

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

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 100 to 300 μ inches gold plating (MIL-STD-1276, Type G-21-A)
- Gold ball wire bonding
- Bulk Metal® 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 $+125^\circ C$
2. Power conditioning 100%
 - 2.1 100 hours at $25^\circ C$, full power
 - 2.2 ΔR and ΔR 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)

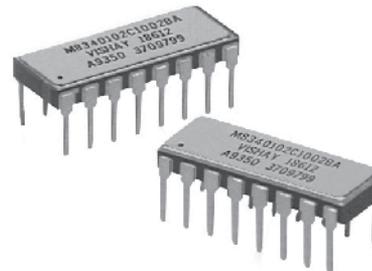
Group B sample testing to MIL-PRF-83401 imposes the following:

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

INTRODUCTION

Model 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 100Ω through $10 k\Omega$. Other values are available non-QPL. Power rating is 0.1 Watt.



Product may not be to scale

Figure 1 – Model 1445Q Dimensions

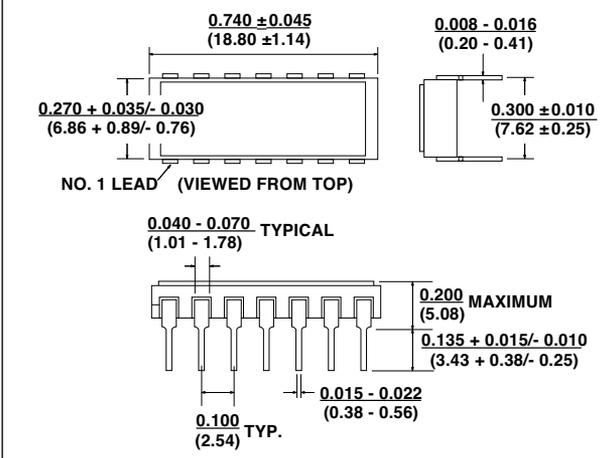


Figure 2 – Model 1446Q Dimensions

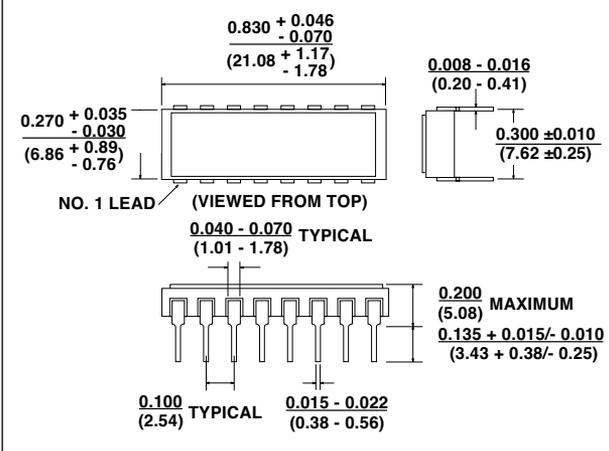


Table 1 – TCR Characteristic			
Qualification to Characteristic “C” covers the following characteristics ⁽¹⁾ .			
CHARACTERISTIC	TCR ABSOLUTE	TCR TRACK	SEAL
C	±50	±5	Hermetic
V	±50	±5	Non-Hermetic
H	±50	NA	Non-Hermetic
K	±100	NA	Non-Hermetic
M	±300	NA	Non-Hermetic

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

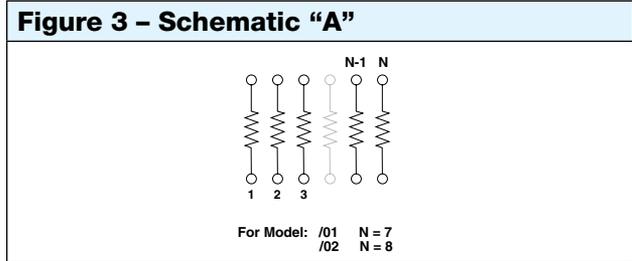


Table 3 – MIL-PRF-83401 Performance Specifications							
TEST OR CONDITION	MIL-PRF-83401						
	Y	R	C	V	H	K	M
Resistance Temp Characteristic ppm/°C	±5	±25	±50	±50	±50	±100	±300
Tracking To Reference Element (-55 to +125°C) ppm/°C	±5	±5	±5	±5	NA	NA	NA
Max Ambient Temp at Rated Wattage	+70°C						
Max Ambient Temp at Zero Power	+125°C						
Thermal Shock and Power Conditioning	±0.02% ±0.01%	±0.08% ±0.04%	±0.25% ±0.02%	±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 – 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	Qualified to the following slash sheets: /01 14 pin DIP, P/N 1445Q /02 16 pin DIP, P/N 1446Q	Qualified to Characteristic C (see Table 1)	Qualified from 100 Ω through 10 kΩ. (see Table 2)	Qualified to the following tolerances: B = 0.1% D = 0.5% ⁽¹⁾ F = 1.0% ⁽¹⁾ G = 2.0% J = 5.0%	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 Foil Resistors 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