



SINCE 1985



香港電阻製造廠

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南充溢辉电子科技有限公司

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AN ISO 9001: 2015 CERTIFIED MANUFACTURER

AN ISO 45001 : 2018 MANUFACTURER

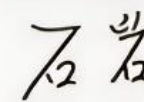
AN ISO 14001 : 2015 MANUFACTURER

AN IATF 16949 : 2016 MANUFACTURER

SPECIFICATIONS FOR APPROVAL

Customer:

Name of Product: High Power Chip Resistors - FPF Series

相关业务 Sales Executive	工程部 Engineering	品质部 Quality Control	核准 Approval
			
客户确认 Customer Approval	客户确认 Customer Approval	客户确认 Customer Approval	客户确认 Customer Approval

* A member of the Hong Kong Resistors Manufactory Group of Companies *

Chip Resistors

本公司产品符合ROHS、REACH、TSCA、POPS、PAHS等环保标准。
The products of our company comply with environmental protection standards
such as ROHS、REACH、TSCA、POPS、PAHS etc.

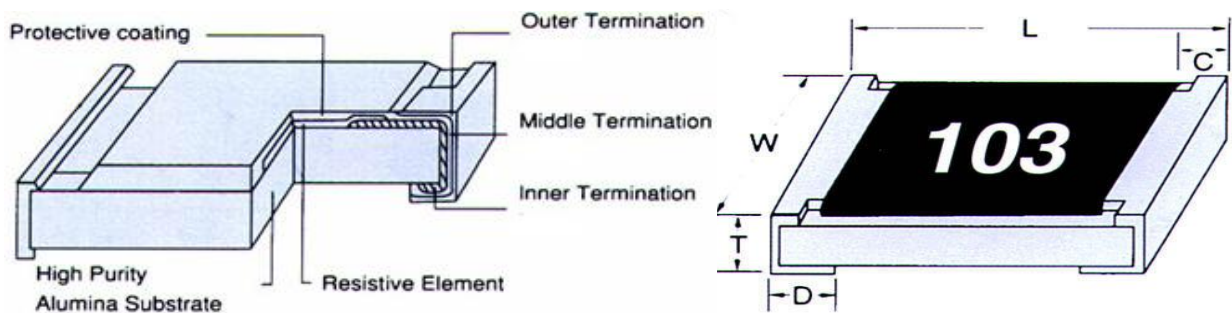
特性 (Features)

- 轻薄短小：小型轻量,大幅缩小 PC 板面积及重量。
Small size and light weight with size range per international standard
- 装配性佳：外观尺寸均匀精确,易于装配。
Highly stable in auto-placement surface mounting application
- 可使用于波峰焊及回流焊。
Compatible with both wave soldering and reflow soldering

料号编码 (Part Number)

FPF	05	27K	J	E	2W
Type	Size	Value	Tolerance	TCR(PPM/°C)	Power
型号	尺寸	阻值	精度	温度系数	功率
	01 : 0201		F : ±1%	E : ±100	1/16W
	02 : 0402		J : ±5%	F : ±200	1/10W
	03 : 0603			H : ±400	1/8W
	05 : 0805				1/4W
	06 : 1206				1/3W
	10 : 1210				1/2W
	20 : 2010				2/3W
	25 : 2512				3/4W
					1W
					1.5W
					2W

构造图 (Configuration)

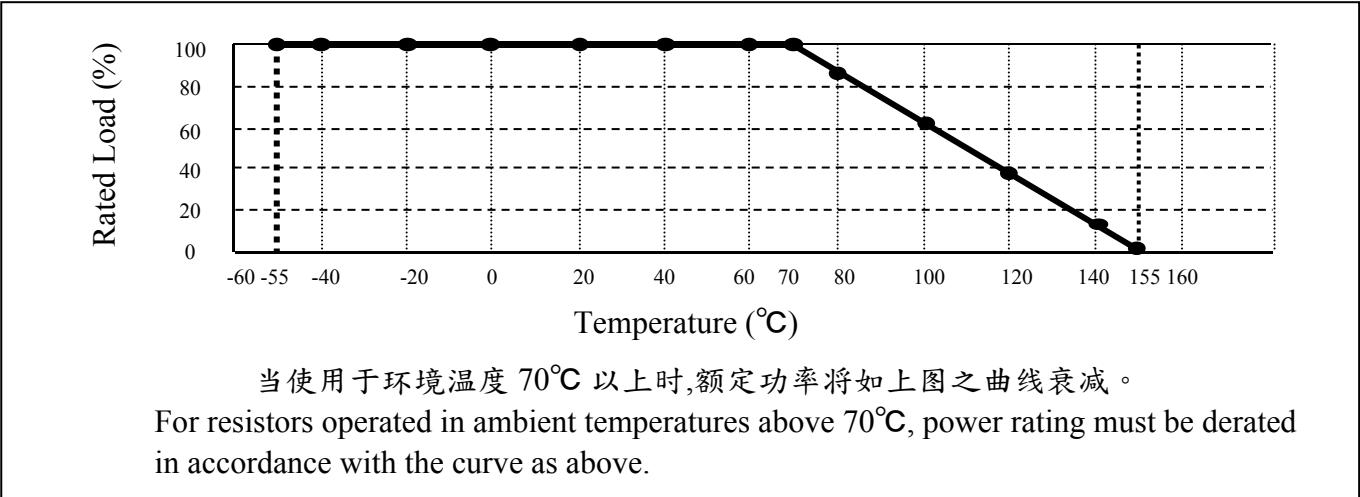


尺寸 (Dimensions)

(unit: mm)

Size	L	W	T	C	D
0201	0.60 ±0.03	0.30 ±0.03	0.23 ±0.03	0.15 ±0.05	0.15 ±0.05
0402	1.00 ±0.10	0.50 ±0.05	0.35 ±0.05	0.20 ±0.10	0.25 ±0.10
0603	1.60 ±0.10	0.80 ±0.10	0.45 ±0.10	0.25 ±0.15	0.30 ±0.15
0805	2.00 ±0.10	1.25 ±0.10	0.50 ±0.10	0.35 ±0.20	0.40 ±0.20
1206	3.10 ±0.10	1.55 ±0.10	0.55 ±0.10	0.45 ±0.20	0.40 ±0.20
1210	3.10 ±0.10	2.50 ±0.10	0.55 ±0.10	0.45 ±0.25	0.45 ±0.25
2010	5.00 ±0.20	2.50 ±0.15	0.55 ±0.10	0.60 ±0.25	0.50 ±0.25
2512	6.35 ±0.20	3.10 ±0.15	0.65 ±0.10	0.60 ±0.25	1.80 ±0.25

功率衰减曲线 (Power Derating Curve)



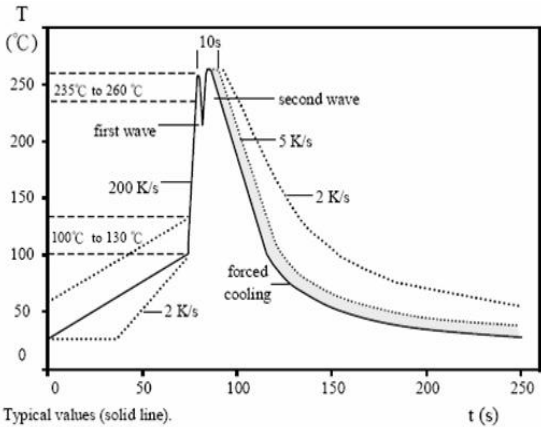
额定 (Rating)

型号 Type	FPF01	FPF02	FPF03	FPF05	FPF06	FPF10	FPF20	FPF25
尺寸 Size	0201	0402	0603	0805	1206	1210	2010	2512
额定功率 Power Rating at 70℃	1/16W	1/10W 1/8W	1/8W 1/4W	1/4W	1/3W 1/2W	1/2W 2/3W 3/4W	1W	1.5W 2W
最高使用电压 Max RCWV	25V	50V	50V	150V	200V	200V	200V	250V
最高过负荷电压 Max Overload Voltage	50V	100V	100V	300V	400V	400V	400V	500V
最高使用电流 Jumper<50mΩ	0.5A	1A	1A	2A	2A	2A	2A	2A
使用温度范围 Operating Temperature Range	-55~+155℃							
标准阻值范围 Standard Resistance Range	0Ω	0~50mΩ						
	±1% (E-96)	1Ω~10MΩ		1Ω~10MΩ				
	±5% (E-24)	1Ω~10MΩ		1Ω~22MΩ				

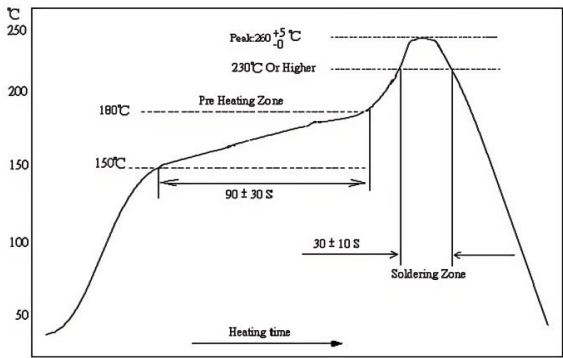
* 工作电压根据阻值按公式 $V=\sqrt{P \cdot R}$ 计算，或者采用上面提供的最高使用电压。
The working voltage is calculated based on the resistance value following the formula of $V=\sqrt{P \cdot R}$ or to its maximum extent as indicated above.

* 过负荷电压根据阻值按公式 $V=2.5\sqrt{P \cdot R}$ 计算，或者采用上面提供的最高过负荷电压。
The overload voltage is calculated based on the resistance value following the formula of $V=2.5\sqrt{P \cdot R}$ or to its maximum extent as indicated above.

焊接温度曲线 (Soldering Temperature Curve)



Typical values (solid line).
Process limits (dotted line).
波峰焊 (WAVE Soldering)



回流焊 (IR Reflow Soldering)

规格说明及测试方法 (Specifications and Test Methods)

ITEM	SPECIFICATIONS	TEST METHOD
焊锡性 Solderability	Over 95% of termination must be covered with solder	JIS C 5201 4.17 / MIL-STD-202G METHOD 208H / IEC 60115-1 4.17 Reflow Soldering: Bath temperature:(260±10)°C, Immersion time:(2±0.5)s WAVE Soldering: Bath temperature:(235±5)°C, Immersion time:(2±0.5)s
耐焊性 Resistance to Solder Heat	J: $\Delta R \leq \pm(1\% + 0.05\Omega)$ F: $\Delta R \leq \pm(0.5\% + 0.05\Omega)$ No mechanical damage	JIS C 5201 4.18 / MIL-STD-202G METHOD 210F / IEC 60115-1 4.18 The temperature of the solder bath shall be (260±5)°C, The immersion time shall be (5±0.5)s or (10±1)s as prescribed by the detail specification
温度系数 Temperature Coefficient of Resistance (TCR)	0402以下规格(0402 & 0201): 1Ω~10Ω;>3.3M: ±400ppm/°C 10Ω(excluding 10Ω)~3.3M: ±200ppm/°C 0603以上规格(0603 or above): 1Ω~10Ω;>1M: ±200ppm/°C 10Ω(excluding 10Ω)~1M: ±100ppm/°C	JIS C 5201 4.8 / MIL-STD-202G METHOD 304 / IEC 60115-1 4.8 The temperature characteristic or temperature coefficient of resistance is not specified for resistance values of less than 5R owing to difficulty of accurate measurement
短时间过负荷 Short Time Overload	J: $\Delta R \leq \pm(2\% + 0.05\Omega)$ F: $\Delta R \leq \pm(1\% + 0.05\Omega)$	JIS C 5201 4.13/IEC 60115-1 4.13 2.5×Rated voltage or Max. Overload Voltage for 2 sec. measure resistance after 30 minutes
恒温恒湿寿命 试验 Load Life Humidity	J: $\Delta R \leq \pm(3\% + 0.05\Omega)$ F: $\Delta R \leq \pm(1\% + 0.05\Omega)$	JIS C 5201 4.24/MIL-STD-202G Method 106G / IEC 60115-1 4.24 Maintain the temperature of the resistor at 40±2°C and 90~95% RH with the rated voltage applied. Cycle ON for 1.5 hours and OFF for 0.5 hour for 1000+48/-0 hours. After 1~4 hour, measure the resistance value.
耐久性 Load Life	J: $\Delta R \leq \pm(3\% + 0.05\Omega)$ F: $\Delta R \leq \pm(1\% + 0.05\Omega)$	JIS C 5201 4.25/MIL-STD-202G Method 108A / IEC 60115-1 4.25 70±2°C, Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF".
高低温试验 Temperature Cycle	J: $\Delta R \leq \pm(1\% + 0.05\Omega)$ F: $\Delta R \leq \pm(0.5\% + 0.05\Omega)$ No mechanical damage	JIS C 5201 4.19/MIL-STD-202G Method 107G / IEC 60115-1 4.19 Repeat 5 cycles as follows -55°C(30 min.)+25°C(2~3 min.)+125°C(30 min.)+25°C(2~3 min.)
绝缘阻抗 Insulation Resistance	Between termination and coating must be over 1000MΩ	JIS C 5201 4.6 / MIL-STD-202G Method 302 / IEC 60115-1 4.6 Test voltage: 100±15V
弯曲强度 Bending Strength	J: $\Delta R \leq \pm(1\% + 0.05\Omega)$ F: $\Delta R \leq \pm(0.5\% + 0.05\Omega)$ No mechanical damage	JIS C 5201 4.33 / MIL-STD-202G Method 211A / IEC 60115-1 4.33 Resistance change after bended on the 90mm PCB. Bend: 3mm for 0201、0402、0603、0805、1206、1210 2mm for 2010、2512

* 客户对VCR 电压系数、高电压、高脉冲、抗硫化、等特殊参数有任何要求时，请选用我们对应系列的电阻产品。

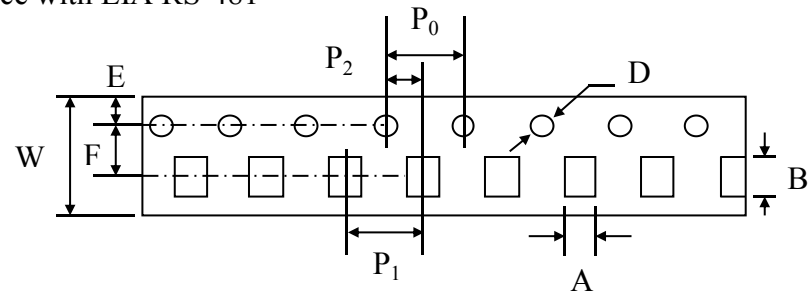
字码编码说明 (Markings)



- 1.1. $\pm 5\%$ (IEC E-24系列 Series)0603、0805、1206及以上规格(0201/0402无字码)均用三字码表示。
No markings on 0201/0402. Markings on the other sizes are expressed by a 3-digit code in its exact value.
E. G. : 6R8=6.8 Ω ; 100=10 $\times 10^0$ =10 Ω ; 472=47 $\times 10^2$ =4700 Ω =4.7K Ω 。
- 1.2. $\pm 1\%$ 阻值表示规则 (+/-1% Resistance value markings)
a. 0805、1206及以上规格 $\pm 1\%$ 阻值均用四字码表示。
Markings on sizes 0805, 1206 and above are expressed by a 4-digit code.
E. G. : 82R5=82.5 Ω ; 1000=100 $\times 10^0$ =100 Ω ; 2212=221 $\times 10^2$ =22100 Ω =22.1K Ω 。
b. 0603 $\pm 1\%$ (IECE-96系列)阻值均采用三代码表示。前两位为阻值的数字代码; 后一位为英文大写 字母, 表示倍率(10^n 次幂)。
Markings on 0603 $\pm 1\%$ (IECE-96 Series) are expressed by a 3-digit code; the first two digits represent the value code and the last capital letter represents the multiplier.
E-96系列阻值的数字代码如下表: The coding system of the E-96 series is as follows :
- | 阻值 | 代码 | 阻值 | 代码 | 阻值 | 代码 | 阻值 | 代码 | 阻值 | 代码 | 阻值 | 代码 | 阻值 | 代码 | 阻值 | 代码 |
|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|
| 100 | 01 | 133 | 13 | 178 | 25 | 237 | 37 | 316 | 49 | 422 | 61 | 562 | 73 | 750 | 85 |
| 102 | 02 | 137 | 14 | 182 | 26 | 243 | 38 | 324 | 50 | 432 | 62 | 576 | 74 | 768 | 86 |
| 105 | 03 | 140 | 15 | 187 | 27 | 249 | 39 | 332 | 51 | 442 | 63 | 590 | 75 | 787 | 87 |
| 107 | 04 | 143 | 16 | 191 | 28 | 255 | 40 | 340 | 52 | 453 | 64 | 604 | 76 | 806 | 88 |
| 110 | 05 | 147 | 17 | 196 | 29 | 261 | 41 | 348 | 53 | 464 | 65 | 619 | 77 | 825 | 89 |
| 113 | 06 | 150 | 18 | 200 | 30 | 267 | 42 | 357 | 54 | 475 | 66 | 634 | 78 | 845 | 90 |
| 115 | 07 | 154 | 19 | 205 | 31 | 274 | 43 | 365 | 55 | 487 | 67 | 649 | 79 | 866 | 91 |
| 118 | 08 | 158 | 20 | 210 | 32 | 280 | 44 | 374 | 56 | 499 | 68 | 665 | 80 | 887 | 92 |
| 121 | 09 | 162 | 21 | 215 | 33 | 287 | 45 | 383 | 57 | 511 | 69 | 681 | 81 | 909 | 93 |
| 124 | 10 | 165 | 22 | 221 | 34 | 294 | 46 | 392 | 58 | 523 | 70 | 698 | 82 | 931 | 94 |
| 127 | 11 | 169 | 23 | 226 | 35 | 301 | 47 | 402 | 59 | 536 | 71 | 715 | 83 | 953 | 95 |
| 130 | 12 | 174 | 24 | 232 | 36 | 309 | 48 | 412 | 60 | 549 | 72 | 732 | 84 | 976 | 96 |
- 倍率字母代码如下表: (Multiplier code)
- | Code | A | B | C | D | E | F | G | X | Y | Z |
|------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|
| Multiplier | 10 ⁰ | 10 ¹ | 10 ² | 10 ³ | 10 ⁴ | 10 ⁵ | 10 ⁶ | 10 ⁻¹ | 10 ⁻² | 10 ⁻³ |
- E. G. : 01Y=100 $\times 10^{-2}$ =1 Ω ; 68A=499 $\times 10^0$ =499 Ω ; 02D=102 $\times 10^3$ =102K Ω
- c. 任何 1%电阻其阻值不在 E-96 范围系列中, 则其字码表示与E-24系列+/-5%字码相同。仅用标签 注明误差。
Any resistance values of 1% tolerance but not included in the E-96 series, the value markings are the same as +/-5% tolerance with labelling identification.
E. G.: 120=12 $\times 10^0$ =12 Ω ; 475=47 $\times 10^5$ =4.7M Ω 。
- 1.3 零欧姆晶片电阻字码均用一个“0”表示, 其阻值在0~50m Ω 范围内, 并无误差之分, 所以我司标 签上无注明误差值。
Marking of the 0 Ohm resistor is a '0' with its value range from 0-50m Ω . No tolerance shown on the product label.

包装及卷包规格 (Tape and Reel Package)

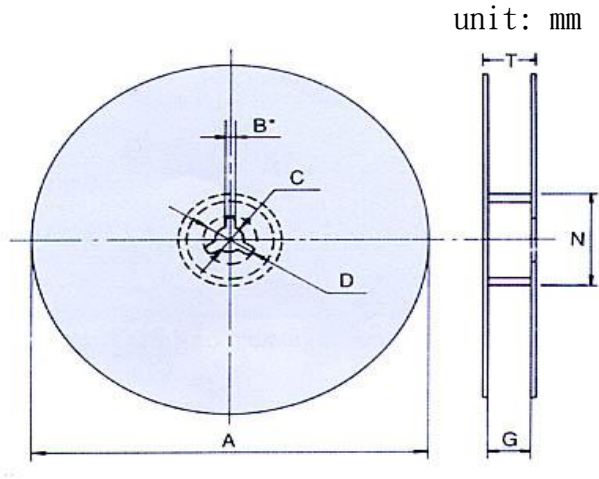
Taping is in accordance with EIA RS-481



Accumulated dimensional tolerance 40±0.2mm

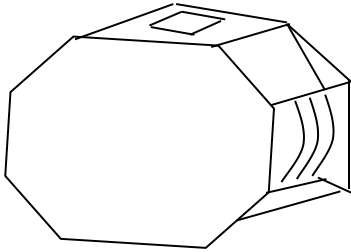
Size	A	B	W	F	E	P ₁	P ₂	P ₀	D
0201	0.36 ±0.02	0.66 ±0.02	8.00 ±0.10	3.50 ±0.05	1.75 ±0.05	2.00 ±0.05	2.00 ±0.05	4.00 ±0.10	1.55 ±0.05
0402	0.65 ±0.10	1.15 ±0.10	8.00 ±0.30	3.50 ±0.05	1.75 ±0.10	2.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50 ±0.10
0603	1.10 ±0.20	1.90 ±0.20	8.00 ±0.30	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50 ±0.10
0805	1.65 ±0.20	2.40 ±0.20	8.00 ±0.30	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50 ±0.10
1206	2.00 ±0.20	3.50 ±0.20	8.00 ±0.30	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50 ±0.10
1210	2.85 ±0.20	3.50 ±0.20	8.00 ±0.30	3.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50 ±0.10
2010	2.80 ±0.20	5.50 ±0.20	12.0 ±0.30	5.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50 ±0.10
2512	3.50 ±0.20	6.70 ±0.20	12.0 ±0.30	5.50 ±0.05	1.75 ±0.10	4.00 ±0.10	2.00 ±0.05	4.00 ±0.10	1.50 ±0.10

Size	Packaging Q'ty
0201	10Kpcs/Reel
0402	10Kpcs/Reel
0603	5Kpcs/Reel
0805	
1206	
1210	
2010	4Kpcs/Reel
2512	



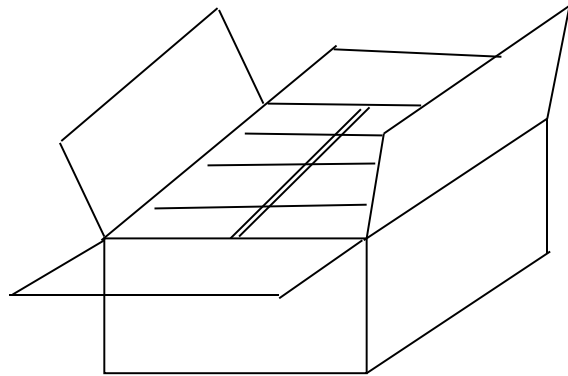
Symbol	A	N	C	D	B	G	T
Dimensions	178 ±3.0	60.0 ±2.0	13.0 ±1.0	19.5 ±1.0	2.30 ±0.5	10.0 ±1.5	14.9 max.
	178 ±3.0	60.0 ±2.0	13.0 ±1.0	19.5 ±1.0	2.30 ±0.5	13.8 ±1.5	16.7 max.
贮存环境 Storage Condition		温度 Temp	湿度 Humidity		储存期 Storage Time		1 年
		5~35℃	20%-70%				1 year

外包装 (Outer Packaging)



第一次包装：1~10卷

First package: 1~10 reels (inner box)



第二次包装：最多80卷

Second package: 80 reels Max (export carton)

■当包装数量不能达到最大时，剩余空隙部位采用辅助材料填满。

When quantity shall not reach the max, the remaining empty space shall be filled up with buffer material.

■当包装数量为最小时，使用其它方法包装，确保运输过程中无问题是至关重要的。

When the quantity is a few, alternative packing methods may be used. It is important to ensure the safety of the products during transportation.