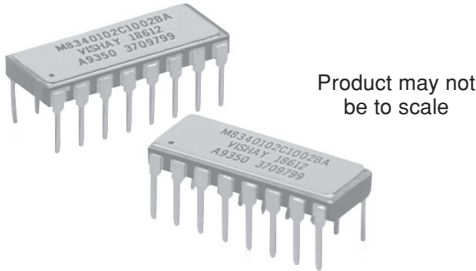


Bulk Metal[®] Foil Technology

1445Q-14 Pin and 1446Q-16 Pin DIP Packages



Product may not be to scale

THROUGH HOLE

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 ohms through 10Kohms. Other values are available non-QPL. Power rating is 0.1 Watt.

FIGURE 1 - MODEL 1445Q DIMENSIONS

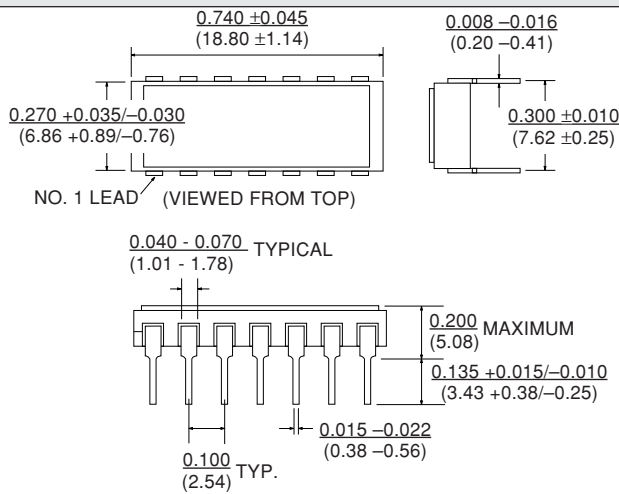
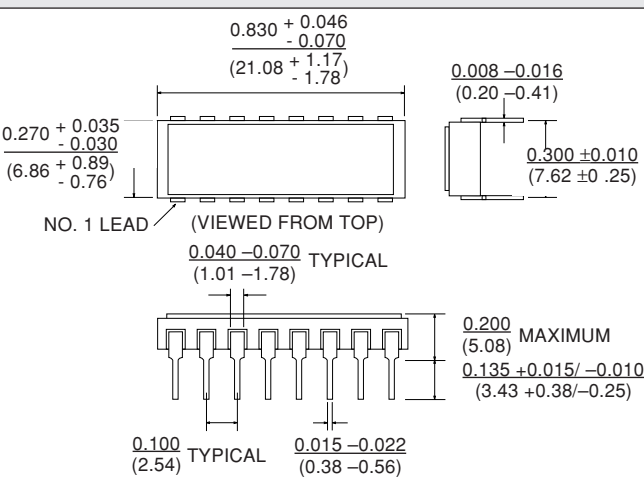


FIGURE 2 - MODEL 1446Q DIMENSIONS



FEATURES

- Hermetically Sealed for maximum environmental protection - 100% leak protection
 - Gross Leak: No bubbles
 - Fine Leak: $< 5 \times 10^{-7}$ 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 100μ 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 + 125C.
2. Power conditioning 100%
 2. 1 100 hours at 25C, full power.
 2. 2 ΔR and Δ ratio 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*

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

*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

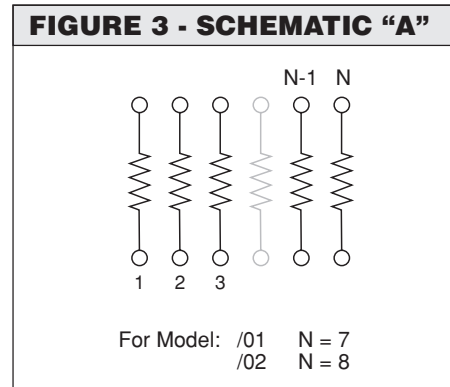


TABLE 3 - MIL-PRF-83401 PERFORMANCE SPECIFICATIONS

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, 1,000 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 (1,000 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	10,000MΩ							
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)	

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.

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THROUGH HOLE

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**
MIL-PRF-83401	Vishay is qualified to the following slash sheets: /01 14pin 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 100Ω through 10KΩ. (see Table 2)	Vishay is qualified to the following tolerances: B = 0.1% D = 0.5%* F = 1.0%* G = 2.0% J = 5.0%	Vishay is qualified to schematic "A". (see Figure 3)

* 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%.

** 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.

*** Hot solder dip leads are available upon request

THROUGH HOLE

EXAMPLES:

14 Pin, 7 Resistor, 10K000, 0.1% Tolerance —

<u>M83401</u>	<u>01</u>	<u>C</u>	<u>1002</u>	<u>B</u>	<u>A</u>
MILITARY SPECIFICATION	SLASH SHEET	TCR CHARACTERISTIC	RESISTANCE VALUE	RESISTANCE TOLERANCE	SCHEMATIC

16 Pin, 8 Resistor, 100R00, 0.1% Tolerance —

<u>M83401</u>	<u>02</u>	<u>C</u>	<u>1000</u>	<u>F</u>	<u>A</u>
MILITARY SPECIFICATION	SLASH SHEET	TCR CHARACTERISTIC	RESISTANCE VALUE	RESISTANCE TOLERANCE	SCHEMATIC