CSP40DC Series

40W 1.5K VDC Isolated Wide Input Voltage DC/DC Converters

Typical Features

The rated output power of this converters is 40W,
the voltage range is 9V-36V、18V-75V,
output Voltage accuracy up to ±1%,
it can be widely used in telecommunications,railway transportation,
instrument and etc.

FEATURES

input voltage range(4:1)	efficiency up to 91%	1.5KVDC isolated
Operating temperature: -40℃to 70℃	Low no-load consumption 0.3W	Miniaturized packaging
output short circuit,over-voltage and over-current protection	under-voltage protection	RoHS compliant

SELECTION GUIDE

Part Number	Input voltage (VDC)			output			efficiency	Max.Capacitive Load μF
				voltage (VDC)	current (A)		Typ.	
	rated	range	Max.		Max.	Min.	@full load	
CSP40DC24S03W	24	9-36	40	3.3	10.00	0	89	20000
CSP40DC24S05W	24	9-36	40	5	8.00	0	90	20000
CSP40DC24S12W	24	9-36	40	12	3.33	0	92	3900
CSP40DC24S15W	24	9-36	40	15	2.67	0	92	2600
CSP40DC24S24W	24	9-36	40	24	1.67	0	91	680
CSP40DC24D12W	24	9-36	40	±12	±1.67	0	90	±2200
CSP40DC24D15W	24	9-36	40	±15	±1.33	0	90	±2200
CSP40DC48S03W	48	18-75	80	3.3	10.00	0	89	20000
CSP40DC48S05W	48	18-75	80	5	8.00	0	90	20000
CSP40DC48S12W	48	18-75	80	12	3.33	0	92	3900
CSP40DC48S15W	48	18-75	80	15	2.67	0	92	2600
CSP40DC48S24W	48	18-75	80	24	1.67	0	91	680
CSP40DC48D12W	48	18-75	80	±12	±1.67	0	90	±2600
CSP40DC48D15W	48	18-75	80	±15	±1.33	0	90	±1600

notes：1,suffix “A” for DIN rail mounting,for example CSP40DC24S05WA

2、 The input voltage cannot exceed this value, otherwise it may cause permanent and irreparable damage ；

3、 The above efficiency values are measured at the input nominal voltage and output rated load;

GENERAL CHARACTERISTICS

parameter	conditions	Min	Typ	Max	Units
Isolation voltage	Input – Output,test 1min leakage current<1mA	1500	\	\	VDC
Isolation resistance	Input-Output, Isolation voltage 500VDC 1minute, 25℃, 75%RH	1000	\	\	MΩ
Isolation capacitor	Input - Output,100KHz/0.1V	\	1500	\	pF
Operation temperature	See picture 1	-40	\	+70	℃
Storage Temperature		-55	\	+125	℃
Storage Humidity	No condensation	5	\	95	%RH
Lead temperature	1.5mm from case for 10 seconds	\	\	+300	℃
Vibration		10-55Hz,10G,30Min.along X,Y and Z			
Switch frequency *	PWM mode	\	250	\	KHz
MTBF	MIL-HDBK-217F@25℃	500	\	\	Khours

*Notes:This series of products adopts frequency reduction technology, and the switching frequency value is the test value at full load. When the load drops below 50%, the switching frequency decreases with the decrease of the load.

GENERAL CHARACTERISTICS

Case materials	metal
size	50.8*25.4*11.8mm
weight	36g(Typ.)
cooling	Free Air Convection

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OUTPUT CHARACTERISTICS

parameter	conditions	Min	Typ	Max	Units
Voltage accuracy	0-100% Load	\	±1		%
Line regulation	Full load,input voltage from low to high	\	±0.2	±0.5	%
Load regulation	0%-100% Load	\	±0.5	±1	%
Transient Recovery Time	Nominal input voltage,25% load step change	\	300	500	μs
Transient response deviation	Nominal input voltage,25% load step change	\	±3	±5	%
Temperature coefficient	100% Load	\	\	±0.03	%/℃
Ripple&noise*	20MHz bandwidth Nominal full load	\	50	100	mVp-p
Voltage regulation (Trim)		\	±10	\	%Vo
Output over-voltage protection	INPUT RANGE	110	\	160	%Vo
Output over-current protection	INPUT RANGE	110	\	190	%Io
Output short circuit protection	INPUT RANGE	Hiccup,Continuous ,Automatic recovery			

*1、 The testing method for ripple and noise adopts the parallel line testing method

INPUT CHARACTERISTICS

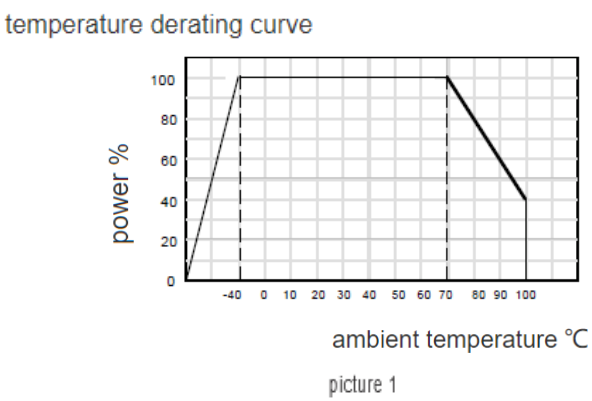
parameter	conditions	Min	Typ	Max	Units
Input current(no-load)	24VDC Input	\	\	15	mA
Input current(no-load)	48VDC Input	\	\	15	mA
Reflected ripple current	Nominal input voltage	\	30	\	mA
Inrush voltage (1sec.max.)	24VDC Input	-0.7	\	50	VDC
Inrush voltage (1sec.max.)	48VDC Input	-0.7	\	100	VDC
Start-up voltage	24VDC Input	\	\	8.8	VDC
Start-up voltage	48VDC Input	\	\	17.8	VDC
Under-voltage protection	24VDC Input	\	8	\	VDC
Under-voltage protection	48VDC Input	\	16	\	VDC
Start-up time	Nominal input voltage constant resistance load	\	10	150	ms
Input filter		Pi type			
hot plug		unavailable			
Control pin (CNT)*	Turn on	CNT NO CONNECTION,or TTL high level (3-12VDC)			
Control pin (CNT)*	Turn off	CNT-Vin or low level (0-1.2VDC)			
Control pin (CNT)*	Input current @Turn off	\	5	10	mA

* The voltage of Remote control CNT is relative to the input pin Vin

EMC CHARACTERISTICS

EMI	Conducted Emission	CISPR32/EN55032 CLASSB(SEE picture 3-②)
EMI	Radiation Emission	CISPR32/EN55032 CLASSB(SEE picture 3-②)
EMS	ESD	IEC/EN61000-4-2 Contact ±6KV perf.Criteria A
EMS	Rf radiation immunity	IEC/EN61000-4-3 10V/m perf.Criteria A
EMS	EFT	IEC/EN61000-4-4 ±2KV(SEE picture 3-①) perf.Criteria A
EMS	Surge	IEC/EN61000-4-5 line to line ±2KV(SEE picture 3-①) perf.Criteria A
EMS	Conducted Emission immunity	IEC/EN61000-4-6 10Vr.m.s perf.Criteria A

CHARACTERISTICS CURVE



picture 1

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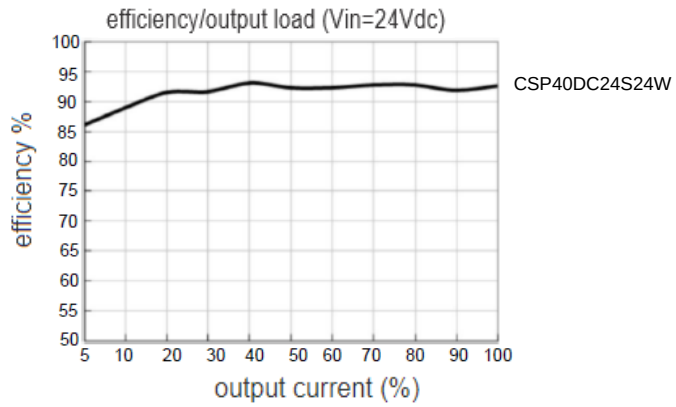
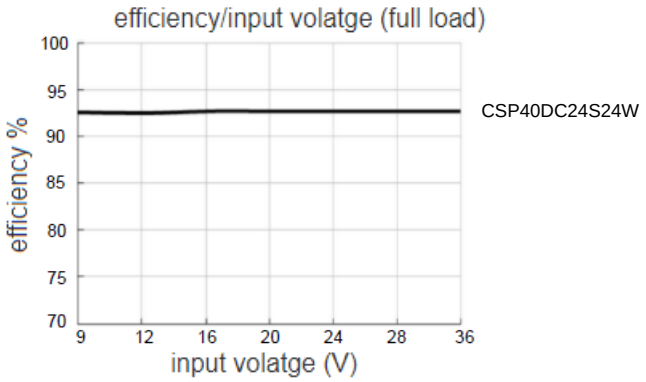
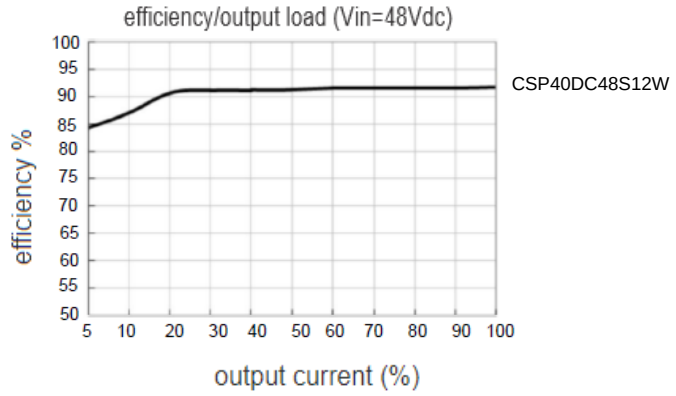
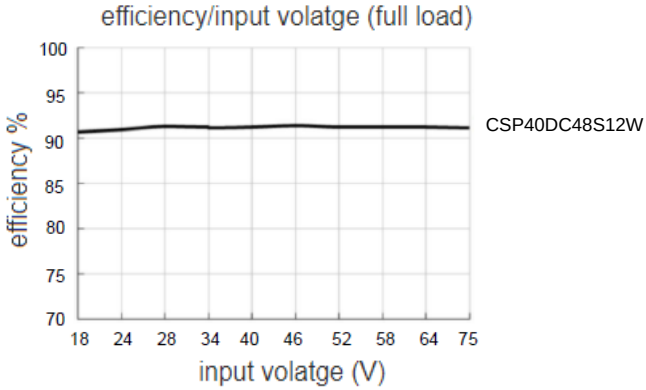
CHARACTERISTICS CURVE









DESIGN REFERENCE

1.Application circuit

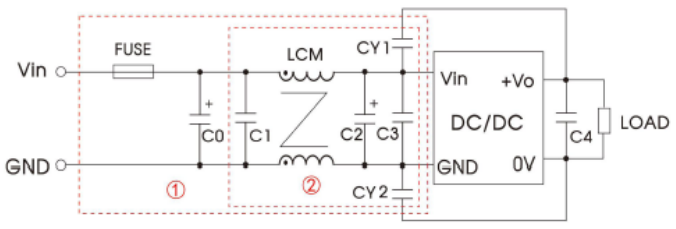
this series are tested according to the recommended testing circuit (picture 2) before leaving the factory

If further reduction of input and output ripple is required, the external capacitance of the Cin &Cout can be increased or a capacitor with a small equivalent impedance value can be selected, but the capacitance value cannot be greater than the maximum capacitive load of the product.

picture 2

OUTPUT (VDC)	Cout (μF)	Cin (μF)
3.3/5/12/15/24	100	100

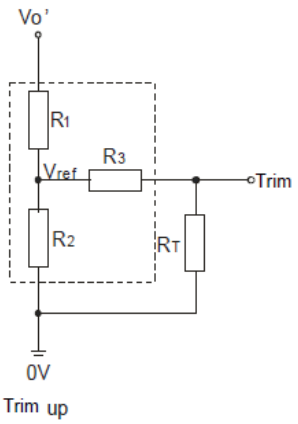
EMC SOLUTION-RECOMMENDED CIRCUIT



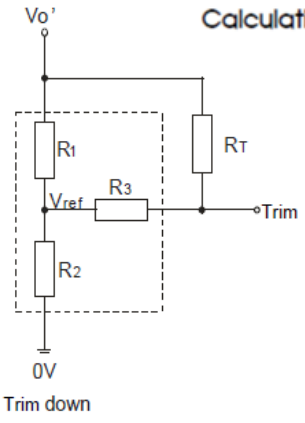
picture 3

PN	Vin:24V	Vin:48V
Fuse	Choose according to actual input current	
C0	680μF/50V	680μF/100V
C1/C3	4.7μF/50V	4.7μF/100V
C2	330μF/50V	330μF/100V
C4	refer to Cout in picture 2	
LCM	2.2mH	
CY1, CY2	2.2nF/2KV	

APPLICATION OF Trim and calculation of Trim resistance



Trim up



Trim down

Applied circuits of Trim (Part in broken line is the interior of models)

Calculation formula of Trim resistance:

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

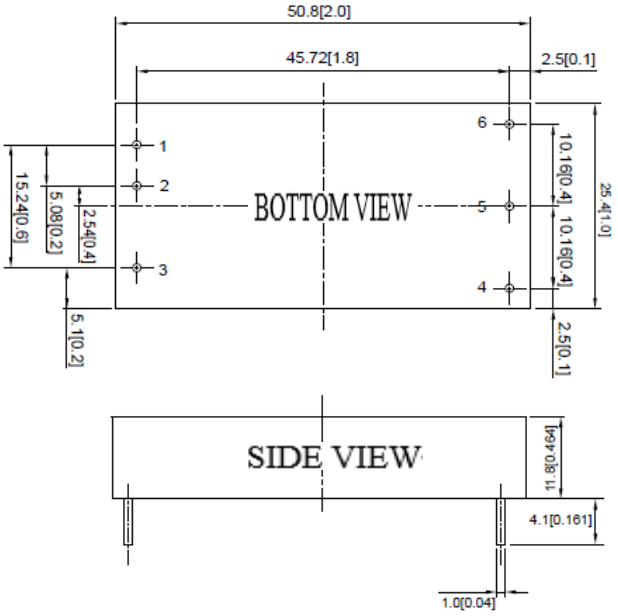
$$down{:}R_T=\frac{aR_1}{R_1-a}-R_3 \qquad a=\frac{Vo'-Vref}{Vref}\cdot R_2$$

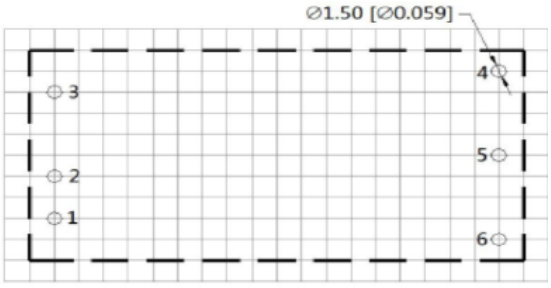
RT is Trim resistance
a is a self-defined parameter,with no real meaning
Vo' is to Increase or decrease voltage for actual application

Vout(VDC)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
12	11.000	2.87	15	2.5
15	14.494	2.87	15	2.5
24	24.872	2.87	15	2.5

The product does not support output parallel power boosting.

MECHANICAL DIMENSIONS





GRADE SPACING:2.54*2.54MM

Pin	1	2	3	4	5	6
Single	+Vin	-Vin	CNT	TRIM	-Vo	+Vo
Dual	+Vin	-Vin	CNT	-Vo2	COM	+Vo1

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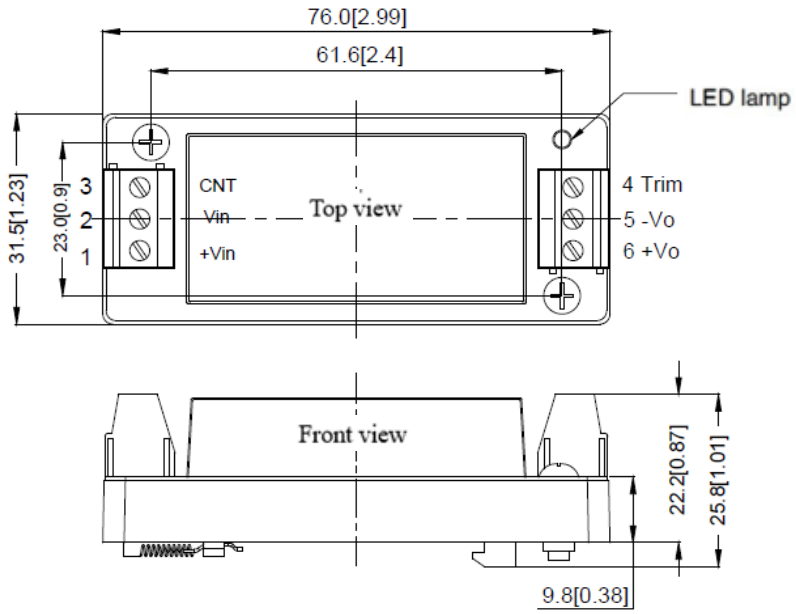
MECHANICAL DIMENSIONS FOR DIN Rail mounting



DIN RAIL TYPE :TS35

Note:
Unit: mm[inch]
Wire range: 24–12 AWG
Tightening torque: Max 0.4 N・m
General tolerances: ±1.00[±0.039]

MODEL SELECTION

CSP 40 D C 24 S 05 W

- W: 4:1 Wide voltage input range
- Output voltage
- S: Single output D: Dual output
- Input Rated Voltage
- Package type
- DC-DC
- Output rated power
- Brand name