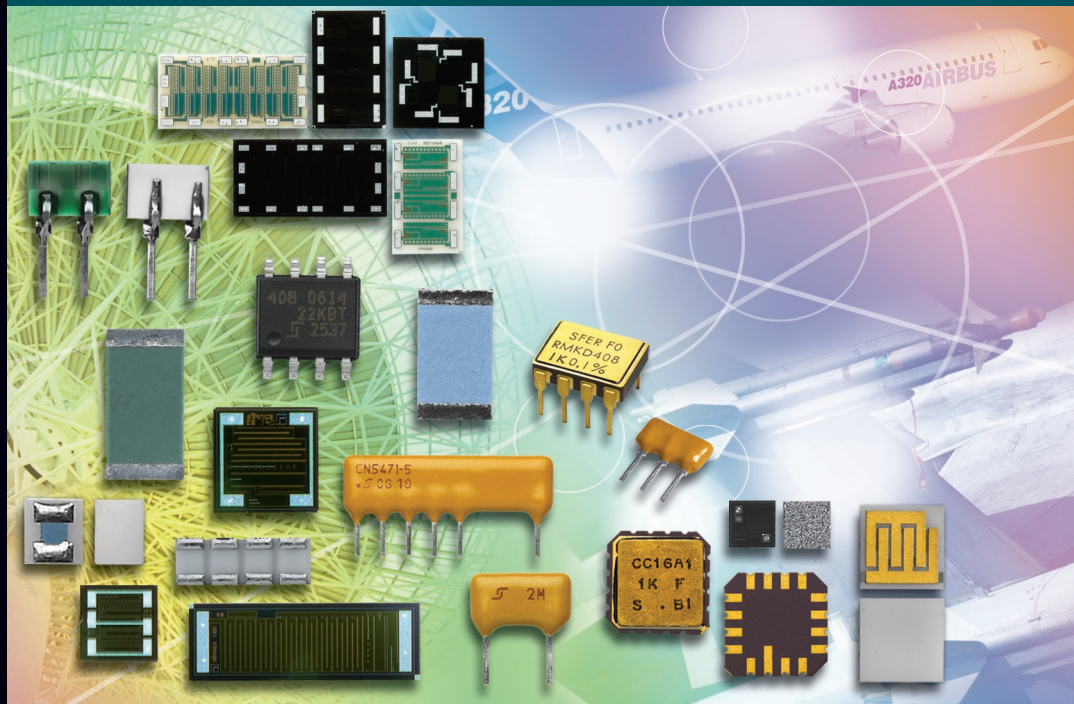




VISHAY INTERTECHNOLOGY, INC.



## THIN FILM RESISTORS/NETWORKS

Vishay Sfernice

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## Thin Film Resistors

- SMD chip resistors (bare chips and wraparound)
- SIL resistor
- Small size: down to 20 mils X 20 mils
- High stability: 0.05 % (1000 hours/Pn/70 °C)
- Low temperature coefficient: 10ppm/°C (- 55 °C; + 155 °C) - 5ppm/°C (- 25 °C; + 85 °C)
- Tight tolerance: down to 0.01 %
- Wide ohmic range: 50 mΩ to 100 MΩ
- CECC qualification
- ESCC qualification

## Thin Film Networks

- SMD resistors network (bare, wraparound and SOIC)
- Hermetic: leadless chip carrier
- High stability: 0.02 % on the ratio (1000 hours/Pn/70 °C)
- Low temperature coefficient: 10 ppm/°C ABS - 2 ppm/°C ratio
- Tight tolerance: down to 0.01 % ratio
- 6 decade voltage divider
- ESCC qualification
- Custom designs



# Thin Film Resistors and Networks

Resistors								
Model	CS22	RMK 22	RMK 55 / 515	RSK 22	TA22	S	CH	CHP / HCHP
Type	Bare Chip	Bare Chip	Bare Chip	Bare Chip	Bare Chip	Bare chip	Wraparound	Wraparound
Sizes	20 mil x 20 mil	20 mil x 20 mil	50 mil x 50 mil 150 mil x 50 mil	20 mil x 20 mil	20 mil x 20 mil	1.5 x 1.5; 3 x 3; 5 x 5	02016 to 2010	0502 to 2512
Resistance Range	10 K to 10 M	50 R to 300 K	1 K to 750 K 1 K to 2 M	10 R to 500 K	10 R to 1 M	0R05 to 1 R	10 R to 500 R	0R1 to 100 MR
Power Rating at 70 °C	50 mW	50 mW	125 mW 250 mW	50 mW	50 mW	500 mW to 6 W	30 mW to 330 mW	50 mW to 2 W
Maximum Voltage	100 V	100 V	100 V	100 V	50 V	N/A	30 V to 75 V	50 V to 250 V
Tolerance	0.5 % to 2 %	0.1% to 1%	0.01 % to 1 %	0.1 % to 1 %	0.5 % to 2 %	1 % to 5 %	1 % to 10 %	0.5 % to 5 %
Temperature Coefficient (ppm/°C)	100 (50 upon request)	5 Typical	10	25	100 (50 upon request)	100	100	100 to 300
Load Life Stability (2000 h at 70 °C at Pn)	0.10 %	0.03 % Typical	0.03 %	0.05 % Typical	0.07 % Typical	0.10 %	N/A	< 0.25 % Typical
Operating Temp. Range 10 ppm/°C Abs 2 ppm/°C ratiom	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 125 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C
Storage Temperature Range	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C
Special Feature						Current sensor	Frequency up to 20 GHz	HCHP: frequency up to 10 GHz
Qualification								ESA (see CHPHR)

For performances versus ohmic range, please refer to the data sheet of the product.


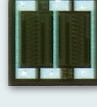

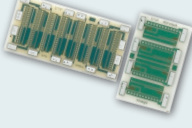
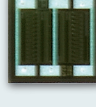
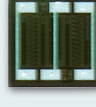


## Resistors

Model	CHPHR	L	P	PHR	RV	TFS-W	CNS 020/ CNS 021	TFS-S
Type	Wraparound	Wraparound	Wraparound	Wraparound	Wraparound	Wraparound	SIL	SIL
Sizes	0603 to 2512	0402 to 2010	0402 to 2010	0603 to 1206	0505 to 1206	0705/1206	.200" or .150" lead spacing	.100" lead spacing
Resistance Range	1 R to 10 M	0R1 to 10 R	10 R to 50 M	50 R to 1 M	100 R to 1 M	25 R to 250 R	100 R to 10 M	25 R to 2500 R
Power Rating at 70 °C	100 mW to 800 mW	125 mW to 1 W	50 mW to 1 W	100 mW to 250 mW	125 mW to 330 mW	N/A	500 mW	N/A
Maximum Voltage	50 V to 300 V	50 V	37 V to 300 V	35 V to 100 V	50 V to 75 V	N/A	300 V	N/A
Tolerance	1 % to 5 %	1 % to 20 %	0.01 % to 2 %	0.01 % to 0.1 %	0.1 % to 5 %	1 % and 2 %	0.01 % to 1 %	1 % and 2 %
Temperature Coefficient (ppm/°C)	100 and 200	50 to 300	5 to 100	5 to 25	10 and 25	6180	10	6180
Load Life Stability (2000 h at 70 °C at Pn)	1 %	0.15 % Typical	0.05 % Typical	0.02 % Typical	0.05 % Typical	0.20 %	0.10 %	0.20 %
Operating Temperature Range	- 55°C; + 155°C	- 55°C; + 155°C	- 55°C; + 155°C	- 55°C; + 155°C	- 55°C; + 155°C	- 55°C; + 155°C	- 55°C; + 155°C	- 55 °C; + 155 °C
Storage Temperature Range	655 °C; + 155 °C	- 55 °C; +155 °C	- 55 °C; + 155 °C	- 55 °C; +155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C
Special Feature	High temperature storage: 1.5 %		200 °C option	High temperature storage: 0.15 %		DCT/CT 0.2 %		DCT/CT 0.2 %
Qualification	ESA (ESCC 4001/026)		ESA (see PHR)	ESA (ESCC 4001/023)	CECC 40401-010			





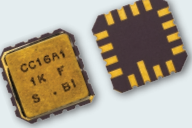

For performances versus ohmic range, please refer to the data sheet of the product.



Networks						
Model						
Type	SIL Network	Bare Network	Bare Network	Bare Network	Bare Network	Bare Network
Sizes	6 or 7 terminals	30 mil x 30 mil	30 mil x 30 mil	8 to 16 terminals	30 mil x 30 mil	30 mil x 30 mil
Resistance Range	100 R to 10 M	10 K to 5 M	1 K to 250 K	500 R to 200 K	10 R to 500 K	50 R to 500 K
Power Rating at 70 °C	100 mW (per resistor)	125 mW	50 mW	125 mW to 250 mW	250 mW	125 mW
Maximum Voltage	1200 V	100 V	100 V	100 V	100 V	50 V
Absolute Tolerance	0.10 %	0.5 % to 2 %	0.1 % to 1 %	0.1 % to 1 %	0.5 % to 2 %	0.5 % to 2 %
Tolerance Ratio	0.03 % to 0.1 %	0.50 %	0.01 % to 0.1 %	0.01 % to 0.05 %	0.05 % to 0.5 %	0.50 %
Absolute Temperature Coefficient (ppm/°C)	< 25	100	10	10	25	100
Temperature Coefficient Ratio	< 2.5	5	2	2	5	5
Load Life Stability (2000 h at 70 °C at Pn)	0.10 %	0.1 % Typical	0.03 % Typical	0.03 % Typical	0.03 % Typical	0.07 % Typical
Load Life Stability On Ratio (2000 h at 70 °C at Pn)	0.01 % Typical	N/A	N/A	N/A	N/A	N/A
Operating Temperature Range	0 °C; + 70 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C
Storage Temperature Range	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C
Special Feature	Decade voltage divider	Unequal values upon request	Unequal values upon request		Unequal values upon request	Unequal values upon request
Custom Part Number		CN	CN	CN	CN	CN

For performances Versus ohmic range, please refer to the data sheet of the product.

## Networks

	PRA	PRAHR	RMKD	RMKMS	SLCC	TAS
Model						
Type	Wraparound network	Wraparound network	Hermetic network	Molded network	Hermetic network	SIL network
Sizes	100, 135, 182	100, 135, 182	8 to 16 terminals	S08, S014, S016	20	2 to 9 terminals
Resistance Range	100 R to 1 M	100 R to 1 M	500 R to 200 K	500 R to 200 K	50 R to 100 K	100 R to 1 M
Power Rating at 70 °C	100 mW (per resistor)	100 mW (per resistor)	125 mW to 250 mW	50 mW (per resistor)	50 mW (per resistor)	100 mW (per resistor)
Maximum Voltage	35 V to 100 V	35 V to 100 V	100 V	50 V	100 V	100 V
Absolute Tolerance	0.1 % to 0.5 %	0.1 % to 1 %	0.05 % and 0.1 %	0.1 % to 1 %	0.1 % to 5 %	0.10 %
Tolerance Ratio	0.01 % to 0.1 %	0.05 % to 0.1 %	0.01 % to 0.05 %	0.05 % to 0.5 %	0.1 % to 1 %	0.01 % to 0.05 %
Absolute Temperature Coefficient (ppm/°C)	10	10	10	15	25	10
Temperature Coefficient Ratio	2	3 to 5	2	5	2	< 2
Load Life Stability (2000 h at 70 °C at Pn)	0.10 %	0.10 %	0.05 %	0.05 %	0.10 %	0.10 %
Load Life Stability On Ratio (2000 h at 70 °C at Pn)	0.02 %	0.02 %	0.03 %	0.02 %	0.05 %	0.005 %
Operating Temperature Range	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 125 °C	- 55 °C; + 125 °C	- 55 °C; + 125 °C	- 40 °C; + 125 °C
Storage Temperature Range	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 155 °C	- 55 °C; + 125 °C
Special Feature	2 to 8 resistors; unequal values available	2 to 8 resistors; unequal values available	Unequal values upon request	Unequal values upon request		
Qualification	ESA (see PRAHR)	ESA (ESCC 4001/025)				
Custom Part Number	CNW	CNW	CNP	CNM	CNP	CNS

For performances Versus ohmic range, please refer to the data sheet of the product.



## Vishay Sfernice Thin Film Resistors and Networks Summary Table

Product Name	Product Type	Custom	Bare Chip/ Network	SIL	Leadless	Through Hole	SMD	Wraparound	Hermetic	DIL	Molded
CH	Resistor		X				X	X			
CHP / HCHP	Resistor						X	X			
CHP HR	Resistor						X	X			
CN	Network	X	X				X				
CNM	Network	X			X		X			X	X
CNP	Network	X				X	X		X	X	
CNS	Network	X		X		X					
CNS 020 / CNS 021	Resistor			X		X					
CNS 471	Network			X		X					
CNW	Network	X					X	X			
CS22	Resistor		X				X				
CS33	Network		X				X				
L	Resistor						X	X			
P	Resistor						X	X			
P HR	Resistor						X	X			
PRA	Network						X	X			
PRA HR	Network						X	X			
RMK 33	Network		X				X				
RMK 408 / 508 / 816 / 914	Network		X				X				
RMK 55/515	Resistor		X				X				
RMK22	Resistor		X				X				
RMKD	Network					X			X	X	
RMKMS	Network						X			X	X
RSK22	Resistor		X				X				
RSK33	Network		X				X				
RV	Resistor						X	X			
SA / SB / SV	Resistor		X				X				
SLCC	Network				X		X		X		
TA22	Resistor		X				X				
TA33	Network		X				X				
TAS	Network			X		X					
TFS-S	Resistor			X		X					
TFS-W	Resistor						X	X			

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