

Carbon Film Resistors

CR-S/FCR-S (mini-size series)

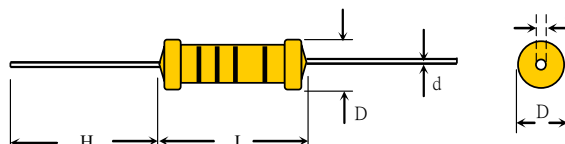
FEATURES

- Space save on PC board
- Excellent long term stability
- Cost comparable to conventional sizes
- Standard Value: 1R-10Meg in E24 series
- Standard tolerance: $\pm 5\%$ (available $\pm 2\%$)
- Body Color: yellow-brown (biege)
- Color band marking
- Flameproof coating available (As FCR-S type)
- Operating Temperature : $-55^{\circ}\text{C} \sim +125^{\circ}\text{C}$

MATERIAL

- Element: Deposited Carbon Film
- Core: High Purity Ceramic Al_2O_3
- Termination: Standard solder-plated cooper lead
- Coating: Epoxy, (FCR-S is grey silicone)

DIMENSION



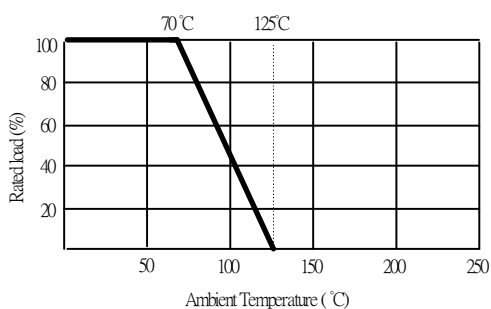
GENERAL SPECIFICATION

TYPE	DIMENSION (mm)				POWER RATING	MAXIMUM WORKING VOLTAGE*	MAXIMUM OVERLOAD VOLTAGE**	RESISTANCE RANGE $\pm 5\%$
	L	D	H	$d \pm 0.03$				
CR025S	3.2 ± 0.2	1.6 ± 0.2	28 ± 1.0	0.48	1/4W	250V	500V	$0.5 \Omega \sim 22\text{M} \Omega$
CR050S	6.0 ± 0.5	2.3 ± 0.3	28 ± 1.0	0.58	1/2W	350V	700V	$0.5 \Omega \sim 22\text{M} \Omega$
CR100S	9.0 ± 0.5	3.0 ± 0.5	28 ± 1.0	0.68	1W	500V	1000V	$0.5 \Omega \sim 22\text{M} \Omega$
CR200S	11 ± 1.0	4.0 ± 0.5	35 ± 3.0	0.78	2W	500V	1000V	$0.5 \Omega \sim 22\text{M} \Omega$
CR300S	15 ± 1.0	5.0 ± 0.5	35 ± 3.0	0.78	3W	500V	1000V	$0.5 \Omega \sim 22\text{M} \Omega$

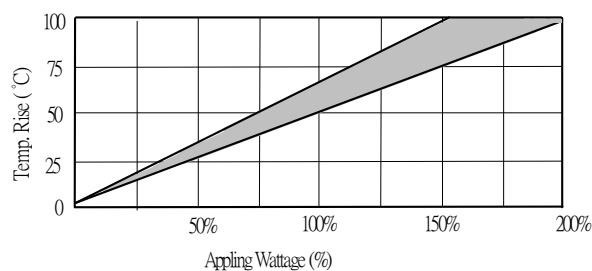
* Maximum Working Voltage determined by $E = \sqrt{P \times R}$, where E should not exceed value listed in column above.

** Maximum Overload Voltage equals to $2.5 \times E$, but should not exceed value listed in column above

DERATING CURVE



TEMPERATURE RISE



CHARACTERISTIC

Temperature Coefficient	$\pm 300\text{ppm}$ ($< 100\text{k} \Omega$), $\pm 1000\text{ppm}$ max.
Insulation Resistance	$10,000\text{M} \Omega$ Min.
Load Life (1000 hours)	$\leq \pm 3\%$ typical, $\pm 5\%$ Max
Shorttime Overload	$\pm 1.0\%$ Max.
Temperature Cycling	$\pm 1.0\%$ Max.
Moisture Resistance	$\pm 5.0\%$ Max.
Shock & Vibration	$\pm 0.5\%$ Max. or 0.5Ω
Effect of Soldering	$\pm 0.5\%$ Max. or 0.5Ω

* Total maximum resistance change is $\Delta R + 0.01R$

HOW TO ORDER :

CR125S	J	TB	=	10R
↓	↓	↓		↓
Type/Power	Tol.	Package		Resistance
CR125S	J= $\pm 5\%$	B=Bulk		10R = 10Ω
CR025S		TB=Tape/box		1K2 = $1.2\text{K} \Omega$
CR050S		TR=Tape/reel		1M = $1\text{M} \Omega$
CR100S		Lead forming		
CR200S		M		
CR300S		F		
		MB		

Carbon Film Resistors - CR/FCR Series

FEATURES

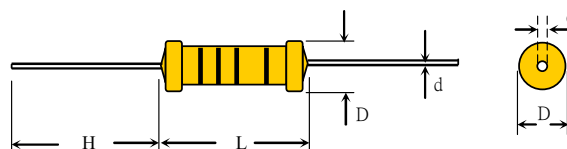
- Industry's lowest cost
- Excellent long term stability
- Used in all kinds of application
- Standard Value: 10R-10Meg in E24 series
- Standard tolerance: +/-5% (available +/-2%)
- Body Color: yellow-brown (biege)
- Color band marking
- Flameproof coating available (As FCR-S type)
- Mini size available (As CR-S type)
- Operating Temperature : -55°C ~+125°C

GENERAL SPECIFICATION

MATERIAL

- Element: Deposited Carbon Film
- Core: High Purity Ceramic Al₂O₃
- Termination: Standard solder-plated cooper lead
- Coating: Epoxy, (FCR is grey silicone)

DIMENSION

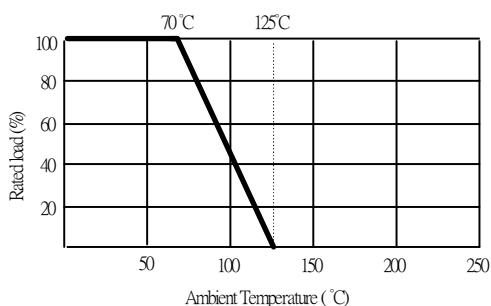


TYPE	DIMENSION (mm)				POWER RATING	MAXIMUM WORKING VOLTAGE*	MAXIMUM OVERLOAD VOLTAGE**	RESISTANCE RANGE '+/-5%
	L	D	H	d+/- 0.05				
CR125	3.2+/-0.2	1.6+/-0.2	28 +/-1.0	0.45	1/8W	200V	400V	1Ω~10MΩ
CR025	6.0+/-0.5	2.3+/-0.3	28 +/-1.0	0.55	1/4W	250V	500V	0.47Ω~22MΩ
CR050	9.0+/-0.5	3.0+/-0.5	28 +/- 1.0	0.63	1/2W	350V	700V	0.47Ω~22MΩ
CR100	11+/-1.0	4.0+/-0.5	35 +/- 3.0	0.75	1W	500V	1000V	0.47Ω~22MΩ
CR200	15+/-1.0	5.0+/-0.5	35 +/- 3.0	0.75	2W	500V	1000V	0.47Ω~22MΩ
CR300	17+/-1.0	6.0+/-0.5	35 +/-3.0	0.75	3W	500V	1000V	0.5Ω~22MΩ

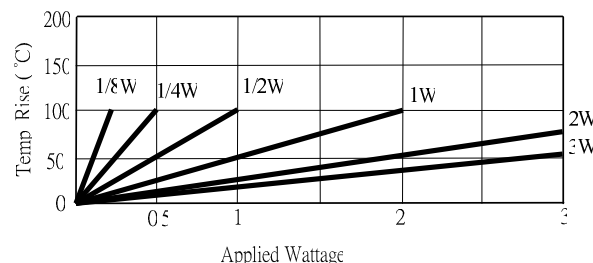
* Maximum Working Voltage determined by $E = \sqrt{P \times R}$, where E should not exceed value listed in column above.

** Maximum Overload Voltage equals to 2.5xE, but should not exceed value listed in column above

DERATING CURVE



TEMPERATURE RISE



CHARACTERISTIC

Temperature Coefficient	+/- 300ppm (<100kΩ), +/- 800ppm max
Insulation Resistance	10,000MΩ Min.
Load Life (1000 hours)	<+/- 3% typical, +/- 5% Max
Shorttime Overload	+/- 1.0% Max.
Temperature Cycling	+/- 1.0% Max.
Moisture Resistance	+/- 5.0% Max.
Shock & Vibration	+/- 0.5% Max. or 0.5Ω
Effect of Soldering	+/- 0.5% Max. or 0.5Ω

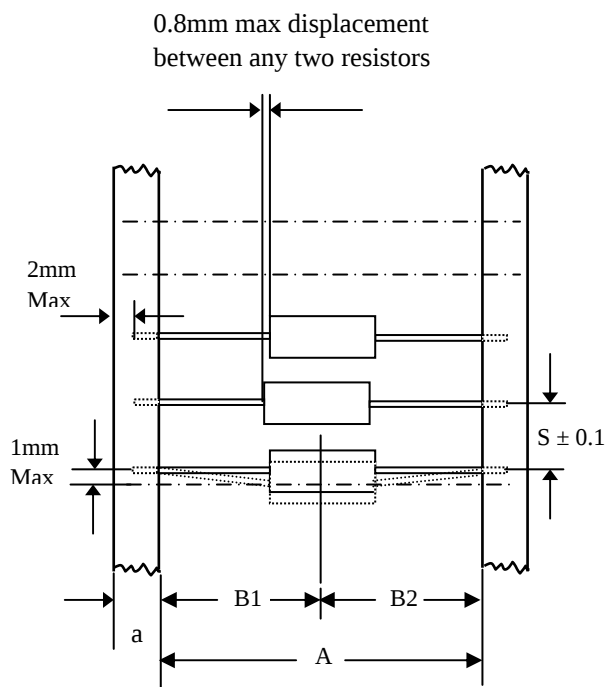
* Total maximum resistance change is $\Delta R + 0.01R$

HOW TO ORDER :

CR125	J	TB	=	10R
↓	↓	↓		↓
Type/Power	Tol.	Package		Resistance
CR125	J=+/- 5%	B=Bulk		10R = 10Ω
CR025		TB=Tape/box		1K2 = 1.2KΩ
CR050		TR=Tape/reel		1M = 1MΩ
CR100		Lead forming		
CR200		M		
CR300		F		
		MB		

Taping Specification

Bandolier for axial leads



Dimension (mm)

WATT	a ± 0.5	A ± 1.5	B1-B2 ±MAX	S (spacing)
1/8W, 1/4WS	6	52.5 [★]	1.2	5
		26.0	1.0	
1/4W, 1/2WS	6	52.5 [★]	1.2	5
		26.0	1.0	
1/2W, 1WS	6	52.5	1.2	5
1W, 2WS	6	52.5	1.2	5
		73.0 [★]	1.5	
2W, 3WS	6	52.5	1.2	10
		73.0 [★]	1.5	
3W,5WS	6	52.5	1.2	10
		73.0 [★]	1.5	
5W	6	88.0	2.0	10

★ means standard taping range

Max deviation of spacing: 1mm per 10 spacing, 0.5mm per 5 spacing

STANDARD RESISTANCE VALUES IN A DECADE

for resistances and capacitances

According to IEC publication 63

E192	E96	E48	E192	E96	E48	E192	E96	E48	E192	E96	E48	E192	E96	E48
100	100	100	169	169	169	287	287	287	487	487	487	825	825	825
101			172			291			493			835		
102	102		174	174		294	294		499	499		845	845	
104			176			298			505			856		
105	105	105	178	178	178	301	301	301	511	511	511	866	866	866
106			180			305			517			876		
107	107		182	182		309	309		523	523		887	887	
109			184			312			530			898		
110	110	110	187	187	187	316	316	316	536	536	536	909	909	909
111			189			320			542			920		
113	113		191	191		324	324		549	549		931	931	
114			193			328			556			942		
115	115	115	196	196	196	332	332	332	562	562	562	953	953	953
117			198			336			569			965		
118	118		200	200		340	340		576	576		976	976	
120			203			344			583			988		
121	121	121	205	205	205	348	348	348	590	590	590			
123			208			352			597					
124	124		210	210		357	357		604	604		E24	E12	E6
126			213			361			612			10	10	10
127	127	127	215	215	215	365	365	365	619	619	619	11		
129			218			370			626			12	12	
130	130		221	221		374	374		634	634		13		
132			223			379			642			15	15	15
133	133	133	226	226	226	383	383	383	649	649	649	16		
135			229			388			657			18	18	
137	137		232	232		392	392		665	665		20		
138			234			397			673			22	22	22
140	140	140	237	237	237	402	402	402	681	681	681	24		
142			240			407			690			27	27	
143	143		243	243		412	412		698	698		30		
145			246			417			706			33	33	33
147	147	147	249	249	249	422	422	422	715	715	715	36		
149			252			427			723			39	39	
150	150		255	255		432	432		732	732		43		
152			258			437			741			47	47	47
154	154	154	261	261	261	442	442	442	750	750	750	51		
156			264			448			759			56	56	
158	158		267	267		453	453		768	768		62		
160			271			459			777			68	68	68
162	162	162	274	274	274	464	464	464	787	787	787	75		
164			277			470			796			82	82	
165	165		280	280		475	475		806	806		91		
167			284			481			816					