



AXIOM COMPONENTS

AN ISO 9001:2008 CERTIFIED MANUFACTURER
AN OHSAS 18001 : 2007 MANUFACTURER
AN ISO 14001 : 2004 MANUFACTURER

Axiom Components Inc. Westmount, PQ, Canada

Support: +1 (438) 226 8933

SPECIFICATIONS FOR APPROVAL

Customer:

Name of Product: High Power Chip Resistor - FPF Series

Sales Executive : _____

Date: Sep 4 ,2017

製造 Prepared by	品質 Quality by	業務 Sales by	核准 Authorized by
			
客戶 customer approval	客戶 customer approval	客戶 customer approval	客戶 customer approval

Scope

—This specification applies to all sizes of rectangular-type fixed chip resistors with Ruthenium-base as material.

Features

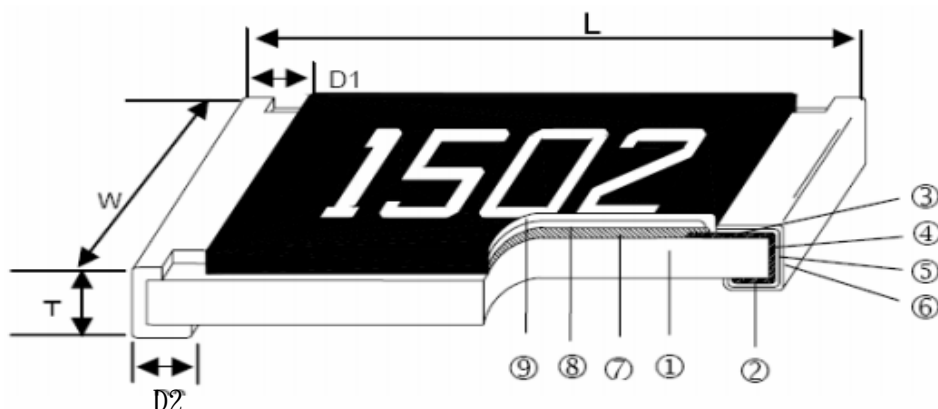
- Small size and light weight
- Highly reliable mulilayer electrode construction
- Compatible with all soldering process

Applications

- Telecommunication Equipments
- Radio and Tape Recorders,TV Tuners
- Digital Cameras,Watches,Pocket Calculators
- Automotive Industry
- Computers, Instruments
- Medical and Military Equipment



Construction



①	Alumina Substrate	④	Edge Electrode(NiCr)	⑦	Resistor Layer (RuO ₂ /Ag)
②	Bottom Electrode(Ag)	⑤	Barrier Layer(Ni)	⑧	Primary Overcoat(Glass)
③	Top Electrode(Ag-Pd)	⑥	External Electrode(Sn)	⑨	Secondary Overcoat(Epoxy)

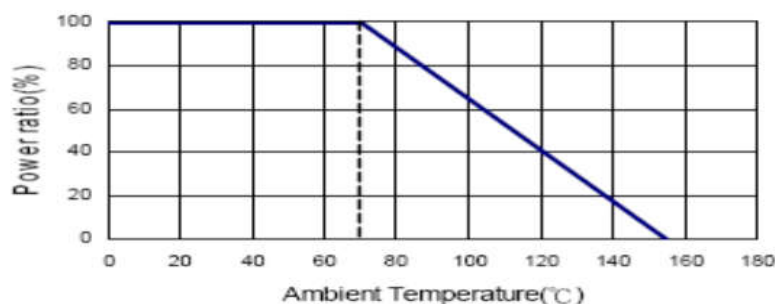
Dimensions

TYPE	L	W	T	D1	D2
FPF02	1.00±0.05	0.50±0.05	0.35±0.05	0.20±0.10	0.20±0.10
FPF03	1.60±0.10	0.80±0.10	0.45±0.15	0.30±0.20	0.30±0.20
FPF05	2.00±0.10	1.25±0.10	0.50±0.15	0.35±0.20	0.40±0.20
FPF06	3.10±0.10	1.55±0.10	0.55±0.15	0.50±0.20	0.50±0.20
FPF10	3.10±0.10	2.60±0.50	0.55±0.10	0.50±0.25	0.50±0.20
FPF18	4.50±0.10	3.00±0.10	0.55±0.10	0.55±0.25	0.70±0.20
FPF20	5.00±0.20	2.50±0.20	0.55±0.20	0.60±0.25	0.50±0.25
FPF25	6.35±0.20	3.10±0.20	0.55±0.20	0.60±0.25	0.50±0.25

Part Numbering

FPF	25	10K	J	F	2W
Type	Size	Value	Tolerance	TCR(PPM/°C)	Power
	02 : 0402		F : ±1%	E: ±100	1/10W
	03 : 0603		J : ±5%	F: ±200	1/8W
	05 : 0805			H: ±400	1/4W
	06 : 1206				1/3W
	10 : 1210				1/2W
	18 : 1812				2/3W
	20 : 2010				3/4W
	25 : 2512				1W
					1.5W
					2W

Derating Curve



High Power&Ultra High Power Rating Electrical Specifications

Item Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	TCR((PPM/°C)		
					Resistance Tolerance	(±1%)	(±5%)
FPF02(0402)	1/10W/1/8W	-55~+155°C	50V	100V	1~9.9Ω	±400PPM	±400PPM
FPF03(0603)	1/8W/1/4W		50V	100V			
FPF05(0805)	1/4W		150V	300V			
FPF06(1206)	1/3W* 1/2W		200V	400V	10Ω~1MΩ	±100PPM	±200PPM
FPF10(1210)	1/2 *2/3 *3/4W		200V	400V			
FPF18(1812)	1W		200V	400V			
FPF20(2010)	3/4 *1W		200V	400V	1.01M~10MΩ	±200PPM	±200PPM
FPF25(2512)	1.5 *2W		250V	500V			

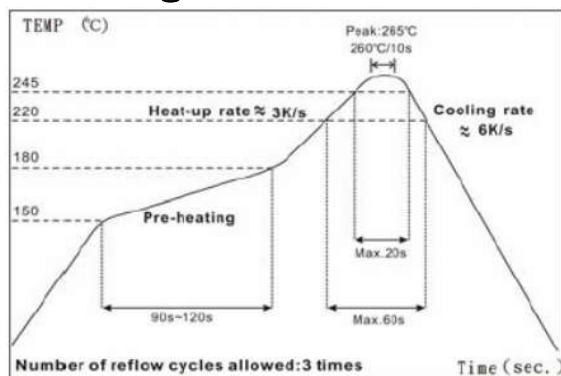
*:Ultra High Power

Operating Voltage= $\sqrt{P \cdot R}$ or Max. operating voltage listed above, whichever is lower.

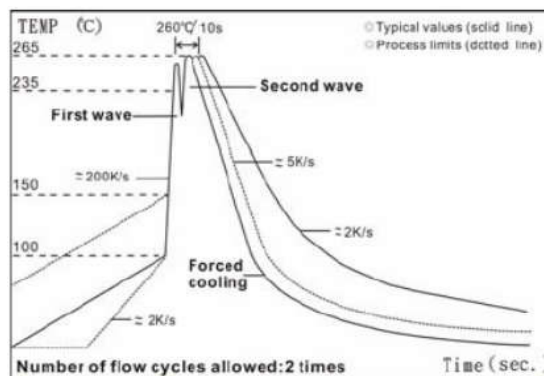
Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$ or Max. overload voltage listed above, whichever is lower.

Type	0402	0603	0805	1206	1210	1812	2010	2512
Jumper Resistance Value	50mΩMax							
Jumper Rated Current	1A				2A			

Soldering Condition



IR Reflow Soldering



Wave Soldering(Flow Soldering)

- (1)Time of IR reflow soldering at maximum temperature point 260°C :10S
- (2)Time of wave soldering at maximum temperature point 260°C :10S
- (3)Time of soldering iron at maximum temperature point 410°C :5S

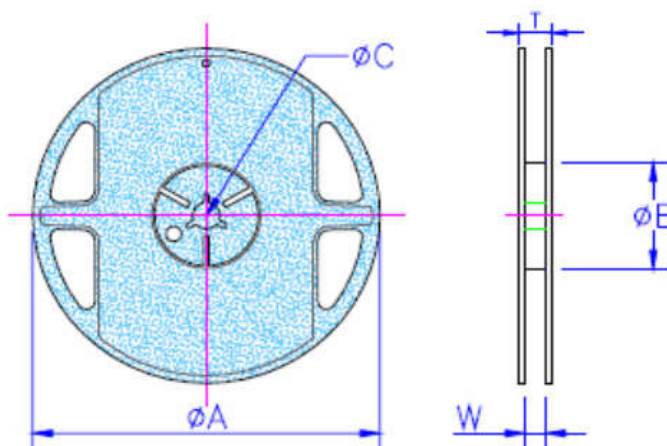
Environmental Characteristics

Item	Requirement			Test method
	±1% and Below	±5%	Jumper	
Temperature Coefficient of Resistance(T.C.R.)	As Spec			JIS C 5201-1 4.8 IEC 60115-1 4.8 -55°C~+125°C, 25°C is the reference temperature
Short Time Overload	±(1.0%+0.05 Ω)	±(2.0%+0.05 Ω)	<50mΩ	JIS C 5201-1 4.13 IEC 60115-1 4.13 2.5 times RCWV or Max. overload voltage for 2 seconds
Insulation Resistance	>10GΩ			JIS C 5201-1 4.6 IEC 60115-1 4.6 Max. overload voltage for 1 minute
Endurance	±(2.0%+0.1 Ω)	±(3.0%+0.1 Ω)	<50mΩ	JIS C 5201-1 4.25 IEC 60115-1 4.25.1 70±2°C, Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Damp Heat with load	±(2.0%+0.1 Ω)	±(3.0%+0.1 Ω)	<50mΩ	JIS C 5201-1 4.24 40±2°C, 90~95% R.H., Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Dry Heat	±(1.0%+0.1 Ω)	±(1.5%+0.1 Ω)	<50mΩ	JIS C 5201-1 4.23.2 IEC 60115-1 2.23.2 at +155°C for 1000 hrs
Bending Strength	±(1.0%+0.05 Ω)	±(1.0%+0.05 Ω)	<50mΩ	JIS C 5201-1 4.33 JIEC 60115-1 4.33 Bending once for 5 seconds with 3mm 2010 2512 sizes: 2 mm
Solderability	95%min. coverage			JIS C 5201-1 4.17 IEC 60115-1 4.17 245±5°C for 3 seconds
Resistance to Soldering heat	±(0.5%+0.05 Ω)	±(1.0%+0.05 Ω)	<50mΩ	JIS C 5201-1 4.18 IEC 60115-1 4.18 260±5°C for 10 seconds
Voltage Proof	No breakdown or flashover			JIS C 5201-1 4.7 IEC 60115-1 4.7 1.42 times RCWV (RMS) for 1 minute
Leaching	Individual leaching area ≤5% Total leaching area ≤10%			JIS C 5201-1 4.18 IEC 60068-2-58 8.2.1 260±5°C for 30 seconds
Rapid Change of Temperature	±(0.5%+0.05 Ω)	±(1.0%+0.05 Ω)	<50mΩ	JIS C 5201-1 4.19 IEC 60115-1 4.19 -55°C to +155°C, 5 cycles

Storage Temperature:25±3°C ;Humidity<80%RH

■ Packaging

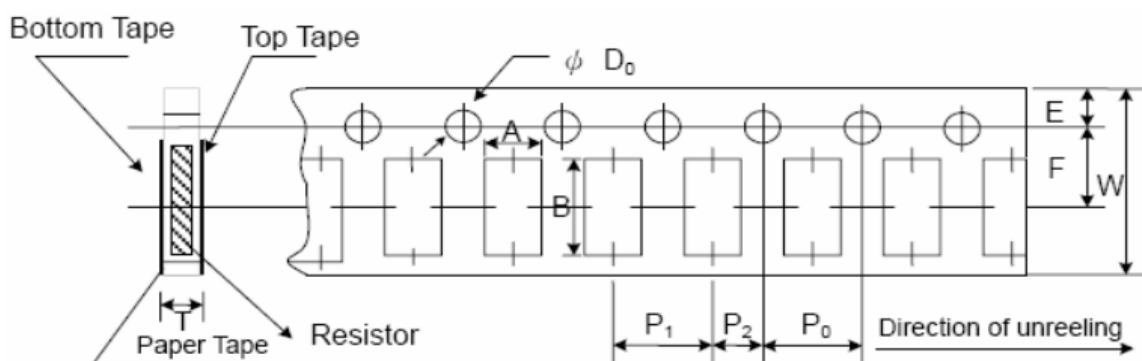
Reel Specifications & Packaging Quantity



Unit: mm

Type	Packaging Quantity		Tape Width	Φ A	Φ B	Φ C	W	T
FPF02	Paper	10k	8mm	178.5±1.5	60+1/-0	13.0±0.2	9.0±0.5	12.5±0.5
FPF03	Paper	5k	8mm	178.5±1.5	60+1/-0	13.0±0.2	9.0±0.5	12.5±0.5
FPF05		10k		254±1	100±0.5	13.0±0.2	9.0±0.5	13.5±0.5
FPF06		20k		330±1	100±0.5	13.0±0.2	9.0±0.5	13.5±0.5
FPF10								
FPF18	Embossed	4K	12mm	178±2.0	60±1.0	13.5±1	13.0±1	16.0±2
FPF20	Embossed	4k	12mm	178.5±1.5	60+1/-0	13.5±1	13.0±1	16.0±2
FPF25		8k		250±1	62±0.5	13.5±1	13.0±1	16.0±2

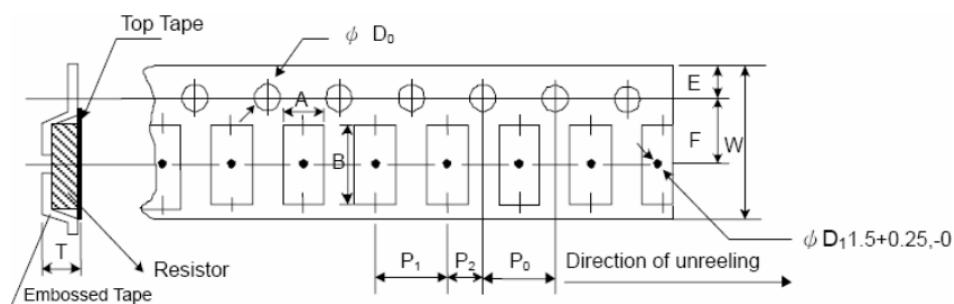
Paper Tape Specifications



Unit: mm

Type	A	B	W	E	F	P ₀	P ₁	P ₂	ΦD ₀	T
FPF02	0.65±0.10	1.15±0.10	8.0±0.2	1.75±0.10	3.5±0.05	4.0±0.1	2.0±0.05	2.0±0.05	1.55+0.1,-0	0.45±0.10
FPF03	1.10±0.10	1.90±0.10	8.0±0.2	1.75±0.10	3.5±0.05	4.0±0.1	4.0±0.1	2.0±0.05	1.55+0.1,-0	0.70±0.10
FPF05	1.60±0.10	2.40±0.20	8.0±0.2	1.75±0.10	3.5±0.05	4.0±0.1	4.0±0.1	2.0±0.05	1.55+0.1,-0	0.85±0.10
FPF06	2.00±0.10	3.50±0.20	8.0±0.2	1.75±0.10	3.5±0.05	4.0±0.1	4.0±0.1	2.0±0.05	1.55+0.1,-0	0.85±0.10
FPF10	2.75±0.10	3.50±0.20	8.0±0.2	1.75±0.10	3.5±0.05	4.0±0.1	4.0±0.1	2.0±0.05	1.55+0.1,-0	0.85±0.10

Embossed Plastic Tape Specifications



Unit:mm

Type	A	B	W	E	F	P ₀	P ₁	P ₂	ΦD ₀	T
FPF18	3.30±0.20	4.60±0.20	12±0.10	1.75±0.10	5.5±0.05	4.0±0.1	4.0±0.1	2.0±0.05	1.5+0.1,-0	1.20+0
FPF20	2.80±0.10	1.90±0.10	8.0±0.2	1.75±0.10	5.5±0.05	4.0±0.1	4.0±0.1	2.0±0.05	1.5+0.1,-0	1.20+0
FPF25	3.50±0.10	6.70±0.10	12.0±0.3	1.75±0.10	5.5±0.05	4.0±0.1	4.0±0.1	2.0±0.05	1.5+0.1,-0	1.20+0

Marking

No Marking for 0402

Jumper for all: Letter "0"

1% for 0805/1206/1210/1812/2010/2512: 4 digits marking

Example

Resistance	4.99Ω	49.9Ω	100R	2.2KΩ	10KΩ	49.9KΩ	100KΩ	1MΩ
Marking	4R99	49R9	1000	2221	1002	4992	1003	1004

5% for 0603/0805/1206/1210/1812/2010/2512: 3 digits marking

Example: 101=100Ω 102=1KΩ (1st and 2nd are E24 code and 3rd code is Multiplier)

E24 code	10	11	12	13	15	16	18	20	22	24	27	30	33	36	39	43	47	51	56	62	68	75	82	91
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1% for 0603: 3 digits marking in E96



3 digits marking for Example: 14C=13K7Ω 13C=13K3Ω

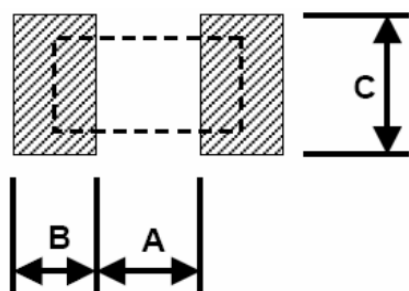
68B=4K99Ω 68X=49.9Ω

Marking Table

Code	E96	Code	E96	Code	E96	Code	E96
02	102	28	191	52	340	75	590
03	105	29	196	53	348	76	604
04	107	31	205	54	357	77	619
06	113	32	210	55	365	78	634
07	115	33	215	56	374	79	649
08	118	34	221	57	383	80	665
09	121	35	226	58	392	81	681
10	124	36	232	59	402	82	698
11	127	37	237	60	412	83	715
13	133	38	243	61	422	84	732
14	137	39	249	62	432	86	768
15	140	40	255	63	442	87	787
16	143	41	261	64	453	88	806
17	147	42	267	65	464	89	825
19	154	43	274	66	475	90	845
20	158	44	280	67	487	91	866
21	162	45	287	68	499	92	887
22	165	46	294	69	511	93	909
23	169	47	301	70	523	94	931
24	174	48	309	71	536	95	953
25	178	49	316	72	549	96	976
26	182	50	324	73	562		
27	187	51	332	74	576		

Code	A	B	C	D	E	F	G	X	Y		
Multiplier	10 ⁰	10 ⁻¹	10 ⁻²	10 ⁻³	10 ⁻⁴	10 ⁻⁵	10 ⁻⁶	10 ⁻¹	10 ⁻²		

Recommend Land Pattern



Unit:mm

Type	A	B	C
FPF02	0.50	0.45	0.60
FPF03	0.90	0.60	0.90
FPF05	1.20	0.70	1.30
FPF06	2.00	0.90	1.60
FPF10	2.00	0.90	2.80
FPF18	3.11	1.40	3.00
FPF20	3.80	0.90	2.80
FPF25	3.80	1.60	3.50