PLETRONICS
Innovations in
Frequency Control

SM12T Series
Miniature SMD Crystal

February 2015

- Pletronics' SM12T Series is a miniature surface mount crystal.
- Package is ideal for automated surface mount assembly and reflow practices.
- Tape and Reel packaging
- 10 MHz to 80 MHz Fundamental Mode
- 40 MHz to 150 MHz 3rd Overtone
- 3.5 x 6 mm 4 pad
- AT Cut 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.

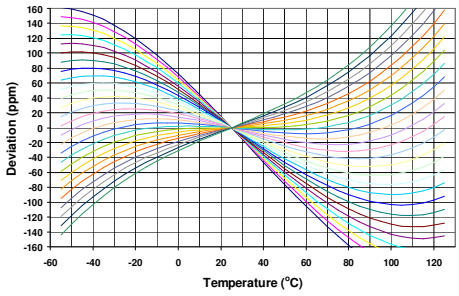
Pletronics Inc. guarantees the device does not contain the following:
Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's
Weight of the Device: 0.06 grams
Moisture Sensitivity Level: 1 As defined in J-STD-020C
Second Level Interconnect code: e4

Lead Free

Electrical Specification:

Item	Min	Max	Unit	Condition	
Frequency Range	10	80	MHz	Fundamental Mode	
	40	150	MHz	3rd Overtone	
Calibration Frequency Tolerance	10	50	ppm	at +25°C ± 3°C, see part number for options	
Frequency Stability over OTR	3	150	ppm	see part number for available options	
Equivalent Series Resistance (ESR)	-	60	Ohms	10 MHz to 16 MHz	Fundamental
	-	50	Ohms	16 MHz to 50 MHz	
	-	100	Ohms	40 MHz to 150 MHz	3rd Overtone
Drive Level	-	100	µW	use 10 µW for testing	
Shunt Capacitance (C0)	-	5	pF	Pad to Pad capacitance	
Aging	-3	+3	ppm /Yr	for the first year	
	-2	+2	ppm /Yr	after the first year	
Operating Temperature Range	-40	+125	°C	see part number for available options	
Storage Temperature Range	-55	+125	°C		

AT Cut Crystal Frequency versus Temperature Typical Performance:



Product information is current as of publication date. The product conforms to specifications per the terms of the Pletronics standard warranty. Production processsing does not necessarily include testing of all parameters.

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SM12T Series
Miniature SMD Crystal
February 2015

Part Number:

SM12T	-18	-14.31818M-	20	E	1	L	K	-XX

See chart below for available options

Internal code or blank

Highest Specified Operating Temperature

A = 40°C	**G** = 70°C	**N** = 100°C
B = 45°C	**H** = 75°C	**P** = 105°C
C = 50°C	**J** = 80°C	**R** = 110°C
D = 55°C	**K** = 85°C	**S** = 115°C
E = 60°C	**L** = 90°C	**T** = 120°C
F = 65°C	**M** = 95°C	**U** = 125°C

Lowest Specified Operating Temperature

A = +10°C	**F** = -15°C	**L** = -40°C
B = +5°C	**G** = -20°C	**M** = -45°C
C = 0°C	**H** = -25°C	**N** = -50°C
D = -5°C	**J** = -30°C	**P** = -55°C
E = -10°C	**K** = -35°C	

Mode: **1** = Fundamental **3** = 3rd Overtone

Frequency Stability See chart below

Calibration Frequency Tolerance

10 = ± 10 ppm at 25°C ± 3°C
15 = ± 15 ppm at 25°C ± 3°C
20 = ± 20 ppm at 25°C ± 3°C
50 = ± 50 ppm at 25°C ± 3°C (Standard)

Frequency in MHz

Cload in pF
Parallel Resonance from **06** to **32** pF or
SR = Series Resonance

Series Model

Operating Temperature Range		Available Frequency Stability versus Temperature in ppm									
		A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**
	CODE	± 3.0	± 5.0	± 8.0	± 10	± 15	± 20	± 30	± 50	± 100	± 150
0 to +45°C	**CB**	●	●	●	●	●	●	●	●	●	●
0 to +50°C	**CC**	●	●	●	●	●	●	●	●	●	●
0 to +60°C	**CE**	●	●	●	●	●	●	●	●	●	●
0 to +70°C	**CG**		●	●	●	●	●	●	**STD**	●	●
-10 to +50°C	**EC**		●	●	●	●	●	●	●	●	●
-10 to +60°C	**EE**		●	●	●	●	●	●	●	●	●
-10 to +75°C	**EH**			●	●	●	●	●	●	●	●
-20 to +70°C	**GG**			●	●	●	●	●	●	●	●
-20 to +75°C	**GH**				●	●	●	●	●	●	●
-30 to +75°C	**JH**				●	●	●	●	●	●	●
-30 to +80°C	**JJ**				●	●	●	●	●	●	●
-30 to +85°C	**JK**				●	●	●	●	●	●	●
-35 to +80°C	**KJ**					●	●	●	●	●	●
-40 to +85°C	**LK**					●	●	●	●	●	●
-40 to +90°C	**LL**					●	●	●	●	●	●
-40 to +105°C	**LP**					●	●	●	●	●	●
-40 to +125°C	**LU**							●	●	●	●

Legacy Part Number (not for new designs):

SM12T	B	E	-18	-11.0592M	-XX

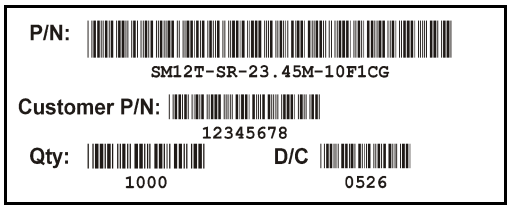
Internal code or blank
Frequency in MHz
Cload in pF Parallel Resonance from **6** to **32** pF or **SR** = Series Resonance
Operating Temperature Range Blank = 0 to + 70ºC **E** = -40 to +85ºC
Calibration Tolerance / **Frequency Stability** Blank = 50/50 (Standard) **A** = 30/50 **B** = 30/30 **C** = 15/30 **D** = 10/20 (not all frequencies)
Model Number

Reliability: Environmental Compliance

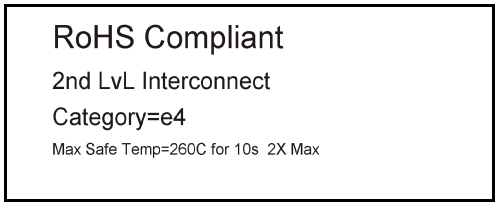
Parameter	Condition
Mechanical Shock	MIL-STD-883 Method 2002, Condition B
Vibration	MIL-STD-883 Method 2007, Condition A
Solderability	MIL-STD-883 Method 2003
Thermal Shock	MIL-STD-883 Method 1011, Condition A

Package Labeling

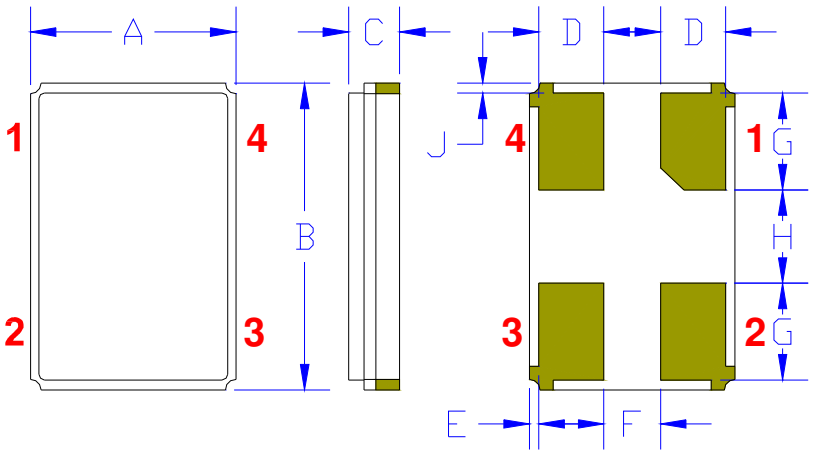
Label is 1" x 2.6" (25.4mm x 66.7mm)
Font is Courier New
Bar code is 39-Full ASCII



Label is 1" x 2.6" (25.4mm x 66.7mm)
Font is Arial



Mechanical:



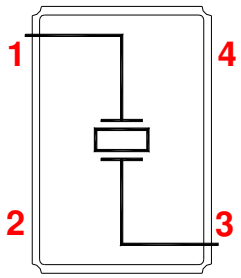
	Inches	mm
A	0.138 ± 0.008	3.5 ± 0.2
B	0.236 ± 0.008	6.0 ± 0.2
C	0.047 max	1.2 max
D[1]	0.035	0.9
E[1]	0.004	0.1
F[1]	0.059	1.5
G[1]	0.055	1.4
H[1]	0.118	3.0
J[1]	0.004	0.1

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

Not to Scale

[1] 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.

Lead Free

Layout and application information

- Trace lengths to the crystal should be kept as short as possible.
- The crystal connections are sensitive to noise.
- The package should be grounded for optimum performance, pad 2 and/or pad 4 connected to ground.

Part Marking:

***fff.fff* M**
P*ymdC*

Where *fff.fff* = frequency in MHz
Pymd = Pletronics and Date code
C = Capacitance load code (see table below)

- Orientation of marking may be mixed on the tape
- Traceability of part is lost once removed from reel

Code	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X	Y
pF	10	12	13	8	15	18	20	22	24	26	28	30	32	34	36	27	series	33	50	19	16	17	14

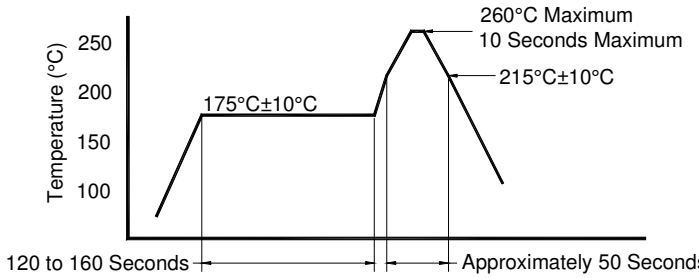
Codes for Date Code YMD

Code	2	3	4	5	6	7	8
Year	2012	2013	2014	2015	2016	2017	2018

Code	A	B	C	D	E	F	G	H	J	K	L	M
Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

Code	1	2	3	4	5	6	7	8	9	A	B	C
Day	1	2	3	4	5	6	7	8	9	10	11	12
Code	D	E	F	G	H	J	K	L	M	N	P	R
Day	13	14	15	16	17	18	19	20	21	22	23	24
Code	T	U	V	W	X	Y	Z					
Day	25	26	27	28	29	30	31					

Reflow Cycle (typical for lead free processing)



The part may be reflowed 2 times without degradation.

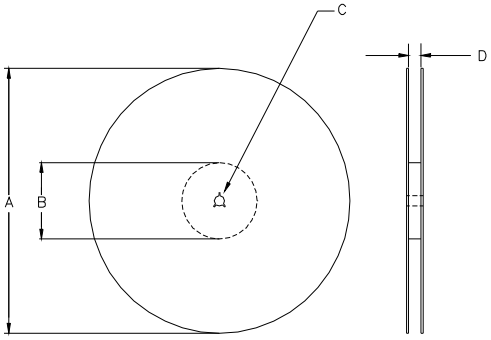
Allowed rate of temperature change
Maximum 4°C per second

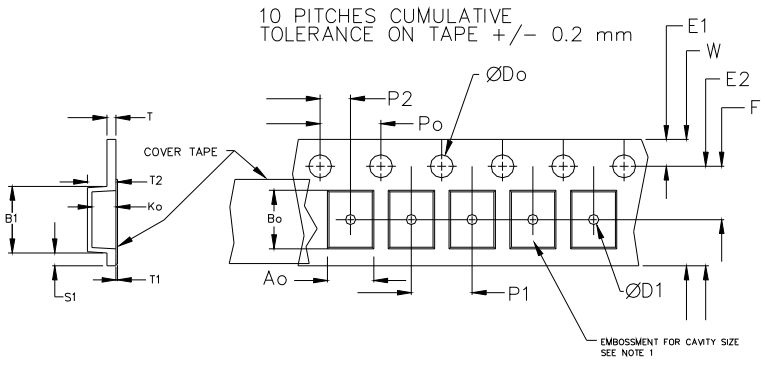
Tape and Reel: available for quantities of 250 to 3000 per reel (<1000 will be cut tape)

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

Variable Dimensions Table 2							
Tape Size	B1 Max	E2 Min	F	P1	T2 Max	W Max	Ao, Bo & Ko
16 mm	12.1	14.25	7.5 ±0.1	8.0 ±0.1	8.0	16.3	Note 1

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





USER DIRECTION OF UNREELING

		REEL DIMENSIONS			
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	Tape Width
C	mm	13.0 +0.5 / -0.2			
D	mm	16.4 +2.0 -0.0	16.4 +2.0 -0.0	16.4 +2.0 -0.0	16.0

Reel dimensions may vary from the above

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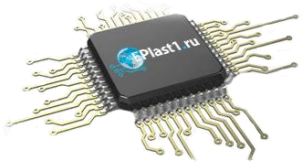

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