



10DCPE_4 series

10W - Single Output DC-DC Converter - Ultra Wide Input Range - High Isolated & Regulated

DC-DC Converter 10 Watt

- ⊕ 10:1 ultra-wide input voltage range: 100 ~ 1000VDC
- ⊕ Operating temperature: -40°C ~ +70°C
- ⊕ 4000VAC high isolation voltage
- ⊕ High efficiency, low ripple & noise
- ⊕ Reverse input voltage protection
- ⊕ Over voltage protection
- ⊕ Short circuit protection (SCP)
- ⊕ Input against reverse protection
- ⊕ High reliability, long life, three years warranty
- ⊕ EN62109 safety approval (pending)



The 10DCPE_4 series is a regulated DC-DC converter with an ultra-wide and ultra-high DC input of 100-1000VDC. The products feature high efficiency, high reliability, high insulation and a high level of safety protection. This type of power supply is widely used in renewable energy industries such as photovoltaic, power generation, energy storage, inverters and high-voltage DC conversions. The converters provide multiple protection features and guarantee stable and safe operating environments even under abnormal working conditions. For extremely harsh EMC environment, we recommend using the application circuit show in Design Reference of this datasheet.

Common specifications	
Short circuit protection:	Continuous, automatic recovery
Temperature rise at full load:	25°C MAX (Ta = 25°C, 100% load)
Cooling:	Free air convection
Operation temperature range:	-40°C~+70°C
Storage temperature range:	-40°C ~+105°C
Case temperature:	90°C MAX
Welding temperature:	Wave-soldering: 260± 5°C; time:5-10s Manual-welding: 360± 10°C; time:3-5s
Hot swap:	Forbidden
Case Material Grade:	Black flame-retardant and heat-resistant plastic (UL94V-0)
Install:	PCB
Storage humidity range:	< 95% (%RH)
Temperature coefficient:	±0.02%/°C MAX
Delay time:	500ms MAX
MTBF (MIL-HDBK-217F@25°C):	>300,000 hours
Weight:	95g (Horizontal package) 150g (Chassis package) 190g (DIN-Rail package)
Dimensions:	70.0 x 48.0 x 23.5 mm (Horizontal) 96.1 x 54.0 x 32.0 mm (Chassis) 96.1 x 54.0 x 36.6 mm (DIN-Rail)

Output specifications						
Item	Test condition	Min	Typ	Max	Units	
Line regulation			±0.5	±1	%	
Load regulation			±0.5	±1	%	
Output voltage accuracy			±1	±2	%	
Ripple & Noise*	20MHz Bandwidth		100	200	mVp-p	
Under input voltage protection		Under voltage protection range: 175~185V Under voltage release range: 185~195V				
Over input voltage protection		• (Feedback-clamp) Voltage limited < 7.5V				

*Test ripple and noise by "parallel cable" method.

Example:

10DCPE_05S4

10 = 10Watt; DC = DIP Case; P = Photovoltaic; E = series; 05 = 5Vout;
S = Single output; 4 = 4kVAC isolation;

Note:

1. Unless otherwise specified, all specifications above are measured at rated input voltage and rated output load, TA = 25°C, humidity < 75%;
2. All specifications stated in this datasheet are subject to the above listed models only. For specifications of non-standard models, please contact our technical support team.

Input specifications						
Item	Test condition	Min	Typ	Max	Units	
Input voltage range		100		1000	VDC	
Input current	• 200VDC input • 600VDC input • 1000VDC input			38 15 8	mA	
External input fuse		1A/1500VDC, required				

Isolation specifications						
Item	Test condition	Min	Typ	Max	Units	
Isolation voltage	Tested for 1 minute	4000			VAC	
Isolation resistance	Test at 500VDC	100			MΩ	

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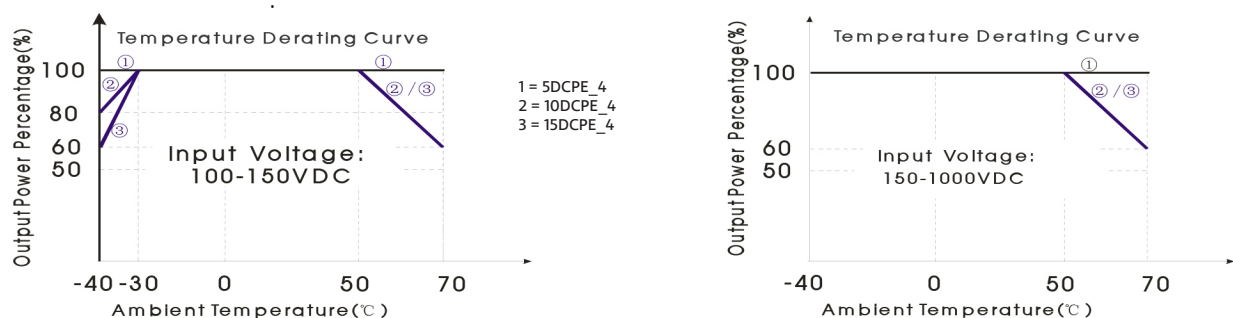
EMC specifications				
EMI	CE	CISPR32/EN55032	CLASS A (Recommended Circuit Refer to EMC recommended circuit)	
EMI	RE	CISPR32/EN55032	CLASS A (Recommended Circuit Refer to EMC recommended circuit)	
EMS	ESD	IEC/EN61000-4-2	Contact 6KV/Air 8KV perf. Criteria B	
EMS	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
EMS	EFT	IEC/EN61000-4-4	±4KV	perf. Criteria B (External Circuit Refer to recommended circuit, 1)
EMS	Surge	IEC/EN61000-4-5	±2KV	perf. Criteria B (External Circuit Refer to recommended circuit, 1)
EMS	CS	IEC/EN61000-4-6	10 Vr.m.s	perf. Criteria A

Product Selection Guide

Part Number	Power [W]	Nominal Output [V; Vo]	Current Output [A; Io]	Capacitive load [μF, Max.]	Ripple & Noise [mV, Max.]	Efficiency [%, max]
10DCPE_05S4	10	5	2	6000	200	72
10DCPE_09S4	10	9	1.11	4000	200	76
10DCPE_24S4	10	24	0.42	470	200	80

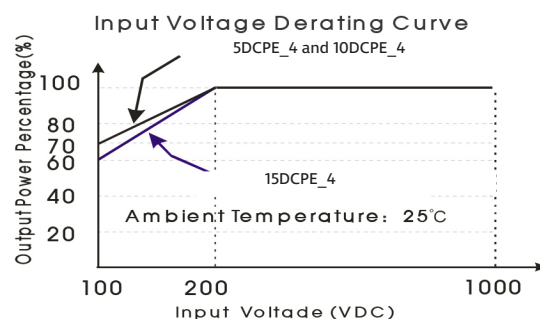
Note: * Use suffix "/CM" for chassis and suffix "/DR" for DIN-Rail mounting.

Product Characteristic Curve



Note: The output power must be derated as per temperature derating curves

2. This product is suitable for applications using natural air cooling; for applications in closed environment please consult factory or one of our FAE.



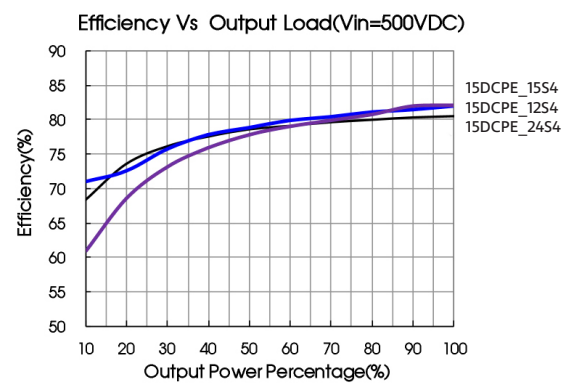
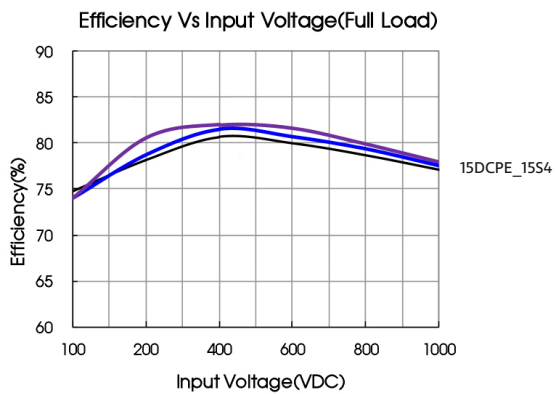
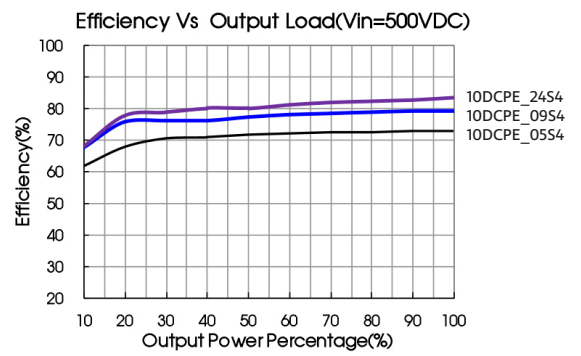
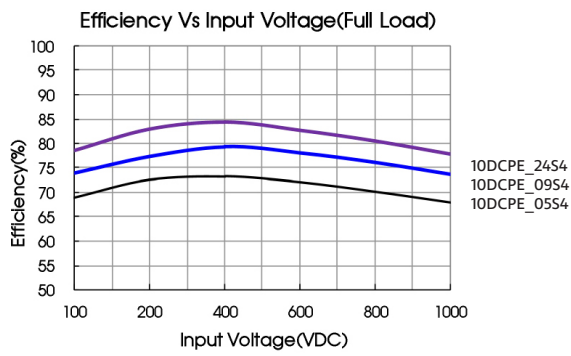
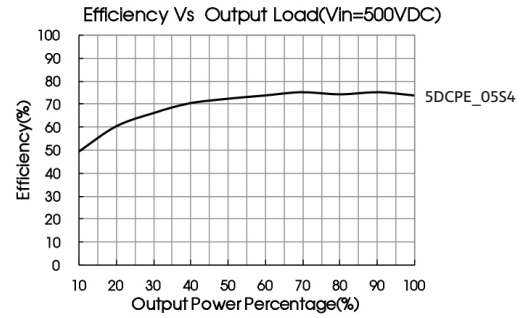
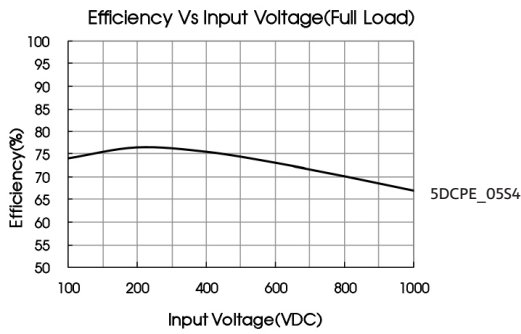
Note: Calculating the actual output power = Nominal output power x Temperature derating x Input voltage derating.

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Efficiency

Note: Calculating the actual output power = Nominal output power x Temperature derating x Input voltage derating.



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Design reference

1. Typical application circuit

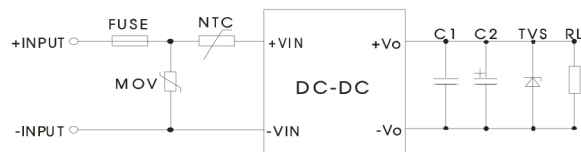


Fig. 1

Model	FUSE	MOV	NTC	C1(μ F)	C2(μ F)	TVS
5DCPE_05S4	1A	S14K880	10D-11	1	220	SMBJ7.0A
10DCPE_05S4					220	SMBJ7.0A
10DCPE_09S4					120	SMBJ12A
10DCPE_24S4					68	SMBJ33A
15DCPE_12S4	2A				120	SMBJ15A
15DCPE_15S4					120	SMBJ20A
15DCPE_24S4					68	SMBJ33A

Note:

Output filtering capacitor C2 is electrolytic capacitor, it is recommended to apply electrolytic capacitor with high frequency and low resistance. For capacitance and current of capacitor please refer to manufacture's datasheet. Capacitance withstand voltage derating should be 80% or above. C1 is ceramic capacitor, which is used to filter high-frequency noise. TVS is a recommended component to protect post-circuits if converter fails.

2. EMC solution-recommended circuit

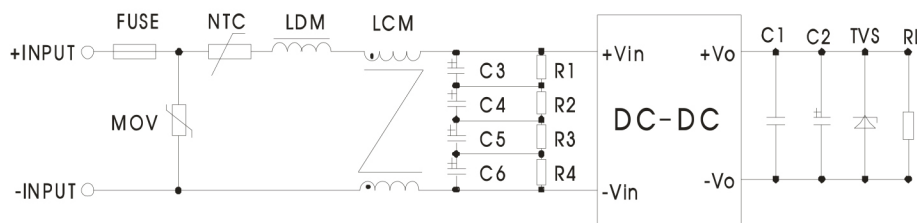


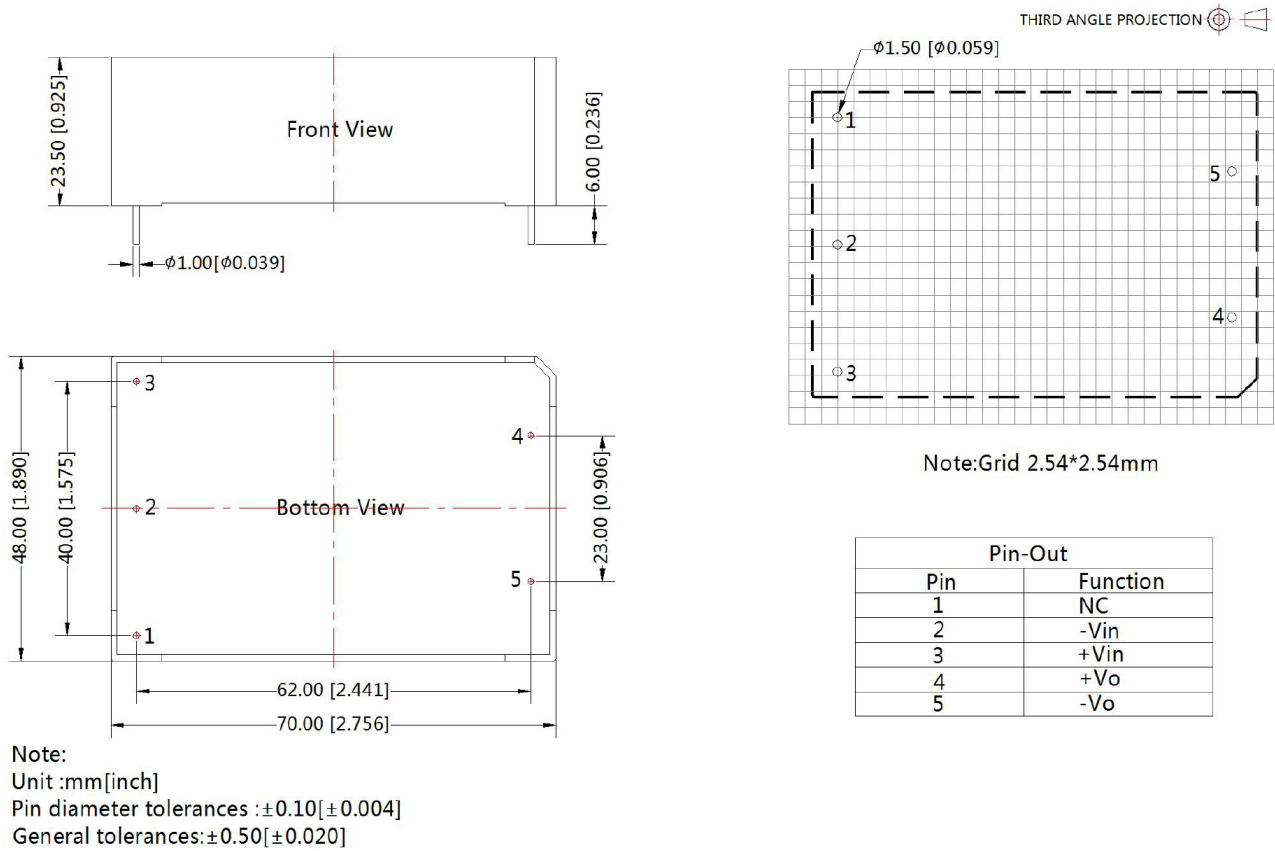
Fig. 2(Output external circuit refer to the typical application circuit)

Element model	Recommended value
MOV	S14K880
C3, C4, C5, C6	47 μ F/400VDC
R1, R2, R3, R4	1M Ω /2W
NTC	10D-11
LDM	4.7mH/0.38A
LCM	10mH
FUSE	1A
	2A

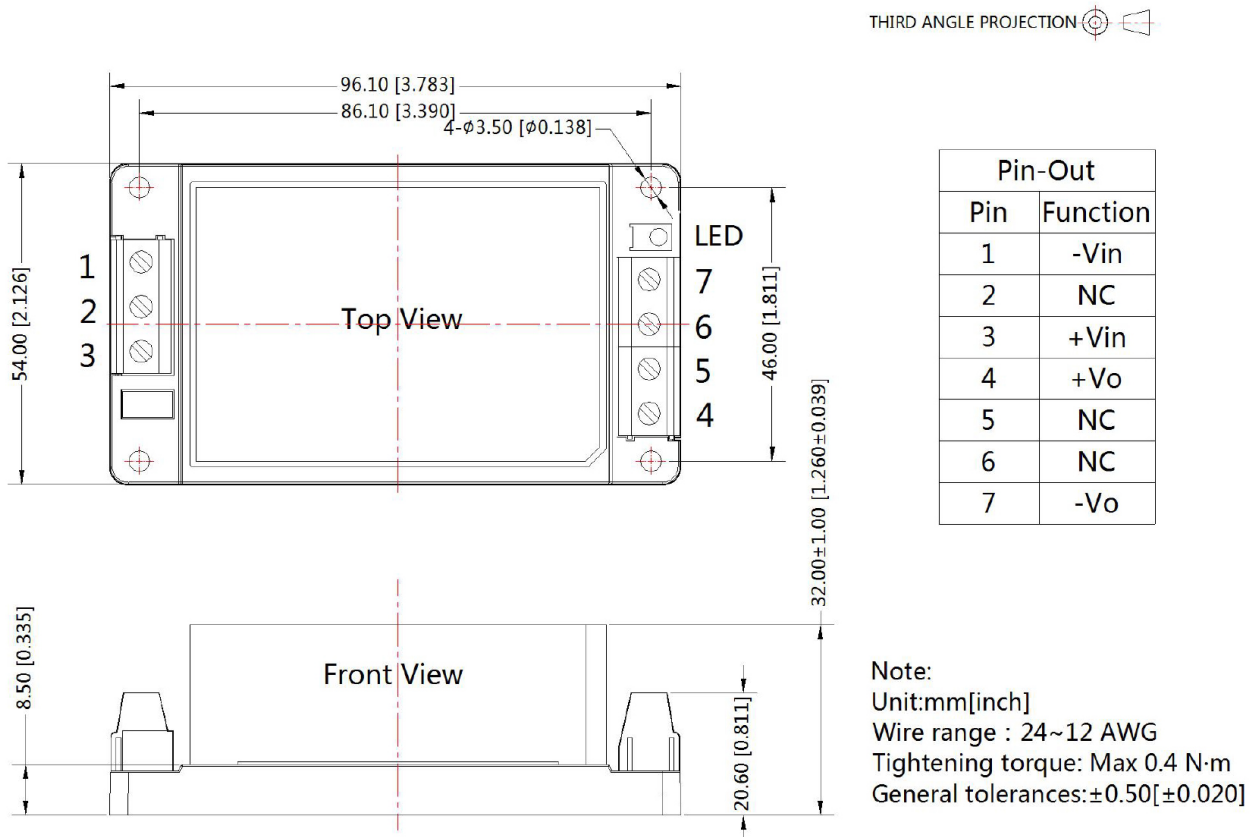
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Dimensions and recommended layout



Chassis mounting

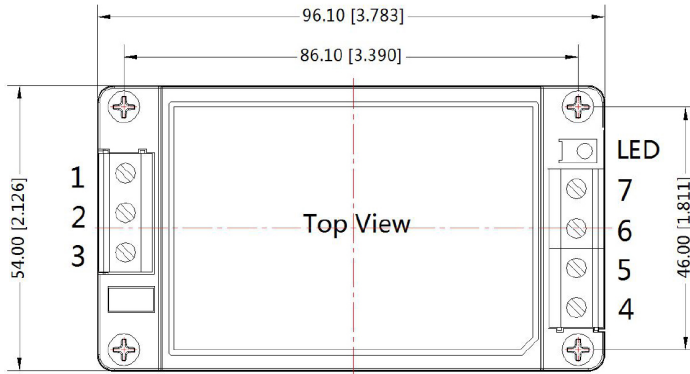


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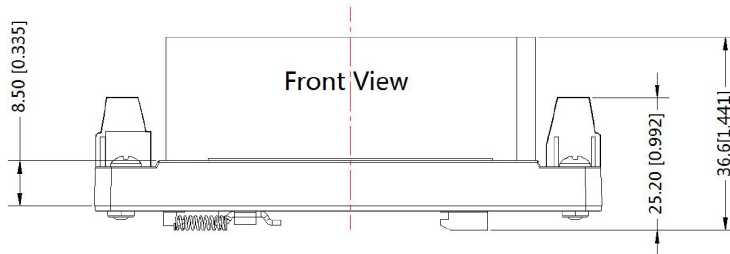
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Din-Rail mounting

THIRD ANGLE PROJECTION 



Pin-Out	
Pin	Function
1	-Vin
2	NC
3	+Vin
4	+Vo
5	NC
6	NC
7	-Vo



Note:
 Unit: mm[inch]
 Mounting rail: TS35, rail needs to connect safety ground
 Wire range: 24-12 AWG
 Tightening torque: Max 0.4 N·m
 General tolerances: $\pm 1.00[\pm 0.039]$