PRECISION THICK FILM CHIP RESISTORS

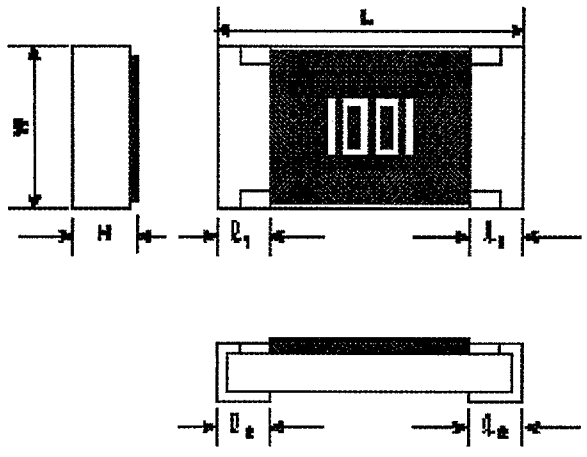
RGC 16S, 16, 10, 18

Kamaya precision thick film chip resistors provide low temperature coefficients at a very economical cost. These resistors are a dependable solution for maintaining resistance stability over changing temperature ranges found in automotive, computer, and a variety of other industrial and commercial applications.

● FEATURES

1. A wide range of power ratings for design flexibility.
2. T.C.R. of either ± 100 ppm/°C or ± 50 ppm/°C available with all power ratings.
3. T.C.R. of ± 100 ppm/°C available up to a resistance value of 4.7 MΩ.
4. Excellent solderability with both flow and reflow soldering operations.
5. Operating temperatures range from -55 to 125°C.

● DIMENSIONS AND STRUCTURE



Unit = mm

Type (Size) / Dimension	RGC 16S (0402)	RGC 16 (0603)	RGC 10 (0805)	RGC 18 (1206)
L	1.0 ± 0.05	1.6 ± 0.1	2.0 ± 0.1	3.2 ± 0.15
W	0.5 ± 0.05	0.8 $\pm^{0.15}_{0.05}$	1.25 ±0.10	1.6 ± 0.15
H	0.35 ± 0.05	0.45 ± 0.1	0.6 ± 0.1	0.6 ± 0.1
ℓ_1	0.2 ± 0.1	0.25 ± 0.1	0.4 ± 0.2	0.5 ± 0.25
ℓ_2	0.25 $\pm^{0.05}_{0.1}$	0.3 ± 0.1	0.4 ± 0.2	0.5 ± 0.25
Unit Weight	0.6 mg	2 mg	5 mg	9 mg

Resistance value indicated by four digit marking on 0805 and larger components.

● RATINGS

Type (Size)	Rated Power @ 70°C W	Maximum Working Voltage V	Maximum Overload Voltage V	Resistance Temperature Coefficient ppm/°C	Resistance Range And Tolerance (E_{96} Series)	
					± 0.5% (D)	± 1.0% (F)
RGC 16S (0402)	0.063	50	100	± 50	100Ω to 1.0 MΩ	100Ω to 1.0 MΩ
				± 100	–	10Ω to 3.3 MΩ
RGC 16 (0603)	0.063	50	100	± 50	100Ω to 1.0 MΩ	100Ω to 1.0 MΩ
				± 100	–	3.3Ω to 3.3 MΩ
RGC 10 (0805)	0.1	150	300	± 50	10Ω to 3.3 MΩ	10Ω to 3.3 MΩ
				± 100	–	3.3Ω to 3.3 MΩ
RGC 18 (1206)	0.125	200	400	± 50	10Ω to 4.7 MΩ	10Ω to 4.7 MΩ
				± 100	–	3.3Ω to 4.7 MΩ

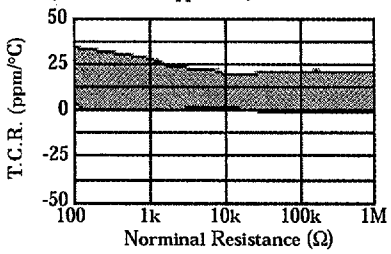
For T.C.R. less than ±50 ppm/°C and resistance tolerance less than ±0.5%, use RNC type.

● PERFORMANCE CHARACTERISTICS

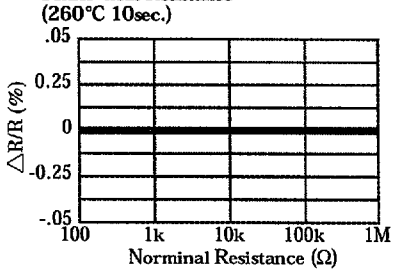
DESCRIPTION	PERFORMANCE	TEST METHOD JIS C5202	
Resistance Temperature Coefficient	As specified in table	section 5.2	Measuring temperature +25°C/-55°C/+25°C/+125°C
Short-time Overload	± 0.5% maximum	section 5.5	Rated voltage x2.5, 5 seconds
Insulation Resistance	1,000 MΩ minimum	section 5.6	RGC1/16S 50Vdc 1 minute RGC1/16~1/8 100Vdc 1 minute
Terminal Strength	± 0.25% maximum	section 6.1.4	Install a sample on the board and bend board 3/45mm for 10 seconds
Vibration	± 0.25% maximum	section 6.3	10Hz→55Hz→10Hz 3 directions X, Y, Z 2 hours each Amplitude 1.5mm
Solder-Heat Resistance	± 0.25% maximum	section 6.10	Dip into 260°C solder bath for 10 seconds
Solderability	95% minimum coverage	section 6.11	After dipping into flux dip into 235°C solder bath for 2 seconds
Temperature Cycle	± 0.25% maximum	section 7.4	Cycle between -55°C and + 125°C for 5 cycles
Load Life in Moisture	± 0.5% maximum	section 7.9	Rated voltage 1.5 hours "ON" 0.5 hours "OFF" 40°C 95%RH 1,000 Hours
Load Life	± 0.5% maximum	section 7.10	Rated voltage 1.5 hours "ON" 0.5 hours "OFF" 70°C. 1,000 Hours

● EXAMPLE OF TYPICAL CHARACTERISTICS (RGC1/10, T.C.R.:C)

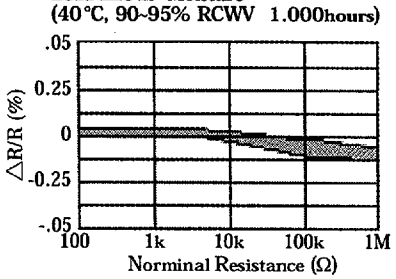
Resistance T emperature Coefficient
(T.C.R.C.: ±50ppm/ °C)



Solder-heat Resistance
(260°C 10sec.)



Load Life in Moisture
(40°C, 90~95% RCWV 1.000hours)



● PART NUMBER SYSTEM

RGC 18 K - XXXX D T

Product Type
RGC = Precision Thick Film Chip Resistor Low T.C.R.

Wattage (size)
16S = 1/8 watt (0402)
16 = 1/16 watt (0603)
10 = 1/10 watt (0805)
18 = 1/8watt (1206)

T.C.R.
C = ± 50 ppm/°C
K = ± 100 ppm/°C

Resistance Value
3 significant digits plus multiplier
1002 = 10.0 KΩ
10R0 = 10.0 Ω

Tolerance
D = ± 0.5%
F = ± 1%

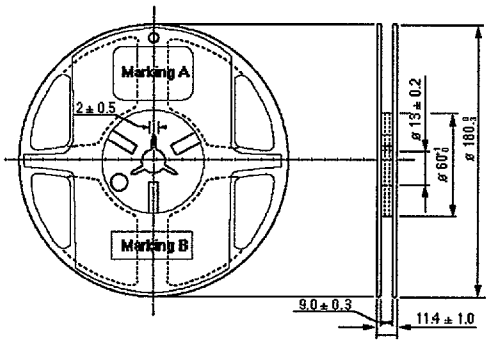
Packaging
B = Bulk
T = Tape and Reel (paper)
TH = Tape and Reel (paper, 2mm pitch) (0402)
BA = Bulk Cartridge

SURFACE MOUNT PRODUCT PACKAGING

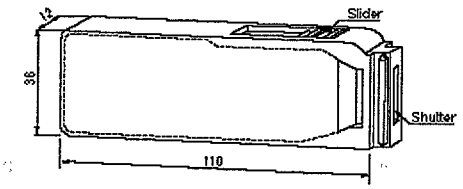
PER EIA RS-481-1

Product Type	Bulk Packaging (pcs/bag)	Tape Packaging (pcs/reel)	
		Paper Tape	Plastic Tape
RMC 16S	5,000	10,000	—
RMC 16	5,000	5,000	—
RMC 10	5,000	5,000	—
RMC 18	5,000	5,000	4,000
RMC 14	5,000	—	4,000
RMC 12	1,000	—	4,000
RMC 01	1,000	—	4,000
RGC 16S	5,000	10,000	—
RGC 16	5,000	5,000	—
RGC 10	5,000	5,000	—
RGC 18	5,000	5,000	—
RNC 20	5,000	5,000	—
RNC 32	5,000	5,000	—
RLC 20	5,000	5,000	—
RLC 32	5,000	5,000	—
RLC 35	5,000	—	4,000
RHC 20	5,000	5,000	—
RHC 32	5,000	5,000	—
RAG 20	5,000	5,000	—
RAG 32	5,000	5,000	—
FCR 14	5,000	—	4,000
FCR 12	1,000	—	4,000
FCR 01	1,000	—	4,000
FRC 20	5,000	5,000	—
FRC 32	5,000	5,000	—
RAC 10	5,000	10,000	—
RAC 16	5,000	5,000	—
RAC 32	1,000	—	4,000
RAG 16	5,000	5,000	—
LTC 10	5,000	5,000	—
LTC 18	5,000	5,000	—

● REEL DIMENSIONS (Unit = mm)



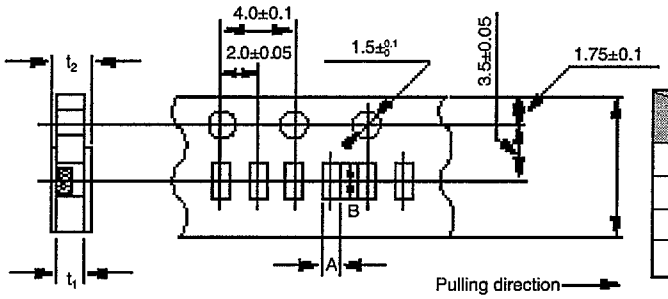
For 8 mm Tape W = 10 ± 1.5
For 12 mm Tape W = 14 ± 1.5



CHIP SIZE	BULK CASE
0603	25,000
0805	10,000
1206	5,000

● TAPE DIMENSIONS (Unit = mm)

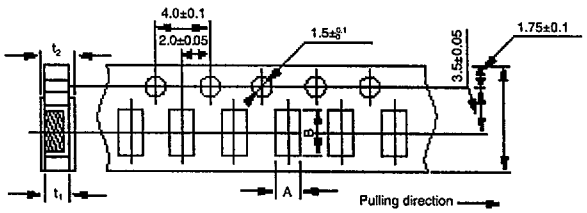
- **8 mm wide paper tape (2 mm pitch, designated by "TH" in part number)**



Dimension / Type	A	B	t1	t2
RMC 16S	0.65 ± 0.05 / 0.1	1.15 ± 0.1 / 0.05	0.4 ± 0.05 / 0	0.5 max.
RGC 16S	0.65 ± 0.05 / 0.1			
RAC 10-2D	1.15 ± 0.05 / 0.1			
RAC 10-4D	1.2 ± 0.1	2.2 ± 0.2	0.4 ± 0.1	

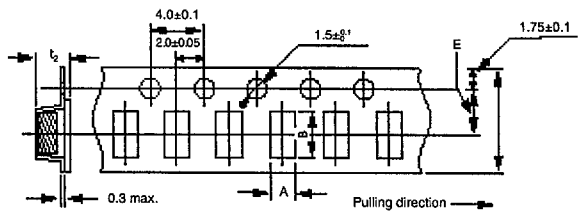
● TAPE DIMENSIONS (Unit = mm) cont'd

- **8 mm wide paper tape (designated by "T" in part number)**



Product Type	A	B	t_1	t_2
RMC 16S	$0.65 \pm \frac{0.1}{0.05}$	$1.15 \pm \frac{0.1}{0.05}$	0.4 ± 0.05	0.5 max.
RMC 16	1.15 ± 0.15	1.9 ± 0.2	0.6 ± 0.1	0.8 max.
RMC 10	1.65 ± 0.15	2.5 ± 0.2	0.8 ± 0.1	1.0 max.
RMC 18	2.00 ± 0.15	3.6 ± 0.2		
FRC 20	1.65 ± 0.15	2.5 ± 0.2		
FRC 32	2.00 ± 0.15	3.6 ± 0.2		
RHC 16	1.15 ± 0.15	1.9 ± 0.2	0.6 ± 0.1	0.8 max.
RHC 20	1.65 ± 0.15	2.5 ± 0.2	0.8 ± 0.1	1.0 max.
RHC 32	2.00 ± 0.15	3.6 ± 0.2	0.8 ± 0.1	1.0 max.
RGC 16S	$0.65 \pm \frac{0.1}{0.05}$	$1.15 \pm \frac{0.05}{0.1}$	0.4 ± 0.05	0.5 max.
RGC 16	1.15 ± 0.15	1.9 ± 0.2	0.6 ± 0.1	0.8 max.
RGC 10	1.65 ± 0.15	2.5 ± 0.2	0.8 ± 0.1	1.0 max.
RGC 18	2.00 ± 0.15	3.6 ± 0.2		
RNC 20	1.65 ± 0.15	2.5 ± 0.2		
RNC 32	2.00 ± 0.15	3.6 ± 0.2		
RLC 20	1.65 ± 0.15	2.5 ± 0.2		
RLC 32	2.00 ± 0.15	3.6 ± 0.2		
FCR 10	1.65 ± 0.15	2.5 ± 0.2		
FCR 18	2.00 ± 0.15	3.6 ± 0.2		
RAC 16-2D	1.90 ± 0.15	1.90 ± 0.15	0.6 ± 0.1	1.0 max.
RAC 16-4D	1.90 ± 0.15	3.60 ± 0.2		
RAG 16	1.90 ± 0.15	3.60 ± 0.2		
RAC 16-8U	1.90 ± 0.15	3.60 ± 0.2		
LTC 10	1.65 ± 0.15	2.5 ± 0.2	0.8 ± 0.1	1.0 max.
LTC 18	2.00 ± 0.15	3.6 ± 0.2		

- **8 mm and 12 mm wide plastic tape (designated by "TP" in part number)**



Product Type	A	B	W	E	t_2
RMC 18	2.0 ± 0.1	3.7 ± 0.1	8.0 ± 0.2	3.5 ± 0.05	0.95 ± 0.1
RMC 14	2.85 ± 0.2	3.5 ± 0.2	8.0 ± 0.3	3.5 ± 0.05	1.0 ± 0.2
RMC 12	3.10 ± 0.2	5.5 ± 0.2	12.0 ± 0.3	5.5 ± 0.05	1.1 ± 0.2
RMC 01	3.60 ± 0.2	6.90 ± 0.2			
FCR 14	2.85 ± 0.2	3.5 ± 0.2	8.0 ± 0.3	3.5 ± 0.05	1.0 ± 0.2
FCR 12	3.1 ± 0.2	5.5 ± 0.2	12.0 ± 0.3	5.5 ± 0.05	1.1 ± 0.2
FCR 01	3.6 ± 0.2	6.9 ± 0.2			
RAC 32-4D	3.50 ± 0.2	5.8 ± 0.2			
RLC 35	2.85 ± 0.2	3.5 ± 0.2	8.0 ± 0.3	3.5 ± 0.05	1.0 ± 0.2

STANDARD RESISTANCE VALUES AND DESIGNATORS

● SYMBOLS OF RESISTANCE TEMPERATURE CHARACTERISTICS

Symbol	Resistance-Temperature Characteristic
E	+ 25 ppm/°C
C	+ 50 ppm/°C
K	+ 100 ppm/°C
D	+ 200 ppm/°C

● SYMBOLS OF RESISTANCE VALUE TOLERANCE

Symbol	Tolerance
B	+ 0.1%
C	+ 0.25%
D	+ 0.5%
F	+ 1.0%
G	+ 2.0%
J	+ 5.0%
K	+ 10%
L	+ 15%
M	+ 20%

● STANDARD RESISTANCE VALUES

E_6 ± 20%	E_{12} ± 10%	E_{24} ± 2% And ± 5%	E_{96} ± 0.1% To ± 1%
10	10	10	100
			102
			105
			107
		11	110
			113
			115
			118
	12	12	121
			124
			127
		13	130
			133
			137
			140
			143
			147
15	15	15	150
			154
		16	158
			162
			165
			169
			174
	18	18	178
			182
			187
			191
			196
		20	200
			205
			210

E_6 ± 20%	E_{12} ± 10%	E_{24} ± 2% And ± 5%	E_{96} ± 0.1% To ± 1%
			215
22	22	22	221
			226
			232
		24	237
			243
			249
			255
			261
	27	27	267
			274
			280
			287
		30	294
			301
			309
			316
33	33	33	324
			332
			340
			348
		36	357
			365
			374
	39	39	383
			392
			402
			412
		43	422
			432
			442
			453

E_6 ± 20%	E_{12} ± 10%	E_{24} ± 2% And ± 5%	E_{96} ± 0.1% To ± 1%
			464
47	47	47	475
			487
		51	499
			511
			523
			536
	56	56	549
			562
			576
			590
			604
		62	619
			634
			649
68	68	68	665
			681
			698
			715
		75	732
			750
			768
			787
	82	82	806
			825
			845
			866
		91	887
			909
			931
			953
			976

● NUMERICAL SYMBOLS AND MULTIPLIER

Symbol	T (tera)	G (giga)	M (mega)	K (kilo)	m (milli)	μ (micro)	n (nano)	p (pico)	Å (angstrom)	ppm
Multiplier	10^{12}	10^{9}	10^{6}	10^{3}	10^{-3}	10^{-6}	10^{-9}	10^{-12}	10^{-7} mm	10^{-6}