Data Sheet

Customer：

Product :	Automotive Grade Thin Film Precision Chip Resistor (Wide Terminal) – ARW..A Series
Size:	0612/1020/1225
Issued Date:	14-Aug-24
Edition :	REV.A2

RoHS Compliant

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14-Aug-24	14-Aug-24	14-Aug-24		
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Automotive Grade Thin Film Precision Chip Resistor (Wide Terminal)



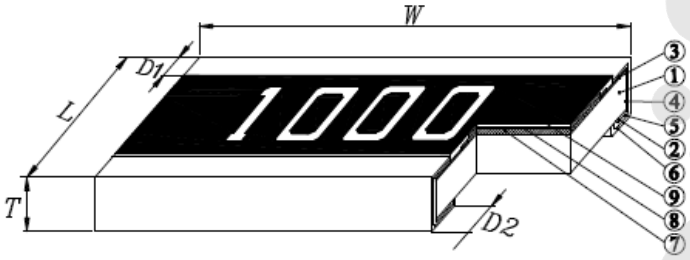
Features

- AEC-Q200 Qualified
- Advanced thin film technology
- RoHS compliant
- Special materials, design, and processing for high sulfur applications
- Test proven immunity to humidity, moisture, and sulfur

Applications

- Automotive electronics
- DC motor , inverters
- Robotics , Industrial control system

Construction



①	Alumina Substrate	④	Edge Electrode	⑦	Resistor Layer
②	Bottom Electrode	⑤	Barrier Layer	⑧	1st Overcoat
③	Top Electrode	⑥	External Electrode	⑨	2nd Marking

Dimensions

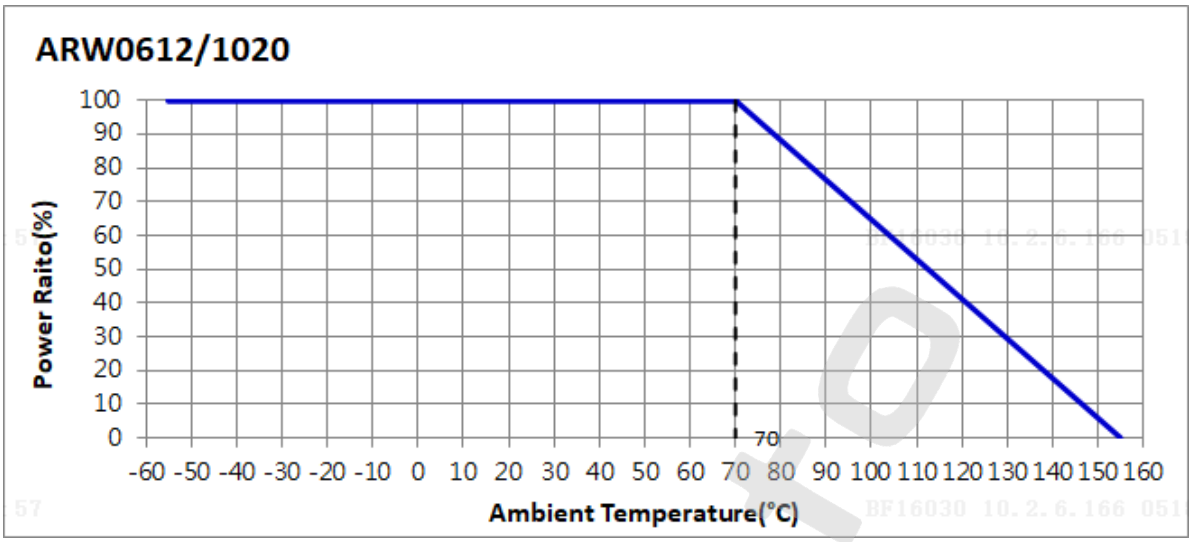
Unit: mm

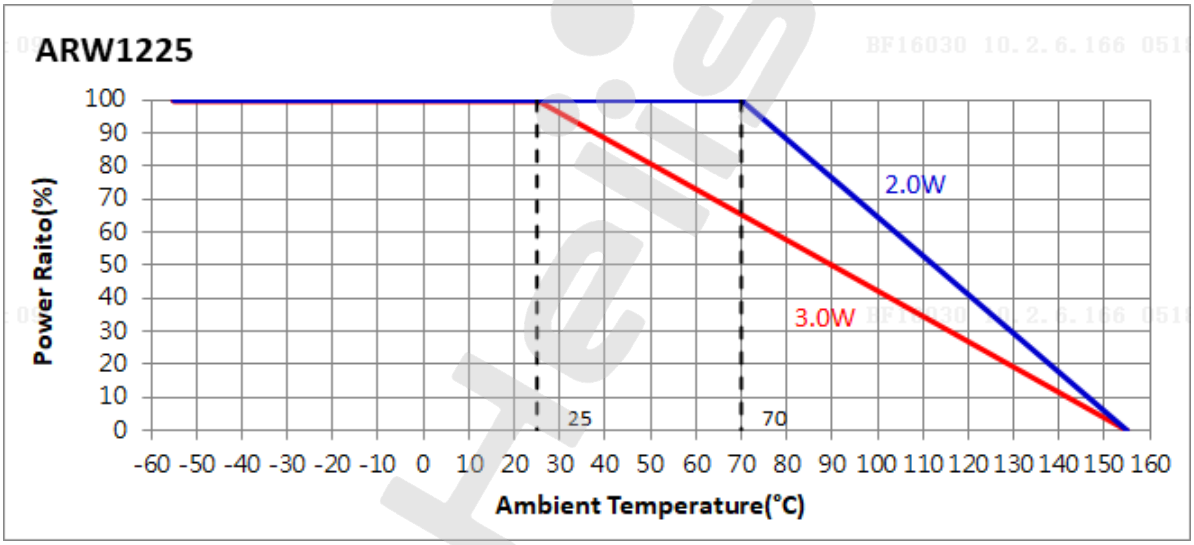
Type	Size (Inch)	L	W	T	D1	D2	Weight (g) (1000pcs)
ARW62	0612	1.55±0.15	3.00±0.15	0.43±0.10	0.25±0.15	0.32±0.15	7.69
ARW20	1020	2.45±0.20	4.90±0.20	0.43±0.10	0.40±0.20	0.52±0.20	20.95
ARW25	1225	3.15±0.20	6.30±0.20	0.43±0.10	0.45±0.20	0.52±0.20	33.24

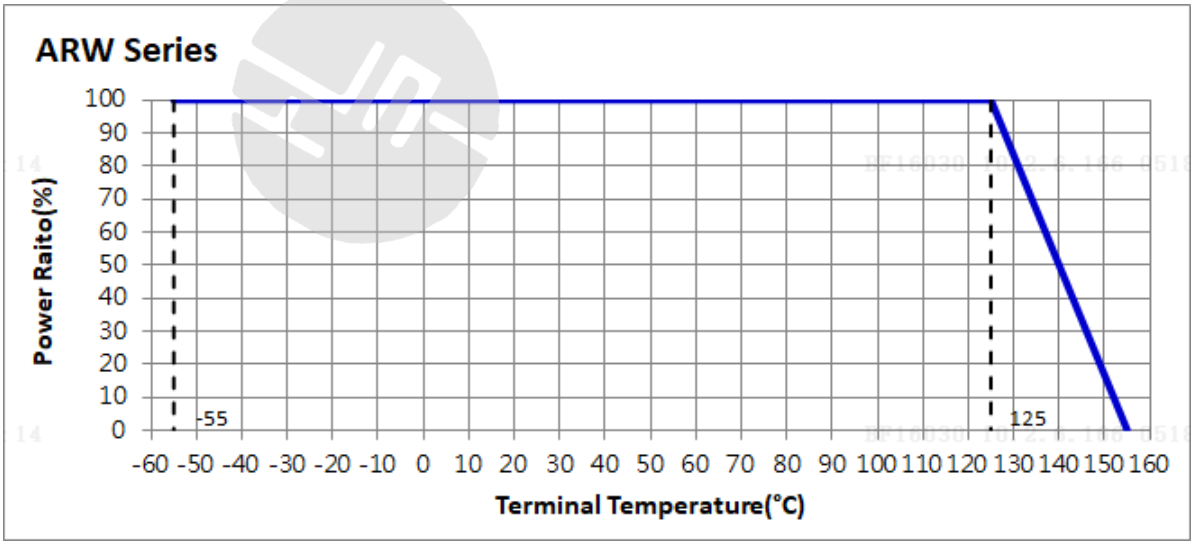
Part Numbering

ARW	62	B	T	C	T	1001	A
Product Type	Dimensions (L×W)	Resistance Tolerance	Packaging Code	TCR (PPM/°C)	Power Rating	Resistance	Marking Code
	62: 0612 20: 1020 25: 1225	B: ±0.1% C: ±0.25% D: ±0.5% F: ±1%	T: Taping Reel B: Bulk	C: ±25 D: ±50	T: 1.0W A: 1.5W S: 2.0W R: 3.0W	0100: 10Ω 10R2: 10.2Ω 1000:100Ω 1001: 1KΩ 1003: 100KΩ	A: Automotive Grade NA: No Making Automotive Grade

■Derating Curve







■Standard Electrical Specifications

Item / Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range				TCR (PPM/°C)
					±0.1%	±0.25%	±0.5%	±1%	
ARW62 (0612)	1.0W	-55 ~ +155°C	75V	150V	2.5Ω – 80KΩ				±25 ±50
ARW20 (1020)	1.5W	-55 ~ +155°C	100V	200V	2.5Ω – 200KΩ				±25 ±50
ARW25 (1225)	2.0W	-55 ~ +155°C	200V	400V	2.5Ω – 250KΩ				±25 ±50

■High Power Rating Electrical Specifications

Item / Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range				TCR (PPM/°C)
					±0.1%	±0.25%	±0.5%	±1%	
ARW20 (1020)	2.0W	-55 ~ +155°C	100V	200V	2.5Ω – 200KΩ				±25 ±50
ARW25 (1225)	3.0W	-55 ~ +155°C	200V	400V	2.5Ω – 250KΩ				±25 ±50

Operating Voltage=$\sqrt{}$(P*R) or Max. operating voltage listed above, whichever is lower.
Overload Voltage=2.5*$\sqrt{}$(P*R) or Max. overload voltage listed above, whichever is lower.
■Viking is capable of manufacturing the optional spec based on customer's requirement.

■Environmental Characteristics

Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	**JIS-C-5201-1 4.8** **IEC-60115-1 4.8** -55°C~+125°C, 25°C is the reference temperature
Short Time Overload (1)	ΔR±0.1% for Standard power rating ΔR±0.2% for high power rating	**JIS-C-5201-1 4.13** RCWV*2.5 or Max. overload voltage whichever is lower for 5 seconds
Insulation Resistance	>1000 MΩ	**JIS-C-5201-1 4.6** **IEC-60115-1 4.6** Apply 100V_{DC} for 1 minute
Endurance	ΔR±0.2%	**MIL-STD-202 Method 108** 70±2°C, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Operational Life	ΔR±0.2%	**MIL-STD-202 Method 108** Condition D Steady State T_A=125°C at derated power. Measurement at 24±4 hours after test conclusion.
Biased Humidity	ΔR±0.1%	**MIL-STD-202 Method 103** 1000 hrs 85°C/85%RH 10% of operating power.
High Temperature Exposure	ΔR±0.2%	**MIL-STD-202 Method 108** at +155°C for 1000 hrs
Temperature Cycling	ΔR±0.1%	**JESD22 Method JA-104** -55°C to +125°C, 1000 cycles
Bending Strength (Board Flex)	ΔR±0.1%	**JIS-C-5201-1 4.33** Bending once for 60 seconds Bending displacement: 1020 1225 sizes: 2 mm 0612 sizes: 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	ΔR±0.05%	**JIS-C-5201-1 4.18** **IEC-60115-1 4.18** 260±5°C for 10 seconds
Terminal strength	No broken	**AEC-Q200-006** Force of 1.8kg for 60 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 0612、1020、1225 2KV
Resistance to solvents	Marking Unsmeared	**MIL-STD-202 Method 215** Add Aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.
Sulfur Test	ΔR±1%	**ASTM-B-809-95 Modified** 105±2 °C no power rating for **1000** hrs.
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.

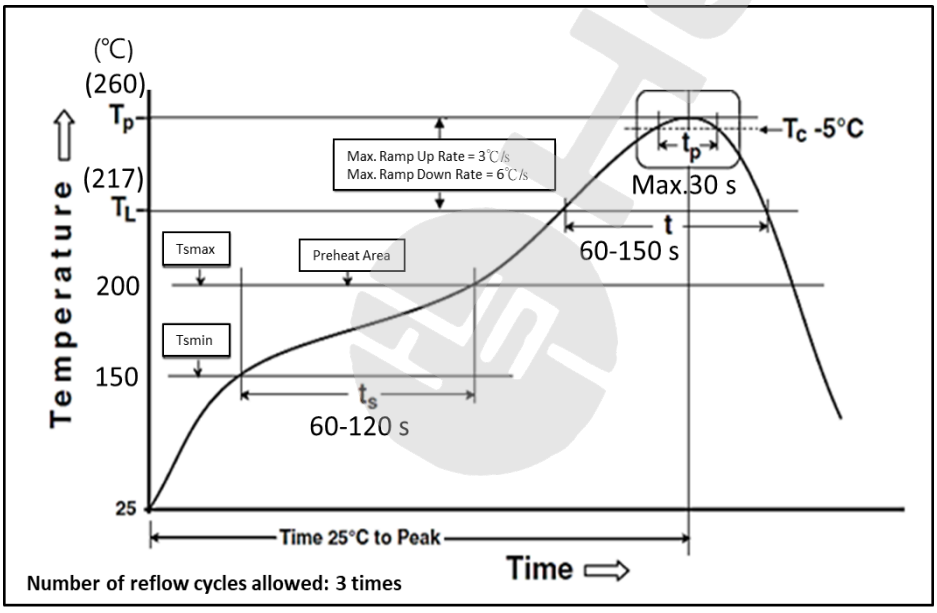
RCWV(Rated continuous working voltage)= √(P*R) or Max. Operating voltage whichever is lower

(1) High power resistor surface temperature measured using FLIR ETS-320 thermal imaging system must be less than 200°C

■ **Storage Temperature: 15~28℃; Humidity < 80%RH**

■ **Shelf Life: 2 years from production date.**

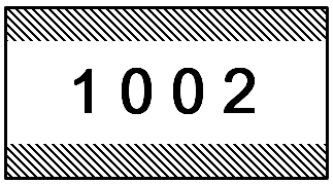
■Soldering Condition(IPC/JEDEC J-STD-020)



Reflow Profiles	
Profile Feature	**Pb-Free Assembly**
Preheat Min. Temperature (Tsmin) Max Temperature (Tsmax) Preheating time (ts) from (Tsmin to Tsmax)	 150 °C 200 °C 60-120 seconds
Ramp-up rate (T_L to Tp)	3 °C/second max.
Liquidous temperature (T_L) Time (t_L) maintained above T_L	217 °C 60-150 seconds
Min. Peak temperature (Tp min)	235°C
Max. Peak temperature (Tp max)	260°C
Time (tp) within 5 °C of the specified classification temperature (Tc)	30 seconds max.
Ramp-down rate (Tp to T_L)	6 °C/second max.
Time 25 °C to peak temperature	8 minutes max.

■Marking

0612~1225 4digit marking Example

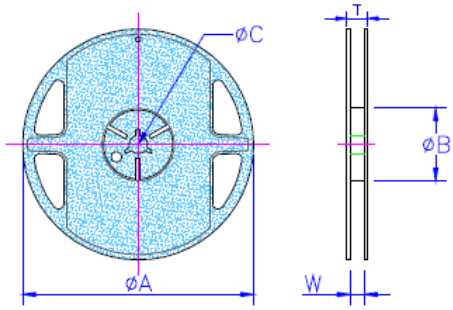


Resistance	4.7Ω	2.2KΩ	10KΩ	49.9KΩ	100KΩ
marking	4R70	2201	1002	4992	1003

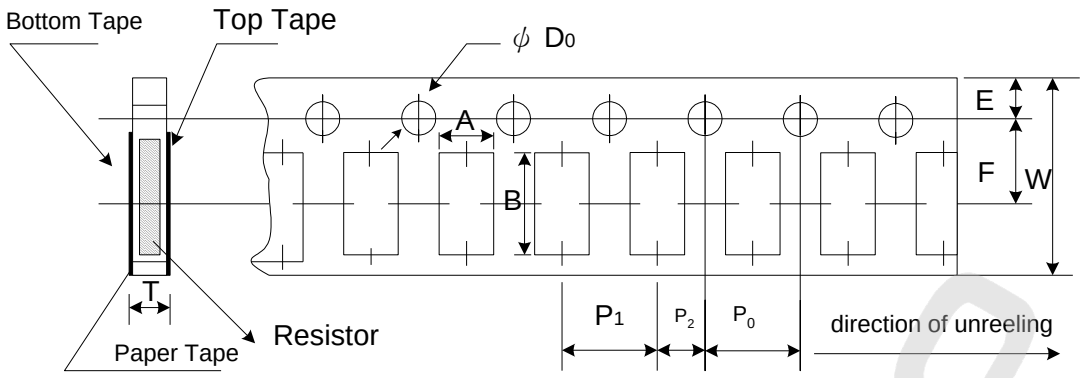
■Packaging

Packing Quantity & Reel Specifications Unit :mm

Type	ØA	ØB	ØC	W	T	Paper Tape (EA)	Emboss Plastic Tape (EA)
ARW62	178.0±1.0	60.0+1.0	13.5±0.7	9.5±1.0	11.5±1.0	5,000	-
ARW20	178.0±1.0	60.0+1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000
ARW25	178.0±1.0	60.0+1.0	13.5±0.7	13.5±1.0	15.5±1.0	-	4,000



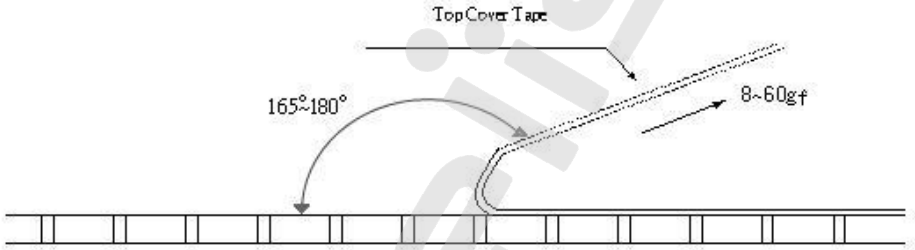
Paper Tape Specifications



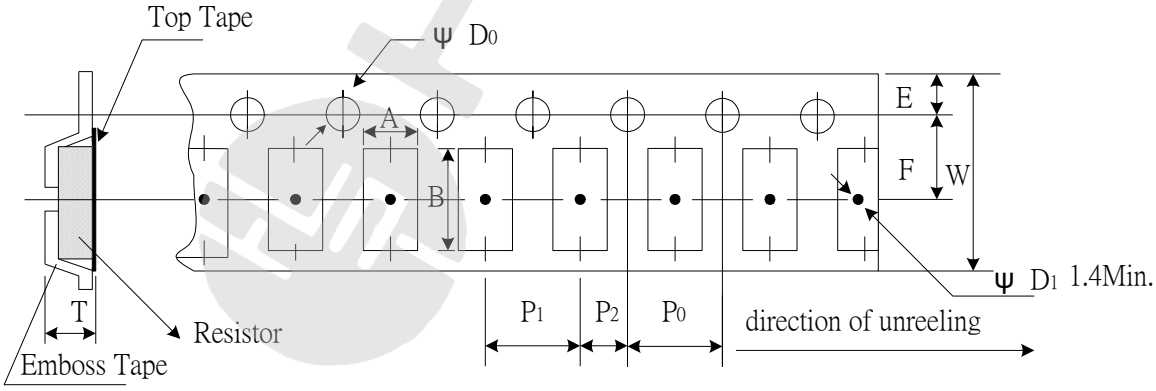
Unit: mm

Type	A	B	W	E	F	P_0	P_1	P_2	ΦD_0	T
ARW62	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

■ Peel force of top cover tape
■ The peel speed shall be about 300mm/min±5%
■ The peel force of top cover tape shall be between 8gf to 60gf



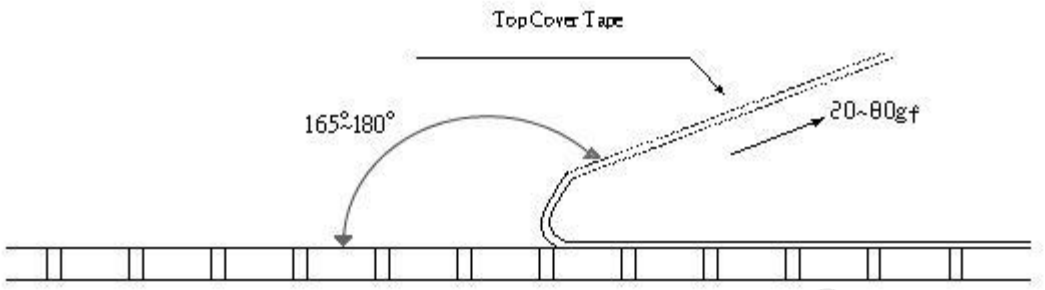
Emboss Plastic Tape Specifications



Unit: mm

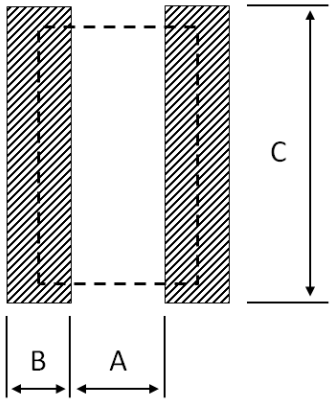
Type	A	B	W	E	F	P_0	P_1	P_2	$ØD_0$	T
ARW20	2.85±0.10	5.45±0.10	12.0±0.10	1.75±0.10	5.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50+0.10	1.00±0.20
ARW25	3.40±0.10	6.65±0.10	12.0±0.10	1.75±0.10	5.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.50+0.10	1.00±0.20

■ Peel force of top cover tape
■ The peel speed shall be about 300mm/min±5%
■ The peel force of top cover tape shall be between 20gf to 80gf



■Recommend Land Pattern

Unit: mm



Type	A	B	C
ARW62	0.60	1.00	3.20±0.2
ARW20	1.00	1.20	5.00±0.2
ARW25	1.80	2.00	6.50±0.2

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version A	Mar.14.2024	-	- Correct the scheme.
Version A1	Jul 01 ,2024	-	- Modify the description in Features from "AEC-Q200 Compliance" to "AEC-Q200 Qualified".
Version A2	Aug 14 ,2024	-	- Add the Power Rating code "R" for 3W in Part Numbering rule. -Add the Derating Curve for ARW1225 3W. -Add the High Power Rating Electrical Specifications for ARW20 2W and ARW25 3W. -Add the Short Time Overload Requirement for high power rating resistors. -Note the surface temperature limitation of Short Time Overload for high power rating resistors.