

MULTILAYER CERAMIC SUBSTRATES

[LTCC (Low Temperature Co-fired Ceramic)]

■ Features

Materialization of high-density, multi-functional products for high-frequency use

- A thick-film Ag electrode with excellent solder wettability is used.
- Plated electrodes are used for wire bonding.
- Alumina ceramic with excellent thermal expansion is applicable to high-reliability bare chip mounting.
- The multilayer glass ceramic is applicable to wiring with high flexibility.
- The high-Q substrate and $3m\Omega/\square$ wiring resistance are applicable to high-frequency characteristics.
- The built-in distributed parameter line is applicable to high-density mounting.
- Various trimming patterns for parameter control substantially facilitate the mounting process.



■ Applications

- VCO substrate
- Various high-frequency circuit modules
- Sensor package

■ Characteristic

Item	LTCC	unit
Type	ML07	
Dielectric Constant	7.5	@1GHz
f · Q	>3500	GHz
f	0 ± 10	ppm/
Density	2.9	g/cm ³
Thermal Expansion Coefficient	5.3	ppm/
Thermal Conductivity	3.6	W/m · K
Bending Strength	>260	MPa
Volume Resistivity	>10 ¹²	· cm(100VDC)
Withstand Voltage	>2.0	KV/100 μ m

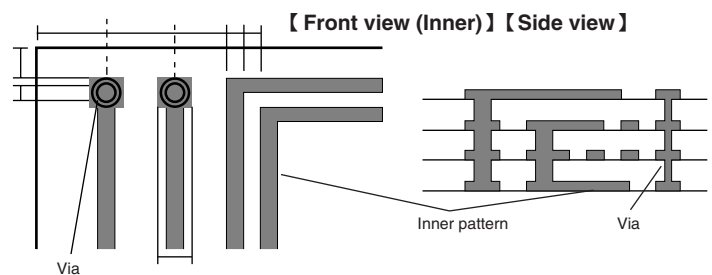
■ Design rule

Item	LTCC		unit
	Special	Standard	
Grade	Special	Standard	
Dimension	120 x 100mm Max		The design rules that meet the needs of market are strictly observed to offer products.
Tolerance	0.25%	0.50%	
Layer Thickness	0.10/0.12/0.15/0.18		
Camber	0.20%	0.40%	
Inner Electrode	Ag: 3m /		
Surface Electrode	Ag/(Cu): 3m /		
Plating	(Ni - Au)		
Cavity	Non	Possible	
Embedded Components	L, C		
Thick Film Resistors	Possible	Non	

[Common design rules for HTCC and LTCC]

■ Inner

Dimensions	Recommended dimensions (MIN)	
Via Diameter	0.20	(0.10)
Via Land	0.40	(0.30)
Via to Line	0.40	(0.30)
Via to Via	0.60	(0.40)
Line Width	0.20	(0.10)
Via to Edge	0.80	
Line to Edge	0.50	
Line Spacing	0.15	



■ Surface

Dimensions	Recommended dimensions (MIN)	
Via Diameter	0.20	(0.10)
Via Land	0.40	(0.30)
Via to Line	0.40	(0.30)
Via to Via	0.60	(0.40)
Line Width	0.20	(0.10)
Via to Edge	0.80	
Line to Edge	0.50	
Line Spacing	0.20	
SMD Pad Spacing	0.50	
WB Pad Spacing	0.20	

