40W 1”x1” Package DC/DC Converter

LLA40W Series

Learn More

Description

The LLA40W series is a compact 40W 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 89%, high isolation up to 2kVDC, 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
- 40W power in compact size 1x1” package
- High Efficiency up to 89%
- -40℃ to +105℃ operating temperature
- Continuous short circuit protection
- Input under voltage lock, output voltage
- Trim, remote ON/OFF function
- Positive or negative logic control

Applications

- Industry Control System
- Energy Battery Application
- Telecom/Datacom
- Save Space Solution

Model Numbering

LLA 40 W 4 – 24 12 D

- D → Output Voltage: (±) output voltage
- 12 → Output Voltage: 3.3V/5V/12V/15V/24V/±12V/±15V
- 24 → Input Voltage: 24V / 48V
- 4 → Input Range: 4:1 (9~36 VDC; 18~75 VDC)
- 40 W → Wattage: 30W
- LLA → 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.)
LLA40W4-243.3	9-36 VDC Nom. 24VDC	3.3 VDC	10000mA	12mA	87%	10000μF
LLA40W4-2405		5 VDC	8000mA	12mA	87%	6000μF
LLA40W4-2412		12 VDC	3333mA	12mA	88%	3000μF
LLA40W4-2415		15 VDC	2667mA	12mA	88%	1000μF
LLA40W4-2424		24 VDC	1667mA	12mA	89%	680uF
LLA40W4-2412D		±12VDC	±1667mA	12mA	88%	±1500μF
LLA40W4-2415D		±15VDC	±1333mA	12mA	98%	±1000μF
LLA40W4-483.3	18-75 VDC Nom. 48VDC	3.3 VDC	10000mA	10mA	86%	10000μF
LLA40W4-4805		5 VDC	8000mA	10mA	88%	6000μF
LLA40W4-4812		12 VDC	3333mA	10mA	89%	3000μF
LLA40W4-4815		15 VDC	2667mA	10mA	88%	1000μF
LLA40W4-4824		24 VDC	1667mA	10mA	88%	680uF
LLA40W4-4812D		±12VDC	±1667mA	10mA	88%	±1500μF
LLA40W4-4815D		±15VDC	±1333mA	10mA	88%	±1000μF

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.

#3: LLA40WR4-xxxxN is mean negative logic control.

#4: All specifications valid at nominal input voltage, full load and 25℃ after warm-up time unless otherwise stated.

Electrical Specification

Model Number		LLA40W4-☐☐
Input		
Input Filter		Pi type
Input Voltage Range	24Vin	9V-36VDC
	48Vin	18-75VDC
Start-Up Time (100% load at nominal Vin)		50ms (3.3V)
		30ms (5V/12V/15V/24V)
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 (Positive logic) Standard	DC-DC ON	Open or 3.5 < Vr < 15VDC
	DC-DC OFF	Short or 0 < Vr < 1.2VDC
Remote ON/OFF (Negative logic) Standard	DC-DC ON	Short or 0 < Vr < 1.2VDC
	DC-DC OFF	Open or 3.5 < Vr < 15VDC
Output		
Voltage Accuracy		± 1% (100% load at nominal Vin)
Line Regulation (LL to HL 100% load)	Single Output	± 0.2%
	Dual Output	± 0.5%
Load Regulation (10% to 100% Load)	Single Output	± 0.2%
	Dual Output	± 1.0%
Cross Regulation		± 5% (Asymmetrical load 25%/100%)
Ripple & Noise (20MHz) Io= Full Load		75 mVp-p
Minimum Load		0%
Voltage Adjustability		± 10% (0%~100% load at Vin range, Pout ≦ max rated power)

Operating Frequency	3.3V Output	300KHz
	Others	400 KHz
Temperature Coefficient		0.05%/˚C
Transient Response Recovery Time		300μs (25% load step change; 75%-100% load)
Environment		
Operating Temperature		-40-+105 ˚C with derating
Storage Temperature		-55-+125 ˚C
Max. Case Temperature		110˚C
Relative Humidity		5%-95% RH
MTBF (MIL-HDBK-217F)		560 KHours (25˚C)
Altitude		3000m
Vibration		MIL-STD-202G
Function		
Isolation Voltage		2 KVDC 1min. Input to Output, DC Isolation cut-off current 1mA
		1KV, AC Isolation cut-off current 2mA
		1 KVDC 1min. Input (Output) to case DC Isolation cut-off current 1mA
		0.5KV, AC Isolation cut-off current 2mA
Isolation Resistance		1000 MΩ @ 500VDC
Isolation Capacitance		2200 pF
Short Circuit Protection		Continuous, automatic recovery
Over Load Protection		160% Hiccup
Over Voltage Protection	3.3V output	3.7-5.3VDC
	5V output	5.6-8VDC
	12V output	13.4-19.2VDC
	15V output	16.8-24.0VDC
	24V output	26.8-38.4VDC
	±12V output	±13.4-19.2VDC
	±15V output	±16.8-24VDC

Safety Approvals	EN62368-1
Physical	
Case Material	Metal
Potting Material	Silicone
Dimension	25.4(L) x 25.4(W) x 10(H) mm
Weight	21 g
Cooling method	Natural convection
Electromagnetic Compatibility	
Electromagnetic Interference	EN 55032 (Class A/B)
Electrostatic Discharge(1)	IEC 61000-4-2, Air±8kV; Contact±6kV (Criteria A)
Radiated Immunity(1)	IEC 61000-4-3, 10V/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, 10V/m (Criteria A)
Magnetic Field Immunity(2)	IEC 61000-4-8, 10A/m(Criteria A)

Notes

#1: Ripple & Noise: Single output measured with 20MHZ BW at nominal input voltage 0%~100% load with 10μF/50V*2 X7R MLCC. Dual output measured with 20MHZ BW at nominal input voltage 0%~100% load with a 10μF/50V X7R MLCC.

#2: About EMI circuit, please check suggestion circuit.

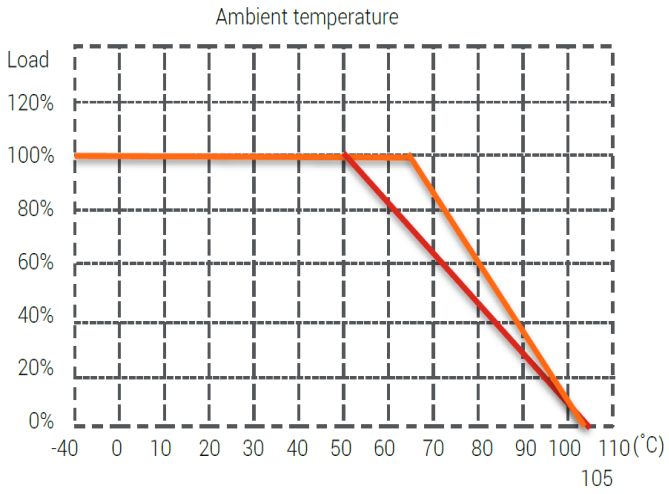
#3: Test with E-CAP 680μF/100Vat input terminal.

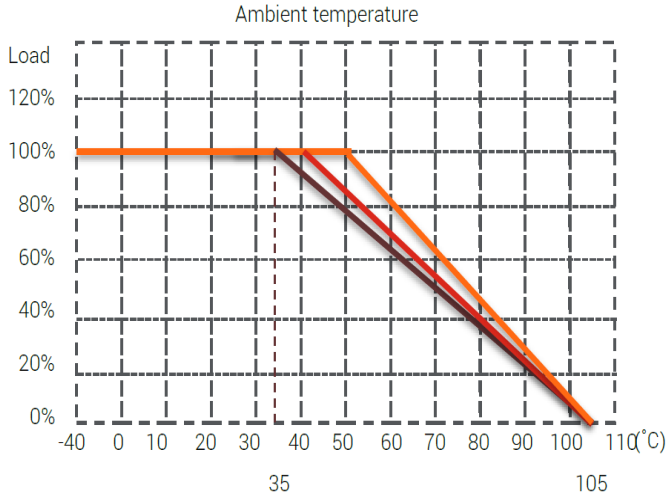
#4: All specifications valid at nominal input voltage, full load and 25 ˚C after warm-up time unless otherwise stated.

#5: The product information and specifications are subject to change without prior notice.

Mechanical Specification

Derating Curve



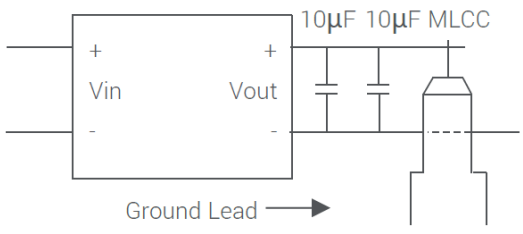


*The derating curve was measured at nominal input voltage with natural convection without heatsink.

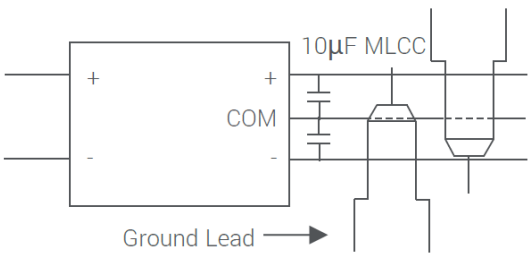
- LLA40W4-24303,2412D,2424
- LLA40W4-24xx
- LLA40W4-483.3,4815
- LLA40W4-4805,4812,4812D,4815D
- LLA40W4-4824

Ripple & Noise Measure Method

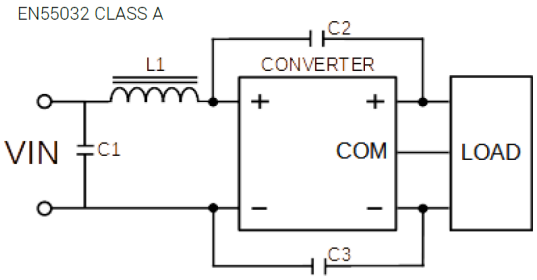
Single output



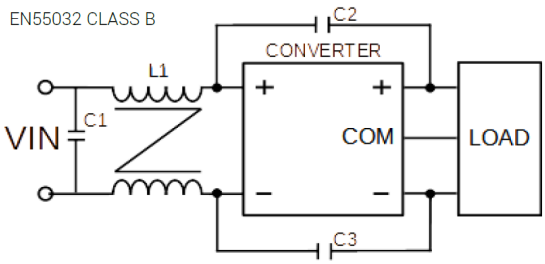
Dual output



EMI Filtering-Suggestion for Class B

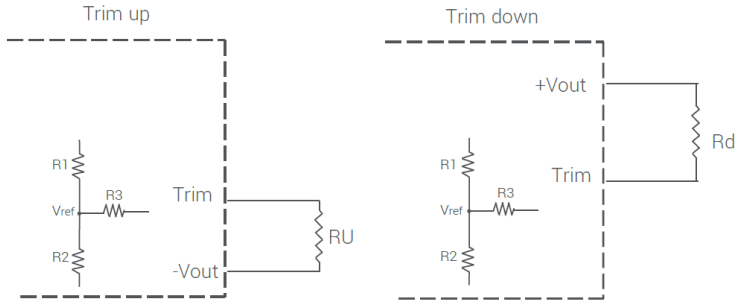


Vout	C1	L1	C2	C3
LLA40W4-243.3	10 µF	2.2 µH	NA	2200 pF
LLA40W4-483.3	10 µF	2.2 µH	NA	2200 pF
5 V	10 µF	2.2 µH	2200 pF	2200 pF
12 V	10 µF	2.2 µH	2200 pF	2200 pF
15 V	10 µF	2.2 µH	2200 pF	2200 pF
24 V	10 µF	2.2 µH	2200 pF	2200 pF
±12 V	10 µF	2.2 µH	NA	2200 pF
±15 V	10 µF	2.2 µH	NA	2200 pF



Vout	C1	L1	C2	C3
3.3 V	10 µF	GSCM121160P-102-2P-AE	2200 pF	2200 pF
5 V	10 µF	GSCM121160P-102-2P-AE	6600 pF	4400 pF
12 V	10 µF	GSCM121160P-102-2P-AE	6600 pF	4400 pF
15 V	10 µF	GSCM121160P-102-2P-AE	6600 pF	4400 pF
24 V	10 µF	GSCM121160P-102-2P-AE	6600 pF	4400 pF
±12 V	10 µF	GSCM121160P-102-2P-AE	2200 pF	2200 pF
±15 V	10 µF	GSCM121160P-102-2P-AE	2200 pF	2200 pF

External Output Voltage Trimming



Formula for trim resistor:

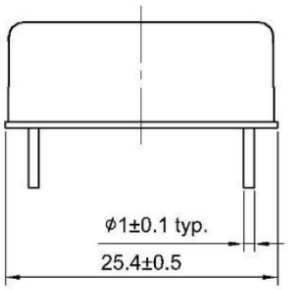
UP: $Ru=\frac{aR_2}{R_2-a}-R_3$ $a=\frac{V_{ref}}{V_o'-V_{ref}}\cdot R_1$

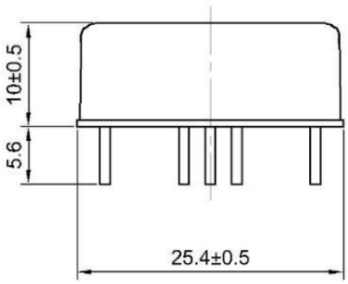
DOWN: $Rd=\frac{bR_1}{R_1-b}-R_3$ $b=\frac{V_o'-V_{ref}}{V_{ref}}\cdot R_2$

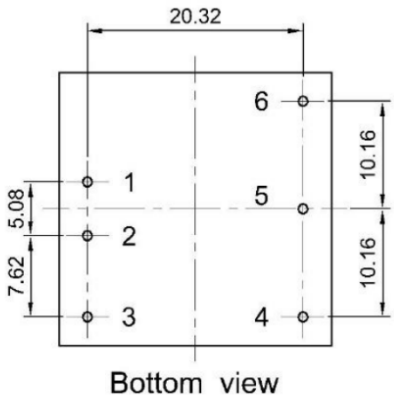
NOTE:
1.Ru, Rd is mean trim resistor, please check the formula.
2.a & b: user define parameter, no actual meanings.
3. V_o' is mean trim up/down voltage.
4.Value for R1, R2, R3 and V_{ref} refer to the table below.

Vout	Vref	R1	R2	R3
3.3 V	1.24 V	16.7 kΩ	10.0 kΩ	52.3 kΩ
5 V	1.24 V	33.5 kΩ	11.0 kΩ	73.2 kΩ
12 V	2.50 V	38.0 kΩ	10.0 kΩ	48.7 kΩ
15 V	2.50 V	50.1 kΩ	10.0 kΩ	64.9 kΩ
24 V	2.50 V	86.0 kΩ	10.0 kΩ	73.2 kΩ

Mechanical Dimension & Pinning







Tolerance : ±0.25mm

UNIT: mm

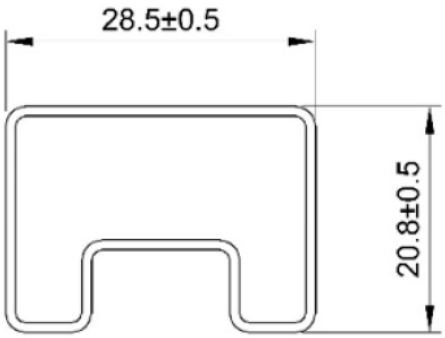
TOL.: XX.X ±0.5 mm

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