



SAMSUNG  
ELECTRO-MECHANICS

# Metal Composite Power Inductor

## Specification Sheet



### CIGW404012GM2R2MLE (4040/EIA 1616)

#### APPLICATION

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



#### FEATURES

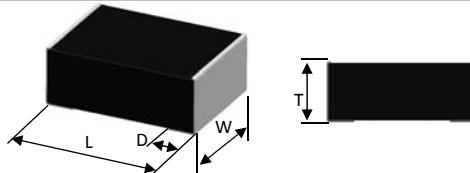
Small power inductor for mobile devices  
Low DCR structure and high efficiency inductor for power circuits.  
Monolithic structure for high reliability  
Free of all RoHS-regulated substances  
Halogen free

#### 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.
CIGW404012GM2R2MLE	1616/4040	1.2	2.2	±20	57	48	4.7	5.2	3.1	3.4

\* 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°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**      **2R2**      **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)

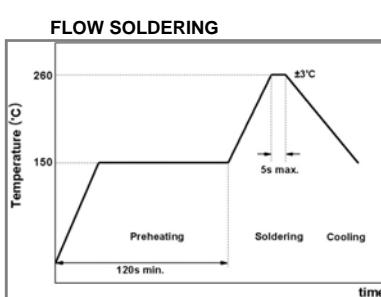
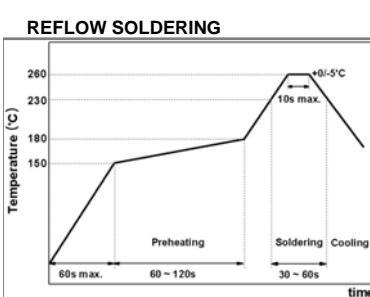
(6) Inductance (2R2: 2.2 uH)

(7) Tolerance (M:±20%)

(8) Internal Code

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

#### RECOMMENDED SOLDERING CONDITION



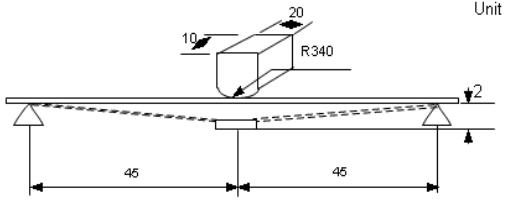
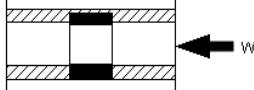
#### IRON SOLDERING

Temperature of Soldering Iron Tip	280 °C max.
Preheating Temperature	150 °C min.
Temperature Differential	$\Delta T \leq 130$ °C
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 $4\pm1$ seconds, and preheated at $150\sim180^\circ\text{C}$ for $2\sim3$ min, the specimen shall be immersed in solder at $245\pm5^\circ\text{C}$ for $4\pm1$ seconds.				
Resistance to Soldering	No mechanical damage. Remaining terminal Electrode: 75% min. Inductance change to be within $\pm20\%$ to the initial.	After being dipped in flux for $4\pm1$ seconds, and preheated at $150\sim180^\circ\text{C}$ for $2\sim3$ min, the specimen shall be immersed in solder at $260\pm5^\circ\text{C}$ for $10\pm0.5$ seconds.				
Thermal Shock (Temperature Cycle test)	No mechanical damage Inductance change to be within $\pm20\%$ to the initial.	Repeat 100 cycles under the following conditions. $-40\pm3^\circ\text{C}$ for 30 min $\rightarrow 85\pm3^\circ\text{C}$ for 30 min				
High Temp. Humidity Resistance Test	No mechanical damage Inductance change to be within $\pm20\%$ to the initial	$85\pm2^\circ\text{C}$ , 85%RH, for $500\pm12$ 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 $\pm20\%$ to the initial.	Solder the sample on PCB. Exposure at $-55\pm2^\circ\text{C}$ for $500\pm12$ hours. Measure the test items after leaving at normal temperature and humidity for 24 hours.				
High Temperature Test	No mechanical damage Inductance change to be within $\pm20\%$ to the initial.	Solder the sample on PCB. Exposure at $125\pm2^\circ\text{C}$ for $500\pm12$ hours. Measure the test items after leaving at normal temperature and humidity for 24 hours.				
High Temp. Humidity Resistance Loading Test	No mechanical damage Inductance change to be within $\pm20\%$ to the initial	$85\pm2^\circ\text{C}$ , 85%RH, Rated Current for $500\pm12$ 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 $\pm20\%$ to the initial	$85\pm2^\circ\text{C}$ , Rated Current for $500\pm12$ 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 $\pm20\%$ to the initial	Peak $260\pm5^\circ\text{C}$ , 3 times				
Vibration Test	No mechanical damage Inductance change to be within $\pm20\%$ 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				
		 <p>Unit :mm</p>				
Terminal Adhesion Test	No indication of peeling shall occur on the terminal electrode.	<table border="1"> <thead> <tr> <th>W(kgf)</th> <th>TIME(sec)</th> </tr> </thead> <tbody> <tr> <td>0.5</td> <td><math>10\pm1</math></td> </tr> </tbody> </table>	W(kgf)	TIME(sec)	0.5	$10\pm1$
W(kgf)	TIME(sec)					
0.5	$10\pm1$					
						
Drop Test	No mechanical damage Inductance change to be within $\pm20\%$ 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 $\pm20\%$ to the initial	$85\pm2^\circ\text{C}$ , 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) = $I_{rms(max)} \times 1.4$				



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## Data Sheet



### 1. Model : CIGW404012GM2R2MLE

### 2. Description

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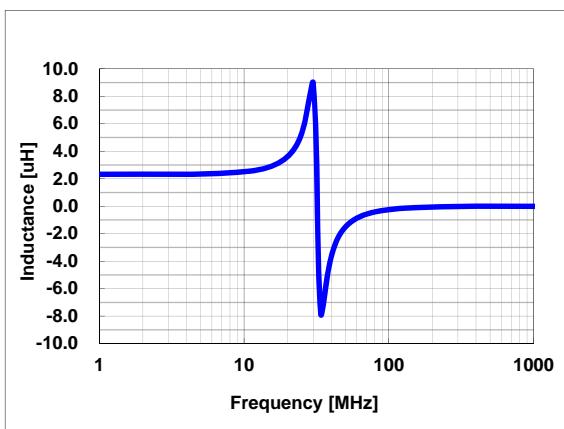
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### 3. Characteristics data

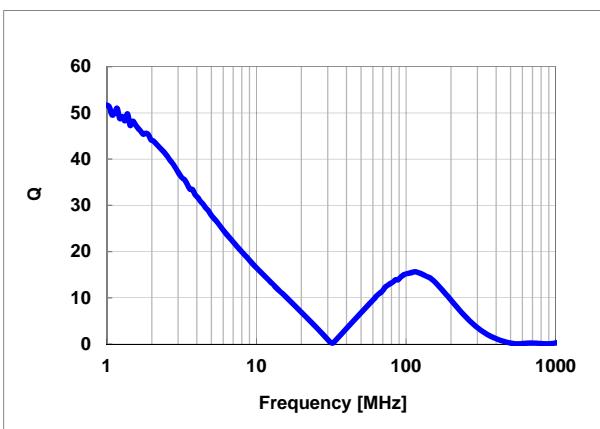
#### 1) Frequency characteristics (Ls)

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

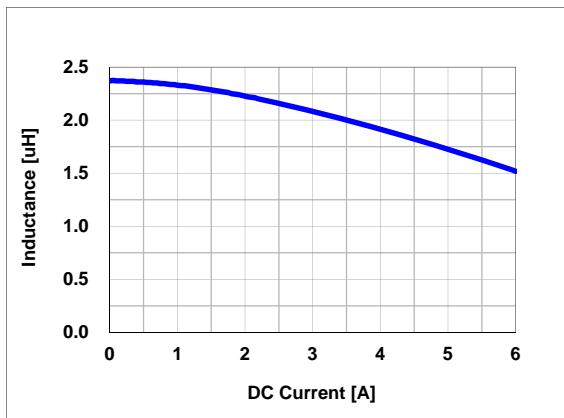


#### 2) Frequency characteristics (Q)

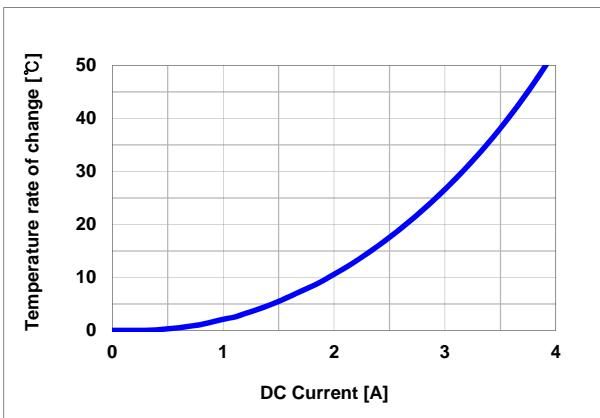
Agilent E4294A +E4991A , 1MHz to 1,000MHz



#### 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