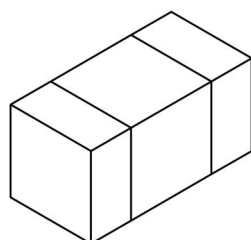
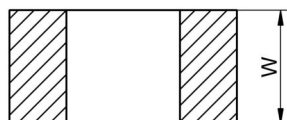
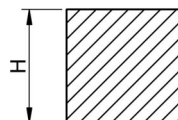
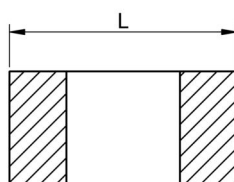
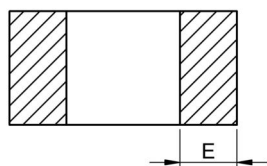
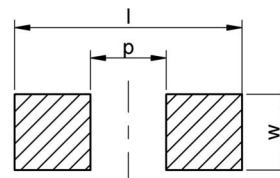
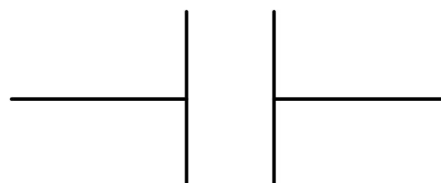


A Dimensions: [mm]**Component Marking:**

L ± 0.05	1.0
W ± 0.05	0.5
H ± 0.05	0.5
E +0.05/-0.10	0.25
I	1.50
p	0.50
w	0.50

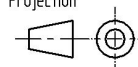
B Recommended land pattern: [mm]**C Schematic:****D1 Electrical Properties:**

Properties	Test conditions		Value	Unit	Tol.
Capacitance	1±0.2 Vrms, 1 MHz ±10%	C	470	pF	± 5%
Rated voltage		U _R	10	V (DC)	max.
Dissipation factor	1±0.2 Vrms, 1 MHz ±10%	DF	Q ≥ 1000		typ.
Isolation Resistance	Apply U _R for 120 s max.	R _{ISO}	≥ 10	GΩ	

E General information:

General Purpose MLCC	
Ceramic Type:	NPO Class I
Temperature Coefficient:	± 30 ppm max.
Storage Conditions:	35°C, <45% RH
Operating Temperature:	-55 °C up to +125 °C
Dielectric Strength:	5 sec. @250% U _R ; Charge & Discharge Current < 50mA
General Test conditions:	25°C, 30-70% RH; if not specified differently
FIT according to	separate documentation

Projection



Würth Elektronik eiSos GmbH & Co. KG
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DESCRIPTION

WCAP-CSGP Ceramic Capacitors

Order.- No.

885012005017

Size: 0402



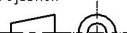
SIZE

A4



D2 Mechanical Properties:

Properties	Definition	
Adhesive Strength of Termination	0402 & 0603	10 ±1 sec; 5N
	> 0603	10 ±1 sec; 10N
Vibration Resistance		all 3 directions, 2 hours each @ 10 - 55 - 10 Hz, amplitude 0.75 mm or 10 g
Resistance to Solder Heat	Solder Temperature	260°C ±5°C
	Dipping Time	10 ±1 sec
	Specific	Refer to Soldering Profile

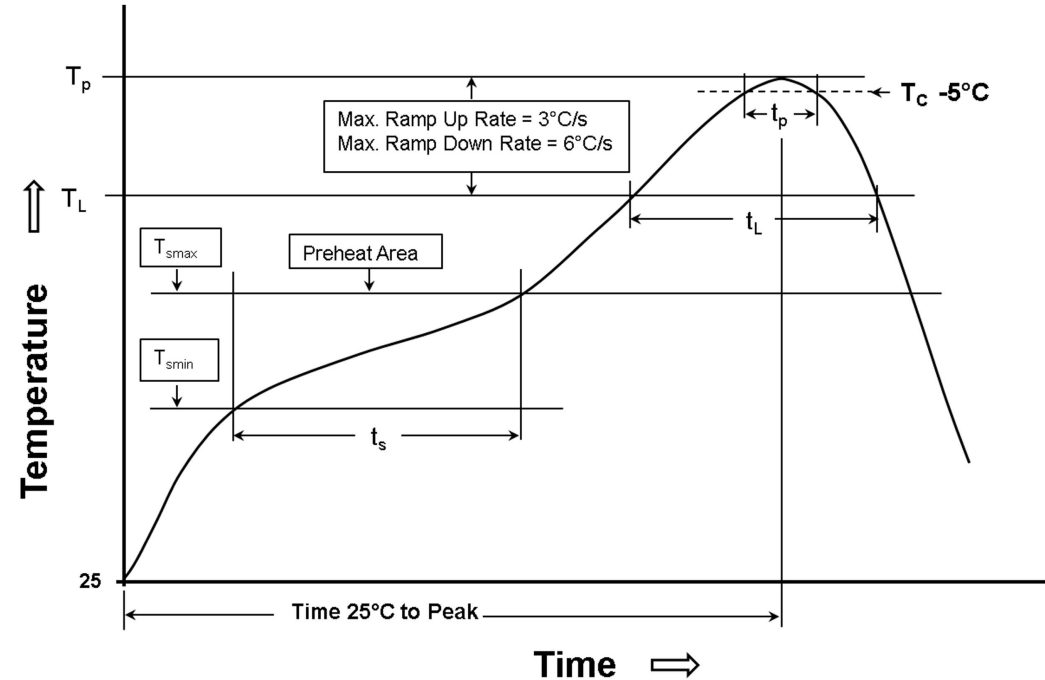
				Projection 		DESCRIPTION WCAP-CSGP Ceramic Capacitors		
				Würth Elektronik eiSos GmbH & Co. KG EMC & Inductive Solutions Max-Eyth-Str. 1 74638 Waldenburg Germany Tel. +49 (0) 79 42 945 - 0 www.we-online.com eiSos@we-online.com		Order.- No. 885012005017 Size: 0402	 COMPLIANT RoHS&REACH WÜRTH ELEKTRONIK	SIZE A4
1.0	2014-11-10	SSt	PSL					
REV	DATE	BY	CHECKED					

This electronic component has been designed and developed for usage in general electronic equipment only. This product is not authorized for use in equipment where a higher safety standard and reliability standard is especially required or where a failure of the product is reasonably expected to cause severe personal injury or death, unless the parties have executed an agreement specifically governing such use. Moreover Würth Elektronik eiSos GmbH & Co KG products are neither designed nor intended for use in areas such as military, aerospace, aviation, nuclear control, submarine, transportation (automotive control, train control, ship control), transportation signal, disaster prevention, medical, public information network etc.. Würth Elektronik eiSos GmbH & Co KG must be informed about the intent of such usage before the design-in stage. In addition, sufficient reliability evaluation checks for safety must be performed on every electronic component which is used in electrical circuits that require high safety and reliability functions or performance.

H Soldering Specifications:



H1: Classification Reflow Profile for SMT components:



H2: Classification Reflow Profiles

Profile Feature	Pb-Free Assembly
Preheat - Temperature Min (T_{smin}) - Temperature Max (T_{smax}) - Time (t_s) from (T_{smin} to T_{smax})	150°C 200°C 60-120 seconds
Ramp-up rate (T_L to T_p)	3°C/ second max.
Liquidous temperature (T_L) Time (t_L) maintained above T_L	217°C 60-150 seconds
Peak package body temperature (T_p)	See Table H3
Time within 5°C of actual peak temperature (t_p)	20-30 seconds
Ramp-down rate (T_p to T_L)	6°C/ second max.
Time 25°C to peak temperature	8 minutes max.

refer to IPC/JEDEC J-STD-020D

H3: Package Classification Reflow Temperature

	Package Thickness	Volume mm³ <350	Volume mm³ 350 - 2000	Volume mm³ >2000
PB-Free Assembly	< 1.6 mm	260°C	260°C	260°C
PB-Free Assembly	1.6 - 2.5 mm	260°C	250°C	245°C
PB-Free Assembly	≥ 2.5 mm	250°C	245°C	245°C

refer to IPC/JEDEC J-STD-020D

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I Cautions and Warnings:

The following conditions apply to all goods within the product series of **WCAP-CSGP** of Würth Elektronik eiSos GmbH & Co. KG:

1. General

- The capacitor is engineered, designed and manufactured to be used within the datasheet specified values.
- Do not use the capacitor neither short term nor long term outside the specified values, which are given in the data sheet.
- Do not apply any kind of flexural or compressive force onto soldered or unsoldered component.
- Prevent the capacitor surface from any damage or scratches with sharp edges (e.g. chassis, screwdrivers, pincers)

2. Product specific

The responsibility for the applicability of customer specific products and use in a particular customer design is always within the authority of the customer. All technical specifications for standard products do also apply to customer specific products.

Follow all instructions mentioned in the data sheet, especially the following items:

2.1 Storage conditions

- These ceramic capacitors must be stored in stable conditions within an ambient temperature between 5°C to 40°C with a relative humidity of <70%.
- The environment in which the capacitors are operated and stored has to have atmospheric characteristics and must be free of dew condensation and toxic gases (e.g. chlorine, ammonia, sulfur, hydrogen sulphide and hydrogen sulfate).
- All products shall be used before the end of the period of 12 months based on the product date code, if not, a 100% solderability cannot be guaranteed.
- The capacitance tolerance as specified within the datasheet is only valid on the date of delivery.

2.2 Operating climatic conditions

- Do not exceed the lower nor the upper specified temperature under no condition.
- Be aware that the specified capacitance tolerance is only valid at the date delivery and according specified measurement criteria.
- Do not use the capacitors under high humidity, high temperature nor under high or low atmospheric pressure which may affect capacitors reliability.
- Surface temperature including self-heating must be kept below the maximum operating temperature.
- The temperature rise of the capacitor's temperature compared to ambient temperature shall be below 20°C.
- Avoid any water or heavy dust on capacitors surface, which may cause electrical leakage, damage, overheating or corrosion.

2.3 Operating load conditions

- Do not use the capacitor with any higher than specified voltage.
- Violation of the technical product specifications such as exceeding the specified voltage will void the warranty.



- Operating voltage across the terminals including AC and DC peaks and AC or pulse overshooting, Vp-p as well as irregular voltage because of resonance or switching must be below the rated voltage.
- Due to self-heating the reliability of the capacitor may be reduced, if high frequency AC or pulse is applied.
- Avoid any overload or conditions that are not specified in the capacitors datasheet.
- Consider carefully possible specific changes of electrical characteristics like capacitance over temperature, voltage and time as well as the specific performance over frequency for the actual use conditions. For detailed information see datasheet.

2.4 Design of the P.C. board

- The chip capacitor shall be located to minimize any possible mechanical stress from deflection or board wrap.
- It is recommended to position the chip capacitor in parallel to slits and perforations and as far away from slits, perforations, separation points, screw holes, frames and edges of the P.C. board to avoid mechanical stress.
- Determine the shape and size of the solder pads to have proper amount of solder on the terminations as the amount of solder at the terminations has a direct effect on the reliability of the capacitor.
- Provide individual solder pads for each termination. Solder pads are specified in the datasheet.
- The PCB design (e.g. land pattern design and grounding planes) must be evaluated for each individual circuit to achieve the optimal soldering results.

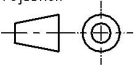
2.5 Mounting

- Avoid any stress from the mounting head to avoid cracks.
- Adjust the bottom dead center of the mounting head not to press on the P.C. board surface.
- The mounting head pressure has to be adjusted to 1 N up to 3 N of static force.
- Provide support from the bottom side of the P.C. board by a support pin for minimizing the impact energy from the mounting head.
- Provide sufficient close up dimension, preventive maintenance and replacement of the centering jaw to avoid a crack when it is worn out.

2.6 Adhesive

Selection of adhesive

- The adhesive should have sufficient coating and viscosity and should harden rapidly.
- The adhesive should be strong enough to hold parts on the board during the mounting and solder process and should have sufficient strength at high temperatures.
- The adhesive should have corrosion resistance, excellent insulation characteristics and no emission of toxic gasses nor any effect on the human body.
- Do not use too much adhesive to avoid pollution of the soldering pads.

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REV	DATE	BY	CHECKED			SIZE A4

I Cautions and Warnings (2):

The following conditions apply to all goods within the product series of **WCAP-CSGP** of Würth Elektronik eiSos GmbH & Co. KG:

2.7 Soldering

- The detailed soldering instructions for reflow and wave soldering are given within Soldering Specification in the datasheet.
- The soldering profile has to be compliant with the technical soldering specification, otherwise this will void the warranty.
- Avoid any other than specified temperature and / or time conditions during soldering.
- Customer needs to ensure that the applied solder paste, the paste thickness and solder conditions are applicable to guarantee a sufficient solder result according to the relevant criteria of IPC-A-610.
- Excessive amount of solder may lead to higher tensile force and chip cracking. Insufficient amount of solder may detach the capacitor due to defective contacts.
- Do not use excessive nor insufficient flux.
- Provide enough washing when water-soluble flux is used.
- Consider the preheating conditions as follows to avoid thermal shock:

Soldering	Size	Temperature difference (ΔT)
Wave soldering	0603, 0805	$\Delta T \leq 150^\circ\text{C}$
Reflow soldering	1206 or less	$\Delta T \leq 190^\circ\text{C}$
Reflow soldering	1210 or more	$\Delta T \leq 130^\circ\text{C}$
Manual soldering	1206 or less	$\Delta T \leq 190^\circ\text{C}$
Manual soldering	1210 or more	$\Delta T \leq 130^\circ\text{C}$

- It is recommended to use air for natural cooling. When dipping the chips into a solvent for cleaning, the temperature difference (ΔT) must be less than 100°C .
- For reflow soldering two times limitation is recommended.
- Wave soldering is recommended only for the following case sizes: 0603 and 0805, thickness < 1 mm.
- Please ensure for manual soldering (solder iron) not to exceed the general temperature capabilities as specified above.
- The following conditions are recommended for solder repair by solder iron:

Size	Temp. ($^\circ\text{C}$)	Preheating Temp. ($^\circ\text{C}$)	Temperature difference (ΔT)	Atmosphere
1206 or less	$330 \pm 20^\circ\text{C}$	$>150^\circ\text{C}$	$\Delta T \leq 190^\circ\text{C}$	Room air
1210 or more	280°C max	$>150^\circ\text{C}$	$\Delta T \leq 130^\circ\text{C}$	Room air

- Typical time of actual peak temperature: <5 sec (300°C), <3 sec (350°C); as short as possible
- Do not make direct contact with the ceramic dielectric.



2.8 Cleaning

- Cleaning agents that are used to clean the customer application might damage or change the characteristics of the component, body, pins or termination.
- Avoid Halogen in the flux or any contaminated flux as well as excessively high ultrasonic cleaning.

2.9 Coating, molding and potting of the P.C. board

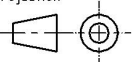
- When coating and molding the P.C. board verify the quality influence on the capacitor.
- Verify the curing temperature and assure that there is no harmful decomposing or reaction gas emission during curing.
- Do not exceed the maximal temperature rise of 20°C .
- If the product is potted in customer applications, the potting material might shrink during and after hardening. The product is exposed to the pressure of the potting material with the effect that the body and termination is possibly damaged and so the electrical as well as the mechanical characteristics are endangered to be affected. After the potting material is cured, the body and termination of the product have to be checked if any reduced electrical or mechanical functions or destructions have occurred.

2.10 Handling after chip is mounted

- Direct mechanical impact to the product shall be prevented.
- After soldering please pay attention not to bend, twist or distort the P.C. board in handling and storage.
- Avoid excessive pressure during the functional check of the P.C. board.
- Avoid bending stress while breaking the P.C. board.

2.11 Handling of loose chip capacitor

- Once dropped do not use the chip capacitor.
- After mounting avoid piling up P.C. boards to avoid hitting the chip capacitor of another board.

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<http://moschip.ru/get-element>

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