

40.000 kHz 4.0 x 6.0 mm cylindrical electrical specification

1] The maximum rating

	Item	Symbol	Rating	Note
1	Storage temperature range	Tsto	-30~+70°C	
2	Maximum drive level	DL max	1.0 μW max.	

2] Recommended Operating Condition

	Item	Symbol	Rating	Note
1	Operating temperature range	Tope	-20~+60°C	
2	Drive level	DL	0.1 μW typ.	

3] Electrical -Characteristics

Measurement temperature :25±2°C

	Item	Symbol	Specifications	Conditions
1	Nominal frequency	F ₀	40.000 kHz	
2	Frequency tolerance	Δf/f ₀	± 20 × 10 ⁻⁶	
3	Load capacitance	C _L	10.0 pF	
4	Equivalent series resistance	R ₁	65 kΩ max.	Measured with ATI 4192A Impedance analyzer. OSC LEVEL = 0.05V
5	Motional capacitance	C ₁	2.0 fF typ.	
6	Shunt capacitance	C ₀	0.8 pF typ.	Measured with ATI 4192A Impedance analyzer. OSC LEVEL = 0.1V
7	Turnover temperature	Tp	25 ± 8°C	Measure this coefficient at 3 points of 10°C, 25°C, and 40°C using C-MOS circuit.
8	Temperature coefficient	k	(-3.5±1.0) × 10 ⁻⁸ /°C ²	
9	Aging	Δf/f ₀	± 10 × 10 ⁻⁶ / year	25±3°C、 First year
10	Insulation resistance	IR	500 MΩ min.	Measured with ATI 4329A Insulation Resistance Meter. Apply DC100V.

60.000 kHz 4.0 x 6.0 mm cylindrical electrical specification

1] The maximum rating

	Item	Symbol	Rating	Note
1	Storage temperature range	Tsto	-30~+70°C	
2	Maximum drive level	DL max	1.0 μW max.	

2] Recommended Operating Condition

	Item	Symbol	Rating	Note
1	Operating temperature range	Tope	-20~+60°C	
2	Drive level	DL	0.1 μW typ.	

3] Electrical -Characteristics

Measurement temperature :25±2°C

	Item	Symbol	Specifications	Conditions
1	Nominal frequency	F ₀	60.000 kHz	
2	Frequency tolerance	Δf/f ₀	± 20 × 10 ⁻⁸	
3	Load capacitance	C _L	10.0 pF	
4	Equivalent series resistance	R ₁	50 kΩ max.	Measured with ATI 4192A Impedance analyzer. OSC LEVEL = 0.05V
5	Motional capacitance	C ₁	1.6 fF typ.	
6	Shunt capacitance	C ₀	0.75 pF typ.	Measured with ATI 4192A Impedance analyzer. OSC LEVEL = 0.1V
7	Turnover temperature	Tp	25 ± 8°C	Measure this coefficient at 3 points of 10°C, 25°C, and 40°C using C-MOS circuit.
8	Temperature coefficient	k	(-3.5±1.0) × 10 ⁻⁸ /°C ²	
9	Aging	Δf/f ₀	± 10 × 10 ⁻⁸ / year	25±3°C、 First year
10	Insulation resistance	IR	500 MΩ min.	Measured with ATI 4329A Insulation Resistance Meter. Apply DC100V.

77.500 kHz 4.0 x 6.0 mm cylindrical electrical specification

1] The maximum rating

	Item	Symbol	Rating	Note
1	Storage temperature range	Tsto	-30~+70°C	
2	Maximum drive level	DL max	1.0 μW max.	

2] Recommended Operating Condition

	Item	Symbol	Rating	Note
1	Operating temperature range	Tope	-20~+60°C	
2	Drive level	DL	0.1 μW typ.	

3] Electrical -Characteristics

Measurement temperature :25±2°C

	Item	Symbol	Specifications	Conditions
1	Nominal frequency	F ₀	77.5000 kHz	
2	Frequency tolerance	Δf/f ₀	± 20 × 10 ⁻⁶	
3	Load capacitance	C _L	10.0 pF	
4	Equivalent series resistance	R ₁	50 kΩ max.	Measured with ATI 4192A Impedance analyzer. OSC LEVEL = 0.05V
5	Motional capacitance	C ₁	1.3 fF typ.	
6	Shunt capacitance	C ₀	0.7 pF typ.	Measured with ATI 4192A Impedance analyzer. OSC LEVEL = 0.1V
7	Turnover temperature	Tp	25 ± 8°C	Measure this coefficient at 3 points of 10°C, 25°C, and 40°C using C-MOS circuit.
8	Temperature coefficient	k	(-3.5±1.0) × 10 ⁻⁸ /°C ²	
9	Aging	Δf/f ₀	± 10 × 10 ⁻⁶ / year	25±3°C、 First year
10	Insulation resistance	IR	500 MΩ min.	Measured with ATI 4329A Insulation Resistance Meter. Apply DC100V.

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