

# CARBON FILM FIXED RESISTORS

CR (EPOXY COATING TYPE)

FCF (FLAME-PROOF COATING TYPE)

## INTRODUCTION

### CR

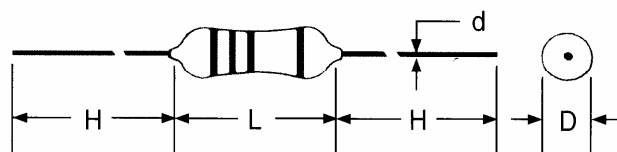
The earliest and most popular type of resistor is carbon film resistor which can be used in almost all kinds of electronic products. The resistive element is a high grade ceramic rod on which a homogenous film of pure carbon is deposited by vacuum heating process to produce electricity conductivity on the surface. Fully automation and mass production on capping, sorting, cutting, welding, coating and double-checking which comes out stable quality, high reliability and economic cost for SYNTON-TECH's CR series.

### FCF

Flame-proof carbon film resistors are coated with layers of nonflame lacquer which is resistant to 800 °C high temperature and without causing crack, breakage, or even a fire hazard. All SYNTON-TECH's FCF series meet overload tests in accordance with UL specification #1412.

## FEATURE

- Meet requirements of JIS-C-5202 and MIL-R-22684B!
- The most economic industrial investment!
- Quicker dissipation of heat!
- Lower temperature rise!
- Small shelf life drift!
- Wider resistance range:  $1\Omega \sim 10\text{Meg}\Omega$
- Tolerance available:  $\pm 5\%$ ,  $\pm 2\%$ ,  $\pm 1\%$
- Wattage available: 1/16W, 1/8W, 1/6W, 1/4W, 1/3W, 1/2W, 1W, 2W, 3W
- Variety of packaging: Bulk, Tape in Box (Ammopack T-26, T-52, T-74), Tape on Reel, Cut-and-Formed and Vertical Panasert/Avisert



## SPECIFICATIONS

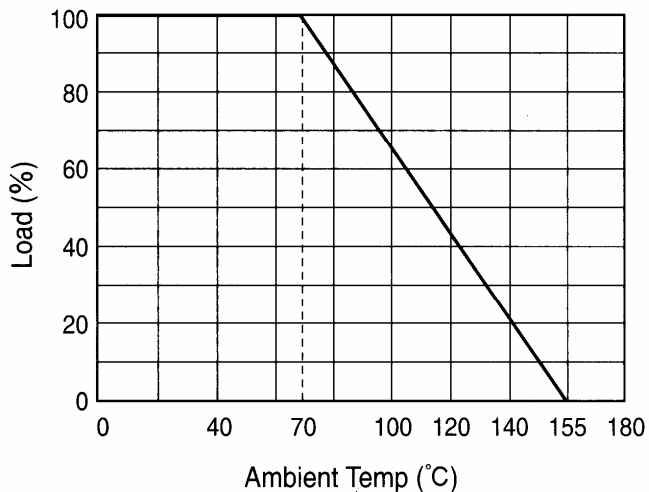
TYPE	POWER RATING @70°C	DIMENSIONS (mm)				MAXIMUM WORKING VOLTAGE	MAXIMUM OVERLOAD VOLTAGE	RESISTANCE RANGE
		L	D	H	d			
CR-12	1/16W, 1/8W, 1/6W	3.5±0.3	1.8±0.3	25±3	0.45±0.05	200V	400V	*STANDARD $1\Omega \sim 10\text{Meg}\Omega$
CR-25S	1/4W	3.5±0.3	1.8±0.3	25±3	0.45±0.05	250V	500V	
CR-25	1/4W	6.0±0.5	2.3±0.3	25±3	0.56±0.1	250V	500V	
CR-33S	1/3W	6.0±0.5	2.3±0.3	25±3	0.56±0.1	350V	700V	
CR-50S	1/2W	6.0±0.5	2.3±0.3	25±3	0.56±0.1	350V	700V	
CR-50	1/2W	9.0±0.5	3.2±0.5	25±3	0.60±0.1	350V	700V	
CR-100S	1W	9.0±0.5	3.2±0.5	25±3	0.60±0.1	500V	1000V	
CR-100	1W	11±1.0	4.5±0.5	35±3	0.8±0.1	500V	1000V	
CR-200S	2W	11±1.0	4.5±0.5	35±3	0.8±0.1	500V	1000V	
CR-200	2W	15±1.0	5.0±0.5	35±3	0.8±0.1	500V	1000V	
CR-200B	2W	17±1.0	6.0±0.5	35±3	0.8±0.1	500V	1000V	*SPECIAL low to 0.05Ω High to 100MegΩ
CR-300S	3W	15±1.0	5.0±0.5	35±3	0.8±0.1	500V	1000V	
CR-300	3W	17±1.0	6.0±0.5	35±3	0.8±0.1	500V	1000V	

\* FCF series have the same specifications as CR series except flame retardant.

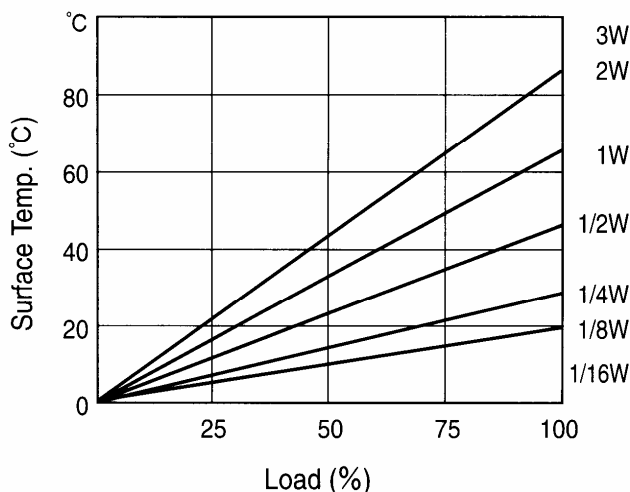
**CHARACTERISTICS**

TEST	TEST METHOD	LIMITS				
<b>TERMINAL STRENGTH</b>	Pull a resistor with a weight of 1kg for 30 seconds. Bend the terminal lead wire with 500gs weight for 90 degree and bend it for 90 degree oppositely and return to normal.	Resistance shall not change more than $\pm 0.3\%$ or 0.5 ohm. No evidence of mechanical damage.				
<b>RESISTANCE TO SOLDERING HEAT</b>	Immerse each terminal wire of a resistor up to $4 \pm 0.8$ mm away from the resistor body in the solder tank at $350 \pm 10^\circ\text{C}$ for $3 \pm 0.5$ seconds. Measure resistance in 3 hours.	Resistance shall not change more than $\pm 0.5\%$ or 0.5 ohm. No evidence of mechanical damage.				
<b>TEMPERATURE CYCLING</b>	STEP	1	2	3	4	Resistance shall not change more than $\pm 0.5\%$ . No evidence of mechanical damage.
	TEMP	$-55^\circ\text{C}$	$25^\circ\text{C}$	$155^\circ\text{C}$	$25^\circ\text{C}$	
	TIME	30min.	10~15min.	30min.	10~15min.	
	Form 1 to 4 is a cycle as shown above, repeat 5 cycles measure resistance after 1 hour in normal temperature.					
<b>VIBRATION</b>	Total amplitude of 1.5mm. The frequency shall vary from 10 HZ to 55 HZ, for approximate 1 second. Make this test in the direction parallel to the resistor axis, and up/down for 2 hours respectively. (altogether 6 hours.)	Resistance shall not change more than $\pm 0.5\%$ or 0.5 ohm. No evidence of mechanical damage.				
<b>MOISTURE RESISTANCE</b>	At temperature of $40 \pm 2^\circ\text{C}$ and a relative humidity of 90~95% for $1000 \pm 12$ hours, under a rating DC voltage for 1 hours on and 1/2 hour off.	Resistance shall not change more than $\pm 3\%$ . No evidence of mechanical damage.				
<b>LOAD LIFE</b>	Thermostatic chamber at a temperature of $70 \pm 5^\circ\text{C}$ under a rated DC voltage for 1.5 hours on and 1/2 hour off repeat this cycle for $1000 \pm 12$ hours.	Resistance shall not change more than $\pm 2.5\%$ . No evidence of mechanical damage.				
<b>TEMPERATURE COEFFICIENT</b>	Resistance Temperature Coefficient: $\frac{R-R_0}{R_0} \times \frac{1}{t-t_0} \times 10^6$ ppm/deg. where t: effective value of test temperature t <sub>0</sub> : effective value of standard temperature R: resistance at t °C R <sub>0</sub> : resistance at t <sub>0</sub> °C	10 ohm below $\pm 200$ ppm/°C 56K ohm below $\pm 300$ ppm/°C 56K~470K ohm $-500$ ppm/°C 470K~1Meg ohm $-700$ ppm/°C 1Meg up $-1000$ ppm/°C				
<b>DIELECTRIC WITHSTANDING VOLTAGE</b>	Resistors shall be clamped in the trough of a 90 degree metallic V-block, apply AC between this electrode and another lead wire for 1 minute.	Resistance shall not change more than $\pm 0.5\%$ . No evidence of mechanical damage.				
<b>NOISE</b>	Quan-Tech Laboratories Inc. Model 515B	100K ohm below $0.3 \mu$ V/V 100K ohm~1M ohm below $0.5 \mu$ V/V 1M ohm~5.6M ohm $1.0 \mu$ V/V				
<b>INSULATION RESISTANCE</b>	Resistors shall be clamped in the trough of a 90 degree metallic V-block, apply DC 100V between this electrode and another lead wire for 1 minute.	10,000 M ohm above				
<b>SHORT-TIME OVERLOAD</b>	Resistors shall be tested at 2.5 times rated voltage for 5 seconds at ambient room temperature.	Resistance shall not change more than $\pm 1\%$ . No evidence of mechanical damage.				
<b>RESISTANCE TO SOLVENTS</b>	Immerse a resistor completely in reagent at a temperature of $20 \sim 25^\circ\text{C}$ for $30 \pm 5$ seconds.	No evidence of mechanical damage.				
<b>SOLDERABILITY</b>	Apply flux to the terminal wire of a resistor up to $4 \pm 0.8$ mm away from the resistor body and immerse the flux applied portion in the solder tank at $230 \pm 5^\circ\text{C}$ for $5 \pm 0.5$ seconds.	More than 95% of a circumference of the immersed portion shall be completely covered with new solder.				

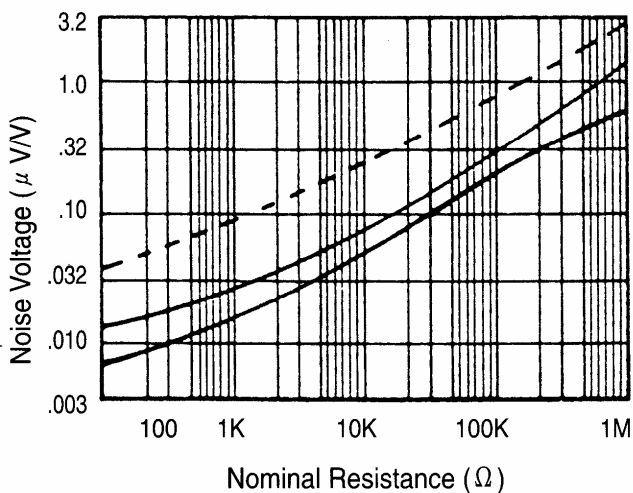
**DERATING CURVE**



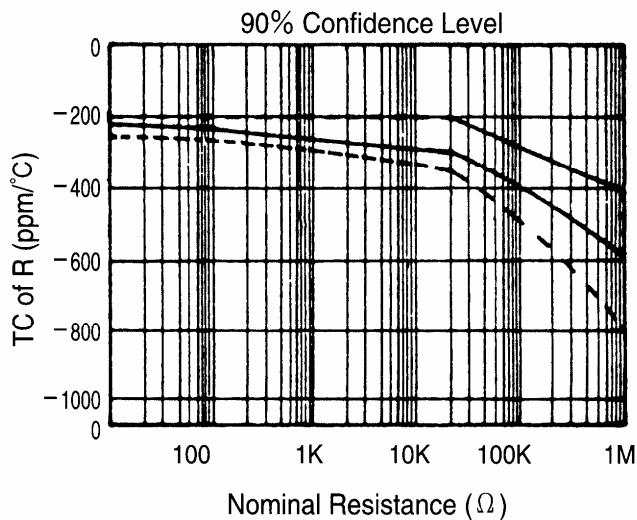
**SURFACE TEMP RISE**



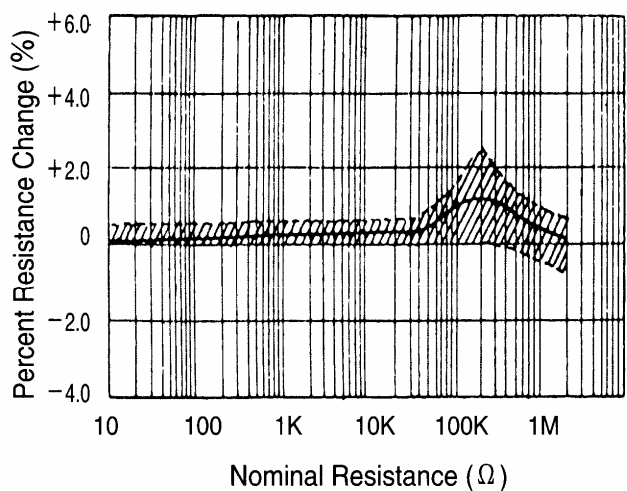
**CURRENT NOISE**



**TEMPERATURE COEFFICIENT**



**LOAD STABILITY 1000 Hrs.**



**RESISTANCE DISTRIBUTION**

