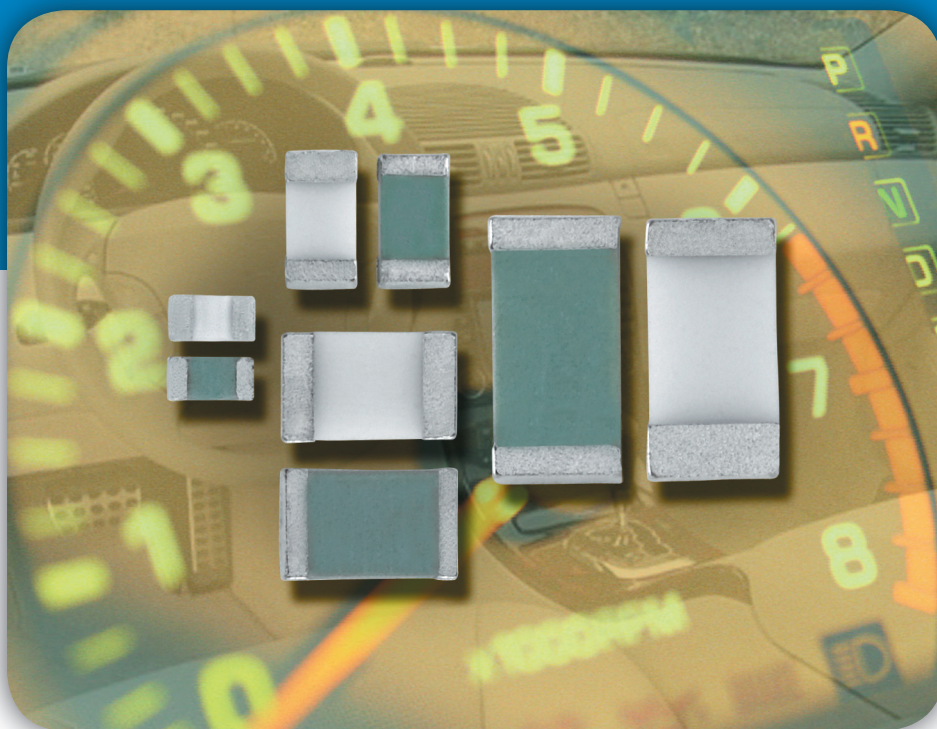




# RESISTIVE PRODUCTS – Precision Flat Chip Resistors



## Precision Thin Film Chip Resistors – Series MCS 0402, MCT 0603, MCU 0805, MCA 1206

### FEATURES

- Thin film technology
- Low TC:  $\pm 10$  to  $\pm 25$  ppm/K
- Precision tolerance of value:  $\pm 0.1$  and  $\pm 0.25\%$
- 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



# MCS 0402, MCT 0603, MCU 0805, MCA 1206 - Precision Precision Flat Chip Resistors

Vishay Beyschlag

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## 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.

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

TECHNICAL SPECIFICATIONS	MCS 0402		MCT 0603		MCU 0805		MCA 1206	
	precision	standard	precision	standard	precision	standard	precision	standard
Metric size	RR 1005M	RR 1608M	RR 2012M	RR 3216M	RR 3216M	RR 3216M	RR 3216M	RR 3216M
Resistance range	100 $\Omega$ to 221 k $\Omega$	39 $\Omega$ to 511 k $\Omega$	39 $\Omega$ to 1.5 M $\Omega$	39 $\Omega$ to 1.5 M $\Omega$	39 $\Omega$ to 2 M $\Omega$	39 $\Omega$ to 2 M $\Omega$	39 $\Omega$ to 2 M $\Omega$	39 $\Omega$ to 2 M $\Omega$
Resistance tolerance	$\pm 0.25$ %; $\pm 0.1$ %							
Temperature coefficient	$\pm 25$ ppm/K; $\pm 15$ ppm/K; $\pm 10$ ppm/K							
Operation mode	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	10/85/56	55/125/56
Rated dissipation, $P_{70}^{(1)}$	0.016 W	0.063 W	0.1 W	0.050 W	0.125 W	0.1 W	0.25 W	0.25 W
Operating voltage, $U_{max}$ , AC/DC	12.5 V	50 V	25 V	75 V	35 V	150 V	50 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 $P_{70}$	100 $\Omega$ to 221 k $\Omega$	39 $\Omega$ to 511 k $\Omega$	39 $\Omega$ to 1.5 M $\Omega$	39 $\Omega$ to 1.5 M $\Omega$	39 $\Omega$ to 2 M $\Omega$	39 $\Omega$ to 2 M $\Omega$	39 $\Omega$ to 2 M $\Omega$	39 $\Omega$ to 2 M $\Omega$
1 000 h	$\leq 0.1$ %	$\leq 0.2$ %	$\leq 0.1$ %	$\leq 0.2$ %	$\leq 0.05$ %	$\leq 0.1$ %	$\leq 0.1$ %	$\leq 0.1$ %
8 000 h	$\leq 0.2$ %	$\leq 0.4$ %	$\leq 0.2$ %	$\leq 0.4$ %	$\leq 0.1$ %	$\leq 0.2$ %	$\leq 0.1$ %	$\leq 0.2$ %
225 000 h	$\leq 0.5$ %	$\leq 1.0$ %	$\leq 0.5$ %	$\leq 1.0$ %	$\leq 0.25$ %	$\leq 0.5$ %	$\leq 0.25$ %	$\leq 0.5$ %
Specified lifetime	225 000 h							
Insulation voltage :								
1 minute; $U_{ins}$	75 V	100 V	200 V	300 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							

## Note

1. The power dissipation on the resistor generates a temperature rise against the local ambient, depending on the heat flow support of the printed-circuit board (thermal resistance). The rated dissipation applies only if the permitted film temperature is not exceeded.

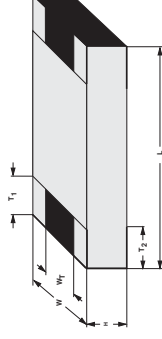
## ORDERING INFORMATION - type description and ordering code

M	C	T	0603	-25	0.1 %	P5	RESISTANCE VALUE
FILM TYPE	PRODUCT CODE	SIZE CODE	IMPERIAL SIZE	TEMPERATURE COEFFICIENT	TOLERANCE	PACKAGING	RESISTANCE VALUE
M = Metal film or cermet	C = Flat chip	S = 0402 U = 0603 U = 0603 A = 1206	0402 0603 0805 1206	$\pm 10$ ppm/K $\pm 15$ ppm/K $\pm 25$ ppm/K	$\pm 0.1$ % $\pm 0.25$ %	E1 = 1 000 units <sup>(1)</sup> E2 = 10 000 units <sup>(1)</sup> 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 <sub>t</sub> (mm)	T <sub>1</sub> (mm)	T <sub>2</sub> (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 + 0.1/-0.15	0.2 $\pm$ 0.1	0.6
MCT 0603	0.45 + 0.1/-0.05	1.55 $\pm$ 0.05	0.85 $\pm$ 0.1	> 75 % of W	0.3 + 0.15/-0.2	0.3 + 0.15/-0.2	1.9
MCU 0805	0.45 + 0.1/-0.05	2.0 $\pm$ 0.1	1.25 $\pm$ 0.15	> 75 % of W	0.4 + 0.1/-0.2	0.4 + 0.1/-0.2	4.6
MCA 1206	0.55 $\pm$ 0.1	3.2 + 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.	RESISTANCE VALUE (1)			
	TOLERANCE	MCS 0402	MCT 0603	MCU 0805
$\pm 25$ ppm/K	$\pm 0.25$ %	100 $\Omega$ to 221 k $\Omega$	39 $\Omega$ to 511 k $\Omega$	39 $\Omega$ to 1.5 M $\Omega$
$\pm 15$ ppm/K	$\pm 0.1$ %	150 $\Omega$ to 221 k $\Omega$	47 $\Omega$ to 511 k $\Omega$	47 $\Omega$ to 1.5 M $\Omega$
$\pm 10$ ppm/K <sup>(2)</sup>	$\pm 0.1$ %	100 $\Omega$ to 150 k $\Omega$	39 $\Omega$ to 332 k $\Omega$	39 $\Omega$ to 1.5 M $\Omega$
	$\pm 0.25$ %	150 $\Omega$ to 150 k $\Omega$	47 $\Omega$ to 332 k $\Omega$	47 $\Omega$ to 1.5 M $\Omega$
	$\pm 0.1$ %	100 $\Omega$ to 130 k $\Omega$	39 $\Omega$ to 221 k $\Omega$	39 $\Omega$ to 1 M $\Omega$
	$\pm 0.1$ %	150 $\Omega$ to 130 k $\Omega$	47 $\Omega$ to 221 k $\Omega$	47 $\Omega$ to 1 M $\Omega$

## 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 CEFCO-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.

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