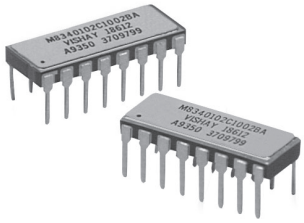
Bulk Metal® Foil Technology
1445Q-14 Pin and 1446Q-16 Pin DIP Packages



Product may not be to scale

Vishay Models 1445Q and 1446Q networks are qualified to MIL-PRF-83401, Characteristic C, Schematic A. Actual performance exceeds all the requirements of MIL-PRF-83401 characteristics “C”.

Model 1445Q contains 7 resistors and 1446Q contains 8 resistors. Qualified resistance range is 100 Ω through 10 kΩ. Other values are available non-QPL. Power rating is 0.1 Watt.

FIGURE 1 - MODEL 1445Q DIMENSIONS

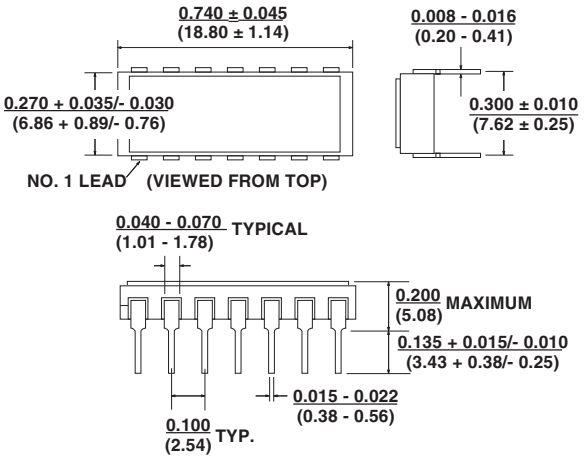
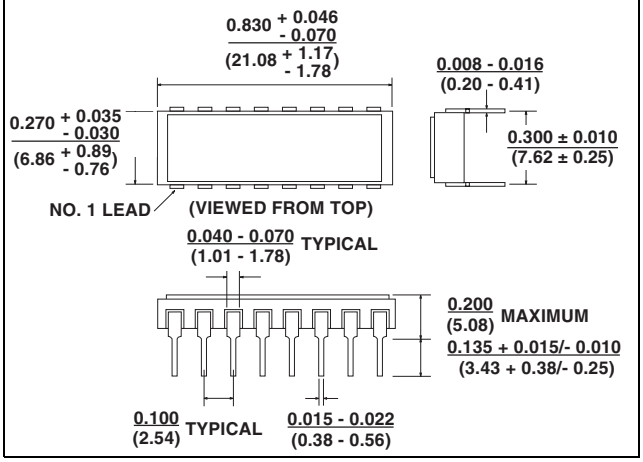


FIGURE 2 - MODEL 1446Q DIMENSIONS



FEATURES

- Hermetically Sealed for maximum environmental protection - 100 % leak protection
  Gross Leak: No bubbles
  Fine Leak: < 5 x 10^{-7} cc/sec
  (MIL-STD-220, Method 112, Test C, Procedure 111A)
- Tested per MIL-PRF-83401
- Ceramic Package: 94 % Alumina (Al_2O_3)
- Lid: Gold plated Kovar
- Solder: Tin/Gold
- Leads: Alloy 42 (Iron Nickel) with 100 µ Inches gold plating (MIL-STD-1276, Type G-21-A)
- Gold ball wire bonding
- Foil Chips V15X5

ADDITIONAL TESTING TO MIL SPEC

Group A testing to MIL-PRF-83401 imposes the following:

1. Thermal shock 100 %

   5X from - 65 to + 125 °C
2. Power conditioning 100 %

   2. 1 100 hours at 25 °C, full power

   2. 2 ΔR and ΔRatio calculation
3. Visual and Mechanical after the above tests (sample plan)

   3. 1 Conformity to physical size

   3. 2 Workmanship

   3. 3 Damage due to the above tests
4. 10 % PDA or one piece whichever is greater
5. Solderability (sample plan)

Group B sample testing to MIL-PRF-83401 imposes the following:

1. Temperature Coefficient of Resistance (sample plan)
2. Resistance to solvents (sample plan)

TABLE 1 - TCR CHARACTERISTIC

Qualification to Characteristic "C" allows Vishay to supply to the following characteristics[1].

CHARACTERISTIC	TCR ABSOLUTE	TCR TRACK	SEAL
C	± 50	± 5	Hermetic
V	± 50	± 5	Non-Hermetic
H	± 50	N.A.	Non-Hermetic
K	± 100	N.A.	Non-Hermetic
M	± 300	N.A.	Non-Hermetic

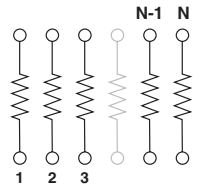
NOTE:
1. For characteristics H, K and M the "C" power rating must be acceptable.

TABLE 2 - RESISTANCE VALUE

A four digit designator in which the first three digits are significant figures and the fourth digit indicates the number of zeros to follow.

Example: 1002 = 10K

FIGURE 3 - SCHEMATIC "A"



For Model: /01 N = 7
/02 N = 8

TABLE 3 - MIL-PRF-83401 PERFORMANCE SPECIFICATIONS

TEST OR CONDITION		MIL-PRF-83401						
		Y	R	C	V	H	K	M
Resistance Temp Characteristic	ppm/°C	± 5	± 25	± 50	± 50	± 50	± 100	± 300
Tracking To Reference Element (- 55 to + 125 °C)	ppm/°C	± 5	± 5	± 5	± 5	NA	NA	NA
Max Ambient Temp at Rated Wattage		+ 70 °C						
Max Ambient Temp at Zero Power		+ 125 °C						
Thermal Shock and Power Conditioning		± 0.02 % ± 0.01 %	± 0.08 % ± 0.04 %	± 0.25 % ± 0.03 %	± 0.25 % ± 0.03 %	± 0.50 % NA	± 0.70 % NA	± 0.70 % NA
Low Temperature Operation	ΔR ΔRatio	± 0.02 % ± 0.02 %	± 0.03 % ± 0.02 %	± 0.10 % ± 0.02 %	± 0.10 % ± 0.02 %	± 0.10 % NA	± 0.25 % NA	± 0.50 % NA
Short Time Overload	ΔR ΔRatio	± 0.02 % ± 0.01 %	± 0.03 % ± 0.02 %	± 0.10 % ± 0.02 %	± 0.10 % ± 0.02 %	± 0.10 % NA	± 0.25 % NA	± 0.50 % NA
Terminal Strength	ΔR ΔRatio	± 0.01 % ± 0.01 %	± 0.03 % ± 0.02 %	± 0.10 % ± 0.03 %	± 0.10 % ± 0.03 %	± 0.25 % NA	± 0.25 % NA	± 0.25 % NA
Resistance to Soldering Heat	ΔR ΔRatio	± 0.01 % ± 0.01 %	± 0.05 % ± 0.02 %	± 0.10 % ± 0.02 %	± 0.10 % ± 0.02 %	± 0.10 % NA	± 0.25 % NA	± 0.25 % NA
Moisture Resistance	ΔR ΔRatio	± 0.02 % ± 0.01 %	± 0.05 % ± 0.02 %	± 0.20 % ± 0.02 %	± 0.20 % ± 0.02 %	± 0.40 % NA	± 0.50 % NA	± 0.50 % NA
Shock (Specified Pulse)	ΔR ΔRatio	± 0.02 % ± 0.02 %	± 0.03 % ± 0.02 %	± 0.25 % ± 0.03 %	± 0.25 % ± 0.03 %	± 0.25 % NA	± 0.25 % NA	± 0.25 % NA
Vibration, High Frequency	ΔR ΔRatio	± 0.02 % ± 0.02 %	± 0.03 % ± 0.02 %	± 0.25 % ± 0.03 %	± 0.25 % ± 0.03 %	± 0.25 % NA	± 0.25 % NA	± 0.25 % NA
Load Life (+ 70 °C, Full Power, 1000 hours)	ΔR ΔRatio	± 0.05 % ± 0.025 %	± 0.1 % ± 0.03 %	± 0.10 % ± 0.03 %	± 0.10 % ± 0.03 %	± 0.50 % NA	± 0.50 % NA	± 2.00 % NA
+ 25 °C Power Rating (1000 hrs.)	ΔR ΔRatio	± 0.05 % ± 0.025 %	± 0.1 % ± 0.03 %	± 0.10 % ± 0.03 %	± 0.10 % ± 0.03 %	± 0.50 % NA	± 0.50 % NA	± 2.00 % NA
High Temperature Exposure (+ 125 °C, 100 hours)	ΔR ΔRatio	± 0.02 % ± 0.01 %	± 0.05 % ± 0.02 %	± 0.10 % ± 0.03 %	± 0.10 % ± 0.03 %	± 0.20 % NA	± 0.50 % NA	± 1.00 % NA
Low Temperature Storage	ΔR ΔRatio	± 0.01 % ± 0.01 %	± 0.03 % ± 0.02 %	± 0.10 % ± 0.02 %	± 0.10 % ± 0.02 %	± 0.10 % NA	± 0.25 % NA	± 0.50 % NA
Insulation Resistance		10 000 MΩ						
Resistance Tolerance and, when applicable, Resistance Ratio Accuracy		± 0.005(V) ± 0.01(T) ± 0.05(A) ± 0.1(B) ± 0.5(D) ± 1.0(F)	± 0.05(A) ± 0.1(B) ± 0.5(D)	± 0.1 %(B) ± 0.5 %(D) ± 1.0 %(F)	± 0.1 %(B) ± 0.5 %(D) ± 1.0 %(F)	± 0.1 %(B) ± 0.5 %(D) ± 1.0 %(F)	± 0.5 %(D) ± 1.0 %(F) ± 2.0 %(G)	± 1.0 %(F) ± 2.0 %(G) ± 5.0 %(J)

NOTE:
1. ΔR's are not cumulative. For purposes of determining reliability calculations, consider the characteristics shown as figures of merit and allow no more than ± 0.05 % ΔR lifetime. Allow proportionately less if the severity of anticipated environmental stress is small compared to the tests as defined in MIL-PRF-83401.

TABLE 4 - ORDERING INFORMATION - VISHAY QUALIFIED M83401 SERIES (MIL-PRF-83401) NETWORKS					
M83401	**01**	**C**	**1002**	**B**	**A**
MILITARY SPECIFICATION	**SLASH SHEET**	**TCR CHARACTERISTIC**	**RESISTANCE VALUE**	**RESISTANCE TOLERANCE**	**SCHEMATIC[2)]**
MIL-PRF-83401	Vishay is qualified to the following slash sheets: /01 14 pin DIP, Vishay P/N 1445Q /02 16 pin DIP, Vishay P/N 1446Q	Vishay is qualified to Characteristic C (see Table 1)	Vishay is qualified from 100 Ω through 10 kΩ (see Table 2)	Vishay is qualified to the following tolerances: B = 0.1 % D = 0.5 %[1)] F = 1.0 %[1)] G = 2.0 % J = 5.0 %	Vishay is qualified to schematic “A”. (see Figure 3)

NOTE:

1. For standard values by tolerance see Table III of MIL-PRF-83401.
All values are considered standard when the specified tolerance is tighter than 0.10 %.

2. What to do if QPL is required and no schematic is available:

Schematic “X” - Additional special schematics may be identified as “X” schematic and described fully in the detailed specifications.

DSCC Drawings - Anyone can request DSCC Drawings if the part is to be used on a military contract. Submit either a catalog sheet or SCD to DSCC or call Vishay for more information.

3. Hot solder dip leads are available upon request.

Example:

14 Pin, 7 Resistor, 10K000, 0.1 % Tolerance
Military Specification: M83401
Slash Sheet: 01
TCR Characteristic: C
Resistance Value: 1002
Resistance Tolerance: B
Schematic: A

16 Pin, 8 Resistor, 100R00, 0.1 % Tolerance
Military Specification: M83401
Slash Sheet: 02
TCR Characteristic: C
Resistance Value: 1000
Resistance Tolerance: F
Schematic: A

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