

## MGV High Current Molded SMT Power Inductors MGV0502 Series

### FEATURES AND APPLICATIONS

Laird MGV series high current power inductors improve performance, reliability and power efficiency. A lower profile benefits consumer electronics and telecom design. Products feature extremely low DCR with greater efficiency and enable a large current in a small size. Inductors are of magnetic shielding and molded construction and perform in operating temperatures ranging from -40 C to 125 C including self-heating rise in temperature.

#### FEATURES

- Magnetic shielded structure
- Low DCR and high efficiency
- Low profile and miniaturization
- High reliability

#### APPLICATIONS

- DC-DC Converter and Power Suppliers
- LCD TV'S and Gaming Console
- Tablet, Notebooks, Servers and Printers
- Networking and Data storage
- GPS, Set-top-box and Base stations
- Smart meters and Medical instruments



#### PART NUMBER EXPLANATION

MGV 0502 4R7 M - 10

| Product series code | Product size code | Inductance value code (i.e. 4R7: 4.7 $\mu$ H) | Tolerance % (i.e. M: $\pm$ 20%) | Standard Catalog P.N |
|---------------------|-------------------|---|---------------------------------|----------------------|
| MGV                 | 0502              | 4R7   | M                               | 10                   |

**Note:** Automotive grade parts are also available, a specific P.N will be assigned upon request. Please contact laird local sales for details.

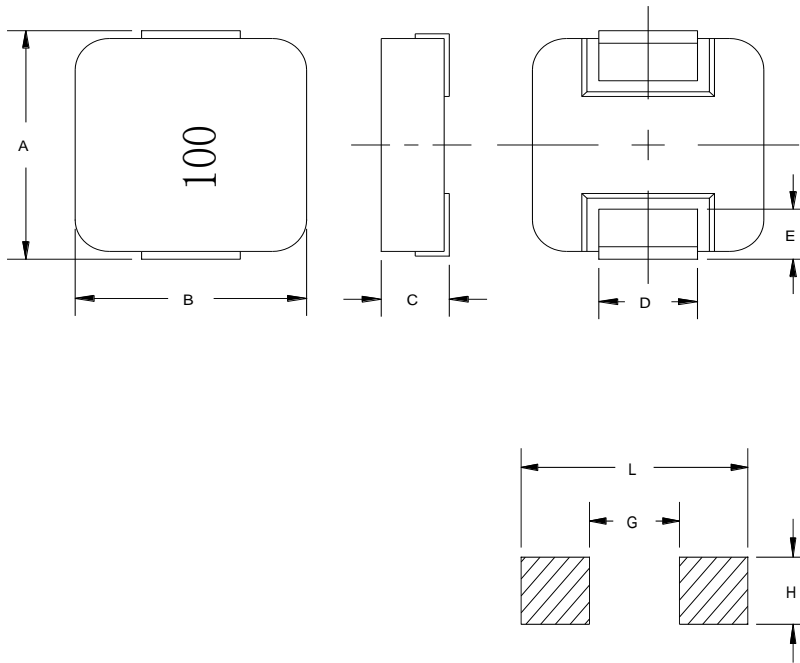
#### ELECTRICAL SPECIFICATIONS

- Tolerance: M:  $\pm$ 20% or N:  $\pm$ 30%
- Inductance tested at 100KHz, 1.0V
- Heat Rated Current (I<sub>rms</sub>) is defined based on temperature rise approximate 40°C without core loss (ambient temperature 25 $\pm$ 5°C)
- Saturation Current (I<sub>sat</sub>) is the DC current at which the inductance drops off approximately 30% from its value without current. (ambient temperature 25 $\pm$ 5°C)
- Operating temperature range: -40°C~+125°C (including self-heating temperature rise)
- Storage temperature range (packaging conditions): -10°C~+40°C and RH 60%(MAX.)

**Note:** Heat Rated Current (I<sub>rms</sub>) is tested on a typical PCB and apply a constant current in still air. The temperature rise is dependent on the application system condition including PCB PAD pattern, trace width and thickness and adjacent components etc. It's suggested to verify the temperature rise of the component under the real operation application conditions.

**SPECIFICATION**

**1.MECHANICAL & DIMENSIONS**



| (UNIT: mm) |           |
|------------|-----------|
| A          | 5.50±0.50 |
| B          | 5.10±0.30 |
| C          | 2.00±0.40 |
| D          | 2.20±0.50 |
| E          | 1.10±0.30 |
| L          | 6.20 ref  |
| G          | 2.20 ref  |
| H          | 2.80 ref  |
| REMARK     |           |
|            |           |
|            |           |
|            |           |
|            |           |
|            |           |
|            |           |

**2.PART NUMBER NOMENCLATOR:**

**MGV 0502 100 M - 1X**  
**A B C D E**

A: Product Series.

B: Series number, part size

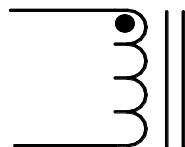
C: Inductance code

D: Inductance Tolerance. (M=±20% ,N=±30%)

E: "X"=0:Standard catalog part number

"X"=1-9:Controlled customized part **or** different performance than std catalog part. And "5-9" is for automotive grade.

**3.EQUIVALENT CIRCUIT:**



**SPECIFICATION**

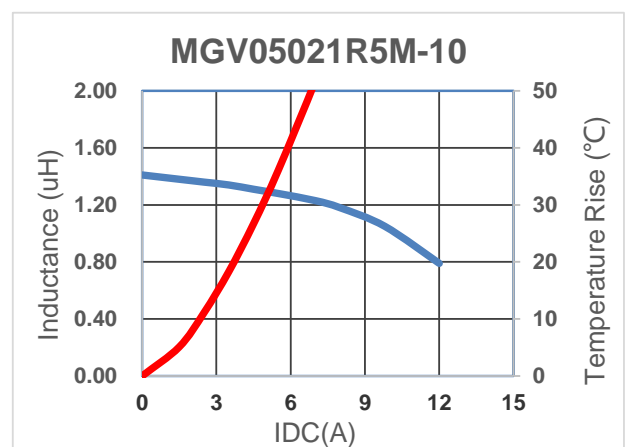
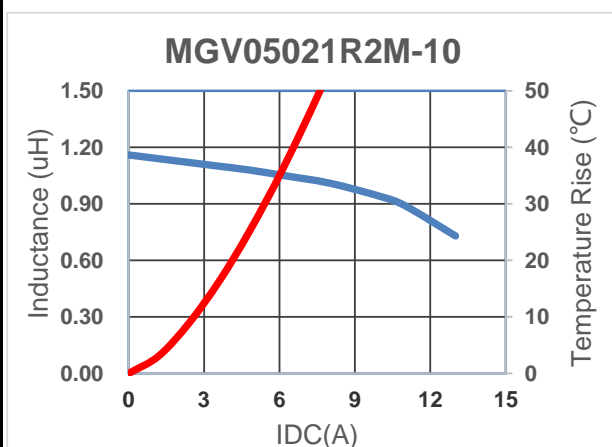
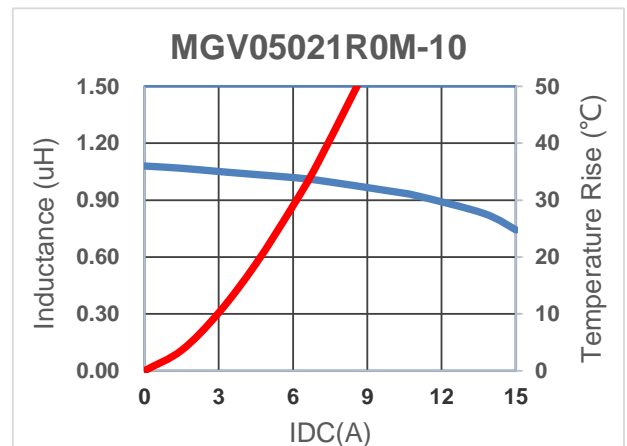
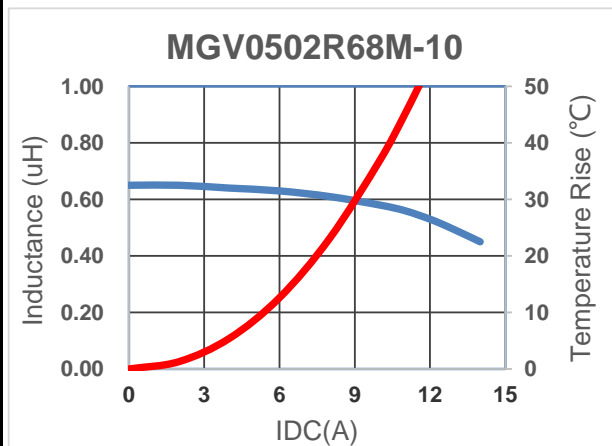
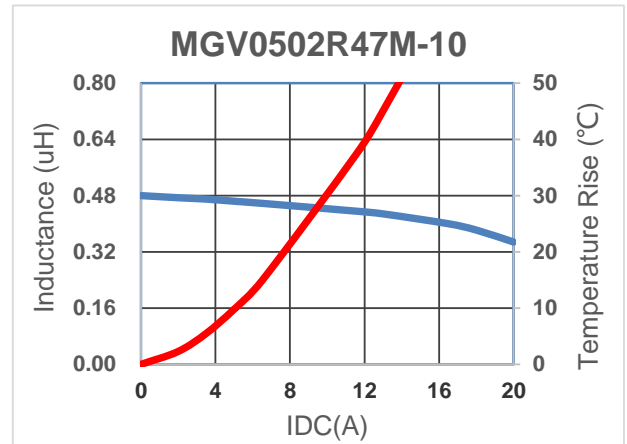
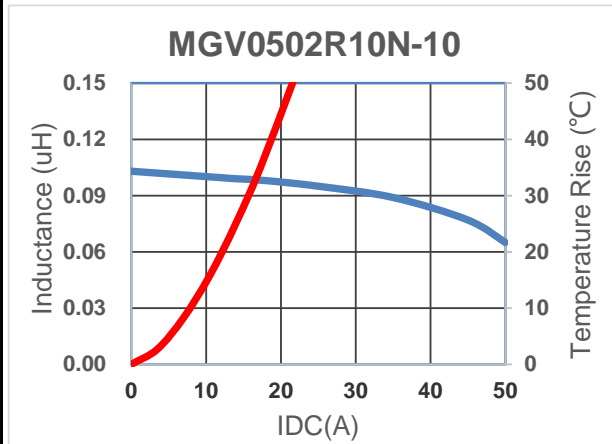
| <b>PART NUMBER</b> | <b>INDUCTANCE (uH)</b> | <b>I<sub>rms</sub>(A) Typ.</b> | <b>I<sub>sat</sub>(A) Typ.</b> | <b>DCR(mΩ) Typ</b> | <b>DCR(mΩ) Max</b> | <b>REMARK</b> |
|--------------------|------------------------|--------------------------------|--------------------------------|--------------------|--------------------|---------------|
| MGV0502R10N-10     | 0.10±30%               | 18.0                           | 45.0                           | 3.6                | 4.0                |               |
| MGV0502R47M-10     | 0.47±20%               | 11.5                           | 18.0                           | 7.3                | 8.6                |               |
| MGV0502R68M-10     | 0.68±20%               | 10.0                           | 12.8                           | 11.0               | 12.4               |               |
| MGV05021R0M-10     | 1.00±20%               | 7.0                            | 13.7                           | 17.5               | 20.0               |               |
| MGV05021R2M-10     | 1.20±20%               | 6.2                            | 11.0                           | 23.0               | 28.0               |               |
| MGV05021R5M-10     | 1.50±20%               | 5.5                            | 9.8                            | 26.5               | 30.5               |               |
| MGV05022R2M-10     | 2.20±20%               | 4.2                            | 9.0                            | 42.0               | 50.0               |               |
| MGV05023R3M-10     | 3.30±20%               | 3.3                            | 7.3                            | 66.0               | 76.0               |               |
| MGV05026R8M-10     | 6.80±20%               | 2.4                            | 3.8                            | 130.0              | 150.0              |               |
| MGV0502100M-10     | 10.00±20%              | 2.3                            | 3.4                            | 180.0              | 199.0              |               |
|                    |                        |                                |                                |                    |                    |               |
|                    |                        |                                |                                |                    |                    |               |
|                    |                        |                                |                                |                    |                    |               |
|                    |                        |                                |                                |                    |                    |               |
|                    |                        |                                |                                |                    |                    |               |
|                    |                        |                                |                                |                    |                    |               |
|                    |                        |                                |                                |                    |                    |               |
|                    |                        |                                |                                |                    |                    |               |
|                    |                        |                                |                                |                    |                    |               |
|                    |                        |                                |                                |                    |                    |               |
|                    |                        |                                |                                |                    |                    |               |

**GENERAL SPECIFICATION:**

- Inductance tested at 100KHz, 0.25V
- Heat Rated Current (I<sub>rms</sub>) is defined based on temperature rise approximate 40°C without core loss (ambient temperature 25±5°C)
- Saturation Current (I<sub>sat</sub>) is the DC current at which the inductance drops off approximately 30% from its value without current. (ambient temperature 25±5°C)
- Operating temperature range: -40°C~+125°C (including self-heating temperature rise)
- Storage temperature range (packaging conditions): -10°C~+40°C and RH 60%(MAX.)

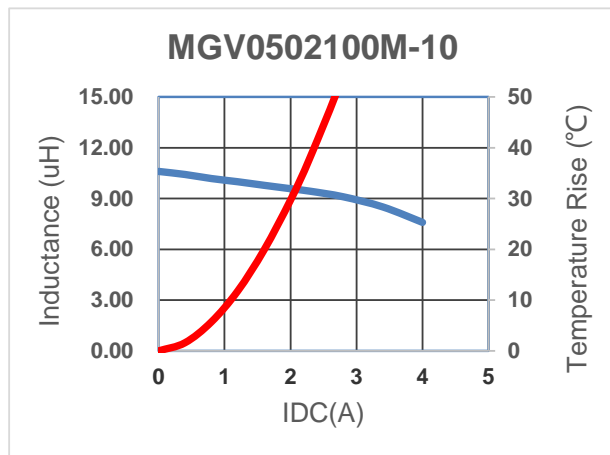
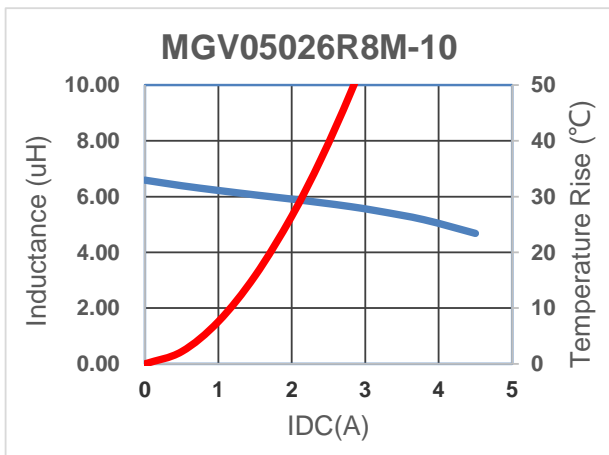
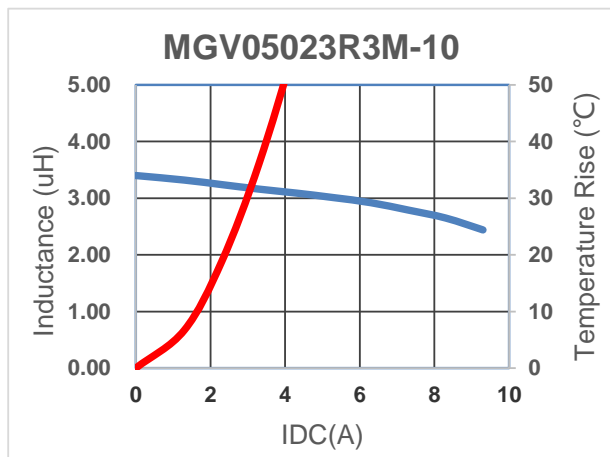
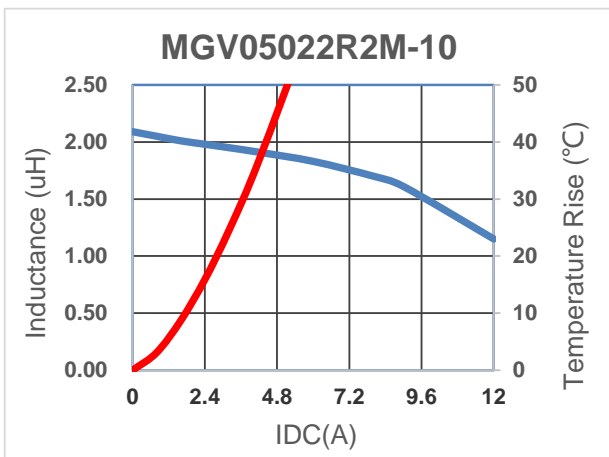
**SPECIFICATION**

**Characteristics Curve**



**SPECIFICATION**

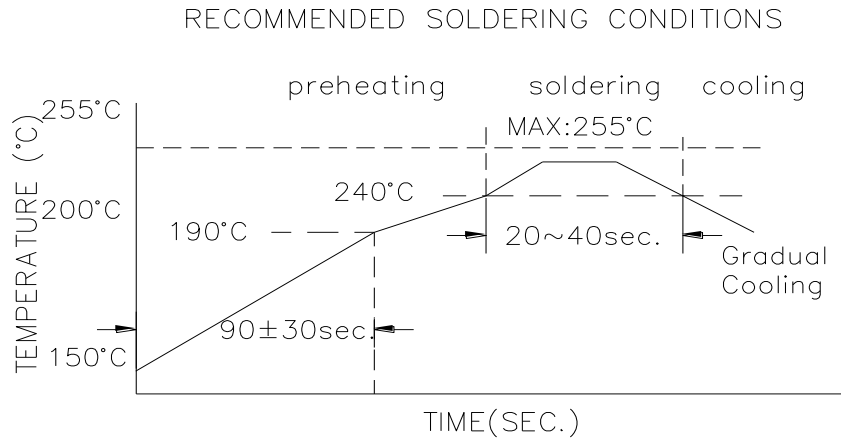
**Characteristics Curve**



**Recommended Soldering Conditions**

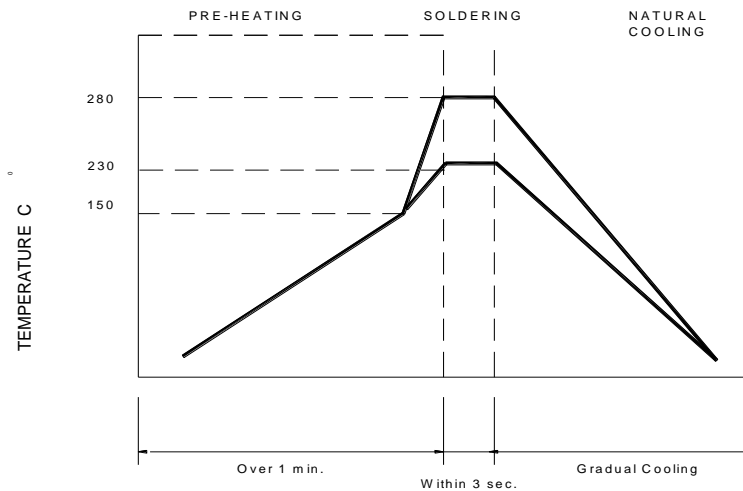
**For Lead-Free Application**

**Figure 1 . Re-flow Soldering**



**Reflow times: 3 times max**

**Figure 2 . Hand Soldering**

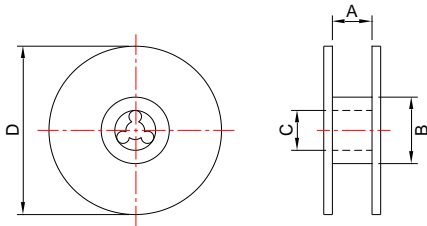


**Hand solder times: 1 time max**

| <i>Reliability and Testina Conditions / Pin Type Power Inductors</i> |  |   |
|--|--|---|
| <b>SMD series(Consumer)</b>  |  |   |
| <b>Item</b>  | <b>Reference</b>                                 | <b>Additional Requirements</b>  |
| Operating temperature range  | -55°C ~ +125°C (Including self-temperature rise) |   |
| Storage temperature and humidity range                               | -10°C to +40°C , 60% RH Max                      |   |
| High Temperature Exposure (Storage)                                  | MIL-STD-202 Method 108                           | 85±2°C, 168+24hours   |
| Temperature Cycling  | JESD22 Method JA-104                             | -40°C → +85, transforming interval:20s, 100cycles   |
| Operational Life   | MIL-PRF-2  | 85±°C, 168+24hours<br>Apply maximum rated voltage and current according part drawing  |
| External Visual  | MIL-STD-883 Method 2009                          | Inspect device construction, marking and workmanship. Electrical Test not required.   |
| Physical Dimension   | JESD22 Method JB-100                             | Verify physical dimensions to the applicable device detail specification. Note: User(s) and Suppliers spec. Electrical Test not required                              |
| Vibration  | MIL-STD-202 Method 204                           | 10~55Hz,1.5mm, 2 hours in each 3mutually perpendicular directions (total of 6 hours)  |
| Resistance to Soldering Heat   | MIL-STD-202 Method 210                           | 1. Max. 260±5°C,10±1s, 2 times<br>2.Solder Composition: Sn/3Ag/0.5Cu  |
| Solderability  | J-STD-002  | 245±5°C, 5±1sec, Solder: Sn/3.0Ag/0.5Cu   |
| Electrical Characterization  | Print Spec                                       | Parametrically test per lot and sample size requirements, summary to show Min, Max, Mean and Standard deviation at room as well as Min and Max Operating temperatures |
| Board Flex   | AEC-Q200-005                                     | 2mm,30±1s   |
| Terminal Strength(SMD)   | AEC-Q200-006                                     | 10N, 5S, X,Y direct   |

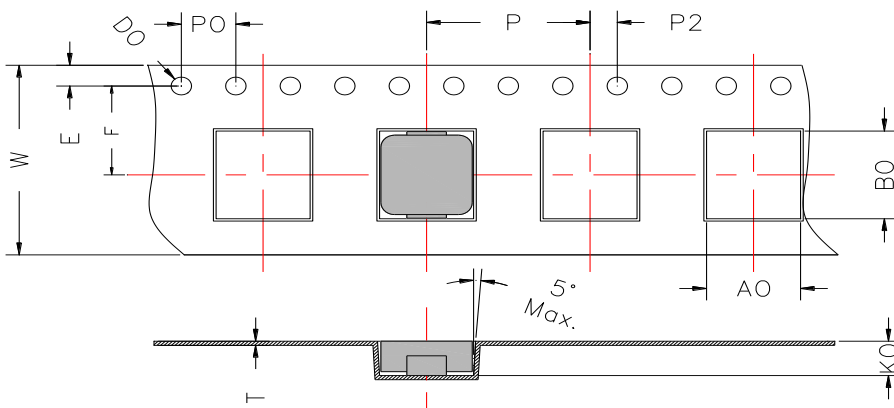
**PACKAGING**

**Reel Dimension**



| Type   | A(mm)     | B(mm)   | C(mm)       | D(mm) |
|--------|-----------|---------|-------------|-------|
| 13'x12 | 12.4+2/-0 | 100 ± 2 | 13+0.5/-0.2 | 330   |

**Tape Dimension**

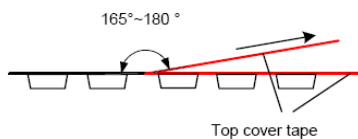


| W        | E        | F        | P        | A0       | B0       | P2      | P0      | K0      | t         | D0      |
|----------|----------|----------|----------|----------|----------|---------|---------|---------|-----------|---------|
| 12.0±0.3 | 1.75±0.1 | 5.50±0.1 | 8.00±0.1 | 5.50±0.1 | 6.30±0.1 | 2.0±0.1 | 4.0±0.1 | 2.3±0.1 | 0.35±0.05 | 1.5Ref. |

**Packaging Quantity**

| P/N             | Chip/Reel | Inner Box | Outer Box |
|-----------------|-----------|-----------|-----------|
| MG V0502 Series | 3000pcs   | 6000pcs   | 12000pcs  |
| Size            | -         | -         | -         |

**Peeling Off Force**



| The force peeling off cover tape is 10 to 100 grams in the arrow direction under the following conditions |               |                 |               |
|---|---------------|-----------------|---------------|
| Room Temp (°C)  | Room Humidity | Room atrn (hPa) | Teaming Speed |
| 5~35  | 45~85         | 860~1060        | 300           |

**※Storage Conditions**

1. Temperature and humidity conditions: -10-+40°C and 60% RH.
2. Recommended products should be used within 12 month from the time of manufacturing.
3. The packaging material should be kept where no chlorine or sulfur exists in the air.
4. Allowable stacking condition of Packaging box: max height 1.5m or 5 boxes stacking