KOME

KMF Metal Film Resistors

Metal film fixed resistors with axial leads · product code KMF

Illustration; not a photograph of a specific part.

RATED POWER	MAX. WORKING VOLTAGE	MAX. OVERLOAD VOLTAGE	RESISTANCE RANGE
1/16W – 5W	200V – 500V	400V – 1000V	10Ω ~ 1MΩ ⑤

How to order

KMF	25	B	J	2	100
1 · Product code Metal film resistor	2 · Rated power ① 1/4W	3 · Packing ② Bulk	4 · Tolerance ③ ±5%	5 · No. of total characters ④ 100=10R=2	6 · Resistance value ④ 100=10R

Ordering example as given on the original sheet (printed as separate parts, not as one string); positions 1 to 6 are explained in the tables below.

1 · Product code	
KMF	Metal film resistor

2 · Rated power ①			
Code	Power	Code	Power
12	1/6W	200	2W
25	1/4W	1WS	1WS
50	1/2W	2WS	2WS
125	1/8W	500	5W
100	1W	700	7W

3 · Packing ②	
T52	Tape/box
T73	Tape/box
B	Bulk
R	Tape reel

4 · Tolerance ③	
F	±1%
J	±5%

5 · No. of total characters ④
100=10R=2
100R=101=3
10K=1000=4

6 · Resistance value ④
100=10R
100R=101
10K = 10,000

General

Scope

This specification applies to KOME metal film resistors.

Nominal resistance

The nominal resistance is the resistance marked on the resistor body and is, as a rule, given in the units Ω, KΩ, MΩ.

Nominal resistance tolerance

The nominal resistance tolerance is indicated by one capital letter: F (±1%), D (±0.5%), C (±0.25%), B (±0.1%) ③.

Ratings

MF (metal film fixed resistors)

Style	Max. working voltage	Max. overload voltage	Resistance value range
MF1/6W / 1/8W / 1/16W	200V	400V	10Ω ~ 1MΩ ⑤
MF1/4W / 1/4WS ⑥	250V	500V	
MF1/2W / 1/2WS	350V	700V	
MF1W / 1WS	500V	1000V	
MF2W / 2WS	500V	1000V	
MF3W / 3WS	500V	1000V	
MF5W / 5WS	500V	1000V	

Power rating

The power rating is defined as the maximum power that can be applied continuously at an ambient temperature of 70°C. When the ambient temperature exceeds 70°C, use Chart 1.

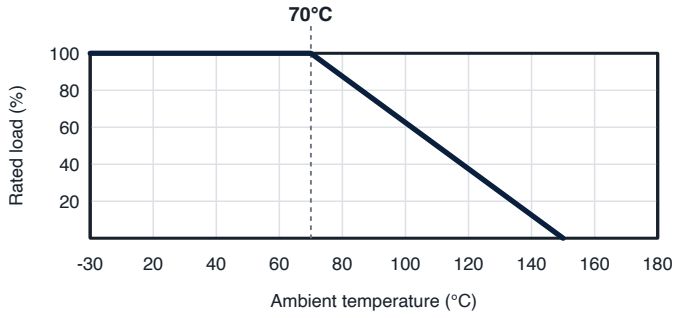


Chart 1 — power derating ⑦

Rated voltage

The rated voltage is the DC voltage, or the AC voltage (effective value at commercial frequency, e.g. 50 c/s, 60 c/s), at which the rated power is applied. It can be calculated with the following equation:

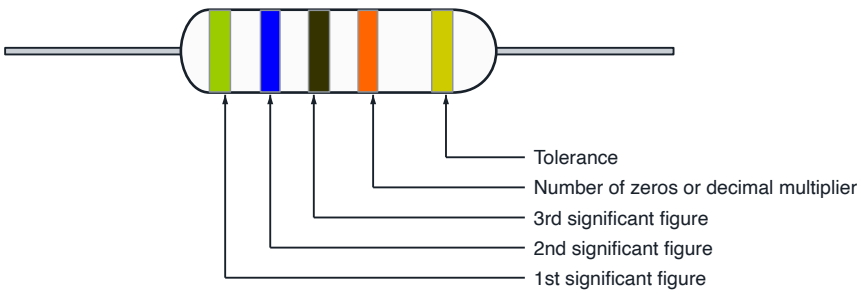
$E = \sqrt{(P \times R)}$	E = rated voltage
	P = rated power (watts)
	R = nominal resistance value (ohm)

When the calculated rated voltage exceeds the maximum usable voltage value shown in Chart 1, the maximum usable voltage is defined as the voltage according to the power derating curve shown in Chart 1 ⑧.

Performance and test methods

Item	Standard	Requirement	Test method
Resistance value vs. temperature characteristics	JIS C 5202 5.2	±100 ppm/°C	Measure the resistance R_0 (ohm) at room temperature T_0 (°C). Measure it again at a temperature 100°C higher than room temperature. PPM = $(R - R_0) / R_0 \times 10^6 / ((T_0+100) - T_0)$
Short-time overload	JIS C 5202 5.5	The resistance change shall be within ±(0.5% + 0.05Ω), and there shall be no mechanical breakage.	Apply a DC voltage of 2.5 times the rated voltage for 5 seconds, then leave the resistor at room temperature for 30 minutes and measure. Max. overload voltage: 0.50W – 700V (DC).
Insulation resistance	JIS C 5202 5.6 (V-block)	10,000MΩ or more	Lay the resistor in a 90° angle metal V-block, apply 500V DC between the resistor leads and the V-block for one minute, and measure.
Voltage endurance	JIS C 5202 5.7	The resistance change shall be within ±(0.5% + 0.05Ω), and there shall be no mechanical breakage.	Lay the resistor in the 90° angle metal V-block and apply the AC test voltage below for one minute. Test voltage: 0.25W – 500V (AC); 0.50W – 700V (AC).
Intermittent overload	JIS C 5202 5.8	The resistance change shall be within ±(0.50% + 0.05Ω).	Apply an AC voltage of 4 times the rated voltage for 1 second, then rest for 25 seconds; repeat this cycle 10000±200 times. After the test, leave the resistor at room temperature for 30 minutes and measure. Max. voltage for intermittent overload: 0.50W – 700V (AC).
Terminal strength	—	The resistance change shall be within ±(0.5% + 0.05Ω), and there shall be no mechanical breakage.	Pull test: apply a force of 2.5kg to the lead in the direction of the lead axis for 30±5 seconds.
Resistance to soldering heat	JIS C 5202 7.10 ⑨	The resistance change shall be within ±(0.25% + 0.05Ω), and there shall be no mechanical breakage.	Dip the leads into a solder bath at a temperature of 350°C ±10°C, up to 4±0.8mm from the resistor body, and hold for 3±0.5 seconds. Leave the resistor at room temperature for 3 hours, then measure.
Load life test	JIS C 5202 7.10 ⑨	The resistance change shall be within ±(1.5% + 0.05Ω), and there shall be no mechanical breakage.	In a constant-temperature chamber at 70°C ±2°C, apply the rated DC voltage for 1.5 hours and switch it off for 0.5 hour; repeat this cycle for 1000 hours. After the test, leave the resistor at room temperature (time not stated ⑩), then measure.
Solderability	JIS C 5202 6.5	More than 95% of the lead surface shall be covered with new solder after the leads are dipped in the solder.	Dip the leads into a solder bath at a temperature of 260°C ±5°C, up to 4±0.8mm from the resistor body, and hold for 5±0.5 seconds, then inspect.
Humidity load test	JIS C 5202 7.9	The resistance change shall be within ±(1.5% + 0.05Ω), and there shall be no mechanical breakage.	In a temperature chamber at 40°C ±2°C and 90 – 95% relative humidity, apply the rated voltage for 1.5 hours and switch it off for 0.5 hour; repeat this cycle for 1000 hours. After the test, leave the resistor at room temperature (time not stated ⑩), then measure.

Marking



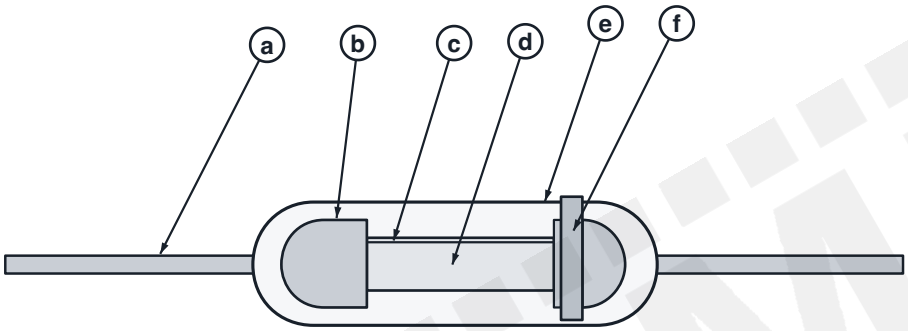
Band colors as drawn on the original sheet.

Color code

Color	1st band	2nd band	3rd band	4th band (multiplier)	Tolerance ③
Black	0	0	0	10^0	
Brown	1	1	1	10^1	±1.00%
Red	2	2	2	10^2	
Orange	3	3	3	10^3	
Yellow	4	4	4	10^4	
Green	5	5	5	10^5	±0.50%
Blue	6	6	6	10^6	±0.25%
Violet	7	7	7	10^7	±0.10%
Grey	8	8	8	10^8	
White	9	9	9	10^9	
Gold				10^{-1}	
Silver				10^{-2}	

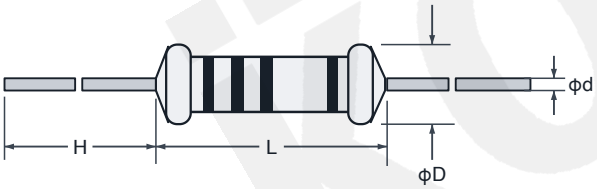
Construction and dimensions

Construction



	Part
a	Lead wire
b	End cap
c	Metal film
d	Ceramic rod
e	Epoxy resin
f	Color code

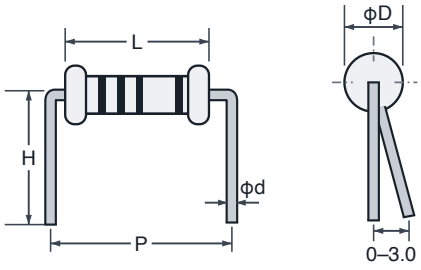
Dimensions



Watts	L	D	H	d ±0.05mm
1/6W 1/8W 1/16W	3.2±0.3	1.8±0.3	28±2.0	0.4
1/4WS				
1/4W	6.0±0.5	2.3±0.3	28.0±2.0	0.45
1/2WS				
1/2W	9.0±0.5	3.2±0.3	26.0±2.0	0.52
1WS				
1W	11.0±1.0	3.7±0.5 ⑪	25.0±2.0	0.65
2WS				
1W	11.0±1.0	4.2±0.5 ⑪	35.0±3.0	0.65
2WS				
2W	15.0±1.0	5.0±0.5	33.0±3.0	0.72
3WS				
3W	17.0±1.0	6.0±0.5	36.0±3.0	0.72
5WS				
5W	24.0±1.0	8.0±1.0	33.0±3.0	0.72

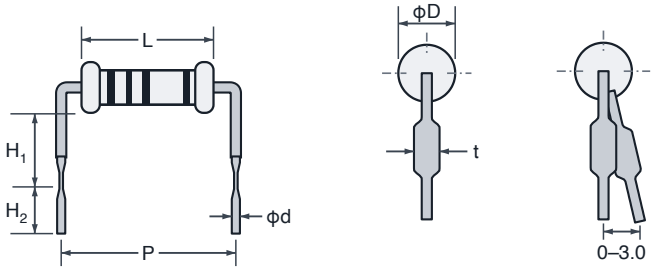
Formed dimensions

M type



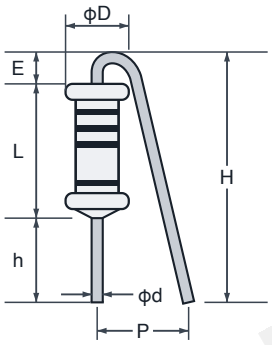
Watts	Dimensions (mm)				
	L	P ±1.0	D	d ±0.05	H ±1.0
1/6W / 1/8W / 1/16W / 1/4WS	3.2±0.3	6	1.8±0.3	0.40	8.0
1/4W / 1/2WS	6.0±0.5	10	2.3±0.3	0.45	8.0
1/2W / 1WS	9.0±0.5	12.5/15 ⑫	3.2±0.3	0.52	8.0
1W / 2WS	11.0±1.0	15	4.2±0.5	0.65	10
2W / 3WS	15.0±1.0	20	5.0±0.5	0.72	10
3W / 5WS	17.0±1.0	25	6.0±0.5	0.72	10
5W	24.0±1.0	33 ⑫	8.0±1.0	0.72	10

MB type



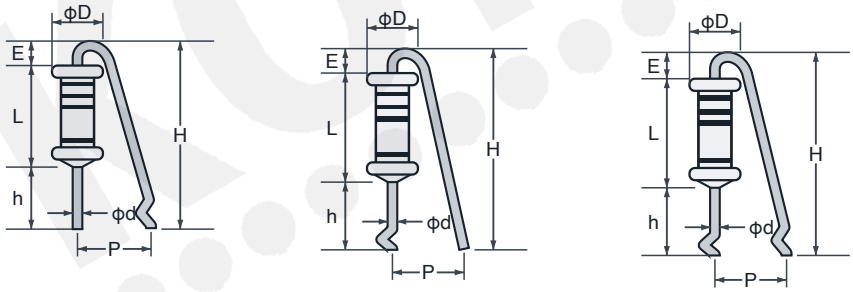
Watts	Dimensions (mm)						
	L	P ±1.0	D	d ±0.05	H_1 ±1.0	H_2 ±1.0	t ±0.2
1/2W / 1WS	9.0±0.5	12.5	3.2±0.3	0.52	10.5	5.0	1.20
1W / 2WS	11.0±1.0	15	4.2±0.5	0.65	10.5	5.0	1.25
2W / 3WS	15.0±1.0	20	5.0±0.5	0.72	10.5	5.0	1.25
3W / 5WS	17.0±1.0	25	6.0±0.5	0.72	10.5	5.0	1.25
5W	24.0±1.0	30 ⑫	8.0±1.0	0.72	10.5	5.0	1.25

F type



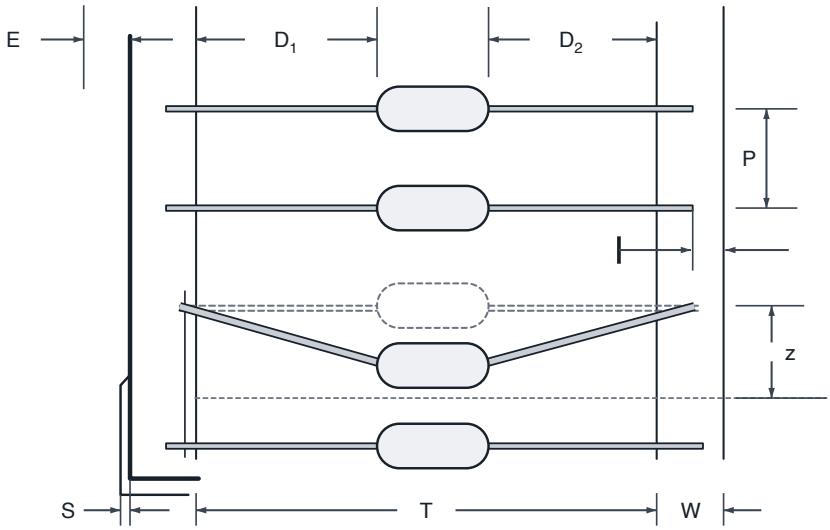
Watts	Dimensions (mm)						
	L	P ±1.0 ⑫	D	d ±0.05	h ±1.0	H ±1.0	E max.
1/4W / 1/2WS	6.0±0.5	6-8	2.3±0.3	0.45	8.0	14	3
1/2W / 1WS	9.0±0.5	6-8	3.2±0.3	0.52	8.0	18	3.5
1W / 2WS	11.0±1.0	6-8	4.2±0.5	0.65	8.0	20	3.5
2W / 3WS	15.0±1.0	6-8	5.0±0.5	0.72	8.0	25	3.5
3W / 5WS	17.0±1.0	6-8	6.0±0.5	0.72	8.0	30	3.5

FK2, FK1 and FKK types ⑬



Watts	Dimensions (mm)						
	L	P ±1.0 ⑫	D	d ±0.05	h +1/–0	H ±1.0	E max.
1/2W / 1WS	9.0±0.5	5-7	3.2±0.3	0.52	8	18	3.5
1W / 2WS	11.0±1.0	5-9	4.2±0.5	0.65	8	20	3.5
2W / 3WS	15.0±1.0	5-9	5.0±0.5	0.72	8	25	3.5
3W / 5WS	17.0±1.0	5-10	6.0±0.5	0.72	8	30	3.5

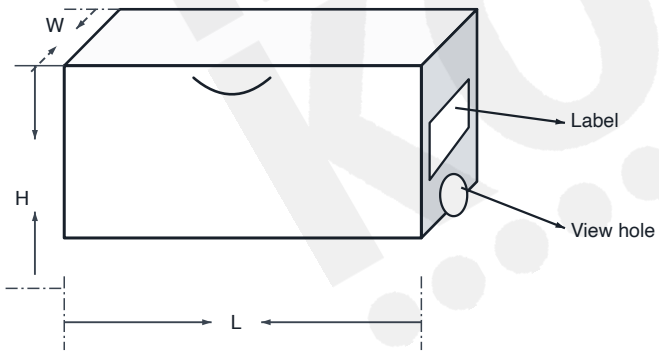
Taping dimensions



Watts	Type ②	T	P ±0.5	W ±0.5	$D_1 - D_2$ max.	E max.	Z max.	S max.	I max. ⑭
1/6W / 1/8W / 1/16W / 1/4WS	T-26	26±1.5	5	6	0.8	0	1.2	0.8	3.2
	T-52	52±1.5	5	6	0.8	0	1.2	0.8	3.2
1/4W / 1/2WS	T-26	26±1.5	5	6	0.8	0	1.2	0.8	3.2
	T-52	52±1.5	5	6	0.8	0	1.2	0.8	3.2
1/2W / 1WS	T-52	52±1.5	5	6	0.8	0	1.2	0.8	3.2
1W / 2WS	T-73	73±1.5	5	6	0.8	0	1.4	0.8	3.2
2W / 3WS	T-73	73±1.5	10	6	0.8	0	1.4	0.8	3.2
3W / 5WS	T-73	73±1.5	10	6	0.8	0	1.4	0.8	3.2

Packing

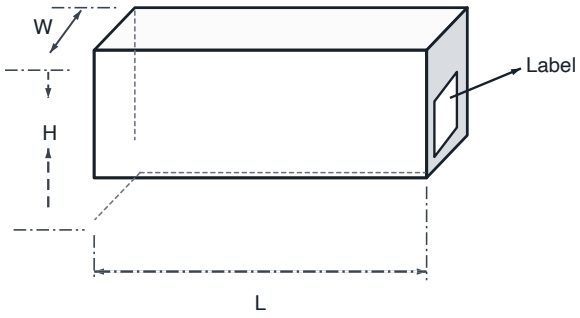
Taping type (ammo box)



Label specification	
1	Type
2	Watts, tolerance
3	Resistance, quantity
4	P/N
5	Lot no.

Type	Watts	W (mm)	H (mm)	L (mm)	Qty (pcs)
T-26 ②	1/6W / 1/8W / 1/16W / 1/4WS	50	67	260	5000
	1/4W / 1/2WS	50	100	260	5000
T-52(60)	1/6W / 1/8W / 1/16W / 1/4WS	80	72	260	5000
	1/4W / 1/2WS	80	100	260	5000
	1/2W / 1WS	80	85	260	2000
T-73(81)	1W / 2WS	90	77	260	1000
	2W / 3WS	90	95	260	1000
	3W / 5WS	90	77	260	500
T-84(94) ②	5W	110	92	260	250

Bulk ②



Watts		Type	L (mm)	W (mm)	H (mm)	Poly bag	Box (pcs)
1/6W 1/8W	1/16W 1/4WS	P	240	140	76	1000	20000
1/4W	1/2WS	P	240	140	76	500	10000
1/2W	1WS	P	240	140	76	500	5000
1W	2WS	P	240	140	76	200	2000
2W	3WS	P	240	140	76	100	1500
3W / 5WS		P	240	140	76	100	1000

① Rated power codes: 25S = 1/4WS, 50S = 1/2WS, 300 = 3W and 500 = 5W; small-size ratings are ordered as written (1WS, 2WS, 3WS, 5WS, 7WS) (not listed on the manufacturer's sheet; added on supplementary confirmation). A code does not mean the rating is available in this series. 1/6W and 1/16W have no small-size (S) version; not every power rating has one. As printed: code 12 = 1/6W is printed twice (shown once). Codes are given for 1WS, 2WS and 7W (700), but not for 1/16W; 7W appears nowhere else on the sheet, and the suffix “WS” is not explained on the original — subject to manufacturer confirmation.

② Packing: How to order lists T52, T73 (tape/box), B (bulk) and R (tape reel). The taping tables use the types T-26, T-52 and T-73, the box table T-26, T-52(60), T-73(81) and T-84(94); T-26 and T-84 have no order code, the bracketed figures are not explained, no reel data is given, and the bulk table gives the type as “P” — subject to manufacturer confirmation.

③ Tolerance: How to order gives F (±1%) and J (±5%); the tolerance section gives F (±1%), D (±0.5%), C (±0.25%) and B (±0.1%); the color code gives ±1.00%, ±0.50%, ±0.25% and ±0.10%, with no band for ±5% — subject to manufacturer confirmation.

④ The examples “10K=1000=4” and “10K = 10,000” do not follow the pattern of the other examples (“100=10R=2”, “100R=101=3”) — subject to manufacturer confirmation.

⑤ Resistance value range: printed “10E——1M”; the letter E is read as Ω and the range is shown as 10Ω ~ 1MΩ — subject to manufacturer confirmation.

⑥ Ratings: printed “MF1/4W / I/4WS” (capital I), shown as 1/4WS. The Ratings table pairs each W rating with the same WS rating (1/4W with 1/4WS, 1/2W with 1/2WS …), whereas the dimension, forming, taping and packing tables pair 1/6W–1/16W with 1/4WS, 1/4W with 1/2WS, 1/2W with 1WS, 1W with 2WS, 2W with 3WS and 3W with 5WS — subject to manufacturer confirmation.

⑦ Chart 1 has no caption on the original sheet (the text calls it chart 1). The interval from -30 to 20 is drawn as wide as the 20°C intervals, and the temperature at which the curve reaches zero load is not labelled — subject to manufacturer confirmation.

⑧ Rated voltage: the equation is printed “E = √PR” with a short radical sign and is shown as E = √(P × R). The text refers to a maximum usable voltage “shown in CHART 1”, but Chart 1 shows only the rated load (%); maximum working and overload voltages are given in the Ratings table — subject to manufacturer confirmation.

⑨ Test methods: JIS C 5202 7.10 is cited for both resistance to soldering heat and the load life test; no clause is given for terminal strength — subject to manufacturer confirmation.

⑩ Load life test and humidity load test: the recovery time at room temperature after the test is printed without a number (“… temperature hour after test”) — subject to manufacturer confirmation.

⑪ Dimensions: the row 1W / 2WS is printed twice, with D 3.7±0.5 / H 25.0±2.0 and with D 4.2±0.5 / H 35.0±3.0; the formed-dimension tables give D 4.2±0.5 for 1W/2WS — subject to manufacturer confirmation.

⑫ Lead pitch P: for 5W, M type gives 33 and MB type 30; for 1/2W/1WS, M type gives 12.5/15. The P columns are headed ±1.0, but the F and FK types give ranges (6-8, 5-7, 5-9, 5-10) — subject to manufacturer confirmation.

⑬ FK types: the three drawings are not individually labelled, so it is not stated which drawing shows FK2, FK1 or FKK; one table covers all three types — subject to manufacturer confirmation.

⑭ Taping: the column “I max.” has no matching letter in the drawing (the drawing shows one unlabelled dimension at the right); the pitch column is headed “p” on the original sheet and is shown as P, the letter used in the drawing. The taping and bulk tables have no 5W row, although the box table lists T-84(94) for 5W — subject to manufacturer confirmation.