VISHAY INTERTECHNOLOGY, INC.

THIN FILM RESISTOR NETWORKS

Precision Dividers and Networks

RESISTIVE PRODUCTS

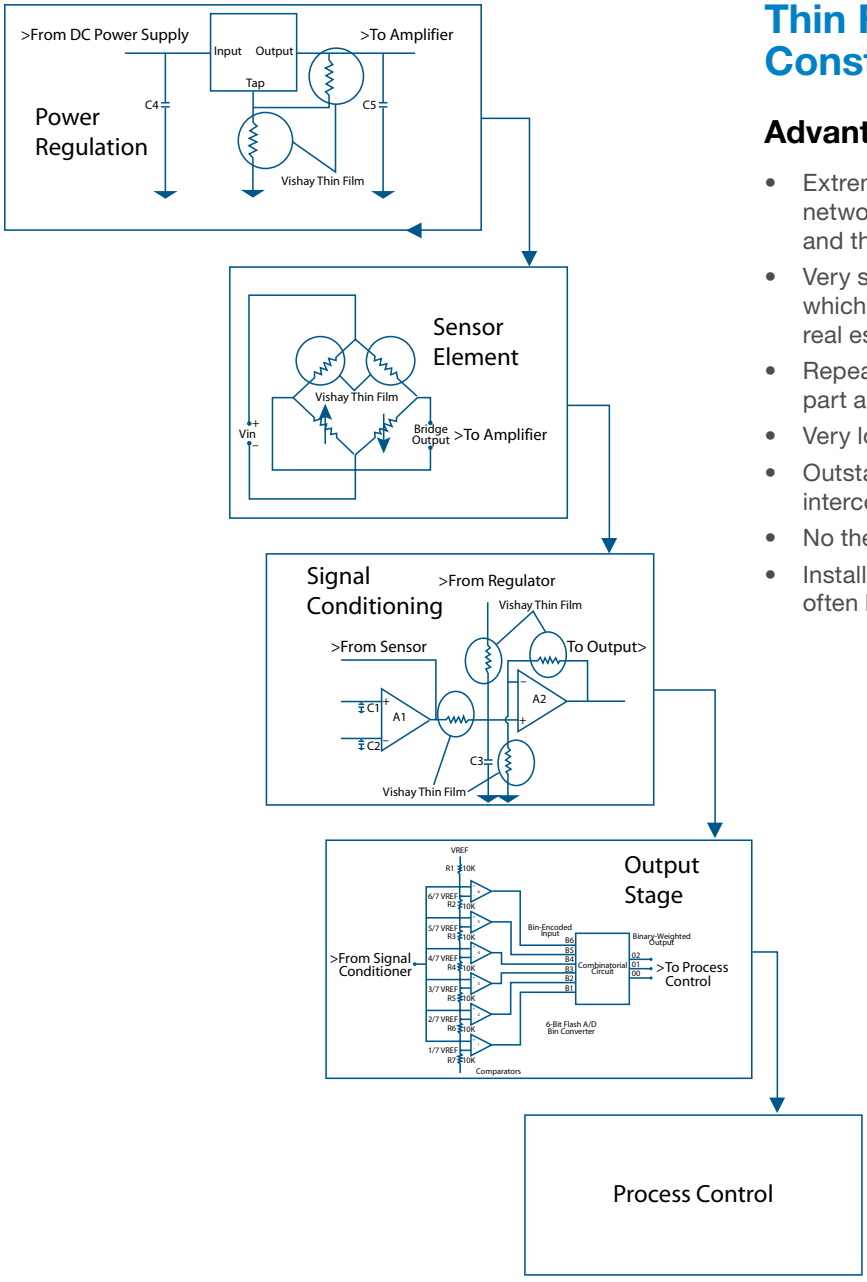
CAPABILITIES

www.vishay.com

Introduction

Precision Thin Film Technology

This capabilities brochure is designed to help circuit designers and component engineers understand the advantages of utilizing thin film integrated resistor network technology. It also highlights some common applications for thin film precision resistor networks.



Thin Film Integrated Construction

Advantages

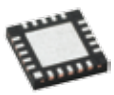
- Extremely close matching of all elements in a network, ensuring close tracking over temperature and throughout life
- Very small, high-density, multi-element networks which save printed circuit board real estate
- Repeatable and consistent characteristics, part-to-part and lot-to-lot
- Very low inductance
- Outstanding reliability – fewer individual interconnections
- No thermoelectric effects
- Installed costs no more than discretes – often less

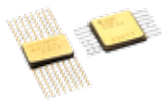
Semi-Precision						
Package	**VSOR** 	**VSSR** 	**VTSR** 	**VSSRC** 	**VSORC** 	**VTSRC** 
Size	16	16, 20, 24	20, 24	20	20	20
Schematic	Isolated and Common, Dual Terminator, Differential Terminator	Isolated and Common, Dual Terminator, Differential Terminator	Isolated and Common, Dual Terminator, Differential Terminator	T-Filter Tapped Termination	T-Filter Tapped Termination	T-Filter Tapped Termination
# R	8 or 15	8 to 23	10 to 23	18 R 18 C	18 R 18 C	18 R 18 C
Range (Ohms)	10 to 47 k	10 to 47 k	10 to 47 k	NA	NA	NA
Abs Tolerance (%)	2 to 5	2 to 5	2 to 5	R = 10 C = 20	R = 10 C = 20	R = 10 C = 20
Ratio Tolerance (%)	NA	NA	NA	NA	NA	NA
TCR (ppm/C) - 55 °C to + 125 °C	100	100	100	200	200	200
TCR Tracking	NA	NA	NA	NA	NA	NA
Power per R (Watts per element)	0.1 W	0.1 W	0.1 W	0.1 W	0.1 W	NA
Package Power (Watts)	16 pin = 1 20 pin = 1.2 24 pin = 1.4	16 pin = 1 20 pin = 1.2 24 pin = 1.4	1.2	1.0	1.0	1.0

THIN FILM RESISTOR NETWORKS

Precision Dividers and Networks

Surface-Mount Networks (Molded) Precision									
Package	**MP** 	**MPD Series** 	**MPM** 	**ORN** 	**ORNA (Divider)** 	**NOMC** 	**OSOP** 	**CSO** 	**TOMC** 
Size	SC-70	SOT-143	SOT-23	SOIC 8-pin	SOIC 8-pin	SOIC 14, 16	SOIC 20	SOIC 6, 8, 12, 14, 16	SOIC 16 Medium
Schematic	Center Tapped or Isolated	Isolated	Center Tapped	Isolated	Isolated	Isolated	Isolated	Any	Isolated and Common
# R	2	2 or 3	2	4	4	7, 8	10	Custom	8
Range (Ohms)	100 to 50 k	100 to 100 k	100 to 100 k	100 to 100 k	100 to 100 k	100 to 100 k	100 to 100 k	100 to 1.5 M	100 to 200 k
Abs Tolerance (%)	0.1 to 1	0.1 to 1	0.05 to 1	0.05 to 1	0.10	0.1 to 1	0.1 to 1	0.1 to 1	0.1 to 1
Ratio Tolerance (%)	0.5 to 0.05	0.5 to 0.05	0.5 to 0.01	0.5 to 0.01	0.05	0.5 to 0.025	0.5 to 0.05	0.1 to 0.02	0.5 to 0.025
TCR (ppm/C) – 55 °C to + 125 °C	25	25	25	25	25	25	25	25	25
TC Tracking (ppm)	2	2	2	5	5	5	5	5	5
Power per R (Watts per element)	0.075 W	0.1 W	0.1 W	0.1 W	0.1 W	0.05 W	0.1 W	0.1 W	0.1 W
Package Power (Watts)	0.15	0.2	0.2	0.4	0.4	0.4/0.5	0.4	0.5	0.75

Surface-Mount Networks (Molded) Precision				
Package	**WOMC** 	**DFN** 	**DFN Divider** 	**QFN-** 
Size	SOIC 16 Wide	8 Pin Dual Flat No-Lead	8 Pin Dual Flat No-Lead	20 Pin Dual Flat No-Lead
Schematic	Custom	Isolated	Isolated	Custom
# R	Custom	4	4	Custom
Range (Ohms)	100 to 500 k	100 to 100 k	100 to 100 k	100 to 500 k
Abs Tolerance (%)	0.1 to 1	0.1 to 1	0.1 to 1	0.1 to 1
Ratio Tolerance (%)	0.1 to 0.05	0.5 to 0.025	0.05	0.1 to 0.05
TCR (ppm/C) – 55 °C to + 125 °C	25	25	25	25
TC Tracking (ppm)	5	3	5	5
Power per R (Watts per element)	0.1 W	0.05 W	0.05 W	0.05 W
Package Power (Watts)	0.5	0.05 W x #R's	0.05 W x #R's	0.05 W x #R's

Surface-Mount (Hermetic) Precision		
Package	**LCC/TLCC** 	**FP (Flatpack)** 
Size	4, 16, 18, 20	14, 16
Schematic	Isolated and Common	Isolated and Common
# R	8 to 23	Custom
Range (Ohms)	100 to 100 k	10 to 1 M
Abs Tolerance (%)	0.1 to 1	0.1 to 1
Ratio Tolerance (%)	NA	0.1 to 0.01
TCR (ppm/C) - 55 °C to + 125 °C	25	10
TCR Tracking	5	2
Power per R (Watts per element)	Common 0.05 Isolated 0.1	0.1 W
Package Power (Watts)	0.5	0.6

Through-Hole Precision					
Package	**TDP** 	**HD (Hermetic Dip)** 	**VTF SIP (Blue)** 	**TSP Molded Sip** 	**HVPS** 
Size	14, 16	8, 14, 16, 18, 20	3, 4, 5, 6, 7, 8, 9, 10	6, 8, 10	2
Schematic	Isolated and Common	Custom	Standard or Custom	Isolated and Common	Isolated
# R	7, 8	Custom	2 to 9	5 to 9	1
Range (Ohms)	100 to 100 k	50 to 1.5 M total	100 to 1 M	100 to 200 k	50 k to 10 M
Abs Tolerance (%)	0.5 to 1	0.1 to 1	0.1 to 1	0.5 to 1	0.01 to 1.0
Ratio Tolerance (%)	0.1 to 0.05	0.1 to 0.01	0.1 to 0.02	0.1 to 0.05	NA
TCR (ppm/C) - 55 °C to + 125 °C	25	10	10	25	5
TCR Tracking	5	2	2	5	NA
Power per R (Watts per element)	Common 0.05 Isolated 0.1	0.1 W	0.1 W	0.1 W	HVPS1: 0.125 W HVPS2: 0.250 W
Package Power (Watts)	0.8	1	0.5	0.5	HVPS1: 0.125 HVPS2: 0.250

Vishay Thin Film Application Specification Guide

Vishay Thin Film Reference No.: _____

Name: _____ Title: _____

Company: _____ Division: _____ Dept.: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax/Email: _____

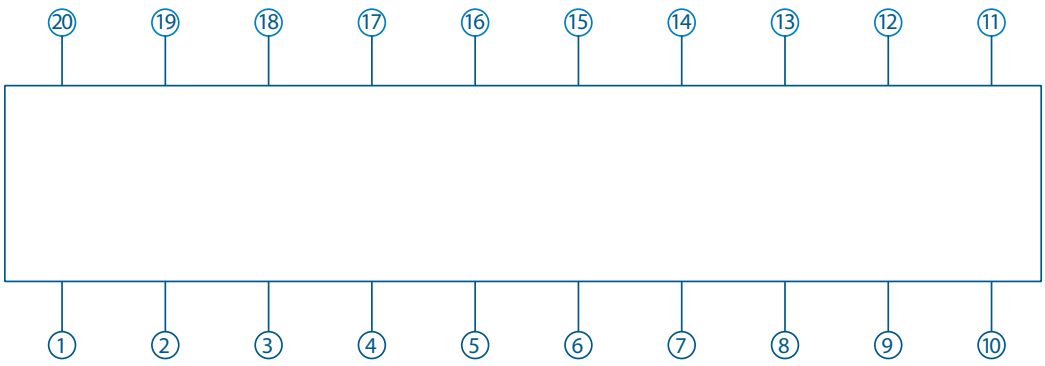
Expected Usage/Year: _____ Timing-Prototypes: _____ Prod.: _____

Application: _____ Hermetic Sealed: ❑ Yes ❑ No

Drawing No.: _____ Package Choices: 1st: _____ 2nd: _____

Special Testing: _____ Operating Temperature Range: _____ °C to _____ °C

Resistor No.	Resistor Value (Ω)	Tolerance		TCR		Reference Resistor	Max Voltage		Power
		Absolute + %	Ratio + %	Absolute + ppm/°C	Tracking + ppm/°C		Peak (V)	RMS (V)	Max (W)



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