15W 1”x1” Package DC/DC Converter

LLA15W Series

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Description

The LLA15W series is a compact 15W 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 90%, 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 90%
- 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 15 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)
- 15 W → Wattage: 15W
- 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.)
LLA15W4-243.3	9-36 VDC Nom. 24VDC	3.3 VDC	4000mA	7mA	85%	12000μF
LLA15W4-2405		5 VDC	3000mA	7mA	88%	6400μF
LLA15W4-2412		12 VDC	1250mA	7mA	88.5%	1200μF
LLA15W4-2415		15 VDC	1000mA	7mA	89%	900μF
LLA15W4-2424		24 VDC	625mA	7mA	89.5%	240uF
LLA15W4-2412D		±12VDC	±625mA	7mA	87%	±520μF
LLA15W4-2415D		±15VDC	±500mA	7mA	89%	±330μF
LLA15W4-483.3	18-75 VDC Nom. 48VDC	3.3 VDC	4000mA	5mA	85%	12000μF
LLA15W4-4805		5 VDC	3000mA	5mA	88%	6400μF
LLA15W4-4812		12 VDC	1250mA	5mA	89%	1200μF
LLA15W4-4815		15 VDC	1000mA	5mA	89.5%	900μF
LLA15W4-4824		24 VDC	625mA	5mA	90%	240uF
LLA15W4-4812D		±12VDC	±625mA	5mA	89.5%	±520μF
LLA15W4-4815D		±15VDC	±500mA	5mA	89.5%	±330μF

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		LLA15W4-☐☐
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%

Trim Range		± 10%
Operating Frequency	Others	350 KHz @ 100% load at all input range
	Vout=3.3Vdc	400 KHz @ 100% load at all input range
Environment		
Operating Temperature		-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)		1000 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		UL62368-1/EN62368-1/IEC62368-1
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)
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)

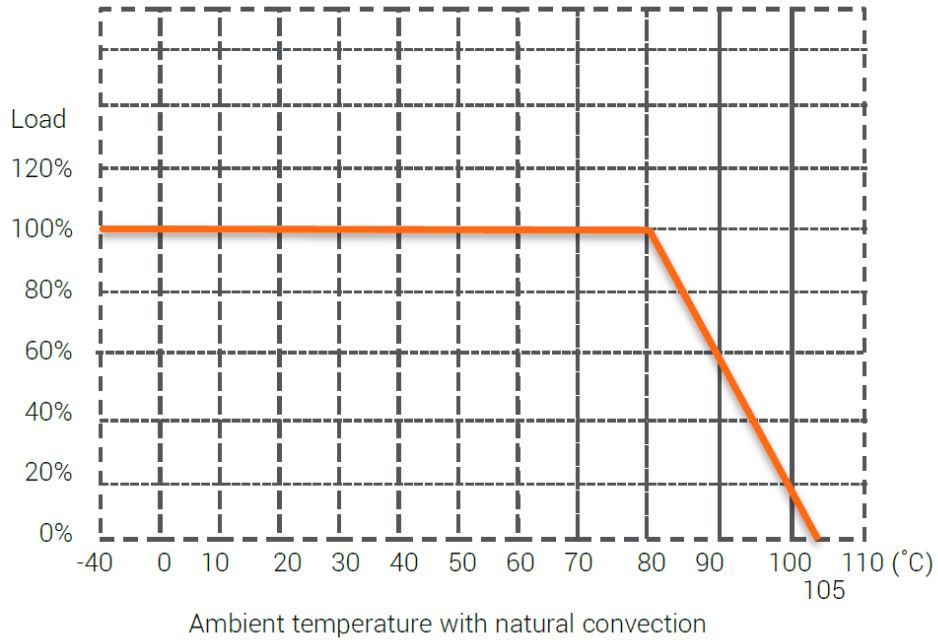
Notes

#1: Test with E-CAP 220μF/100Vat input terminal.

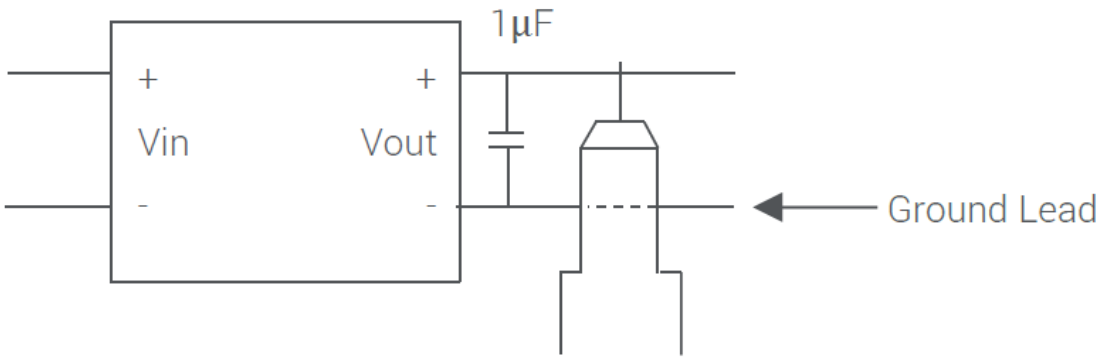
#2: All specifications valid at nominal input voltage, full load and 25˚C unless otherwise stated.

Mechanical Specification

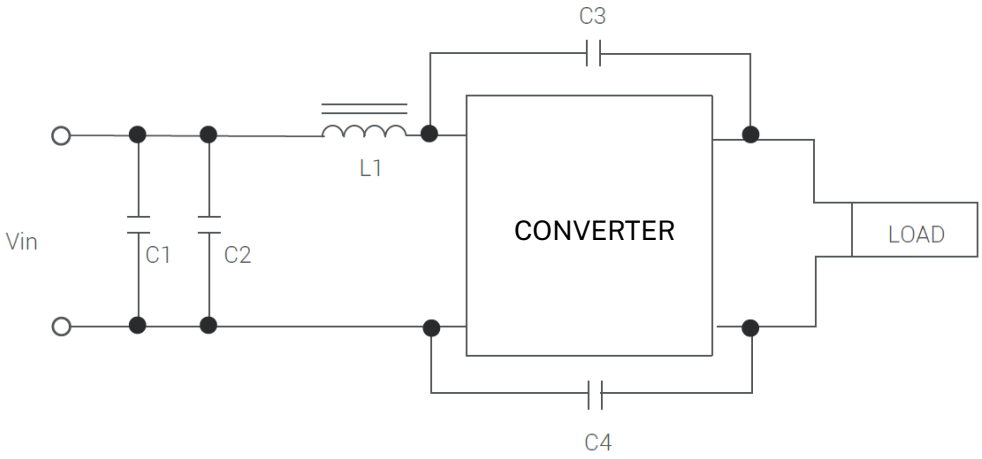
Derating Curve



Ripple & Noise Measure Method

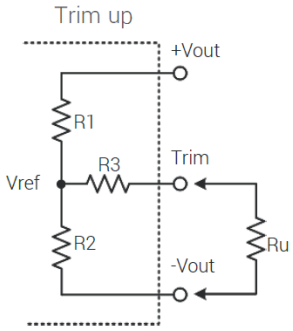


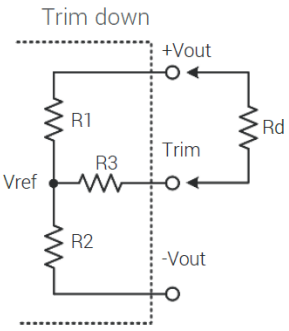
EMI Filtering-Suggestion for Class B



	C1	C2	L1	C3	C4
LLA15W4-24XX	2.2 µF	2.2 µF	4.7 µH	1500 pF	1500 pF
LLA15W4-48XX	2.2 µF	2.2 µF	4.7 µH	1500 pF	1500 pF

External Output Voltage Trimming



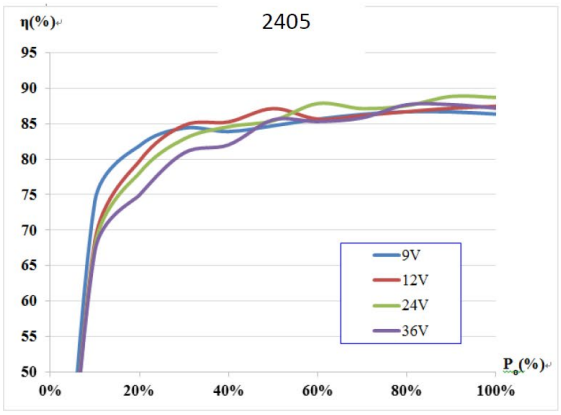


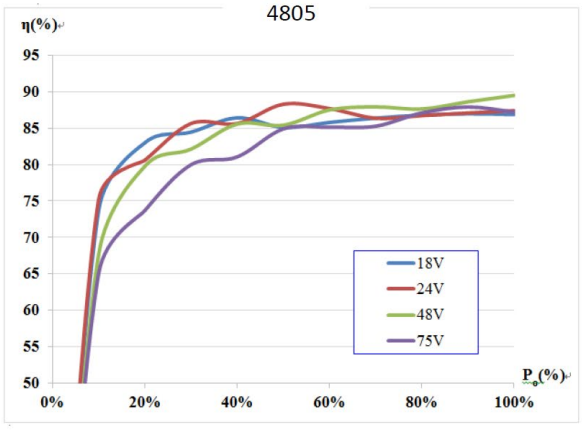
$$Ru=\frac{aR_2}{R_2-a}-R_3 \quad a=\frac{V_{ref}}{V_o'-V_{ref}}\cdot R_1$$

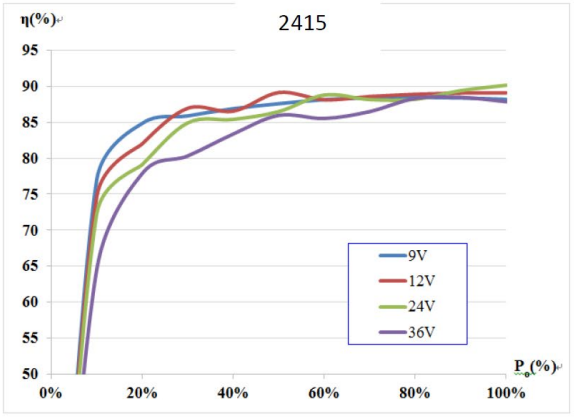
$$Rd=\frac{bR_1}{R_1-b}-R_3 \quad b=\frac{V_o'-V_{ref}}{V_{ref}}\cdot R_2$$

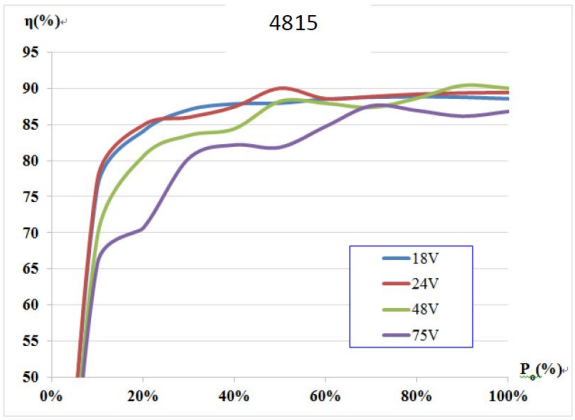
Model	R1	R2	R3	Vref
LLA15W4-XX3.3	16.6 kΩ	10 kΩ	52.3 kΩ	1.24V
LLA15W4-XX05	10 kΩ	10 kΩ	35.7 kΩ	2.5V
LLA15W4-XX12	38.1 kΩ	10 kΩ	48.7 kΩ	2.5V
LLA15W4-XX15	50.1 kΩ	10 kΩ	51 kΩ	2.5V
LLA15W4-XX24	86.32 kΩ	10 kΩ	73.2 kΩ	2.5V

Efficiency Curve

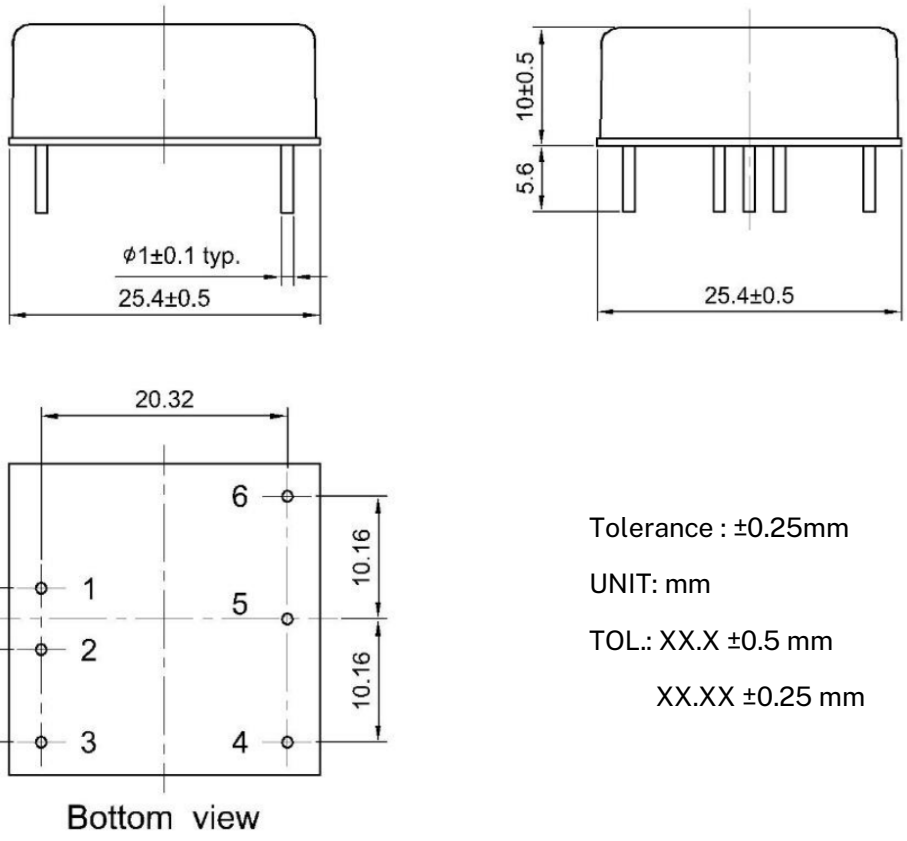








Mechanical Dimension & Pinning



Tolerance : ±0.25mm

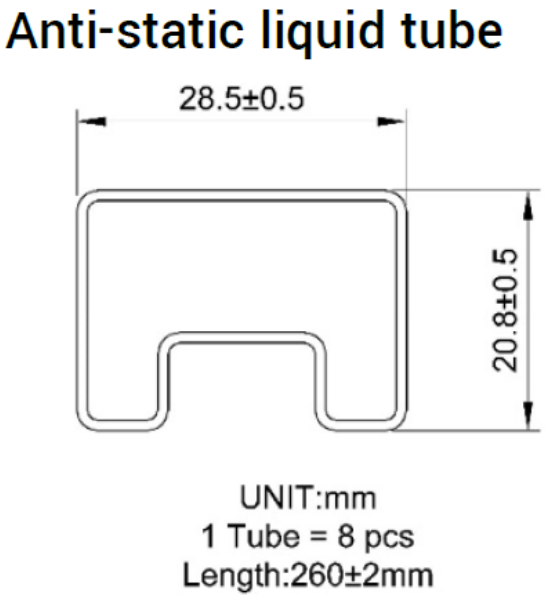
UNIT: mm

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



Recommend Footprint