10W 1”x1” Package DC/DC Converter

LLA10W Series

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Description

The LLA10W series is a compact 10W isolated DC-DC converter housed in a 1”x1” package, supporting wide nominal input voltages of 24Vand 48V DC. It provides stable single outputs from 3.3V to 15V with efficiencies up to 88%, high isolation up to 1.6kVDC, and reliable operation from −40°C to +105°C. Designed to meet EN62368-1 standards, it is ideal for industrial control, Tele-cimmunucation and energy battery power applications.

Features

- 4:1 Wide input voltage range
- Compact size 1”x1” package
- Efficiency up to 88%
- Wide operating temperature from -40˚C to +105˚C
- Continuous short circuit protection
- EMI class A without external circuit
- Ultra low standby power
- No minimum load required

Applications

- Industry Control System
- Telecommunucations
- Energy Battery Power

Model Numbering

LLA 10W 4 – 24 12 D

- Output Voltage: (±) output voltage
- Output Voltage: 3.3V/5V/12V/15V/24V/±12V/±15V
- Input Voltage: 24V / 48V
- Input Range: 4:1 (9~36 VDC; 18~75 VDC)
- Wattage: 10 W
- Series Name

No. 90, Jian 1st Rd., Zhonghe Dist., New Taipei City 23545, Taiwan

Model Selection Guide

Part No.	Input Voltage	Output Voltage	Output Current @ Full Load	Input Current @ No Load	Efficiency (1) (Typ.)	Capacitor Load (2) (Max.)
LLA10W4-243.3	9-36 VDC Nom. 24VDC	3.3 VDC	2000mA	7mA	81%	2500μF
LLA10W4-2405		5 VDC	2000mA	7mA	86.5%	2500μF
LLA10W4-2412		12 VDC	840mA	7mA	87%	430μF
LLA10W4-2415		15 VDC	670mA	7mA	87%	350μF
LLA10W4-2424		24 VDC	420mA	7mA	88%	125uF
LLA10W4-2412D		±12VDC	±417mA	7mA	86.5%	±350μF
LLA10W4-2415D		±15VDC	±333mA	7mA	87%	±250μF
LLA10W4-483.3	18-75 VDC Nom. 48VDC	3.3 VDC	2000mA	5mA	81.5%	2500μF
LLA10W4-4805		5 VDC	2000mA	5mA	86.5%	2500μF
LLA10W4-4812		12 VDC	840mA	5mA	87%	430μF
LLA10W4-4815		15 VDC	670mA	5mA	88%	350μF
LLA10W4-4824		24 VDC	420mA	5mA	86%	125uF
LLA10W4-4812D		±12VDC	±417mA	5mA	86.5%	±350μF
LLA10W4-4815D		±15VDC	±333mA	5mA	86.5%	±250μF

Notes

#1: The efficiency is test by nominal input and max. full load @ 25℃

#2: The capacitive load is test by minimum input and constant resistive load.

Electrical Specification

Model Number		LLA10W4-☐☐
Input		
Input Filter		Pi type
Input Voltage Range	24Vin	9V-36VDC
	48Vin	18-75VDC
Start-Up Time		20-25ms (100% load at nominal Vin)
Start-Up Voltage (0%-100% load)	24Vin	9VDC
	48Vin	18VDC
Under Voltage Lockout (0%-100% load)	24Vin	7.5VDC
	48Vin	16VDC
Input Surge Voltage (0.1s max)	24Vin	50VDC
	48Vin	100VDC
Remote ON/OFF	DC-DC ON	Open or 3.5-15VDC
	DC-DC OFF	Short or 0-1.2VDC
	Input Current (Remote Off Mode)	2mA
Output		
Voltage Accuracy		± 1% (100% load at nominal Vin)
Voltage Balance		1% (Dual output balanced load)
Line Regulation (LL to HL 100% load)	Single Output	± 0.2%
	Dual Output	± 0.5%
Load Regulation (10% to 100% Load)	Single Output	± 0.5%
	Dual Output	± 1.0%
Cross Regulation		± 5% (Asymmetrical load 25%/100%)
Ripple & Noise (20MHz) Io= Full Load	24Vin	60 mVp-p
	48Vin	100 mVp-p
Minimum Load		0%

Operating Frequency		330KHz @ 100% load at all input range
Transient Response Recovery Time		300μs (25% load step change; 75% to 100% load)
Environment		
Operating Temperature		-40-+85 ˚C without derating -40-+105 ˚C with derating
Storage Temperature		-55-+125 ˚C
Max. Case Temperature		110˚C @ 100% loaf at nominal load
Relative Humidity		5%-95% RH
MTBF (MIL-HDBK-217F)		700 KHours (25˚C)
Vibration		MIL-STD-202G
Function		
Isolation Voltage		1.6 KVDC 1min. Input to Output
Isolation Resistance		1000 MΩ
Isolation Capacitance		1200 pF
Short Circuit Protection		Continuous, automatic recovery
Over Load Protection	24VDC	170% Hiccup
	48VDC	190% Hiccup
Safety Approvals		EN62368-1
Physical		
Case Material		Nickel plated metal with FR-4 base
Potting Material		Silicone
Dimension		25.4(L) x 25.4(W) x 10(H) mm
Weight		17 g
Cooling method		Free air convection
Electromagnetic Compatibility		
Electromagnetic Interference		EN 55032 (Class A/B) with external filter
Electrostatic Discharge[1]		IEC 61000-4-2, Air±8kV; Contact±6kV (Criteria A)
Radiated Immunity[1]		IEC 61000-4-3, 3V/m (Criteria A)
Electrical Fast Transient[1]		IEC 61000-4-4, ±2kV (Criteria A)

Surge Immunity(1)	IEC 61000-4-5, ±2kV (Criteria A)
Conducted Immunity(1)	IEC 61000-4-6, 3V/rms (Criteria A)
Magnetic Field Immunity(2)	IEC 61000-4-8, 1A/m (Criteria A)

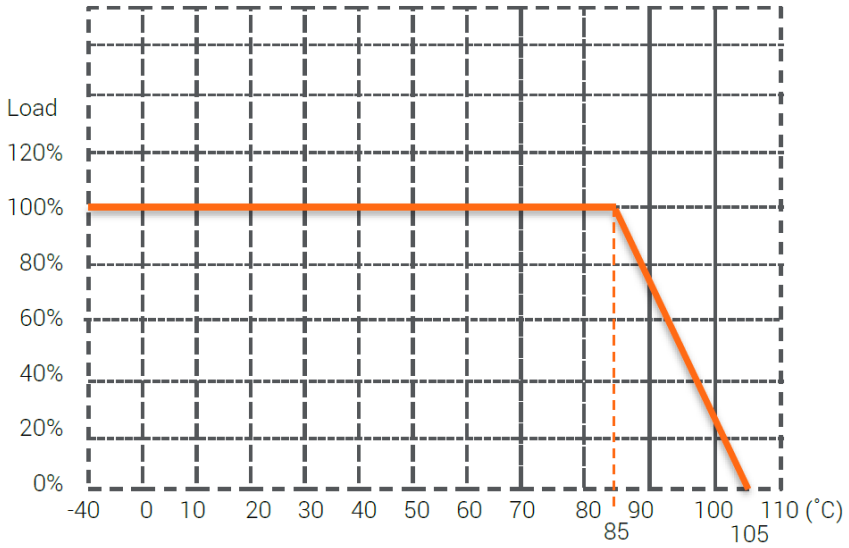
Notes

#1: Test with E-CAP 470μF/100V at input terminal.

#2: All specifications valid at nominal input voltage, full load and 25˚C unless otherwise stated.

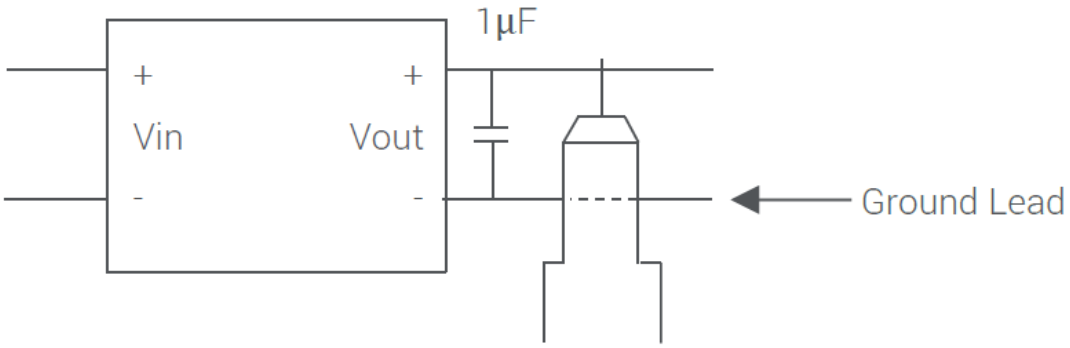
Mechanical Specification

Derating Curve

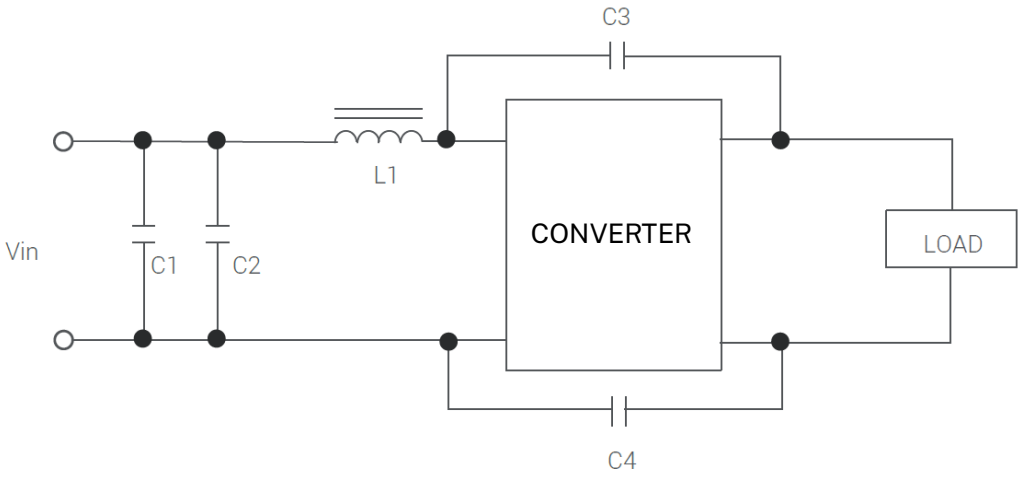


Ambient temperature with natural convection

Ripple & Noise Measure Method

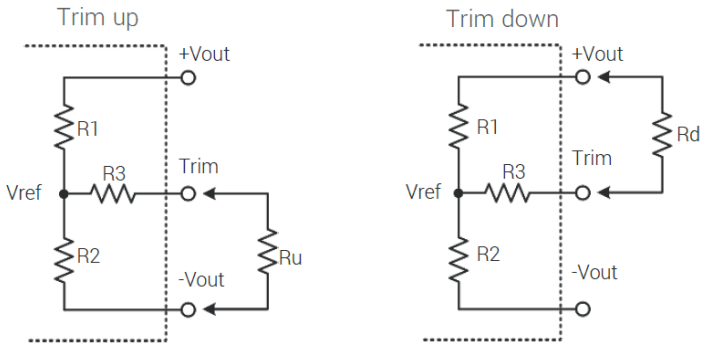


EMI Filtering-Suggestion for Class B



	C1	C2	L1	C3	C4
LLA10W4-24XX	2.2 μF	2.2 μF	4.7 μH	1500 pF	1500 pF
LLA10W4-48XX	2.2 μF	2.2 μF	4.7 μH	1500 pF	1500 pF

External Output Voltage Trimming

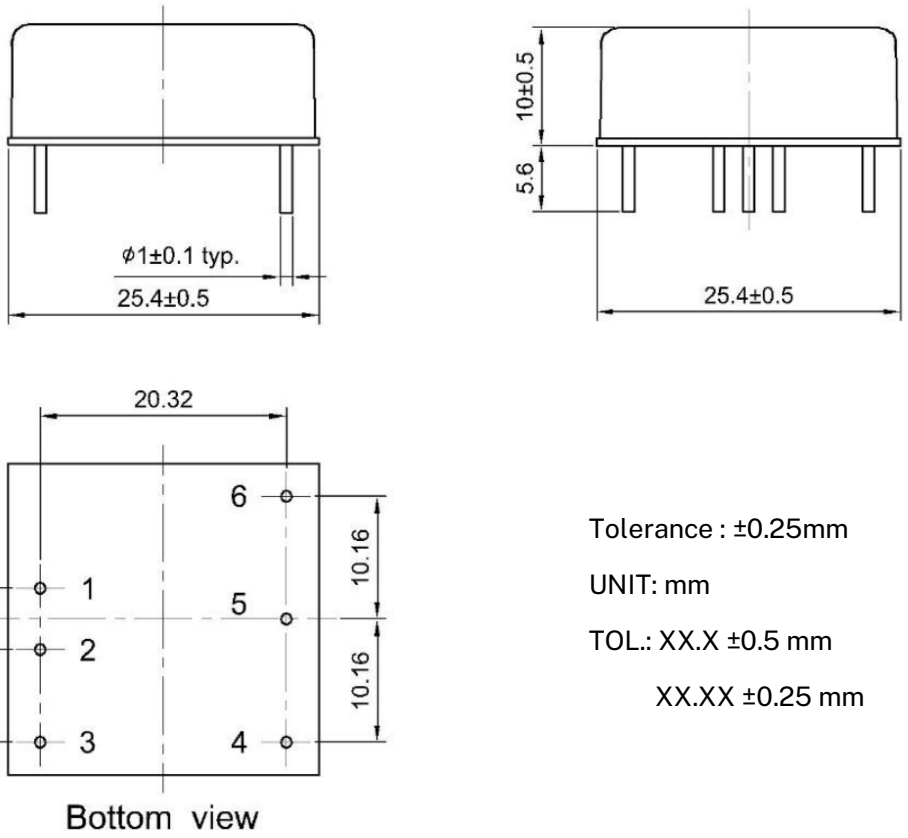


$$Ru=\frac{aR_2}{R_2-a}-R_3 \quad a=\frac{V_{ref}}{V_o'-V_{ref}}\cdot R_1$$

$$Rd=\frac{bR_1}{R_1-b}-R_3 \quad b=\frac{V_o'-V_{ref}}{V_{ref}}\cdot R_2$$

Model	R1	R2	R3	Vref
LLA10W4-XX3.3	16.6 kΩ	10 kΩ	52.3 kΩ	1.24V
LLA10W4-XX05	10 kΩ	10 kΩ	35.7 kΩ	2.5V
LLA10W4-XX12	38.1 kΩ	10 kΩ	48.7 kΩ	2.5V
LLA10W4-XX15	50.1 kΩ	10 kΩ	51 kΩ	2.5V
LLA10W4-XX24	86.32 kΩ	10 kΩ	73.2 kΩ	2.5V

Mechanical Dimension & Pinning



Tolerance : ±0.25mm

UNIT: mm

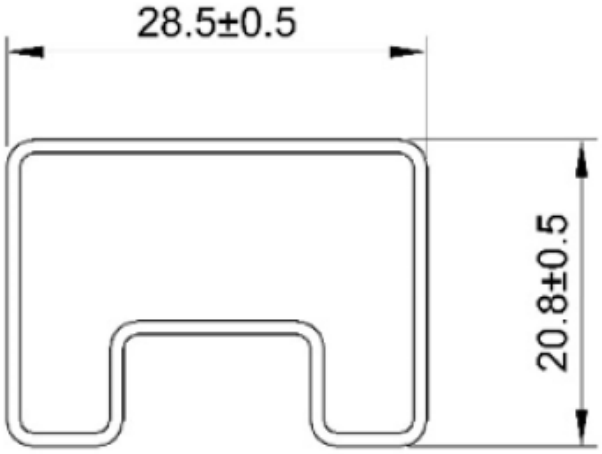
TOL.: XX.X ±0.5 mm

XX.XX ±0.25 mm

Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	Ctrl	Ctrl
4	-Vout	-Vout
5	Trim	COM
6	+Vout	+Vout

Package

Anti-static liquid tube



UNIT:mm
1 Tube = 8 pcs
Length:260±2mm