Data Sheet

Customer：	
Product :	**Thin Film Array Chip Resistor - TFAN Series**
Size:	**0603x4**
Issued Date:	**16-May-24**
Edition :	**REV.B9**

RoHS Compliant

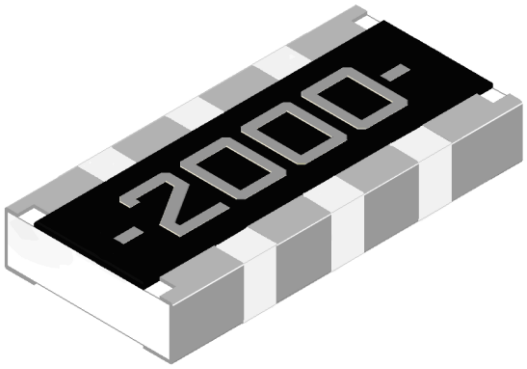
HONG KONG HELISTO INDUSTRIAL LIMITED
香港海利斯特实业有限公司

SHENZHEN HELISTO TECHNOLOGYCOLTD
深圳市海利斯特科技有限公司

ADD:5/F., A Block, Hongdu Industrial Park, Fanshen Road, 45 Area, Baoan, Shenzhen, China
TEL:+86-755-29741555 29749555
FAX:+86-755-29742111
E-mail:donnyhai@helisto.com
www.Helisto.com

Produced by (QC)	Checked (QC)	Approved by (QC)	Prepared by (Sales)	Accepted by (Customer)
16-May-24	16-May-24	16-May-24	16-May-24	
Chun	*Ben Chang*	*Ben Chang*		

Thin Film Array Chip Resistor
(TFAN Series)



■Features

— Advanced thin film technology
— Very tight tolerance down to ±0.05%
— Extremely low TCR down to ±5PPM/°C
— TCR tracking down to 5ppm(±2.5ppm) and tolerance matching down to 0.1%(±0.05%)
— RoHS compliant component, compatible with lead (Pb)-free

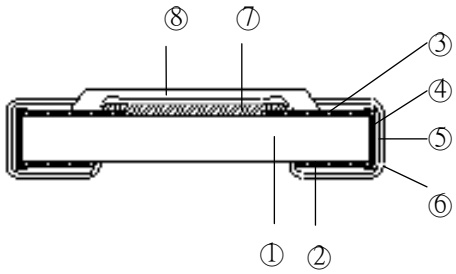
■Applications

— Voltage divider

— Feedback circuits

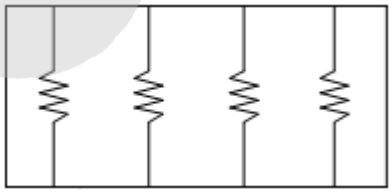
— Signal conditioning

■Construction



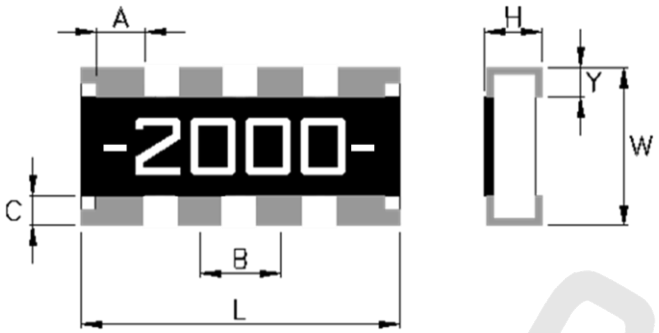
①	Alumina Substrate	④	Edge Electrode	⑦	Resistor Layer
②	Bottom Electrode	⑤	Barrier Layer	⑧	Overcoat
③	Top Electrode	⑥	External Electrode		

■Equivalent Circuit Diagram



TFAN43

Dimensions



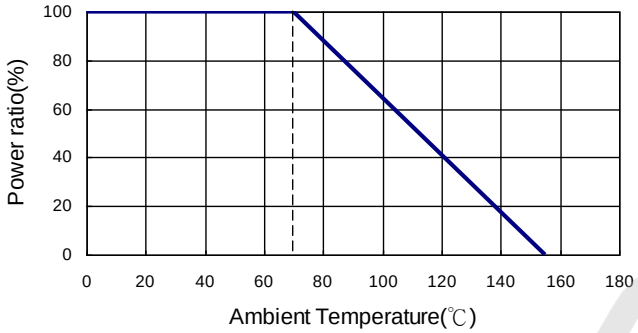
Type	Number of Resistors	L	W	H	A	B	C	Y
TFAN43	4	3.20±0.15	1.60±0.15	0.55±0.10	0.50±0.15	0.80±0.05	0.25±0.15	0.30±0.15

Part Numbering

TFAN	43	B0	T	C0	Y	1001	N
Product Type	Dimensions	Tolerance Grade	Packaging Code	TCR Grade	Power Rating	Resistance	Marking Code
	0603X4	Reference Tolerance Grade Table	T: Taping Reel B: Bulk	Reference TCR Grade Table	Y:1/16W W:1/8W X:1/10W	1000: 100Ω 1001: 1KΩ 1211: 1.21KΩ 3323:332KΩ	: Standard Marking for E96 N: No Marking

Accuracy Grade Table							
Tolerance Grade				TCR Grade			
Code	Absolute Tolerance	Tolerance Matching	Resistance Value	Code	Absolute TCR	TCR Tracking	Resistance Value
A0	±0.05%	N/A	24.9~332K	S0	±5ppm	N/A	24.9~60K
B0	±0.1%	N/A	24.9~332K	S5	±5ppm	5ppm	24.9~60K
B3	±0.1%	0.1%	24.9~332K	B0	±10ppm	N/A	24.9 ~332K
C0	±0.25%	N/A	24.9~332K	B4	±10ppm	10ppm	24.9 ~332K
C2	±0.25%	0.25%	24.9~332K	B5	±10ppm	5ppm	24.9~60K
C3	±0.25%	0.1%	24.9~332K	N0	±15ppm	N/A	24.9 ~332K
D0	±0.5%	N/A	24.9~332K	N3	±15ppm	15ppm	24.9 ~332K
D1	±0.5%	0.5%	24.9~332K	N4	±15ppm	10ppm	24.9 ~332K
D2	±0.5%	0.25%	24.9~332K	N5	±15ppm	5ppm	24.9~60K
F0	±1%	N/A	24.9~332K	C0	±25ppm	N/A	24.9~332K
F1	±1%	0.5%	24.9~332K	C2	±25ppm	25ppm	24.9~332K
F2	±1%	0.25%	24.9~332K	C3	±25ppm	15ppm	24.9~332K
				C4	±25ppm	10ppm	24.9~332K
				D0	±50ppm	N/A	24.9~332K
				D1	±50ppm	50ppm	24.9~332K
				D2	±50ppm	25ppm	24.9~332K

■Derating Curve



■Electrical Specifications

Item / Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range					TCR (PPM/°C)
					±0.05%	±0.1%	±0.25%	±0.5%	±1%	
TFAN 43	1/16W	-55 ~ +155°C	50V	100V	24.9Ω~332KΩ					±10 ±15 ±25 ±50
	1/10W 1/8W	-55 ~ +155°C	75V	150V	24.9Ω~332KΩ					±25 ±50
	1/16W	-55 ~ +155°C	50V	100V	24.9Ω~60KΩ					±5
	1/10W	-55 ~ +155°C	75V	150V						

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.	**MIL-STD-202 Method 304** +25/-55/+25/+125/+25°C
Short Time Overload	ΔR±0.1%	**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	1000Hr：ΔR±0.15% 8000Hr：ΔR±0.3%	**MIL-STD-202 Method 108** 70±2°C, RCWV with 1.5 hrs "ON" and 0.5 hrs "OFF"
Damp Heat with Load	ΔR±0.25%	**MIL-STD-202 Method 103** 40±2°C, 90~95% R.H., RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Damp Heat with Load(85°C/85% R.H)	ΔR±0.5%	85±2°C, 80~90% R.H. 10% of RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Dry Heat	1000Hr：ΔR±0.25% 8000Hr：ΔR±0.5%	At +125℃
Bending Strength	ΔR±0.2%	**JIS-C-5201-1 4.33** Bending amplitude 3 mm for 10 seconds
Solderability	95% min. coverage	**MIL-STD-202 Method 208** 245±5°C for 3 seconds
Resistance to Soldering Heat	ΔR±0.2%	**MIL-STD-202 Method 210** 260±5°C for 10 seconds

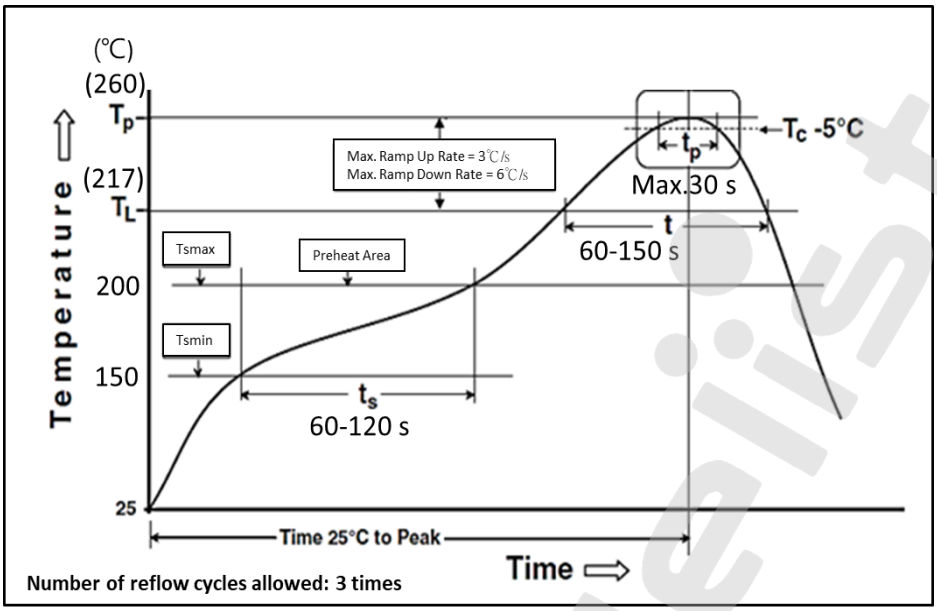
Dielectric Withstand Voltage	100V	**MIL-STD-202 Method 301** Max. overload voltage for 1 minute
Thermal Shock	ΔR±0.25%	**MIL-STD-202 Method 107** -55°C ~150°C, 100 cycles
Low Temperature Operation	ΔR±0.25%	**JIS-C-5201-1 4.36** 1 hour, -65°C, followed by 45 minutes of RCWV

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

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

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

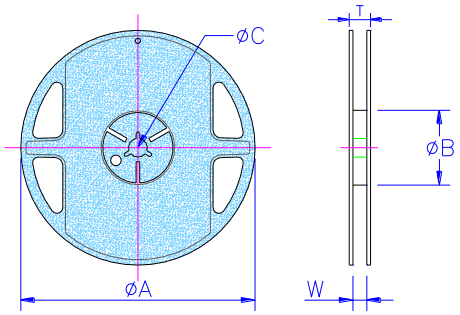
■Soldering Condition(IPC/JEDEC J-STD-020)



Reflow Profiles	
Profile Feature	**Pb-Free Assembly**
Preheat Min. Temperature (T_{smin}) Max Temperature (T_{smax}) Preheating time (t_s) from (T_{smin} to T_{smax})	 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.

■Packaging

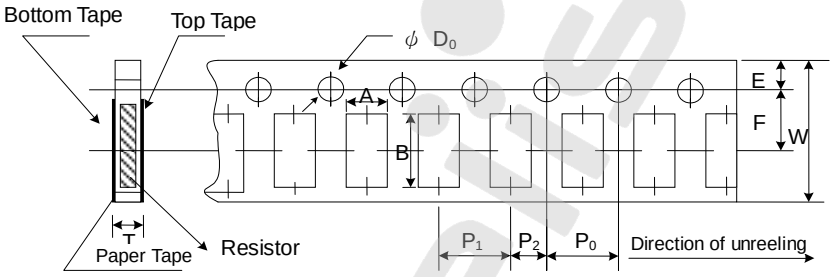
Reel Specifications & Packaging Quantity



Unit: mm

Type	Packaging Quantity		Tape width	Reel Diameter	ΦA	ΦB	ΦC	W	T
TFAN 43	Paper	5K	8mm	7 inch	178.5±1.5	$60^{+1/-0}$	13.0±0.2	9.0±0.5	12.5±0.5

Paper Tape Specifications



Unit: mm

Type	A	B	W	E	F	P_0	P_1	P_2	ΦD_0	T
TFAN43	1.95±0.1	3.50±0.1	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	4.0±0.05	2.0±0.05	$1.5^{+0.1}_{-0}$	0.85±0.1

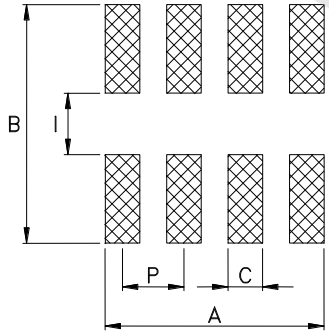
■Marking

TFAN 43: 4 digits marking

Example:

Resistance	100Ω	2.2KΩ	10KΩ	49.9KΩ	100KΩ	332KΩ
marking	1000	2201	1002	4992	1003	3323

■Recommend Land Pattern



Unit: mm

Type	A	B	C	I	P
TFAN43	3.10	2.85	0.45	0.80	0.80