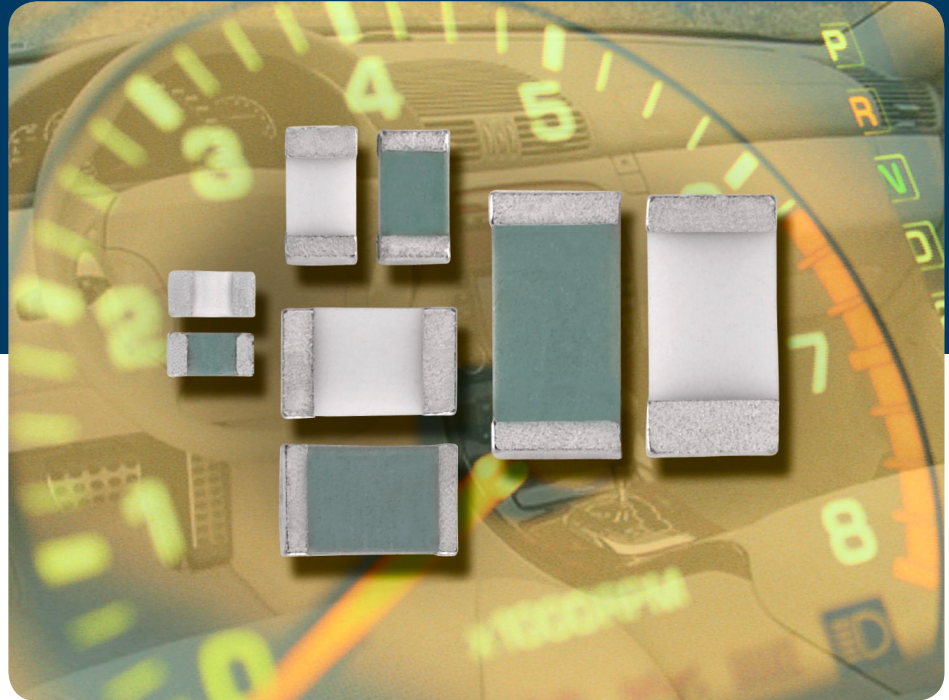




THIN FILM RESISTORS

Series MCS 0402, MCT 0603, MCU 0805, MCA 1206



Precision Thin Film Flat Chip Resistors

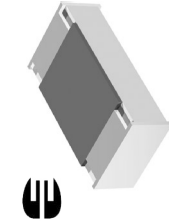
KEY BENEFITS

- Thin film technology
- Low TC: ± 10 to ± 25 ppm/K
- Precision tolerance of value: ± 0.1 and ± 0.25 %
- Superior overall stability: class 0.1 and 0.25
- Green product, supports lead-free soldering
- Approved according to EN 140 401-801

APPLICATIONS

- Telecommunications
- Industrial equipment
- Automotive electronics
- Test and measuring equipment
- Medical equipment

Datasheet is available on our web site at www.vishay.com
for Precision Flat Chip Resistors - <http://www.vishay.com/doc?28700>



FEATURES

- Approved according to EN 140401-801
- Thin-film technology
- Low TC: ± 10 to ± 25 ppm/K
- Precision tolerance of value: ± 0.1 and ± 0.25 %
- Superior overall stability, class 0.1 and 0.25
- Green product, supports lead-free soldering

APPLICATIONS

- Automotive
- Test and measuring equipment
- Medical equipment
- Industrial equipment

Thin Film Flat Chip Resistors combine the proven reliability of the professional products with an advanced level of precision and stability. Therefore they are perfectly suited for applications in the fields of test and measuring equipment together with industrial and medical electronics. The latest member of this product family size 0402 follows the ongoing trend of miniaturisation and enables precision applications in micro circuit designs.



RoHS
COMPLIANT

METRIC SIZE			
INCH:	0402	0603	0805
METRIC:	RR 1005M	RR 1608M	RR 2012M
			RR 3216M

DESCRIPTION	MCS 0402		MCT 0603		MCU 0805		MCA 1206	
	RR 1005M	RR 2012M	RR 1608M	RR 2012M	RR 3216M	RR 3216M	RR 3216M	RR 3216M
Metric size	100 Ω to 221 k Ω	39 Ω to 511 k Ω	39 Ω to 1.5 M Ω	39 Ω to 2 M Ω	39 Ω to 2 M Ω	39 Ω to 2 M Ω	39 Ω to 2 M Ω	39 Ω to 2 M Ω
Resistance range								
Resistance tolerance	± 0.25 %, ± 0.1 %	± 0.25 %, ± 0.1 %	± 0.25 %, ± 0.1 %	± 0.25 %, ± 0.1 %	± 0.25 %, ± 0.1 %	± 0.25 %, ± 0.1 %	± 0.25 %, ± 0.1 %	± 0.25 %, ± 0.1 %
Temperature coefficient	± 25 ppm/K, ± 15 ppm/K, ± 10 ppm/K	± 25 ppm/K, ± 15 ppm/K, ± 10 ppm/K	± 25 ppm/K, ± 15 ppm/K, ± 10 ppm/K	± 25 ppm/K, ± 15 ppm/K, ± 10 ppm/K	± 25 ppm/K, ± 15 ppm/K, ± 10 ppm/K	± 25 ppm/K, ± 15 ppm/K, ± 10 ppm/K	± 25 ppm/K, ± 15 ppm/K, ± 10 ppm/K	± 25 ppm/K, ± 15 ppm/K, ± 10 ppm/K
Operation mode	precision standard	precision standard	precision standard	precision standard	precision standard	precision standard	precision standard	precision standard
Climatic category (LCT/UCT/days)	10/85/56	55/125/56	10/85/56	55/125/56	10/85/56	55/125/56	55/125/56	55/125/56
Rated dissipation, P_R (1)	0.016 W	0.063 W	0.032 W	0.125 W	0.1 W	0.25 W	0.1 W	0.25 W
Operating voltage, U_{max} , AC/DC	12.5 V	50 V	25 V	35 V	150 V	50 V	200 V	200 V
Film temperature	85 °C	125 °C	85 °C	125 °C	85 °C	125 °C	85 °C	125 °C
Max. resistance change at P_R	100 Ω to 221 k Ω	39 Ω to 511 k Ω	39 Ω to 1.5 M Ω	39 Ω to 2 M Ω	39 Ω to 2 M Ω	39 Ω to 2 M Ω	39 Ω to 2 M Ω	39 Ω to 2 M Ω
1 000 h	≤ 0.1 %	≤ 0.2 %	≤ 0.1 %	≤ 0.2 %	≤ 0.1 %	≤ 0.2 %	≤ 0.05 %	≤ 0.1 %
8 000 h	≤ 0.2 %	≤ 0.4 %	≤ 0.2 %	≤ 0.4 %	≤ 0.1 %	≤ 0.4 %	≤ 0.1 %	≤ 0.25 %
225 000 h	≤ 0.5 %	≤ 1.0 %	≤ 0.5 %	≤ 1.0 %	≤ 0.5 %	≤ 1.0 %	≤ 0.25 %	≤ 0.5 %
Insulation voltage:								
1 minute, U_{ins}	75 V	100 V	200 V	200 V	300 V	300 V	300 V	300 V
continuous	75 V	75 V	75 V	75 V	75 V	75 V	75 V	75 V
Failure rate	$\leq 2 \times 10^{-9}$ h	$\leq 2 \times 10^{-9}$ h	$\leq 2 \times 10^{-9}$ h	$\leq 2 \times 10^{-9}$ h	$\leq 2 \times 10^{-9}$ h	$\leq 2 \times 10^{-9}$ h	$\leq 2 \times 10^{-9}$ h	$\leq 2 \times 10^{-9}$ h

Note

1. The power dissipation on the resistor generates a temperature rise against the local ambient, depending on the heat flow support of the resistors. These resistors do not feature a limited lifetime when operated within the permissible limits. However, resistance value drift increasing over operating time may result in exceeding a limit acceptable to the specific application, thereby establishing a functional lifetime.

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For technical questions, contact tf3resistors@vishay.com

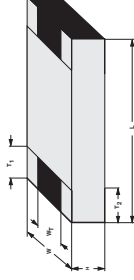
ORDERING INFORMATION - type description and ordering code

M	C	T	0603	-25	0.1 %	P5	47 K
FILM TYPE	PRODUCT CODE	SIZE CODE	IMPERIAL SIZE	TEMPERATURE COEFFICIENT	TOLERANCE	PACKAGING	RESISTANCE VALUE
M = Metal film or cermet	C = Flat chip	S = 0402 T = 0603 A = 1206	0402 0603 1206	± 10 ppm/K ± 25 ppm/K	± 0.1 % ± 0.25 %	E1 = 1 000 units(1) E0 = 10 000 units(1) P5 = 5 000 units PW = 20 000 units	See temperature coefficient and resistance range table

Note: We recommend that the clear text ordering code is used to minimize the possibility of errors in order handling.

1. E1 and E0 only for MCS 0402.

DIMENSIONS



DIMENSIONS - CHIP resistor types, mass and relevant physical dimensions

TYPE	H (mm)	L (mm)	W (mm)	W ₁ (mm)	T ₁ (mm)	T ₂ (mm)	MASS (mg)
MCS 0402	0.32 \pm 0.05	1.0 \pm 0.05	0.5 \pm 0.05	> 75 % of W	0.2 \pm 0.1/-0.15	0.2 \pm 0.1	0.6
MCT 0603	0.45 \pm 0.1/-0.05	1.55 \pm 0.05	0.85 \pm 0.1	> 75 % of W	0.3 \pm 0.15/-0.2	0.3 \pm 0.15/-0.2	1.9
MCU 0805	0.45 \pm 0.1/-0.05	2.0 \pm 0.1	1.25 \pm 0.15	> 75 % of W	0.4 \pm 0.1/-0.2	0.4 \pm 0.1/-0.2	4.6
MCA 1206	0.55 \pm 0.1	3.2 \pm 0.1/-0.2	1.6 \pm 0.15	> 75 % of W	0.5 \pm 0.25	0.5 \pm 0.25	9.2

TEMPERATURE COEFFICIENT AND RESISTANCE RANGE

T.C.	TOLERANCE	RESISTANCE VALUE (1)					
		MCS 0402	MCT 0603	MCU 0805	MCA 1206	MCA 1206	MCA 1206
± 25 ppm/K	± 0.25 %	100 Ω to 221 k Ω	39 Ω to 511 k Ω	39 Ω to 1.5 M Ω	39 Ω to 2 M Ω	39 Ω to 2 M Ω	39 Ω to 2 M Ω
± 0.1 %	± 0.1 %	150 Ω to 221 k Ω	47 Ω to 511 k Ω	47 Ω to 1.5 M Ω	47 Ω to 2 M Ω	47 Ω to 2 M Ω	47 Ω to 2 M Ω
± 15 ppm/K	± 0.25 %	100 Ω to 150 k Ω	39 Ω to 332 k Ω	39 Ω to 1 M Ω	39 Ω to 1.5 M Ω	39 Ω to 1.5 M Ω	39 Ω to 1.5 M Ω
± 0.1 %	± 0.1 %	150 Ω to 150 k Ω	47 Ω to 332 k Ω	47 Ω to 1 M Ω	47 Ω to 1.5 M Ω	47 Ω to 1.5 M Ω	47 Ω to 1.5 M Ω
± 10 ppm/K(2)	± 0.25 %	100 Ω to 130 k Ω	39 Ω to 221 k Ω	39 Ω to 511 k Ω	39 Ω to 1 M Ω	39 Ω to 1 M Ω	39 Ω to 1 M Ω
± 0.1 %	± 0.1 %	150 Ω to 130 k Ω	47 Ω to 221 k Ω	47 Ω to 511 k Ω	47 Ω to 1 M Ω	47 Ω to 1 M Ω	47 Ω to 1 M Ω

Note

1. Resistance values to be selected from E96 and E192 series, other values are available on request.
2. TC 10 is specified over the temperature range from -10 °C to 85 °C.

Resistance ranges printed in bold are preferred T.C. tolerance combinations with optimized availability.

ASSEMBLY

The resistors are suitable for processing on automatic SMD assembly systems and for automatic soldering using wave, reflow or vapour phase. The encapsulation is resistant to all cleaning solvents commonly used in the electronics industry, including alcohols, esters and aqueous solutions. The resistors are lead (Pb)-free, the pure tin plating provides compatibility with lead (Pb)-free and lead-containing soldering processes. The immunity of the plating against tin whisker growth has been proven under extensive testing. All products comply with the CEFC/EECA/EICTA list of legal restrictions on hazardous substances.

APPROVALS

The resistors are tested in accordance with EN 140401-801 (superseding CECC 40401-801) which refers to EN 60115-1 and EN 140400. Approval of conformity is indicated by the CECC logo on the package label. Vishay BEYSCHLAG has achieved "Approval of Manufacturer" in accordance with EN 100114-1. The release certificate for "Technology Approval Schedule" in accordance with CECC 240001 based on EN 100114-6 is granted for the Vishay BEYSCHLAG manufacturing process.