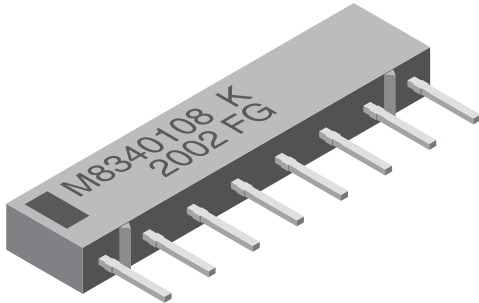




# Thick Film Resistor Networks, Military, MIL-PRF-83401 Qualified, Type RZ040 to RZ090, Single-In-Line, Molded SIP



## FEATURES

- Isolated, bussed and dual terminator schematics available
- MIL-PRF-83401 qualified
- 0.195" (4.95 mm) "A" and 0.350" (8.89 mm) "C" maximum seated heights
- Thick film resistive elements
- TCR available in "K" ( $\pm 100$  ppm/ $^{\circ}$ C) or "M" ( $\pm 300$  ppm/ $^{\circ}$ C) characteristic
- All device leads are hot-solder dipped
- Rugged molded case construction
- Compatible with automatic insertion equipment
- 100 % screen tested per group A, subgroup 1 of MIL-PRF-83401
- All devices are capable of passing the MIL-STD-202, method 210, condition D "Resistance to Soldering Heat" test
- Available in tube pack

STANDARD ELECTRICAL SPECIFICATIONS									
VISHAY DALE MODEL/ PIN NO/ PROFILE	MIL STYLE	MIL SPEC. SHEET	SCHEMATIC	POWER RATING ELEMENT $P_{70^{\circ}\text{C}}$ W	POWER RATING PACKAGE $P_{70^{\circ}\text{C}}$ W	RESISTANCE RANGE $\Omega$	TOLERANCE <sup>(1)</sup> $\pm$ %	TEMPERATURE COEFFICIENT <sup>(2)</sup> (-55 $^{\circ}$ C to +125 $^{\circ}$ C) $\pm$ ppm/ $^{\circ}$ C	WEIGHT g
MSM06C	RZ040	04	01 (C)	0.20	1.00	10 to 1M	1, 2, 5	100, 300	0.7
			03 (G)	0.20	0.60	10 to 1M	1, 2, 5	100, 300	
			05 (H)	0.11	0.88	Consult factory	1, 2, 5	100, 300	
MSM08C	RZ050	05	01 (C)	0.20	1.40	10 to 1M	1, 2, 5	100, 300	0.9
			03 (G)	0.20	0.80	10 to 1M	1, 2, 5	100, 300	
			05 (H)	0.11	1.32	Consult factory	1, 2, 5	100, 300	
MSM10C	RZ060	06	01 (C)	0.20	1.80	10 to 1M	1, 2, 5	100, 300	1.1
			03 (G)	0.20	1.00	10 to 1M	1, 2, 5	100, 300	
			05 (H)	0.11	1.80	Consult factory	1, 2, 5	100, 300	
MSM06A	RZ070	07	01 (C)	0.12	0.60	10 to 1M	1, 2, 5	100, 300	0.4
			03 (G)	0.12	0.36	10 to 1M	1, 2, 5	100, 300	
			05 (H)	0.07	0.60	Consult factory	1, 2, 5	100, 300	
MSM08A	RZ080	08	01 (C)	0.12	0.84	10 to 1M	1, 2, 5	100, 300	0.5
			03 (G)	0.12	0.48	10 to 1M	1, 2, 5	100, 300	
			05 (H)	0.07	0.84	Consult factory	1, 2, 5	100, 300	
MSM10A	RZ090	09	01 (C)	0.12	1.08	10 to 1M	1, 2, 5	100, 300	0.6
			03 (G)	0.12	0.60	10 to 1M	1, 2, 5	100, 300	
			05 (H)	0.07	1.08	Consult factory	1, 2, 5	100, 300	

### Notes

<sup>(1)</sup>  $\pm 2$  % standard,  $\pm 1$  % and  $\pm 5$  % available.

<sup>(2)</sup> K =  $\pm 100$  ppm/ $^{\circ}$ C; M =  $\pm 300$  ppm/ $^{\circ}$ C.

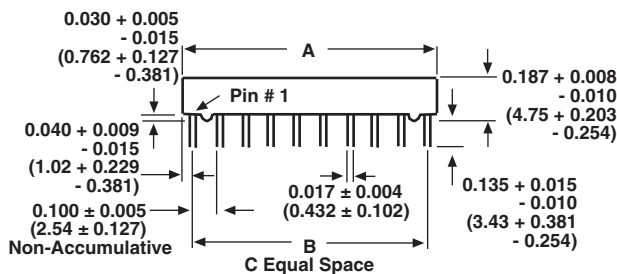
GLOBAL PART NUMBER INFORMATION																	
<b>New Global Part Numbering: M8340107K1003GCD03 (preferred part numbering format)</b>																	
M	8	3	4	0	1	0	7	K	1	0	0	3	G	C	D	0	3
MIL STYLE	SPEC SHEET	CHARACTERISTIC	RESISTANCE VALUE	TOLERANCE CODE	SCHEMATIC	PACKAGING											
M83401	04 = 6 pin, "C" profile 05 = 8 pin, "C" profile 06 = 10 pin, "C" profile 07 = 6 pin, "A" profile 08 = 8 pin, "A" profile 09 = 10 pin, "A" profile	K = 100 ppm M = 300 ppm	3 digit significant figure, followed by a multiplier 10R0 = 10 Ω 3302 = 33 kΩ 1004 = 1 MΩ	F = ± 1 % G = ± 2 % J = ± 5 %	C = Bussed G = Isolated	D03 = Tin/lead, tube DSL = Tin/lead, tube, single lot date code											
<b>Historical Part Number example: M8340107K1003GC (will continue to be accepted)</b>																	
M83401	07	K	1003	G	C	D03											
MIL STYLE	SPEC SHEET	CHARACTERISTIC	RESISTANCE VALUE	TOLERANCE CODE	SCHEMATIC	PACKAGING											
<b>New Global Part Numbering: M8340104KA001GHD03 (preferred part numbering format)</b>																	
M	8	3	4	0	1	0	4	K	A	0	0	1	G	H	D	0	3
MIL STYLE	SPEC SHEET	CHARACTERISTIC	RESISTANCE VALUE	TOLERANCE CODE	SCHEMATIC	PACKAGING											
M83401	04 = 6 pin, "C" profile 05 = 8 pin, "C" profile 06 = 10 pin, "C" profile 07 = 6 pin, "A" profile 08 = 8 pin, "A" profile 09 = 10 pin, "A" profile	K = 100 ppm M = 300 ppm	Per std. MIL Spec (see Impedance Codes table)	F = ± 1 % G = ± 2 % J = ± 5 %	H = Dual terminator	D03 = Tin/lead, tube DSL = Tin/lead, tube, single lot date code											
<b>Historical Part Number example: M8340104KA001GH (will continue to be accepted)</b>																	
M83401	04	K	A001	G	H	D03											
MIL STYLE	SPEC SHEET	CHARACTERISTIC	RESISTANCE VALUE	TOLERANCE CODE	SCHEMATIC	PACKAGING											

**Note**

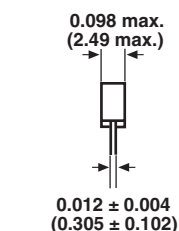
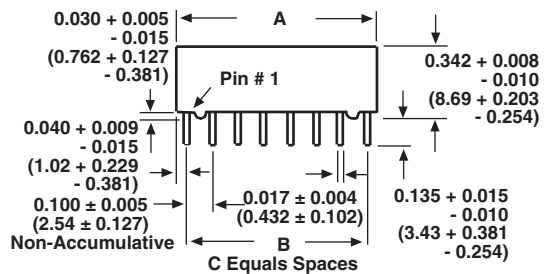
- For additional information on packaging, refer to the Through Hole Network Packaging document ([www.vishay.com/doc?31542](http://www.vishay.com/doc?31542)).

**DIMENSIONS** in inches (millimeters)

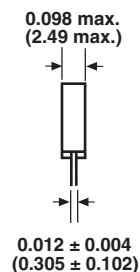
**"A" Profile**



**"C" Profile**



VISHAY DALE MODEL	A	B	C
MSM06	0.583 ± 0.015 (14.81 ± 0.381)	0.500 (12.70)	5
MSM08	0.783 ± 0.015 (19.89 ± 0.381)	0.700 (17.78)	7
MSM10	0.983 ± 0.015 (24.97 ± 0.381)	0.900 (22.86)	9





TECHNICAL SPECIFICATIONS		
PARAMETER	UNIT	MSM SERIES
Maximum Operating Voltage	V <sub>DC</sub>	50
Voltage Coefficient of Resistance	V <sub>eff</sub>	< 50 ppm
Dielectric Strength	V <sub>AC</sub>	200 min.
Insulation Resistance	Ω	10 000M
Operating Temperature Range	°C	-55 to +125
Storage Temperature Range	°C	-55 to +150

MECHANICAL SPECIFICATIONS	
Body	Molded epoxy
Terminals	Copper alloy, hot-solder dipped
Solderability	Per MIL-PRF-83401

**CAGE CODE: 91637 and 2799A (formerly SH903)**

MILITARY IMPEDANCE CODES					
CODE	R <sub>1</sub> (Ω)	R <sub>2</sub> (Ω)	CODE	R <sub>1</sub> (Ω)	R <sub>2</sub> (Ω)
A001	82	130	A011	330	680
A002	120	200	A012	1.5K	3.3K
A003	130	210	A013	3K	6.2K
A004	160	260	A014	180	270
A005	180	240	A015	270	270
A006	180	390	A016	560	560
A007	220	270	A017	560	1.2K
A008	220	330	A018	620	2.7K
A009	330	390	A019 <sup>(1)</sup>	150	1K
A010	330	470	A020 <sup>(1)</sup>	1K	1K

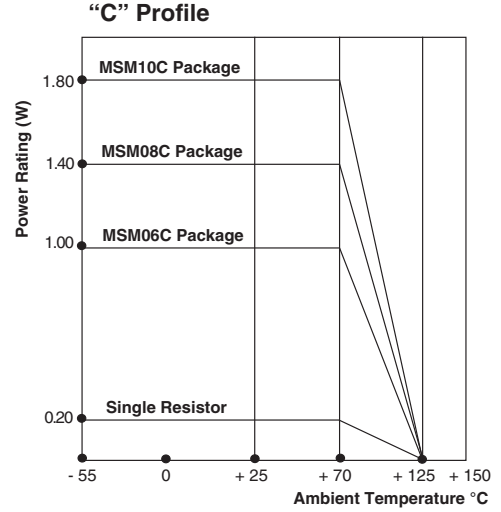
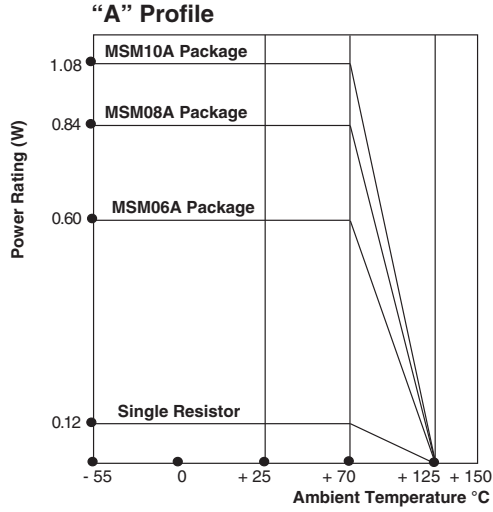
**Note**

<sup>(1)</sup> Offered for the M83401/09 product only

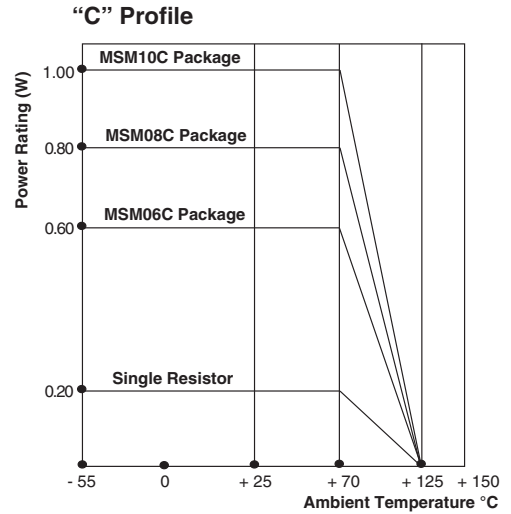
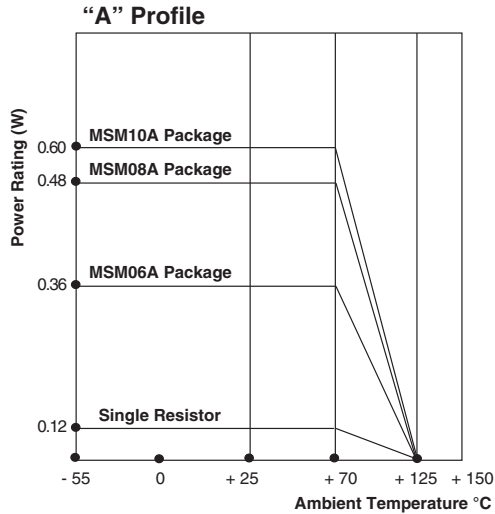


DERATING

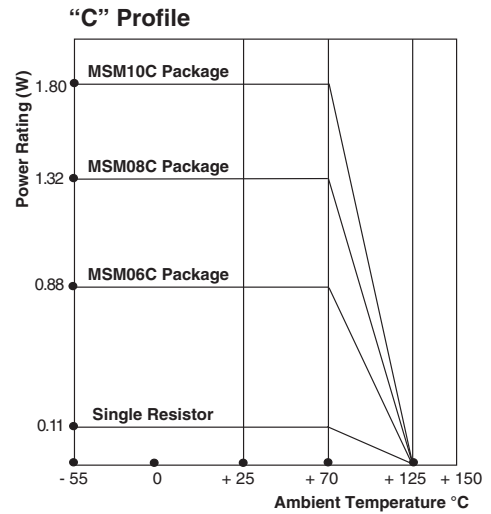
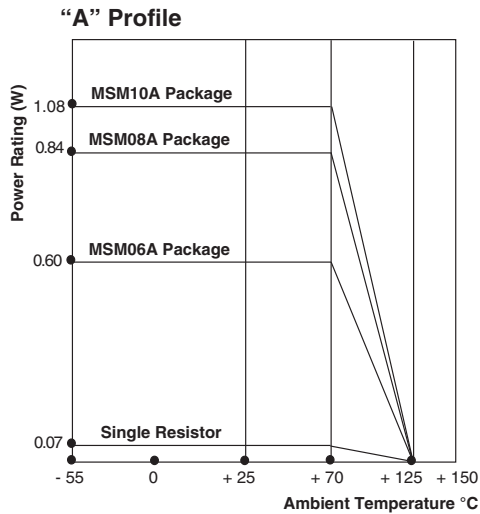
01 Schematic



03 Schematic



05 Schematic



CIRCUIT APPLICATIONS		
<p><b>01 Schematic</b></p>	<p>5, 7 or 9 resistors with one pin common</p> <p>“A” Profile                      MSM06A01 (M8340107xxxxxC)                      MSM08A01 (M8340108xxxxxC)                      MSM10A01 (M8340109xxxxxC)</p> <p>“C” Profile                      MSM06C01 (M8340104xxxxxC)                      MSM08C01 (M8340105xxxxxC)                      MSM10C01 (M8340106xxxxxC)</p> <p>The MSM06A01, MSM08A01, MSM10A01, MSM06C01, MSM08C01, and MSM10C01 molded single-in-line resistor networks provide the user with a choice of 5, 7, or 9 nominally equal resistors, each connected to a common pin (Pin No. 1).</p> <p>Commonly used in the following applications:</p> <ul style="list-style-type: none"> <li>• “Wired OR” pull-up</li> <li>• Power Gate pull-up</li> <li>• MOS/ROM pull-up/pull-down</li> <li>• Open collector pull-up</li> <li>• TTL input pull-down</li> <li>• TTL unused gate pull-up</li> </ul>	
<p><b>03 Schematic</b></p>	<p>3, 4 or 5 isolated resistors</p> <p>“A” Profile                      MSM06A03 (M8340107xxxxxG)                      MSM08A03 (M8340108xxxxxG)                      MSM10A03 (M8340109xxxxxG)</p> <p>“C” Profile                      MSM06C03 (M8340104xxxxxG)                      MSM08C03 (M8340105xxxxxG)                      MSM10C03 (M8340106xxxxxG)</p> <p>The MSM06A03, MSM08A03, MSM10A03, MSM06C03, MSM08C03, and MSM10C03 molded single-in-line resistor networks provide the user with a choice of 3, 4, or 5 nominally equal resistors. Each resistor is isolated from all others.</p> <p>Commonly used in the following applications:</p> <ul style="list-style-type: none"> <li>• “Wired OR” pull-up</li> <li>• Power driven pull-up</li> <li>• Power gate pull-up</li> <li>• Line termination</li> <li>• Long-line impedance balance</li> <li>• LED current limiting</li> <li>• ECL output pull-down</li> <li>• TTL input pull-down</li> </ul>	
<p><b>05 Schematic</b></p>	<p>4, 6 or 8 resistor pairs</p> <p>“A” Profile                      MSM06A05 (M8340107xxxxxH)                      MSM08A05 (M8340108xxxxxH)                      MSM10A05 (M8340109xxxxxH)</p> <p>“C” Profile                      MSM06C05 (M8340104xxxxxH)                      MSM08C05 (M8340105xxxxxH)                      MSM10C05 (M8340106xxxxxH)</p> <p>The MSM06A05, MSM08A05, MSM10A05, MSM06C05, MSM08C05, and MSM10C05 molded single-in-line resistor networks provide the user with a choice of 4, 6, or 8 pair of <math>R_1/R_2</math> resistor values for pulse squaring and TTL dual-line terminating requirements.</p>	

PERFORMANCE		
TEST	CONDITIONS	MAX. $\Delta R$ (TYPICAL TEST LOTS)
Power Conditioning	1.5 x rated power, applied 1.5 h “ON” and 0.5 h “OFF” for 100 h $\pm$ 4 h at +25 °C ambient temperature	$\pm$ 0.50 % $\Delta R$
Thermal Shock	5 cycles between -65 °C and +125 °C	$\pm$ 0.50 % $\Delta R$
Short Time Overload	2.5 x rated working voltage for 5 s	$\pm$ 0.25 % $\Delta R$ (Characteristic K) $\pm$ 0.50 % $\Delta R$ (Characteristic M)
Low Temperature Operation	45 min at full rated working voltage at -65 °C	$\pm$ 0.25 % $\Delta R$ (Characteristic K) $\pm$ 0.50 % $\Delta R$ (Characteristic M)
Moisture Resistance	240 h with humidity ranging from 80 % RH to 98 % RH	$\pm$ 0.50 % $\Delta R$
Resistance to Soldering Heat	Leads immersed in +260 °C solder to within 1/16" of body for 10 s	$\pm$ 0.25 % $\Delta R$
Shock	Total of 18 shocks at 100 g's	$\pm$ 0.25 % $\Delta R$
Vibration	12 h at maximum of 20 g's between 10 Hz and 2000 Hz	$\pm$ 0.25 % $\Delta R$
Load Life	1000 h at +70 °C, rated power applied 1.5 h “ON”, 0.5 h “OFF” for full 1000 h period	$\pm$ 0.50 % $\Delta R$ (Characteristic K) $\pm$ 2.00 % $\Delta R$ (Characteristic M)
Terminal Strength	4 1/2 pound pull for 30 s	$\pm$ 0.25 % $\Delta R$
Insulation Resistance	10 000 M $\Omega$ (minimum)	-
Dielectric Withstanding Voltage	No evidence of arcing or damage (200 V <sub>RMS</sub> for 1 min)	-



## **Disclaimer**

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.