

### CIGW404012GM4R7MLE (4040/EIA 1616)

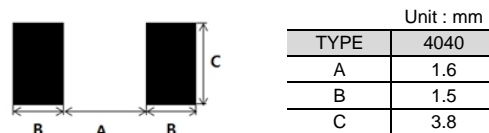
#### APPLICATION

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

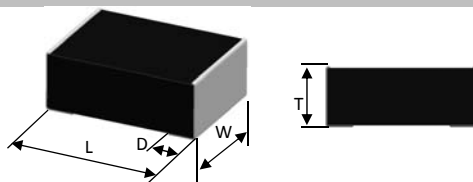
#### FEATURES

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



#### 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.
CIGW404012GM4R7MLE	1616/4040	1.2	4.7	±20	96	80	2.9	3.4	2.0	2.4

- \* 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℃ whichever is smaller. (Reference: ambient temperature is 25℃±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℃±10)
- (Irms) : Allowable current of temperature rise : The temperature rise allowable current value is specified when temperature of the inductor is raised 40℃ by DC current. (Reference: ambient temperature is 25℃±10)
- \* Absolute maximum voltage : Absolute maximum voltage DC 40V.
- \* Operating temperature range : -40 to +125℃ (Including self-temperature rise)

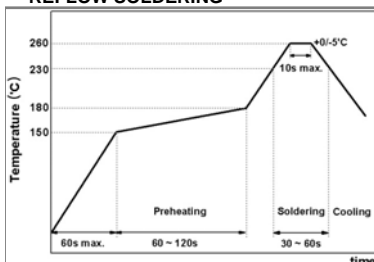
#### PRODUCT IDENTIFICATION

**CIG**    **W**    **4040**    **12**    **GM**    **4R7**    **M**    **L**    **E**  
**(1)**    **(2)**    **(3)**    **(4)**    **(5)**    **(6)**    **(7)**    **(8)**    **(9)**

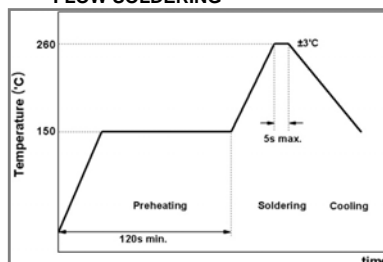
- (1) Power Inductor
- (2) Type (T: Metal Composite Wire Wound Type)
- (3) Dimension (4040 : 4.1mm×3.8mm)
- (4) Thickness (12: 1.2mm)
- (5) Remark (Characterization Code)
- (6) Inductance (4R7: 4.7 uH)
- (7) Tolerance (M:±20%)
- (8) Internal Code
- (9) Packaging (C:paper tape, E:embossed tape)

#### RECOMMENDED SOLDERING CONDITION

##### REFLOW SOLDERING



##### FLOW SOLDERING



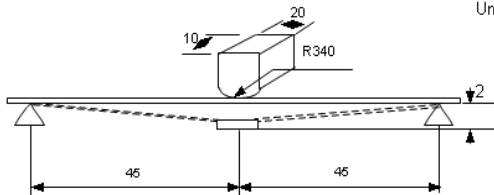
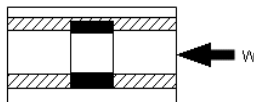
##### IRON SOLDERING

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

#### PACKAGING

Packaging Style	Quantity(pcs/reel)
Embossed 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 °C for 2 ~ 3 min, the specimen shall be immersed in solder at 245±5 °C for 4±1 seconds.	
Resistance to Soldering	No mechanical damage. Remaining terminal Electrode: 75% min. Inductance change to be within ±20% to the initial.	After being dipped in flux for 4±1 seconds, and preheated at 150 ~ 180 °C for 2 ~ 3 min, the specimen shall be immersed in solder at 260±5 °C for 10 ±0.5 seconds.	
Thermal Shock (Temperature Cycle test)	No mechanical damage Inductance change to be within ±20% to the initial.	Repeat 100 cycles under the following conditions. -40±3 °C for 30 min → 85±3 °C for 30 min	
High Temp. Humidity Resistance Test	No mechanical damage Inductance change to be within ±20% to the initial	85±2 °C, 85%RH, for 500±12 hours. Measure the test items after leaving at normal temperature and humidity for 24 hours.	
Low Temperature Test	No mechanical damage Inductance change to be within ±20% to the initial.	Solder the sample on PCB. Exposure at -55±2 °C for 500±12 hours. Measure the test items after leaving at normal temperature and humidity for 24hours.	
High Temperature Test	No mechanical damage Inductance change to be within ±20% to the initial.	Solder the sample on PCB. Exposure at 125±2 °C for 500±12 hours. Measure the test items after leaving at normal temperature and humidity for 24hours.	
High Temp. Humidity Resistance Loading Test	No mechanical damage Inductance change to be within ±20% to the initial	85±2 °C, 85%RH, Rated Current for 500±12 hours. Measure the test items after leaving at normal temperature and humidity for 24 hours.	
High Temperature Loading Test	No mechanical damage Inductance change to be within ±20% to the initial	85±2 °C, Rated Current for 500±12 hours. Measure the test items after leaving at normal temperature and humidity for 24 hours.	
Reflow Test	No mechanical damage Inductance change to be within ±20% to the initial	Peak 260±5 °C, 3 times	
Vibration Test	No mechanical damage 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 Test Speed; 1.0mm/sec. Keep the test board at the limit point in 5 sec. PCB thickness : 1.6mm	
	<div>Unit :mm</div> 		
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 Inductance change to be within ±20% to the initial.	Random Free Fall test on concrete plate. 1 meter, 10 drops	
Ipeak (AC+DC Load Life)	No mechanical damage Inductance change to be within ±20% to the initial	85±2 °C, 85%RH, Load(Ipeak) for 120 hours. (Frequency:1MHz, Load(Ipeak):1.5hr on / 0.5hr off) Measure the test items after leaving at normal temperature and humidity for 24 hours. * Load(Ipeak) = Irms(max)×1.4	

### 1. Model : CIGW404012GM4R7MLE

### 2. Description

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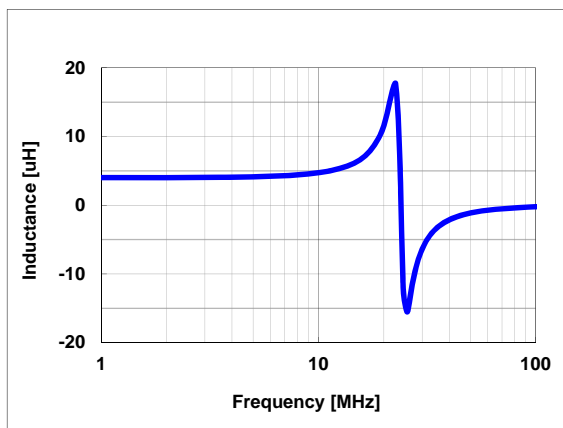
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\* Operating temperature range : -40 to +125°C (Including self-temperature rise)

### 3. Characteristics data

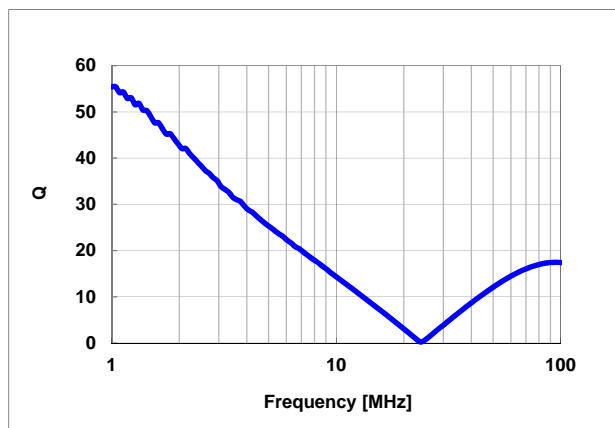
#### 1) Frequency characteristics (Ls)

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

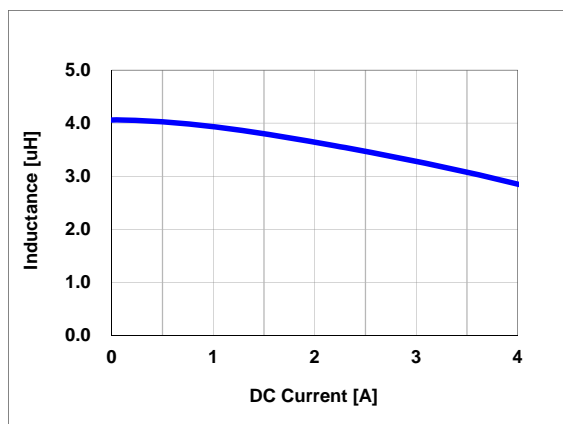


#### 2) Frequency characteristics (Q)

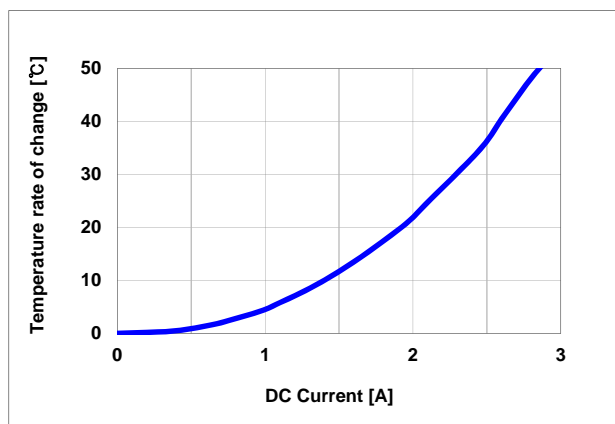
Agilent E4294A +E4991A , 1MHz to 1,000MHz



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



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



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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