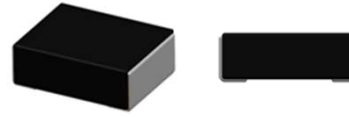


## Specification Sheet

### CIGW404012GMR47MLE (4040/EIA 1616)

#### APPLICATION

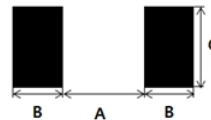
Smart phones, Tablet, Wearable devices, Power converter modules, etc.



#### FEATURES

Small power inductor for mobile devices  
Low DCR structure and high efficiency inductor for power circuits.  
Monolithic structure for high reliability  
Free of all RoHS-regulated substances  
Halogen free

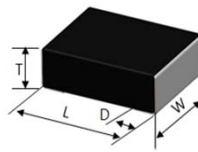
#### RECOMMENDED LAND PATTERN



Unit : mm

| TYPE | 4040 |
|------|------|
| A    | 1.6  |
| B    | 1.5  |
| C    | 3.8  |

#### DIMENSION



| TYPE | Dimension [mm] |         |         |         |
|------|----------------|---------|---------|---------|
|      | L              | W       | T       | D       |
| 4040 | 4.1±0.2        | 3.8±0.2 | 1.2 max | 0.8±0.3 |

#### DESCRIPTION

| Part no.           | Size [inch/mm] | Thickness [mm] (max) | Inductance [uH] | Inductance tolerance (%) | DC Resistance [mΩ] |      | Rated DC Current (Isat) [A] |      | Rated DC Current (Irms) [A] |      |
|--------------------|----------------|----------------------|-----------------|--------------------------|--------------------|------|-----------------------------|------|-----------------------------|------|
|                    |                |                      |                 |                          | Max.               | Typ. | Max.                        | Typ. | Max.                        | Typ. |
| CIGW404012GMR47MLE | 1616/4040      | 1.2                  | 0.47            | ±20                      | 17                 | 13   | 9.0                         | 9.4  | 6                           | 6.5  |

\* Inductance : Measured with a LCR meter 4991A(Agilent) or equivalent (Test Freq. 1MHz, Level 0.1V)

\* DC Resistance : Measured with a Resistance HP4338B or equivalent

\* Maximum allowable DC current : Value defined when DC current flows and the initial value of inductance has decreased by 30% or when current flows and temperature has risen to 40°C whichever is smaller. (Reference: ambient temperature is 25°C±10)

(Isat) : Allowable current in DC saturation : The DC saturation allowable current value is specified when the decrease of the initial inductance value at 30% (Reference: ambient temperature is 25°C±10)

(Irms) : Allowable current of temperature rise : The temperature rise allowable current value is specified when temperature of the inductor is raised 40°C by DC current. (Reference: ambient temperature is 25°C±10)

\* Absolute maximum voltage : Absolute maximum voltage DC 20V.

\* Operating temperature range : -40 to +125°C (Including self-temperature rise)

#### PRODUCT IDENTIFICATION

**CIG**    **W**    **4040**    **12**    **GM**    **R47**    **M**    **L**    **E**  
**(1)**    **(2)**    **(3)**    **(4)**    **(5)**    **(6)**    **(7)**    **(8)**    **(9)**

(1) Power Inductor

(3) Dimension (4040 : 4.1mm×3.8mm)

(5) Remark (Characterization Code)

(7) Tolerance (M:±20%)

(8) Internal Code

(9) Packaging (C:paper tape, E:embossed tape)

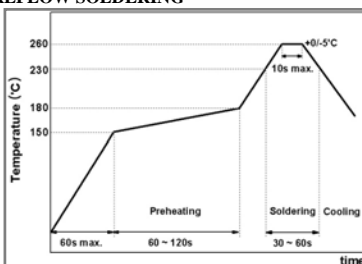
(2) Type (T: Metal Composite Wire Wound Type)

(4) Thickness (12: 1.2mm)

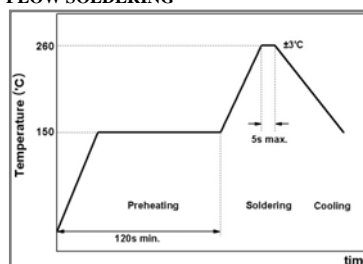
(6) Inductance (R47: 0.47 uH)

#### RECOMMENDED SOLDERING CONDITION

##### REFLOW SOLDERING



##### FLOW SOLDERING



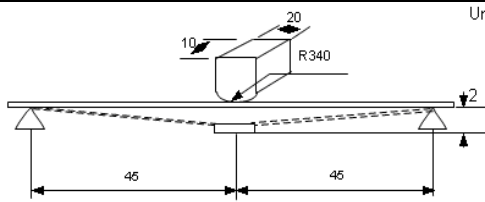
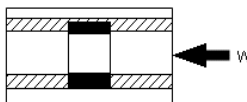
##### IRON SOLDERING

|                                   |            |
|-----------------------------------|------------|
| Temperature of Soldering Iron Tip | 280°C max. |
| Preheating Temperature            | 150°C min. |
| Temperature Differential          | ΔT ≤ 130°C |
| Soldering Time                    | 3sec max.  |
| Wattage                           | 50W max.   |

#### PACKAGING

| Packaging Style     | Quantity(pcs/reel) |
|---------------------|--------------------|
| Embossed 13" Taping | 1,500pcs           |

## Reliability Test

| Item   | Specified Value   | Test Condition   |           |
|--|---|--|-----------|
| Solderability                                  | More than 90% of terminal electrode should be soldered newly.   | After being dipped in flux for 4±1 seconds, and preheated at 150~180℃ for 2~3 min, the specimen shall be immersed in solder at 245±5℃ for 4±1 seconds.     |           |
| Resistance to Soldering                        | No mechanical damage.<br>Remaining terminal Electrode: 75% min.<br>Inductance change to be within ±20% to the initial.          | After being dipped in flux for 4±1 seconds, and preheated at 150~180℃ for 2~3 min, the specimen shall be immersed in solder at 260±5℃ for 10 ±0.5 seconds. |           |
| Thermal Shock<br>(Temperature Cycle test)      | No mechanical damage<br>Inductance change to be within ±20% to the initial.   | Repeat 100 cycles under the following conditions.<br>-40±3℃ for 30 min → 85±3℃ for 30 min  |           |
| High Temp. Humidity<br>Resistance Test         | No mechanical damage<br>Inductance change to be within ±20% to the initial  | 85±2℃, 85%RH, for 500±12 hours.<br>Measure the test items after leaving at normal temperature and humidity for 24 hours.                                   |           |
| Low Temperature Test                           | No mechanical damage<br>Inductance change to be within ±20% to the initial.   | Solder the sample on PCB. Exposure at -55±2℃ for 500±12 hours.<br>Measure the test items after leaving at normal temperature and humidity for 24hours.     |           |
| High Temperature Test                          | No mechanical damage<br>Inductance change to be within ±20% to the initial.   | Solder the sample on PCB. Exposure at 125±2℃ for 500±12 hours.<br>Measure the test items after leaving at normal temperature and humidity for 24hours.     |           |
| High Temp. Humidity Resistance<br>Loading Test | No mechanical damage<br>Inductance change to be within ±20% to the initial  | 85±2℃, 85%RH, Rated Current for 500±12 hours.<br>Measure the test items after leaving at normal temperature and humidity for 24 hours.                     |           |
| High Temperature Loading Test                  | No mechanical damage<br>Inductance change to be within ±20% to the initial  | 85±2℃, Rated Current for 500±12 hours.<br>Measure the test items after leaving at normal temperature and humidity for 24 hours.                            |           |
| Reflow Test                                    | No mechanical damage<br>Inductance change to be within ±20% to the initial  | Peak 260±5℃, 3 times   |           |
| Vibration Test                                 | No mechanical damage<br>Inductance change to be within ±20% to the initial.   | Solder the sample on PCB. Vibrate as apply 10~55Hz, 1.5mm amplitude for 2 hours in each of three(X,Y,Z) axis (total 6 hours).                              |           |
| Bending Test                                   | No mechanical damage  | Bending Limit; 2mm<br>Test Speed; 1.0mm/sec.<br>Keep the test board at the limit point in 5 sec.<br>PCB thickness : 1.6mm                                  |           |
|  |  <p style="text-align: right;">Unit :mm</p> |  |           |
| Terminal Adhesion Test                         | No indication of peeling shall occur on the terminal electrode.   | W(kgf)   | TIME(sec) |
|  |   | 0.5  | 10±1      |
|  |    |  |           |
| Drop Test                                      | No mechanical damage<br>Inductance change to be within ±20% to the initial.   | Random Free Fall test on concrete plate.<br>1 meter, 10 drops  |           |

### 1. Model : CIGW404012GMR47MLE

### 2. Description

| Part no.           | Size<br>[inch/mm] | Thickness<br>[mm] (max) | Inductance<br>[uH] | Inductance<br>tolerance<br>(%) | DC Resistance [mΩ] |      | Rated DC Current (Isat) [A] |      | Rated DC Current (Irms)<br>[A] |      |
|--------------------|-------------------|-------------------------|--------------------|--------------------------------|--------------------|------|-----------------------------|------|--------------------------------|------|
|                    |                   |                         |                    |                                | Max.               | Typ. | Max.                        | Typ. | Max.                           | Typ. |
| CIGW404012GMR47MLE | 1616/4040         | 1.2                     | 0.47               | ±20                            | 17                 | 13   | 9.0                         | 9.4  | 6.0                            | 6.5  |

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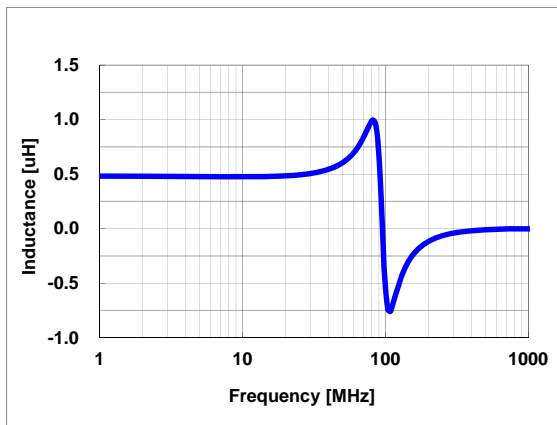
\* Absolute maximum voltage : Absolute maximum voltage DC 20V.

\* Operating temperature range : -40 to +125°C (Including self-temperature rise)

### 3. Characteristics data

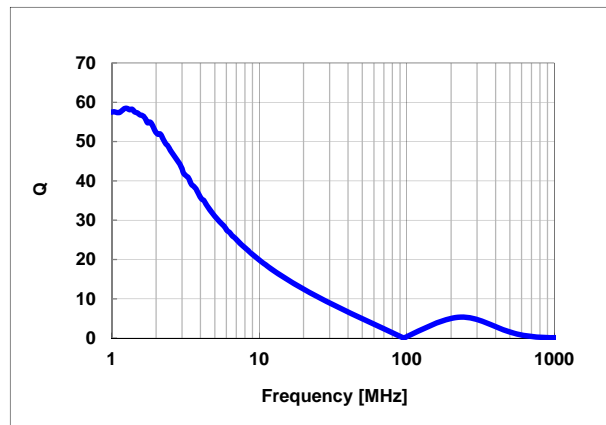
#### 1) Frequency characteristics (Ls)

Agilent E4294A +E4991A , 1MHz to 1,000MHz

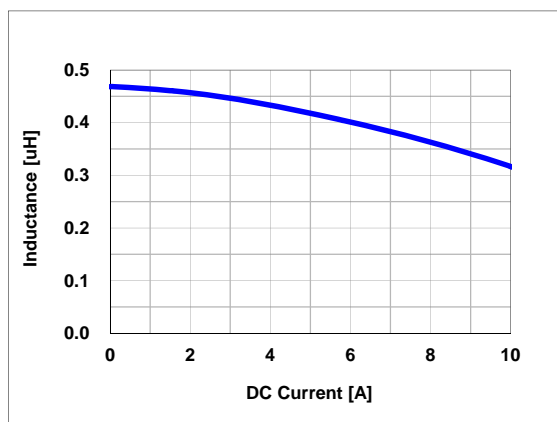


#### 2) Frequency characteristics (Q)

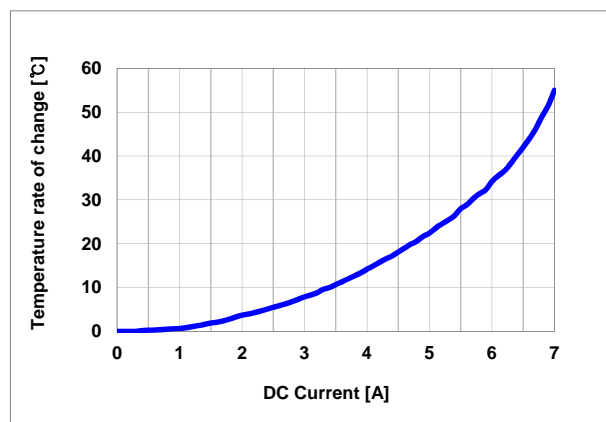
Agilent E4294A +E4991A , 1MHz to 1,000MHz



#### 3) DC Bias characteristics (Typ.)



#### 4) Temperature characteristics (Typ.)



Any data in this sheet are subject to change, modify or discontinue without notice

The data sheets include the typical data for design reference only. If there is any question regarding the data sheets, please contact our sales personnel or application engineers