CUSTOMER: _____ DATE: _____

APPROVAL SPECIFICATION

PRODUCT NAME: SMD high current power inductor
YOUR PART NO.:
OUR PART NO.: MGHC966410E Series
VERSION: V1.0

RECEPTION THE SPECIFICATION HAS BEEN ACCEPTED. DATE: **COMPANY:**		
CFMD	CHKD	RCVD

MANUFACTURING NAME

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CFMD.	CHKD.	DSGD.
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CATALOG

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Component SPEC Version Record

Rev.	Effective Date	Changed Contents	Change Reasons	Approved By
1.0	2021/03/23	New released	/	Remo

1. Scope

This specification applies to the MGHC966410E series of SMD power inductor.

2. Product Identification

MGHC 966410E – R07 K – LF

MGHC 966410E – R10 K – LF

MGHC 966410E – R12 K – LF

MGHC 966410E – R15 K – LF

MGHC 966410E – R18 K – LF

MGHC 966410E – R22 K – LF

① ② ③ ④ ⑤

① Product Symbol (High current SMD power inductor)

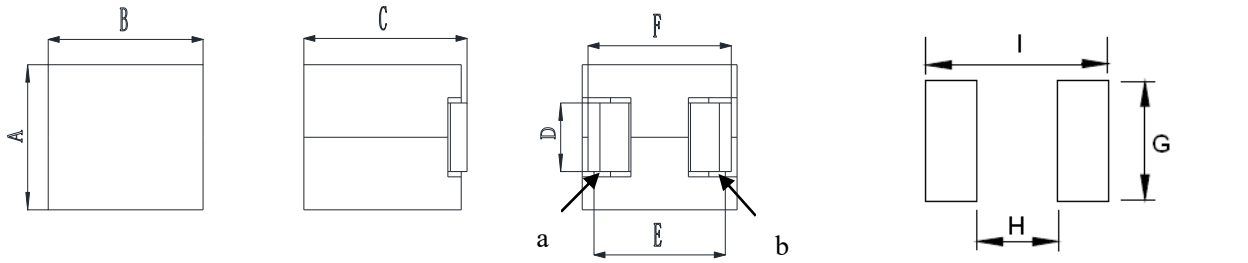
② Product dimensions

③ Inductance Value： (R07: 70nH; R10: 100nH; R12: 120nH; R15: 150nH; R18: 180nH; R22: 220nH;)

④ Inductance Tolerance：(K: ±10% ;L: ±15% ; M: ±20% ;)

⑤ Lead free product.

3. Appearance and Dimensions



Top View Side View Bottom View Recommended Land Pattern

Dimensions in mm								
A	B	C	D	E	F	G	H	I
6.60 Max	9.60 Max	10.0 Max	2.50 Typ	7.75 Typ	9.50 Typ	2.80 Typ	5.50 Typ	10.2 Typ

Soldering surfaces to be coplanar within 0.10mm.

PCB tolerance ±0.10mm unless otherwise specified.

4.Testing Conditions

Unless otherwise specified, the standard conditions for measurement/test as:
Ambient Temperature : 5 to 35℃
Relative Humidity: 25 to 85% RH
Atmospheric Pressure: 86 to 106 kPa

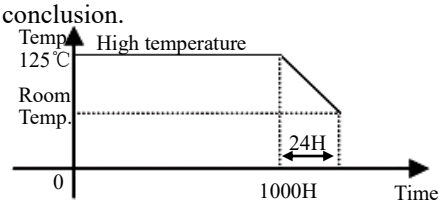
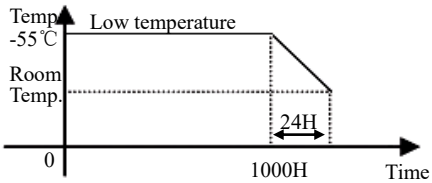
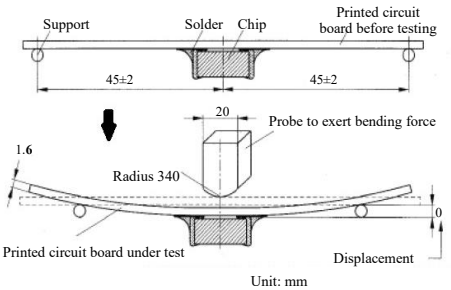
If any doubt on the results, measurements/tests should be made within the following limits:
Ambient Temperature : 25±1℃
Relative Humidity: 60 to 70% RH
Atmospheric Pressure: 86 to 106 kPa

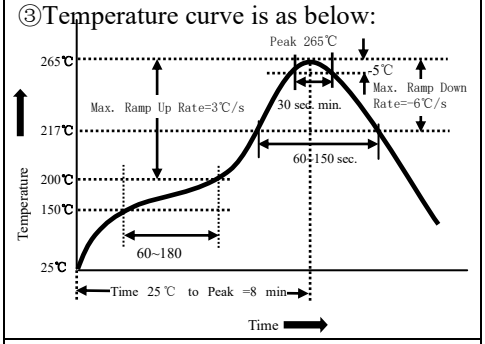
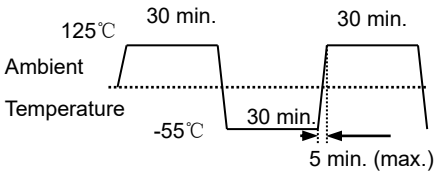
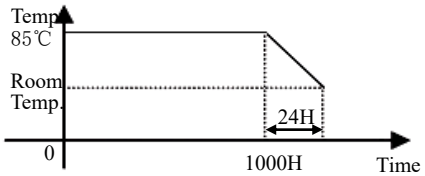
5. Electrical Characteristics

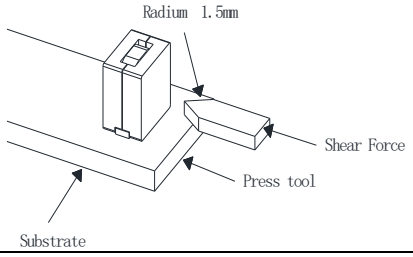
Microgate Part No.	Customer Part No.	Inductance (nH)	DCR•1 (mΩ)	Isat•2 @25°C (A)	Isat•3 @100°C (A)	Isat•4 @125°C (A)	Irms•5 (A)
MGHC966410E-R07K-LF	-	70±10%	0.15±10%	162	138	127	67
MGHC966410E-R10K-LF	-	100±10%	0.15±10%	118	100	90	67
MGHC966410E-R12K-LF	-	120±10%	0.15±10%	98	83	73	67
MGHC966410E-R15K-LF	-	150±10%	0.15±10%	76	65	59	67
MGHC966410E-R18K-LF	-	180±10%	0.15±10%	62	53	48	67
MGHC966410E-R22K-LF	-	220±10%	0.15±10%	49	42	39	67

* Operating temperature:-40~+125℃(Including coils temperature rise)
* L test condition:100kHz & 1V at 25℃ambient;
* •1: DCR: The nominal DCR is measured from point "a" to point "b" as seen in bottom view of Appearance and Dimensions.
•2:Isat@25°C: direct current at which the inductance drops approximate 30% from its value without current at 25°C;
•3:Isat@100°C: direct current at which the inductance drops approximate 30% from its value without current at 100°C;
•4:Isat@125°C: direct current at which the inductance drops approximate 30% from its value without current at 125°C;
•5:Irms: direct current when the temperature of the product rise (△T =40°C) from 20°C ambient.

6. **Reliability and Test Condition**

No.	Item	Requirements	Test Methods and Remarks	Reference	Sample Size
1	Solderability	(1)No mechanical damage. (2)No corrosion.. (3)Terminal area must have 90% min. solder coverage.	①all samples shall be subjected to steam aging for a period of 8 hours as a precondition to testing ②Temperature:245± 5℃, flux 5-10 s. ③Sample immersion tin furnace 5 ±1s. ④Immersed and in and out of speed: 25 ± 6mm/s.	AEC-Q200 (J-STD-002)	40
2	High Temperature Storage	(1)No mechanical damage. (2)No corrosion. (3)Inductance value and DC resistance meet specifications.	①Temperature: 125±2℃. ②Time : 1000 hours. ③Measurement at 24±4 hours after test conclusion. 	AEC-Q200 (MIL-STD -202 Method 108)	77
3	Low Temperature Storage		①Temperature: -55℃. ②Time : 1000 hours. ③Measurement at 24±4 hours after test conclusion. 	GB/T 2423.1-2008	77
4	Board Flex		①Part mounted on a 100mm*40mm FR4 PCB board, which is 1.6±0.2 mm thick and as a Layer-thickness 35 µm ± 10 µm. ②Bending speed is 1mm/s. ③Keeping the P.C Board 2 mm minimum for 60 seconds. 	AEC-Q200 (AEC-Q200-005)	10
5	Loading at High Temperature		①Samples shall be from the Pre-conditioning group. ②Temperature: 85±2℃. ③Time : 1000 hours. ④Applied Current : Rated current. ⑤Measurement at 24±4 hours after test conclusion.	MIL-STD-202 Method 108 Test Condition D	77

No.	Item	Requirements	Test Methods and Remarks	Reference	Sample Size
6	Resistance to Soldering Heat	(1)No mechanical damage. (2)No corrosion. (3)Inductance value and DC resistance meet specifications.	①The peak temperature: 260+5/-0℃. ②Reflow:2 times. ③Temperature curve is as below: 	Reflow soldering: JEDED J-STD-020 Hand soldering: MIL-STD-202 Method 210 Section 4.4 Test condition A (table 1)	20
			1 reflow cycle + 1hand soldering cycle		10
7	Pre-conditioning		2 reflow cycles	JESD22-A113	Sufficient for reliability test coverage
8	Temperature Cycling		①Samples shall be from the Pre-conditioning group ②First -55℃ for 30 minutes, last 125℃ 30minutes as 1 cycle. Go through 200 cycles. ③Max transfer time is 1 minutes. ④Measurement at 24±4 hours after test conclusion. 	MIL-STD -202 Method 107 Test condition D	77
9	Humidity Resistance		①Samples shall be from the Pre-conditioning group. ②1000 hours, 85±2°C / 85±2% RH. ③Unpowered. ④Measurement at 24±4 hours after test conclusion. 	AEC-Q200 (MIL-STD -202 Method 103)	77
10	Vibration		①Samples shall be from the Pre-conditioning group. ②10Hz to 55Hz at 15±1.5gs. ③Sweep time and duration: 10Hz~55Hz~10Hz for 20 minutes. ④Each four hours in X,Y,Z direction, 1 hours in total.	AEC-Q200 (MIL-STD-202 Method 204 Test condition B)	77

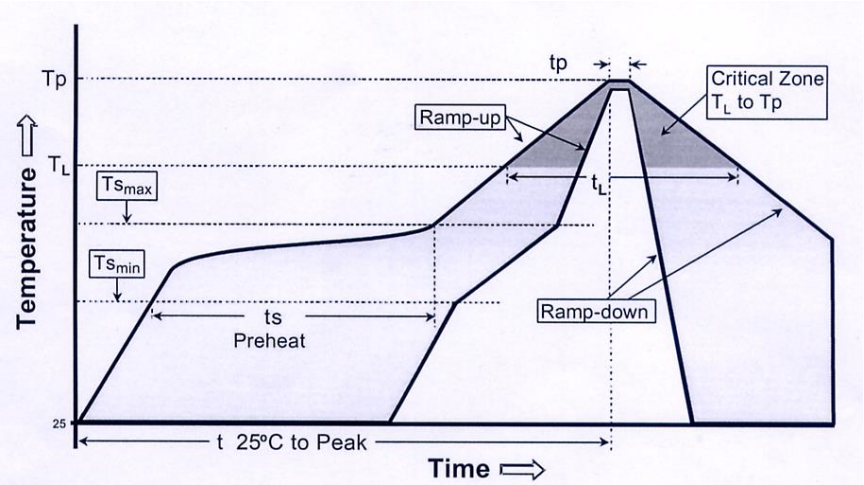
No.	Item	Requirements	Test Methods and Remarks	Reference	Sample Size
11	Terminal Strength	(1)No mechanical damage. (2)No corrosion. (3)Inductance value and DC resistance meet specifications.	①The test samples shall be soldered to the board. ②17.64N, 60s. 	AEC-Q200 (AEC-Q200-006)	10

7. Recommended Soldering Conditions

Product can be applied to reflow soldering.

(1) Reflow soldering conditions

Reflow curve



Profile Feature		Lead-Free Assembly
Average Ramp-Up Rate (Ts max. to Tp)		3℃/second max.
Preheat	– Temperature Min (Ts min.) – Temperature Max (Ts max.) – Time (ts min to ts max.)	150 ℃ 200 ℃ 60-180 seconds
Time maintained above	– Temperature (TL) – Time (tL)	217 ℃ 60-150 seconds
Peak/Classification Temperature (Tp) Peak/Classification Time (Tp)		260 ℃ 3-4 seconds
Time within 5 °C of actual Peak Temperature (Tp)		20-40 seconds
Ramp-Down Rate		6°C/second max.
Time 25 °C to Peak Temperature		8 minutes max.

Note 1: All temperatures refer to topside of the package, measured on the package body surface.

(2) The method on Re-work with using the iron:

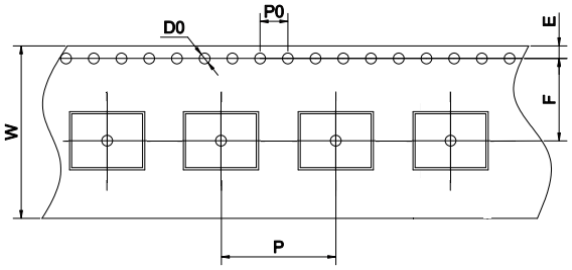
The following conditions must be strictly followed when using a soldering iron

Pre-heating	150℃, 1 minute
Tip temperature	350℃ max
Soldering iron output	80w max
End of soldering iron	φ1mm max
Soldering time	3 seconds max

Product once removes from the circuit board may not be used again.

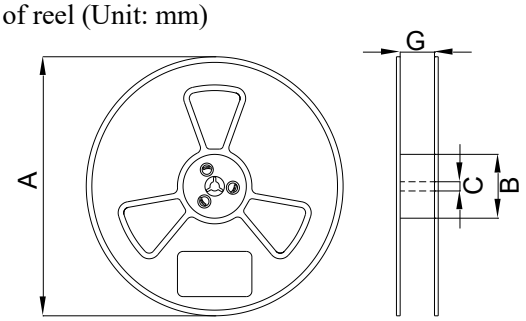
8. Package

8.1 Dimension of tape (Unit: mm)



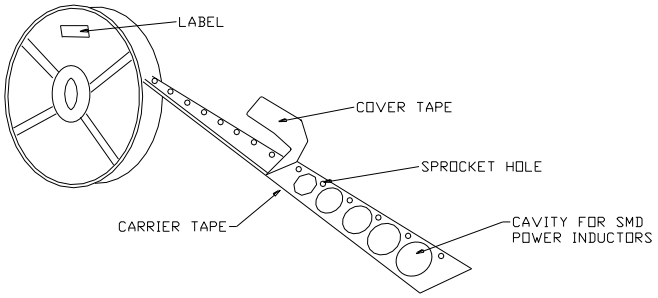
W	E	F	P	P0	D0
24.0±0.30	1.75±0.10	11.5±0.10	12.0±0.10	4.00±0.10	1.50±0.10

8.2 Dimension of reel (Unit: mm)



Symbol	Dimension
A	330
B	100
C	13.0
G	24.5

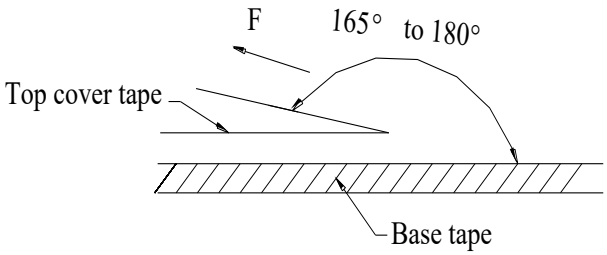
8.3 Taping figure and drawing direction



8.4 Packaging quantities: 500PCS/Reel.

8.5 Peeling strength of cover tape:

The peel force of top cover tape shall be between 0.1N to 1.3N



Room Temp. (℃)	Room Humidity (%)	Room aim (hpa)	Peel Speed Mm/min
5-35	45-85	860-1060	300

9.Products Storage

(1) Storage period

Products which inspected in MICROGATE over 12 months ago should be examined and used, which can be confirmed with inspection No. marked on the container. Solderability should be checked if this period is exceeded.

(2) Storage conditions

Products should be storage in the warehouse on the following conditions:

Temperature: -10 ~+ 40℃

Humidity : Less than 80% relative and humidity

No rapid change on temperature and humidity

(3) Don't keep products in corrosive gases such as sulfur, chlorine gas or acid, or it may cause oxidization of electrode, resulting in poor solderability.

(4) Products should be storage on the palette for the prevention of the influence from humidity, dust and so on.

(5) Products should be storage in the warehouse without heat shock, vibration, direct sunlight and so on.

(6) Products should be storage under the airtight packaged condition.