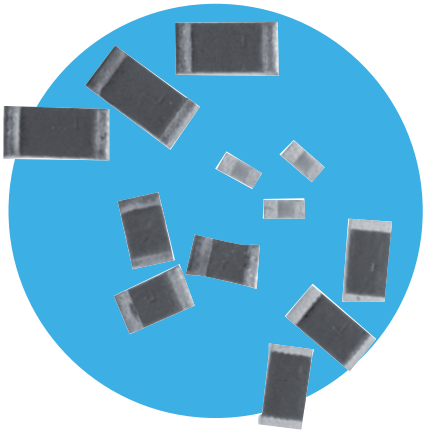
Surface Mounted Resistors

CR Series

- CECC released products
- 100% high temperature and overload screened versions available for high reliability applications
- Terminations available for wire bonding or soldering
- Available in sizes down to 0503
- Resistance range 1 ohm to100M ohms
- Tolerances down to 0.1%
- Solder terminations have a nickel barrier layer
- Shorting Links available



All Pb-free parts comply with EU Directive 2011/65/EU (RoHS2)

Electrical Data

Commercial		**CR0503**	**CR0805**	**CR1005**	**CR1206**	**CR2010**	**CR2512**	**Notes**
Power rating at 70°C	watts	0.063	0.125	0.125	0.25	0.5	1.0	
Resistance range	ohms	1R to 10M	1R to 100M			1R to 1M		
Limiting element voltage	volts	50	100	150	200	400	500	
TCR -55° to +155°C	ppm/°C	<10 ohms 200: 10 to 1M ohms 100: >1M ohms 250						
Resistance tolerance	%	0.1, 0.25, 0.5, 1, 2, 5						See table of value ranges
Ambient temperature range	°C	-55 to 155						

CECC 40401-004 Requirements			**CR0805**		**CR1206**			
Power rating at 70°C	watts		0.125		0.25			
Resistance range	ohms		1R to 10M					
Limiting element voltage	volts		100		200			
TCR -55°C to +125°C	ppm/°C	<10 ohms 200: 10 to 1M 100: >1M 200						
TCR +20°C to +70°C	ppm/°C	<10 ohms 200: 10 to 1M 50: >1M 100						
Resistance tolerance	%	0.5, 1, 2, 5						See table of value ranges
Ambient temperature range	°C	-55 to +125						

CECC 40401-008 Requirements			**CR0805**		**CR1206**	**CR2010**	**CR2512**	
Power rating at 70°C	watts		0.125		0.25	0.5	1.0	
Resistance range	ohms		1R to 10M		1R to 10M	1R to 1M	1R to 1M	
Limiting element voltage	volts		100		200	400	500	
TCR -55°C to +155°C	ppm/°C	<10 ohms 200: 10 to 1M ohms 100: >1M ohms 250						
Resistance tolerance	%	0.1, 0.25, 0.5, 1, 2, 5						See table of value ranges
Ambient temperature range	°C	-55 to 155						

CECC 40401-003 Requirements			**CR0805**		**CR1206**			
Power rating at 70°C	watts		0.063		0.125			
Resistance range	ohms		1R to 3M		1R to 5M			
Limiting element voltage	volts		100		200			
TCR -55°C to +125°C	ppm/°C	<5 ohms 500: 5 to 10 ohms 350: 10 to 3M ohms 100: >3M ohms 250						
Resistance tolerance	%	0.25, 0.5, 1, 2, 5						See table of value ranges
Ambient temperature range	°C	-55 to 125						

These tables indicate the CECC specification requirements, and these are met or exceeded by the corresponding CR series products

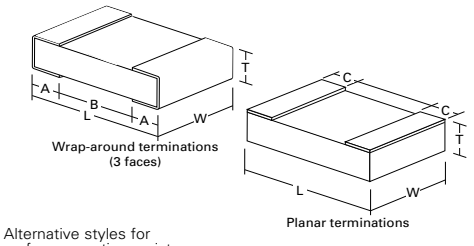
Values		E24 & E96 preferred						Any value to order
Thermal impedance	°C/watt	800	360	290	200	80	70	Mounted on custom designed PCB's

General Note

TT electronics reserves the right to make changes in product specification without notice or liability.
All information is subject to TT electronics' own data and is considered accurate at time of going to print.

Physical Data

Dimensions of Standard Styles (mm) & Weight (g)							
	Wrap around						
Style	L	W	T max	A	B†	C	Wt
0503	1.25±0.2	0.63±.15	0.5	Not available		0.20±0.1	0.005
0805	2.0±0.2	1.25±0.15	0.6	0.3±0.15	0.9 min	0.3±0.1	0.009
1005	2.5±0.3	1.25±0.2	0.7	Not available		0.4±0.15	0.015
1206	3.2±0.2	1.6±0.2	0.7	0.4±0.2	1.8 min	0.4±0.15	0.020
2010	5.1±0.3	2.5±0.2	0.7	0.6±0.3	3.0 min	N/A	0.036
2512	6.5±0.3	3.2±0.2	0.7	0.6±0.3	4.4 min	N/A	0.055



Alternative styles for surface mounting resistors

†This dimension determines the number of conductors which may pass under the surface mounted device.

Construction
Thick film resistor material, overglaze and organic protection are screen printed on a 96% alumina substrate.

Terminations
Planar (or single-sided) termination is gold and suitable for wire-bonding; wrap-around is suitable for soldering.

Solderability
Wrap-around terminations have an electroplated nickel barrier and solder coating, this ensures excellent 'leach' resistance properties and solderability. They will withstand immersion in solder at 260°C for 30 seconds.

Marking
All relevant information recorded on the primary package or reel.

Performance Data

		CECC 40401-008 Requirements	CECC40401-004 Requirements	CECC40401-003 Requirements	Actual Maximum	Actual Typical
Load at rated power: 1000 hours at 70°C	ΔR%	2	2	≤ 3M3 2 >3M3 3	2	0.25
Shelf life: 12 months at room temp.	ΔR%	-	-	-	0.1	0.02
Derating from rated power at 70°C		Zero at 155°C	Zero at 125°C	Zero at 125°C		
Overload	ΔR%	0805:1 1206:0.5	0.5	2	1	0.1
Dry Heat: 1000 hours at UCT (125°C for 003 & 004 - 155°C for 008)	ΔR%	2	1	≤ 3M3 2 >3M3 3	to 10M 1 >10M 2	0.2 >10M 1
Long term damp heat	ΔR%	2	2	2	1	0.25
Temperature rapid change	ΔR%	0.5	0.5	1	0.25	0.05
Resistance to solder heat	ΔR%	0.5	0.5	2	0.25	0.05
Voltage proof	volts	0805 : 200 1206 : 300 2010 : 400 2512 : 500			0503 : 100 All others : 500	

Note: An 0.01 ohm addition to be added to the performance of all resistors <10 ohms

Value Ranges (ohms)

Tolerance	%					
Size	5	2	1	0.5	0.25	0.1
0503	1 to 10M	1 to 10M	10 to 10M	100 to 1M	N/A	N/A
0805	1 to 100M	1 to 50M	1 to 20M	10 to 10M	100 to 1M	100 to 1M
1005	1 to 100M	1 to 50M	1 to 20M	10 to 10M	100 to 1M	100 to 1M
1206	1 to 100M	1 to 50M	1 to 25M	10 to 10M	100 to 1M	100 to 1M
2010	1 to 1M	1 to 1M	1 to 1M	10 to 10M	100 to 1M	N/A
2512	1 to 1M	1 to 1M	1 to 1M	10 to 10M	100 to 1M	N/A

Application Notes

Operating Temperature Range
The chips themselves can operate at a maximum temperature of 155°C (see performance claims above). For soldered chips, the joint temperature should not exceed 110°C. This condition is met when the stated power levels at 70°C are used.

Mounting
This chip resistor is ideally suited for handling by automatic methods due to its rectangular shape and the small dimensional tolerances. Electrical connection to a ceramic substrate or to a printed circuit board can be made by wire bonding (eg suffix 'G' in CR0805G) or by reflow soldering of wrap-around terminations (eg suffix 'F' in CR0805F).

The 'F' terminations provide good leach properties and ensure reliable contact. Due to the robust construction the resistor chip can be immersed in the solder bath for 30 seconds at 260°C. This enables the resistor to be mounted on one side of a printed circuit board and other wire-leaded components on the other side.

Packaging
Wrap-around Termination
Chip resistors are supplied taped and reeled on standard 8mm tape to IEC 286-3.

Quantity per reel; 3000 max.

Planar Terminations
Resistor chips are supplied in waffle packs.

Ordering Procedure

Example: CR2512 with solderable wraparound terminations at 10 kilohms and 1% tolerance on a reel of up to 1800 pieces -

C R 2 5 1 2 F – 1 0 K F I

Type

Termination

F	Solderable wraparound	0805, 1206, 2010, 2512 only
G	Gold pad planar	All sizes

Value (use IEC62 code)

Tolerance (use IEC62 code)

B	0.1%	D	0.5%	G	2%
C	0.25%	F	1%	J	5%

Packing

I	Tape	0805F, 1206F, 2010F	Up to 3000/reel	Standard
		2512F	Up to 1800/reel	
	Waffle	G Termination		

For CECC released product state on order the CECC number. Example: **CR2512F-10KFI CECC40401-008**
For SnPb finish instead of Pb-free replace the packing suffix with **PB**. Example: **CR2512F-10KFPB**
For zero-ohm jumper chips use the dummy value & tolerance code **R005J**