Specification for Approval

Date: 2015/12/31

Halogen-free Pb-free Certificate of Green Partner

Customer : Qisda

TAI-TECH P/N: FCM1608KF-121T06

CUSTOMER P/N: 6H.12160.0T2

DESCRIPTION:

QUANTITY: pcs

REMARK:		
Customer Approval Feedback		

西北臺慶科技股份有限公司
TAI-TECH Advanced Electronics Co., Ltd

■ 西北臺慶科技股份有限公司
TAI-TECH Advanced Electronics Co., Ltd
Headquarter:
NO.1 YOU 4TH ROAD, YOUTH INDUSTRIAL DISTRICT, YANG-MEI,
TAO-YUAN HSIEN, TAIWAN, R.O.C.
TEL: +886-3-4641148 FAX: +886-3-4643565
http://www.tai-tech.com.tw
E-mail: sales@tai-tech.com.tw

□ 東莞臺慶精密電子有限公司
DONGGUAN TAI-TECH ADVANCED ELECTRONICS CO., LTD
JITIGANG MANAGEMENT DISTRICT, HUANGJIANG, DONGGUAN,
GUANGDONG, CHINA
TEL: +86-769-3365488 FAX: +86-769-3366896
E-mail: twnwe@pub.dgnet.gd.cn

Office:
金亨國際有限公司
KAMHENG INTERNATIONAL LIMITED
TEL: +86-852-25772033 FAX: +86-852-28817778

□ 臺慶精密電子(昆山)有限公司
TAI-TECH ADVANCED ELECTRONICS(KUNSHAN) CO., LTD
SHINWHA ROAD, KUNJIA HI-TECH INDUSTRIAL PARK, KUN-SHAN,
JIANG-SU, CHINA
TEL: +86-512-57619396 FAX: +86-512-57619688
E-mail: hui@tai-tech.com.tw

Office:
北欣國際有限公司
NORTH STAR INTERNATIONAL LIMITED
TEL: +86-512-57619396 FAX: +86-512-57619688

Sales Dep.

APPROVED	CHECKED
戴若伊 Maggie Dai	王塏惠 Dora Wang

R&D Center

APPROVED	CHECKED	DRAWN
楊祥忠 Mike Yang	詹偉特 Jack Chan	張嘉玲 Alin Chang

Ferrite Chip Bead(Lead Free)

FCM1608KF-121T06

ECN HISTORY LIST

REV	DATE	DESCRIPTION	APPROVED	CHECKED	DRAWN
1.0	13/06/06	變更可靠度條件	楊祥忠	羅培君	張嘉玲
2.0	14/01/24	變更電鍍錫層厚度 3.0um min.=>3.5um min.	楊祥忠	羅培君	張嘉玲
3.0	14/08/01	變更 Reflow 圖示	楊祥忠	羅培君	張嘉玲
3.1	14/08/01	修正包裝帶尺寸	楊祥忠	羅培君	張嘉玲
4.0	14/10/13	訂正 1608 包裝帶 Ao 尺寸	楊祥忠	羅培君	張嘉玲
備註					

Ferrite Chip Bead(Lead Free)

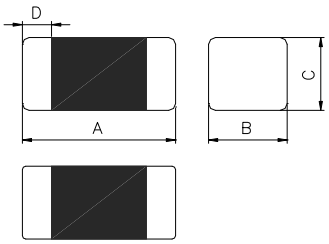
FCM1608KF-121T06

1.Features

1. Monolithic inorganic material construction.
2. Closed magnetic circuit avoids crosstalk.
3. S.M.T. type.
4. Suitable for reflow soldering.
5. Shapes and dimensions follow E.I.A. spec.
6. Available in various sizes.
7. Excellent solder ability and heat resistance.
8. High reliability.
9. 100% Lead(Pb) & Halogen-Free and RoHS compliant.

Halogen-free Pb-free Certificate of Green Partner

2.Dimensions



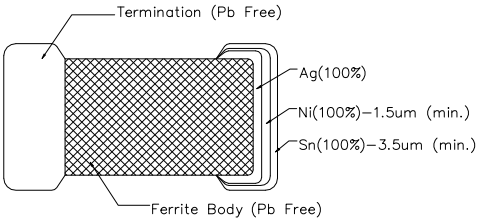
Chip Size	
A	1.60±0.15
B	0.80±0.15
C	0.80±0.15
D	0.30±0.20

Units: mm

3.Part Numbering

FCM	1608	KF	-	121	T	06
A	B	C		D	E	F

A: Series
B: Dimension L x W
C: Material Lead Free Material
D: Impedance 121=120Ω
E: Packaging T=Taping and Reel, B=Bulk(Bags)
F: Rated Current 06=600mA

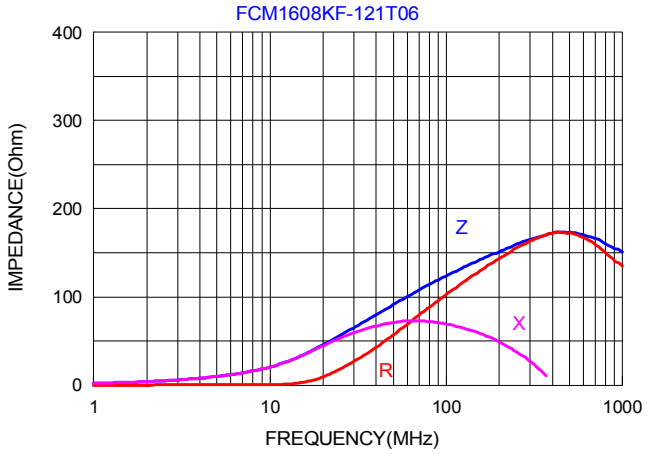


4.Specification

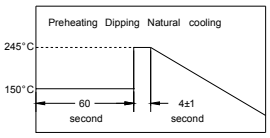
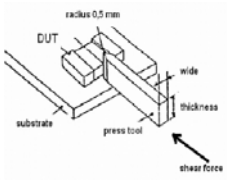
Tai-Tech Part Number	Impedance (Ω)	Test Frequency (Hz)	DC Resistance (Ω) max.	Rated Current (mA) max.
FCM1608KF-121T06	120±25%	60mV/100M	0.25	600

- Rated current: based on temperature rise test
- In compliance with EIA 595

■ Impedance-Frequency Characteristics



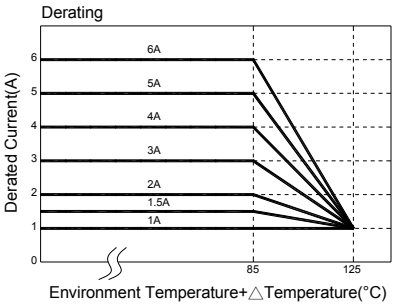
5. Reliability and Test Condition

<table>
<tr><th>Item</th><th colspan="9">Performance</th><th>Test Condition</th></tr>
<tr><td>Series No.</td><td>FCB</td><td>FCM</td><td>HCB</td><td>GHB</td><td>FCA</td><td>FCI</td><td>FHI</td><td>FCH</td><td>HCI</td><td>--</td></tr>
<tr><td>Operating Temperature</td><td colspan="5">-40~+125℃
(Including self-temperature rise)</td><td colspan="4">-40~+105℃
(Including self-temperature rise)</td><td>--</td></tr>
<tr><td>Transportation
Storage Temperature</td><td colspan="5">-40~+125℃
(on board)</td><td colspan="4">-40~+105℃
(on board)</td><td>For long storage conditions, please see the Application Notice</td></tr>
<tr><td>Impedance (Z)</td><td colspan="9" rowspan="5">Refer to standard electrical characteristics list</td><td>Agilent4291
Agilent E4991
Agilent4287
Agilent16192</td></tr>
<tr><td>Inductance (Ls)</td><td></td></tr>
<tr><td>Q Factor</td><td></td></tr>
<tr><td>DC Resistance</td><td>Agilent 4338</td></tr>
<tr><td>Rated Current</td><td>DC Power Supply
Over Rated Current requirements, there will be some risk</td></tr>
<tr><td>Temperature Rise Test</td><td colspan="9">Rated Current < 1A ΔT 20℃Max
Rated Current ≧ 1A ΔT 40℃Max</td><td>1. Applied the allowed DC current.
2. Temperature measured by digital surface thermometer.</td></tr>
<tr><td>Resistance to Soldering Heat</td><td colspan="9">Appearance：No damage.
Impedance：within±15% of initial value
Inductance：within±10% of initial value
Q：Shall not exceed the specification value.
RDC：within ±15% of initial value and shall not exceed the specification value</td><td>Number of heat cycles: 1
<table><tr><th>Temperature (°C)</th><th>Time (s)</th><th>Temperature ramp/immersion and emersion rate</th></tr><tr><td>260 ±5 (solder temp)</td><td>10 ±1</td><td>25mm/s ±6 mm/s</td></tr></table>Depth: completely cover the termination</td></tr>
<tr><td>Solderability</td><td colspan="9">More than 95% of the terminal electrode should be covered with solder.
</td><td>Preheat: 150℃,60sec.
Solder: Sn96.5%-Ag3%-Cu0.5%
Solder temperature: 245±5℃
Flux for lead free: Rosin. 9.5%
Depth: completely cover the termination.
Dip time: 4±1sec.</td></tr>
<tr><td>Terminal strength</td><td colspan="9">Appearance：No damage.
Impedance：within±15% of initial value
Inductance：within±10% of initial value
Q：Shall not exceed the specification value.
RDC：within ±15% of initial value and shall not exceed the specification value
</td><td>Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020D Classification Reflow Profiles)
Component mounted on a PCB apply a force (>0805:1kg <=0805:0.5kg)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 shock the component being tested.</td></tr>
<tr><td>Bending</td><td colspan="9">Appearance：No damage.
Impedance：within±10% of initial value
Inductance：within±10% of initial value
Q：Shall not exceed the specification value.
RDC：within ±15% of initial value and shall not exceed the specification value</td><td>Shall be mounted on a FR4 substrate of the following dimensions:>=0805:40x100x1.2mm
<0805:40x100x0.8mm
Bending depth:>=0805:1.2mm
<0805:0.8mm
Duration of 10 sec for a min.</td></tr>
<tr><td>Vibration Test</td><td colspan="9">Appearance：No damage.
Impedance：within±15% of initial value
Inductance：within±10% of initial value
Q：Shall not exceed the specification value.
RDC：within ±15% of initial value and shall not exceed the specification value</td><td>Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020D Classification Reflow Profiles)
Oscillation Frequency: 10～2K～10Hz for 20 minutes
Equipment： Vibration checker
Total Amplitude:1.52mm±10%
Testing Time : 12 hours(20 minutes, 12 cycles each of 3 orientations)。</td></tr>
<tr><td>Shock</td><td colspan="9">Appearance：No damage.
Impedance：within±15% of initial value
Inductance：within±10% of initial value
Q：Shall not exceed the specification value.
RDC：within ±15% of initial value and shall not exceed the specification value</td><td>Test condition:
<table><tr><th>Type</th><th>Peak Value (g's)</th><th>Normal duration (D) (ms)</th><th>Wave form</th><th>Velocity change (Vi)ft/sec</th></tr><tr><td>SMD</td><td>1,500</td><td>0.5</td><td>Half-sine</td><td>15.4</td></tr><tr><td>Lead</td><td>100</td><td>6</td><td>Half-sine</td><td>12.3</td></tr></table></td></tr>
</table>

Item	Performance	Test Condition
Life test	Appearance: no damage. Impedance: within±15%of initial value. Inductance: within±10%of initial value. Q：Shall not exceed the specification 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-020D Classification Reflow Profiles) Temperature: 125±2℃(bead), 85±2℃(inductor) Applied current: rated current. Duration: 1000±12hrs. Measured at room temperature after placing for 24±2 hrs.
Load Humidity		Preconditioning: Run through IR reflow for 2 times.(IPC/JEDEC J-STD-020D Classification Reflow Profiles) Humidity: 85±2%R.H. Temperature: 85±2℃. Duration: 1000hrs Min. with 100% rated current. Measured at room temperature after placing for 24±2 hrs.
Thermal shock	Appearance: no damage. Impedance: within±15%of initial value. Inductance: within±10%of initial value. Q：Shall not exceed the specification 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-020D Classification Reflow Profiles) Condition for 1 cycle Step1: -40±2℃ 30±5 min. Step2: 25±2℃ ≦0.5min Step3: +105±2℃ 30±5min. Number of cycles: 500 Measured at room temperature after placing for 24±2 hrs.
Low temperature storage test		Temperature: -40±2℃. Duration: 500±8hrs. Measured at room temperature after placing for 2 to 3hrs.
Insulation Resistance	IR>1GΩ	Chip Inductor Only Test Voltage:100±10%V for 30Sec.

****Derating Curve**

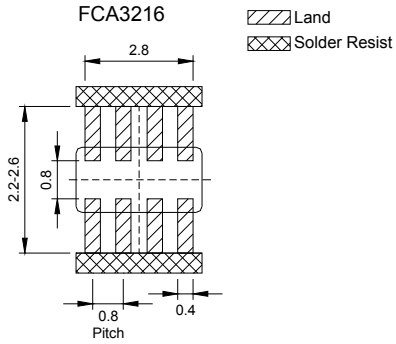
For the ferrite chip bead which withstanding current over 1.5A, as the operating temperature over 85℃, the derating current information is necessary to consider with. For the detail derating of current, please refer to the Derated Current vs. Operating Temperature curve.

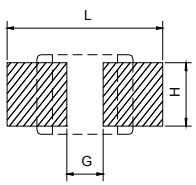


6.Soldering and Mounting

6-1. Recommended PC Board Pattern

Chip Size						Land Patterns For Reflow Soldering		
Series	**Type**	**A(mm)**	**B(mm)**	**C(mm)**	**D(mm)**	**L(mm)**	**G(mm)**	**H(mm)**
FCB	0603	0.6±0.03	0.30±0.03	0.30±0.03	0.15±0.05	0.80	0.30	0.30
FCM	1005	1.0±0.10	0.50±0.10	0.50±0.10	0.25±0.10	1.50	0.40	0.55
HCB	1608	1.6±0.15	0.80±0.15	0.80±0.15	0.30±0.20	2.60	0.60	0.80
GHB	2012	2.0±0.20	1.25±0.20	0.85±0.20	0.50±0.30	3.00	1.00	1.00
FCI		2.0±0.20	1.25±0.20	1.25±0.20	0.50±0.30			
FHI	3216	3.2±0.20	1.60±0.20	1.10±0.20	0.50±0.30	4.40	2.20	1.40
FCH	3225	3.2±0.20	2.50±0.20	1.30±0.20	0.50±0.30	4.40	2.20	3.40
HCI	4516	4.5±0.20	1.60±0.20	1.60±0.20	0.50±0.30	5.70	2.70	1.40
	4532	4.5±0.20	3.20±0.20	1.50±0.20	0.50±0.30	5.90	2.57	4.22





PC board should be designed so that products can prevent damage from mechanical stress when warping the board.

6-2. Soldering

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

Note.

If wave soldering is used ,there will be some risk.

Re-flow soldering temperatures below 240 degrees, there will be non-wetting risk

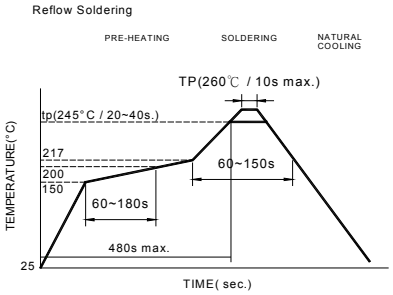
6-2.1 Lead Free Solder re-flow:

Recommended temperature profiles for lead free re-flow soldering in Figure 1. (Refered to J-STD-020C)

6-2.2 Soldering Iron:

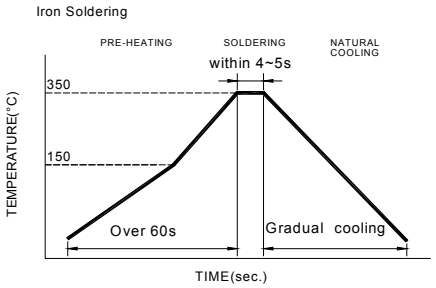
Products attachment with a soldering iron is discouraged due to the inherent process control limitations. If a soldering iron must be employed the following precautions are recommended. for Iron Soldering in Figure 2.

- 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 4~5sec.



Reflow times: 3 times max

Fig.1



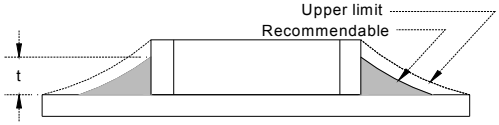
Iron Soldering times：1 times max

Fig.2

6-2.3 Solder Volume:

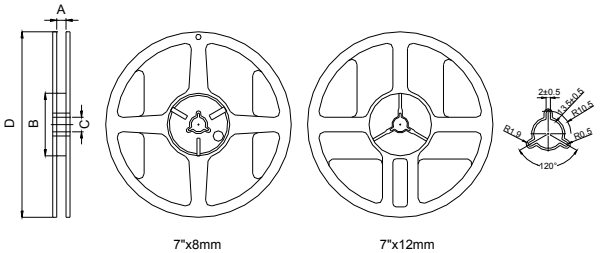
Accordingly increasing the solder volume, the mechanical stress to product is also increased. Exceeding solder volume may cause the failure of mechanical or electrical performance. Solder shall be used not to be exceed as shown in right side:

Minimum fillet height = soldering thickness + 25% product height



7.Packaging Information

7-1. Reel Dimension

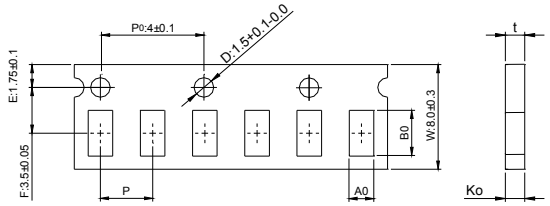


7"x8mm 7"x12mm

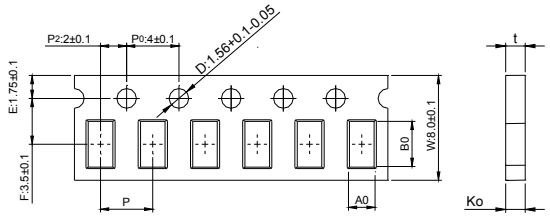
Type	A(mm)	B(mm)	C(mm)	D(mm)
7”x8mm	9.0±0.5	60±2	13.5±0.5	178±2
7”x12mm	13.5±0.5	60±2	13.5±0.5	178±2

7-2.1 Tape Dimension / 8mm

■Material of taping is paper

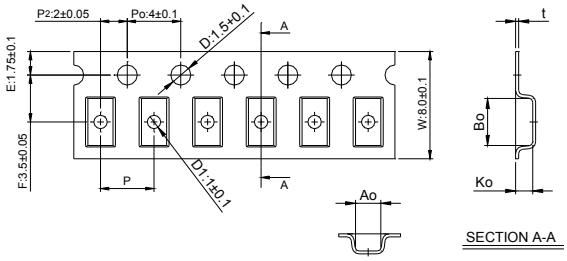


Size	Bo(mm)	Ao(mm)	Ko(mm)	P(mm)	t(mm)
060303	0.70±0.06	0.40±0.06	0.45max	2.0±0.05	0.45max
100505	1.12±0.03	0.62±0.03	0.60±0.03	2.0±0.05	0.60±0.03



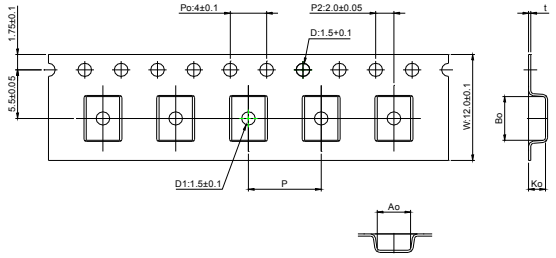
Size	Bo(mm)	Ao(mm)	Ko(mm)	P(mm)	t(mm)
160808	1.80±0.05	0.96+0.05/-0.03	0.95±0.05	4.0±0.10	0.95±0.05
201209	2.10±0.05	1.30±0.05	0.95±0.05	4.0±0.10	0.95±0.05

■Material of taping is plastic



Size	Bo(mm)	Ao(mm)	Ko(mm)	P(mm)	t(mm)	D1(mm)
201212	2.10±0.10	1.28±0.10	1.28±0.10	4.0±0.10	0.22±0.05	1.0±0.10
321611	3.35±0.10	1.75±0.10	1.25±0.10	4.0±0.10	0.23±0.05	1.0±0.10
322513	3.42±0.10	2.77±0.10	1.55±0.10	4.0±0.10	0.22±0.05	1.0±0.10
321609	3.40±0.10	1.77±0.10	1.04±0.10	4.0±0.10	0.22±0.05	1.0±0.10

7-2.2 Tape Dimension / 12mm

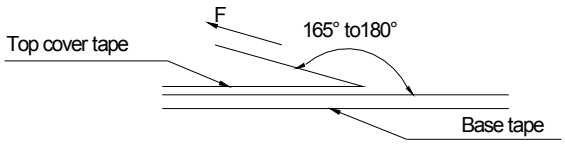


Size	Bo(mm)	Ao(mm)	Ko(mm)	P(mm)	t(mm)	D1(mm)
451616	4.70±0.10	1.75±0.10	1.75±0.10	4.0±0.10	0.24±0.05	1.5±0.1
453215	4.70±0.10	3.45±0.10	1.60±0.10	8.0±0.10	0.24±0.05	1.5±0.1

7-3. Packaging Quantity

Chip Size	453215	451616	322513	321611	321609	201212	201209	160808	100505	060303
Chip / Reel	1000	2000	2500	3000	3000	2000	4000	4000	10000	15000
Inner box	4000	8000	12500	15000	15000	10000	20000	20000	50000	75000
Middle box	20000	40000	62500	75000	75000	50000	100000	100000	250000	375000
Carton	40000	80000	125000	150000	150000	100000	200000	200000	500000	750000

7-4. Tearing Off Force



The force for tearing off cover tape is 15 to 60 grams in the arrow direction under the following conditions.

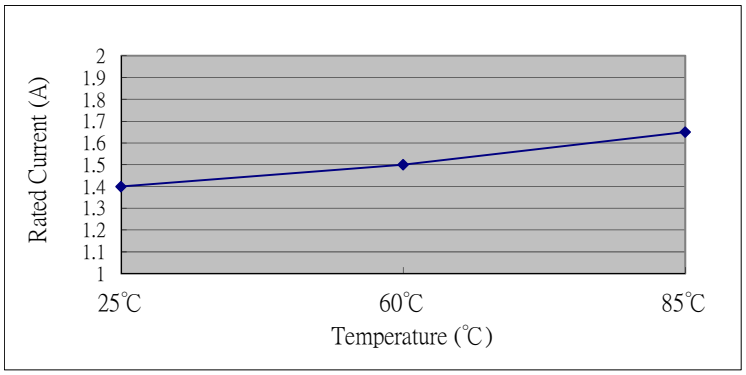
Room Temp. (℃)	Room Humidity (%)	Room atm (hPa)	Tearing Speed mm/min
5~35	45~85	860~1060	300

Application Notice

・Storage Conditions(component level)
To maintain the solder ability of terminal electrodes:
1. TAI-TECH 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 from 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.

8.Impedance vs Thermal Curves



9. 出貨標籤貼紙編碼原則

9-1.條碼貼紙



貼附位置:料盤下方

條碼材質:銅版紙

條碼紙大小:80*50mm

條碼分辨率:300DPI

顏色:白紙+黑字

文字字體:Arial

黏貼方式:自黏

條碼內容依 Qisda 要求規範

9-2.內盤標籤貼紙

CUST P/N: 6H.00216.0T1

DESC: HCB 1608KF-221T20

QUANTITY: 4,000 PCS

DATE: 2009/11/04

LOT NO: KMS99L159

貼附位置:料盤上方

條碼材質:模造紙

條碼紙大小:88*36mm

顏色:白紙+黑字

文字字體:Roman

黏貼方式:自黏

內容說明:

CUST P/N:QISDA 料號

DESC:TAI-TECH 品名

QUANTITY:數量(單位 PCS)

DATE:西曆

LOT NO:英文與阿拉伯數字 7-9 碼

9-3.外箱標籤貼紙

CUST P/N: 6H.60160.0T1

DESC: HCB 1608KF-601T10

QUANTITY: 100,000 PCS

DATE: 2014/10/21

LOT NO:



同內盤標籤貼紙+無鉛 Pb 貼紙

貼附位置:外箱左上方