

Large-stroke High-fidelity Square-pipe PZN-PT Single Crystal d32-mode “Stake” Actuator (WIPO/PAT No.:2013/100860 A1)



Key Features:

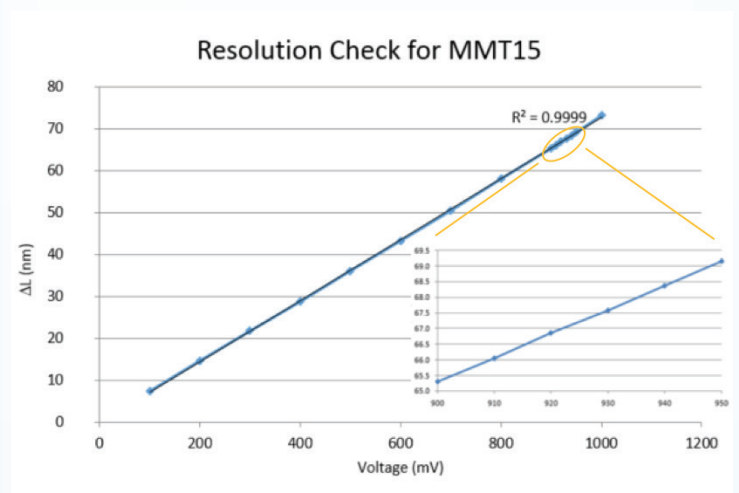
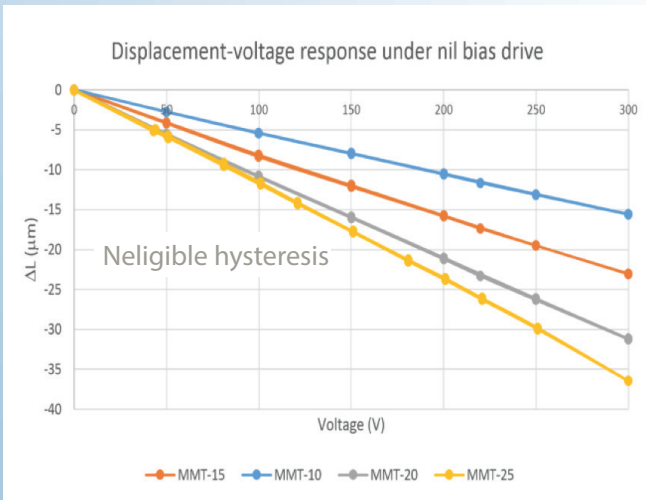
- Compact & light (<5g)
- Large stroke with negligible hysteresis, suitable for open loop control
- >50 N blocking force under +300V d.c. bias drive
- Nanometer resolution, microsecond response
- Add-on strain gage available
- A central hole may be incorporated for pre-loading purposes

Feature	MMT-10	MMT-15	MMT-20	MMT-25
Dimensions: A x A x L (mm)	5 x 5 x 13	5 x 5 x 18	5 x 5 x 23	5 x 5 x 28
ΔL (μm) @ +300V under zero bias drive; $\pm 10\%$	-15	-23	-29	-37
ΔL (μm) @ 0V under +300V bias drive, $\pm 10\%$	15	23	29	37
Blocking force (N) @ 0V under +300V bias drive	57	57	57	57
Resonant Frequency-free-free ends (kHz)	35	27	21	17
Capacitance, C_p (nF) @ 1 kHz; $\pm 20\%$	12	17	22.5	32
Usable temperature range ($^{\circ}\text{C}$)	-20 to 65			

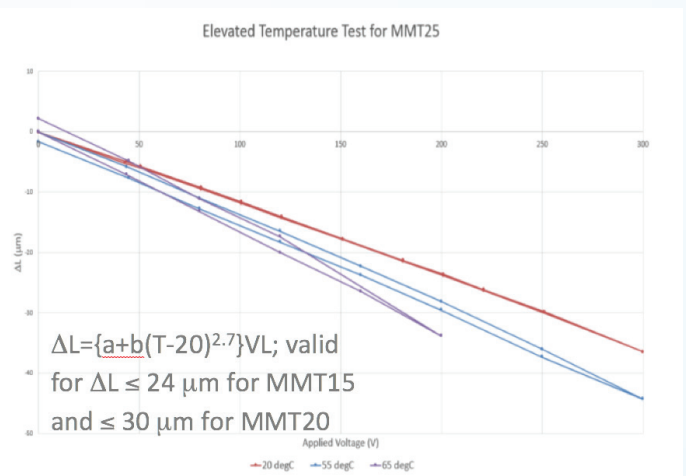
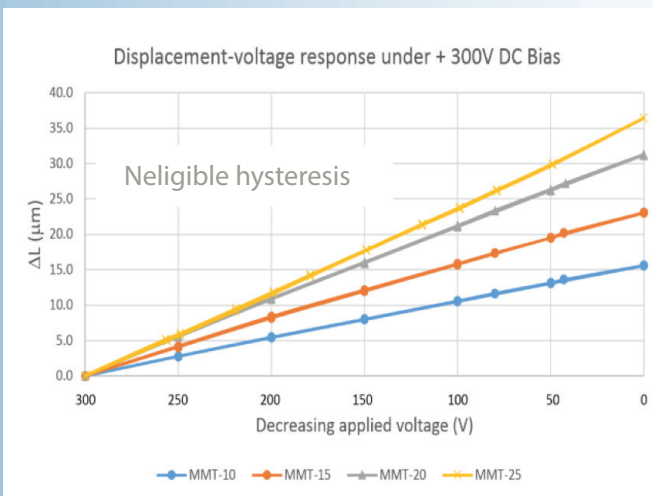
Other performance specifications including custom specifications and other cross-sections (e.g., triangular pipe, 6-and 8-sided polygonal pipes, etc) are also available.

Applications:

- Micro and nano-positioning of precision instruments and machinery
- Fine positioning and tilt control in laser communications
- Deformable mirrors; actuator array surfaces
- Motor section for low Frequency Sonar
- Industrial, medical, aviation applications requiring compact and light piezo actuators

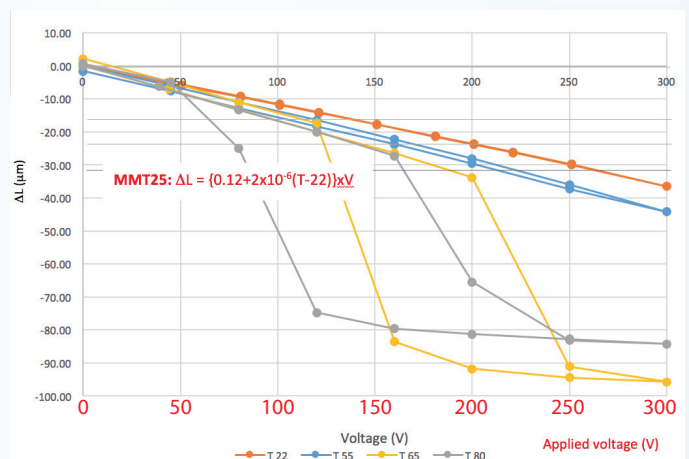
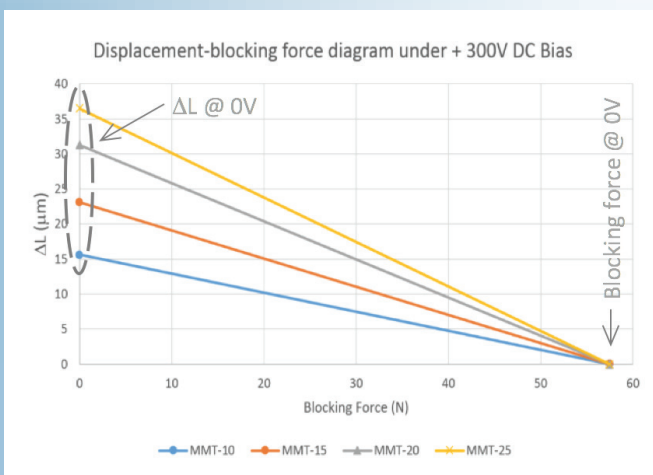


Displacement resolution check for MMT15



Displacement-voltage responses under nil (top) and +300V (bottom) bias drive.

Elevated temperature tests for MMT25. The curves fit the expression: $\Delta L = \{a + b(T-20)^{2.7}\}VL$ where T is in ΔC, V in volt, ΔL in μm and L in mm; a=0.0048 and b=8x10-8.



Displacement-blocking force diagram under +300V bias drive

Top figure: Elevated temperature test for MMT15 (say, at 22, 35, 50 and 65°C)
Elevated temperature tests under nil bias drive for MMT15 (top)

