

High Precision Bulk Metal® Foil Surface Mount Voltage Divider, TCR Tracking of $< 0.5 \text{ ppm/}^\circ\text{C}$, Tolerance Match of 0.01% and Stability of $\pm 0.005 \%$ (50 ppm)



Any value at any ratio available within resistance range

INTRODUCTION

Bulk Metal® Foil Technology out-performs all other resistor technologies available today for applications that require High Precision and High Stability.

This technology has been invented, patented and pioneered by Vishay. Products based on this technology are the most suitable for a wide range of applications.

BMF technology allows to produce customer oriented products designed to satisfy challenging and specific technical requirements. Model DSM offers Low TCR (both absolute and tracking), Excellent Load Life Stability, Tight tolerance, Excellent Ratio Stability, and Low Current Noise, all in one package.

The DSM surface mount divider provides a matched pair of Bulk Metal® Foil Resistors in a small epoxy molded package. The electrical specification of this integrated construction offers improved performance and better real estate utilization over discrete resistors and matched pairs.

Our Application Engineering Department is available to advise and make recommendations. For non-standard technical requirements and special applications, please contact us.

FIGURE 1 - SCHEMATIC

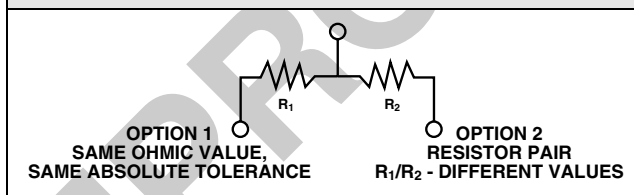


TABLE 1 - MODEL DSM SPECIFICATIONS

MODEL	ABSOLUTE TCR (- 55 °C TO + 125 °C, + 25 °C REF.) TYPICAL + MAX. SPREAD	RESISTANCE RATIO	TCR TRACKING	TOLERANCE	
				ABSOLUTE	MATCH
DSM	$\pm 2 \text{ ppm/}^\circ\text{C} \pm 3 \text{ ppm/}^\circ\text{C}$	$R1/R2 = 1$	$1.0 \text{ ppm/}^\circ\text{C}$	$\pm 0.02 \%$	0.01%
		$1 < R1/R2 \leq 10$	$2.0 \text{ ppm/}^\circ\text{C}$	$\pm 0.05 \%$	0.02%
		$10 < R1/R2 \leq 200$	$3.0 \text{ ppm/}^\circ\text{C}$	$\pm 0.1 \%$	0.05%

* Pb containing terminations are not RoHS compliant, exemptions may apply

FEATURES

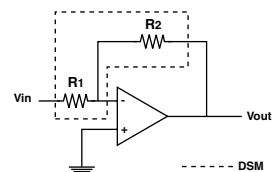
- Temperature Coefficient of Resistance (TCR):
Absolute: $\pm 2 \text{ ppm/}^\circ\text{C}$ typical
(- 55 °C to + 125 °C, + 25 °C Ref.)
Tracking: $0.5 \text{ ppm/}^\circ\text{C}$ typical
- Tolerance: Absolute: $\pm 0.02 \%$; Match: 0.01%
- Power Rating at 70 °C: Entire Package: 0.1 W
Each Resistor: 0.05 W
- Ratio Stability: 0.005% (0.05 W at 70 °C, 2000 hours)
- Resistance Range: 100 Ω to 20 k Ω per resistor
- Large Variety of Resistance Ratios: 1:200
- Electrostatic Discharge (ESD) above 25 000 Volts
- Short Time Overload $\leq 0.005 \%$
- Non Inductive, Non Capacitive Design
- Rise Time: 1.0 ns without ringing
- Current Noise: $< -40 \text{ dB}$
- Voltage Coefficient: $< 0.1 \text{ ppm/V}$
- Non Inductive: $< 0.08 \mu\text{H}$
- Non Hot Spot Design
- Terminals: silver coated copper alloy
- Any value available within resistance range (e.g. 1K2345)
- Prototype samples available from 48 hours. For more information, please contact foil@vishay.com
- For better performances, please see DSMZ datasheet (Z-Foil)



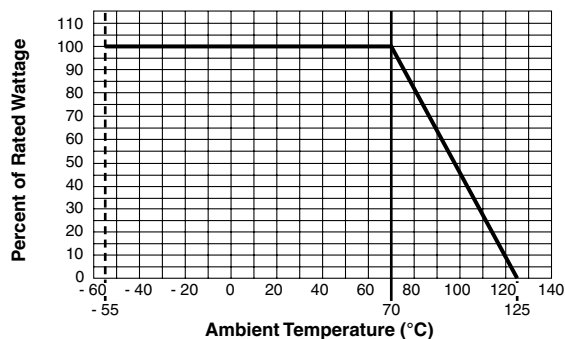
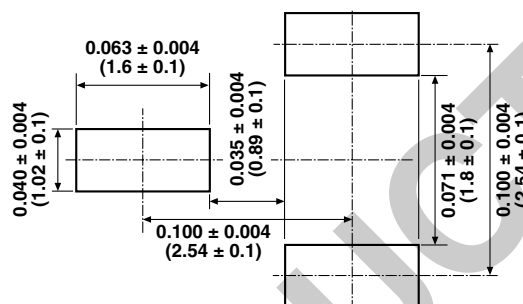
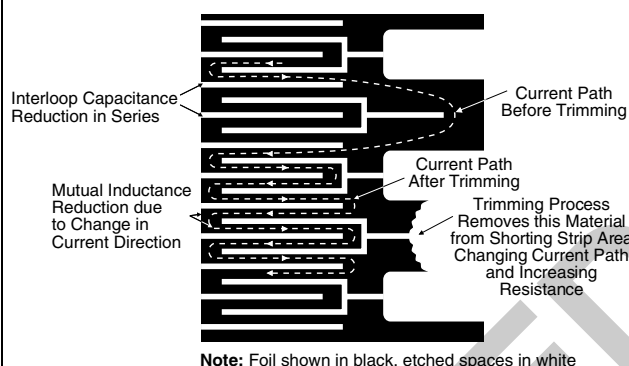
RoHS*
COMPLIANT

APPLICATIONS

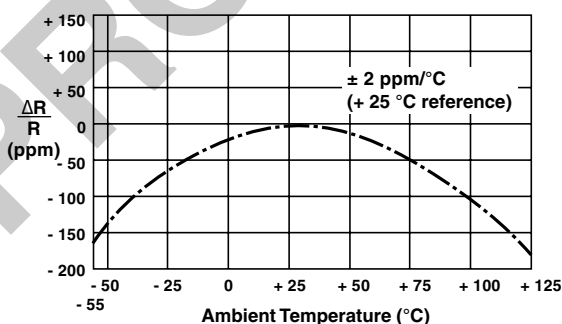
- Instrumentation amplifiers
- Bridge networks
- Differential amplifiers
- Ratio arms in bridge circuits
- Medical and test equipment
- Military
- Airborne etc.



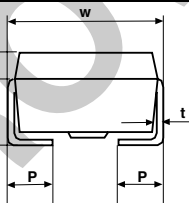
Vishay Foil Resistors High Precision Bulk Metal® Foil Surface Mount Voltage Divider, TCR Tracking of $\leq 0.5 \text{ ppm}/^\circ\text{C}$, Tolerance Match of 0.01% and Stability of $\pm 0.005 \%$ (50 ppm)

FIGURE 2 - POWER DERATING CURVE**FIGURE 3 - RECOMMENDED LAND****FIGURE 4 - TRIMMING TO VALUES**
(Conceptual Illustration)

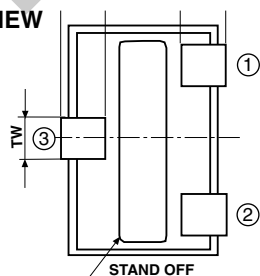
Note: Foil shown in black, etched spaces in white

FIGURE 5 - TYPICAL TCR CURVE
(For more details, see table 1)**FIGURE 6 - DIMENSIONS AND IMPRINTING**

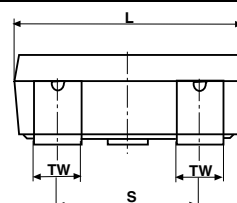
SIDE VIEW



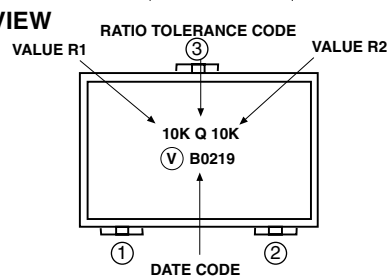
BOTTOM VIEW



FRONT VIEW



TOP VIEW



Note:
R1 - between PIN1 and PIN3
R2 - between PIN 2 and PIN3

DIMENSIONS	L	W	H	P	TW	TH	S	t
INCHES	0.160 ± 0.008	0.106 ± 0.008	0.063 ± 0.008	0.031 ± 0.005	0.031 ± 0.004	0.043 ± 0.008	0.100 ± 0.008	0.005 ± 0.002
MILLIMETERS	4.06 ± 0.20	2.69 ± 0.20	1.60 ± 0.20	0.79 ± 0.13	0.79 ± 0.10	1.09 ± 0.20	2.54 ± 0.20	0.13 ± 0.05



High Precision Bulk Metal® Foil Surface Mount Voltage Vishay Foil Resistors
Divider, TCR Tracking of ≤ 0.5 ppm/°C, Tolerance
Match of 0.01 % and Stability of ± 0.005 % (50 ppm)

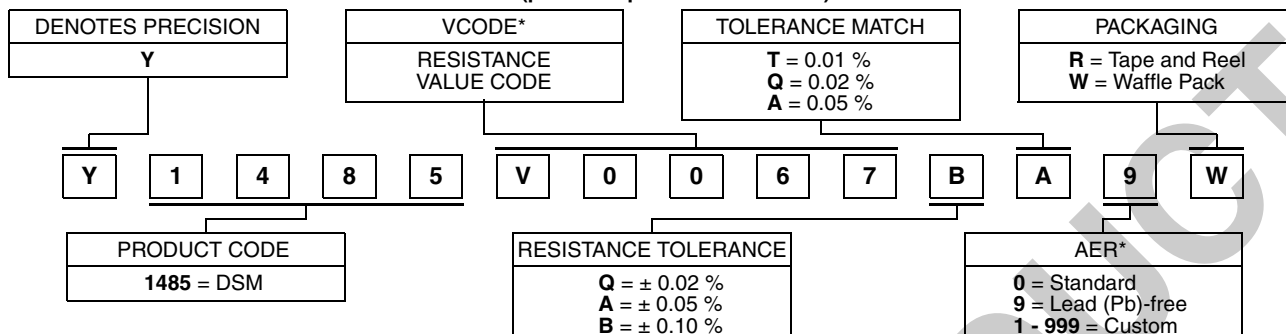
TABLE 3 - PERFORMANCE SPECIFICATIONS (Test Method Per MIL-PRF-914)

SPECIFICATIONS	TYPICAL LIMITS
Power rating at 70 °C	Entire package: 0.1 W Each resistor: 0.05 W
Maximum Working Voltage (each resistor)	25 V
Working Temperature Range	- 65 °C to + 125 °C
Thermal Shock 25 x (- 65 °C to + 125 °C)	$\Delta R = 0.01$ % (100 ppm) $\Delta \text{Ratio} = 0.005$ % (50 ppm)
Thermal Shock 5 x (- 65 °C to + 125 °C) and Power Conditioning 1.5 rated power at 25 °C, 100 hours	$\Delta R = 0.015$ % (150 ppm) $\Delta \text{Ratio} = 0.01$ % (100 ppm)
DWV atmospheric pressure, 200 V (A.C.), 1 minute	Successfully passed
Insulation Resistance 100 V (D.C.), 1 minute	$> 10^4$ M Ω
Resistance to Soldering Heat	$\Delta R = 0.01$ % (100 ppm) $\Delta \text{Ratio} = 0.005$ % (50 ppm)
Moisture Resistance + 65 °C to - 10 °C; 90 % to 98 % RH; 0.1 x rated power, 240 hours	$\Delta R = 0.02$ % (200 ppm) $\Delta \text{Ratio} = 0.005$ % (50 ppm)
Shock (Specified Pulse) 100 G	$\Delta R = 0.005$ % (50 ppm) $\Delta \text{Ratio} = 0.0025$ % (25 ppm)
Vibration, High Frequency (10 Hz - 2000 Hz), 20 G	$\Delta R = 0.01$ % (100 ppm) $\Delta \text{Ratio} = 0.005$ % (50 ppm)
High Temperature Exposure 100 hours at 125 °C	$\Delta R = 0.01$ % (100 ppm) $\Delta \text{Ratio} = 0.005$ % (50 ppm)
Low Temperature Storage 24 hours at - 65 °C	$\Delta R = 0.005$ % (50 ppm) $\Delta \text{Ratio} = 0.005$ % (50 ppm)
Load Life Stability 2000 hours at + 70 °C; rated power	$\Delta R = 0.005$ % (50 ppm) $\Delta \text{Ratio} = 0.005$ % (50 ppm)
Short Time Overload 6.25 x Rated Power; 5 seconds	$\Delta R = 0.005$ % (50 ppm) $\Delta \text{Ratio} = 0.0025$ % (25 ppm)
Low Temperature Operation	$\Delta R = 0.005$ % (50 ppm) $\Delta \text{Ratio} = 0.0025$ % (25 ppm)
Weight	0.04 g

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TABLE 4 - GLOBAL PART NUMBER INFORMATION

NEW GLOBAL PART NUMBER: Y1485V0067BA9W (preferred part number format)



FOR EXAMPLE: ABOVE GLOBAL ORDER Y1485 V0067 B A 9 W:

TYPE: DSM
VALUES: 10K/400R
ABSOLUTE TOLERANCE: $\pm 0.1\%$
TOLERANCE MATCH: 0.05%
TERMINATION: Lead (Pb)-free
PACKAGING: Waffle Pack

HISTORICAL PART NUMBER: DSM 10K 400R TCR2 B A S W (will continue to be used)

DSM	10K 400R	TCR2	B	A	S	W
MODEL	OHMIC VALUE $R_1 = 10 \text{ k}\Omega$ $R_2 = 400 \Omega$	TCR CHARACTERISTIC	ABSOLUTE TOLERANCE $Q = \pm 0.02\%$ $A = \pm 0.05\%$ $B = \pm 0.10\%$	TOLERANCE MATCH $T = 0.01\%$ $Q = 0.02\%$ $A = 0.05\%$	TERMINATION $S = \text{Lead (Pb)-free}$ $B = \text{Tin/Lead}$	PACKAGING $T = \text{Tape and Reel}$ $W = \text{Waffle Pack}$

Note

* For non-standard requests or additional values, please contact Application Engineering.

TABLE 5 - RESISTANCE VALUE CODE LIST FOR POPULAR RATIOS
(other values available upon request)

VCODES	R1/R2 RATIO	R1	R2	VCODES	R1/R2 RATIO	R1	R2
V0052	100	10K	100R	V0080	2.5	1K	400R
V0065	50	10K	200R	V0081		500R	200R
V0066		5K	100R	V0082		10K	5K
V0067	25	10K	400R	V0083		2K	1K
V0068		5K	200R	V0084	2	1K	500R
V0069		10K	500R	V0085		400R	200R
V0070	20	2K	100R	V0086		200R	100R
V0071		10K	1K	V0087	1.25	500R	400R
V0072	10	2K	200R	V0001		10K	10K
V0073		1K	100R	V0002		5K	5K
V0074		5K	1K	V0059	1	2K	2K
V0075	5	2K	400R	V0004		1K	1K
V0076		1K	200R	V0091		500R	500R
V0077		500R	100R	V0090		400R	400R
V0246		10K	2K5	V0089		200R	200R
V0078	4	2K	500R	V0088		100R	100R
V0079		400R	100R				



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All product specifications and data are subject to change without notice.

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