300W Half Brick Package DC/DC Converter

LRA300W Series

Learn More

Description

The LRA300W series is a compact 300W isolated DC-DC converter housed in a half brick package, supporting wide nominal input voltages of 24VDC. It provides stable single outputs from 12V to 48V with efficiencies up to 89.5%, high isolation up to 3kVDC, and reliable operation from −40°C to +105°C. Designed to meet EN62368-1 standards, it is ideal for industrial control, Datacom and Automation and Railway applications.

Features

- Wide 4:1 input range voltage
- 300W power in industrial standard half brick package
- Wide operating temperature from -40˚C to +100˚C
- Continuous short circuit protection
- Over temperature protection, Over voltage/ current protection, input under voltage lockout, and remote ON/OFF control function
- Fixed switching frequency
- Design meet EN62368-1 standard

Applications

- Industry Control System
- Battery Mangement System
- Datacom Application
- Industrial Application
- Automation Application
- Electric Power
- Railway Solution

Model Numbering

LRA 300 W 4 – 24 12

- 12 → Output Voltage: 12V / 15V / 24V/ 48V
- 24 → Input Voltage: 24V
- 4 → Input Range: 4:1 (9~36VDC)
- 300 W → Wattage: 150W
- LRA → Series Name

Model Selection Guide

Part No.	Input Voltage	Output Voltage	Output Current @ Full Load	Ripple & Noise (1)	No-Load Input Current	Efficiency (2) (Typ.)	Capacitor Load (3) (Max.)
LRA300W4-2412	9-36 VDC Nom. 24VDC	12VDC	25000mA	120mVp-p	50mA	86.5%	8800μF
LRA300W4-2415		15VDC	20000mA	150mVp-p	50mA	87%	8800μF
LRA300W4-2424		24VDC	12500mA	300mVp-p	50mA	86%	4300μF
LRA300W4-2448		48VDC	6250mA	480mVp-p	70mA	87%	1500μF

Notes

#1: Ripple & Noise measured with 20MHZ BW at nominal input voltage 0%~100% load with E-cap 47μF/100V +X7R MLCC 0.47μF/100V.

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

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

#4: Special input and output voltage combinations available by request, please check with our sales.

Electrical Specification

Model Number		LRA300W4-☐☐
Input		
Input Filter		LC type
Input Voltage Range		9V-36VDC
Start-Up Time (100% load at 48 Vin)		200ms
Start-Up Voltage (0%-100% load)		9VDC
Under Voltage Lockout (0%-100% load)		7VDC
Input Surge Voltage (0.1s Max)		50VDC
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%
Minimum Load		0%
Voltage Adjustability (0%~100% load at Vin range Pout≦max rated power)		± 10% (24Vout)
		± 10% (12V/ 15Vout at 12~36Vin range)
		- 10% ~ +15% (48V at 12~36Vin range)
Temperature Coefficient		0.05%/ ˚C
Transient Response Recovery Time		500μs
Operating Frequency		250 KHz @ 100% Load at nominal Vin
Environment		
Operating Temperature		-40-+100 ˚C with derating
Storage Temperature		-55-+125 ˚C

Baseplate Temperature		105˚C
Relative Humidity		5%-95% RH
MTBF (MIL-HDBK-217F)		600 KHours (25˚C)
Vibration		MIL-STD-202G
Function		
Isolation Voltage		3000VDC (60 sec., Input to output; DC Isolation cut-off current: 1mA)
		2000VDC (AC Isolation cut-off current: 5mA)
		1600VDC (60 sec., Input to case; DC Isolation cut-off current: 1mA)
		1000VDC (AC Isolation cut-off current: 5mA)
Isolation Resistance		1000 MΩ
Isolation Capacitance		4700 pF
Short Circuit Protection		Continuous, Automatic recovery
Over Load Protection		150%
Over Voltage Protection (Shut Down)	12V output	13.4-19.2VDC
	15V output	16.8-24.0VDC
	28V output	26.9-38.4VDC
	48V output	56.2-67.2VDC
Short Circuit Protection		Continuous, automatic recovery
Over Temperature Protection		110 ˚C TC (Case Temperature)
Safety Standard		Meet EN62368-1
Physical		
Case Material		Aluminum Baseplate with Plastic
Potting Material		Silicone (94V-0)
Cooling Method		Natural convection
Dimension		57.9(L) x 61.0(W) x 12.7(H) mm
Weight		120 g

Electromagnetic Compatibility	
Electromagnetic Interference	EN 55032 (Class A/B) with external filter
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[1]	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

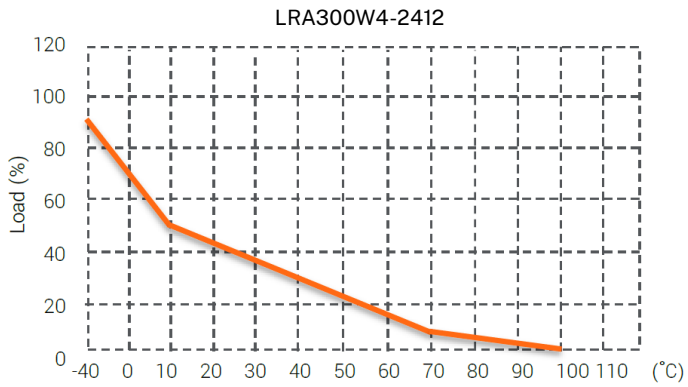
#1: External input capacitor required 1000μF/ 100V.

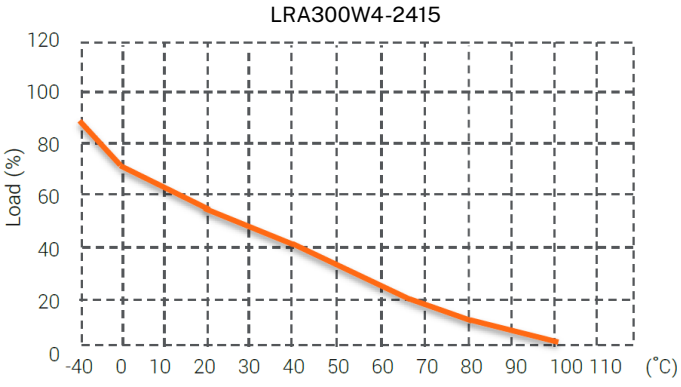
#2: All specifications valid at nominal input voltage, full load and 25°C after warm-up time unless otherwise stated.

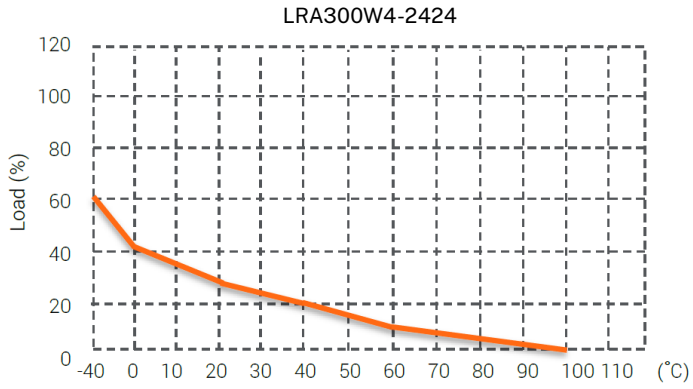
#3: The product information and specifications are subject to change without prior notice.

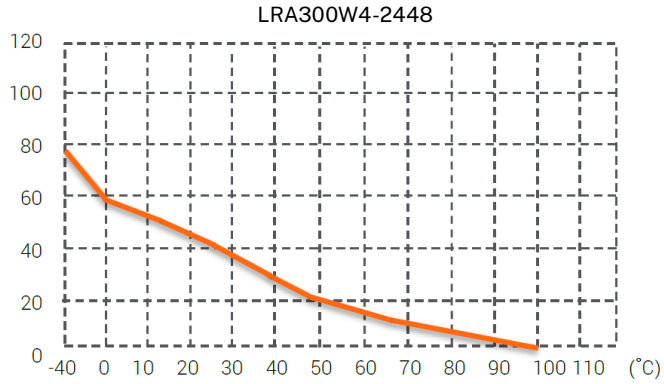
Mechanical Specification

Derating Curve



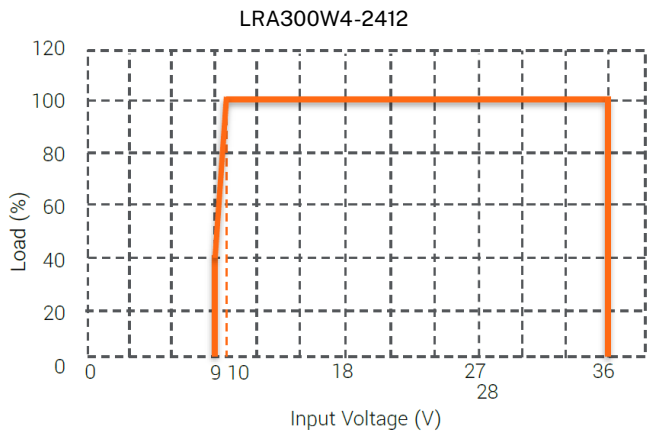


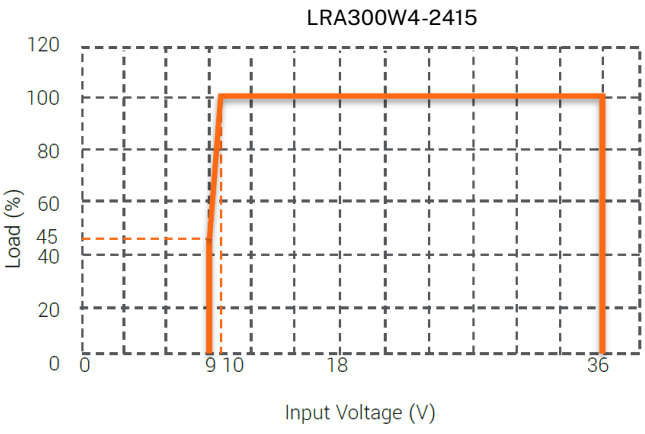




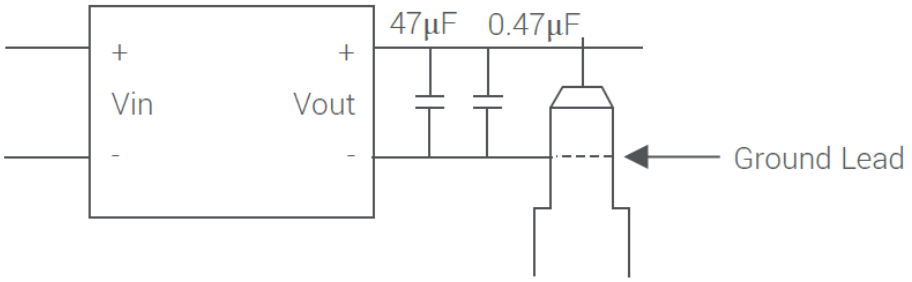
The derating curve was measured at nominal input voltage with natural convection.

Derating curve for input voltage



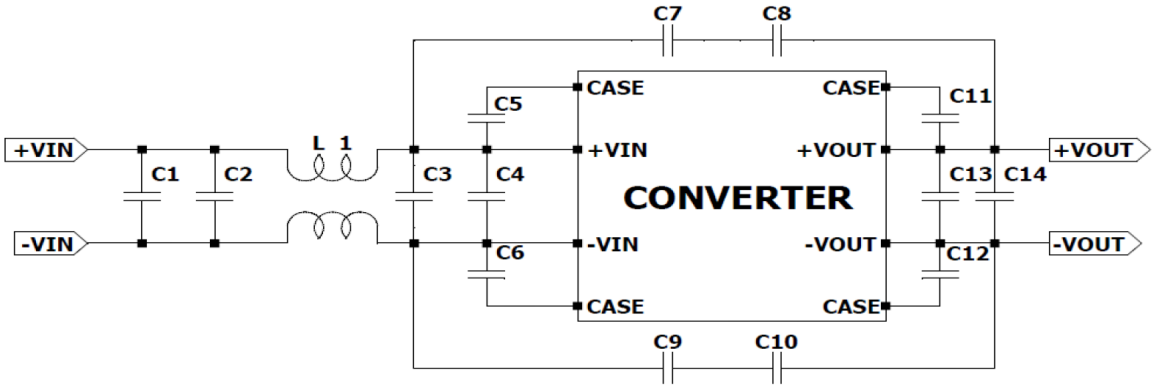


Ripple & Noise Measure Method



Measured with 20MHz bandwidth and E-Cap 47μF/100V +X7R MLCC 0.47μF/100V

EMI Filtering-Suggestion for EN55032



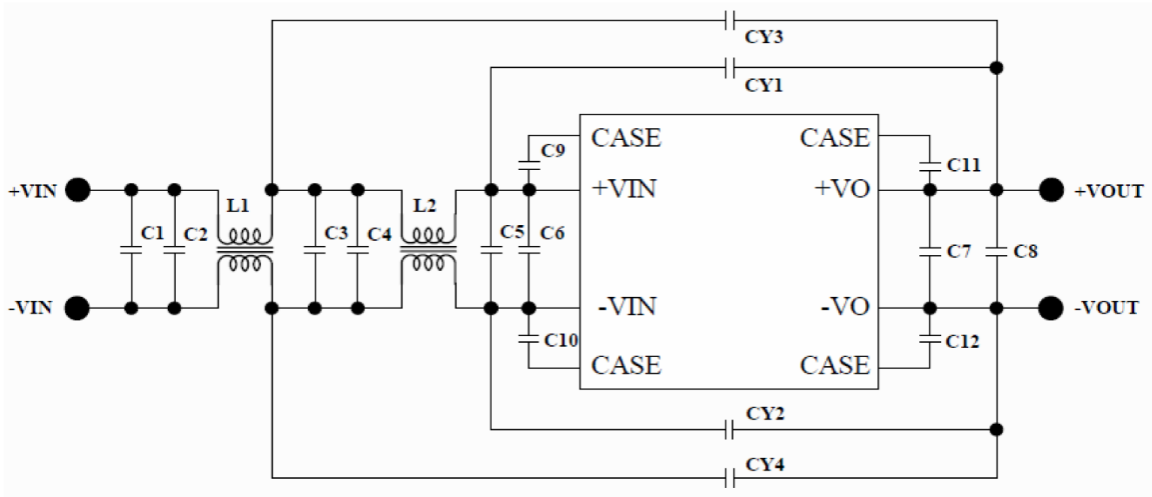
EMI CLASS A - LRA300W4-2412, LRA300W4-2415

C1	C2	C3	C4	C5	C6	C7	C8
KYA 220μF/ 100VDC	MLCC 1μF/ 50VDC	KYA 220μF/ 100VDC	MLCC 1μF/ 50VDC	MLCC 4700PF/ 2KVDC x 4	MLCC 4700PF/ 2KVDC x 4	MLCC 4700PF/ 2KVDC	MLCC 4700PF/ 2KVDC
C9	**C10**	**C11**	**C12**	**C13**	**C14**	**L1**	
MLCC 4700PF/ 2KVDC	MLCC 4700PF/ 2KVDC	MLCC 4700PF/ 2KVDC x 4	MLCC 4700PF/ 2KVDC x 4	MLCC 47μF/ 50VDC	MLCC 0.1μF/ 50VDC	A10 T22X14X10 1.3mH	

EMI CLASS A - LRA300W4-2448

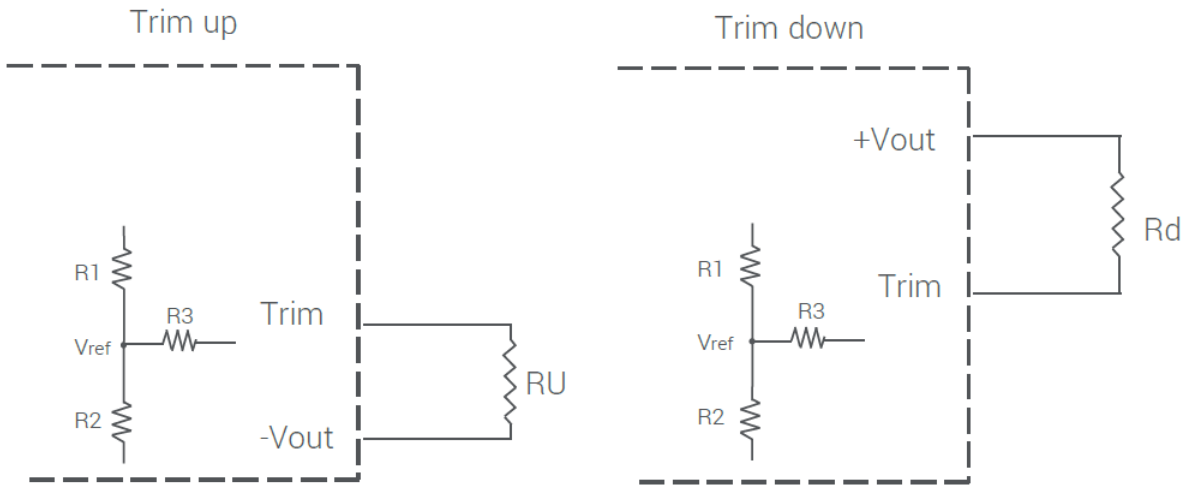
C1	C2	C3	C4	C5	C6	C7	C8
KYA 220μF/ 100VDC	MLCC 1μF/ 50VDC	KYA 220μF/ 100VDC	MLCC 1μF/ 50VDC	MLCC 4700PF/ 2KVDC x 6	MLCC 4700PF/ 2KVDC x 6	MLCC 4700PF/ 2KVDC	MLCC 4700PF/ 2KVDC
C9	**C10**	**C11**	**C12**	**C13**	**C14**	**L1**	
MLCC 4700PF/ 2KVDC	MLCC 4700PF/ 2KVDC	MLCC 4700PF/ 2KVDC x 6	MLCC 4700PF/ 2KVDC x 6	MLCC 4.7μF/ 100VDC	MLCC 0.1μF/ 100VDC	A10 T22X14X10 1.3mH	

EMI CLASS A - LRA300W4-2424



C1	C2	C3	C4	C5	C6	C7	C8	C9
KYA 220μF/ 100VDC	MLCC 1μF/ 50VDC	KYA 220μF/ 100VDC	MLCC 1μF/ 50VDC	KYA 220μF/ 100VDC	MLCC 1μF/ 50VDC	MLCC 4.7μF/ 50VDC	MLCC 0.1μF/ 50VDC	MLCC 2200PF/ 3KVDC
C10	**C11**	**C12**	**CY1**	**CY2**	**CY3**	**CY4**	**L1**	**L2**
MLCC 2200PF/ 3KVDC	MLCC 2200PF/ 3KVDC	MLCC 2200PF/ 3KVDC	MLCC 2200PF/ 3KVDC x 5 Parallel	MLCC 2200PF/ 3KVDC x 5 Parallel	NC	NC	A10 T22X14X10 1.3mH	A10 T22X14X10 1.3mH

External Output 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.

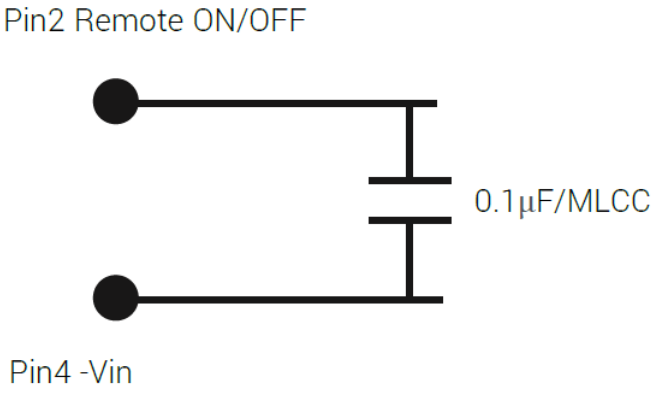
2.a & b: user define parameter, no actual meanings.

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

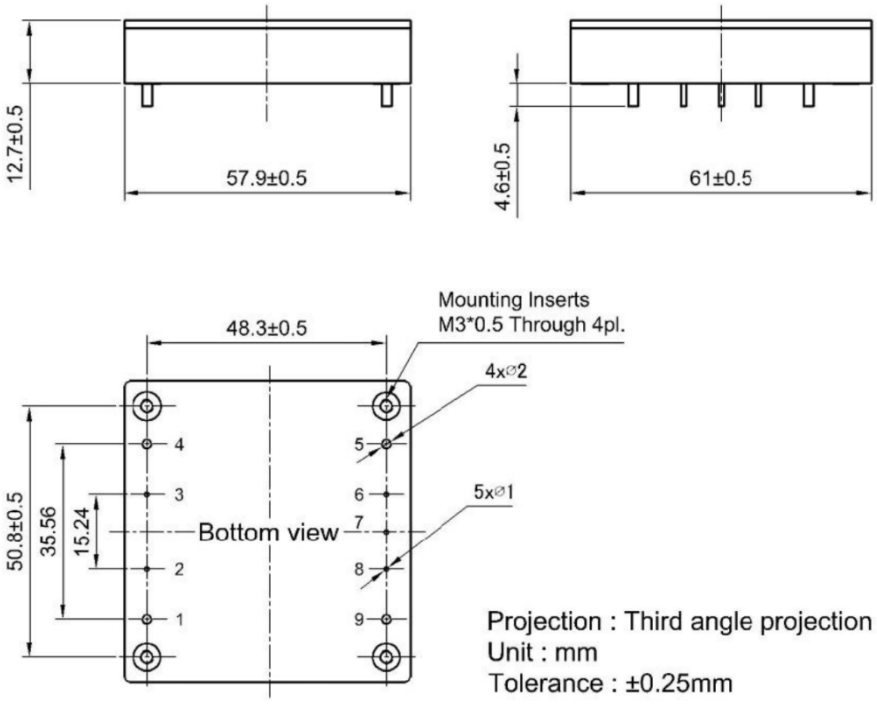
4. Value for R1, R2, R3 and Vref refer to below table.

Vout	Vref	R1	R2	R3
12V	2.5V	38KΩ	10KΩ	68KΩ
15V	2.5V	50KΩ	10KΩ	68KΩ
24V	1.24V	103KΩ	5.6KΩ	51KΩ
48V	2.5V	36.4KΩ	2KΩ	12.4KΩ

Remote ON/OFF Control



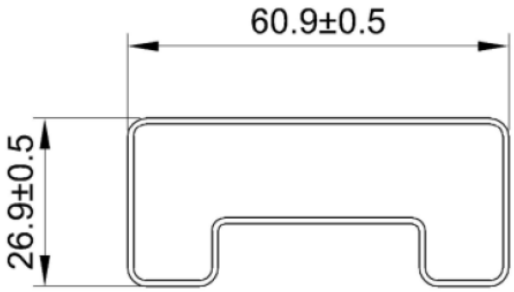
Mechanical Dimension & Pinning



Pin	Function
1	+Vin
2	Ctrl
3	Case
4	-Vin
5	-Vout
6	-Sense
7	Trim
8	+Sense
9	+Vout

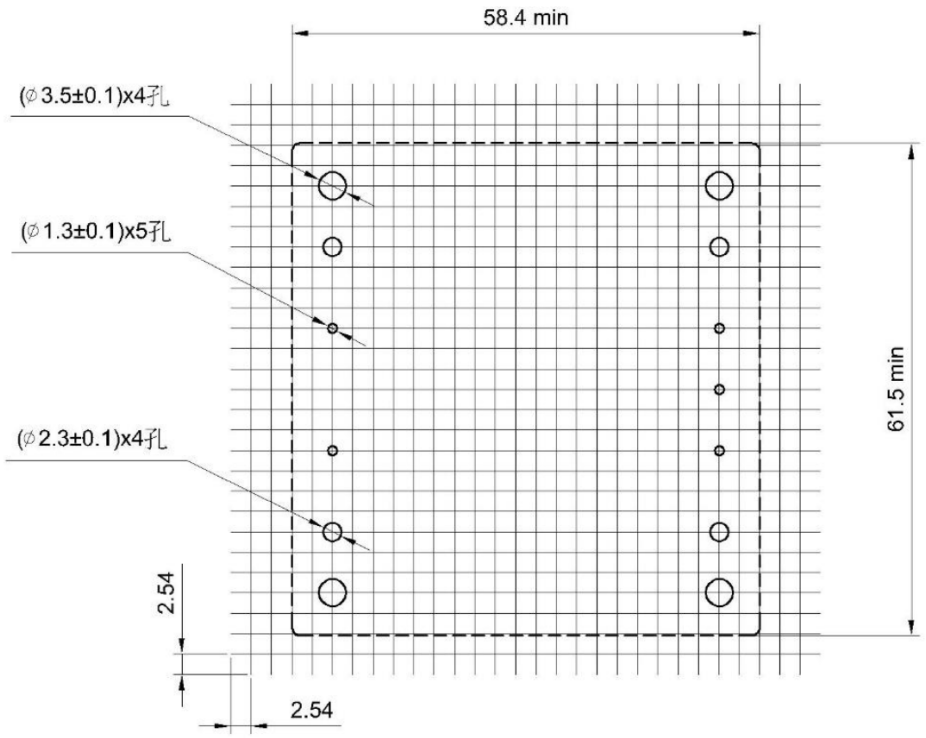
Package

Anti-static liquid tube



UNIT:mm
1 Tube = 7 pcs
Length:520±2mm

Recommend Footprint



Footprint (Top view)