

# Thick Film Chip Resistor AEC-Q200 Qualified

CRA Series

**MERITEK**

## FEATURE

- Excellent Mechanical Strength and Electrical Stability
- Ideal for Pick and Place Machinery
- Stable High Frequency Characteristics
- Miniature, High Board Density
- Equivalent Specification EIAJ-RC-2690, EIAJ-RC-1009B, EIA-RS-481A
- AEC-Q200 qualified



## PART NUMBERING SYSTEM

CRA   10   1002   F   -   13  
(1)   (2)   (3)   (4)   (5)

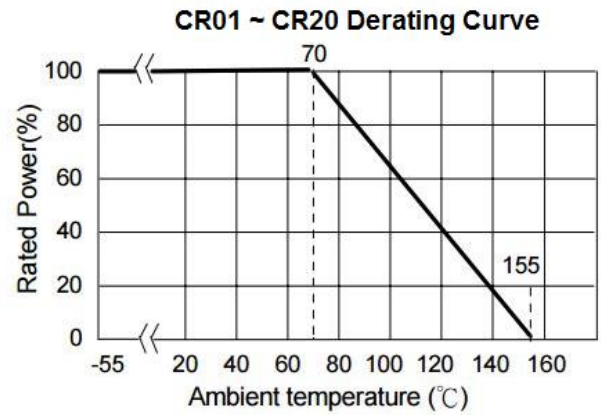
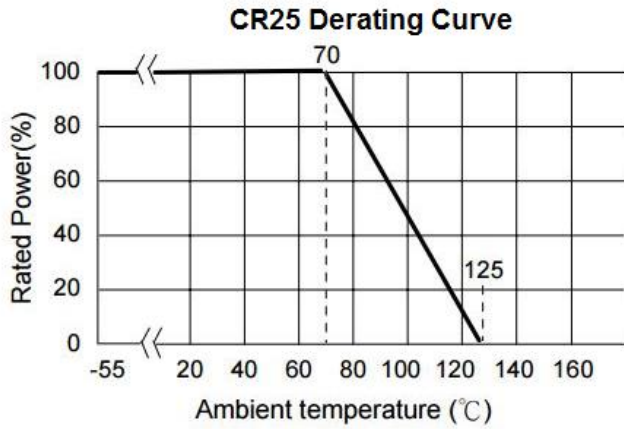


No	Item	Code	Description	Series Reference
(1)	Meritek Series	CRA	Thick Film Chip Resistor	AEC-Q200 Qualified Type
(2)	Size	10	10: 0805	01: 2512, 02: 2010, 03: 1812, 04: 1210 08: 1206, 16: 0603, 20: 0402, 25: 0201
(3)	Resistance	1002	1002: 10KΩ	3 Digit: First 2 are significant, Last is multiplier (10 <sup>X</sup> ) 4 Digit: First 3 are significant, Last is multiplier (10 <sup>X</sup> )
(4)	Tolerance	F	F: ±1%	B: ±0.1%, D=±0.5%, G=±2%, J: ±5%
(5)	Packaging	13	13: 13" reel	Blank: Standard 7" reel

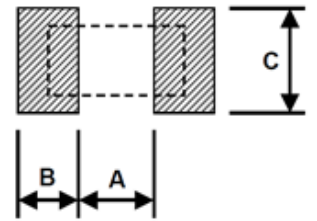
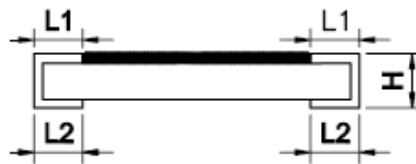
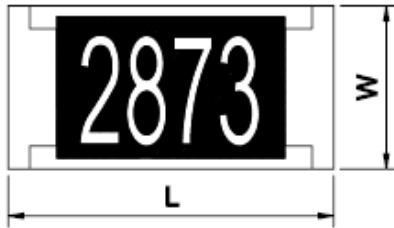
## ELECTRICAL CHARACTERISTICS

Type	Rated Power 70°C	Max Working Voltage	Max Overload Voltage	T.C.R. (ppm/°C)	Resistance Range (Ω)				Jumper (0Ω) Rated Current		Jumper (0Ω) Resistance	
					B(±0.1%) E-24, E-96	D(±0.5%) E-24, E-96	F(±1%) E-24, E-96	G(±2%) J(±5%) E-24	J (±5%)	F (±1%)	J (±5%)	F (±1%)
CRA25 (0201)	1/20W	25V	50V	-200 +400	-	1≤R<10	1≤R<10	1≤R<10	0.5A	-	50mΩ Max	-
				±200	47~1M	10~10M	10~10M					
CRA20 (0402)	1/16W	50V	100V	±100	100~1M	10~1M	10~22M	10~22M	1A	-	50mΩ Max	-
				±200	-	-	1≤R<10	1≤R<10				
CRA16 (0603)	1/10W	75V	150V	±100	100~1M	10~1M	10~22M	10~22M	1A	-	50mΩ Max	
				±200	-	1≤R<10	1≤R<10	1≤R<10				
CRA10 (0805)	1/8W	150V	300V	±100	100~1M	10~10M	10~27M	10~27M	2A	2.5A	50mΩ Max	20mΩ Max
				±200	-	1≤R<10	1≤R<10	1≤R<10				
CRA08 (1206)	1/4W	200V	400V	±100	10~1M	10~10M	10~27M	10~27M	2A	3.5A	50mΩ Max	20mΩ Max
				±200	3≤R<10	1≤R<10	1≤R<10	1≤R<10				
CRA04 (1210)	1/2W	200V	400V	±100	100~1M	10~10M	10~27M	10~27M	2A	4A	50mΩ Max	20mΩ Max
				±200	-	-	1≤R<10	1≤R<10				
CRA02 (2010)	3/4W	200V	400V	±100	100~1M	10~10M	10~20M	10~20M	2A	5A	50mΩ Max	20mΩ Max
				±200	-	-	1≤R<10	1≤R<10				
CRA01 (2512)	1W	200V	400V	±100	100~1M	10~10M	10~20M	10~20M	2A	7A	50mΩ Max	20mΩ Max
				±200	-	-	1≤R<10	1≤R<10				
Operating Temperature				-55~+155°C (0201: -55~+125°C)								

**POWER DERATING CURVE**



**DIMENSIONS**



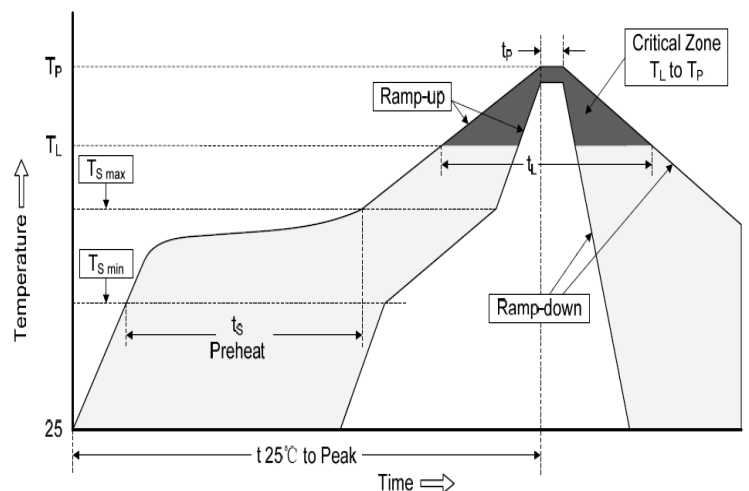
Type	Size	Dimensions (mm)					Recommended Land Pattern (mm)		
		L	W	H	L1	L2	A	B	C
CRA25	0201	0.60±0.03	0.30±0.03	0.23±0.03	0.10±0.05	0.15±0.05	0.3	0.35	0.4
CRA20	0402	1.00±0.10	0.50±0.05	0.30±0.05	0.20±0.10	0.25±0.10	0.5	0.5	0.6
CRA16	0603	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.15	0.30±0.15	0.8	0.65	0.9
CRA10	0805	2.00±0.10	1.25±0.10	0.50±0.10	0.35±0.20	0.35±0.15	1.2	0.9	1.3
CRA08	1206	3.05±0.10	1.55±0.10	0.50±0.10	0.45±0.20	0.35±0.15	2.2	1	1.6
CRA04	1210	3.05±0.10	2.55±0.10	0.55±0.10	0.50±0.20	0.50±0.20	2.2	1	2.8
CRA02	2010	5.00±0.20	2.50±0.20	0.55±0.10	0.60±0.20	0.60±0.20	3.5	1.3	2.8
CRA01	2512	6.30±0.20	3.20±0.20	0.55±0.10	0.60±0.20	0.60±0.20	3.8	2.1	3.5

**RELIABILITY TEST CONDITION AND REQUIREMENT**

Test	Standard	Condition	Requirement for Resistors		
			0.1%, 0.5% 1%	2%, 5%	Jumper
Temperature Coefficient of Resistance (T.C.R.)	AEC-Q200	-55°C ~ +125°C, 25°C is the reference temperature	As Specified		
Short Time Overload	JIS-C-5201-1 4.13	Apply 2.5X rated voltage for 5 seconds. For Jumpers, apply 2.5X rated current, release load for 0.5hrs	$ \Delta R/R  \leq 1.0\%$ No visible damage	$ \Delta R/R  \leq 2.0\%$ No visible damage	As specified
ESD	AEC-Q200	Use 2kΩ and 150pF for discharge test. Apply 2KV DC discharges positive and negative polarity to two samples respectively, stabilize in room temperature for 30mins	$ \Delta R/R  \leq 3.0\%$ No visible damage	$ \Delta R/R  \leq 3.0\%$ No visible damage	As specified
Bending Strength	AEC-Q200	Bending 5mm once, for 60 seconds	$ \Delta R/R  \leq 1.0\%$ No visible damage or peeling off	$ \Delta R/R  \leq 1.0\%$ No visible damage or peeling off	As specified
Solderability	AEC-Q200	235±5°C for 5 seconds	95% min. coverage		
Resistance to Soldering Heat	AEC-Q200	260±5°C for 10 seconds, stabilize in room temperature for 1 hour	$ \Delta R/R  \leq 1.0\%$ No visible damage or peeling off	$ \Delta R/R  \leq 1.0\%$ No visible damage or peeling off	As specified
High Temperature Exposure (Storage)	AEC-Q200	155±3°C for 1,000 hours, , stabilize in room temperature for 24±4hrs	$ \Delta R/R  \leq 1.0\%$ No visible damage	$ \Delta R/R  \leq 2.0\%$ No visible damage	As specified
Temperature Cycling	AEC-Q200	-55°C ~ +125°C 5mins as one cycle for 1000 times, stabilize in room temperature for 24±4hrs	$ \Delta R/R  \leq 2.0\%$ No visible damage	$ \Delta R/R  \leq 2.0\%$ No visible damage	As specified
Bias Humidity	AEC-Q200	85±5°C, 85±5% R.H. Apply voltage calculated based on 10% of rated power for 1000 hrs, stabilize in room temperature for 24±4hrs	$ \Delta R/R  \leq 2.0\%$ No visible damage	$ \Delta R/R  \leq 3.0\%$ No visible damage	As specified
Load Life	AEC-Q200	125±3°C, Apply rated voltage, for 1000 hrs, stabilize in room temperature for 24±4hrs	$ \Delta R/R  \leq 2.0\%$ No visible damage	$ \Delta R/R  \leq 3.0\%$ No visible damage	As specified

**RECOMMENDED SOLDERING PROFILES**

Reflow Condition		
Pre Heat	Temp. Min $T_{s(min)}$	150°C
	Temp. Max $T_{s(max)}$	180°C
	Time (min. to max.) ( $t_s$ )	60~120 seconds
Average ramp up rate ( $T_L$ ) to peak		3°C/second max.
$T_{s(max)}$ to $T_L$ (Ramp-up rate)		3°C/second max.
Reflow	Temp. ( $T_L$ )	230°C
	Time (min. to max.) ( $t_L$ )	40 seconds max.
Peak Temperature ( $T_P$ )		260~265°C
Time within 5°C of actual peak Temperature ( $t_p$ )		10 seconds max.
Ramp-down Rate		6°C/second

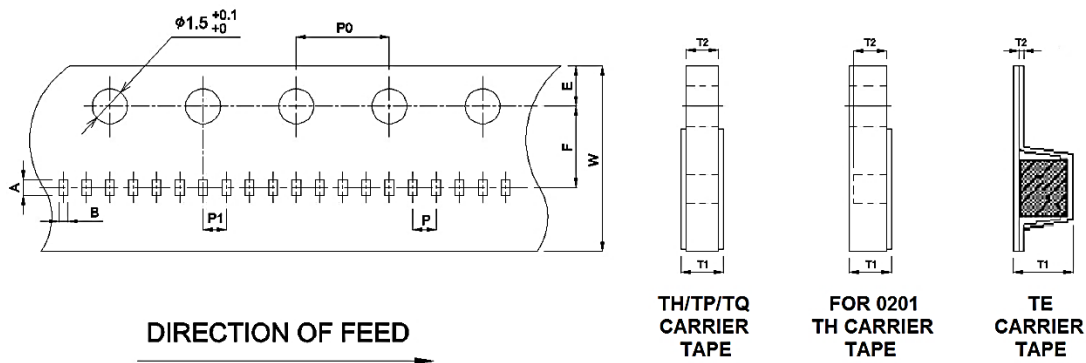


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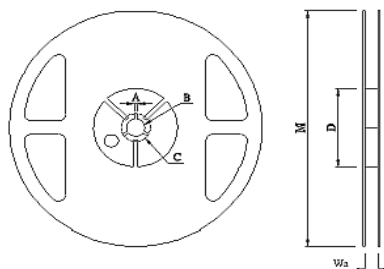
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## TAPE AND REEL DIMENSIONS



Tape Dimensions (mm)												
Type	Tape	A	B	W	E	F	T1	T2	P	P0	10 X P0	P1
CRA25	TQ Paper	0.68 ±0.05	0.38 ±0.03	8.00 ±0.10	1.75 ±0.10	3.50 ±0.05	0.42 +0.1/-0	0.28 ±0.02	1.00 ±0.05	4.00 ±0.05	40.00 ±0.20	1.00 ±0.05
CRA25	TQ PE	0.68 ±0.03	0.38 ±0.03	8.00 ±0.10	1.75 ±0.10	3.50 ±0.05	0.38 ±0.05	0.30 ±0.02	1.00 ±0.05	4.00 ±0.05	40.00 ±0.20	1.00 ±0.05
CRA25	TH Paper	0.68 ±0.05	0.38 ±0.03	8.00 ±0.10	1.75 ±0.10	3.50 ±0.05	0.42 +0.1/-0	0.28 ±0.02	2.00 ±0.05	4.00 ±0.05	40.00 ±0.20	2.00 ±0.05
CRA25	TH PE	0.68 ±0.03	0.38 ±0.03	8.00 ±0.10	1.75 ±0.10	3.50 ±0.05	0.38 ±0.05	0.30 ±0.02	2.00 ±0.05	4.00 ±0.05	40.00 ±0.20	2.00 ±0.05
CRA20	TH	1.15 ±0.05	0.65 ±0.05	8.00 ±0.20	1.75 ±0.10	3.50 ±0.05	0.40 +0.2/-0	0.40 ±0.05	2.00 ±0.10	4.00 ±0.05	40.00 ±0.20	2.00 ±0.05
CRA16	TH	1.80 ±0.10	1.00 ±0.10	8.00 ±0.20	1.75 ±0.10	3.50 ±0.05	0.60 +0.2/-0	0.60 ±0.10	2.00 ±0.10	4.00 ±0.05	40.00 ±0.20	2.00 ±0.05
CRA16	TP	1.80 ±0.10	1.00 ±0.10	8.00 ±0.20	1.75 ±0.10	3.50 ±0.05	0.60 +0.2/-0	0.60 ±0.10	4.00 ±0.10	4.00 ±0.05	40.00 ±0.20	2.00 ±0.05
CRA10	TP	2.30 ±0.10	1.55 ±0.10	8.00 ±0.20	1.75 ±0.10	3.50 ±0.05	0.75 +0.2/-0	0.75 ±0.10	4.00 ±0.10	4.00 ±0.05	40.00 ±0.20	2.00 ±0.05
CRA08	TP	3.50 ±0.20	1.90 ±0.20	8.00 ±0.20	1.75 ±0.10	3.50 ±0.05	0.75 +0.2/-0	0.75 ±0.10	4.00 ±0.10	4.00 ±0.05	40.00 ±0.20	2.00 ±0.05
CRA04	TP	3.50 ±0.20	2.80 ±0.20	8.00 ±0.20	1.75 ±0.10	3.50 ±0.05	0.75 +0.2/-0	0.75 ±0.10	4.00 ±0.10	4.00 ±0.05	40.00 ±0.20	2.00 ±0.05
CRA02	TE	5.50 ±0.20	2.80 ±0.20	12.00 ±0.20	1.75 ±0.10	5.50 ±0.05	1.10 ±0.15	0.23 ±0.15	4.00 ±0.10	4.00 ±0.05	40.00 ±0.20	2.00 ±0.05
CRA01	TE	6.70 ±0.20	3.40 ±0.20	12.00 ±0.20	1.75 ±0.10	5.50 ±0.05	1.10 ±0.15	0.23 ±0.15	4.00 ±0.10	4.00 ±0.05	40.00 ±0.20	2.00 ±0.05



Reel Dimensions (mm)						
Reel Type/ Tape	Wa	M	A	B	C	D
7" reel for 8 mm tape	9.0 ± 0.5	178 ± 2.0	2.0 ± 0.5	13.5 ± 0.5	21.0 ± 0.5	60.0 ± 1.0
7" reel for 12 mm tape	13.8 ± 0.5	178 ± 2.0				80.0 ± 1.0
10" reel for 8 mm tape	10.0 ± 0.5	254 ± 2.0				100 ± 1.0
13" reel for 8 mm tape	10.0 ± 0.5	330 ± 2.0				100 ± 1.0

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**PACKAGING**

Type	Tape Width (mm)	Packaging Quantity (pcs / reel)																
		TQ		TH										TP				TE
		Q1	QE	TH	H0	H1	H2	H3	H4	H5	H6	TP	P2	P3	P4	TE		
CRA25	8	20K	150K	10K	15K	20K	20K	30K	40K	50K	60K	-	-	-	-	-		
CRA20	8	-	-	10K	-	20K	20K	30K	40K	50K	60K	-	-	-	-	-		
CRA16	8	-	-	-	-	-	-	-	40K	-	-	5K	10K	15K	20K	-		
CRA10	8	-	-	-	-	-	-	-	-	-	-	5K	10K	15K	20K	-		
CRA08	8	-	-	-	-	-	-	-	-	-	-	5K	10K	15K	20K	-		
CRA04	8	-	-	-	-	-	-	-	-	-	-	5K	10K	15K	20K	-		
CRA02	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4K		
CRA01	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4K		
Reel Type		7"	13"	7"	7"	7"	10"	10"	13"	13"	13"	7"	10"	13"	13"	7"		
Pitch (mm)		1	1	2	2	2	2	2	2	2	2	4	4	4	4	4		

\*Specifications subject to change without notice.