

15DCPE_4 series

15W - Single Output DC-DC Converter - Ultra Wide Input Range - High Isolated & Regulated



DC-DC Converter

15 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 15DCPE_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)

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

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:

15DCPE_05S4

15 = 15Watt; 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.

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EMC specifications

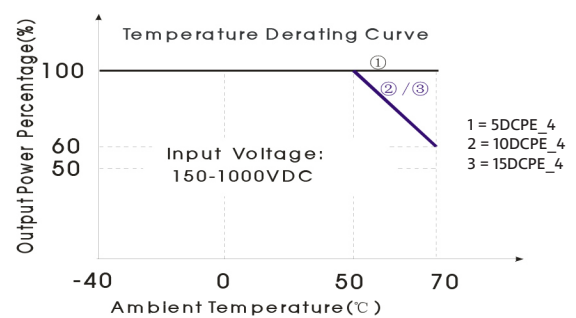
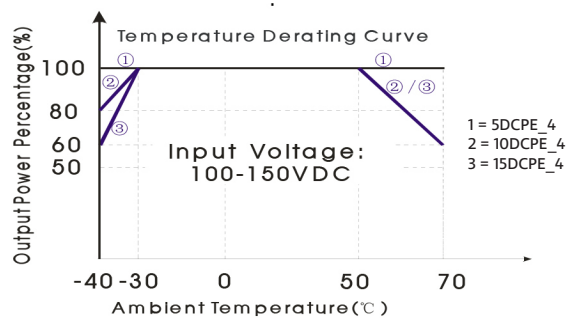
EMI	CE	CISPR32/EN55032	CLASS A (Recommended Circuit Refer to EMC recommended circuit)
EMI	RE	CISPR32/EN55032	CLASS A (Recommended Circuit Refer to EMC recommended circuit)
EMS	ESD	IEC/EN61000-4-2	Contact 6KV/Air 8KV perf. Criteria B
EMS	RS	IEC/EN61000-4-3	10V/m perf. Criteria A
EMS	EFT	IEC/EN61000-4-4	±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]
15DCPE_12S4	15	12	1.25	2000	200	77
15DCPE_15S4	15	15	1	1200	200	78
15DCPE_24S4	15	24	0.625	470	200	80

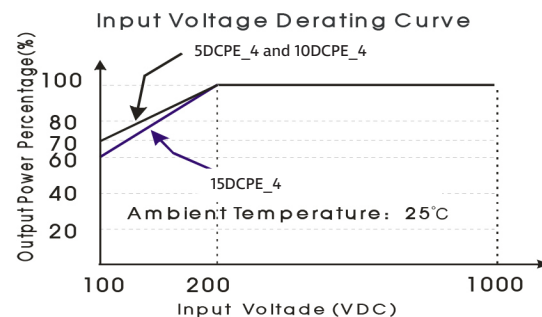
Note: * Use suffix "/CM" for chassis and suffix "/DR" for DIN-Rail mounting.

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.



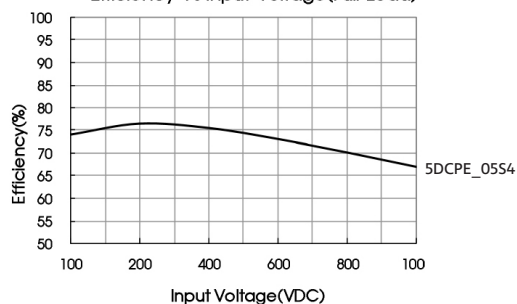
Note: Calculating the actual output power = Nominal output power x Temperature derating x Input voltage derating.

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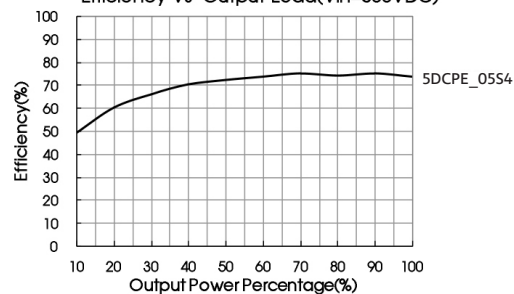
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Efficiency

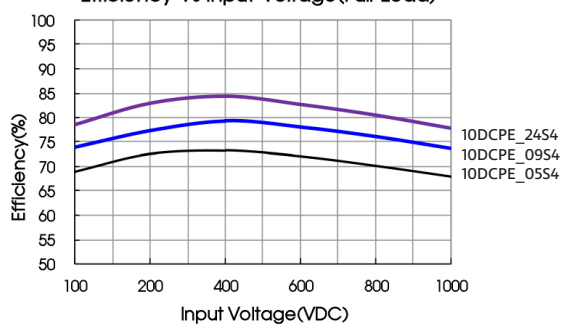
Efficiency Vs Input Voltage(Full Load)



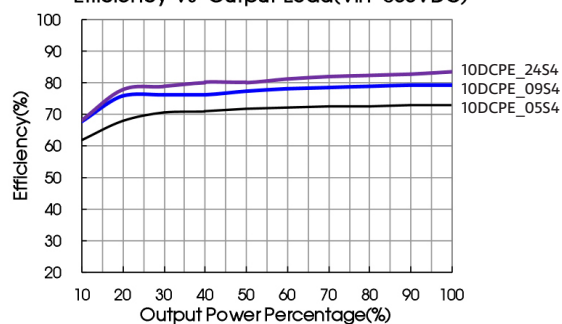
Efficiency Vs Output Load(Vin=500VDC)



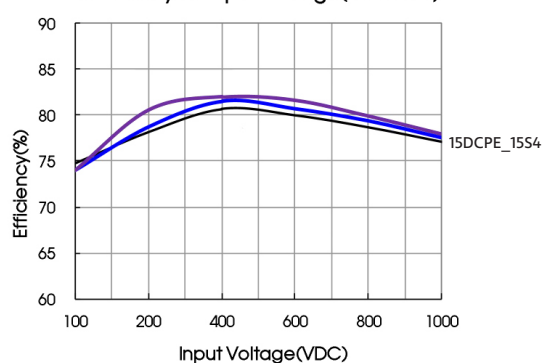
Efficiency Vs Input Voltage(Full Load)



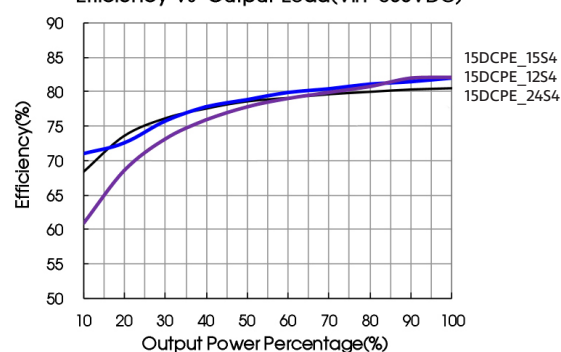
Efficiency Vs Output Load(Vin=500VDC)



Efficiency Vs Input Voltage(Full Load)



Efficiency Vs Output Load(Vin=500VDC)



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Design reference

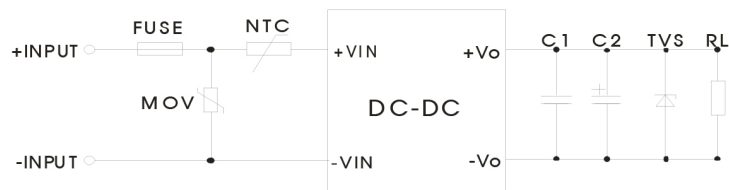


Fig. 1

Model	FUSE	MOV	NTC	C1(μF)	C2(μF)	TVS
5DCPE_05S4	1A/1500VDC	14D142K	10D-11 (10Ω)	1μF/16V	220μF/16V	SMBJ7.0A
10DCPE_05S4				1μF/16V	220μF/16V	SMBJ7.0A
10DCPE_09S4				1μF/16V	120μF/16V	SMBJ12A
10DCPE_24S4				1μF/35V	68μF/35V	SMBJ33A
15DCPE_12S4	2A/1500VDC	14D142K	10D-11 (10Ω)	1μF/25V	120μF/25V	SMBJ15A
15DCPE_15S4				1μF/25V	120μF/25V	SMBJ20A
15DCPE_24S4				1μF/35V	68μF/35V	SMBJ33A

Note on filter components:

We recommend using an electrolytic capacitor with high frequency and low ESR rating for C2 (refer to manufacture's datasheet). Choose a capacitor voltage rating with at least 20% margin, in other words not exceeding 80%. C1 is a ceramic capacitor, used to filter high-frequency noise. TVS is a recommended suppressor diode to protect the application in case of a converter failure.

2. EMC compliance recommended circuit

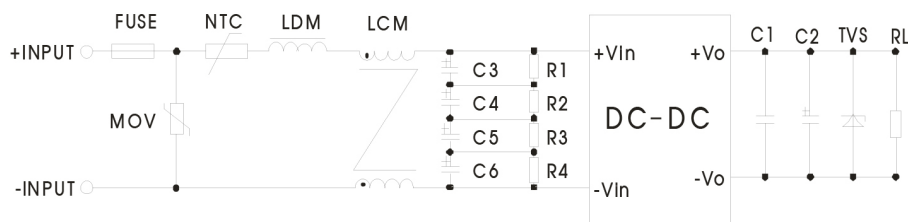


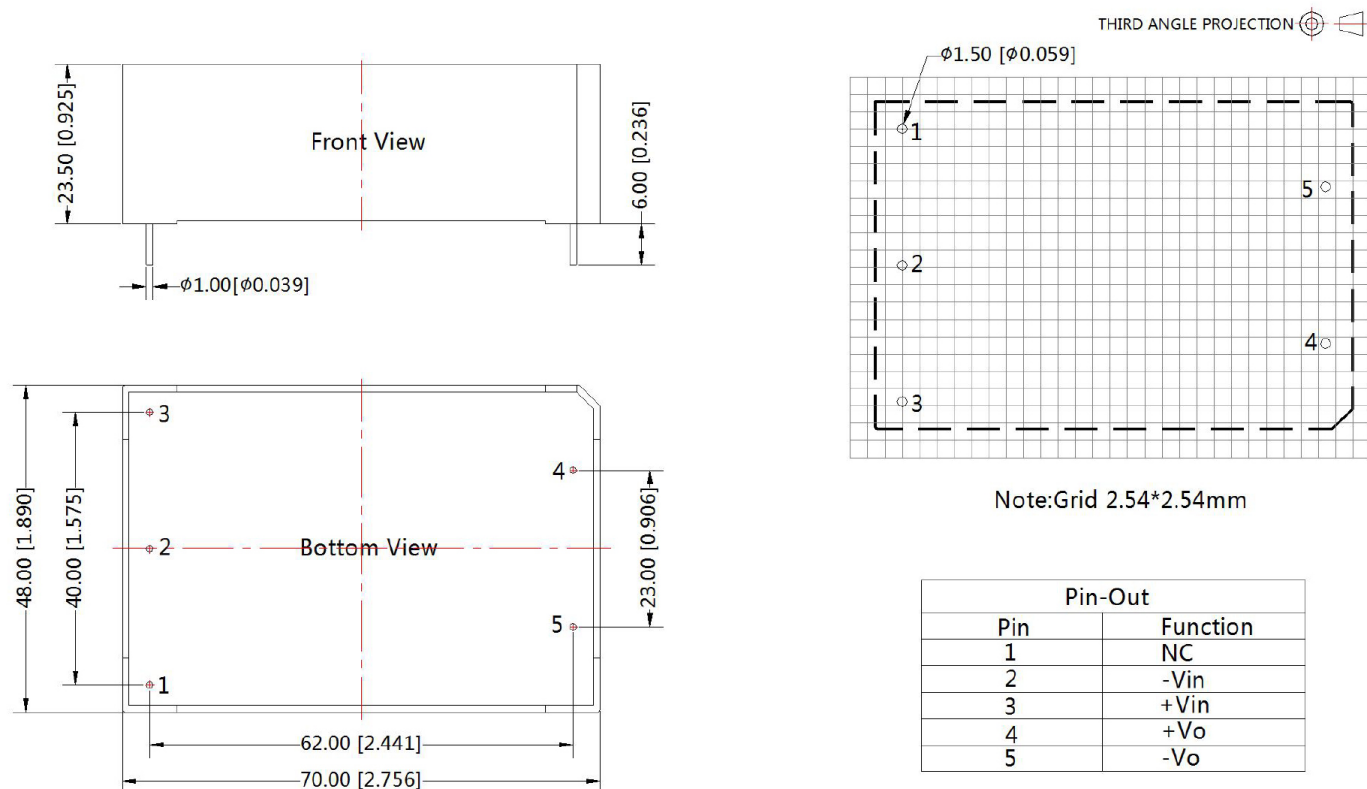
Fig. 2: EMC Recommended circuit (for output components also refer to typical application)

Component	Recommended value
MOV	S14K880
C3, C4, C5, C6	47μF/400VDC
R1, R2, R3, R4	1MΩ/2W
NTC	10D-11
LDM	4.7mH/0.38A
LCM	10mH
FUSE	1A/1500VDC, required for PV05-27BxxR2/ PV10-27BxxR2 2A/1500VDC, required for PV15-27BxxR2

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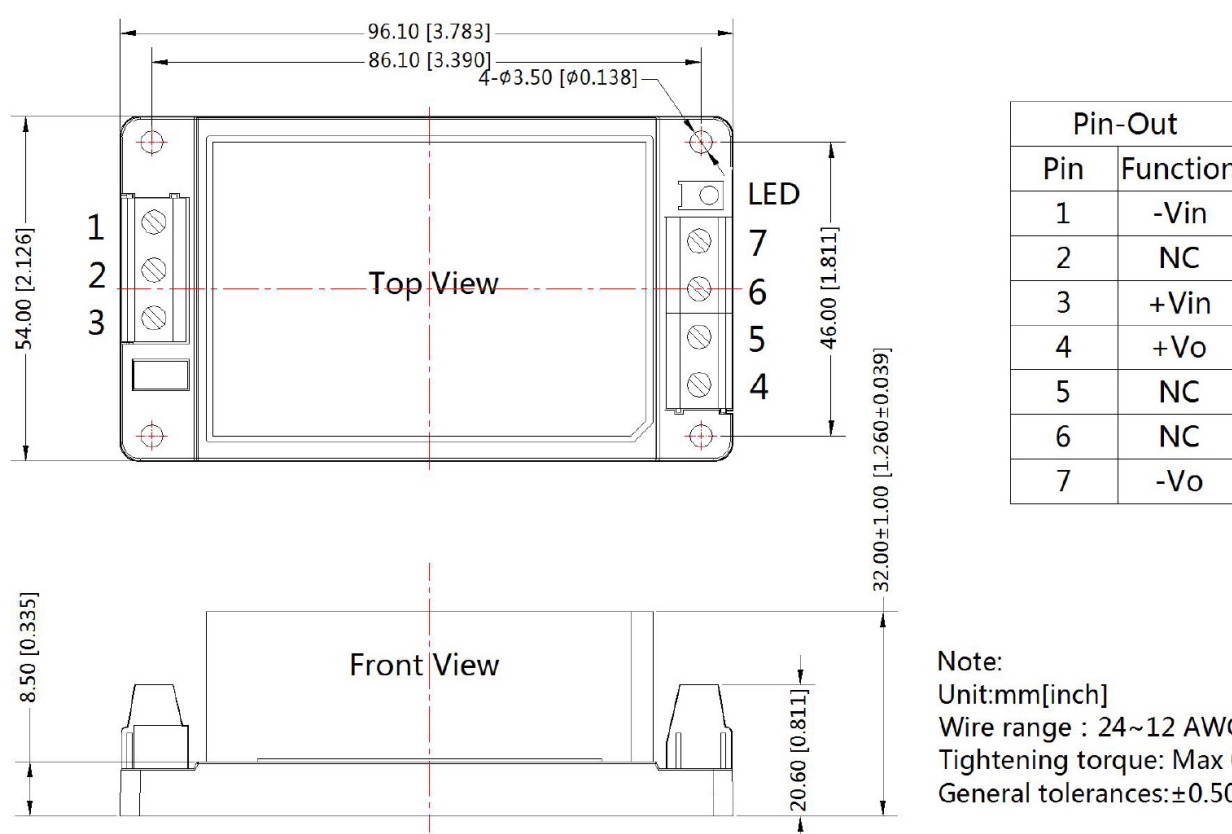
Dimensions and recommended layout



Note:
 Unit :mm[inch]
 Pin diameter tolerances : $\pm 0.10 [\pm 0.004]$
 General tolerances: $\pm 0.50 [\pm 0.020]$

Chassis mounting

THIRD ANGLE PROJECTION



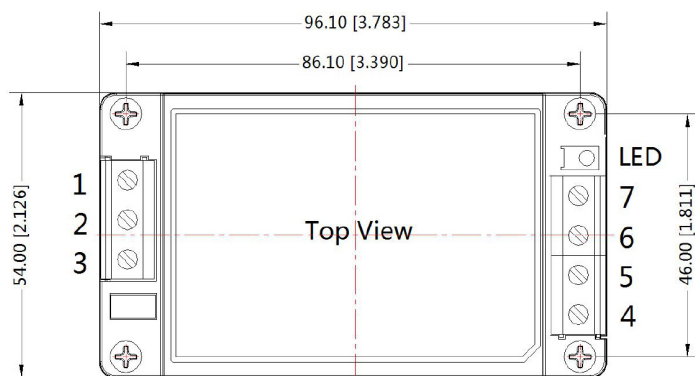
Note:
 Unit:mm[inch]
 Wire range : 24~12 AWG
 Tightening torque: Max 0.4 N·m
 General tolerances: $\pm 0.50 [\pm 0.020]$

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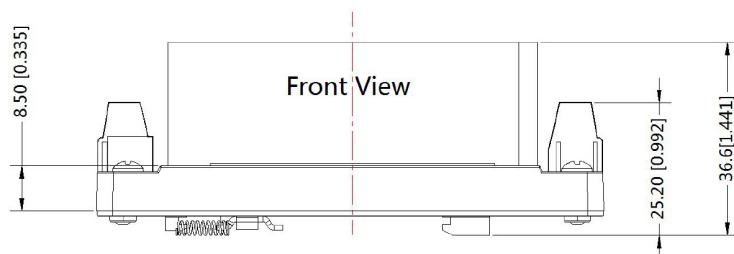
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Din-Rail mounting

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: $\pm 1.00 [\pm 0.039]$