40W 2”x1” Package DC/DC Converter

LQA40W Series

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Description

The LQA40W series is a compact 40W isolated DC-DC converter housed in a 2”x1” package, supporting wide nominal input voltages of 110VDC. It provides stable single outputs from 5V to 48V with efficiencies up to 92%, high isolation up to 3kVDC, and reliable operation from −40°C to +105°C. Designed to meet EN62368-1 ,EN50155 and EN55032/35 standards, it is ideal for industrial control, Tele-cimmunucation and Railway applications.

Features

- High Efficiency 40W power in compact size 2”x1” package
- No minimum load required
- Wide operating temperature from -40˚C to +105˚C
- Continuous short circuit protection
- Over load protection/ over voltage protection/ over temperature protection
- Six-sided continuous shield
- EN50155, EN45545-2 railway standard approvals

Applications

- Industry Control System
- Save Space Solution
- Telecommunicattions Application
- Industrial Application
- Railway Application

Model Numbering

LQA 40 W 4 – 110 05

- 05 → Output Voltage: 5V / 12V / 24V/ 48V
- 110 → Input Voltage: 110V
- 4 → Input Range: 4:1 (40~160 VDC)
- 40 W → Wattage: 40W
- LQA → 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.)
LQA40W4-11005	40-160 VDC Nom. 110VDC	5VDC	8000mA	10mA	85.5%	20000μF
LQA40W4-11012		12VDC	3333mA	10mA	89.5%	3900μF
LQA40W4-11024		24VDC	1667mA	10mA	89.5%	1300μF
LQA40W4-11048		48VDC	833mA	10mA	88.5%	220μF

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		LQA40W4-☐☐
Input		
Input Filter		Pi type
Input Voltage Range		40V-160VDC
Start-Up Time (100% load at nominal Vin)		50ms
Start-Up Voltage (0%-100% load)		40VDC
Under Voltage Lockout (0%-100% load)		34VDC
Input Surge Voltage		200VDC
Remote ON/OFF	DC-DC ON	Open or 3.5 < Vr < 12VDC
	DC-DC OFF	Short or 0 < Vr < 1.2VDC
Output		
Voltage Accuracy		± 1% (100% Load at Nominal Vin)
Line Regulation (LL to HL 100% load)		± 0.2%
Load Regulation (0% to 100% Load)		± 0.5%
Ripple & Noise (20MHZ BW at Vin range 0%~100% load, with a 1μF/50V X7R MLCC)		100 mVp-p (5V)
		150 mVp-p (12V, 24V)
		200 mVp-p (48V)
Minimum Load		0%
Voltage Adjustability		± 10%
Operating Frequency		250 KHz @ 100% Load at nominal Vin
Environment		
Operating Temperature		-40-+105 ˚C with derating
Storage Temperature		-55-+125 ˚C
Max. Case Temperature		110˚C
Temperature Coefficient		± 0.05%/ ˚C

Relative Humidity		5%-95% RH
MTBF (MIL-HDBK-217F)		779K Hours (25℃)
Vibration		EN61373
Function		
Isolation Voltage		3 KVDC 1min. Input to Output
Isolation Resistance		1000 MΩ @ 500VDC
Isolation Capacitance		1500 pF
Short Circuit Protection		Continuous,automatic Recovery
Over Load Protection		175%
Over Voltage Protection (Zener Diode Clamp)	5V output	5.6-8.0VDC
	12V output	13.4-19.2VDC
	24V output	26.9-38.4VDC
	48V output	53.8-76.8VDC
Over Temperature Protection		115 ˚C TC (Case Temperature)
Safety Approvals		EN62368-1/ IEC62368-1/ EN50155/ EN55032&35
Physical		
Case Material		Metal Case
Potting Material		Silicone (94V-0)
Cooling Method		Natural convection
Dimension		50.8(L) x 25.4(W) x 10.5(H) mm
Weight		45 g
Electromagnetic Compatibility		
Electromagnetic Interference		EN 55032, EN55011(Class A/B)
Electrostatic Discharge		IEC 61000-4-2, Air±8kV; Contact±6kV (Criteria A)
Radiated Immunity		IEC 61000-4-3, 10V/m (Criteria A)
Electrical Fast Transient		IEC 61000-4-4, ±2kV (Criteria A)
Surge Immunity		IEC 61000-4-5, ±2kV (Criteria A)
Conducted Immunity		IEC 61000-4-6, 10V/m (Criteria A)
Magnetic Field Immunity		IEC 61000-4-8, 10A/m(Criteria A)

Notes

#1: EMI class A without external circuit, and class B suggestion circuit, please check suggestion circuit.

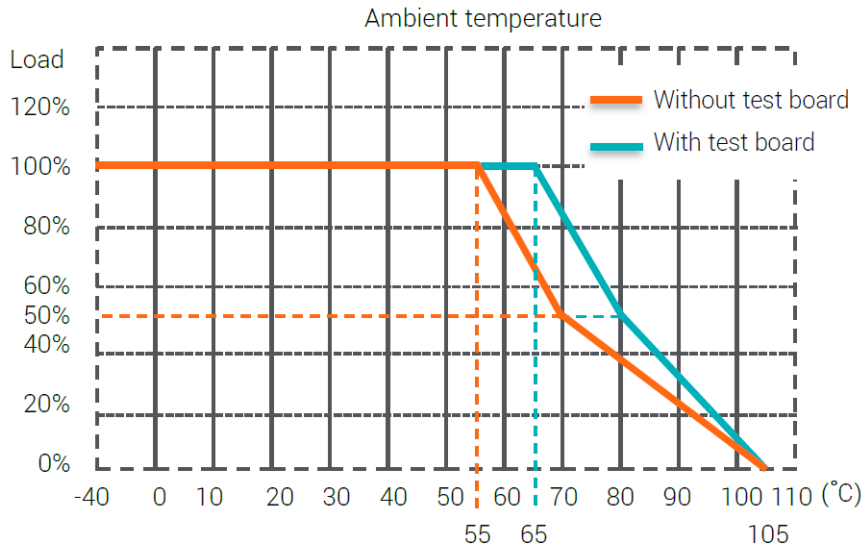
#2: External input capacitor required 680μF/100V.

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

#4: Derating measured with nominal line. Mounted test board
(90 x 80 mm and each power pin with 43 x 40 mm, 2Oz double layer)

Mechanical Specification

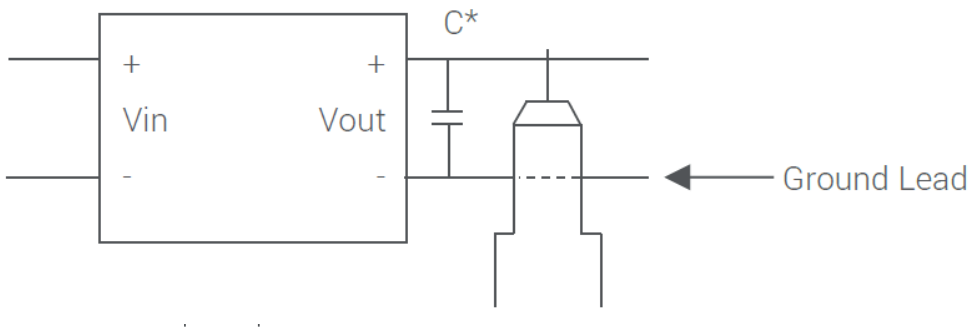
Derating Curve



The derating curve was measured at nominal Vin in chamber with nature convection.

The derating curve was measured with nominal line. Mounted test board (600*950mm , 2Oz)

Ripple & Noise Measure Method



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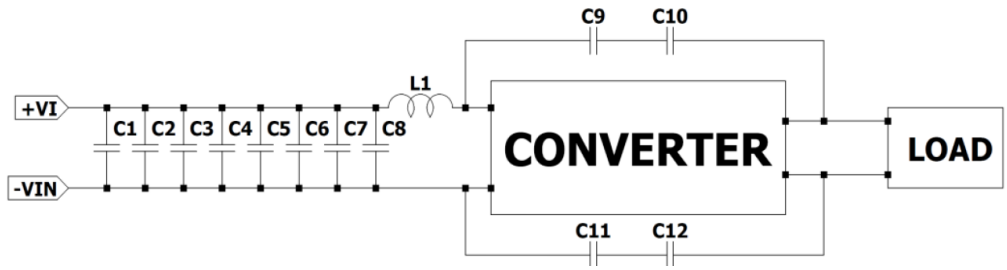
RCB40WR4-11005 and RCB40WR4-11012 measured with 20MHZ BW at Vin range 15%~100% load With a 47μF X7R MLCC.

RCB40WR4-11024 and RCB40WR4-11048 measured with 20MHZ BW at Vin range 15%~100% load With a 10μF X7R MLCC.

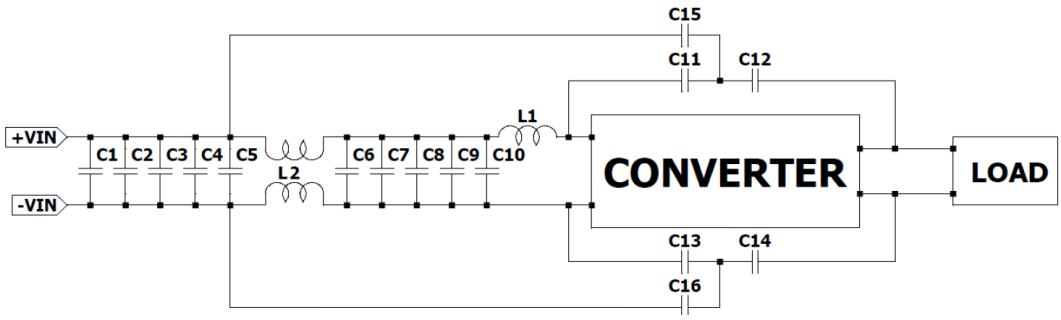
EMI Filtering-Suggestion for Class B

EN55032 CLASS A



Vin	L1	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12
110V	68 µH	0.68 µF	0.68 µF	0.68 µF	0.68 µF	0.68 µF	0.68 µF	0.68 µF	0.68 µF	4700 pF	4700 pF	4700 pF	4700 pF

EN55032 CLASS B



Vout	L1	L2	C1	C2	C3	C4	C5	C6	C7
05/12V	68 µH	2.2 mH	0.68 µF	0.68 µF	0.68 µF	0.68 µF	0.68 µF	0.68 µF	0.68 µF
24/48V	68 µH	2.2 mH	0.68 µF	0.68 µF	0.68 µF	0.68 µF	0.68 µF	0.68 µF	0.68 µF
Vout	**C8**	**C9**	**C10**	**C11**	**C12**	**C13**	**C14**	**C15**	**C16**
05/12V	0.68 µF	0.68 µF	0.68 µF	4700 pF	4700 pF	4700 pF	4700 pF	47 pF	47 pF
24/48V	0.68 µF	0.68 µF	0.68 µF	4700 pF	4700 pF	4700 pF	4700 pF	33 pF	33 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: $Rd=\frac{bR_1}{R_1-b}-R_3$ $b=\frac{V_o'-V_{ref}}{V_{ref}}\cdot R_2$

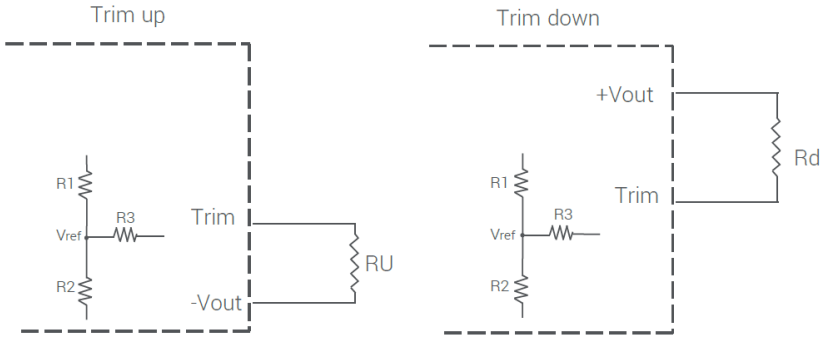
Note:

1.Ru, Rd is mean trim resistor, please check the formula.

2.a & b: user define parameter, no actual meanings.

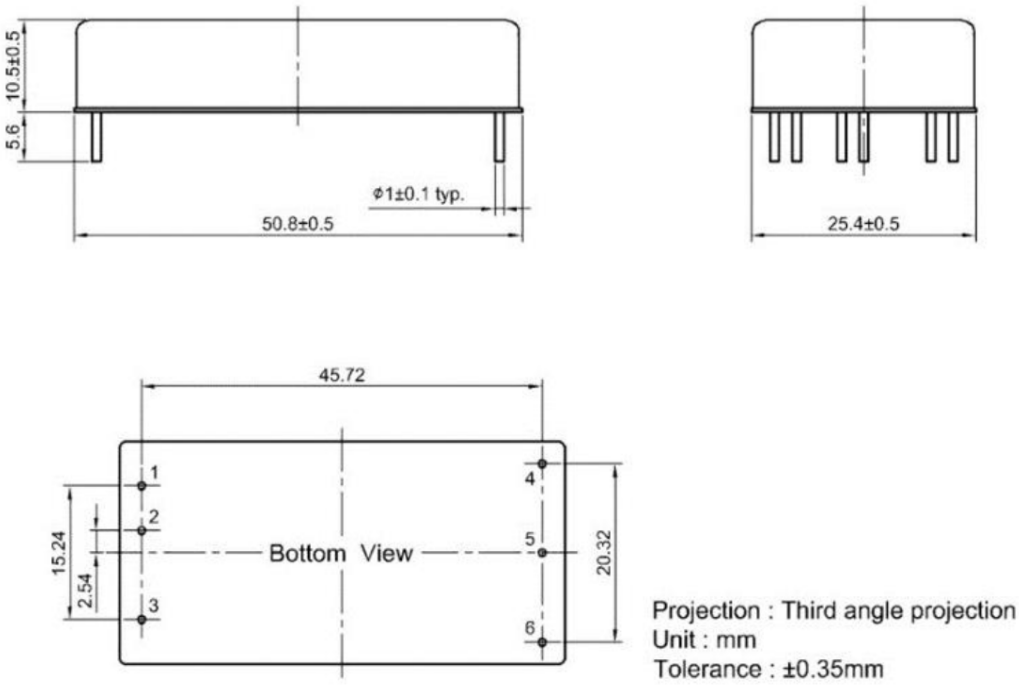
3. V_o' is mean trim up/down voltage.

4. Value for R1, R2, R3 and Vref refer to below table.



Vin	Vout	Vref	R1	R2	R3
110V	5V	1.24V	15.47KΩ	5.1KΩ	30.0KΩ
110V	12V	2.50V	38.0KΩ	10.0KΩ	68.0KΩ
110V	24V	2.50V	86.0KΩ	10.0KΩ	76.8KΩ
110V	48V	2.50V	182.0KΩ	10.0KΩ	80.6KΩ

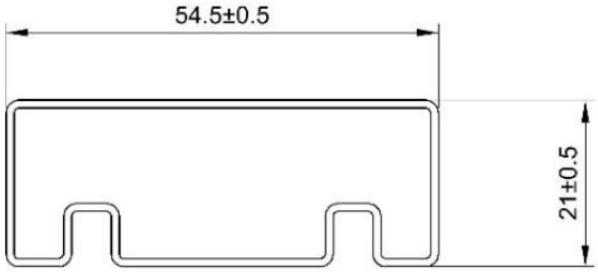
Mechanical Dimension & Pinning



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

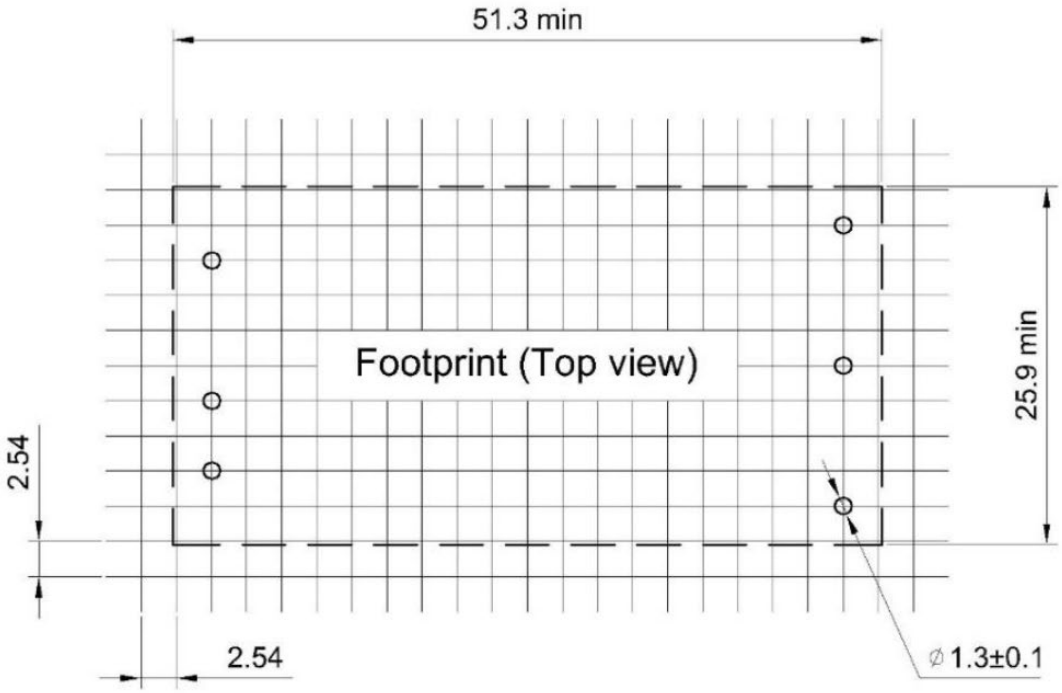
Package

Anti-static liquid tube



UNIT:mm
1 Tube = 18 pcs
Length:520±2mm

Recommend Footprint



Unit: mm