

# SM10T019-24.0M Miniature SMD Crystal

October 2013

- Pletronics' SM10T Series is a miniature surface mount crystal.
- Package is ideal for automated surface mount assembly and reflow practices.
- Tape and Reel packaging
- 2.5 x 3.2 mm 4 pad
- AT Cut Fundamental Crystal
- Ideal for use in hand held consumer products



**Pletronics Inc. certifies this device is in accordance with the RoHS 6/6 (2011/65/EC) and WEEE (2002/96/EC) directives.**

Pletronics Inc. guarantees the device does not contain the following:

Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's

Weight of the Device: 0.03 grams

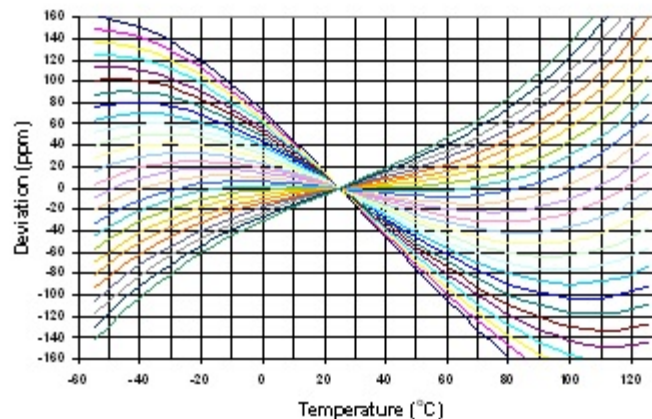
Moisture Sensitivity Level: 1 As defined in J-STD-020D.1

Second Level Interconnect code: e4

### Electrical Specification: 24.000MHz at 20pF $C_{LOAD}$

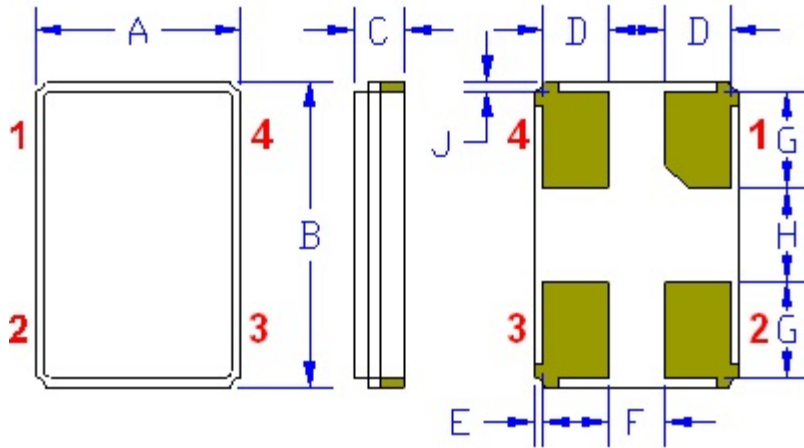
Item	Min	Max	Unit	Condition
Calibration Frequency Tolerance	-30	+30	ppm	at +25°C ± 3°C
Frequency Stability	-50	+50	ppm	-40°C to 85°C referenced to 25°C
$C_{LOAD}$	20.0		pF	
Equivalent Series Resistance (ESR)	-	30	Ohms	
Drive Level	-	500	µW	use 10 µW for testing
Shunt Capacitance ( $C_0$ )	-	7	pF	Pad to Pad capacitance
Aging at 25°C ± 3°C	-5	+5	ppm /Yr	for the first year, at +25°C ± 3°C
	-10	+10	ppm /20Yr	for the 20 year, at +25°C ± 3°C
Operating Temperature Range	-40	+85	°C	
Storage Temperature Range	-45	+125	°C	

### AT Cut Crystal Frequency versus Temperature Typical Performance:





### Mechanical:



	Inches	mm
A	0.098 ± 0.004	2.5 ± 0.15
B	0.126 ± 0.004	3.2 ± 0.15
C	0.028 max	0.7 max
D <sup>1</sup>	0.028 to 0.031	0.7 to 0.8
E <sup>1</sup>	0.004	0.1
F <sup>1</sup>	A - (2 * (D + E))	
G <sup>1</sup>	0.035	0.9
H <sup>1</sup>	0.047	1.2
J <sup>1</sup>	0.004	0.1

The chamfered pad may or may not be present and may be on any pad

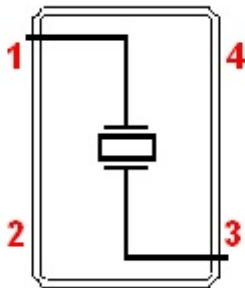
#### Contacts :

Gold 11.8 μinches 0.3 μm minimum over  
 Nickel 50 to 350 μinches 1.27 to 8.89 μm

Not to Scale

<sup>1</sup> Typical dimensions

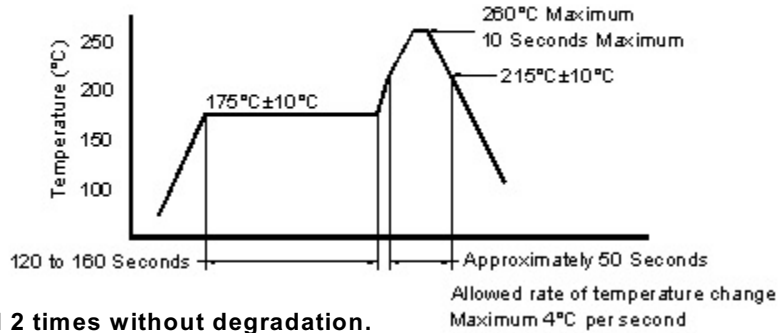
### Connection (top view):



Pad 2 and Pad 4 are common and connected to the metal cover. They are not connected to the crystal. Connected to ground is recommended

The crystal is symmetrical, there is no Pad 1 preference. The part can be rotated 180° when being assembled on the PCB and will still perform correctly.

### Reflow Cycle (typical for lead free processing)

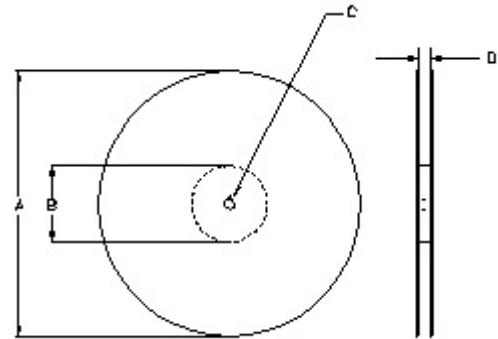


The part may be reflowed 2 times without degradation.

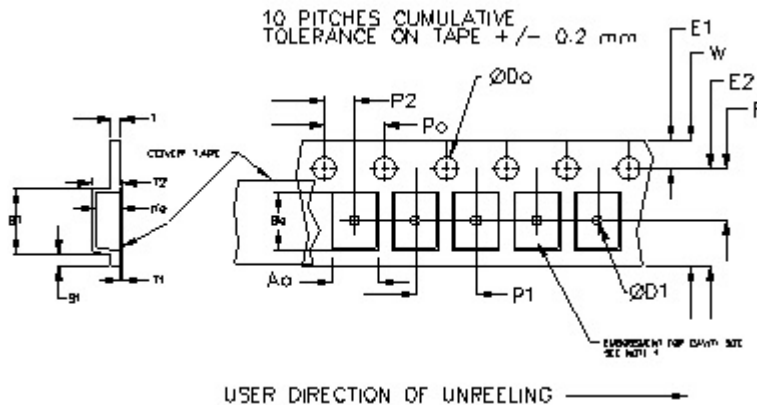
### Tape and Reel: available for quantities of 250 to 3000 per reel (<1000 will be cut tape)

Constant Dimensions Table 1								
Tape Size	D0	D1 Min	E1	P0	P2	S1 Min	T Max	T1 Max
8mm	1.5	1.0	1.75	4.0	2.0 +0.05	0.6	0.25	0.1
12mm		1.5			2.0 ±0.1			
16mm		+0.1 -0.0			±0.1			
24mm		1.5			±0.1			

Variable Dimensions Table 2							
Tape Size	B1 Max	E2 Min	F	P1	T2 Max	W Max	Ao, Bo & Ko
8 mm	3.5	6.4	1.7 ± 0.1	4.0 ± 0.1	1.0	8.9	Note 1



Note 1: Embossed cavity to conform to EIA-481-B Dimensions in mm Not to scale



		REEL DIMENSIONS			Tape Width
A	inches	7.0	10.0	13.0	
	mm	177.8	254.0	330.2	
B	inches	2.50	4.00	3.75	
	mm	63.5	101.6	95.3	
C	mm	13.0 +0.5 / -0.2			
D	mm	8.4 +2.0 -0.0	8.4 +2.0 -0.0	8.4 +2.0 -0.0	8.0

Reel dimensions may vary from the above

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