

## DATA SHEET

## 2900 Series: Temperature-Stable Resonators

### Applications

- Microwave filters
- PCS/DCS filters and combiners

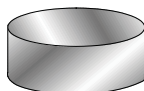
### Features

- 100,000  $Q_u \times F$  product at 1 GHz
- Matching tuners available
- Matching low-loss Alumina supports available
- Lowest possible insertion loss
- Small size
- Frequency stability vs temperature

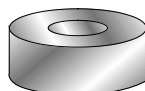
### Description

Trans-Tech offers the D2900 series ceramic resonators, which are optimized for high  $Q_u$  in the 1800 to 2000 MHz range, especially for low-loss PCS and DCS filter and combiner applications. This  $Q_u \times F$  product is cavity-dependent, but is generally 100,000 or more. Although usually cylindrical, virtually all parts are customer-specific geometries that are unique to the application. For example, combiner resonators may have large inner diameters (IDs) to permit dielectric tuning with a moveable slug of the same or similar material. Alternatively, the resonator may have a small hole for mounting purposes and might be tuned by a moveable ceramic disc.

We recommend high-purity Alumina supports to retain the high  $Q_u$ -factor, and we provide custom resonator/support assemblies bonded with proprietary adhesives. Resonators or resonator/support assemblies are sized to frequency, typically  $\pm 5$  MHz tolerance, in customer-specified cavities, and 100% inspected. Please contact us with your specific requirements.



Disk



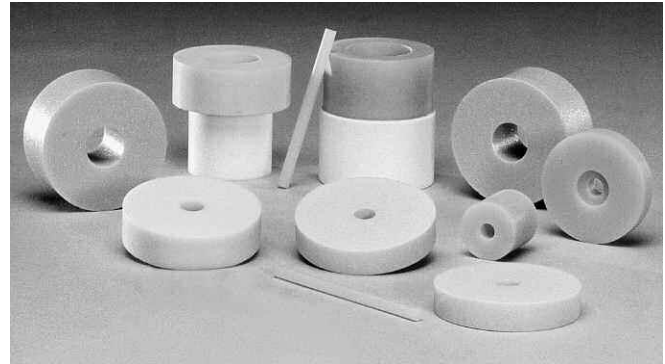
Cylinder



Trans-Tech products are compliant with all applicable legislation and are halogen-free.



For additional information, refer to *Trans-Tech's* document RFC-F0028, RFC-F0029, and RFC-F0022



**Table 1. Temperature Characteristics for Series D/C29**

Type	Dielectric Constant	Temperature Coefficient of $f_0$ ( $\tau_f \pm 2$ (ppm/°C))	Q at 2 GHz
14	30.7 $\pm 1$	+4 ppm/°C	~50,000
12	30.4 $\pm 1$	+2 ppm/°C	
00	30.0 $\pm 1$	0 ppm/°C	
02	29.0 $\pm 1$	-2 ppm/°C	

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	~50,000 at 2.0 GHz
Thermal expansion (ppm/°C) (20°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
Composition	Ba, Zn, Ta-oxide (perovskite)
Color	Yellow

**Table 3. Typical Sizes**

PCS	1.20" OD x 0.6" ID x 0.6" height	2000 MHz
DCS	1.33" OD x 0.6" ID x 0.6" height	1834 MHz

Custom sizes available for 1500 to 5550 MHz.

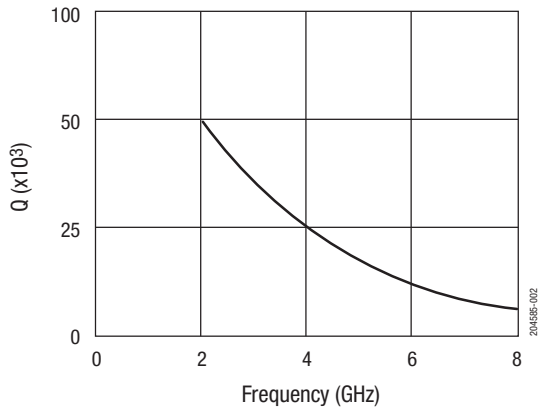


Figure 2. Typical Q vs Frequency

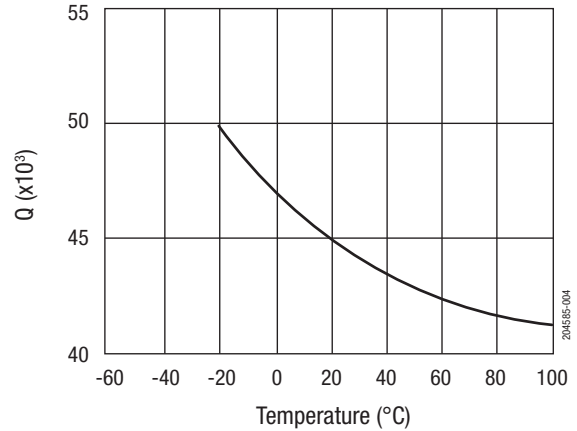


Figure 3. Typical Q vs Temperature @ 2 GHz

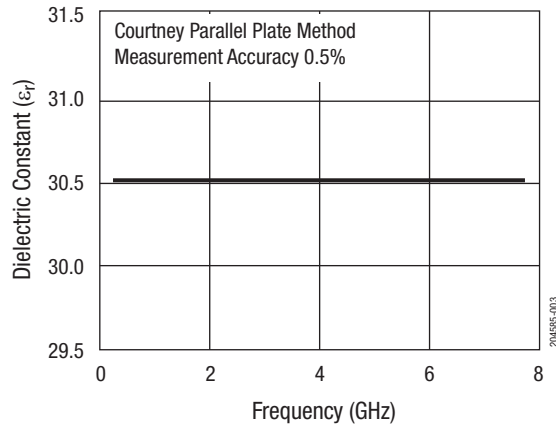


Figure 4. Typical (ε<sub>r</sub>) vs Frequency

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