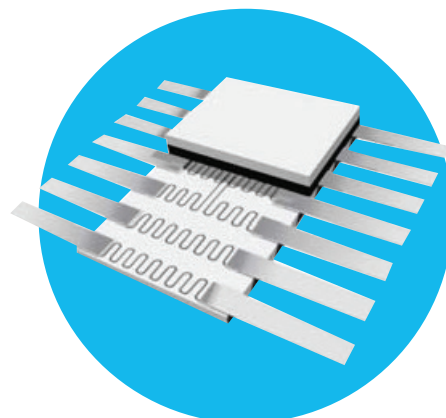


# TaNFilm® Precision Flat Pack Networks

## 8900 Series

- Precision absolute and ratio tolerances available
- Qualified to MIL-PRF-83401 /03, /10 and /15
- Qualified to characteristics M, K and H
- Custom schematics readily available
- Absolute TCR to  $\pm 15\text{ppm}/^\circ\text{C}$



All Pb-free parts comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

TaNFilm® resistor networks are designed for use in applications requiring a high degree of reliability, stability, tight tolerance and TCR tracking, and low noise. The sputtering process for resistor formation has been perfected to allow a continuous feed production line under high vacuum conditions, thus, insuring uniformity of properties between networks. Laser trimming makes tight ratios easily achievable. The gold plated copper leads are solid phase welded to a large area of gold conductor pads on the ceramic substrate assuring the most reliable termination and long term stability. The Tantalum Nitride resistor material is passivated for environmental protection insuring excellent performance far superior to military requirements.

Our TaNFilm® process enables us to manufacture networks containing different resistance values and still maintain tight tolerances and tracking characteristics. The nature of our photo-etch process makes it readily adaptable to meet each individual customer's needs. Custom circuit designs and special mechanical configurations can be easily achieved with a modest set up charge while maintaining our high standards of precision and reliability.

## Electrical Data

Schematic	Resistance Range ( $\Omega$ )	Absolute Tolerance	Optional Ratio Tolerance	Absolute TCR ( $\text{ppm}/^\circ\text{C}$ )	Tracking TCR ( $\text{ppm}/^\circ\text{C}$ )	Element Power (mW)
A	10 - 49.9	F, G, J	F, G	$\pm 50; \pm 100; \pm 300$	$\pm 20$	50
	50.0 - 199	F, G, J	D, F, G	$\pm 25; \pm 50; \pm 100; \pm 300$	$\pm 10$	
	200 - 999	B, D, F, G, J	A, B, D, F, G	$\pm 25; \pm 50; \pm 100; \pm 300$	$\pm 5$	
	1.0K - 100K	B, D, F, G, J	T, Q, A, B, D, F, G	$\pm 15; \pm 25; \pm 50; \pm 100; \pm 300$	$\pm 5$	
	101K - 200K	B, D, F, G, J	A, B, D, F, G	$\pm 25; \pm 50; \pm 100; \pm 300$	$\pm 5$	
B	50 - 149	B, D, F, G, J	B, D, F, G	$\pm 300; \pm 100$	$\pm 50$	25
	150 - 499	B, D, F, G, J	B, D, F, G	$\pm 300; \pm 100; \pm 50$	$\pm 20$	
	500 - 999	B, D, F, G, J	B, D, F, G	$\pm 25; \pm 50; \pm 100; \pm 300$	$\pm 5$	
	1.0K - 150K	B, D, F, G, J	B, D, F, G	$\pm 15; \pm 25; \pm 50; \pm 100; \pm 300$	$\pm 5$	

### General Note

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8900 Series

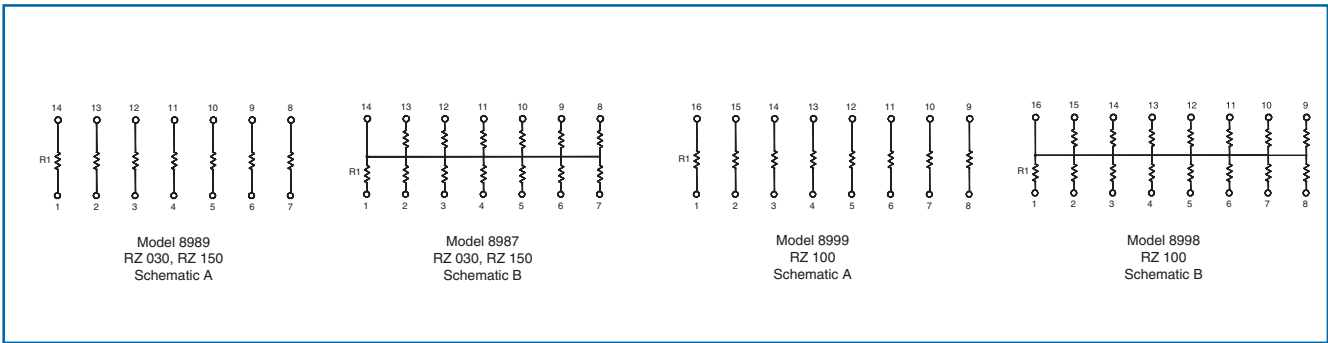
MIL-PRF-83401 Qualification Data

Specification	Size	Schematic	Resistance Range (Ω)	Absolute Tolerance (%)	Characteristic
MIL-PRF-83401/03 MIL-PRF-83401/15	14-Pin	A, B	20 - 121K	F, G, J	K, M
			100 - 100K	B, D, F, G, J	H, K, M
MIL-PRF-83401/10	16-Pin	A, B	100 - 100K	B, D, F, G, J	H, K, M

Package Specification Data (MIL and Commercial)

Schematic	Package Power (mW)		Power Derating	Voltage Rating	Temperature Range	Substrate	Lead Finish	Noise
	14-pin	16-pin						
A	350	400	100% from 0°C to 70°C derated linearly to 0% at 125°C	$\sqrt{PxR}$ not to exceed 50V	-65°C to +125°C	99.6% Alumina	Gold Plate (60/40 Sn/Pb available)	<-30dB
B	325	375						

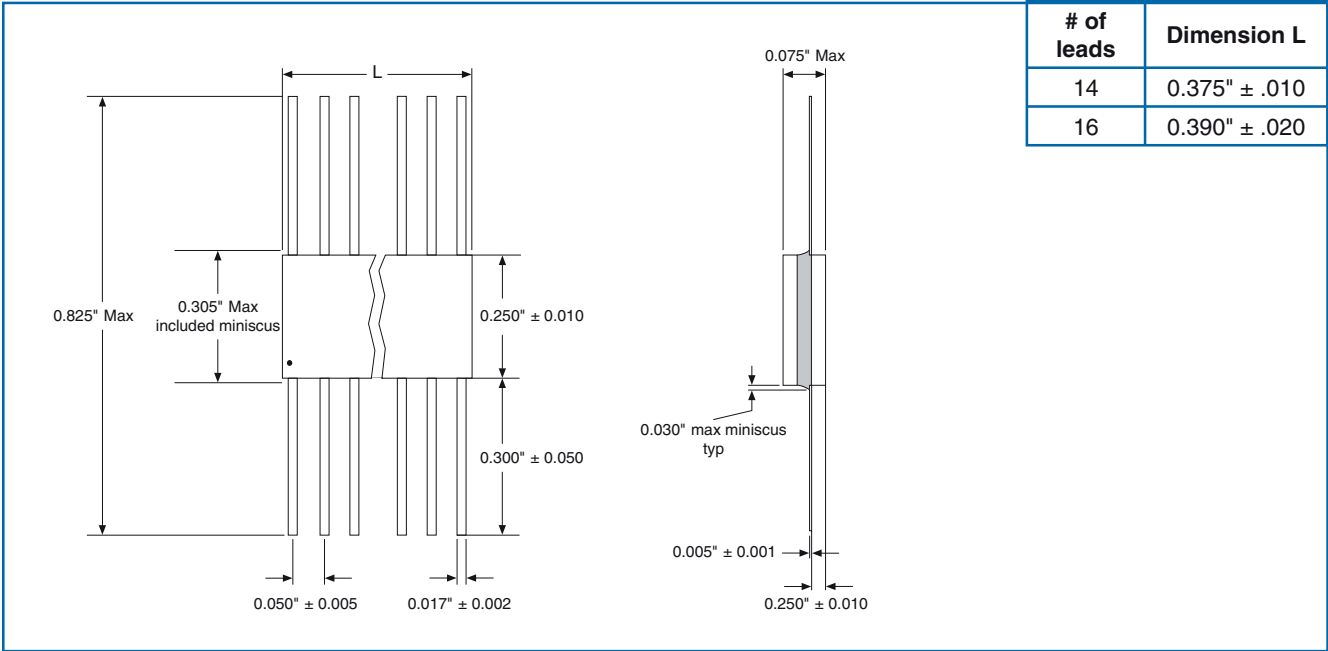
Schematic Data



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Physical Data



Environmental Data

Test per MIL-PRF-83401	MIL-PRF-83401 Limits (ΔR%)				TaNFilm® Test Data (ΔR%)	
	M	K	H	V	Max	Typical
Thermal Shock and Power Conditioning	0.7	0.7	0.5	0.25	0.1	0.02
Low Temperature Operation	0.5	0.25	0.1	0.1	0.1	0.01
Short Term Overload	0.5	0.25	0.1	0.1	0.05	0.01
Terminal Strength	0.25	0.25	0.25	0.1	0.1	0.01
Resistance to Solder Heat	0.25	0.25	0.1	0.2	0.1	0.02
Moisture Resistance	0.5	0.5	0.4	0.25	0.1	0.03
Shock	0.25	0.25	0.25	0.25	0.1	0.03
Vibration	0.25	0.25	0.25	0.1	0.1	0.03
Life	2.0	0.5	0.5	0.1	0.1	0.03
High Temperature Exposure	1.0	0.5	0.2	0.1	0.1	0.03
Low Temperature Storage	0.5	0.25	0.1	0.1	0.1	0.02
25°C Double Load	2.0	0.5	0.5	0.1	0.05	0.03

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## Commercial and MIL-Screened (Non-QPL) Ordering Data

Prefix	FP	-	8999	-	03	-	1001	-	B	F
Model										
8987 = 14-pin Flat Pack, schematic B, gold terminations 8987SD = 14-pin Flat Pack, schematic B, 60/40 Sn/Pb terminations 8987HR = 14-pin HI-REL Flat Pack, schematic B, gold terminations 8989 = 14-pin Flat Pack, schematic A, gold terminations 8989SD = 14-pin Flat Pack, schematic A, 60/40 Sn/Pb terminations 8989HR = 14-pin HI-REL Flat Pack, schematic A, gold terminations  8998 = 16-pin Flat Pack, schematic B, gold terminations 8998SD = 16-pin Flat Pack, schematic B, 60/40 Sn/Pb terminations 8998HR = 16-pin HI-REL Flat Pack, schematic B, gold terminations 8999 = 16-pin Flat Pack, schematic A, gold terminations 8999SD = 16-pin Flat Pack, schematic A, 60/40 Sn/Pb terminations 8999HR = 16-pin HI-REL Flat Pack, schematic A, gold terminations										
Absolute TCR										
Commercial Screening	01 = $\pm 100\text{ppm}/^{\circ}\text{C}$ ; 02 = $\pm 50\text{ppm}/^{\circ}\text{C}$ ; 03 = $\pm 25\text{ppm}/^{\circ}\text{C}$ ; 11 = $\pm 15\text{ppm}/^{\circ}\text{C}$									
MIL-PRF-83401 Group A Screening	04 = $\pm 300\text{ppm}/^{\circ}\text{C}$ Characteristic M; 05 = $\pm 100\text{ppm}/^{\circ}\text{C}$ Characteristic K 06 = $\pm 50\text{ppm}/^{\circ}\text{C}$ Characteristic H; 07 = $\pm 25\text{ppm}/^{\circ}\text{C}$ Characteristic H									
Resistance										
Standard 4-digit MIL resistance code Example: 1001 = 1000 $\Omega$ ; 50R0=50 $\Omega$										
Absolute Tolerance										
J = $\pm 5\%$ ; G = $\pm 2\%$ ; F = $\pm 1.0\%$ ; D = $\pm 0.5\%$ ; B = $\pm 0.1\%$										
Optional Ratio Tolerance to R <sub>i</sub>										
F = $\pm 1.0\%$ ; D = $\pm 0.5\%$ ; C = $\pm 0.25\%$ ; B = $\pm 0.1\%$ ; A = $\pm 0.05\%$ ; Q = $\pm 0.02\%$ ; T = $\pm 0.01\%$										
Notes										
HI-REL models include a precap inspection and thermo-compression bonded leads. TCR codes 01, 02, 03, and 11 are not available on HI-REL models. Custom schematics and screening available. Contact factory for ordering information.										

## MIL-PRF-83401 Ordering Data

<b>Prefix</b> .....	<b>M83401</b>	<b>03</b>	<b>K</b>	<b>1001</b>	<b>F</b>	<b>A</b>
<b>Specification Sheet</b> .....	<p>03 = 14-pin Flat Pack 10 = 16-pin Flat Pack 15 = 14-pin HI REL Flat Pack</p>					
<b>Characteristic</b> .....	<p>M, K, H</p>					
<b>Resistance</b> .....	<p>Standard 4-digit MIL resistance code Example: 1001 = 1000Ω; 50R0=50Ω</p>					
<b>Absolute Tolerance</b> .....	<p>J = ±5%; G = ±2%; F = ±1.0%; D = ±0.5%; B = ±0.1%</p>					
<b>Schematic</b> .....	<p>A = Isolated; B = Bussed Schematic</p> <p>Standard lead termination is gold plate. Contact factory for optional 60/40 Sn/Pb hot solder dip finish.</p>					

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