

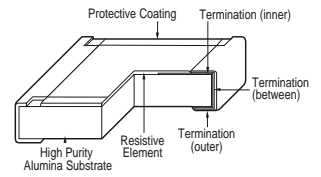
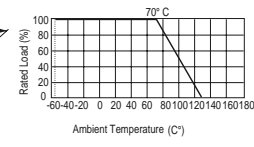
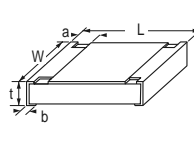
1206 / 0805 / 0603 / 0402 / 1210 / 2010 / 2012 1% Precision Thick Film Chip Resistors

Surface Mount Available In 1/8, 1/10, 1/16, 1/4, 1/2 and 1 Watt

Panasonic 1206 0805 0603 0402 1210 2010 2512 Available in 1/8, 1/10, 1/16, 1/4, 1/2 and 1 Watt

Size	Power Rating at 70°C	Maximum RCWW*	Maximum Overload Voltage
1206	1/8 W - (1/4 W)**	200 V	400 V
0805	1/10 W - (1/8 W)**	150 V	200 V
0603	1/16 W - (1/10 W)**	50 V	100 V
0402	1/16 W	50 V	100 V
1210	1/4 W	200 V	400 V
2010	1/2 W	200 V	400 V
2512	1 W	200 V	400 V

Resistance to Soldering Heat:
±(1.0% 0.1s) max. with no evidence of mechanical damage.
Dip Time:
270°C ± 5°C,
10+ seconds. 100 PPM.



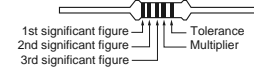
* Rated Continuous Working Voltage (RCWW) shall be determined from RCWW = √ Power Rating x Resistance Values, or max. RCWW listed above, whichever is less.
** Available for reduction of load of pulse characteristics (RCWW x 2.5 RCWW x 2.0, R≥1.1kΩ).

Description	Dimensions (mm)					Value Range	Digi-Key Part No.	Pricing				Panasonic Part No.			
	L	W	a	b	t			5M	10M	50M	100M				
1206, 1/8 Watt, 1% Chip Resistors (Tape & Reel) - (5000/Pkg.)	3.20	1.60	0.50	0.50	0.60	10.0 - 2.20M Ω	P + Value + "FTR-ND"	—	—	—	9.45/M	8.51/M	7.09/M	4.26/M	ERJ-BENFxxxxV
1206, 1/8 Watt, 1% Chip Resistors - (Tape)	3.20	1.60	0.50	0.50	0.60	10.0 - 2.20M Ω	P + Value + "CT-ND"	.98	2.65	6.08	16.09	—	—	—	ERJ-BENFxxxx
0805, 1/10 Watt, 1% Chip Resistors (Tape & Reel) - (5000/Pkg.)	2.00	1.25	0.40	0.40	0.60	10.0 - 2.20M Ω	P + Value + "CTR-ND"	—	—	—	6.90/M	6.21/M	5.18/M	3.11/M	ERJ-6ENFxxxxV
0805, 1/10 Watt, 1% Chip Resistors - (Tape)	2.00	1.25	0.40	0.40	0.60	10.0 - 2.20M Ω	P + Value + "CCT-ND"	.87	2.33	5.36	14.18	—	—	—	ERJ-6ENFxxxx
0603, 1/16 Watt, 1% Chip Resistors (Tape & Reel) - (5000/Pkg.)	1.60	0.80	0.30	0.30	0.45	10.0 - 2.20M Ω	P + Value + "HTR-ND"	—	—	—	5.18/M	4.60/M	3.45/M	3.11/M	ERJ-3KFxxxxV
0603, 1/16 Watt, 1% Chip Resistors - (Tape)	1.60	0.80	0.30	0.30	0.45	10.0 - 2.20M Ω	P + Value + "HCT-ND"	.87	2.33	5.36	14.18	—	—	—	ERJ-3KFxxxx
0402, 1/16 Watt, 1% Chip Resistors (Tape & Reel) - (10,000/Pkg.)	1.00	0.50	0.20	0.25	0.35	10.0 - 1.00M Ω	P + Value + "LTR-ND"	—	—	—	—	6.30/M	4.73/M	4.26/M	ERJ-2RFKxxxxV
0402, 1/16 Watt, 1% Chip Resistors - (Tape)	1.00	0.50	0.20	0.25	0.35	10.0 - 1.00M Ω	P + Value + "LCT-ND"	.98	2.65	6.08	16.09	—	—	—	ERJ-2RFKxxxx
1210, 1/4 Watt, 1% Chip Resistors (Tape & Reel) - (5000/Pkg.)	3.20	2.50	0.50	0.50	0.60	10.0 - 1M Ω	P + Value + "AATR-ND"	—	—	—	51.33/M	45.62/M	34.22/M	30.80/M	ERJ-14NFxxxxV
1210, 1/4 Watt, 1% Chip Resistors - (Tape)	3.20	2.50	0.50	0.50	0.60	10.0 - 1M Ω	P + Value + "AACT-ND"	3.69	9.92	22.79	60.32	—	—	—	ERJ-14NFxxxx
2010, 1/2 Watt, 1% Chip Resistors (Tape & Reel) - (5000/Pkg.)	5.00	2.50	0.60	0.60	0.60	10.0 - 1M Ω	P + Value + "ACR-ND"	—	—	—	83.97/M	74.64/M	55.98/M	50.39/M	ERJ-12SFxxxxV
2010, 1/2 Watt, 1% Chip Resistors - (Tape)	5.00	2.50	0.60	0.60	0.60	10.0 - 1M Ω	P + Value + "ACT-ND"	5.68	15.29	35.12	92.97	—	—	—	ERJ-12SFxxxx
2512, 1 Watt, 1% Chip Resistors (Tape & Reel) - (3000/Pkg.)	6.40	3.20	0.65	1.30	1.10	10.0 - 1M Ω	P + Value + "AER-ND"	—	—	—	553.68/M	328.83/M	298.97/M	248.83/M	ERJ-1WFYxxxxV
2512, 1 Watt, 1% Chip Resistors - (Tape)	6.40	3.20	0.65	1.30	1.10	10.0 - 1M Ω	P + Value + "AECT-ND"	13.24	35.62	81.84	216.63	—	—	—	ERJ-1WFYxxxx

See below for values available

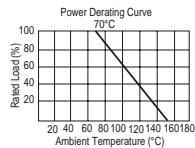
1% Metal Film Fixed Resistors 1/4 Watt

YAGEO
MFR Series



The MFR series Metal Film Resistors are manufactured using vacuum sputtering system to deposit multiple layers of mixed metals and passive materials onto a carefully treated high grade ceramic substrate, the resistors are coated with layers of light-blue lacquer.
General Specifications: Power Rating: 1/4 Watt. Max. Working Voltage: 250V. Max. Overload Voltage: 500V. Rated Ambient Temperature: 70°C.

Temperature Cycling: -65°C to +150°C. **Resistance Range:** 10.0Ω to 1.00MΩ. **Resistance Tolerance:** ±1%.
Electrical Specifications: (See "General Specifications"). All measurements are taken at +25°C at 1KHz and 65% relative humidity, unless stated otherwise. **Type:** MF-25 **Style:** RN-55 **Power Rating:** 1/4 Watt **Resistance Tolerance:** ±1% **Temperature Coefficient:** ±100PPM/°C



Characteristics

- Temperature Cycling, -65°C to +150°C (%) ... ±0.25
- Low Temperature Operation, -65°C (%) ... ±0.25
- Short Time Overload (%) ... ±0.20
- Terminal Strength, 5 lb. pull (%) ... ±0.20
- Resistance to Soldering Heat, +350°C (%) ... ±0.10
- Moisture Resistance, Mil Std 202 (%) ... ±0.50
- Life 1000 hrs. (Rated Power) (%) ... ±0.50
- Shock, 50G, 11ms (%) ... ±0.20
- Vibration-High Frequency, 10-2000Hz (%) ... ±0.20
- Insulation Resistance (%) ... ±10⁻¹⁰ Ω
- Failure-Rate (%) ... 10⁻¹⁰/h

Description	Value Range	Digi-Key Part No.	Pricing							
			5	200	1M	5M	10M	50M	100M	
1/4 Watt, 1% Metal Film Resistors Bulk Package	10.0 - 1.00M Ω (i.e. 10.0XBK-ND)	Value + "X" + "3K-ND"	54	3.27	21.38	18.24	15.68	12.54	—	—
1/4 Watt, 1% Metal Film Resistors Order in multiples of 5,000 (5,000 pcs./reel)	10.0 - 1.00M Ω (i.e. 10.0XTR-ND)	Value + "X" + "TR-ND"	—	—	—	20.63/M	17.60/M	14.30/M	9.90/M	8.80/M

See below for values available.

Panasonic and YAGEO Standard Resistor Values

10.0	18.7	34.8	64.9	121	226	422	787	1.47K	2.74K	5.11K	9.53K	17.8K	33.2K	61.9K	115K	215K	402K	750K
10.2	19.1	35.7	66.5	124	232	432	806	1.50K	2.80K	5.23K	9.76K	18.2K	34.0K	63.4K	118K	221K	412K	768K
10.5	19.6	36.5	68.1	127	237	442	825	1.54K	2.87K	5.36K	10.0K	18.7K	34.9K	64.9K	121K	226K	422K	787K
10.7	20.0	37.4	69.8	130	243	453	845	1.58K	2.94K	5.49K	10.2K	19.1K	35.7K	66.5K	124K	232K	432K	806K
11.0	20.5	38.3	71.5	133	249	464	866	1.62K	3.01K	5.62K	10.5K	19.6K	36.6K	68.1K	127K	237K	442K	825K
11.3	21.0	39.2	73.2	137	255	475	887	1.65K	3.09K	5.76K	10.7K	20.0K	37.4K	69.8K	130K	243K	453K	845K
11.5	21.5	40.2	75.0	140	261	487	909	1.69K	3.16K	5.90K	11.0K	20.5K	38.3K	71.5K	133K	249K	464K	866K
11.8	22.1	41.2	76.8	143	267	499	931	1.74K	3.24K	6.04K	11.3K	21.0K	39.2K	73.2K	137K	255K	475K	887K
12.1	22.6	42.2	78.7	147	274	511	953	1.78K	3.32K	6.19K	11.5K	21.5K	40.2K	75.0K	140K	261K	487K	909K
12.4	23.2	43.2	80.6	150	280	523	976	1.82K	3.40K	6.34K	11.8K	22.1K	41.2K	76.8K	143K	267K	499K	931K
12.7	23.7	44.2	82.5	154	287	536	1.00K	1.87K	3.48K	6.49K	12.1K	22.6K	42.2K	78.7K	147K	274K	511K	953K
13.0	24.3	45.3	84.5	158	294	549	1.02K	1.91K	3.57K	6.65K	12.4K	23.2K	43.2K	80.6K	150K	280K	523K	976K
13.3	24.9	46.4	86.6	162	301	562	1.05K	1.96K	3.65K	6.81K	12.7K	23.7K	44.2K	82.5K	154K	287K	536K	1.00M
13.7	25.5	47.5	88.7	165	309	576	1.07K	2.00K	3.74K	6.98K	13.0K	24.3K	45.3K	84.5K	158K	294K	549K	1.10M
14.0	26.1	48.7	90.9	169	316	590	1.10K	2.05K	3.83K	7.15K	13.3K	24.9K	46.4K	86.6K	162K	301K	562K	1.20M
14.3	26.7	49.9	93.1	174	324	604	1.13K	2.10K	3.92K	7.32K	13.7K	25.5K	47.5K	88.7K	165K	309K	576K	1.30M
14.7	27.4	51.1	95.3	178	332	619	1.15K	2.15K	4.02K	7.50K	14.0K	26.1K	48.7K	90.9K	169K	316K	590K	1.50M
15.0	28.0	52.3	97.6	182	340	634	1.18K	2.21K	4.12K	7.68K	14.3K	26.7K	49.9K	93.1K	174K	324K	604K	1.60M
15.4	28.7	53.6	100	187	348	649	1.21K	2.26K	4.22K	7.87K	14.7K	27.4K	51.1K	95.3K	178K	332K	619K	1.80M
15.8	29.4	54.9	102	191	357	665	1.24K	2.32K	4.32K	8.06K	15.0K	28.0K	52.3K	97.6K	182K	340K	634K	2.00M
16.2	30.1	56.2	105	196	365	681	1.27K	2.37K	4.42K	8.25K	15.4K	28.7K	53.6K	100K	187K	348K	649K	2.20M
16.5	30.9	57.6	107	200	374	698	1.30K	2.43K	4.53K	8.45K	15.8K	29.4K	54.9K	102K	191K	357K	665K	2.40M
16.9	31.6	59.0	110	205	383	715	1.33K	2.49K	4.64K	8.66K	16.2K	30.1K	56.2K	105K	196K	365K	681K	2.60M
17.4	32.4	60.4	113	210	392	732	1.37K	2.55K	4.75K	8.87K	16.5K	30.9K	57.6K	107K	200K	374K	698K	2.80M
17.8	33.2	61.9	115	215	402	750	1.40K	2.61K	4.87K	9.09K	16.9K	31.6K	59.0K	110K	205K	383K	715K	3.00M
18.2	34.0	63.4	118	221	412	768	1.43K	2.67K	4.97K	9.31K	17.4K	32.4K	60.4K	113K	210K	392K	732K	3.20M

Panasonic 2010 Values

10	100
100	10
1K	1K
10K	10K
100K	100K
1M	1M

Panasonic 1210 Values

10	110	1.2K	13K	150K
11	120	1.3K	15K	160K
12	130	1.5K	16K	180K
13	150	1.6K	18K	200K
15	160	1.8K	20K	220K
16	180	2.0K	22K	240K
18	200	2.2K	24K	270K
20	220	2.4K	27K	300K
15K	20	2.7K	30K	330K
22	240	2.7K	30K	360K
24	270	3.0K	33K	360K
27	300	3.3K	36K	390K
30	330	3.6K	39K	430K
33	360	3.9K	43K	470K
36	390	4.3K	47K	510K
39	430	4.7K	51K	560K
43	470	5.1K	56K	620K
47	510	5.6K	62K	680K
51	560	6.2K	68K	750K
56	620	6.8K	75K	820K
62	680	7.5K	82K	910K
68	750	8.2K	91K	1M
75	820	9.1K	100K	—
82	910	10K	110K	—
91	1K	11K	120K	—
100	1.1K	12K	130K	—

Panasonic 2512 Values

10	100	1K	10K	100K	1M
100	10	1K	10K	100K	1M
1K	1K	10K	100K	1M	—
10K	10K	100K	1M	—	—
100K	100K	1M	—	—	—
1M	1M	—	—	—	—

YAGEO 1% Metal Film Resistors Digi-Key® Assortment Kits