



## SM25 / SM30 / SM42 Series Miniature SMD Crystal

January 2014

- The Pletronics' SM42 Series is a miniature surface mount crystal
- The package is ideal for automated surface mount assembly and reflow practices.
- Tape and Reel packaging
- 3 MHz to 70 MHz
- AT Cut Crystal
- SM42: 4.7 x 12.9 x 4.6 mm
- SM30: 4.7 x 12.9 x 3.5 mm
- SM25: 4.7 x 12.9 x 2.9 mm

**Pletronics Inc. certifies this device is in accordance with the  
RoHS (2002/95/EC) and WEEE (2002/96/EC) directives.**

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

Cadmium, Hexavalent Chromium, Lead (<1000 ppm), Mercury, PBB's, PBDE's

Weight of the Device: 0.62 grams

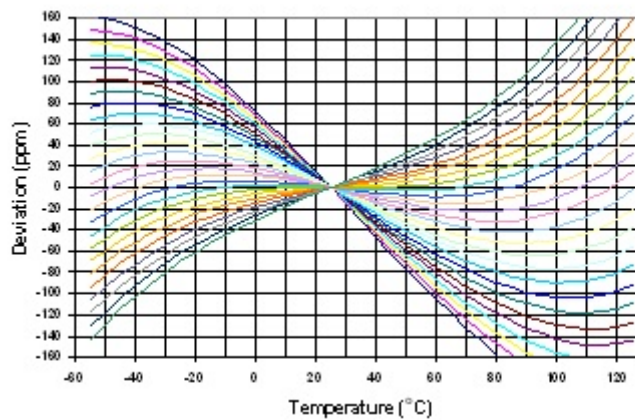
Moisture Sensitivity Level: 1 As defined in J-STD-020C

Second Level Interconnect code: e1, e2 or e3

### Electrical Specification:

Item	Min	Max	Unit	Condition		
Frequency Range	3	70	MHz	AT cut		
Calibration Frequency Tolerance	-	-	ppm	at +25°C ± 3°C	see table on page 3 for available options	
Frequency Stability over OTR	-	-	ppm			
Equivalent Series Resistance (ESR)	-	150	Ohms	3 to 4 MHz	SM42	Fundamental
	-	130	Ohms	4 to 5 MHz	SM30/SM42	
	-	100	Ohms	5 to 6 MHz	SM30/SM42	
	-	90	Ohms	6 to 7 MHz	SM30/SM42	
	-	80	Ohms	7 to 9 MHz	SM30/SM42	
	-	70	Ohms	9 to10 MHz	SM25/SM30/SM42	
		60	Ohms	10 to 13 MHz	SM25/SM30/SM42	
		50	Ohms	13 to 15 MHz	SM25/SM30/SM42	
		40	Ohms	15 to 27 MHz	SM25/SM30/SM42	
	-	30	Ohms	27 to 36 MHz	SM25/SM30/SM42	
	-	100	Ohms	27 to 32 MHz	SM25/SM30/SM42	3 <sup>rd</sup> Overtone
	-	80	Ohms	32 to 50 MHz	SM25/SM30/SM42	
	-	60	Ohms	50 to 70 MHz	SM25/SM30/SM42	
Drive Level	-	1	mW	use 100 μW for testing		
Shunt Capacitance (C0)	-	7	pF	Pad to Pad capacitance		
Aging	-5	+5	ppm /Yr	at +25°C ± 3°C		
Specified Temperature Range	-55	+125	°C	see table on page 3 for available options		
Storage Temperature Range	-55	+125	°C			

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



### Part Marking:

**SxFFFFFPymdz or LSxFFFFzywwz**

### Legend:

S = Model code for SM42, Z = SM25, 5 = SM30  
 x = Capacitance load code from below  
 FFFFF = Frequency coded  
 P or L = Pletronics  
 ymd or yww = Date of Manufacture (year, month and day) or year, week week  
 All other marking is internal factory codes

Some frequency marking examples: 3.579545M = 03579, 14.31818M = 14318, 24.0M = 24000

Specifications such as frequency tolerance and operating temperature range, etc. are not identified from the marking. External packaging labels and packing list will correctly identify the ordered Pletronics part number.

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	6	7	8	9	0	1	2	3	4	5
Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015

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					

Part Number:

SM42 -18 -14.31818M -50 H 1 G G -XX

See chart below for available options

	Internal code or blank
	<b>Highest Specified Operating Temperature</b> <b>A</b> = 40°C <b>G</b> = 70°C <b>N</b> = 100°C <b>B</b> = 45°C <b>H</b> = 75°C <b>P</b> = 105°C <b>C</b> = 50°C <b>J</b> = 80°C <b>R</b> = 110°C <b>D</b> = 55°C <b>K</b> = 85°C <b>S</b> = 115°C <b>E</b> = 60°C <b>L</b> = 90°C <b>T</b> = 120°C <b>F</b> = 65°C <b>M</b> = 95°C <b>U</b> = 125°C
	<b>Lowest Specified Operating Temperature</b> <b>A</b> = +10°C <b>F</b> = -15°C <b>L</b> = -40°C <b>B</b> = +5°C <b>G</b> = -20°C <b>M</b> = -45°C <b>C</b> = 0°C <b>H</b> = -25°C <b>N</b> = -50°C <b>D</b> = -5°C <b>J</b> = -30°C <b>P</b> = -55°C <b>E</b> = -10°C <b>K</b> = -35°C
	<b>Mode:</b> <b>1</b> = Fundamental <b>3</b> = 3rd Overtone
	<b>Frequency Stability</b> See chart below
	<b>Calibration Frequency Tolerance</b> <b>15</b> = ± 15 ppm at 25°C ± 3°C <b>20</b> = ± 20 ppm at 25°C ± 3°C <b>30</b> = ± 30 ppm at 25°C ± 3°C (Standard) <b>50</b> = ± 50 ppm at 25°C ± 3°C
	<b>Frequency in MHz</b>
	<b>Load in pF</b> Parallel Resonance from <b>09</b> to <b>44</b> pF or <b>SR</b> = Series Resonance
	<b>Series Model</b>

Operating Temperature Range		Available Frequency Stability versus Temperature in ppm					
		<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>J</b>
	<b>CODE</b>	± 10	± 15	± 20	± 30	± 50	± 100
0 to +45°C	<b>CB</b>	•	•	•	•	•	•
0 to +50°C	<b>CC</b>	•	•	•	•	•	•
0 to +60°C	<b>CE</b>	•	•	•	•	•	•
0 to +70°C	<b>CG</b>	•	•	•	•	STD	•
-10 to +50°C	<b>EC</b>	•	•	•	•	•	•
-10 to +60°C	<b>EE</b>	•	•	•	•	•	•
-10 to +75°C	<b>EH</b>	•	•	•	•	•	•
-20 to +70°C	<b>GG</b>	•	•	•	•	•	•
-20 to +75°C	<b>GH</b>	•	•	•	•	•	•
-30 to +75°C	<b>JH</b>	•	•	•	•	•	•
-30 to +80°C	<b>JJ</b>	•	•	•	•	•	•
-30 to +85°C	<b>JK</b>	•	•	•	•	•	•
-35 to +80°C	<b>KJ</b>		•	•	•	•	•
-40 to +85°C	<b>LK</b>		•	•	•	•	•

NOTE: These are standard available stability versus temperature values. Other combinations available on request.

### Legacy Part Number (not for new designs):

SM42	B	E	-18	-11.0592M	-XX	
						Internal code or blank
						Frequency in MHz
						Load in pF Parallel Resonance in pF or <b>SR</b> = Series Resonance
						<b>Operating Temperature Range</b> Blank = 0 to + 70°C (STD) <b>E</b> = -40 to +85°C
						<b>Calibration Tolerance / Frequency Stability</b> Blank = 30/50 (STD) <b>B</b> = 30/30 <b>C</b> = 15/30 <b>D</b> = 10/20 (not all frequencies)
						Series Model






### 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

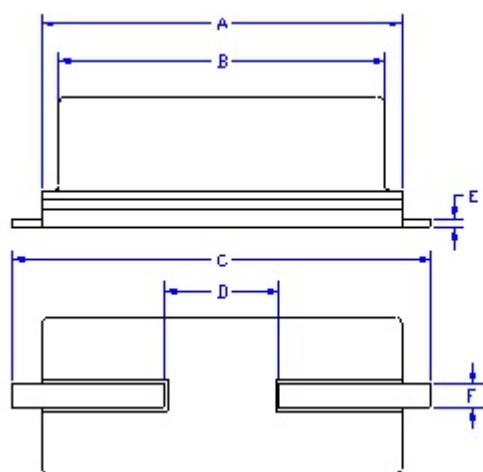
<b>P/N:</b>  SM42-18-25.0M <b>Customer P/N:</b>  12345678 <b>Qty:</b>  1000 <b>D/C:</b>  0632-WYLF	
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<b>RoHS Compliant</b> 2nd LvL Interconnect Category=e1 Max Safe Temp=260C for 10s 2X Max
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<b>RoHS Compliant</b> 2nd LvL Interconnect Category=e3 Max Safe Temp=260C for 10s 2X Max
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<b>RoHS Compliant</b> 2nd LvL Interconnect Category=e2 Max Safe Temp=260C for 10s 2X Max
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### Mechanical:



Contacts (3 types of lead plating used):

Matte Tin (Sn)

Tin over Copper (SnCu)

SAC (SnAgCu)

**Not to Scale**

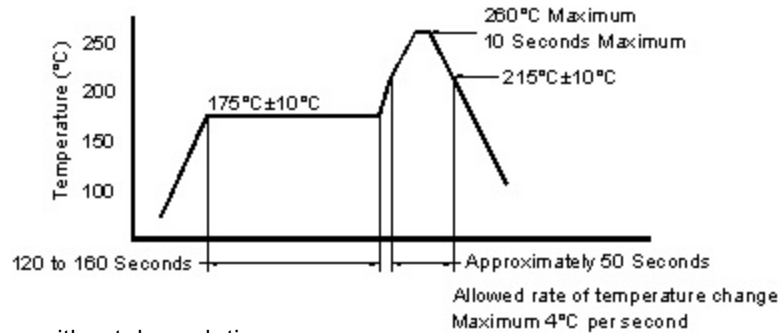
	Inches	mm
A	0.457 max	11.60 max
B	0.414 max	10.50 max
C	0.532 max	13.50 max
D	0.192 ± 0.008	4.88 ± 0.20
E	0.012 ± 0.004	0.30 ± 0.10
F	0.030 ± 0.008	0.75 ± 0.20
G	0.197 max	5.00 max
H	0.145 max	3.68 max
I	0.040 max	1.00 max
J	0.197 max	5.00 max
K <sup>1</sup>	0.016	0.40
L SM42	0.182 max	4.60 max
L SM30	0.138 max	3.50 max
L SM25	0.114 max	2.90 max

<sup>1</sup> Typical dimensions

### Layout and application information

- Trace lengths to the crystal should be kept as short as possible.
- The crystal connections are sensitive to noise.
- Load may need to be determined experimentally on the actual PCB.

## Reflow Cycle (typical for lead free processing)



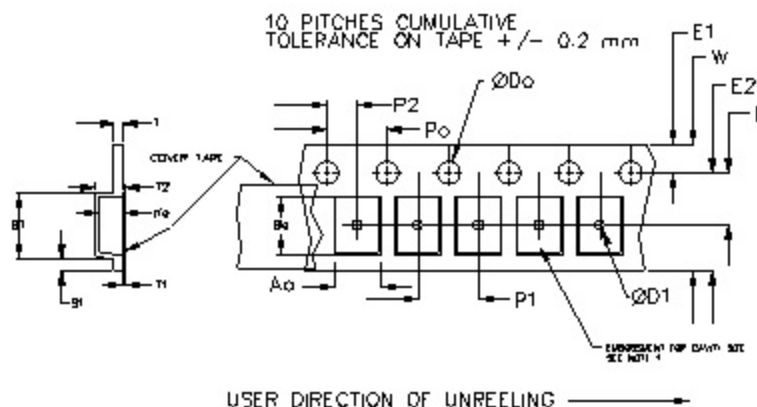
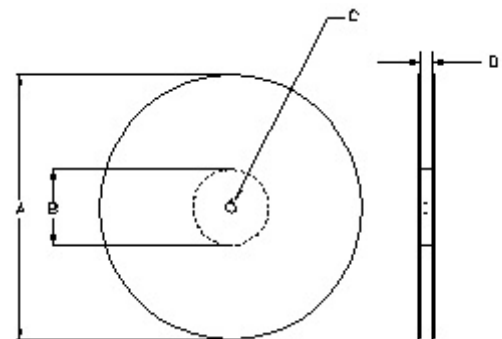
The part may be reflowed 2 times without degradation.

## Tape and Reel: available for quantities of 1000 per reel, cut tape for < 250

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	4.0	2.0 +0.05	0.6	0.25	0.1
12mm		1.5						
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
24 mm	18	14.25	7.5 ± 0.1	12.0 ± 0.1	8	16.3	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	24.4 +2.0 -0.0	24.4 +2.0 -0.0	24.4 +2.0 -0.0	24.0

Reel dimensions may vary from the above

### IMPORTANT NOTICE

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