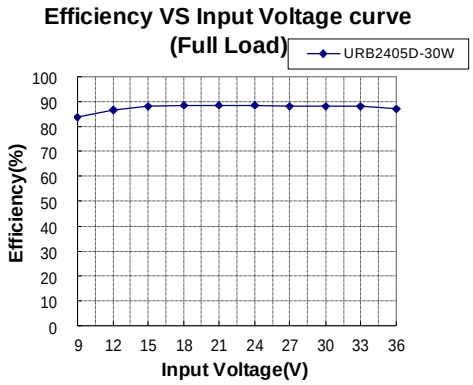


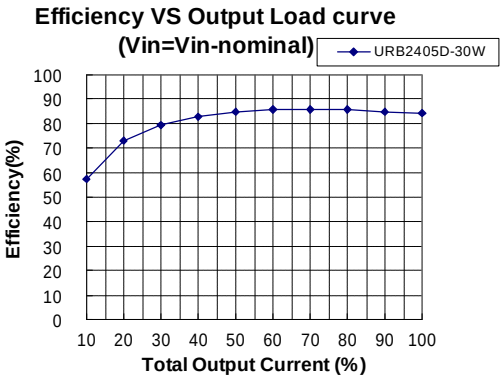
Efficiency VS Input Voltage curve (Full Load)



Efficiency VS Output Load curve (Vin=Vin-nominal)

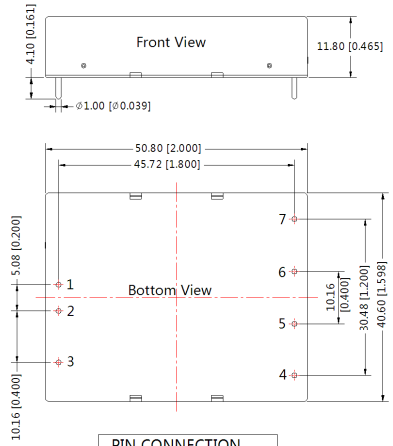






OUTLINE DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING

MECHANICAL DIMENSIONS

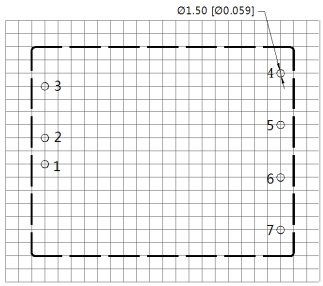


PIN CONNECTION		
Pin	Single	Dual
1	Vin	Vin
2	GND	GND
3	Ctrl	Ctrl
4	Trim	Trim
5	0V	-Vo
6	+Vo	0V
7	No Pin	+Vo

Note:
Unit :mm[inch]
Pin diameter tolerances :±0.10[±0.004]
Pin height tolerances :±0.50[±0.020]
General tolerances:±0.25[±0.010]

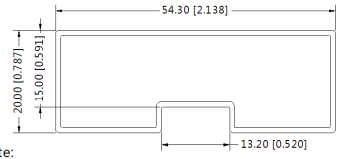
THIRD ANGLE PROJECTION

RECOMMENDED FOOTPRINT DETAILS



Note : Grid 2.54*2.54mm

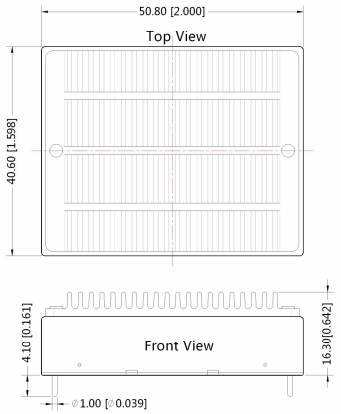
TUBE PACKAGING DIMENSIONS (WITHOUT HEATSINK)



Note:
Unit :mm[inch]
General tolerances :±0.50[±0.020]
L=220mm[8.661 inch] Tube Quantity:4 pcs
Inner carton(S):L*W*H=255*170*80
Outer carton(S):L*W*H=375*280*270,6 inner cartons(S)

HEATSINK ASSEMBLY & PACKAGE DIAGRAM

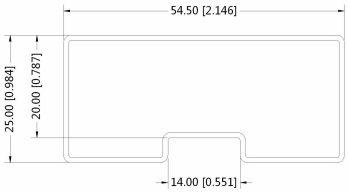
MECHANICAL DIMENSIONS (WITH HEATSINK)



Note:
Unit :mm[inch]
General tolerances:±0.30mm[±0.012inch]
If use heat sinks, make sure there is enough space for a specific size in the above graph.

THIRD ANGLE PROJECTION

TUBE PACKAGING DIMENSIONS (WITH HEATSINK)

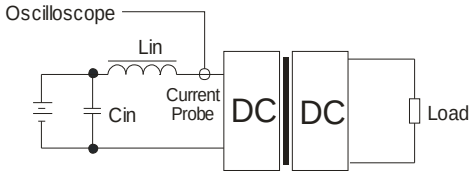


Note:
Unit :mm[inch]
General tolerances :±0.5mm[±0.020inch]
L=220mm[8.661 inch] Tube Quantity:4 PCS
Inner carton(S):L*W*H=255*170*80mm
Outer carton(S):L*W*H=375*280*270mm,6 inner cartons(S)

TEST CONFIGURATIONS

Input Reflected-Ripple Current Test Setup

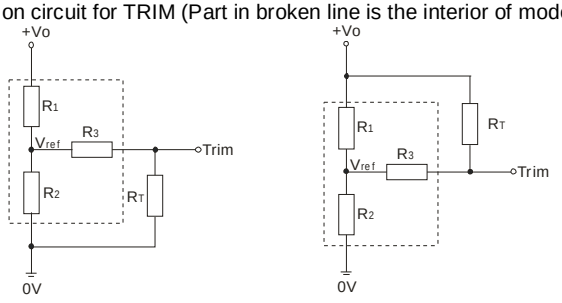
Input reflected-ripple current is measured with an inductor Lin and Cin to simulate source impedance.



Lin(4.7μH) Cin(220μF, ESR < 1.0Ω at 100 KHz)

TRIM APPLICATION & TRIM RESISTANCE

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



Formula for resistance of TRIM

$$\text{up: } R_T = \frac{aR_2}{R_2 - a} - R_3 \qquad a = \frac{Vref}{Vo' - Vref} \cdot R_1$$

$$\text{down: } R_T = \frac{aR_1}{R_1 - a} - R_3 \qquad a = \frac{Vo' - Vref}{Vref} \cdot R_2$$

Note: Leave open if not used. Value for R1, R2, R3, and Vref refer to the below table1，R_T: Resistance of Trim. a: User-defined parameter, no actual meanings. Vo': The trim up/down voltage.

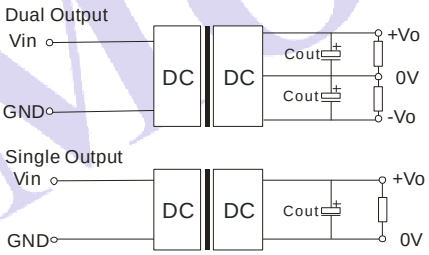
TRIM parameter (Table 1)

Parameter \ Vo	5 (VDC)	12 (VDC)	15 (VDC)
R1(KΩ)	2.88	10.97	14.50
R2(KΩ)	2.86	2.86	2.86
R3(KΩ)	10	17.8	17.8
Vref(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 3).

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).



(Figure 3) Recommended Circuit

EXTERNAL CAPACITOR TABLE (Table 2)

Single Vout (VDC)	Cout (μF)	Dual Vout (VDC)	Cout# (μF)
5	10	±5	10
12/15	4.7	±12/±15	4.7

Note: # For each output.

Note:

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

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