

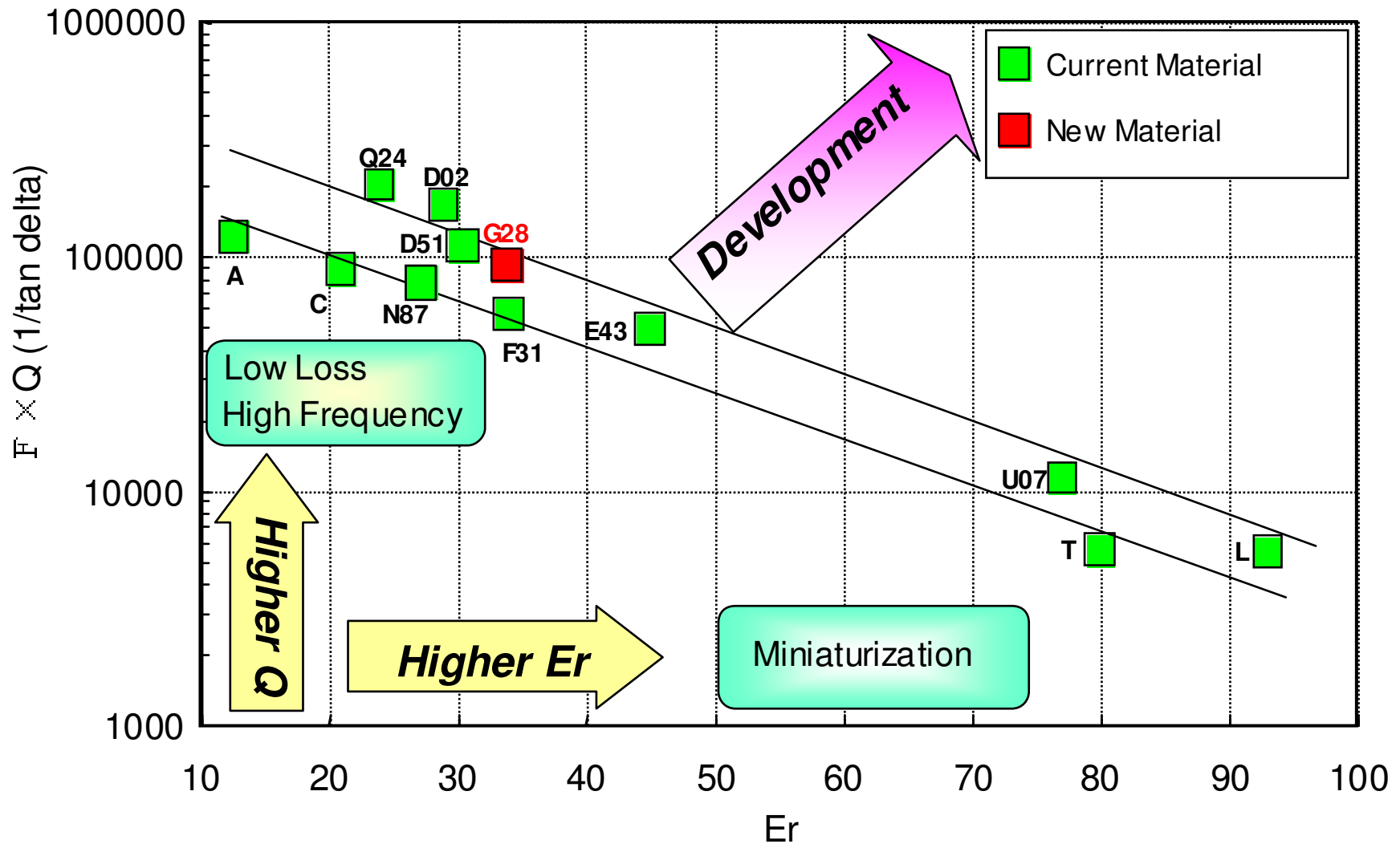


NTK Dielectric Material



Development Trend of Dielectric Material

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COMMUNICATION MEDIA COMPONENTS GROUP

NGK SPARK PLUG CO.,LTD
871-6,Hosokoshi, Enza, ISE, MIE,JAPAN

Ver.4

Characteristics of NTK Dielectric Material

NEW

ITEM \ MATERIAL	A	C	Q24	N87	D02	D51	F31	G28	E43	U07	T	L	KP-99C
DIELECTRIC CONSTANT	12.6	21	24	27	29	30	34	34	45	78	80	93	9.8
TEMP. COEF. OF FREQ. (ppm/°C)	+12	0	-2	+3	0~+4.5	-0.5	-1~+11	-2.5~+6.5	-3.5~+12.5	0	+13	+9	-60
Q VALUE (1/tanδ) (measured freq.)	17,200 (7.0GHz)	10,300 (6.0GHz)	40,300 (5.0GHz)	15,400 (5.0GHz)	33,000 (5.0GHz)	26,000 (5.0GHz)	14,000 (4.5GHz)	18,000 (4.5GHz)	12,000 (4.0GHz)	3,300 (3.0GHz)	1,850 (3.0GHz)	1,600 (3.0GHz)	18,100 (8.0GHz)
VOLUME RESISTIVITY (ohm/cm)	1.1×10 ¹⁴	—	—	—	3.2×10 ¹⁵	—	1.1×10 ¹³	—	—	—	7.6×10 ¹⁴	—	—
THERMAL EXPANSION (ppm/°C)	7.6	11.3	9.1	9.5	9.5	10.7	8.9	9.5	10.1	8.8	10.0	9.8	8.3
DENSITY (g/cm ³)	3.9	3.8	7.3	6.2	7.6	6.9	4.5	6.3	4.7	5.6	5.4	5.7	3.9
BENDING STRENGTH (kg/cm ²)	3,900	2,000	—	1,120	900	—	1,400	860	2,300	—	2,000	2,000	3,000
THERMAL CONDUCTIVITY (W/mK)	25.1	8.4	3.2	2.7	3.8	3.8	1.8	2.9	2.8	2.6	2.8	1.7	33.4
WATER ABSORPTION (%)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01













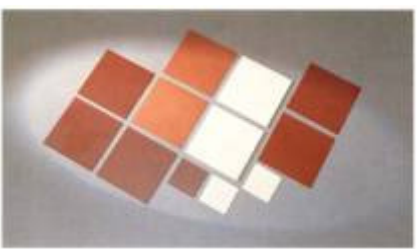
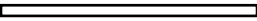


NTK Dielectric Resonators

➤ ***Shape and Type of Dielectric Resonator and Dielectric Substrate***

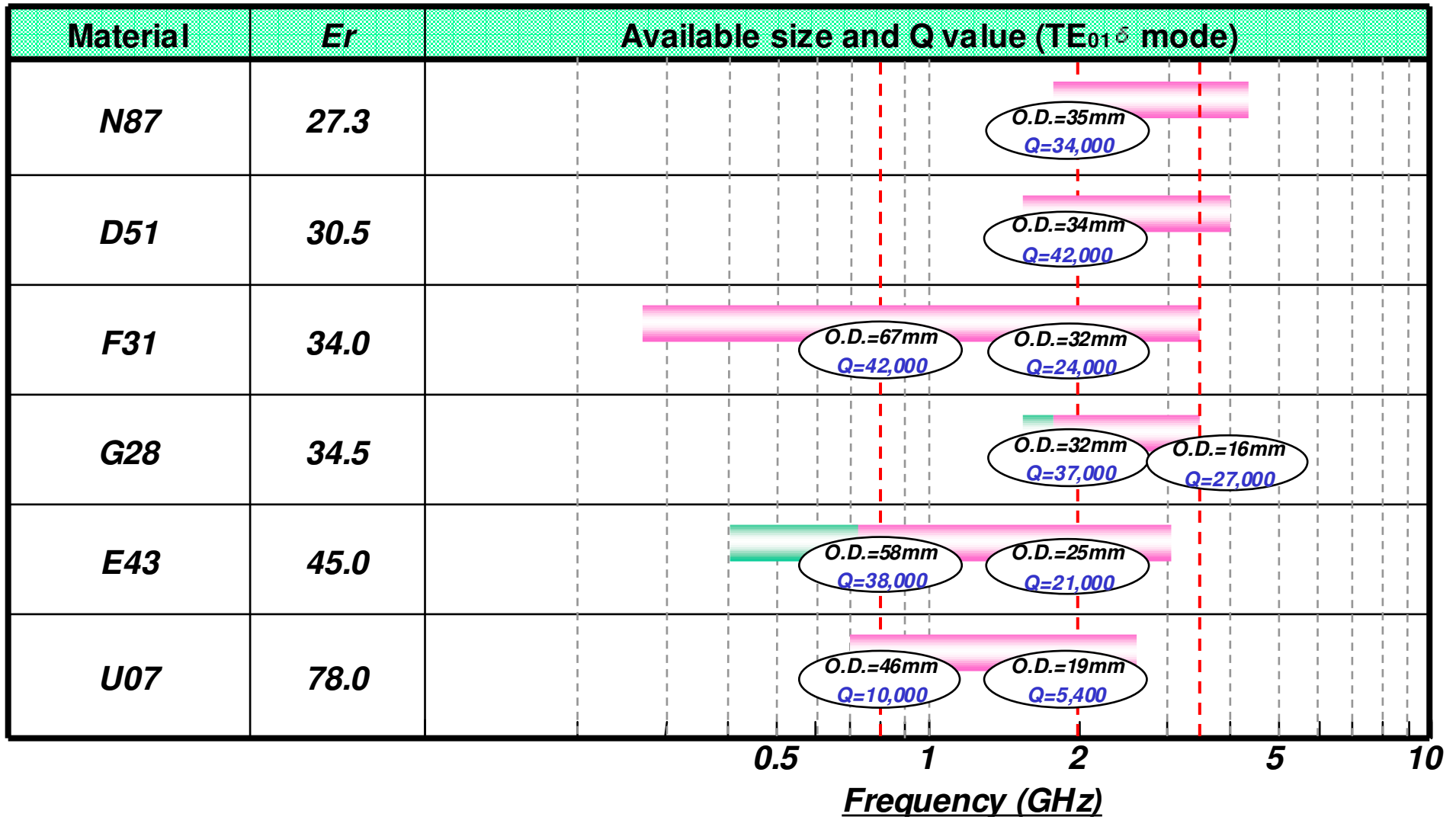
➤ ***Development Trend of Dielectric Resonator***

Shape and Type of Dielectric Resonator and Dielectric Substrate

Item	Dielectric Resonator			Support
Type	<i>MDD (TE mode)</i>	<i>MDD (TM mode)</i>	<i>MDC</i>	<i>MDP</i>
Shape	 	 	 	 
Item	Dielectric Resonator with Support		Dielectric Substrate	
Type	<i>MDE</i>	<i>MDG</i>	<i>MDS</i>	
Shape	 	 	 	

Available Size and Q value of Resonator

 Available Now
 Under Review





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Available T_f of Resonator

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