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Innovative Service Around the Globe YAGEO

DATA SHEET

MELF METAL FILM RESISTORS

General Purpose

MMF Series

±0.1%, ±0.25%, ±0.5%, ±1%, ±2%, ±5%

1/6W to 1W

RoHS compliant & Halogen Free

YAGEO

Product specification – November 13, 2024 V.5



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APPLICATIONS

- All general purpose applications
- Power applications
- Energy meter

FEATURES

- AEC-Q200 qualified
- MELF, SMD package
- Excellent pulse withstanding capability
- Wide resistance range
- RoHS compliant and halogen free

ORDERING INFORMATION

Part number of the MELF metal film resistor is identified by the series, power rating, tolerance, packing, temperature coefficient and resistance value.

PART NUMBER

MMF	25S	F	R	E	100R
(1)	(2)	(3)	(4)	(5)	(6)

(1) SERIES NAME

MMF Series

(2) POWER RATING

-12 = 1/6W	50S = 1/2W
25S = 1/4W	207 = 0.6W
204 = 0.4W	-50 = 1/2W
-25 = 1/4W	1WS = 1W

(3) TOLERANCE

B = ±0.1%	G = ±2%
C = ±0.25%	J = ±5%
D = ±0.5%	- = Based on spec.
F = ±1%	

(4) PACKAGING

R = Reel Pack

(5) TEMPERATURE COEFFICIENT OF RESISTANCE

C=±15ppm/°C	E=±50ppm/°C
D=±25ppm/°C	F=±100ppm/°C
G=±200ppm/°C	- = Based on spec.

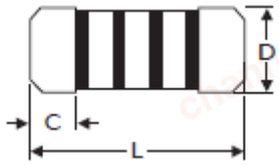
(6) RESISTANCE VALUE

0.22Ω-1MΩ for E24 & E96 Series value,100Ω-100KΩ for E192 Series value
Example:
1R = 1Ω, 10K = 10,000Ω, 1M = 1,000,000Ω

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DIMENSIONS

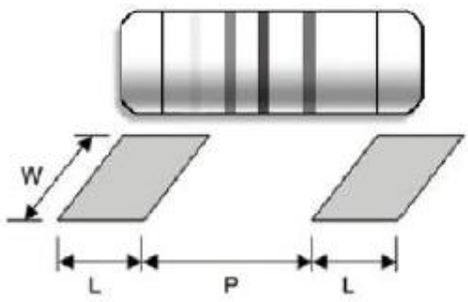
Unit: mm



Normal	Miniature	L	D	C Min.
MMF-12	MMF25S / MMF204	3.50 ± 0.2	1.40 ± 0.15	0.5
MMF-25	MMF50S / MMF207	5.90 ± 0.2	2.20 ± 0.1	0.5
MMF-50	MMF1WS	8.50 ± 0.2	3.20± 0.2	0.5

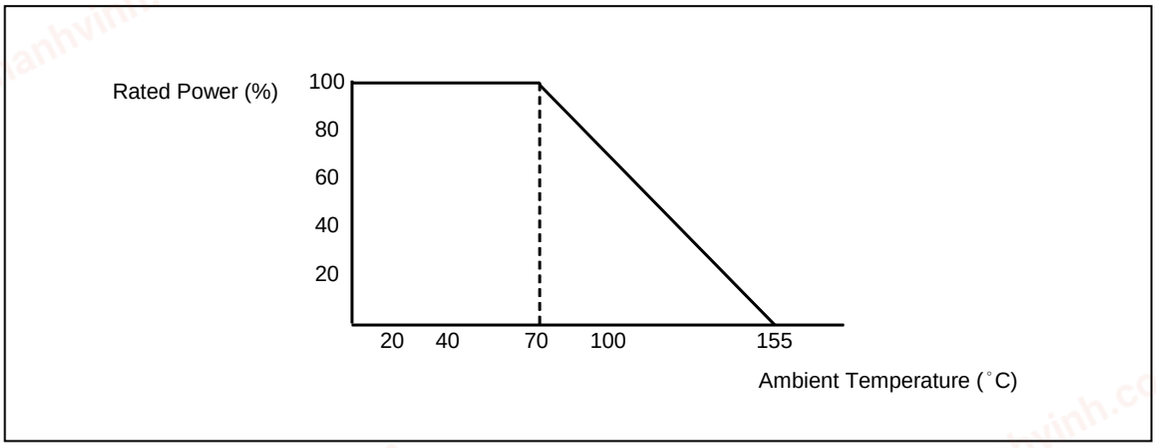
SUGGESTED PAD LAYOUT

Unit: mm



Normal	Miniature	Soldering Mode	L Min.	P	W Min.
MMF-12	MMF25S MMF204	Reflow	1.3	1.6 ± 0.1	1.6
		Wave	1.5	1.5 ± 0.1	1.8
MMF-25	MMF50S MMF207	Reflow	2.0	3.0 ± 0.1	3.0
		Wave	2.5	3.0 ± 0.1	3.0
MMF-50	MMF1WS	Reflow	2.3	5.5 ± 0.2	4.0
		Wave	2.8	5.5 ± 0.2	4.0

DERATING CURVE



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ELECTRICAL CHARACTERISTICS

CHARACTERISTICS	MMF-12	MMF25S	MMF204	MMF-25	MMF50S	MMF207	MMF-50	MMF1WS
Power Rating at 70 °C	1/6W	1/4W	0.4W	1/4W	1/2W	0.6W	1/2W	1W
Maximum Working Voltage	150V	200V	200V	250V	250V	250V	350V	350V
Maximum Overload Voltage	300V	400V	400V	500V	500V	500V	700V	700V
Voltage Proof on Insulation	300V	300V	300V	500V	500V	500V	700V	700V
Resistance Range	0.22Ω ~ 3.9Ω for Tol ±5%, E24 series value, 4Ω ~ 1MΩ for Tol ±1% E24 + E96 series value							
Operating Temp. Range	- 55°C to +155°C							
Temperature Coefficient	±15ppm/°C for 10R-9K99，±25ppm/°C for 100Ω-470KΩ, ±50ppm/°C for 4Ω ~ 1MΩ, ±100ppm/°C for 1Ω ~1MΩ，±200ppm/°C for 0.22Ω ~ 0.99Ω							

Note: For resistance value out of above range is by request.

TEST AND REQUIRMENTS

TEST	TEST METHOD	PROCEDURE	APPRAISE
Short Time Overload	IEC 60115-1 4.13	2.5 times RCWV for 5 sec. (Not more than maximum overload voltage)	±0.25%+0.005Ω for≤332KΩ ±0.5%+0.005Ω for>332KΩ
Voltage Proof on Insulation	IEC 60115-1 4.7	In V-Block for 60 sec. test voltage as above table	No Breakdown
Temperature Coefficient	IEC 60115-1 4.8	Between -55°C to +155°C	By Type
Insulation Resistance	IEC 60115-1 4.6	In V-Block for 60 sec.	>10,000MΩ
Solderability	IEC 60115-1 4.17	245±5°C for 3±0.5 Sec.	95% Min. coverage
Solvent Resistance of Marking	IEC 60115-1 4.30	IPA for 5±0.5 Min. with ultrasonic	No deterioration of coatings and markings
Periodic-pulse Overload	IEC 60115-1 4.39	4 times RCWV 10,000 cycles (1 Sec. on, 25 Sec.off)	±1.0%+0.005Ω
Damp Heat Steady State	IEC 60115-1 4.24	40±2°C,90-95% RH for 56 days, loaded with 0.1 times RCWV	±1.5%+0.005Ω for≤332KΩ ±2.5%+0.005Ω for>332KΩ
Damp Heat Steady State (accelerated mode)	IEC 60115-1 4.37	85±2°C,85% RH for 56 days, loaded with 0.1 times RCWV(no over 100V)	±3.0%+0.005Ω for≤332KΩ ±5.0%+0.005Ω for>332KΩ
Endurance at 70°C	IEC 60115-1 4.25	70±2°C at RCWV(or Umax., whichever less) for 1,000 Hr.(1.5 Hr.on,0.5 Hr. off)	±0.75%+0.005Ω for≤332KΩ ±1.0%+0.005Ω for>332KΩ
Temperature Cycling	IEC 60115-1 4.19	➔ -55°C ➔ Room Temp. ➔ +155°C Room Temp.(5 cycles)	±0.75%+0.005Ω

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Resistance to Soldering Heat	IEC 60115-1 4.18	260±3°C for 10±1 Sec., immersed to a point 3±0.5mm from the body	±0.5%+0.005Ω
Endurance at upper category temperature	IEC 60115-1 4.25	125±2°C for 1,000 Hr.	±1.0%+0.005Ω
Endurance at upper category temperature	IEC 60115-1 4.25	155±2°C for 1,000 Hr.	±2.0%+0.005Ω
Climatic test	IEC 60115-1 4.23	Dry heat: 125°C for 16 Hr. Damp heat: 55°C,95% RH for 24 Hr. Cold: -55°C for 2 Hr. Negative air pressure:8.5KPa at 25±10°C for 2 Hr. Damp heat cyclic: 55°C, 95% RH for 5 days. DC load: -55°C at RCWV for 1 Min. 125°C at RCWV for 1 Min.	±1.0%+0.005Ω

Note:

RCWV (Rated Continuous Working Voltage):

The DC or AC (rms) continuous working voltage corresponding to the rated power is determined by the following formula:

$V=\sqrt{(P \times R)}$
or max. working voltage whichever is less

Where

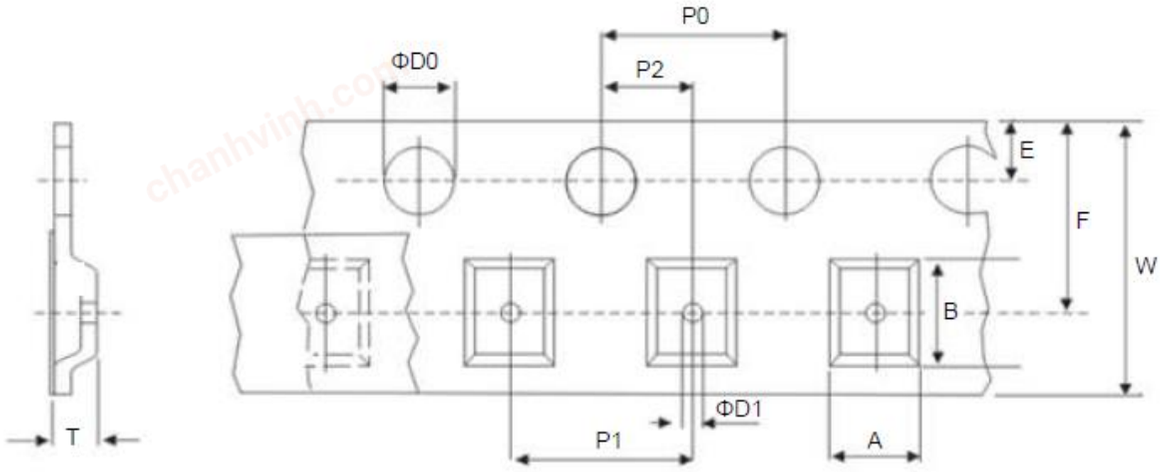
V=Continuous rated DC or AC (rms) working voltage (V)

P=Rated power (W)

R=Resistance value (Ω)

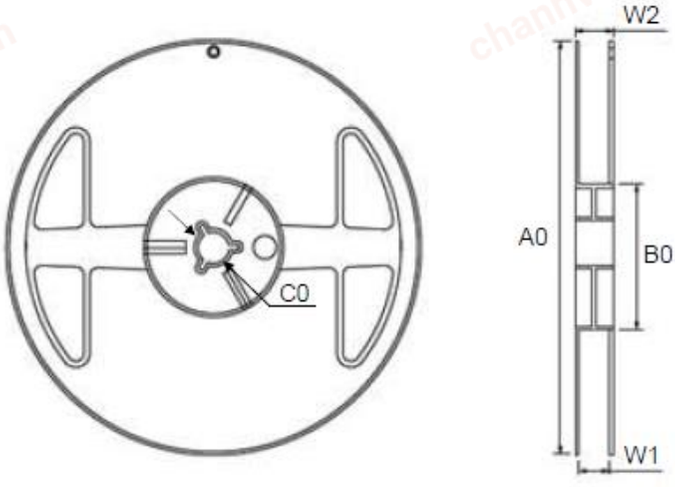
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PACKING METHODS



DIMENSIONS — Unit: mm

TYPE	A	B	W	E	F	P0	P1	P2	ΨD0	ΨD1	T
MMF-12 MMF25S MMF204	1.6±0.1	3.7±0.1	8.0±0.2	1.75±0.1	5.5±0.05	4.0±0.1	4.0±0.1	2.0±0.05	1.5±0.1	0.9 Min.	1.45±0.1
MMF-25 MMF50S MMF207	2.4±0.1	6.3±0.1	12.0±0.2	1.75±0.1	7.5±0.05	4.0±0.1	4.0±0.1	2.0±0.05	1.5±0.1	1.4 Min.	2.50±0.1
MMF-50 MMF1WS	3.3±0.1	9.0±0.1	16.0±0.3	1.75±0.1	9.5±0.1	4.0±0.1	8.0±0.1	2.0±0.05	1.5±0.1	1.4 Min.	3.30±0.1

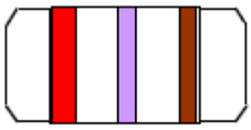


DIMENSIONS — Unit: mm/piece

TYPE	A0	B0	C0	W1	W2	Packaging	Quantity
MMF-12 MMF25S MMF204	178.5±1.5	60.0±1.0	13.0±0.2	9.0±0.5	12.5±0.5	7”	3,000
MMF-25 MMF50S MMF207	178.5±1.5	60.0±1.0	13.0±0.5	13.0±0.5	15.5±0.5	7”	2,000
MMF-50 MMF1WS	330.0±1.5	100.0±1.0	13.0±0.5	17.0±0.5	19.0±0.5	13”	2,500

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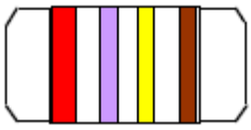
MARKING



3-BAND-CODE

±2%, ±5%

COLOR	1st BAND	2nd BAND	3rd BAND	MULTIPLIER
BLACK	0	0	0	1Ω
BROWN	1	1	1	10Ω
RED	2	2	2	100Ω
ORANGE	3	3	3	1KΩ
YELLOW	4	4	4	10KΩ
GREEN	5	5	5	100K
BLUE	6	6	6	1MΩ
VIOLET	7	7	7	10MΩ
GREY	8	8	8	0.001Ω
WHITE	9	9	9	0.0001Ω
GOLD				0.1Ω
SILVER				0.01Ω



±0.1%, ±0.25%, ±0.5%, ±1%

4-BAND-CODE

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REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 5	Nov.13, 2024	-	-Updated the resistance range of TCR
Version 4	Sep.05, 2024	-	-Updated packing methods
Version 3	Aug.31, 2023	-	-Revised LEGAL DISCLAIMER
Version 2	Feb.8, 2023	-	-Add TCR ±15ppm/°C
Version 1	Sep.29, 2021	-	-Add TCR ±25ppm/°C
Version 0	Aug.2, 2021	-	- First issue of this specification

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