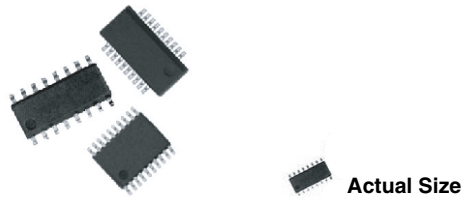




Molded, 25 mil or 50 mil Pitch, Dual-In-Line Thin Film Resistor, Surface Mount Network

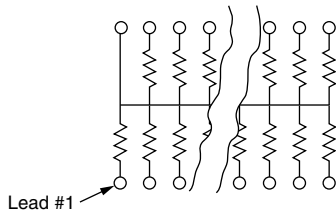


Vishay Dale Thin Film resistor networks are designed to be used in either analog or digital circuits. The use of thin film resistive elements within the network allows you to achieve an infinite number of very low noise and high stability circuits for industrial, medical and scientific instrumentation.

SCHEMATICS

01 SCHEMATIC

Resistance Range: 10 Ω to 47 kΩ



FEATURES

- Reduces total assembly costs
Compatible with automatic surface mounting equipment
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 circuits
Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS COMPLIANT HALOGEN FREE

TYPICAL PERFORMANCE

Table with 3 columns: Parameter, Absolute, Tracking. Rows include TCR (100, NA) and 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.

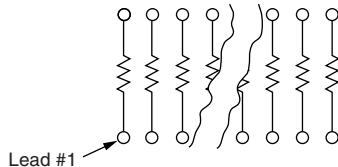
Commonly used in the following applications:

- MOS/ROM pull-up/-down
Open collector pull-up
'Wired OR' pull-up
Power 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

03 SCHEMATIC

Resistance Range: 10 Ω to 47 kΩ



ISOLATED RESISTORS

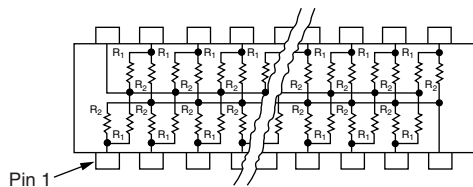
The 03 circuit provides nominally equal resistors isolated from all others and wired directly across.

Commonly used in the following applications:

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

Broad selection of standard values available

05 SCHEMATIC



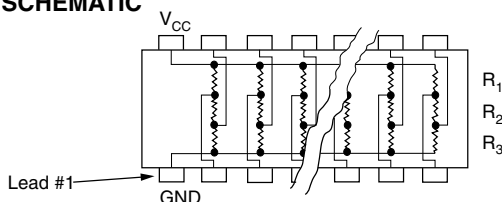
DUAL-LINE TERMINATOR; PULSE SQUARING

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.

Standard values are:

- VSSR1605: R1 = 220 Ω, R2 = 330 Ω; R1 = 330 Ω, R2 = 470 Ω
VSSR2005: R1 = 220 Ω, R2 = 330 Ω; R1 = 220 Ω, R2 = 1.8 kΩ; R1 = 1.5 kΩ, R2 = 3.3 kΩ

47 SCHEMATIC



DIFFERENTIAL TERMINATOR

The 47 schematic consists of series resistor sections connected between VCC and ground. Each contains 3 resistors of 2 different resistance values.

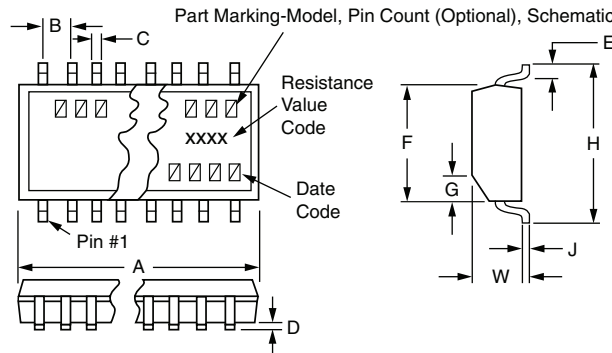
Standard values are:

- VSSR20 and VTSR20: R1 = 270 Ω, R2 = 120 Ω
VSSR16 and VTSR16: R1 = 330 Ω, R2 = 150 Ω; R1 = 330 Ω, R2 = 220 Ω



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	-	-

**DIMENSIONS AND IMPRINTING** in inches (millimeters)



DIMENSION	VTSR-xxxx	VSSR-xxxx	VSOR-xxxx
A - 16 PIN	0.206 ± 0.003 (5.23 ± 0.08)	0.193 ± 0.004 (4.90 ± 0.010)	0.390 ± 0.010 (9.91 ± 0.25)
A - 20 PIN	0.256 ± 0.003 (6.50 ± 0.08)	0.341 ± 0.003 (8.66 ± 0.08)	NA
A - 24 PIN	0.306 ± 0.003 (7.77 ± 0.08)	0.341 ± 0.003 (8.66 ± 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 ± 0.003 (4.39 ± 0.08)	0.154 ± 0.003 (3.91 ± 0.08)	0.152 ± 0.003 (3.86 ± 0.08)
G	0.015 × 45° (0.38)	0.015 × 45° (0.38)	0.015 × 45° (0.38)
H	0.252 ± 0.005 (6.40 ± 0.13)	0.236 ± 0.008 (5.99 ± 0.20)	0.236 ± 0.005 (5.99 ± 0.13)
J (Ref.)	0.005 (0.13)	0.010 (0.25)	0.008 (0.20)
W	0.043 ± 0.005 (1.09 ± 0.13)	0.064 ± 0.005 (1.63 ± 0.13)	0.064 ± 0.005 (1.63 ± 0.13)

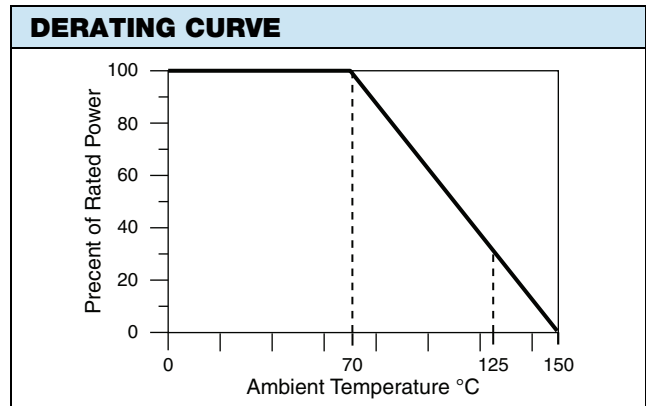
**MARKING**

MODEL	PIN COUNT (Optional)	SCHEMATIC	RESISTANCE	RESISTANCE	DATE CODE
<b>VXXX</b>	<b>XX</b>	<b>XX</b>	<b>XXXX</b>	<b>XXX</b>	<b>XXXX</b>
VSOR	16	01, 03,	1 % RESISTANCE	<b>OR</b> 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.	
VSSR	20	05 or 47	e.g.: 43R2		
VTSR	24		4 digits are used to express ohmic values only less than 100 Ω. R is used to designate the decimal position		



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



### GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: **VTSR1601103JTF**

V	T	S	R	1	6	0	1	1	0	3	J	T	F			
V	S	O	R	1	6	0	5	3	3	1	4	7	1	G	T	F

GLOBAL MODEL	PIN COUNT	SCHEMATIC	RESISTANCE (3, 4 or 6 digits)	TOLERANCE	PACKAGING
<b>VTSR</b> <b>VSSR</b> <b>VSOR</b> Lead (Pb)-free (e3) date code > 2705	<b>16</b> <b>20</b> <b>24</b> (not VSOR)	<b>01</b> (bussed) <b>03</b> (isolated)	XXX: ≥ 100R and all 1 %, 2 % and 5 % First 2 digits are significant figures. Last digit specifies number of zeros to follow. XXXX: < 100R 1 % First 3 digits are significant figures. Last digit specifies number of zeros to follow.  xxx xxx First 2 digits are significant figures. Last digit specifies number of zeros.	<b>F</b> = 1.0 % <b>G</b> = 2.0 % <b>J</b> = 5.0 %	TAPE AND REEL <b>TF</b> = full reel 2500 <b>UF</b> = tubed
	<b>16</b> (not VTSR) <b>20</b>	<b>05</b> (terminator) <b>47</b> (terminator)		<b>G</b> = 2.0 % <b>J</b> = 5.0 %	

Historical Part Number example: **VSSR2001102GT/R** (for reference purposes only)

VSSR	20	01	102	G	T/R
MODEL	PIN COUNT	SCHEMATIC	RESISTANCE	TOLERANCE	PACKAGING



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