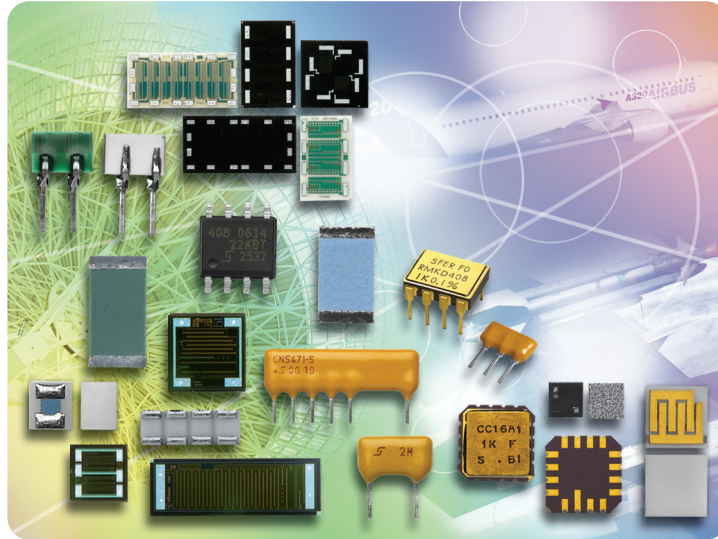


High Stability and Low Temperature Coefficient



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 h / P_n / 70 °C)
- Low temperature coefficient: 5 ppm/°C (-55 °C; +155 °C)
- Tight tolerance: down to 0.01 %
- Wide ohmic range: 50 mΩ to 100 MΩ
- CECC qualification
- ESCC qualification
- High temperature (-55 °C; +215 °C)

THIN FILM NETWORKS

- SMD resistors network (bare chips, wraparound and SOIC)
- Hermetic: leadless chip carrier
- High stability: 0.02 % on the ratio (1000 h / P_n / 70 °C)
- Low temperature coefficient: 10 ppm/°C absolute, 2 ppm/°C ratio
- Tight tolerance: down to 0.01 % ratio
- 6-decade voltage divider
- ESCC qualification
- Custom designs
- High temperature (-55 °C; +215 °C)

RESOURCES

- For technical questions contact sferthinfilm@vishay.com
- Sales contacts: www.vishay.com/doc?99914



THIN FILM RESISTORS AND RESISTOR NETWORKS

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Vishay Sfernice Thin Film Resistors and Networks Summary Table

Product Name	Product Type	Custom	Bare Chip / Network	SIL	Lead-Less	Through-Hole	SMD	Wraparound	Hermetic	DIL	Molded
CH	Resistor						X	X			
CHP, HCHP	Resistor						X	X			
CHPHR	Resistor						X	X			
CN	Network	X	X				X				
CNHT	Network	X	X				X				
CNM	Network	X					X				X
CNP	Network	X			X	X	X		X		
CNS	Network	X		X		X					
CNS 020	Resistor			X		X					
CNS 471	Network			X		X					
CNW	Network	X					X	X			
CS 22	Resistor		X				X				
CS 33	Network		X				X				
EPIC	Resistor	X					X	X			
L	Resistor						X	X			
P	Resistor						X	X			
PFRR	Resistor						X	X			
PHR	Resistor						X	X			
PHT	Resistor						X	X			
PRA073, PRA074, PRA100, PRA135, PRA182	Network						X	X			
PRA HR	Network						X	X			
PZR	Resistor						X	X			
RMK 33N	Network		X				X				
RMK 408N, 508N, 48N, 816N, 914N	Network		X				X				
RMK 55N, RMK 515N	Resistor		X				X				
RMK 22N	Resistor		X				X				
RMKHT	Resistor and Network		X				X				
RMKD	Network					X			X	X	
RMKMS	Network						X			X	X
RSK 22N	Resistor		X				X				
RSK 33N	Network		X				X				
RV	Resistor						X	X			
SLCC	Network				X		X		X		
TA 22	Resistor		X				X				
TA 33	Network		X				X				
TAS	Network			X		X					



THIN FILM RESISTORS AND RESISTOR NETWORKS

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Resistors											
Model	CS 22	RMK 22N	RMKHT	RMK 55N, RMK 515N	RSK 22N	TA 22	CH	CHP, HCHP	CHPHR	EPIC	L
Type	Bare chip	Bare chip	Bare chip	Bare chip	Bare chip	Bare chip	Wraparound	Wraparound	Wraparound	Wraparound	Wraparound
Sizes	20 mil x 20 mil	20 mil x 20 mil	20 mil x 20 mil to 213 mil x 102 mil	50 mil x 50 mil to 150 mil x 50 mil	20 mil x 20 mil	20 mil x 20 mil	02016 to 2010	0502 to 2512	0603 to 2512	0603	0603 to 2010
Resistance Range	10K to 10M	50R to 300K	10R to 7M5	1K to 750K, 1K to 2M	10R to 500K	10R to 1M	10R to 500R	0R1 to 100M	1R to 10M	2R to 10R	0R1 to 9R99
Power Rating at 70 °C	50 mW	50 mW	5mW to 100 mW	125 mW 250 mW	50 mW	50 mW	30 mW to 330 mW	50 mW to 2 W	100 mW to 800 mW	n/a	125 mW to 1 W
Maximum Voltage	100 V	100 V	n/a	100 V	100 V	50 V	30 V to 75 V	50 V to 250 V	50 V to 300 V	n/a	50 V
Tolerance	0.5 % to 2 %	0.01 % to 1 %	0.05 % to 1 %	0.01 % to 1 %	0.1 % to 1 %	0.5 % to 2 %	1 % to 10 %	0.5 % to 5 %	1 % to 5 %	n/a	1 % to 10 %
Temperature Coefficient (ppm/°C)	100 (50 upon request)	5 typical	25 ppm/°C	10	25	100 (50 upon request)	100	100 and 200	100 and 200	n/a	100 to 300
Load Life Stability (2000 h at 70 °C at P _n)	0.10 %	0.03 % typical	0.5 % (at 200 °C)	0.03 %	0.05 % typical	0.07 % typical	n/a	< 0.25 % typical	1 %	n/a	0.15 % typical
Operating Temperature Range	-55 °C; +155 °C	-55 °C; +155 °C	-55 °C; +215 °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	-55 °C; +155 °C
Storage Temperature Range	-55 °C; +155 °C	-55 °C; +155 °C	-55 °C; +230 °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	-55 °C; +155 °C
Special Features			High temperature, backside metallized option				Frequency up to 50 GHz (design kits available)	HCHP: frequency up to 10 GHz	High temperature storage: 1.5 %	Electro-pyrotechnic initiator: firing energy 50 μJ / firing time 50 μs	
Qualification								ESA (see CHPHR)	ESA (ESCC 4001/026)		ESA ongoing

For detailed information on device performance at various ohmic values, please refer to the product datasheets.



THIN FILM RESISTORS AND RESISTOR NETWORKS

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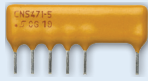


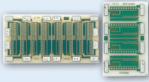
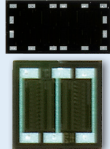


Resistors							
	<u>P</u>	<u>PFRR</u>	<u>PHR</u>	<u>PHT</u>	<u>PZR</u>	<u>RV</u>	<u>CNS 020</u>
Model							
Type	Wraparound	Wraparound	Wraparound	Wraparound	Wraparound	Wraparound	SIL
Sizes	0302 to 2010 (2512 under development)	0603 to 1206	0603 to 2010	0603 / 0805 / 1206 / 2010	02016 to 2512	0505 to 1206	0.200" lead spacing
Resistance Range	10R to 50M	100R to 3M01	50R to 3M	10R to 7M6	0R (25 mΩ)	100R to 1M	100R to 10M
Power Rating at 70 °C	40 mW to 1 W	100 mW to 500 mW	100 mW to 500 mW	12.5 mW to 100 mW	10 mW to 1 W	125 mW to 330 mW	500 mW
Maximum Voltage	25 V to 300 V	50 V to 200 V	35 V to 150 V	75 V to 300 V	$I_{max} = 0.7 \text{ A to } 6.3 \text{ A}$	50 V to 75 V	300 V
Tolerance	0.01 % to 2 %	0.05 % to 0.1 %	0.01 % to 0.1 %	0.05 % to 1 %	n/a	0.1 % to 5 %	0.01 % to 1 %
Temperature Coefficient (ppm/°C)	5 to 100	10 ppm/°C and 25 ppm/°C	5 to 25	25 ppm/°C to 100 ppm/°C	n/a	10 and 25	10
Load Life Stability (2000 h at 70 °C at P_n)	0.05 % typical	0.02 % typical	0.02 % typical	0.5 % at 215 °C, 1000 h at P _n	$R_{max} = 25 \text{ m}\Omega$ after 2000 h	0.05 % typical	0.10 %
Operating Temperature Range	-55 °C; +155 °C	-55 °C; +155 °C	-55 °C; +155 °C	-55 °C; +215 °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; +230 °C	-55 °C; +155 °C	-55 °C; +155 °C	-55 °C; +155 °C
Special Features	215 °C option	High temperature storage: 0.15 %	High temperature storage: 0.15 %	High temperature			
Qualification	ESA (see PHR)	ESA (ESCC 4001/023) variants 09 to 12	ESA (ESCC 4001/023) variants 01 to 08		ESA on going (see PZHR)	CECC 40401-010	

For detailed information on device performance at various ohmic values, please refer to the product datasheets.



THIN FILM RESISTORS AND RESISTOR NETWORKS

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Networks							
Model	CNS 471 	CS 33 	RMK 33N 	RMK 408N, 508N, 48N, 816N, 914N 	RMKHT 	RSK 33N 	TA 33 
Type	SIL network	Bare 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	8 to 16 terminals	30 mil x 30 mil	30 mil x 30 mil
Resistance Range	100R to 10M	10K to 10M	1K to 250K	1K to 200K	10R to 1M ²	10R to 1M	50R to 1M
Power Rating at 70 °C	100 mW (per resistor)	125 mW	50 mW	125 mW to 250 mW	12.5 mW to 25 mW	250 mW	125 mW
Maximum Voltage	1200 V	100 V	100 V	100 V	n/a	100 V	50 V
Absolute Tolerance	0.10 %	0.5 % to 2 %	0.1 % to 1 %	0.1 % to 1 %	0.05 % to 1 %	0.5 % to 2 %	0.5 % to 2 %
Tolerance Ratio	0.03 % to 0.1 %	0.5 %	0.01 % to 0.1 %	0.01 % to 0.05 %	0.02 % to 0.1 %	0.05 % to 0.5 %	0.1 % to 0.50 %
Absolute Temperature Coefficient (ppm/°C)	< 25	100	10	10	25	25	100
Temperature Coefficient Ratio	< 2.5	5	2	2	2	5	5
Load Life Stability (2000 h at 70 °C at P_n)	0.10 %	0.1 % typical	0.03 % typical	0.03 % typical	0.5 % (at 200 °C)	0.03 % typical	0.07 % typical
Load Life Stability On Ratio (2000 h at 70 °C at P_n)	0.01 % typical	n/a	n/a	n/a	0.5 % (at 200 °C)	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; +215 °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; +230 °C	- 55 °C; + 155 °C	-55 °C; +155 °C
Special Features	Decade voltage divider	Unequal values upon request	Unequal values upon request		Unequal values upon request, back side metallized option	Unequal values upon request	Unequal values upon request
Qualification							
Custom Part Number		CN	CN	CN	CNHT	CN	CN

For detailed information on device performance at various ohmic values, please refer to the product datasheets.



THIN FILM RESISTORS AND RESISTOR NETWORKS

Vishay Sfernice

Networks						
Model	PRA073, PRA074, PRA100, PRA135, PRA182	PRA HR	RMKD	RMKMS	SLCC	TAS
Type	Wraparound network	Wraparound network	Hermetic network	Molded network	Hermetic network	SIL network
Sizes	100, 135, 182	100, 135, 182	8 to 16 terminals	SO8, SO14, SO16	20	2 to 9 terminals
Resistance Range	100R to 1M Ω	100R to 1M	500R to 200K	500R to 200K	50R to 100K	100R to 1K
Power Rating at 70 °C	100 mW to 200 mW (per resistor)	100 mW (per resistor)	125 mW to 250 mW	50 mW (per resistor)	50 mW (per resistor)	50 mW (per resistor)
Maximum Voltage	50 V to 150 V	35 V to 100 V	100 V	50 V	100 V	100 V
Absolute Tolerance	0.01 % to 0.5 %	0.5 % to 0.1 %	0.05 % to 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 P _n)	0.10 %	0.10 %	0.05 %	0.05 %	0.10 %	0.10 %
Load Life Stability On Ratio (2000 h at 70 °C at P _n)	0.02 %	0.02 %	0.03 %	0.02 %	0.05 %	0.05 %
Operating Temperature Range	-55 °C; +155 °C	-55 °C; +155 °C	-55 °C; +155 °C	-55 °C; +125 °C	-55 °C; +155 °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 Features	2 to 8 resistors; unequal values available	2 to 8 resistors; unequal values available	Unequal values upon request	Unequal values upon request	Unequal values upon request	Custom up to 10M
Qualification	ESA (see PRAHR)	ESA (ESCC 4001/025) 				
Custom Part Number	CNW	CNWHR	CNP	CNM	CNP	CNS

For detailed information on device performance at various ohmic values, please refer to the product datasheets.