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# TIMING DEVICES

## Product Configuration

### Guide



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Epson's standard product offering is compliant with EU RoHS directive.

Please refer to the 2016 Crystal Master (pp. 143 ~ 145) for a complete list of products that are RoHS compliant (with Pb exemption) and/or Pb Free and its associated terminal materials.

# Product Configuration Guide

## CRYSTALS



- 32.768kHz Crystals
- Standard kHz Crystals
- MHz Crystals



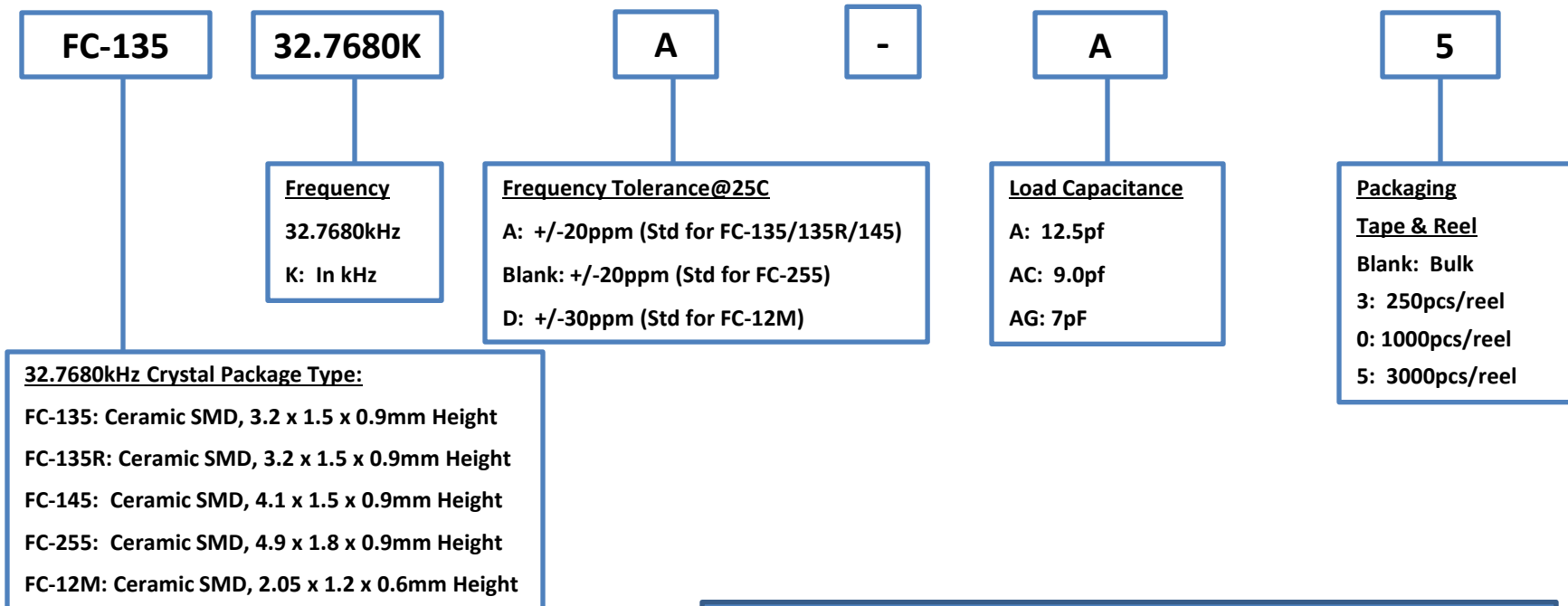
**EPSON**

September 2016

# Product Configuration System



## kHz Range Crystal Units



**NOTES:**

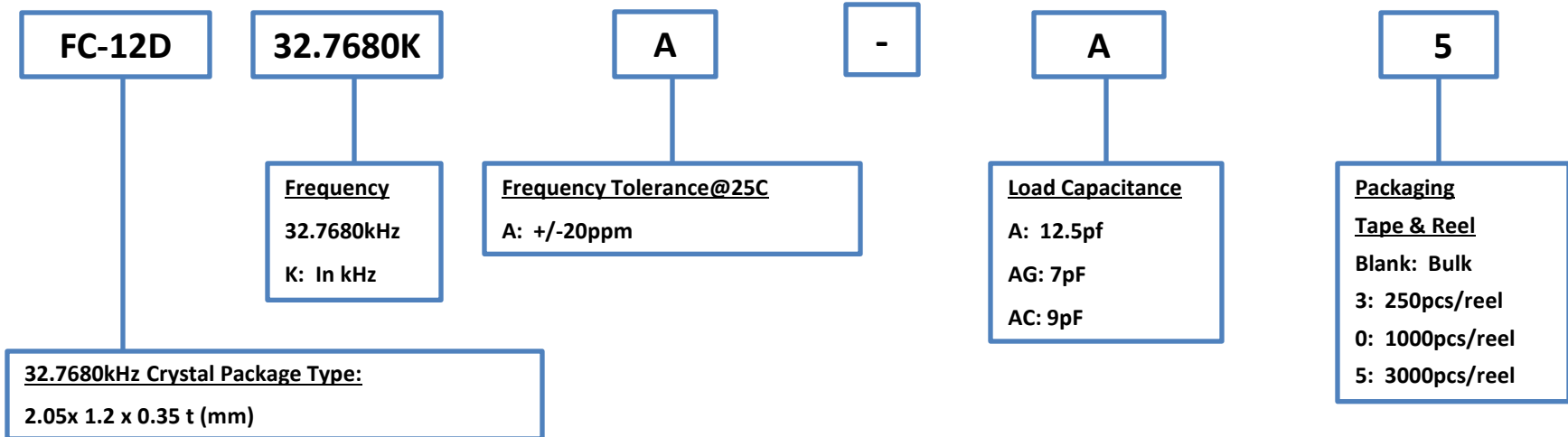
- 1) This product configuration guide is applicable only to 32.7680kHz Crystals. For other frequencies, please reference the Standard kHz Crystal Product Configuration System.
- 2) If you require a load capacitance other than the above listed, please contact your EEA representative for assistance.





# Product Configuration System

## 32.768 kHz Crystal Unit with 0.35mm height for Smart Card



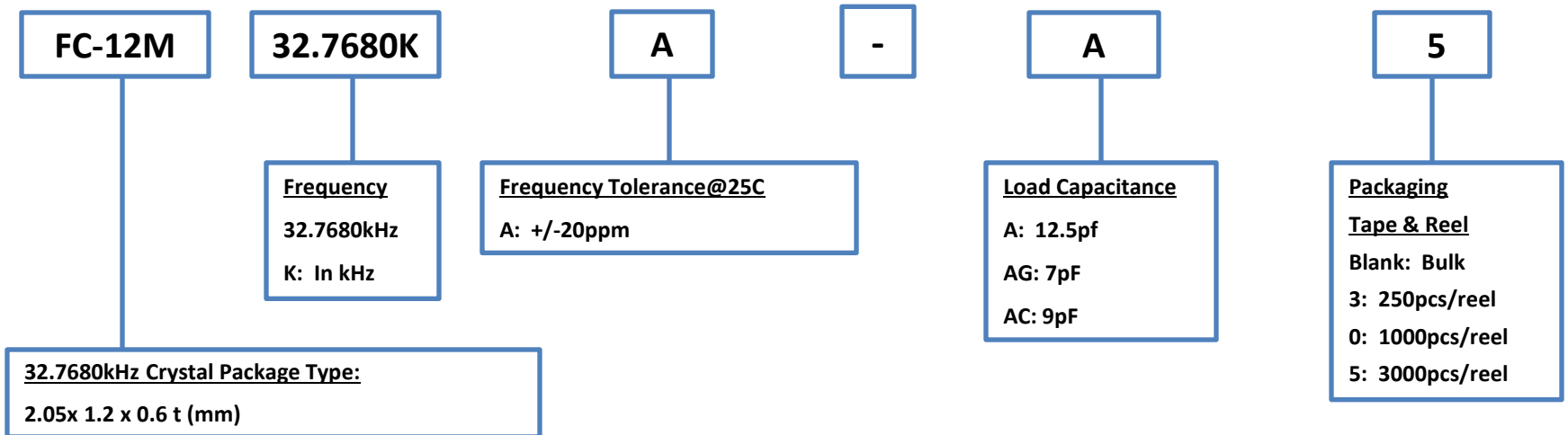
### NOTES:

- 1) If your application for this part is not a Smart Card, please contact your EEA representative for assistance.
- 2) If you require a load capacitance other than the above listed, please contact your EEA representative for assistance.



# Product Configuration System

## kHz Range Crystal Units



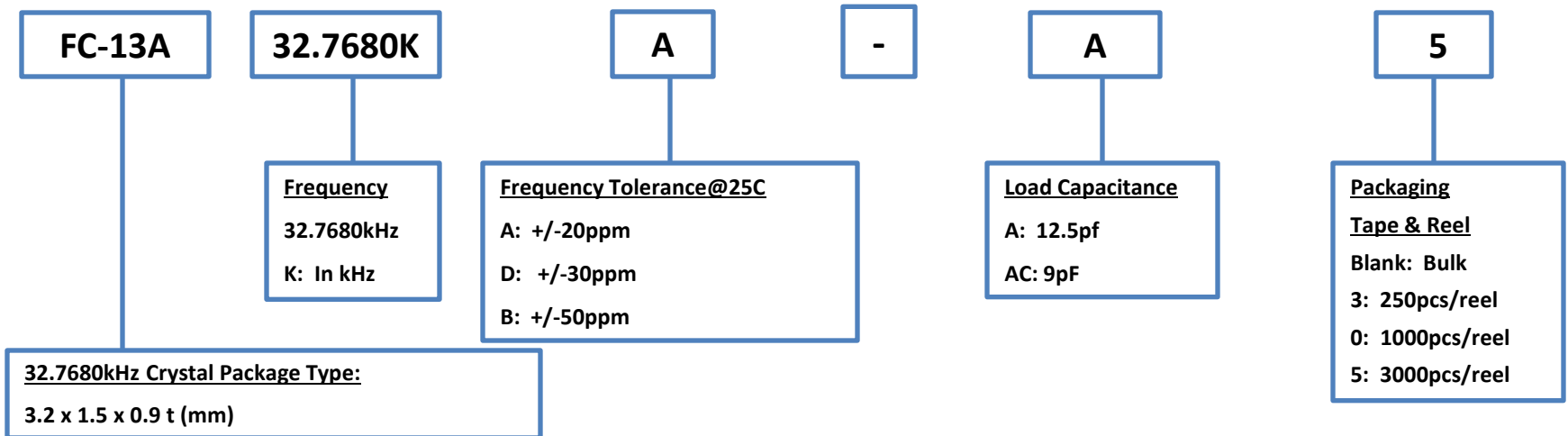
### NOTES:

- 1) If you require a frequency or tolerance other than the above listed, please contact your EEA representative for assistance.

# Product Configuration System



## kHz Range Crystal Units



### NOTES:

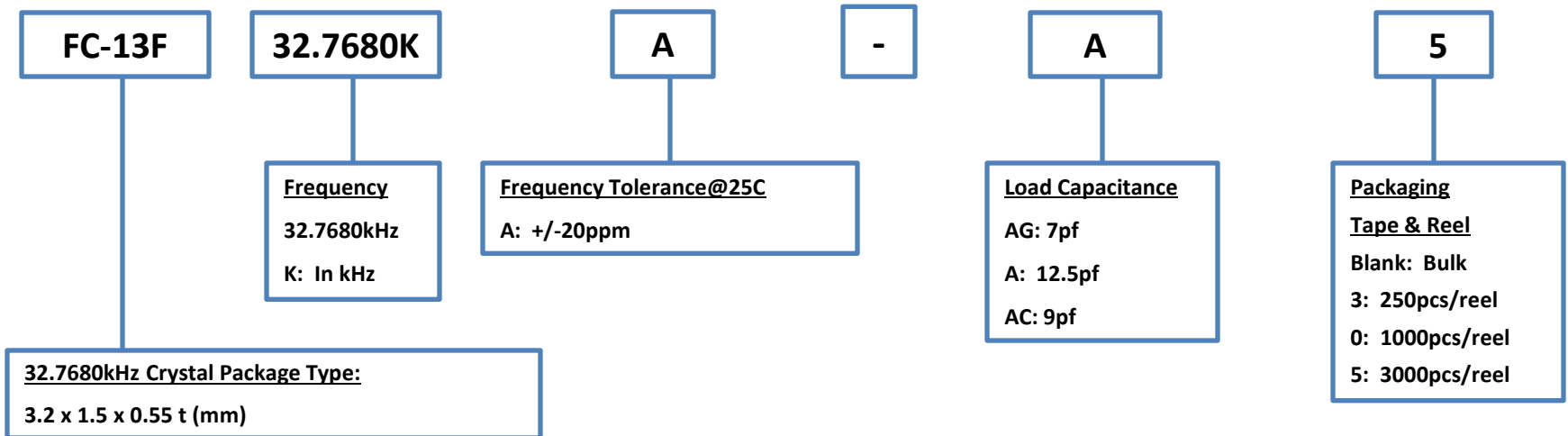
- 1) This product configuration guide is applicable only to 32.7680kHz Crystals. For other frequencies, please reference the Standard kHz Crystal Product Configuration System.
- 2) If you require a load capacitance other than the above listed, please contact your EEA representative for assistance.



# Product Configuration System



## kHz Range Crystal Units



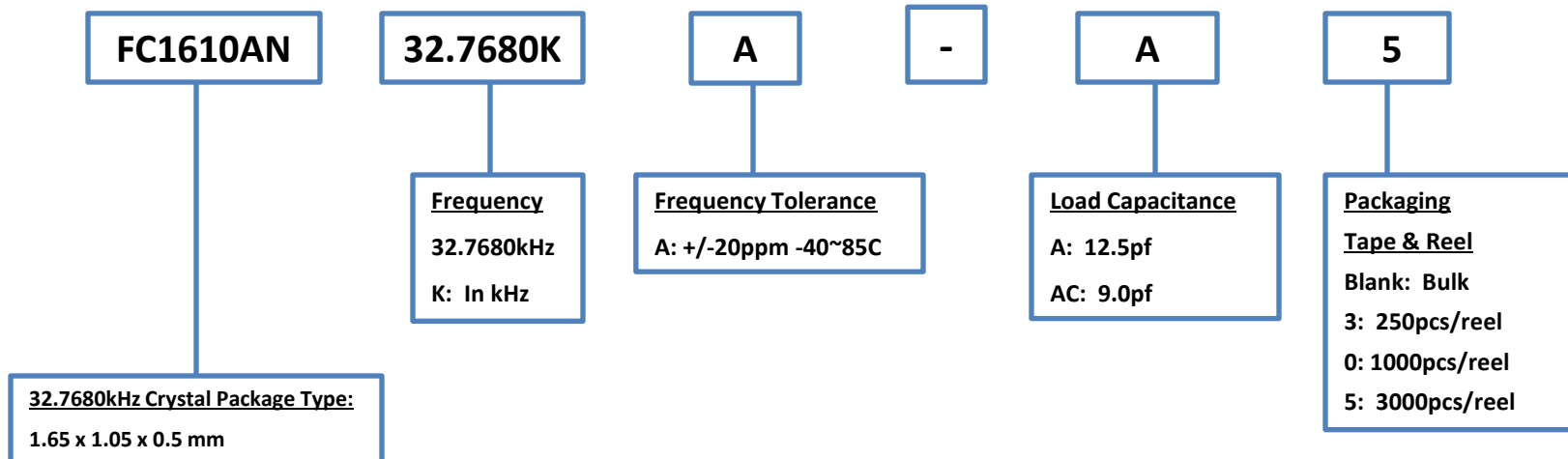
### NOTES:

- 1) If you require a frequency or tolerance other than the above listed, please contact your EEA representative for assistance.

# Product Configuration System



## kHz Range Crystal Unit



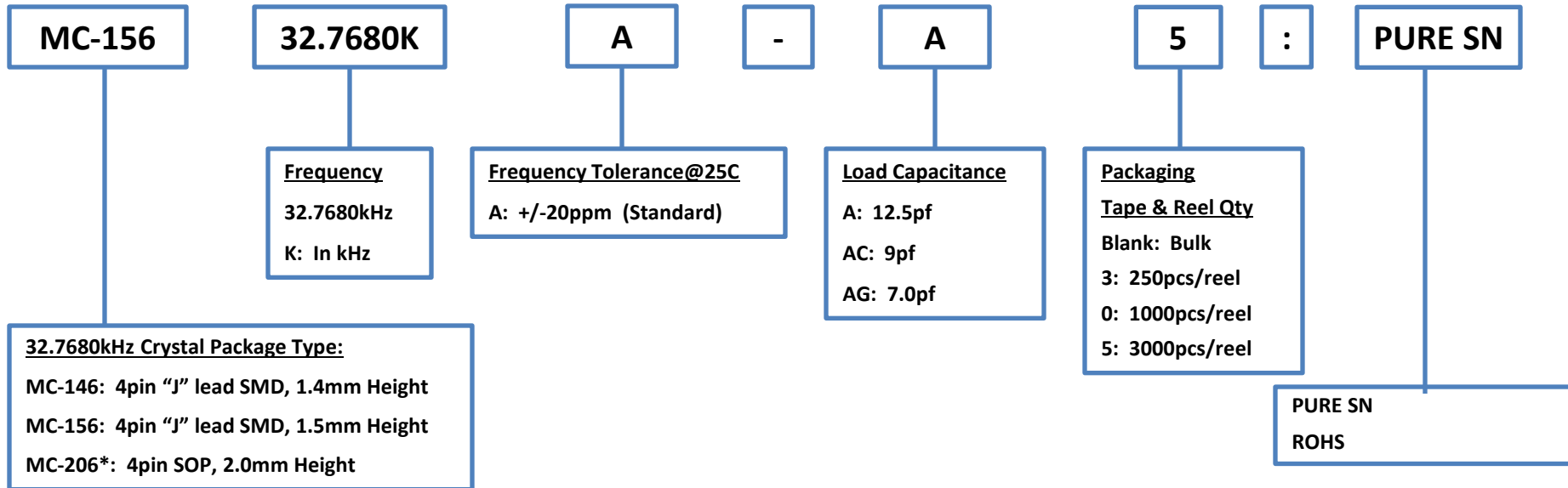
### NOTES:

- 1) If you require a load capacitance other than the above listed, please contact your EEA representative for assistance.

# Product Configuration System



## kHz Range Crystals Units



**MC-206:**  
Not Recommended for New Designs

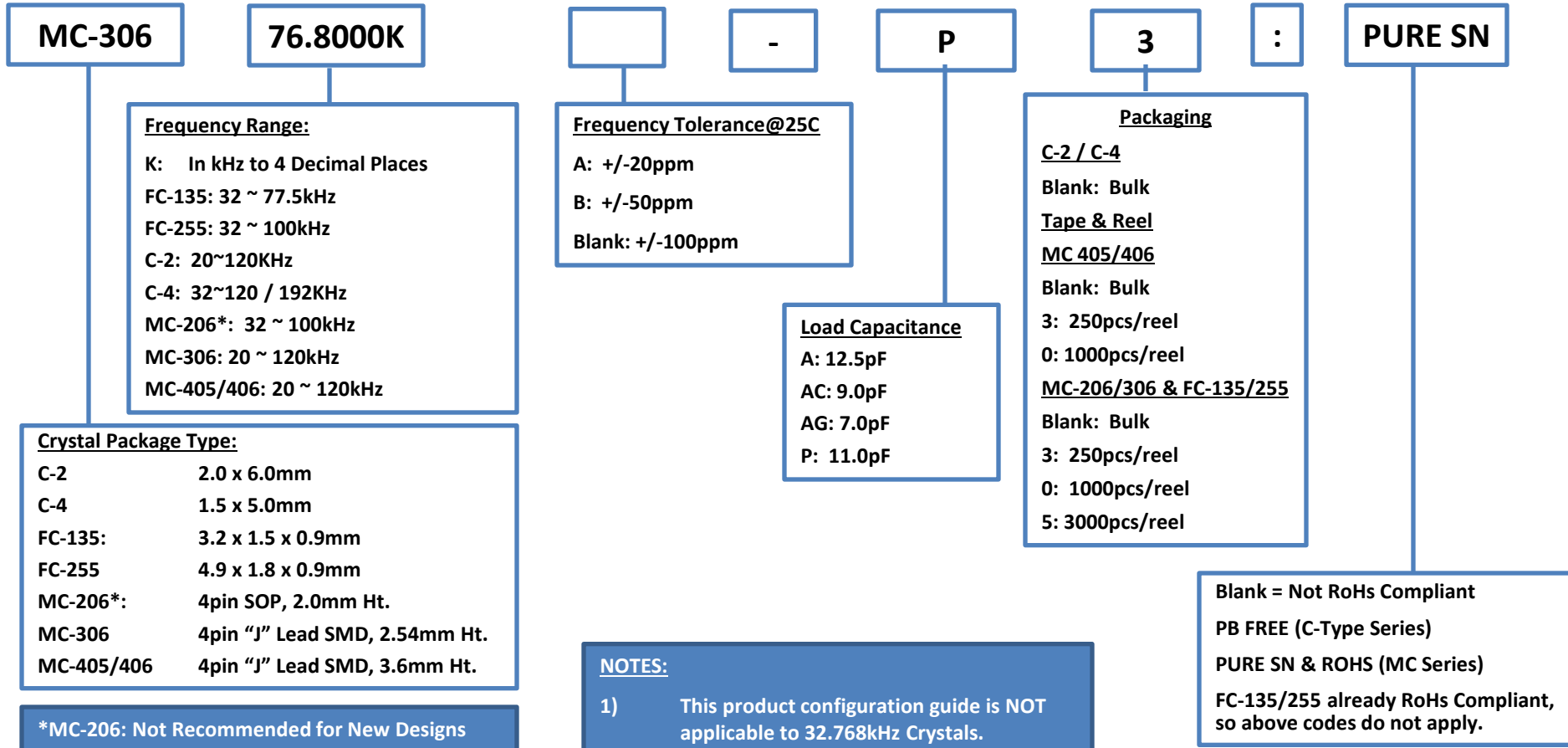
- NOTES:**
- 1) This product configuration guide is applicable only to 32.7680kHz Crystals. For other frequencies, please reference the Standard kHz Crystal Product Configuration System.
  - 2) If you require a load capacitance other than the above listed, please contact your EEA representative for assistance.





# Product Configuration System

## kHz Range Crystals Units



**NOTES:**

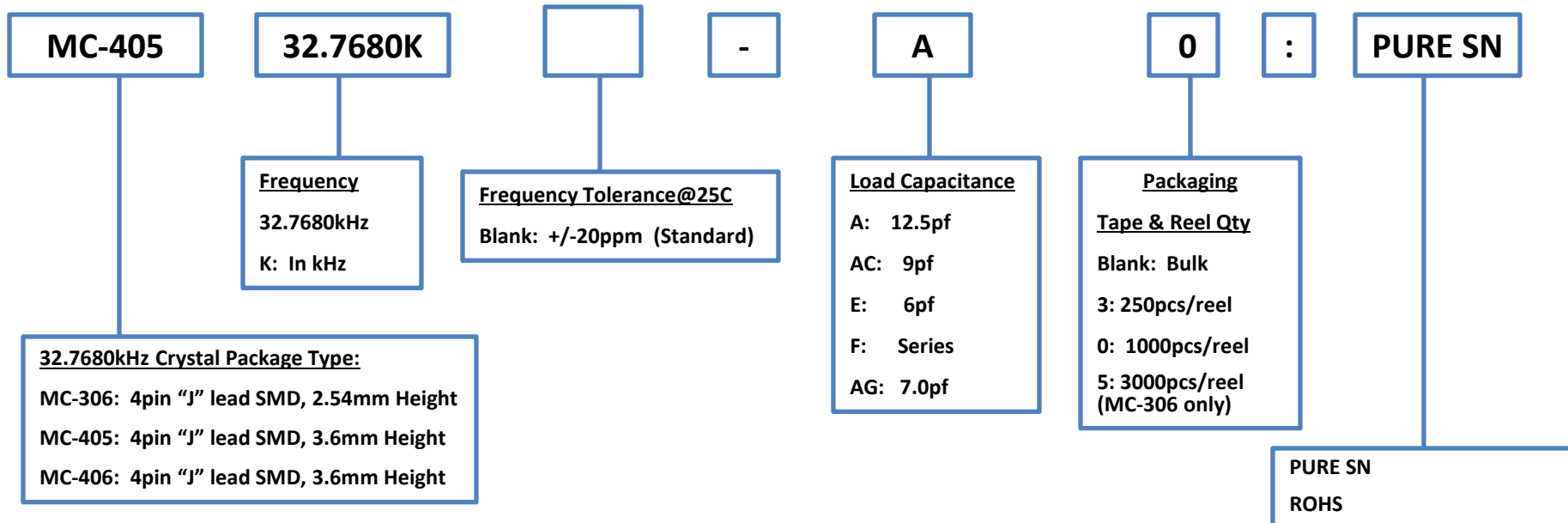
- 1) This product configuration guide is NOT applicable to 32.768kHz Crystals.
- 2) If you require a load capacitance other than the above listed, please contact your EEA representative for assistance.



# Product Configuration System



## kHz Range Crystals Units



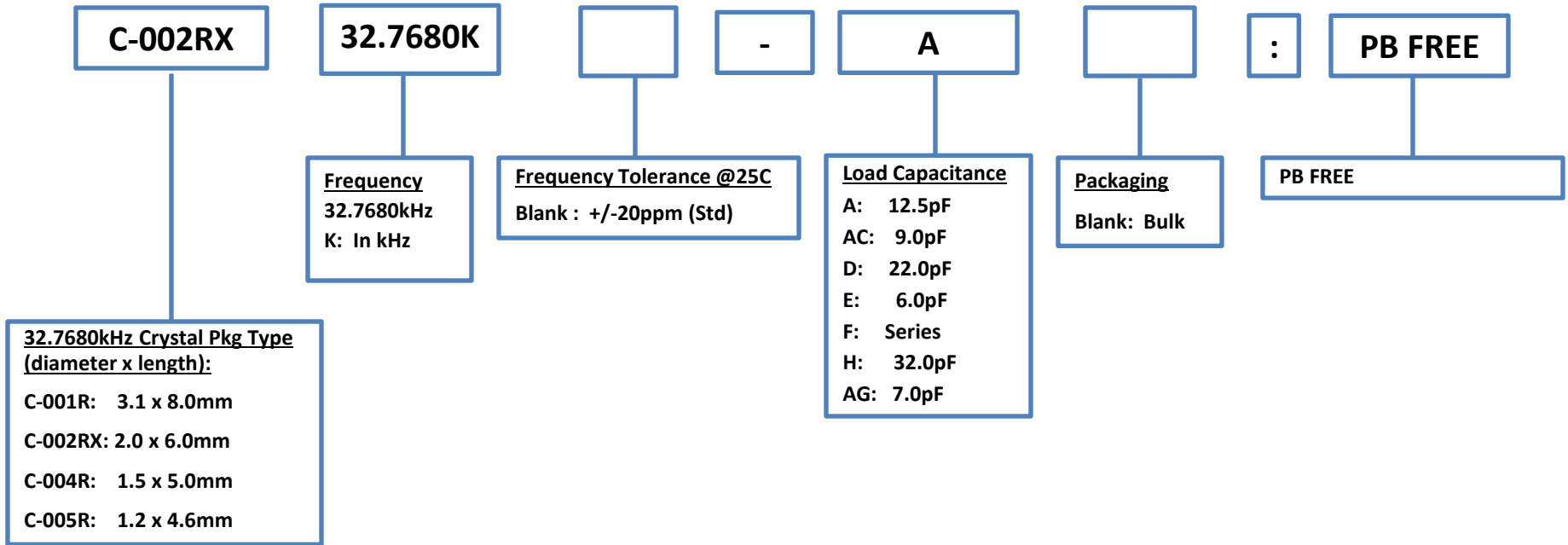
### NOTES:

- 1) This product configuration guide is applicable only to 32.7680kHz Crystals. For other frequencies, please reference the Standard kHz Crystal Product Configuration System.
- 2) If you require a load capacitance other than the above listed, please contact your EEA representative for assistance.

# Product Configuration System



## kHz Range Crystals Units



**NOTES:**

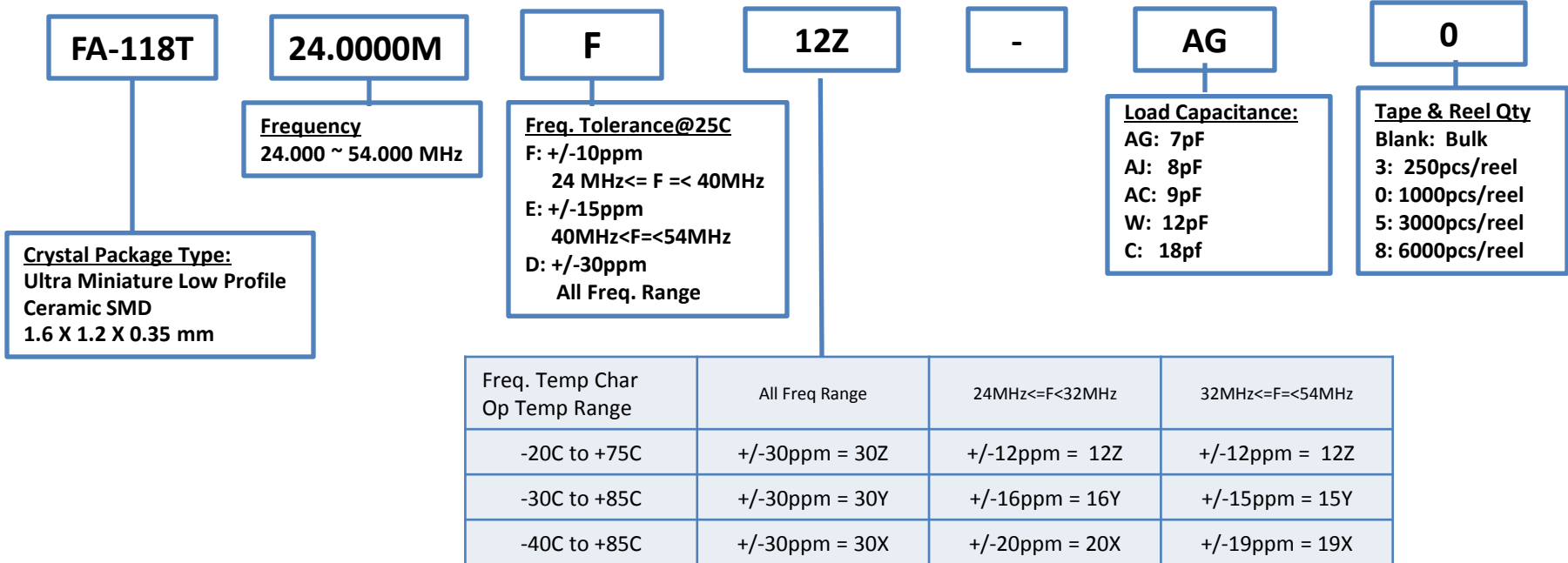
- 1) This product configuration guide is applicable only to 32.7680kHz crystals. For other frequencies, please refer to the Standard kHz Crystal Product Configuration System.
- 2) If you require a load capacitance other than the above listed, please contact your EEA representative for assistance.



# Product Configuration System



## MHz Range Crystals Units



### NOTES:

- 1) If you require frequency , tolerance, frequency temperature characteristics over temperature and load capacitance values other than the above listed, please contact your EEA representative for assistance.

# Standard Frequencies

## FA-118T Ultra Minature Low Profile

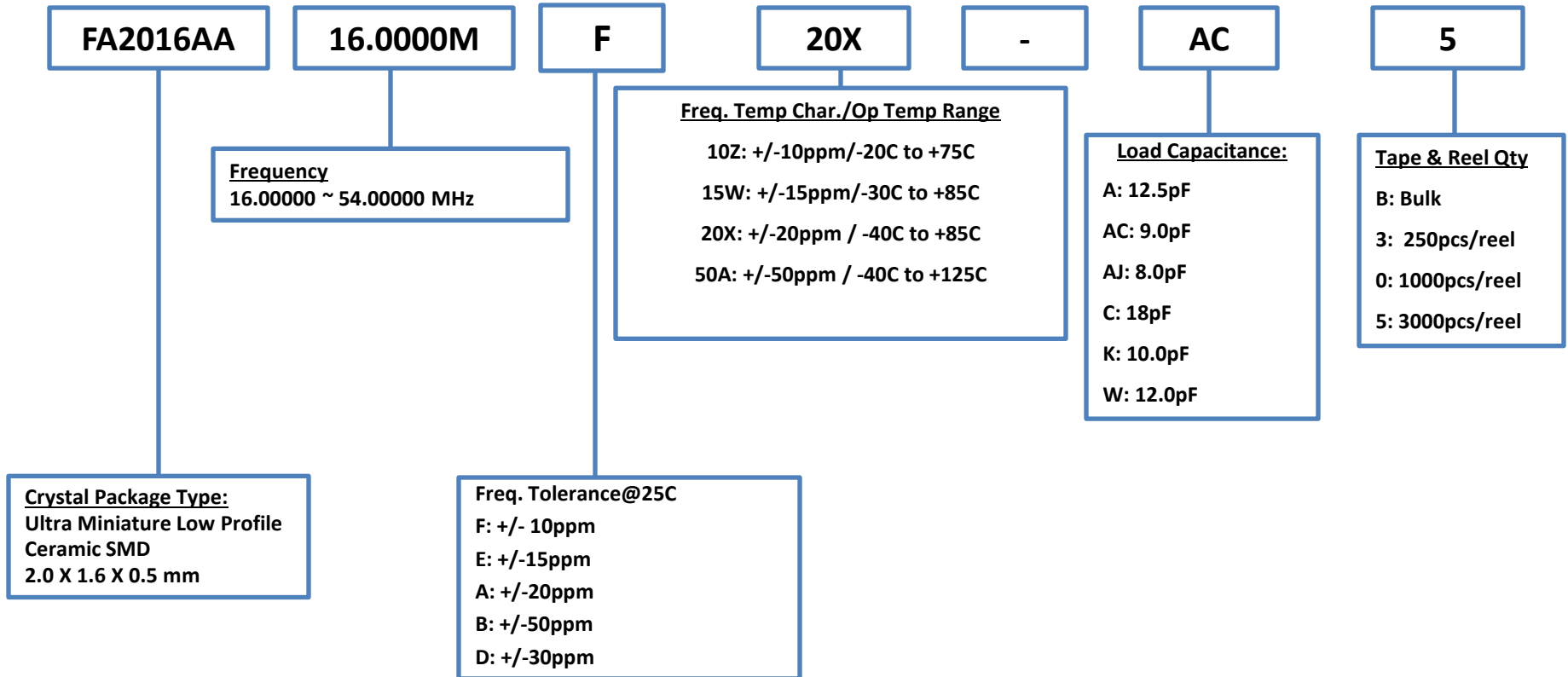
Frequency [Mhz]	Freq. Tolerance@25C		Freq. vs. Temp. Char.		Load Capacitance	
	Code		Code		Code	[pF]
24	D	+/- 30ppm	30Z	+/- 30ppm / -20C to +75C	AL	9.5
26	A	+/- 10ppm	12Z	+/- 12ppm / -20C to +75C	AC	9
37.4	F	+/- 10ppm	12Z	+/- 12ppm / -20C to +75C	K	10
38.4	F	+/- 10ppm	12Z	+/- 12ppm / -20C to +75C	K	10
48	D	+/- 30ppm	30Z	+/- 30ppm / -20C to +75C	B	16



# Product Configuration System



## MHz Range Crystal Units



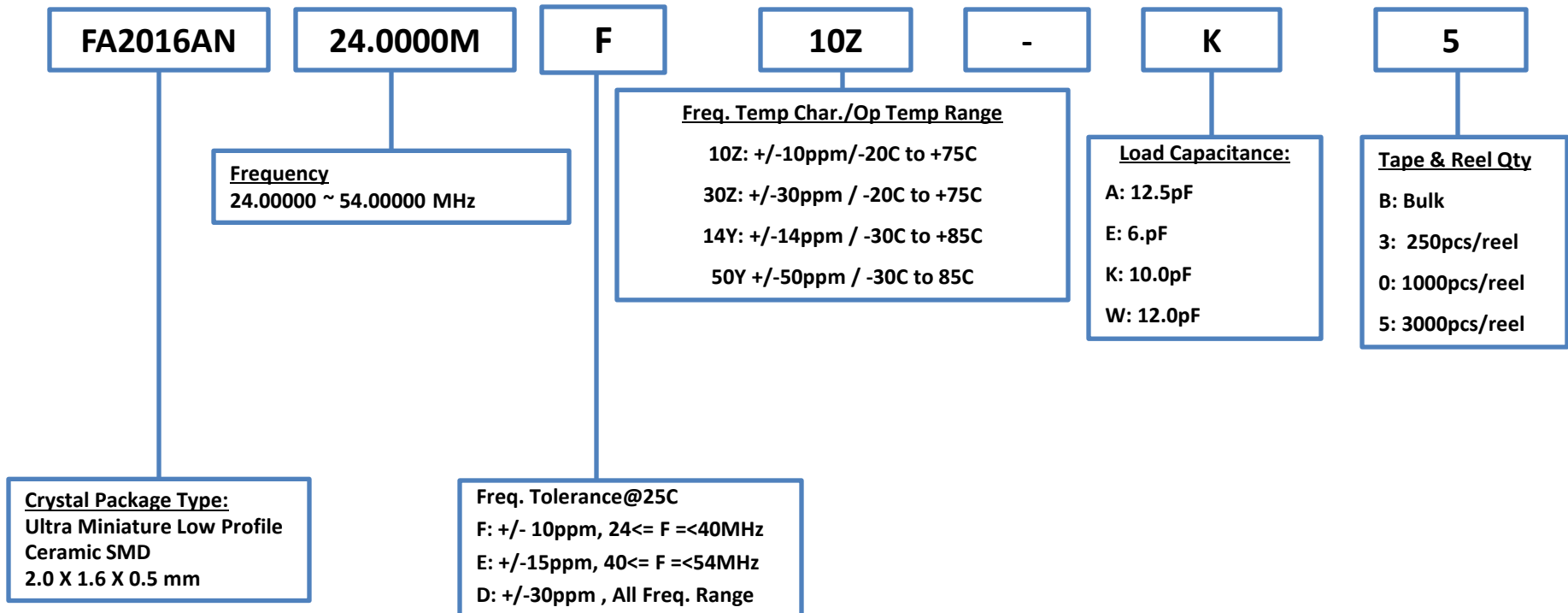
**NOTES:**

1) If you require frequency , tolerance, frequency temperature characteristics over temperature and load capacitance values other than the above listed, please contact your EEA representative for assistance.

# Product Configuration System



## MHz Range Crystal Units



**NOTES:**

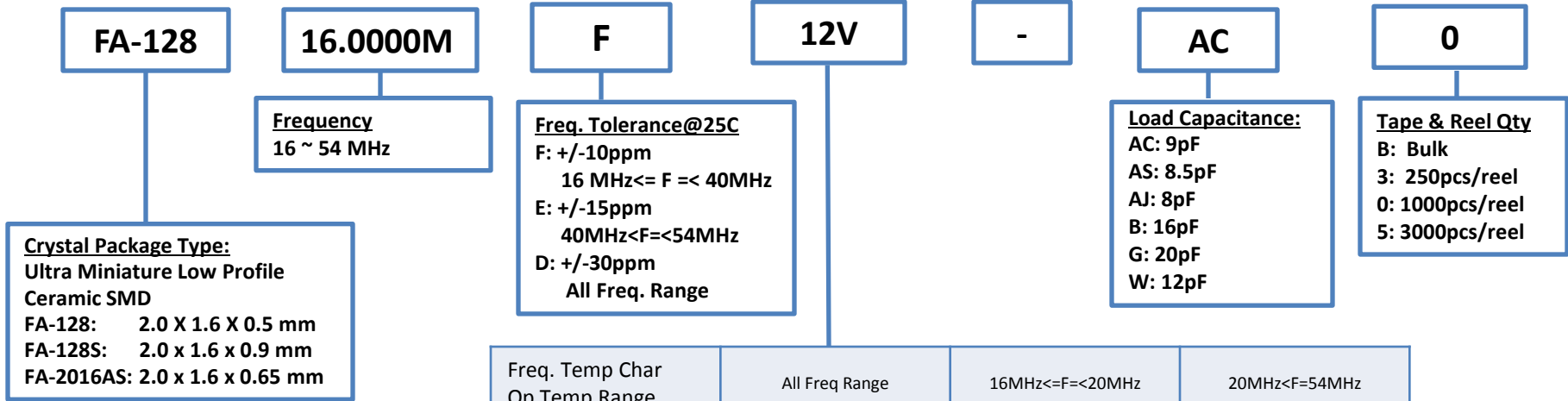
1) If you require frequency , tolerance, frequency temperature characteristics over temperature and load capacitance values other than the above listed, please contact your EEA representative for assistance.



# Product Configuration System



## MHz Range Crystals Units



Freq. Temp Char Op Temp Range	All Freq Range	16MHz<=F=<20MHz	20MHz<F=54MHz
-20C to +75C	+/-20ppm = 20Z	+/-12ppm = 12Z	+/-10ppm = 10Z
-20C to +80C	+/-20ppm = 20K	+/-12ppm = 12K	+/-10ppm = 10K
-20C to +85C	+/-20ppm = 20P	+/-12ppm = 12P	+/-12ppm = 12P
-30C to +70C	+/-28ppm = 28R	+/-17ppm = 17R	+/-14ppm = 14R
-30C to +75C	+/-28ppm = 28E	+/-17ppm = 17E	+/-14ppm = 14E
-30C to +80C	+30ppm = 30W	+/-17ppm = 17W	+/-14ppm = 14W
-30C to +85C	+/-30ppm = 30Y	+/-17ppm = 17Y	+/-14ppm = 14Y
-30C to +85C	+/-50ppm = 50Y	+/-17ppm = 17Y	+/-14ppm = 14Y
-40C to +85C	+/-40ppm = 40X	+/-22ppm = 22X	+/-20ppm = 20X

**NOTE: 81Z = +8/-10ppm / -20C to +75C**



**NOTES:**  
1) If you require frequency, tolerance, frequency temperature characteristics over temperature and load capacitance values other than the above listed, please contact your EEA representative for assistance.

# Standard Frequencies

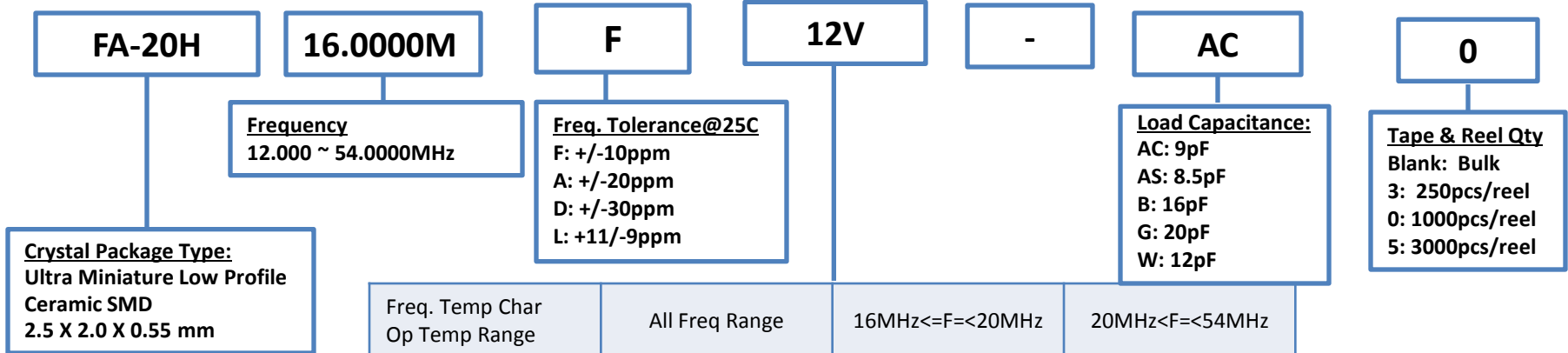
## FA-128 MHz Range Crystals

Frequency [MHz]	Freq. Tolerance@25C		Freq. vs. Temp. Char.		Load Capacitance	
	Code		Code		Code	[pF]
24	F	+/- 10ppm	10Z	+/- 10ppm / -20C to +75C	K	10
24	D	+/- 30ppm	30Z	+/- 30ppm / -20C to +75C	K	10
24	D	+/- 30ppm	30X	+/- 30ppm / -40C to +85C	K	10
24.576	D	+/- 30ppm	30Z	+/- 30ppm / -20C to +75C	K	10
25	F	+/- 10ppm	10Z	+/- 10ppm / -20C to +75C	K	10
25	D	+/- 30ppm	30Z	+/- 30ppm / -20C to +75C	K	10
25	D	+/- 30ppm	30X	+/- 30ppm / -40C to +85C	K	10
26	F	+/- 10ppm	10Z	+/- 10ppm / -20C to +75C	AC	9
26	F	+/- 10ppm	12Y	+/- 12ppm / -30C to +85C	AJ	8
27	F	+/- 10ppm	10Z	+/- 10ppm / -20C to +75C	AC	9
27	D	+/- 30ppm	30Z	+/- 30ppm / -20C to +75C	AC	9
27	F	+/- 10ppm	18X	+/- 18ppm / -40C to +85C	AJ	8
27.12	F	+/- 10ppm	10Z	+/- 10ppm / -20C to +75C	K	10
27.12	D	+/- 30ppm	30Y	+/- 30ppm / -30C to +85C	K	10
27.12	D	+/- 30ppm	30Z	+/- 30ppm / -20C to +75C	K	10
30	F	+/- 10ppm	20Z	+/- 20ppm / -20C to +75C	AC	9
30	F	+/- 10ppm	20X	+/- 20ppm / -40C to +85C	AC	9
30	D	+/- 30ppm	30Z	+/- 30ppm / -20C to +75C	E	6
32	F	+/- 10ppm	10Z	+/- 10ppm / -20C to +75C	W	12
32	F	+/- 10ppm	20X	+/- 20ppm / -40C to +85C	K	10
33.6	F	+/- 10ppm	10Z	+/- 10ppm / -20C to +75C	AC	9
37.4	F	+/- 10ppm	10Z	+/- 10ppm / -20C to +75C	C	18
38.4	F	+/- 10ppm	10Z	+/- 10ppm / -20C to +75C	K	10
40	F	+/- 10ppm	10Z	+/- 10ppm / -20C to +75C	AJ	8
40	F	+/- 10ppm	20X	+/- 20ppm / -40C to +85C	K	10
48	D	+/- 30ppm	20X	+/- 20ppm / -40C to +85C	B	16

# Product Configuration System



## MHz Range Crystals Units



Freq. Temp Char Op Temp Range	All Freq Range	16MHz<=F=<20MHz	20MHz<F=<54MHz
-20C to +70C	+/-20ppm = 20V	+/-12ppm = 12V	+/-10ppm = 10V
-20C to +70C	+/-30ppm = 30V	+/-12ppm = 12V	+/-10ppm = 10V
-20C to +75C	+/-20ppm = 20Z	+/-12ppm = 12Z	+/-10ppm = 10Z
-20C to +80C	+/-20ppm = 20K	+/-12ppm = 12K	+/-10ppm = 10K
-20C to +85C	+/-20ppm = 20P	+/-12ppm = 12P	+/-12ppm = 12P
-30C to +70C	+/-28ppm = 28R	+/-17ppm = 17R	+/-14ppm = 14R
-30C to +75C	+/-28ppm = 28E	+/-17ppm = 17E	+/-14ppm = 14E
-30C to +80C	+/-30ppm = 30W	+/-17ppm = 17W	+/-14ppm = 14W
-30C to +85C	+/-30ppm = 30Y	+/-17ppm = 17Y	+/-14ppm = 14Y
-30C to +85C	+/-50ppm = 50Y	+/-17ppm = 17Y	+/-14ppm = 14Y
-40C to +85C	+/-40ppm = 40X	+/-22ppm = 22X	+/-20ppm = 20X

**NOTE:** 81Z = +8/-10ppm / -20C to +75C

**NOTES:**

1) If you require frequency, tolerance, frequency temperature characteristics over temperature and load capacitance values other than the above listed, please contact your EEA representative for assistance.



# Standard Frequencies

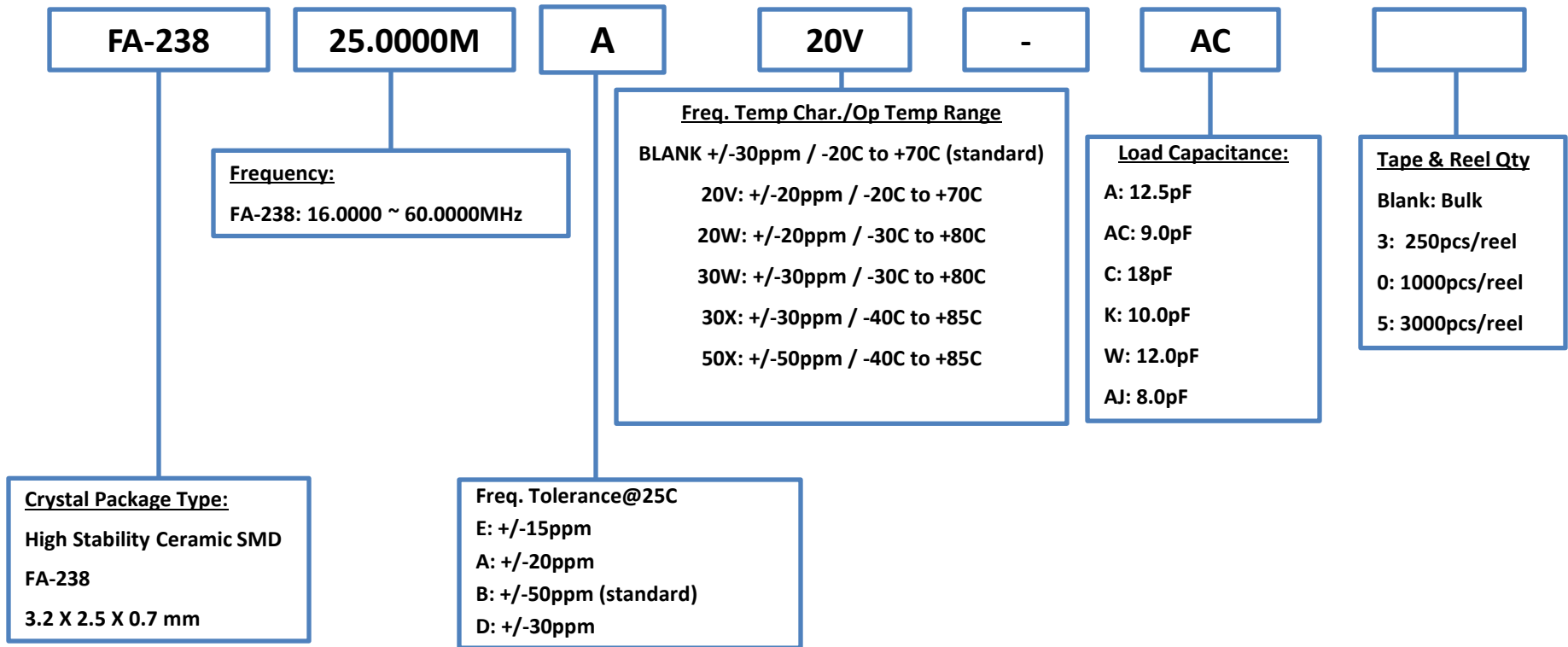
## FA-20H MHz Range Crystals

Frequency [MHz]	Freq. Tolerance@25C		Freq. vs. Temp. Char.		Load Capacitance	
	Code		Code		Code	[pF]
24	F	+/- 10ppm	10Z	+/- 10ppm / -20C to +75C	K	10
24	D	+/- 30ppm	30Z	+/- 30ppm / -20C to +75C	K	10
24	D	+/- 30ppm	30X	+/- 30ppm / -40C to +85C	K	10
24.576	D	+/- 30ppm	10V	+/- 10ppm / -20C to +70C	W	12
25	D	+/- 30ppm	30Z	+/- 30ppm / -20C to +75C	K	10
25	D	+/- 30ppm	30X	+/- 30ppm / -40C to +85C	R	15
26	F	+/- 10ppm	10Z	+/- 10ppm / -20C to +75C	AC	9
26	F	+/- 10ppm	15Y	+/- 15ppm / -30C to +85C	AC	9
27	F	+/- 10ppm	10Z	+/- 10ppm / -20C to +75C	AG	7
27	F	+/- 10ppm	20X	+/- 20ppm / -40C to +85C	AC	9
27	D	+/- 30ppm	30Z	+/- 30ppm / -20C to +75C	K	10
27.12	D	+/- 30ppm	30Z	+/- 30ppm / -20C to +75C	K	10
30	F	+/- 10ppm	20X	+/- 20ppm / -40C to +85C	W	12
30	D	+/- 30ppm	30Z	+/- 30ppm / -20C to +75C	AJ	8
32	F	+/- 10ppm	10Z	+/- 10ppm / -20C to +75C	W	12
32	F	+/- 10ppm	20X	+/- 20ppm / -40C to +85C	K	10
38.4	F	+/- 10ppm	10Z	+/- 10ppm / -20C to +75C	K	10
40	F	+/- 10ppm	15Z	+/- 15ppm / -20C to +75C	AC	9
40	F	+/- 10ppm	20X	+/- 20ppm / -40C to +85C	K	10
48	B	+/- 50ppm	30Z	+/- 30ppm / -20C to +75C	AG	7

# Product Configuration System



## MHz Range Crystal Units



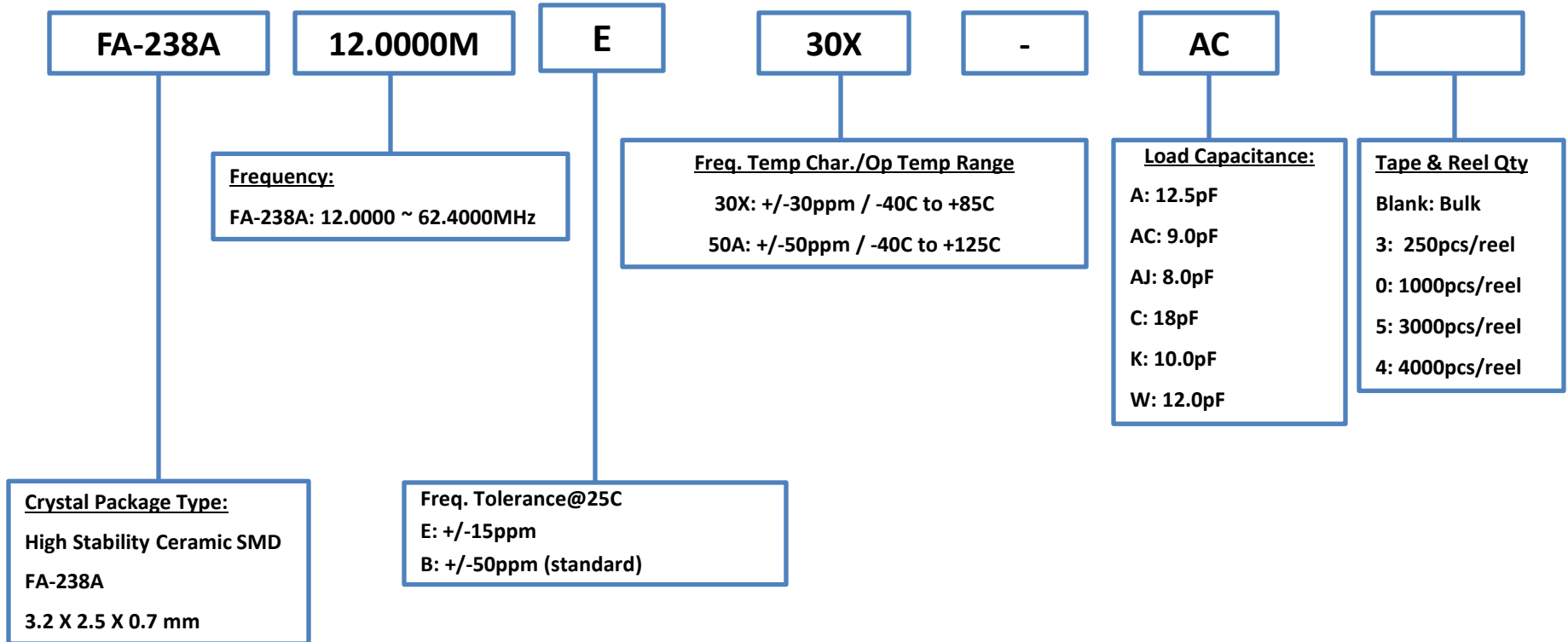
### NOTES:

- 1) If you require frequency, tolerance, frequency temperature characteristics over temperature and load capacitance values other than the above listed, please contact your EEA representative for assistance.

# Product Configuration System



## MHz Range Crystal Units



### NOTES:

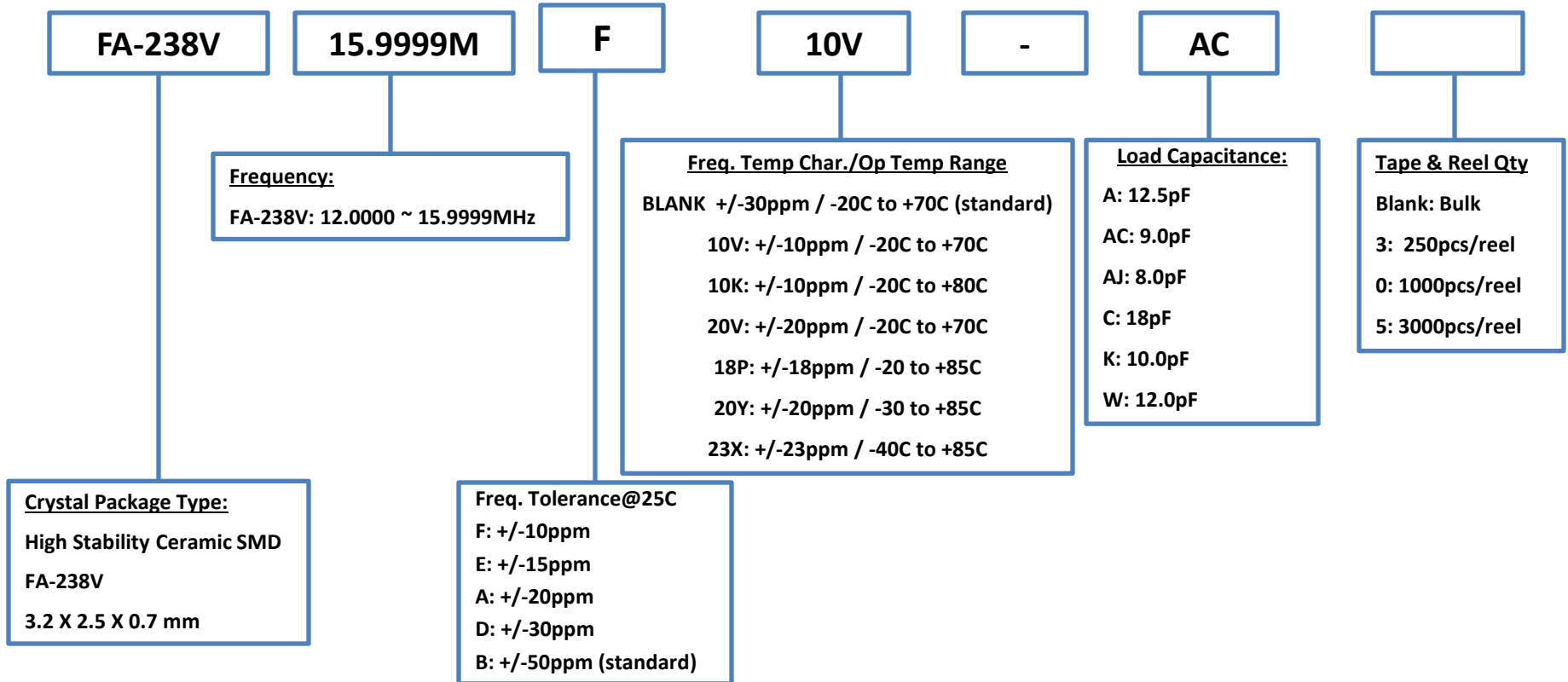
- 1) If you require frequency, tolerance, frequency temperature characteristics over temperature and load capacitance values other than the above listed, please contact your EEA representative for assistance.



# Product Configuration System



## MHz Range Crystal Units



**NOTES:**

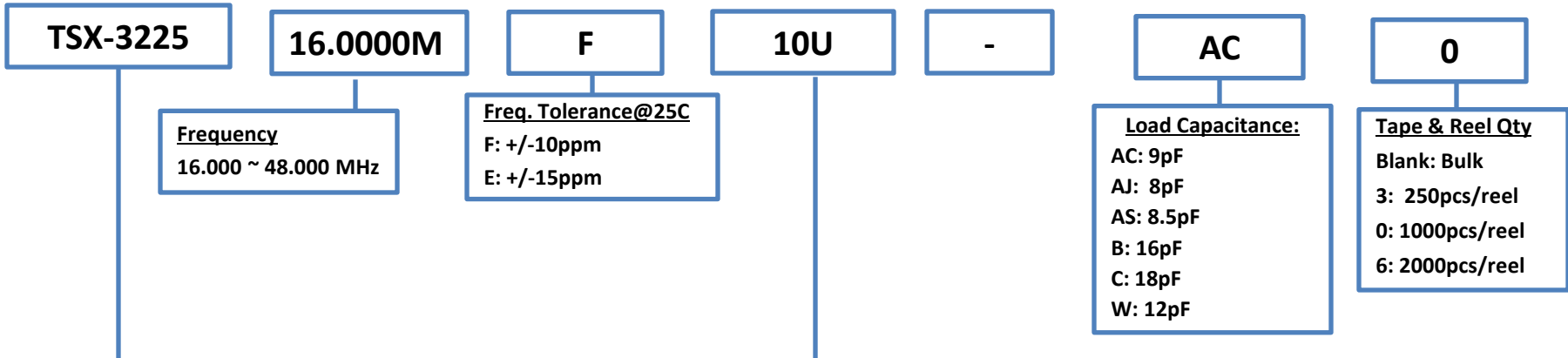
1) If you require frequency , tolerance, frequency temperature characteristics over temperature and load capacitance values other than the above listed, please contact your EEA representative for assistance.



# Product Configuration System



## MHz Range Crystal Units



**Crystal Package Type:**  
 Miniature Size Low Profile Ceramic SMD  
 3.2 X 2.5 X 0.6 mm

Freq. Temp Char Op Temp Range	16MHz<=F=<26.99MHz	27MHz<F=<48MHz
-10C to 60C	+/-10ppm = 10U	+/-10ppm = 10U
-20C to +75C	+/-9ppm = 09Z	+/-9ppm = 09Z (for <40MHz)
-20C to +75C	+/-10ppm = 10Z	+/-10ppm = 10Z
-20C to +85C	+/-10ppm = 10P	+/-10ppm = 10P
-30C to +85C	+/-13ppm = 13Y	+/-15ppm = 15Y
-40C to +85C	+/-18ppm = 18X	+/-18ppm = 18X
-40C to +105C	+/-20ppm = 20G (for 20MHz and 24MHz only)	



**NOTES:**

1) If you require frequency, tolerance, frequency temperature characteristics over temperature and load capacitance values other than the above listed, please contact your EEA representative for assistance.