VTSR, VSSR, VSOR

Vishay Thin Film

Molded, 25 or 50 Mil Pitch, Dual-In-Line Resistor Networks

Actual Size

Vishay 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 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 Thin Film stocks many designs and values for off-the-shelf convenience.

With Vishay Thin Film you can depend on quality products delivered on time with service backing the product.

FEATURES

- Reduces total assembly costs
- Compatible with automatic surface mounting equipment
- UL 94V-0 flame resistant
- Thin Film Tantalum Nitride on silicon
- Choice of package sizes: VTSR (TSSOP), VSSR (SSOP or QSOP), VSOR (SOIC narrow)
- Moisture sensitivity level 1 (per IPC/JEDEC STD-20C)

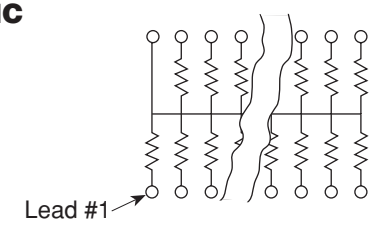
TYPICAL PERFORMANCE

◆	ABS	TRACKING
TCR	100	NA
	ABS	**RATIO**
TOL	5, 2, 1	NA

SCHEMATICS

01 SCHEMATIC

Resistance Range:
10Ω to 47KΩ



RESISTORS WITH ONE PIN COMMON

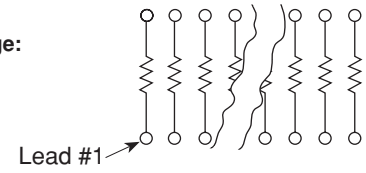
The 01 circuit provides nominally equal resistors connected between a common pin and a discrete PC board pin. Commonly used in the following applications:

- MOS/ROM Pull-up/Pull-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:
10Ω to 47KΩ



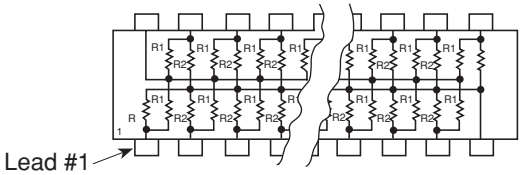
ISOLATED RESISTORS

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
- Powergate 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

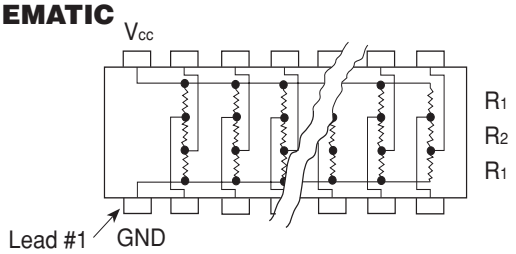


DUAL-LINE TERMINATOR; PULSE SQUARING

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. The 05 circuits are designed for dual-line termination and pulse squaring. **Standard values are:**

VSSR1605 - $R_1 = 220\Omega$, $R_2 = 330\Omega$ $R_1 = 220\Omega$, $R_2 = 1.8K\Omega$
$R_1 = 330\Omega$, $R_2 = 470\Omega$ $R_1 = 1.5K\Omega$, $R_2 = 3.3K\Omega$
VSSR2005 - $R_1 = 220\Omega$, $R_2 = 330\Omega$

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 - $R_1 = 270\Omega$, $R_2 = 120\Omega$
VSSR16 and VTSR16 - $R_1 = 330\Omega$, $R_2 = 220\Omega$
$R_1 = 330\Omega$, $R_2 = 150\Omega$

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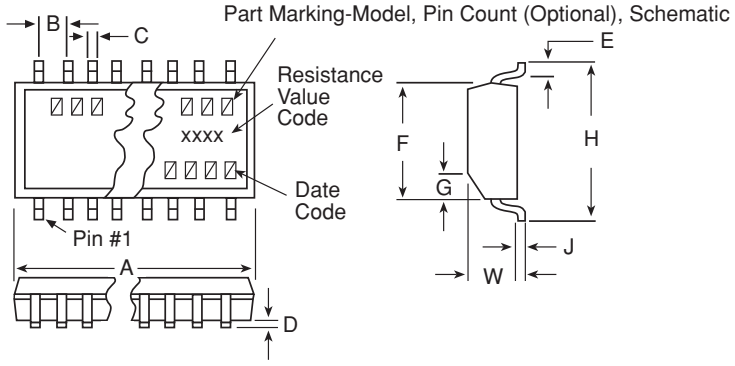
STANDARD ELECTRICAL SPECIFICATIONS			
TEST		**SPECIFICATIONS**	**CONDITIONS**
ELECTRICAL SPECIFICATIONS		**16, 20, 24**	
Resistance Range		10Ω to 47kΩ	Per-E - 24 table
TCR:	**Tracking**	NA	
	Absolute	± 100ppm/°C	- 55°C to + 125°C
Tolerance:	**Ratio**	NA	
	Absolute	± 5% standard (± 2% available) / per E-24 Table ± 1% special (check factory) / per E-96 Table	Per-E - 24 table Per-E - 96 table
Power Rating:	**Resistor**	100mW (Maximum)	@ + 70°C
	Package	16 = 1.0W 20 = 1.2W 24 = 1.4W	0°C to + 70°C
Voltage Coefficient		5ppm/V typical	
Working Voltage		50VDC	
Operating Temperature Range		- 55°C to + 125°C	
Storage Temperature Range		- 55°C to + 150°C	
Noise		< - 35dB	

DIMENSIONS AND IMPRINTING in inches and millimeters



MODEL	A 16 PIN	A 20 PIN	A 24 PIN	B (REF.)	C (REF.)	D	E (TYP.)	F	G	H	J (REF.)	W
VTSR-xxxx	0.206 ± 0.003	0.256 ± 0.003	0.306 ± 0.003	0.0256	0.0087	0.004	0.024	0.173 ± 0.003	0.015 x 45°	0.252 ± 0.005	0.005	0.043 ± 0.005
(millimeters)	5.23 ± 0.08	6.50	7.77	0.65	0.22	0.10	0.61	4.39 ± 0.08	0.38	6.40 ± 0.13	0.13	1.09 ± 0.13
VSSR-xxxx	0.193 ± 0.004	0.341 ± 0 .003	0.341 ± 0.003	0.025	0.010	0.006	0.025	0.154 ± 0.003	0.015 x 45°	0.236 ± 0 .008	0.010	0.064 ± 0.005
(millimeters)	4.90 ± 0.10	8.66 ± 0.08	8.66 ± 0.08	0.64	0.25	0.15	0.64	3.91 ± 0.08	0.38	5.99 ± 0.20	0.25	1.63 ± 0.13
VSOR-xxxx	0.390 ± 0.010	NA	NA	0.050	0.016	0.008	0.030	0.152 ± 0.003	0.015 x 45°	0.236 ± 0.005	0.008	0.064 ± 0.005
(millimeters)	9.91 ± 0.25	NA	NA	1.27	0.41	0.20	0.76	3.86 ± 0.08	0.38	5.99 ± 0.13	0.20	1.63 ± 0.13

NOTE: Mold flash not included in body dimensions.

MARKING

MODEL	PIN COUNT (optional)	SCHEMATIC	RESISTANCE		RESISTANCE	DATE CODE
VXXX	**XX**	**XX**	**XXXX**	**OR**	**XXX**	**XXXX**
VSOR	16	01, 03	1% RESISTANCE		1%, 2%, 5% RESISTANCE	
VSSR	20	05 or 47	e.g: 43R2		e.g: 103 = 10K	
VTSR	24		4 digits are used to express ohmic values only less than 100 ohms. R is used to designate the decimal position		The first 2 digits are significant figures, the last digit specifies the number of zeros to follow.	
V***T Lead-(Pb) Free Version						

VTSR, VSSR, VSOR

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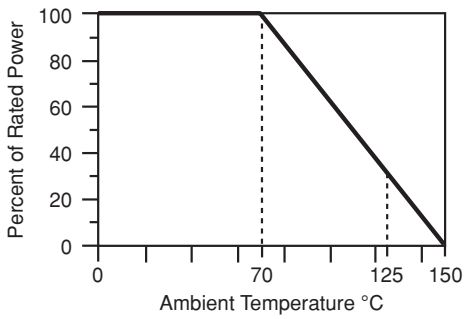
MECHANICAL SPECIFICATIONS	
Resistive Element	Tantalum Nitride
Substrate Material	Silicon
Body	Molded epoxy
Terminals	Copper Alloy
Plating	Tin lead
Lead Coplanarity	0.0005”
Marking Resistance to Solvents	Permanency testing per MIL-STD-202, Method 215
Lead (Pb)-Free Option	100% Sn Matte
Lead (Pb)-Free Finish	Plated

PACKAGING INFORMATION			
MODEL	**LEADS**	**TAPE AND REEL**	**TUBES**
VTSR (TSSOP)	16	2,500	94
	20	2,500	74
	24	2,500	62
VSSR (QSOP)	16	2,500	98
	20	2,500	55
	24	2,500	55
VSOR (SOIC)	16	2,500	48

DERATING CURVE



How to Order

	Model	Number of Leads	Schematic	Resistance Value***		Tolerance	Packaging
Schematic 01 and 03	**XXXX**	**XX**	**XX**	**XXX** 1% ≥100 Ohms & all 2% & 5% tol.	**OR** **XXXX**** <100 Ohms 1% Tol	**X**	**X or X/X**
	VTSR VSSR VSOR*	16 20 24	01 03	First 2 digits are significant figures. Last digit specifies number of zeroes to follow.	First 3 digits are significant figures. Last digit specifies number of zeroes to follow.	F = ± 1% G = ± 2% J = ± 5%	T = Tubes T/R = Tape and Reel
Schematic 05 & 47	**XXXX**	**XX**	**XX**	**XXX R1 VALUE** / **XXX R2 VALUE**		**X**	**X or X/X**
	VTSR VSSR VSOR*	16 20	05 47	First 2 digits are significant figures. Last digit specifies number of zeroes. Values separated by (/) slash.		G = ± 2% J = ± 5%	T = Tubes T/R = Tape and Reel

*16 Pin only
**4 digits are used to express ohmic values less than 100 ohms at 1% tolerance.
***3 or 4 digits imprinting, based on value and tolerance.

Example #1: VSSR2001102GT/R = VSSR pkg., 20 pin count, 01 schematic, 1,000 ohms 2%, tape and reel pack.
Example #2: VSSR1605331/471GT = VSSR pkg., 16 pin count, 05 schematic, 330 ohms 470 ohms 2%, tube pack.
Lead (Pb)-Free Example: VTSRTXX01XXXX
Lead (Pb)-Free Example: VSSRTXX01XXXX

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