

**DATA SHEET**

# 8300 Series: Temperature Stable Resonators

**Features**

- High  $\epsilon'$
- High Q
- Linear  $\tau_f$
- Frequency stability vs. temperature

**Benefits**

- Reduced size and weight
- Low loss
- Close channel spacing
- Ease of temperature compensation

**Applications**

- AMPS/GSM/PCS/DBS/TVRO
- Dielectric resonator oscillators
- Microwave filters and combiners

**Introduction**

8300 is Trans-Tech's standard material for PCS/PCN/DCS/GSM application, combining good Q with reasonable cost. A wide range of temperature coefficients is available.

**Size Recommendations**

Common sizes accommodate frequencies from 0.8–13.5 GHz. Trans-Tech's market leadership in this area has given us experience to guide designers toward the best mechanical configuration for optional performance in customer cavities.



**Material Characteristics**

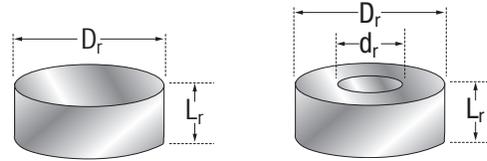
Dielectric constant	.....35.0–36.5
Temperature coefficient of resonant frequency ( $\tau_f$ ) (ppm/°C)	.....-3 to +9
Q (1/tan $\delta$ ) min	.....9,500 at 4.3 GHz .....and 28,000 at 850 MHz
Insulation resistance (ohm cm) (volume resistivity) @ 25°C	.....~10 <sup>13</sup>
Thermal expansion (ppm/°C) (20–200 °C)	......10
Thermal conductivity (cal/cm sec°C) @ 25 °C	......0.0045
Specific heat (cal/g °C)	......0.15
Density (g/cc)	.....>.4.65
Water absorption (%)	.....<.0.01
Composition	.....Titanate Based
Color	......Rust

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 $f_0$ ( $\tau_f$ ) $\pm 2$	Q at 4.3 GHz
D/C83	74	36.5 $\pm$ 1	+9 ppm/ $^{\circ}$ C	>9,500
D/C83	73	36.0 $\pm$ 1	+6 ppm/ $^{\circ}$ C	>9,500
D/C83	72	35.7 $\pm$ 1	+3 ppm/ $^{\circ}$ C	>9,500
D/C83	71	35.5 $\pm$ 1	0 ppm/ $^{\circ}$ C	>9,500
D/C83	70	35.0 $\pm$ 1	-3 ppm/ $^{\circ}$ C	>9,500

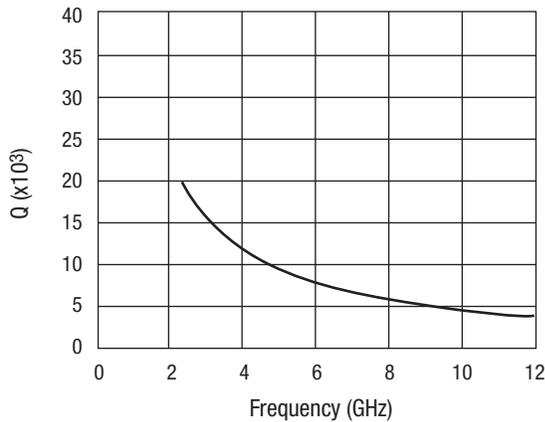
Contact factory for custom  $\tau_f$  and other tolerances.



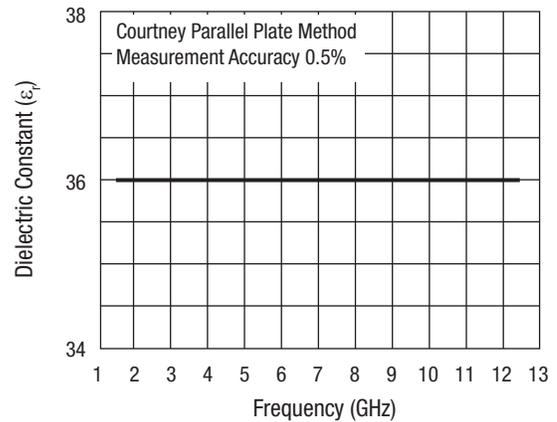
	Disk	Cylinder
<b>Diameter Range</b>		
$D_r$	0.975–0.160	1.400–0.245
$L_r$	35% to 45% of $D_r$	35% to 45% of $D_r$
$d_r$	N/A	0.162–0.083
<b>Frequency Range (GHz)</b>		
	2080 to 13800 MHz	1450 to 9010 MHz

Contact factory for custom sizes.

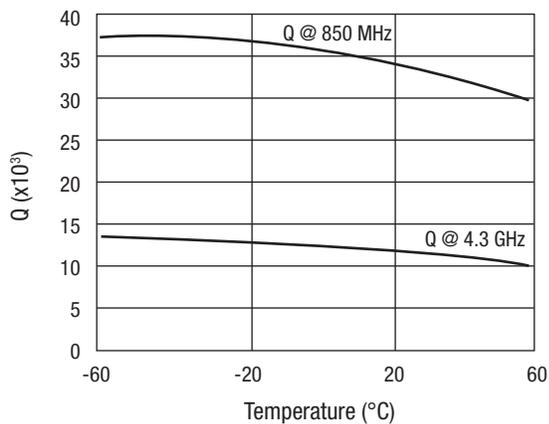
### Typical Performance Data



Typical Q vs. Frequency



Typical ( $\epsilon_r$ ) vs. Frequency



Typical Q vs. Temperature

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