

DATA SHEET

8700 Series: Temperature Stable Resonators

Features

- High ϵ'
- $Q > 10,000$
- Wide range of τ_f
- Frequency stability vs. temperature

Benefits

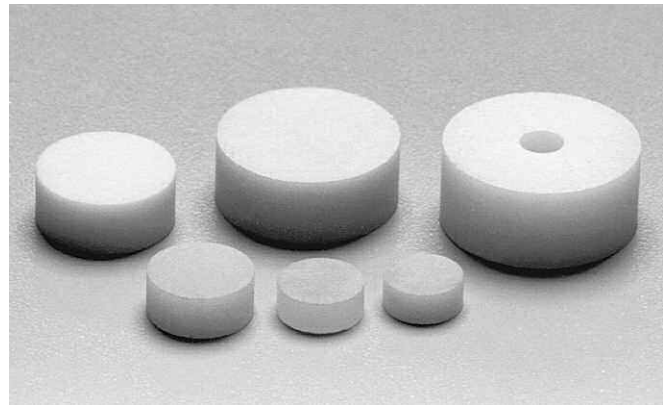
- Small size
- Reduced Weight
- High stability DRO design
- Ease of compensation for temperature drift
- Repeatability of design
- Negligible aging effects

Applications

- Microwave filters
- LMDS
- High stability DROs
- Satellite communications
- Telemetry
- Automobile Collision Avoidance

Introduction

The 8700 series is designed for use from 6–40 GHz and features excellent loss characteristics. This series offers a wide selection of temperature coefficients of resonant frequency for easier circuit compensation and a Q greater than 10,000 at 10 GHz for high stability DRO designs up to millimeter wave frequencies.



Material Characteristics

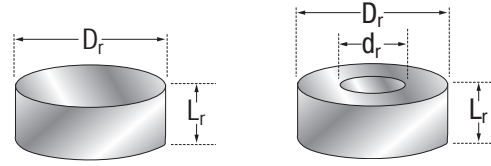
Dielectric constant	.....29.0–30.7
Temperature coefficient of resonant frequency (τ_f) (ppm/°C)	.....-2 to +4
Q (1/tan δ) min	.....>10,000 at 10.0 GHz
Insulation resistance (ohm cm)	.....> 10^{14}
Thermal expansion (ppm/°C) (20–200 °C)	.....10
Thermal conductivity (cal/cm sec°C) @ 25 °C	.....0.006
Specific 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

Components will be custom manufactured. Consult Trans-Tech's Applications Engineering for advice on supports, tuning, and resonator configurations. Frequency accuracy to 0.5% of a customer provided correlation sample is standard.

Temperature Characteristics

Series	Type	Dielectric Constant	Temperature Coefficient of f_0 (τ_f) ± 2	Q at 10 GHz
D/C 87	35	30.7 ± 1	± 4 ppm/ $^{\circ}$ C	>10,000
D/C 87	34	30.4 ± 1	± 2 ppm/ $^{\circ}$ C	>10,000
D/C 87	33	30.0 ± 1	0 ppm/ $^{\circ}$ C	>10,000
D/C 87	32	29.0 ± 1	-2 ppm/ $^{\circ}$ C	>10,000

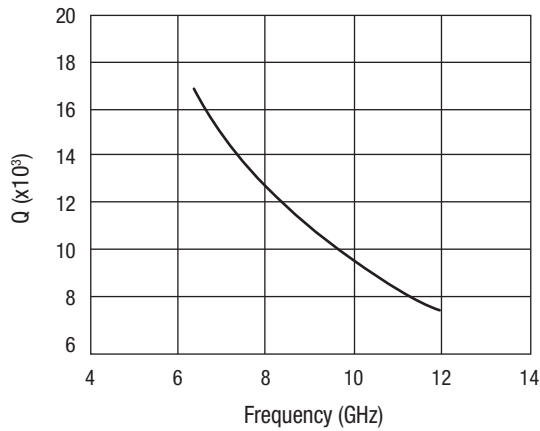
Contact factory for custom τ_f and other tolerances.



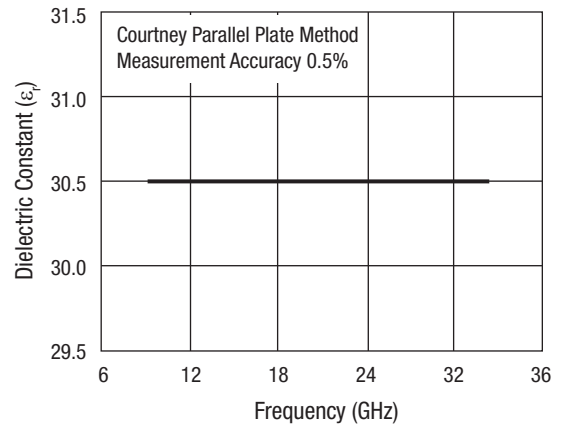
	Disk	Cylinder
Diameter Range		
D_r	0.405–0.076	0.405–0.245
L_r	35% to 45% of D_r	35% to 45% of D_r
d_r	N/A	0.083
Frequency Range (GHz)		
	5550 to 32150	5550 to 9870

Contact factory for custom sizes.

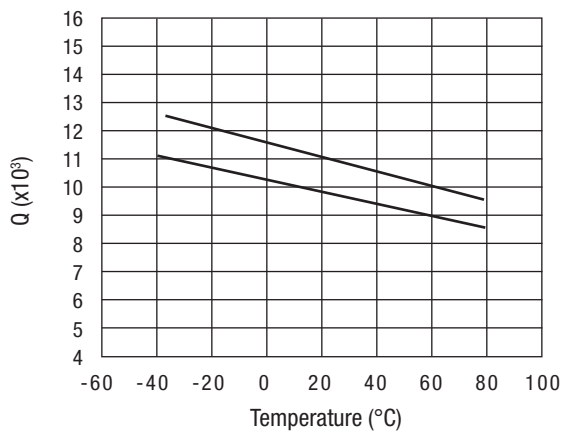
Typical Performance Data



Typical Q vs. Frequency



Typical (ϵ_r) vs. Frequency



Typical Q vs. Temperature @ 10 GHz

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