FrelTec GmbH

Mathildenstr. 10A
82319 Starnberg
Germany

Thin Film Chip Resistor
SMD
High Precision (1% to 0,1%)
High Power

Part Number

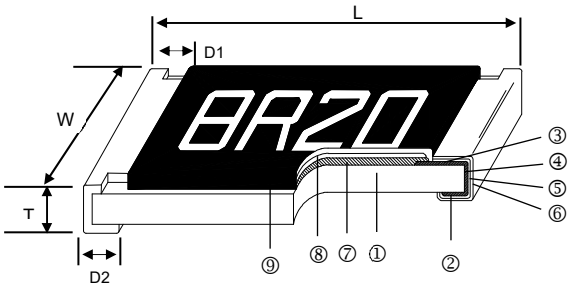
039	06*	1001*	F*	T05	D	C
Type	Size	Value	Tolerance	Packing	TCR	Power Rating
039 : SMD Thin Film Chip Resistor	06 : 1206	The last digit is the multiplier which denotes the number of zero following	F : ±1%	T05: Tape and Reel for 5k pc (7"reel) for 1206	D : ±25ppm/°C	J: 1W
High Precision High Power			D : ±0,5%		E : ±50ppm/°C	
		Example: 97R6= 97,6Ohm 9760 = 976Ohm 1001 = 1kOhm	B : ±0,1%		* not all combination is possible	

All products according to RoHS (2015/863/EU)

SMD Thin Film Chip Resistors

THIN FILM CHIP RESISTORS

Construction

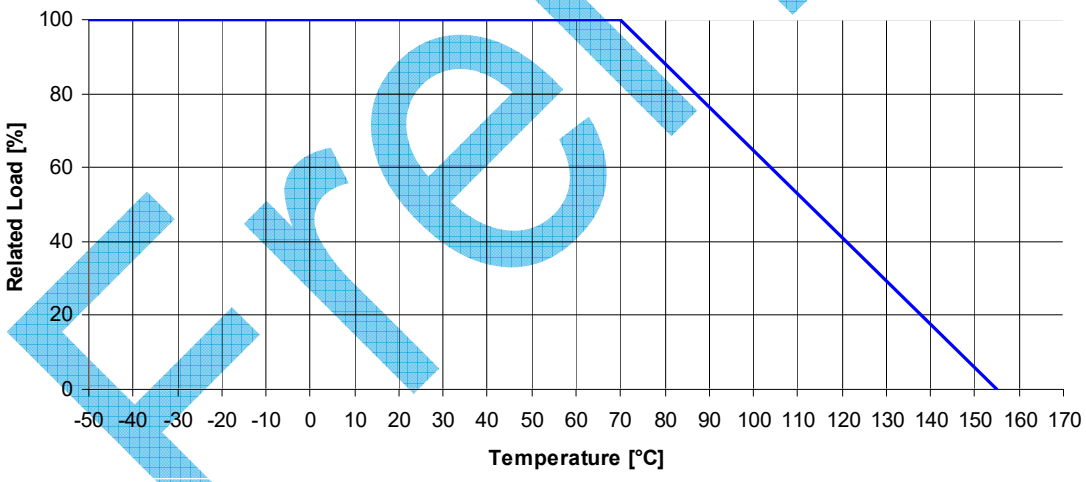


①	Alumina Substrate	③	Edge Electrode	⑤	Resistor Layer
②	Bottom Electrode	④	Barrier Layer	⑥	Overcoat
③	Top Electrode	⑥	External Electrode	⑨	Marking

Dimensions

Size	L	W	T	D1	D2
1206	3,05±0,15	1,55±0,15	0,55±0,10	0,42±0,20	1,10±0,20

Power Derating Curve



THIN FILM CHIP RESISTORS

039 *Series*

GENERAL PURPOSE CHIP RESISTORS

Type	Size	Power Rating at 70°C	Max, Operating Voltage	Max, Overload Voltage	Operating Temp. Range	Temperature Coeffic ient [TCR; ppm/°C]	Resistance Range [Ω]		
							B(±0,1%) E24, E96*	D(±0,5%) E24, E96*	F(±1%) E24, E96*
039 06	1206	1W	75V	400V	-55~+155°C	±25	47Ω~100kΩ		
						±50	47Ω~100kΩ	10Ω~100kΩ	

*Specific ohm value possible, availability need checking with sales
Operating Voltage=√(P*R) or Max. operating voltage listed above, whichever is lower.
Overload Voltage=2.5*√(P*R) or Max. overload voltage listed above, whichever is lower.

SPECIFICATION

1206

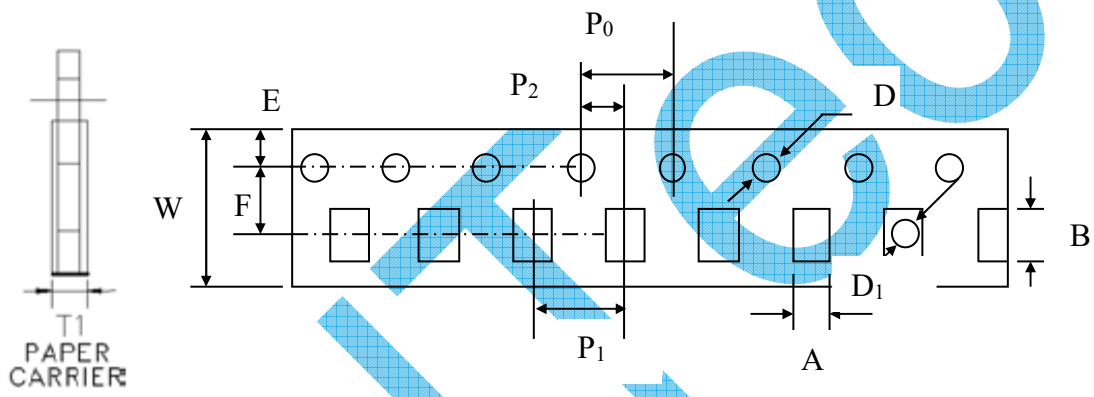
4 digit marking, first three digits marking are significant figures; forth digit is multiplier (10^X),

examples: 1542 = 154x10²=15,400 Ohm=15,4kOhm

Some value might have no marking. Pls check with sales details.

SPECIFICATION

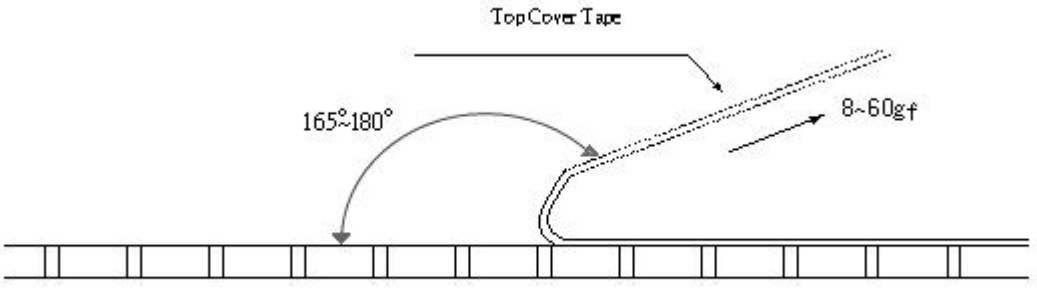
Tape And Reel Package

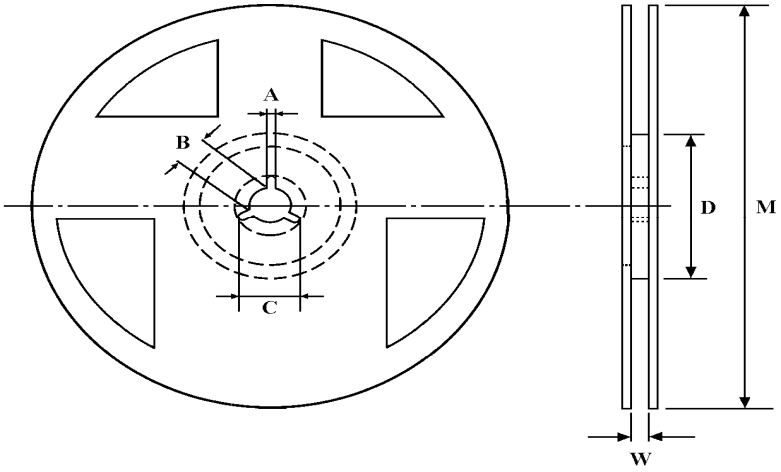


Type	A	B	W	E	F	P_0	P_1	P_2	ΦD	T1
1206	2,00±0,05	3,55±0,05	8,00±0,10	1,75±0,05	3,5±0,05	4,00±0,10	4,00±0,10	2,00±0,05	1,55±0,05	0,75±0,05

Cover Tape Peel off Strength

Specifications: peel force of top cover tape shall be between 8 to 60g
The peel speed shall be about 300mm/min±5%



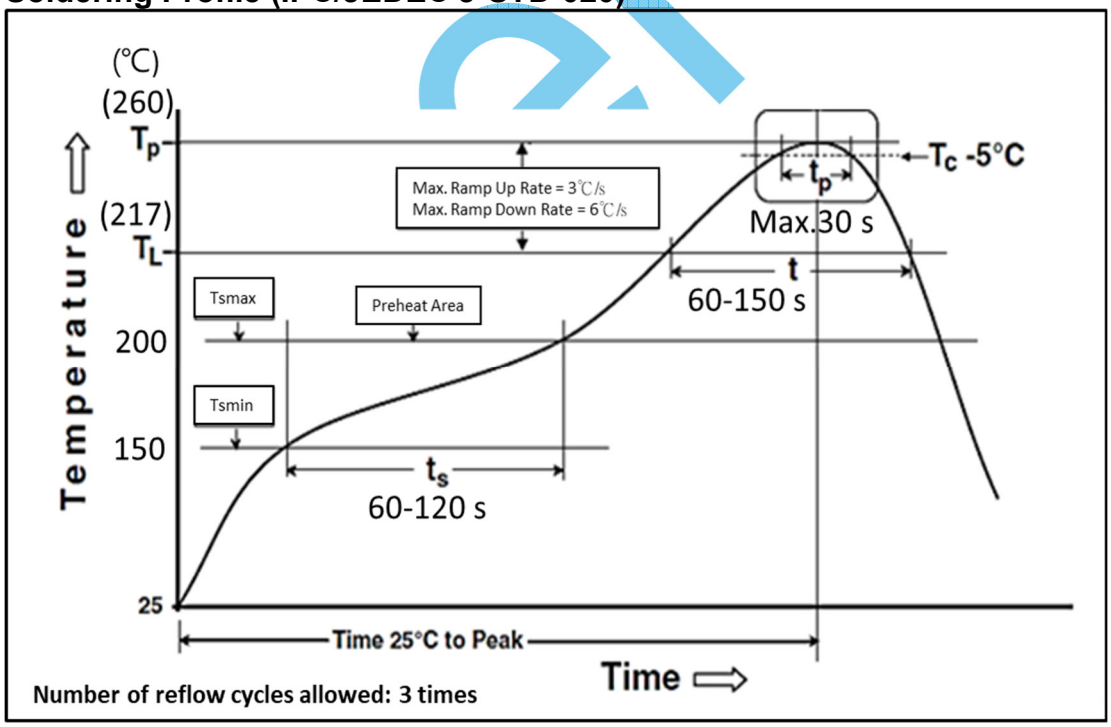


Type	Packaging	M	B	D	W
039 06 … T05	Paper	178,0±1,0	13,5±0,7	60,0+1,0	11,5±1,0

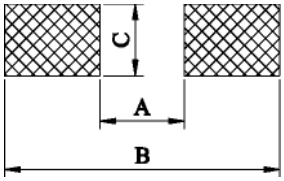
Stock period

The performance of these products, including the solderability, is guaranteed for 24 month, provided that they remain packed as they were when delivered and stored at a temperature of 25°C ± 3°C and a relative humidity less than 80%RH

Soldering Profile (IPC/JEDEC J-STD-020)



Recommended Land Pattern Design (mm):



Size	A	B	C
1206	0,8	4,60	1,80

Environmental Characteristics

Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As spec.	**MIL-STD-202F Method 304** +25/-55/+25/+125/+25°C
Short Time Overload	<47Ω ▵R±0,4%; ≧47Ω ▵R±0,2%	**JIS-C-5201-1 4.13** RCWV*2,5 or Max. overload voltage whichever is lower for 5 seconds
Insulation Resistance	>1000 MΩ	**MIL-STD-202 Method 302** Apply 100V_{DC} for 1 minute
Endurance	<47Ω ▵R±0,5%; ≧47Ω ▵R±0,25%	**MIL-STD-202 Method 108** 70±2°C, RCWV for 1000 hrs with 1,5 hrs “ON” and 0,5 hrs “OFF”
Terminal strength	No broken	**AEC-Q200-006** Force of 1.8kg for 60 seconds.
Bending Strength	ΔR±0,1%	**JIS-C-5201-1 4.33** Bending once for 60 seconds Bending displacement: 3 mm
Solderability	95% min. coverage	**JIS-C-5201-1 4.17** **IEC-60115-1 4.17** 245±5°C for 3 seconds
Resistance to Soldering Heat	<47Ω ▵R±0,25%; ≧47Ω ▵R±0,1%	**JIS-C-5201-1 4.18** **IEC-60115-1 4.18** 260±5°C for 10 seconds
Mechanical Shock	ΔR±0,1%	**MIL-STD-202 Method 213** Wave Form: Tolerance for half sine shock pulse. Peak value is 100g’s. Normal duration (D) is 6.
Vibration	ΔR±0,1%	**MIL-STD-202 Method 204** 5 g’s for 20 min., 12 cycles each of 3 orientations, 10-2000 Hz
ESD	ΔR±0,5%	**AEC-Q200-002** Human body model 1206 : 1KV
High Temperature Exposure	<47Ω ▵R±0.25%; ≧47Ω ▵R±0.1%	**MIL-STD-202 Method 108 at +155°C for 1000 hrs**
Biased Humidity	<47Ω ▵R±0.25%; ≧47Ω ▵R±0.1%	**MIL-STD-202 Method 103 1000 hrs 85°C/85%RH 10% of operating power**
Temperature Cycling	<47Ω ▵R±0.25%; ≧47Ω ▵R±0.1%	**JESD22 Method JA-104 -55°C to +125°C, 1000 cycles**
Resistance to solvents	Marking Unsmeared	**MIL-STD-202 Method 215** Add Aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.
Flammability	No ignition of the tissue paper or scorching or the pinewood board	**UL-94** V-0 or V-1 are acceptable. Electrical test not required.
Sulfur Test	ΔR±1%	**ASTM-B-809-95 Modified** 105±2 °C no power rating for 750 hrs.

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