WALRONY深圳市华容源电子有限公司

Shenzhen Huarongyuan Electronic Co., Ltd.

规格确认书

SPECIFICATION

客　　户 CUSTOMER:	
客 户 料 号 CUSTOMER P/N:	
物 料 名 称	共模滤波器-车规
MODEL NO：	Common Mode Choke Coil-AEC-Q200
料 号 P/N：	RACF 系列 RACF series
文 件 编 号 FILE NO：	23-07

日期：2023-07-06 DATE：July 06, 2023	承办人：刘俊 ISSUEDER：Liu Jun

客户确认 APPROVED BY	
签名： SIGN：	日期： DATE：
结论 RESULT：	

确认后请回传　PLEASE RETURN BY ONE COPY

●特征

高频下的高共模阻抗会影响出色的噪声抑制性能。

RACF4532 系列实现了小尺寸和低矮化。4.5x3.2x2.8 毫米。

100%无铅（Pb）和无卤素，符合 RoHS 标准。
高可靠性-可靠性测试符合 AEC-Q200 标准。

工作温度-55~+150℃（包括自温升）

●FEATURES

High common mode impedance at high frequency effects excellent noise suppression performance.
RACF4532 series realizes small size and low profile.4.5x3.2x2.8 mm.
100%Lead(Pb)&Halogen-Free and RoHS compliant.
High reliability -Reliability tests comply with AEC-Q200.
Operating temperature -55~+150℃(Including self-temperature rise)

●用途

用于汽车 CAN 总线和信号线的共模噪音滤除。

●Applications

Common mode noise filtering for automotive CAN-BUS and signal line.

●品名系统

RACF 4532 - 510 - 2P - T
① ② ③ ④ ⑤

① 产品代号: 绕线式片式共模扼流器。

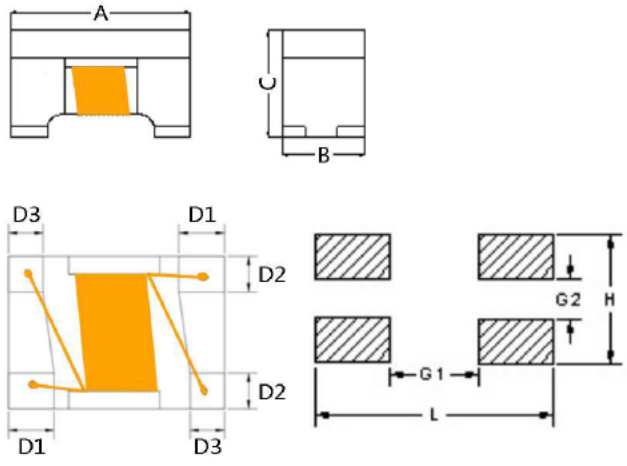
② 尺寸规格: 4532=4.5x3.2(mm)
③ 电感值:510=51μH
④ 引线数量
⑤ 包装：T=卷带包装

●Product Identification

RACF 4532 - 510 - 2P - T
① ② ③ ④ ⑤

① Product symbol : Winding Type Common Mode Choke Coil
② Dimension: 4532=4.5x3.2(mm)
③ Inductance : 510=51μH
④ Number of Lines.
⑤ Packing:T=Tape & Reel

●结构及尺寸



●Structure And Dimension

Units:mm

Series	4532	3225
A	4.5±0.2	3.3±0.2
B	3.2±0.2	2.5±0.2
C	2.8±0.2	2.3±0.2
D1	0.75±0.2	0.55±0.15
D2	0.85±0.2	0.75±0.2
D3	0.60±0.2	0.55±0.15
L	5	3.7
H	3.6	2.3
G1	3.4	2.2
G2	1.7	0.6

●规格 ●Specifications

RACF3225

Part Number	Common mode Impedance (Ω) [10MHz]		Inductance [100kHz/0.1V] (μH)+50/-30%	DC Resistance (Ω) max.	Rated Current (mA)	Rated Volt. (Vdc)	IR (MΩ) min.
RACF3225-110-2P-T	300 min.	550 typ.	11	0.4	300	80	10
RACF3225-220-2P-T	500 min.	1100 typ.	22	0.5	250	80	10
RACF3225-510-2P-T	1000 min.	2600 typ.	51	0.7	200	80	10
RACF3225-101-2P-T	2200 min.	5100 typ.	100	1.5	150	80	10

RACF4532

Part Number	Common mode Impedance (Ω) [10MHz]		Inductance [100kHz/0.1V] (μH)+50/-30%	DC Resistance (Ω) max.	Rated Current (mA)	Rated Volt. (Vdc)	IR (MΩ) min.
RACF4532-110-2P-T	300 min.	600 typ.	11	0.6	360	50	10
RACF4532-220-2P-T	500 min.	1200 typ.	22	1.0	310	50	10
RACF4532-510-2P-T	1000 min.	2800 typ.	51	1.0	230	50	10
RACF4532-101-2P-T	2000 min.	5800 typ.	100	2.0	200	50	10

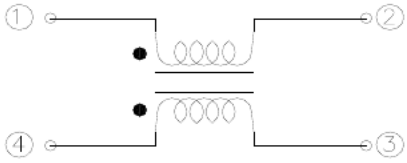
Notes

1.All test data is referenced to 25℃ambient.

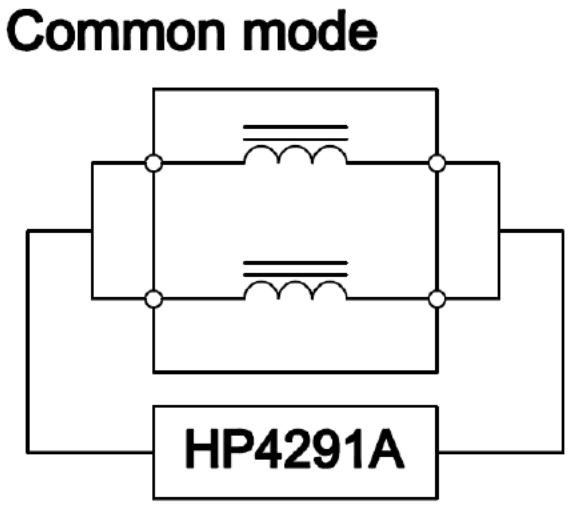
2.Irms (A):DC current (A)that will cause an approximate AT of 40℃(reference ambient temperature is 25℃).

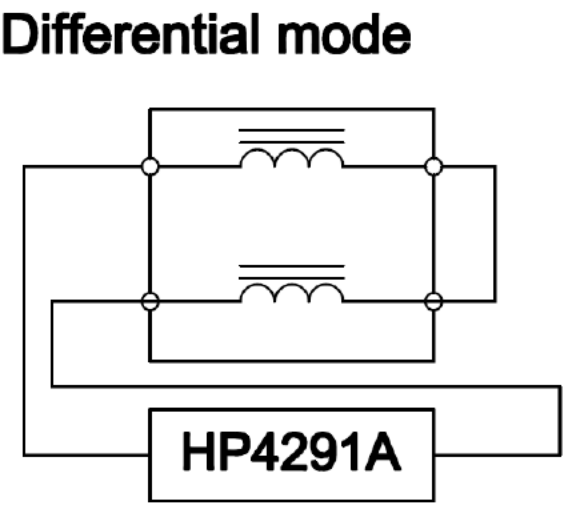
3.The part temperature (ambient temp rise)should not exceed 150℃ under worst case operating conditions.Circuit design,component placement,PWB trace size and thickness,airflow and other cooling provisions.All affect the part temperature.Part temperature should be verified in the end application.

●电气原理图 ●Schematic Diagram



●测量电-2 线 ●Measuring Circuits 2 Line

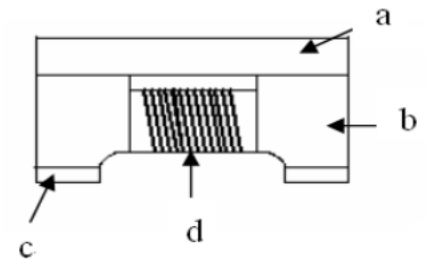




●材质

No.	Description	Specification
a.	Upper Plate	Ferrite
b.	Core	Ferrite Core
c	Termination	Ag/Ni/Sn
d	Wire	Enameled Copper Wire

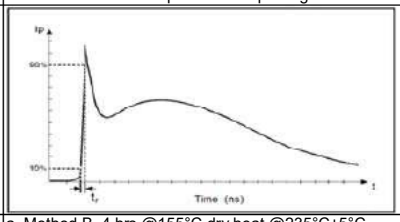
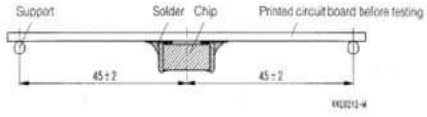
●Materials

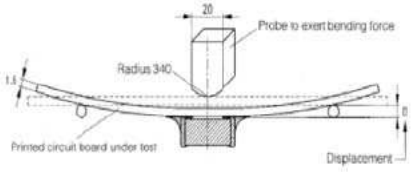
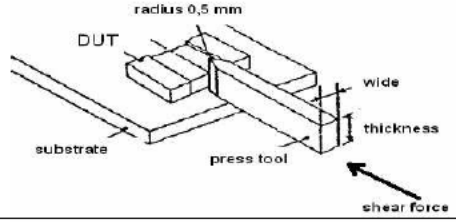


●可靠性和测试条件

●Reliability and Test Condition

Item	Performance	Test Condition
Operating temperature	-55~+150℃(Including self - temperature rise)	
Storage temperature	-55~+125℃(on board)	
Electrical Performance Test		
L(common mode)	Refer to standard electrical characteristics list.	Agilent-4285A+ Agilent -16334A
DCR		Agilent-4338B
I.R.		Agilent4339
Temperature Rise Test	Rated Current ΔT 40℃Max	1.Applied the allowed DC current. 2.Temperature measured by digital surface thermometer
Reliability Test		
High Temperature Exposure(Storage) AEC-Q200	Appearance：No damage. Impedance：within±15% of initial value Inductance：within±10% of initial value RDC：within ±15% of initial value and shall not exceed the specification value	Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020DClassification Reflow Profiles Temperature：150±2℃ Duration ：1000hrs Min. Measured at room temperature after placing for 24±2 hrs
Temperature Cycling AEC-Q200		Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020DClassification Reflow Profiles Condition for 1 cycle Step1：-55±2℃ 30min Min. Step2：150±2℃ transition time 1min MAX. Step3：150±2℃ 30min Min. Step4：Low temp. transition time 1min MAX. Number of cycles： 1000 Measured at room temperature after placing for 24±2 hrs
Biased Humidity (AEC-Q200)		Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020DClassification Reflow Profiles Humidity ：85±3%R.H, Temperature：85℃±2℃ Duration：1000hrs Min Measured at room temperature after placing for24±2hrs
High Temperature Operational Life (AEC-Q200)		Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020DClassification Reflow Profiles Temperature：150±2℃ Duration ：1000hrs Min. with 100% rated current. Measured at room temperature after placing for24±2hrs
External Visual	Appearance：No damage.	Inspect device construction, marking and workmanship. Electrical Test not required.
Physical Dimension	According to the product specification size measurement	According to the product specification size measurement
Resistance to Solvents	Appearance：No damage.	Add aqueous wash chemical - OKEM clean or equivalent.
Mechanical Shock	Appearance：No damage. Impedance：within±15% of initial value Inductance：within±10% of initial value RDC：within ±15% of initial value and shall not exceed the specification value	Type / Peak value (g's) / Normal duration (D) (ms) / Wave form / Velocity change (Vi)ft/sec SMD / 100 / 6 / Half-sine / 12.3 Lead / 100 / 6 / Half-sine / 12.3 shocks in each direction along 3 perpendicular axes.

<table>
<tr><th>Item</th><th>Performance</th><th>Test Condition</th></tr>
<tr><td>Vibration</td><td rowspan="3">Appearance：No damage.
Impedance：within±15% of initial value
Inductance：within±10% of initial value
RDC：within ±15% of initial value and shall not exceed the specification value</td><td>PC/JEDEC J-STD-020DClassification Reflow Profiles
Oscillation Frequency:10Hz～2KHz～10Hz for 20 minute
Equipment： Vibration checker
Total Amplitude:5g
Testing Time : 12 hours(20 minutes, 12 cycles each of 3 orientations)。</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>Test condition ：
<table>
<tr><th>Temperature(℃)</th><th>Time(s)</th><th>Temperature ramp/immersion and emersion rate</th><th>Number of heat cycles</th></tr>
<tr><td>250±5(soldertemp)</td><td>30±5</td><td>1℃/s-4℃/s; time above 183℃, 90s-120s</td><td>3</td></tr>
</table></td></tr>
<tr><td>Thermal shock
(AEC-Q200)</td><td>Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020DClassification Reflow Profiles
Condition for 1 cycle
Step1：-55±2℃ 15±1min
Step2：150±2℃ within 20Sec.
Step3：150±2℃ 15±1min
Number of cycles： 300
Measured at room fempraturc after placing fo24±2hrs</td></tr>
<tr><td>ESD</td><td>Appearance：No damage.</td><td> 
</td></tr>
<tr><td>Solderability</td><td>More than 95% of the terminal electrode should be covered with solder。</td><td>a. Method B, 4 hrs @155°C dry heat @235°C±5°C
Testing Time :5 +0/-0.5 seconds
b. Method D category 3. (8hours ± 15 min)@ 260°C±5°C
Testing Time :30 +0/-0.5 seconds</td></tr>
<tr><td>Electrical Characterization</td><td>Refer Specification for Approval</td><td>Summary to show Min, Max, Mean and Standard deviation .</td></tr>
<tr><td>Flammability</td><td>Electrical Test not required.</td><td>V-0 or V-1 are acceptable.</td></tr>
<tr><td>Board Flex</td><td>Appearance：No damage</td><td>Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020DClassification Reflow Profiles
Place the 100mm X 40mm board into a fixture similar to the one shown in below Figure with the component facing down. The apparatus shall consist of mechanical means to apply a force which will bend the board (D) x = 2 mm minimum. The duration of the applied forces shall be 60 (+ 5) sec. The force is to be applied only once to the board.
 


</td></tr>
<tr><td>Terminal Strength(SMD)</td><td>Appearance：No damage</td><td>Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020D Classification Reflow Profiles
With the component mounted on a PCB with the device to be tested, apply a 17.7 N (1.8 Kg) force to the side of a device being tested. This force shall be applied for 60 +1 seconds. Also the force shall be applied gradually as not to apply a shock to the component being tested.
 
</td></tr>
</table>

●焊接和安装

●Soldering and Mounting

1. Soldering

Mildly activated rosin fluxes are preferred. WARONY terminations are suitable for all wave and re-flow soldering systems. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools.

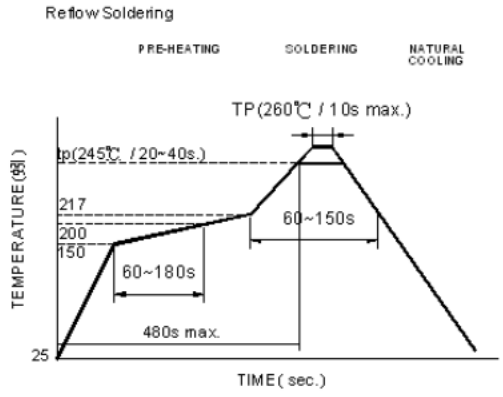
1.1 Solder re-flow:

Recommended temperature profiles for re-flow soldering in Figure 1.

1.2 Soldering Iron(Figure 2):

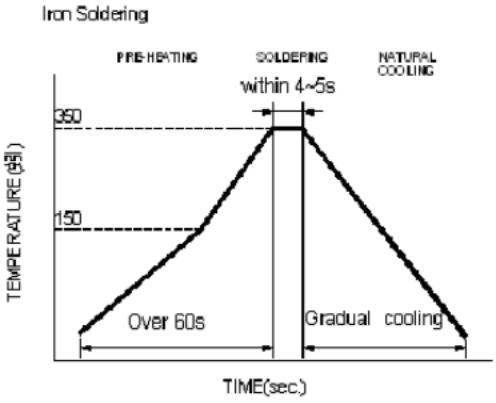
Products attachment with a soldering iron is discouraged due to the inherent process control limitations. In the event that a soldering iron must be employed the following precautions are recommended.

- Preheat circuit and products to 150℃
- Never contact the ceramic with the iron tip
- Use a 20 watt soldering iron with tip diameter of 1.0mm
- 350℃ tip temperature (max)
- 1.0mm tip diameter (max)
- Limit soldering time to 4~5 sec.



Reflow times: 3 times max.

Fig.1

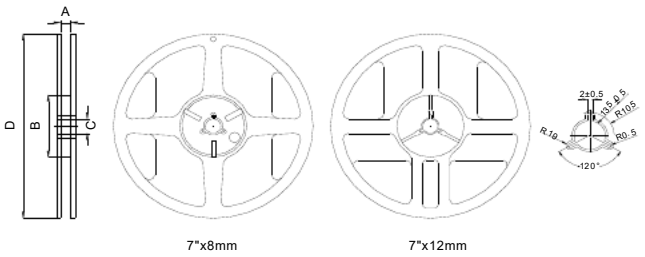


Iron Soldering times: 1 times max.

Fig.2

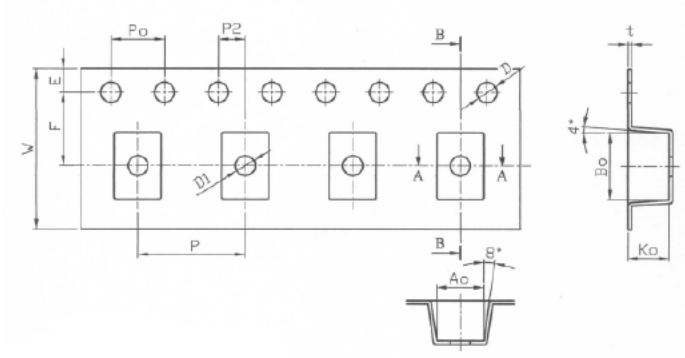
●包装 ●Packaging Information

1. Reel Dimension



Type	A(mm)	B(mm)	C(mm)	D(mm)
7"x12mm	13.5±0.5	60±2	13.5±0.5	178±2

2. Tape Dimension / 12mm

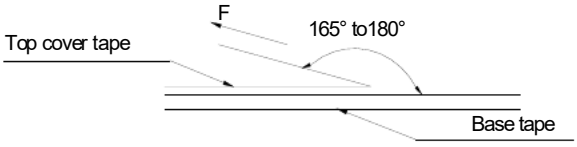


Series	P(mm)	Po(mm)	P2(mm)	Bo(mm)	Ao(mm)	Ko(mm)	D(mm)	E(mm)	F(mm)	W(mm)	t(mm)	D1(mm)
4532	8.00±0.10	4.00±0.10	2.00±0.05	4.90±0.10	3.60±0.10	3.00±0.10	1.50+0.10/-0.00	1.75±0.10	5.50±0.05	12.00±0.10	0.26±0.05	1.50±0.10

3. Packaging Quantity

Chip size	Chip/Reel	Inner Box	Middle Box	Carton
4532	500	2000	10000	20000

4. Tearing Off Force



The force for tearing off cover tape is 15 to 80 grams in the arrow direction under the following conditions.

Room Temp. (℃)	Room Humidity (%)	Room atm (hPa)	Tearing Speed mm/min
5~35	45~85	860~1060	300

Application Notice

・Storage Conditions(component level)
To maintain the solderability of terminal electrodes:
1. WARONY products meet IPC/JEDEC J-STD-020D standard-MSL, level 1.
2. Temperature and humidity conditions: Less than 40℃ and 60% RH.
3. Recommended products should be used within 12 months form the time of delivery.
4. The packaging material should be kept where no chlorine or sulfur exists in the air.

・Transportation
1. Products should be handled with care to avoid damage or contamination from perspiration and skin oils.
2. The use of tweezers or vacuum pick up is strongly recommended for individual components.
3. Bulk handling should ensure that abrasion and mechanical shock are minimized.