150W Half Brick Package DC/DC Converter

LRA150W Series

Learn More

Description

The LRA150W series is a compact 150W isolated DC-DC converter housed in a half brick package, supporting wide nominal input voltages of 48VDC. It provides stable single outputs from 12V to 54V 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, IEC60950 and EN50155 standards, it is ideal for industrial control, Datacom and Automation applications.

Features

- Ultra wide range voltage from 9-75Vdc
- 150W power in industrial standard half brick package
- Wide operating temperature from -40˚C to +105˚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
- UL62368/ IEC62368/ IEC60950/ EN62368/ EN50155 safety approved
- 3KV isolation

Applications

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

Model Numbering

LRA 150 W 8 – 48 12

- 12 → Output Voltage: 12V / 24V / 28V / 48V / 54V
- 48 → Input Voltage: 48V
- 8 → Input Range: 8:1 (9~75 VDC)
- 150 W → Wattage: 150W
- LRA → 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	Ripple & Noise	Efficiency [1] (Typ.)	Capacitor Load [2] (Max.)
LRA150W8-4812	9-75 VDC Nom. 48VDC	12VDC	12500mA	120mVp-p	89.5%	5000μF
LRA150W8-4824		24VDC	6250mA	240mVp-p	88.5%	2000μF
LRA150W8-4828		28VDC	5357mA	240mVp-p	89.0%	1500μF
LRA150W8-4848		48VDC	3125mA	240mVp-p	88.5%	1000μF
LRA150W8-4854		54VDC	2778mA	240mVp-p	89.0%	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: Special input and output voltage combinations available by request, please check with our sales.

Electrical Specification

Model Number		LRA150W8-☐☐
Input		
Input Filter		Pi type
Input Voltage Range		9V-75VDC
No Load Input Current		35mA (Vout ≦ 28Vdc)
		75mA (Vout = 48,54Vdc)
Start-Up Time (100% load at 48 Vin)		200-400ms
Start-Up Voltage		9VDC
Under Voltage Lockout (0%-100% load)		8VDC typ. 7-8.8VDC
Input Surge Voltage (0.1s Max)		100VDC
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		± 10%
Transient Response Recovery Time		500μs
Operating Frequency		200 KHz @ 100% Load at nominal Vin
Environment		
Operating Temperature		-40-+105 ˚C with derating
Storage Temperature		-55-+125 ˚C
Baseplate Temperature		110˚C
Over Temperature Protection		115˚C

Temperature Coefficient		± 0.05%/ ˚C
Relative Humidity		5%-95% RH
MTBF (MIL-HDBK-217F)		1000 KHours (25˚C)
Vibration		MIL-STD-202G
Function		
Isolation Voltage		3 KVDC 1min. Input to Output
Isolation Resistance		1000 MΩ @ 500VDC
Isolation Capacitance		3500 pF
Short Circuit Protection		Continuous, Automatic recovery
Over Load Protection		150%
Over Voltage Protection (Shut Down)	12V output	13.4-18.0VDC
	15V output	26.9-36.0VDC
	28V output	31.4-42.0VDC
	48V output	53.8-72.0VDC
	54V output	60.5-81.0VDC
Short Circuit Protection		Continuous, automatic recovery
Safety Approvals		EN62368-1/ IEC62368-1/ IEC60950/ EN50155/ EN55032&35
Physical		
Case Material		Plastic
Potting Material		Silicone (94V-0)
Cooling Method		Natural convection
Dimension		57.9(L) x 61.0(W) x 12.7(H) mm
Weight		109 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[1]		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

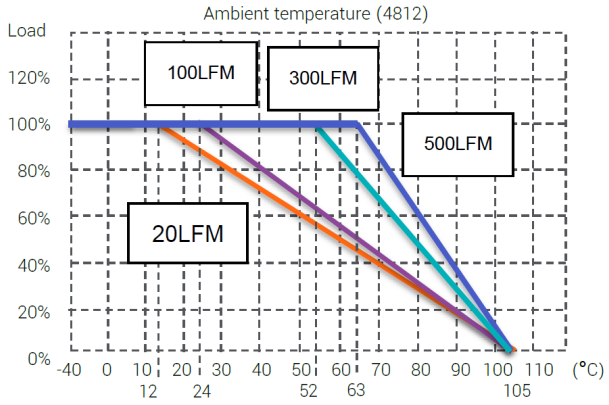
#1: External input capacitor required 1000μF/ 100V.

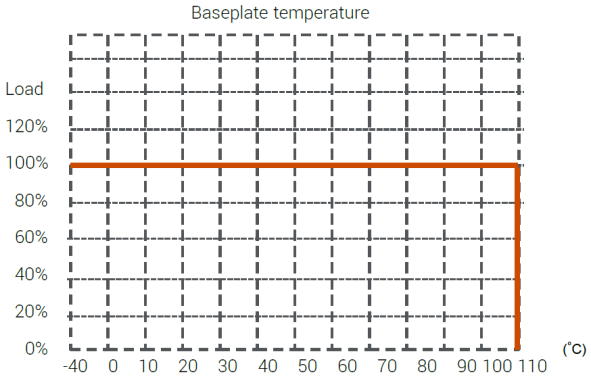
#2: All specifications valid at nominal input voltage, full load and 25°C after warm-up time unless otherwise stated.

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

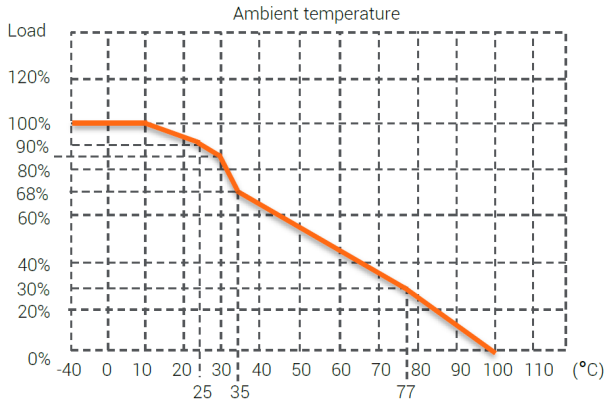
Mechanical Specification

Derating Curve



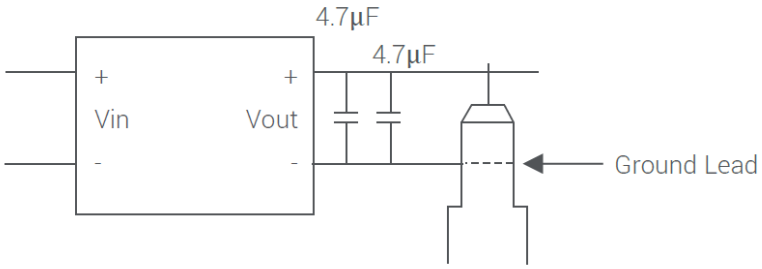


The derating curve was measured at 48V input in chamber.



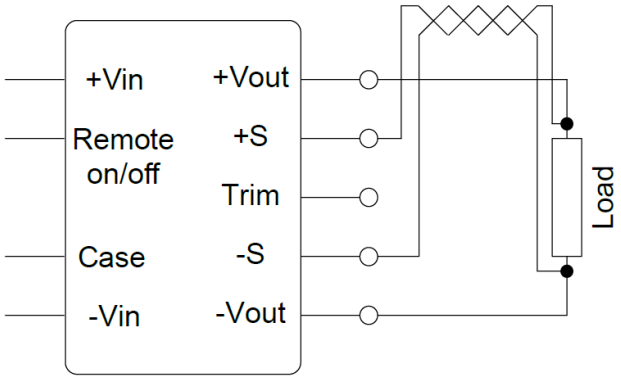
The derating curve was measured with heat sink.

Ripple & Noise Measure Method

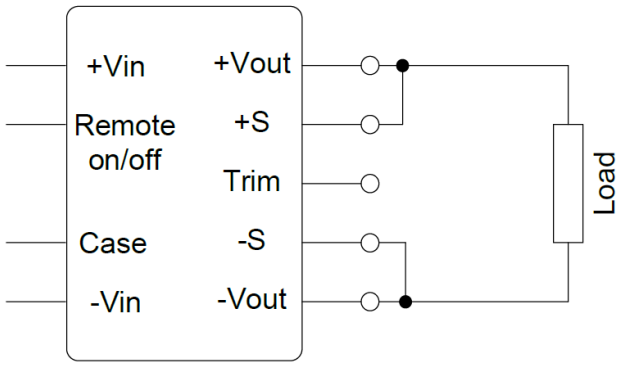


Measured with 20MHz bandwidth and 4.7µF+4.7µF ceramic

Remote Sense Application

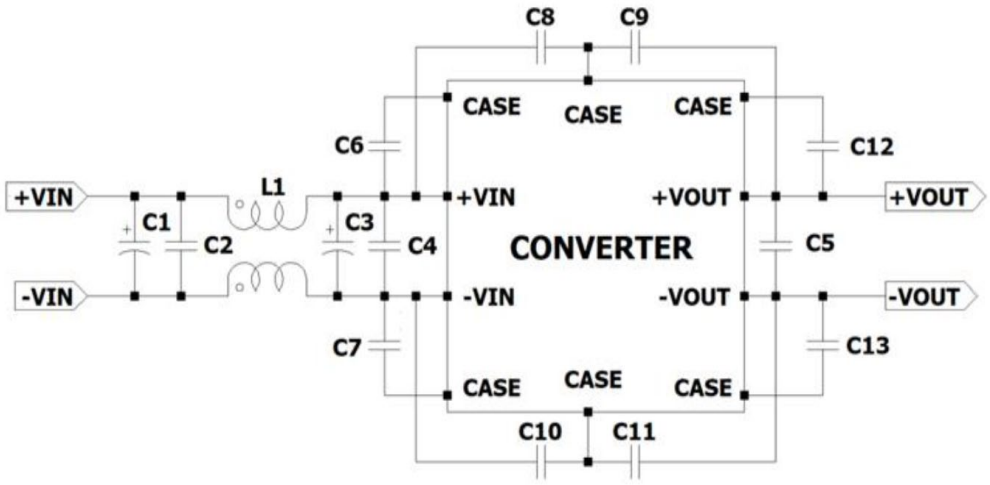


(a) With Remote Sense



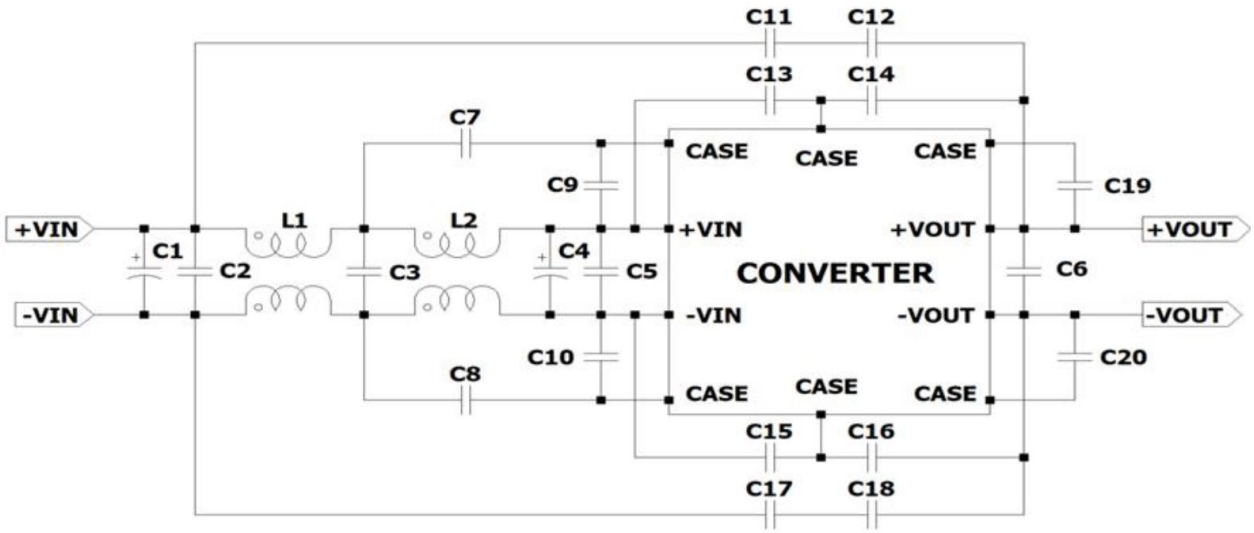
(b) Without Remote Sense

EMI Filtering-Suggestion for EN55032 Class A



Vout	C1	C2	L1	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
12V	220 µF	2.2 µF	2.2 µF	220 µF	2.2 µF	4.7 µF* 2	4700 pF +2200 pF	4700 pF +2200 pF	4700 pF	2200 pF	4700 pF	2200 pF	4700 pF +2200 pF	4700 pF +2200 pF
24V	220 µF	2.2 µF	2.2 µF	220 µF	2.2 µF	4.7 µF* 2	4700 pF +2200 pF	4700 pF +2200 pF	4700 pF	2200 pF	4700 pF	2200 pF	4700 pF +2200 pF	4700 pF +2200 pF
28V	220 µF	2.2 µF	2.2 µF	220 µF	2.2 µF	4.7 µF* 2	4700 pF +2200 pF	4700 pF +2200 pF	4700 pF	2200 pF	4700 pF	2200 pF	4700 pF +2200 pF	4700 pF +2200 pF
48V	220 µF	2.2 µF	2.2 µF	220 µF	2.2 µF	4.7 µF* 2	4700 pF	4700 pF	4700 pF	3300 pF	4700 pF	3300 pF	4700 pF	4700 pF
54V	220 µF	2.2 µF	2.2 µF	220 µF	2.2 µF	4.7 µF* 2	4700 pF	4700 pF	4700 pF	3300 pF	4700 pF	3300 pF	4700 pF	4700 pF

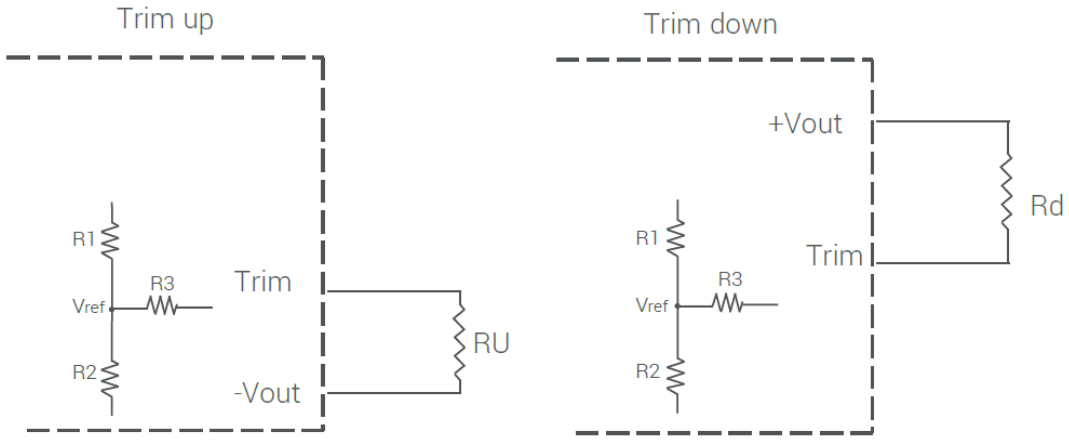
EMI Filtering-Suggestion for EN55032 Class B



Vout	C1	C2	L1	C3	L2	C4	C5	C6	C7	C8	C9
12V	220 µF	2.2 µF	2.2 mH	2.2 µF	2.2 mH	220 µF	2.2 µF	4.7 µF*2	4700 pF*3	4700 pF*3	None
24V	220 µF	2.2 µF	2.2 mH	2.2 µF	2.2 mH	220 µF	2.2 µF	4.7 µF*2	4700 pF*3	4700 pF*3	None
28V	220 µF	2.2 µF	2.2 mH	2.2 µF	2.2 mH	220 µF	2.2 µF	4.7 µF*2	4700 pF*3	4700 pF*3	None
48V	220 µF	2.2 µF	2.2 mH	2.2 µF	2.2 mH	220 µF	2.2 µF	4.7 µF*2	4700 pF*3	4700 pF*3	4700 pF
54V	220 µF	2.2 µF	2.2 mH	2.2 µF	2.2 mH	220 µF	2.2 µF	4.7 µF*2	4700 pF*3	4700 pF*3	None

Vout	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20
12V	None	15 pF	15 pF	4700 pF	4700 pF	4700 pF	4700 pF	15 pF	15 pF	4700 pF*3	4700 pF*3
24V	None	10 pF	10 pF	4700 pF*2	4700 pF	4700 pF*2	4700 pF	10 pF	10 pF	4700 pF*3	4700 pF*3
28V	None	10 pF	10 pF	4700 pF*2	4700 pF	4700 pF*2	4700 pF	10 pF	10 pF	4700 pF*3	4700 pF*3
48V	470 pF	15 pF	15 pF	4700 pF*3	4700 pF	4700 pF*3	4700 pF	15 pF	15 pF	4700 pF*3	4700 pF*3
54V	None	15 pF	15 pF	4700 pF*3	4700 pF	4700 pF*3	4700 pF	15 pF	15 pF	4700 pF*3	4700 pF*3

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:

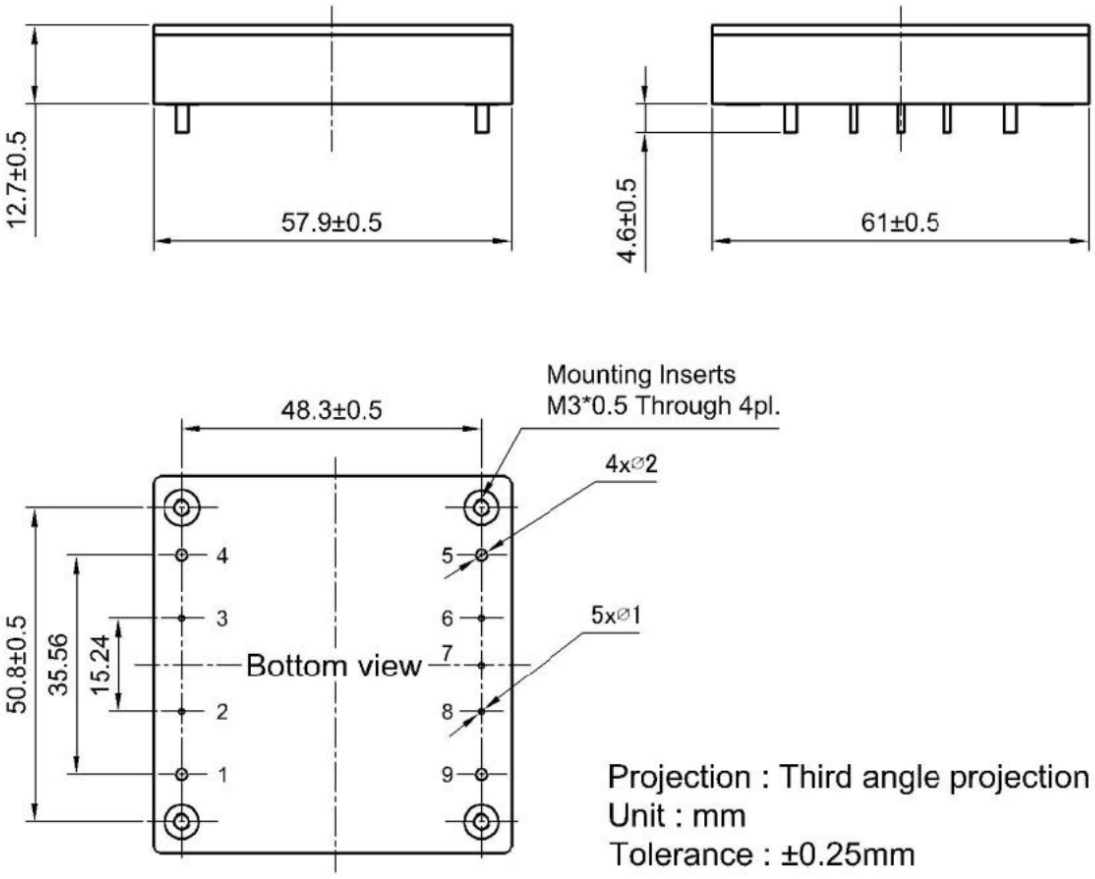
1.Ru, Rd is mean trim resistor, please check the formula.

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

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

Vout	Vref	R1	R2	R3
12V	2.5V	38K	10K	68K
24V	2.5V	86K	10K	76.8K
28V	2.5V	102K	10K	76.8K
48V	2.5V	182K	10K	80.6K
54V	2.5V	206.1K	10K	82K

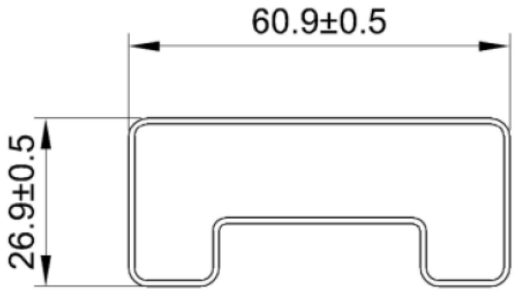
Mechanical Dimension & Pinning



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

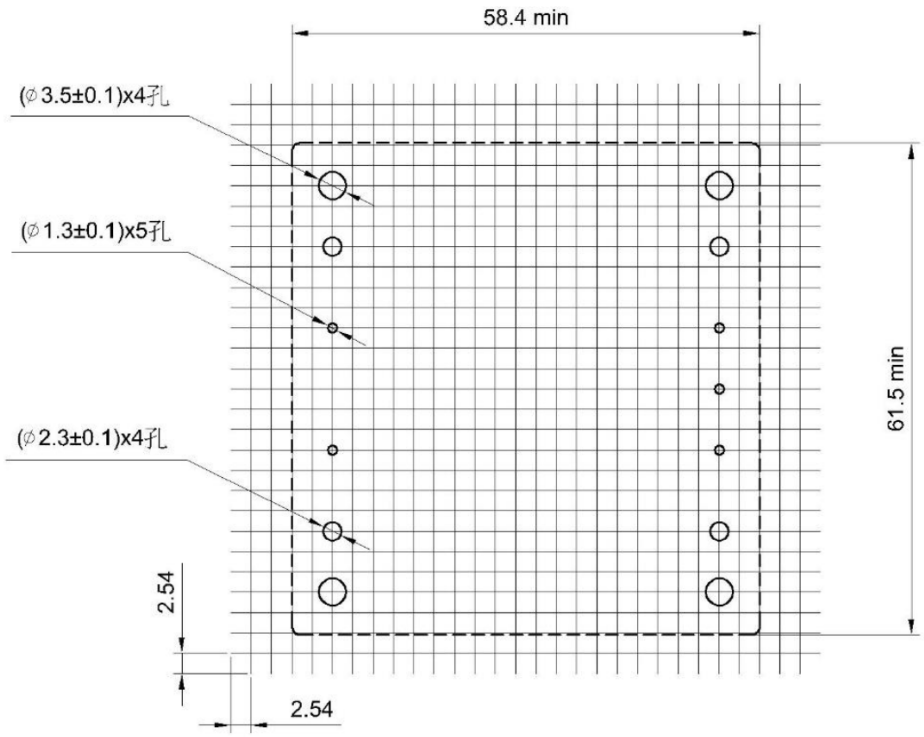
Package

Anti-static liquid tube



UNIT:mm
1 Tube = 7 pcs
Length:520±2mm

Recommend Footprint



Footprint (Top view)