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Vishay Dale Thin Film

**RoHS** COMPLIANT

**HALOGEN** 

**FREE** 

## Molded, 25 mil or 50 mil Pitch, Dual-In-Line Thin Film Resistor, **Surface Mount Network**



**Actual Size** 

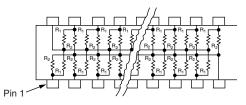
Vishay Dale Thin Film resistor networks are designed to be used in either analog or digital circuits. The use of thin film resistive elements within the network allows you to achieve an infinite number of very low noise and high stability circuits for industrial, medical and scientific instrumentation. Vishay Dale Thin Film resistor networks are packaged in molded plastic packages with sizes that are recognized throughout the world. The rugged packaging offers superior environmental protection and consistent dimensions for ease of placement with automatic SMT equipment. Vishay Dale Thin Film stocks many designs and values for off-the-shelf convenience. With Vishay Dale Thin Film you can depend on quality products delivered on time with service backing the product.

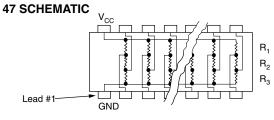
#### **SCHEMATICS**

# 01 SCHEMATIC Resistance Range: 10 $\Omega$ to 47 $k\Omega$

# 03 SCHEMATIC Resistance Range: 10 $\Omega$ to 47 $k\Omega$

### **05 SCHEMATIC**





#### **FEATURES**

- · Reduces total assembly costs
- Compatible with automatic surface mounting
- UL 94 V-0 flame resistant
- Thin film tantalum nitride on silicon
- Choice of package sizes: VTSR (TSSOP) JEDEC® MO-153, VSSR (SSOP or QSOP) JEDEC MO-137, VSOR (SOIC narrow) JEDEC MS-012
- Moisture sensitivity level 1 (per IPC/JEDEC STD-20C)
- Isolated/bussed/dual terminator/differential terminator
- Material categorization: for definitions of compliance please see www.vishav.com/doc?99912

#### TYPICAL PERFORMANCE

•	ABSOLUTE	TRACKING	
TCR	100	NA	
	ABSOLUTE	RATIO	
TOL.	5, 2, 1	NA	

### **RESISTORS WITH ONE PIN COMMON**

The 01 circuit provides nominally equal resistors connected between a common pin and a discrete PC board pin.

Commonly used in the following applications:

- MOS/ROM
- pull-up/-down Open collector pull-up
- "Wired OR" pull-upPower driven pull-up
- TTL input pull-down
- Digital pulse squaring
- TTL unused gate pull-up
  High speed parallels pull-up

Broad selection of standard values available

#### **ISOLATED RESISTORS**

The 03 circuit provides nominally equal resistors isolated from all others and wired directly across.
Commonly used in the following applications:

- "Wired OR" pull-up
- Power driven pull-up
- Power gate pull-up
- I ine termination
- Long-line impedance
- balancing
- LED current limiting
- ECL output pull-down
- TTL input pull-down

Broad selection of standard values available

#### **DUAL-LINE TERMINATOR; PULSE SQUARING**

The 05 circuit contains pairs of resistors connected between ground and a common line. The junctions of these resistor pairs are connected to the input leads. The 05 circuits are designed for dual-line termination and pulse

## squaring. Standard values are:

 $\begin{array}{l} \text{VSSR1605:} \\ \text{R}_1 = 220 \ \Omega, \ \text{R}_2 = 330 \ \Omega \\ \text{R}_1 = 330 \ \Omega, \ \text{R}_2 = 470 \ \Omega \end{array}$ VSSR2005:  $R_1 = 220 \Omega$ ,  $R_2 = 330 \Omega$   $R_1 = 220 \Omega$ ,  $R_2 = 1.8 k\Omega$ = 1.5 k $\Omega$ ,  $R_2$ 

#### **DIFFERENTIAL TERMINATOR**

The 47 schematic consists of series resistor sections connected between  $V_{\rm CC}$  and ground. Each contains 3 resistors of 2 different resistance values.

Standard values are:

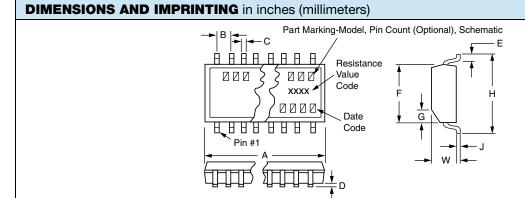
VSSR20 and VTSR20:  $R_1 = 270 \Omega, R_2 = 120 \Omega$  VSSR16 and VTSR16:  $R_1 = 330 \ \Omega, \ R_2 = 150 \ \Omega$   $R_1 = 330 \ \Omega, \ R_2 = 220 \ \Omega$ 

Revision: 01-Mar-2019 Document Number: 60003



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STANDARD ELECTRICAL SPECIFICATIONS			
TEST	SPECIFICATIONS	CONDITIONS	
Material	Tantalum nitride	-	
Pin / Lead Number	16, 20, 24	-	
Resistance Range	10 Ω to 47 kΩ	Per E-24 table	
TCR: Absolute	± 100 ppm/°C	-55 °C to +125 °C	
TCR: Tracking	n/a	-	
Tolerance: Absolute	± 5 % standard (± 2 % available) ± 1 % standard (check factory)	Per E-24 table Per E-96 table	
Tolerance: Ratio	NA	-	
Power Rating: Resistor	100 mW max.	At +70 °C	
Power Rating: Package	16 = 1.0 W, 20 = 1.2 W, 24 = 1.4 W	0 °C to +70 °C	
Stability: Absolute	-	-	
Stability: Ratio	-	-	
Voltage Coefficient	5 ppm/V (typical)	-	
Working Voltage	50 V <sub>DC</sub>	-	
Operating Temperature Range	-55 °C to +125 °C	-	
Storage Temperature Range	-55 °C to +150 °C	-	
Noise	< -35 dB	-	
Thermal EMF	-	-	
Shelf Life Stability: Absolute	-	-	
Shelf Life Stability: Ratio	-	-	



DIMENSION	VTSR-xxxx	VSSR-xxxx	VSOR-xxxx
A - 16 PIN	$0.206 \pm 0.003 (5.23 \pm 0.08)$	$0.193 \pm 0.004 (4.90 \pm 0.010)$	$0.390 \pm 0.010 (9.91 \pm 0.25)$
A - 20 PIN	$0.256 \pm 0.003 (6.50 \pm 0.08)$	$0.341 \pm 0.003 (8.66 \pm 0.08)$	NA
A - 24 PIN	$0.306 \pm 0.003 (7.77 \pm 0.08)$	$0.341 \pm 0.003 (8.66 \pm 0.08)$	NA
B (Ref.)	0.0256 (0.65)	0.025 (0.64)	0.050 (1.27)
C (Ref.)	0.0087 (0.22)	0.010 (0.25)	0.016 (0.41)
D	0.004 (0.10)	0.006 (0.15)	0.008 (0.20)
E (Typ.)	0.024 (0.61)	0.025 (0.64)	0.030 (0.76)
F	$0.173 \pm 0.003 (4.39 \pm 0.08)$	$0.154 \pm 0.003 (3.91 \pm 0.08)$	$0.152 \pm 0.003 (3.86 \pm 0.08)$
G	0.015 × 45° (0.38)	0.015 × 45° (0.38)	0.015 × 45° (0.38)
Н	$0.252 \pm 0.005 (6.40 \pm 0.13)$	$0.236 \pm 0.008 (5.99 \pm 0.20)$	$0.236 \pm 0.005 (5.99 \pm 0.13)$
J (Ref.)	0.005 (0.13)	0.010 (0.25)	0.008 (0.20)
W	$0.043 \pm 0.005 (1.09 \pm 0.13)$	$0.064 \pm 0.005 (1.63 \pm 0.13)$	$0.064 \pm 0.005 (1.63 \pm 0.13)$

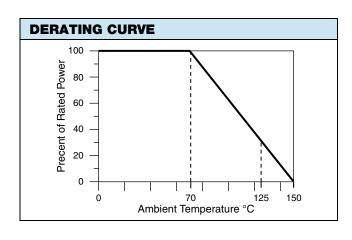
MARKING						
MODEL	PIN COUNT (Optional)	SCHEMATIC	RESISTANCE		RESISTANCE	DATE CODE
VXXX	XX	XX	XXXX		XXX	XXXX
VSOR VSSR VTSR	16 20 24	01, 03, 05 or 47	N RESISTANCE     e.g.: 43R2     digits are used to express ohmic values only less than 100 Ω. R is used to designate the decimal position	OR	1 %, 2 %, 5 % RESISTANCE e.g.: 103 = 10K The first 2 digits are significant figures, the last digit specifies the number of zeros to follow.	

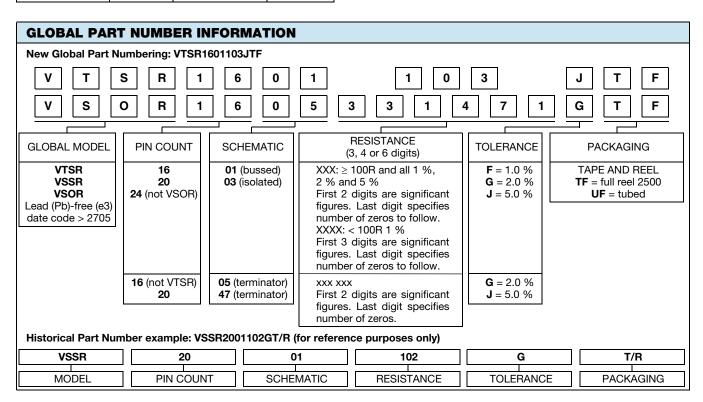


## Vishay Dale Thin Film

MECHANICAL SPECIFICATIONS			
Resistive Element	Tantalum nitride		
Substrate Material	Silicon		
Body	Molded epoxy		
Terminals	Copper alloy		
Plating	100 % matte tin		
Lead Coplanarity	0.0005"		
Marking Resistance to Solvents	Permanency testing per MIL-STD-202, method 215		

PACKAGING INFORMATION				
MODEL	LEADS	TAPE AND REEL	TUBES	
VTSR (TSSOP)	16	2500	94	
	20	2500	74	
	24	2500	62	
VSSR (QSOP)	16	2500	98	
	20	2500	55	
	24	2500	55	
VSOR (SOIC)	16	2500	48	
	20	1000	38	





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