

**DATA SHEET**

# 8700 Series: Temperature-Stable Resonators

## Applications

- Microwave filters
- LMDS
- High stability DROs
- Satellite communications
- Telemetry
- Automobile collision avoidance

## Features

- High  $\epsilon_r$
- $Q > 10,000$
- Wide range of  $\tau_f$
- Frequency stability versus temperature
- Reduced size and weight
- High stability DRO design
- Ease of compensation for temperature drift
- Repeatability of design
- Negligible aging effects

## Introduction

Skyworks, through its wholly owned subsidiary, Trans-Tech, offers the 8700 series temperature-stable resonators, designed for use from 6 GHz to 40 GHz with excellent loss characteristics. The 8700 series offers a wide selection of temperature coefficients of resonant frequency for easier circuit compensation and a Quality factor (Q) greater than 10,000 at 10 GHz for high stability dielectric resonator oscillator (DRO) designs up to millimeter (mm) wave frequencies.



**Table 1. Temperature Characteristics for Series D/C87**

Type	Dielectric Constant	Temperature Coefficient of $f_0$ ( $\tau_f$ ) $\pm 2$ (ppm/°C)	Q at 4.3 GHz
35	$30.7 \pm 1.0$	+4	>10,000
34	$30.4 \pm 1.0$	+2	
33	$30 \pm 1$	0	
32	$29 \pm 1$	-2	

**Note:** Contact us for custom  $\tau_f$  and tolerances.

**Table 2. Material Characteristics**

Item	Value
Dielectric constant	29.0 to 30.7
Temperature coefficient of resonant frequency ( $\tau_f$ ) (ppm/°C)	-2 to +4
Q ( $1/\tan \delta$ ) minimum	>10,000 at 10.0 GHz
Insulation resistance ( $\Omega$ cm)	$\sim 10^{14}$
Thermal expansion (ppm/°C) (20°C – 200°C)	10
Thermal conductivity (cal/cm-sec °C) at 25°C	0.006
Specific heat (cal/g°C)	0.07
Density (g/cc)	>7.6
Water absorption	<0.01
Vicker hardness no. (kg/mm)	700
Flexural strength (PSI)	10,000
Composition	Ba, Zn, Ta-oxide (perovskite)
Color	Yellow

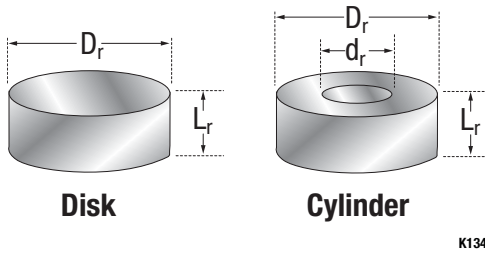


Figure 1. 8700 Disk and Cylinder

Table 3. Disk and Cylinder Ranges

Disk	Cylinder
<i>Diameter Range</i>	
Dr: 0.405 to 0.076 Lr: 35% to 45% of Dr dr: N/A	Dr: 0.405 to 0.245 Lr: 35% to 45% of Dr dr: 0.083
<i>Frequency Range</i>	
5550 to 32150	5550 to 9870

Note: Contact us for custom sizes.

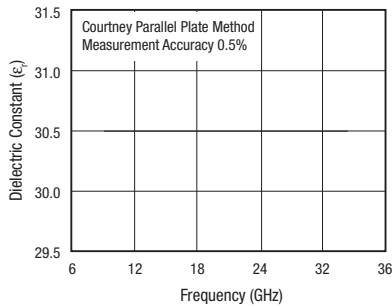


Figure 3. Typical ( $\epsilon_r$ ) vs Frequency

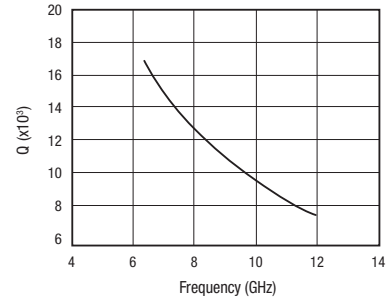


Figure 2. Typical Q vs Frequency

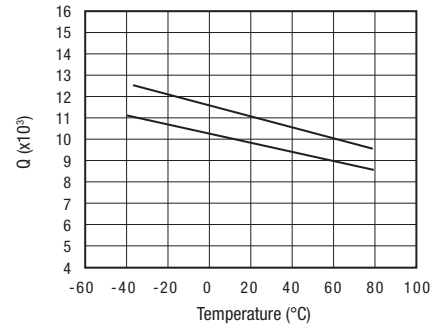


Figure 4. Typical Q vs Temperature @ 10 GHz

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