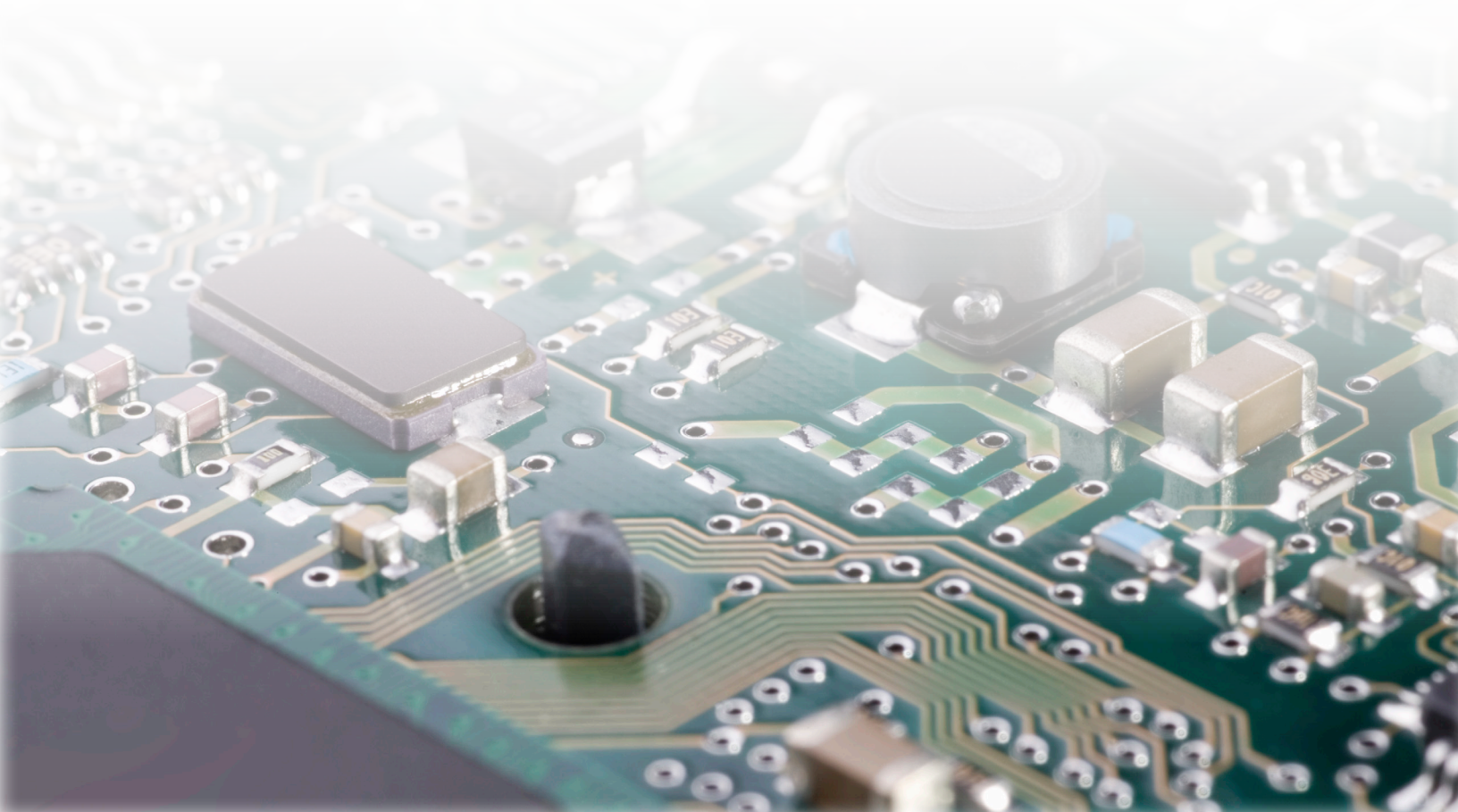
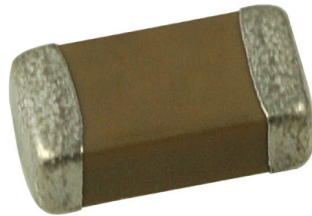




VENKEL LTD.

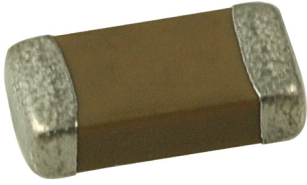
SERIES DATASHEET

# CERAMIC CAPACITORS HIGH VOLTAGE (HVC SERIES)



(800) 950-8365  
[venkel.com](http://venkel.com)

# High Voltage Ceramic Capacitors (HVC Series)



## Features:

- RoHS Compliant and Halogen Free
- Capacitance range: 0.5pF to 2.2uF
- Voltage range: 200V to 5000V
- Ceramic monolithic structure provides excellent reliability
- High-speed automated placement capabilities

## Part Number Structure

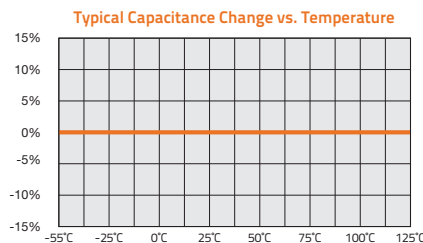
C	1808	X7R	202	-	102	K	N	E
Ceramic Capacitor	Size	Temperature Characteristic (Dielectric)	Rated Voltage		Capacitance (pico - Farads)	Tolerance:	Termination	Packaging
	0603	COG	1st two digits are significant followed by number of zeroes.		1st two digits are significant, followed by number of zeroes.	*C = ± 0.25pF *D = ± 0.50pF	N = 100% matte Tin (Sn) over nickel. P = Palladium Silver	P = Paper Tape E = Embossed Tape
	0805	X7R	201 = 200V		101 = 100pF	F = ± 1%		
	1206		251 = 250V		R denotes decimal	G = ± 2%		
	1210		601 = 600V		6R8 = 6.8pF	J = ± 5%		
	1808		631 = 630V			K = ± 10%		
	1812		102 = 1000V			M = ± 20%		
	1825		202 = 2000V			N = ± 30%		
	2220		302 = 3000V			*For values below 10pF only.		
	2225		402 = 4000V					
			502 = 5000V					

Example P/N: C1808X7R202-102KNE

Standard termination finish is 100% matte Tin (Sn).

## Electrical Specifications

### COG (NPO)



**Operating Temperature Range:**  
-55°C to +125°C

**Temperature Coefficient:**  
0 ±30PPM/°C

**Temperature Voltage Coefficient:**  
0 ±30PPM/°C

**Insulation Resistance:**  
>100 Ω-F or 10 GΩ, whichever is less at 25°C, WDCV.  
(The IR at 125°C is 10% of the value at 25°C)

**Withstanding Voltage:**  
See below

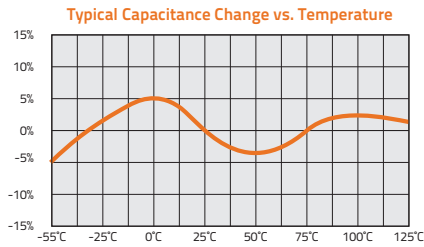
**Capacitance Tolerance:**  
C, D, F, G, J, K

Dielectric Strength is equal to 1.5 times rated voltage (WVDC) for 500 volt capacitors and 1.2 times (WVDC) for 1,000 through 5,000 volt capacitors.  
Circuit applications in excess of 1,000 volts may require a surface coating to prevent external arcing.

# High Voltage Ceramic Capacitors (HVC Series)

## Electrical Specifications

### X7R



**Operating Temperature Range:**  
-55°C to +125°C

**Temperature Coefficient:**  
0 ±15%Δ°C MAX.

**Temperature Voltage Coefficient:**  
X7R not applicable

**Insulation Resistance:**  
>100 ohms F or 10 G ohms, whichever is less at 25°C, WDCV.  
(The IR at 125°C is 10% of the value at 25°C)

**Withstanding Voltage:**  
See below

**D.F. Specification:**  
≥50V, ≤2.5%

**Capacitance Tolerance:**  
J,K,M,N

## Test Parameters

Test parameters for Multilayer Ceramic Capacitors - X7R:

1KHz ± 50Hz at 1.0 ± 0.2 Vrms, 25°C

Test parameters for Multilayer Ceramic Capacitors - COG (NP0):

1MHz ± 50KHz at 1.0 ± 0.2 Vrms ≤ 1000pF, 25°C

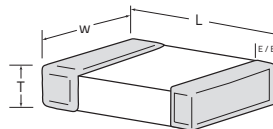
1KHz ± 50Hz at 1.0 ± 0.2 Vrms > 1000pF, 25°C

**Note:** To ensure proper capacitance readings, the voltage level must be held constant. The HP4284 and Agilent E4980 has a "ALC" (Automatic Level Control) function and should be switched to the "ON" position for accurate capacitance readings.

# High Voltage Ceramic Capacitors (HVC Series)

## Voltage and Capacitance Range

### COG (NP0) Dielectric



Values that are typically available.

(All measurements in inches)

Size	0603				0805				1206				1210															
L	.063 ± .004				.080 ± .008				.125 ± .012				.125 ± .012															
W	.031 ± .004				.050 ± .008				.062 ± .008				.095 ± .008															
T (max)	.039				.065				.080				.085															
Max E/B	.006				.020				.020				.020															
VDCW (MAX)	200V / 250V		200V / 250V		500V		600V / 630V		200V / 250V		500V		600V / 630V		1KV		2KV		3KV		200V / 250V		500V		600V / 630V		1KV	
OR5	0.5pF																											
1R0	1.0pF																											
1R2	1.2pF																											
1R5	1.5pF																											
1R8	1.8pF																											
2R0	2.0pF																											
2R2	2.2pF																											
2R7	2.7pF																											
3R3	3.3pF																											
3R9	3.9pF																											
5R0	5.0pF																											
8R2	8.2pF																											
100	10pF																											
120	12pF																											
150	15pF																											
180	18pF																											
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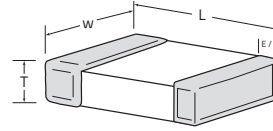
Note: Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.



# High Voltage Ceramic Capacitors (HVC Series)

## Voltage and Capacitance Range

### COG (NP0) Dielectric



Values that are typically available.

(All measurements in inches)

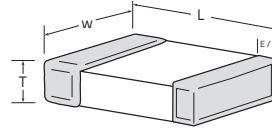
Size	1808						1812						1825			
L	.180 ± .012						.177 ± .012						.180 ± .012			
W	.080 ± .008						.125						.250 ± .016			
T (max)	.095						.118						.128			
Max E/B	.020						.020						.020			
VDCW (MAX)	500V	600V / 630V	1KV	2KV	3KV	5KV	200V / 250V	500V	600V / 630V	1KV	2KV	3KV	200V / 250V	500V	600V / 630V	1KV
OR5	0.5pF															
1R0	1.0pF															
1R2	1.2pF															
1R5	1.5pF															
1R8	1.8pF															
2R0	2.0pF															
2R2	2.2pF															
2R7	2.7pF															
3R3	3.3pF															
3R9	3.9pF															
5R0	5.0pF															
8R2	8.2pF															
100	10pF															
120	12pF															
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473	0.047uF															
563	0.056uF															
683	0.068uF															
104	0.10uF															
124	0.12uF															

Note: Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.

# High Voltage Ceramic Capacitors (HVC Series)

## Voltage and Capacitance Range

### COG (NP0) Dielectric



Values that are typically available.

(All measurements in inches)

Size		2220					2225			
L		.220 ± .016					.225 ± .016			
W		.197 ± .016					.250 ± .016			
T (max)		.118					.145			
Max E/B		.012					.020			
VDCW (MAX)		200V / 250V	500V	600V / 630V	1KV	5KV	200V / 250V	500V	600V / 630V	1KV
OR5	0.5pF									
1R0	1.0pF									
1R2	1.2pF									
1R5	1.5pF									
1R8	1.8pF									
2R0	2.0pF									
2R2	2.2pF									
2R7	2.7pF									
3R3	3.3pF									
3R9	3.9pF									
5R0	5.0pF									
8R2	8.2pF									
100	10pF									
120	12pF									
150	15pF									
180	18pF									
220	22pF									
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390	39pF									
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103	0.01uF									
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393	0.039uF									
473	0.047uF									
563	0.056uF									
683	0.068uF									
104	0.10uF									
124	0.12uF									

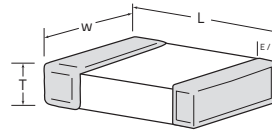
Note: Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.



# High Voltage Ceramic Capacitors (HVC Series)

## Voltage and Capacitance Range

### X7R Dielectric



Values that are typically available.

(All measurements in inches)

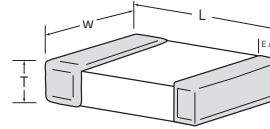
Size	0603		0805				1206					1210				
L	.063 ± .007		.080 ± .008				.125 ± .012					.125 ± .012				
W	.031 ± .007		.050 ± .008				.062 ± .008					.095 ± .008				
T (max)	.031		.065				.080					.085				
Max E/B	.015		.020				.020					.020				
VDCW (MAX)	200V / 250V		200V / 250V	500V	600V / 630V	1KV	200V / 250V	500V	600V / 630V	1KV	2KV	200V / 250V	500V	600V / 630V	1KV	2KV
101	100pF															
121	120pF															
151	150pF															
181	180pF															
221	220pF															
271	270pF															
331	330pF															
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274	0.27uF															
334	0.33uF															
394	0.39uF															
474	0.47uF															
564	0.56uF															
684	0.68uF															
824	0.82uF															
105	1.0uF															
155	1.5uF															
225	2.2uF															

Note: Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.

# High Voltage Ceramic Capacitors (HVC Series)

## Voltage and Capacitance Range

### X7R Dielectric



Values that are typically available.

(All measurements in inches)

Size		1808						1812						1825			
L		.180 ± .012						.177 ± .012						.180 ± .012			
W		.080 ± .008						.125						.250 ± .016			
T (max)		.095						.118						.128			
Max E/B		.020						.020						.020			
VDCW (MAX)		500V	600V / 630V	1KV	2KV	3KV	4KV	200V / 250V	500V	600V / 630V	1KV	2KV	3KV	200V / 250V	500V	1KV	2KV
101	100pF																
121	120pF																
151	150pF																
181	180pF																
221	220pF																
271	270pF																
331	330pF																
391	390pF																
471	470pF																
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682	6800pF																
822	8200pF																
103	0.01uF																
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473	0.047uF																
563	0.056uF																
683	0.068uF																
104	0.10uF																
124	0.12uF																
154	0.15uF																
184	0.18uF																
224	0.22uF																
274	0.27uF																
334	0.33uF																
394	0.39uF																
474	0.47uF																
564	0.56uF																
684	0.68uF																
824	0.82uF																
105	1.0uF																
155	1.5uF																
225	2.2uF																

Note: Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.

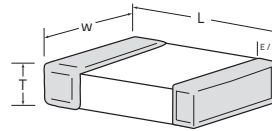




# High Voltage Ceramic Capacitors (HVC Series)

## Voltage and Capacitance Range

### X7R Dielectric



Values that are typically available.

(All measurements in inches)

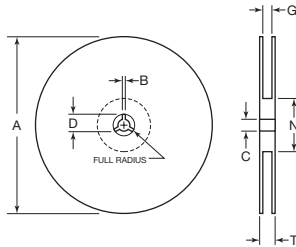
Size	2220				2225			
L	.220 ± .016				.225 ± .016			
W	.197 ± .016				.250 ± .016			
T (max)	.118				.145			
Max E/B	.012				.020			
VDCW (MAX)	200V / 250V	500V	1KV	2KV	200V / 250V	500V	1KV	2KV
151	150pF							
181	180pF							
221	220pF							
271	270pF							
331	330pF							
391	390pF							
471	470pF							
561	560pF							
681	680pF							
821	820pF							
102	1000pF							
122	1200pF							
152	1500pF							
182	1800pF							
222	2200pF							
272	2700pF							
332	3300pF							
392	3900pF							
472	4700pF							
562	5600pF							
682	6800pF							
822	8200pF							
103	0.01uF							
123	0.012uF							
153	0.015uF							
183	0.018uF							
223	0.022uF							
273	0.027uF							
333	0.033uF							
393	0.039uF							
473	0.047uF							
563	0.056uF							
683	0.068uF							
104	0.10uF							
124	0.12uF							
154	0.15uF							
184	0.18uF							
224	0.22uF							
274	0.27uF							
334	0.33uF							
394	0.39uF							
474	0.47uF							
564	0.56uF							
684	0.68uF							
824	0.82uF							
105	1.0uF							
155	1.5uF							
225	2.2uF							

Note: Additional values may be available. Please contact us for more information. Due to demand and raw material fluctuations, specific values may not be available.

# High Voltage Ceramic Capacitors (HVC Series)

## Tape and Reel Specifications

All tape and reel specifications must be adhered to per EIA-481-1-A.

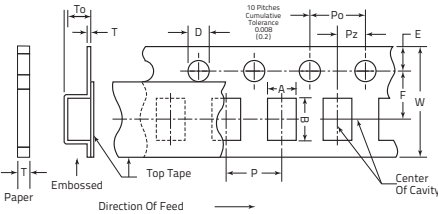


### Reel Dimensions

Unit: mm (inch)

TAPE	B min	C	A (7°)	A (13°)	D min	N min	G	T max
8mm	0.3 (.012)	13 ± .05 (.512 ± .02)	178 ± 2.0 (7 ± .079)	330 ± 2.0 (13 ± .08)	20.2 (.795)	50 (1.97)	10 ± 1.5 (.394 ± .059)	14.9 (.587)
12mm	0.3 (.012)	13 ± .05 (.512 ± .02)	178 ± 2.0 (7 ± .079)	330 ± 2.0 (13 ± .08)	20.2 (.795)	50 (1.97)	10 ± 1.5 (.394 ± .059)	14.9 (.587)

### Taping Specifications



### 7 in. Reel Quantities\*

Size	0603	0805	1206	1210	1812	2221
Tape Size	8mm	8mm	8mm	8mm	12mm	12mm
Min Qty Per Reel	3000	2000	2000	1000	1000	1000
Max Qty Per Reel	4000	5000	5000	5000	3000	1000

\*Quantity dependent on thickness

### Paper Tape Carrier Dimensions (8mm)

Unit: mm (inch)

Size (inches)	A	B	W	F	E	Po	Pz	D	t	P
0603	1.10 ± 0.2 (.043 ± .008)	1.90 ± 0.2 (.075 ± .008)	8.0 ± 0.2 (.315 ± .008)	3.5 ± 0.1 (.138 ± .004)	1.75 ± 0.1 (.069 ± .004)	4.0 ± 0.1 (.157 ± .004)	2.0 ± 0.05 - 0.0 (.039 ± .002) - .000	1.5 ± 0.1 (.064 ± .004)	1.15 MAX (.045 MAX)	4.0 ± 0.1 (.157 ± .004)
0805	1.16 ± 0.2 (.046 ± .008)	2.4 ± 0.2 (.095 ± .008)	8.0 ± 0.2 (.315 ± .008)	3.5 ± 0.1 (.138 ± .004)	1.75 ± 0.1 (.069 ± .004)	4.0 ± 0.1 (.157 ± .004)	2.0 ± 0.05 - 0.0 (.039 ± .002) - .000	1.5 ± 0.1 (.064 ± .004)	1.15 MAX (.045 MAX)	4.0 ± 0.1 (.157 ± .004)
1206	2.0 ± 0.2 (.079 ± .008)	3.6 ± 0.2 (.142 ± .008)	8.0 ± 0.2 (.315 ± .008)	3.5 ± 0.1 (.138 ± .004)	1.75 ± 0.1 (.069 ± .004)	4.0 ± 0.1 (.157 ± .004)	2.0 ± 0.05 - 0.0 (.039 ± .002) - .000	1.5 ± 0.1 (.064 ± .004)	1.15 MAX (.045 MAX)	4.0 ± 0.1 (.157 ± .004)

### Embossed Carrier Dimensions (8mm & 12mm)

Size (inches)	A	B	W	F	E	Po	Pz	D	To	T	P
0805	1.48 ± 0.2 (.058 ± .008)	2.3 ± 0.2 (.091 ± .008)	8.0 ± 0.2 (.315 ± .008)	3.5 ± 0.1 (.138 ± .004)	1.75 ± 0.1 (.069 ± .004)	4.0 ± 0.1 (.157 ± .004)	2.0 ± 0.05 (.079 ± .002)	1.5 ± 0.1 - 0.0 (.06 ± .004) - .000	2.5 MAX (.098 MAX)	0.6 MAX (.024 MAX)	4.0 ± 0.1 (.157 ± .004)
1206	2.0 ± 0.2 (.079 ± .008)	3.6 ± 0.2 (.142 ± .008)	8.0 ± 0.2 (.315 ± .008)	3.5 ± 0.1 (.138 ± .004)	1.75 ± 0.1 (.069 ± .004)	4.0 ± 0.1 (.157 ± .004)	2.0 ± 0.05 (.079 ± .002)	1.5 ± 0.1 - 0.0 (.06 ± .004) - .000	2.5 MAX (.098 MAX)	0.6 MAX (.024 MAX)	4.0 ± 0.1 (.157 ± .004)
1210	2.9 ± 0.2 (.114 ± .008)	3.6 ± 0.2 (.142 ± .008)	8.0 ± 0.2 (.315 ± .008)	3.5 ± 0.1 (.138 ± .004)	1.75 ± 0.1 (.069 ± .004)	4.0 ± 0.1 (.157 ± .004)	2.0 ± 0.05 (.079 ± .002)	1.5 ± 0.1 - 0.0 (.06 ± .004) - .000	2.5 MAX (.098 MAX)	0.6 MAX (.024 MAX)	4.0 ± 0.1 (.157 ± .004)
1808	2.5 ± 0.2 (.098 ± .008)	4.9 ± 0.2 (.193 ± .008)	12.0 ± 0.3 (.472 ± .012)	5.5 ± .05 (.22 ± .004)	1.75 ± 0.1 (.069 ± .004)	4.0 ± 0.1 (.157 ± .004)	2.0 ± 0.05 (.079 ± .002)	1.5 ± 0.1 - 0.0 (.06 ± .004) - .000	4.0 MAX (.16 max)	0.6 MAX (.024 MAX)	4.0 ± 0.1 (.157 ± .004)
1812	3.6 ± 0.2 (.142 ± .008)	4.9 ± 0.2 (.193 ± .008)	12.0 ± 0.3 (.472 ± .012)	5.6 ± .01 (.221 ± .004)	1.75 ± 0.1 (.069 ± .004)	4.0 ± 0.1 (.157 ± .004)	2.0 ± 0.05 (.079 ± .002)	1.5 ± 0.1 - 0.0 (.06 ± .004) - .000	4.0 MAX (.16 max)	0.6 MAX (.024 MAX)	8.0 ± 0.1 (.315 ± .004)
2220	5.4 ± 0.2 (.21 ± .008)	6.1 ± 0.2 (.193 ± .008)	12.0 ± 0.3 (.472 ± .012)	5.5 ± .05 (.22 ± .004)	1.75 ± 0.1 (.069 ± .004)	4.0 ± 0.1 (.157 ± .004)	2.0 ± 0.05 (.079 ± .002)	1.5 ± 0.1 - 0.0 (.06 ± .004) - .000	4.0 MAX (.16 max)	0.6 MAX (.024 MAX)	8.0 ± 0.1 (.315 ± .004)
2225	6.9 ± 0.2 (.27 ± .008)	6.1 ± 0.2 (.193 ± .008)	12.0 ± 0.3 (.472 ± .012)	5.5 ± .05 (.22 ± .004)	1.75 ± 0.1 (.069 ± .004)	4.0 ± 0.1 (.157 ± .004)	2.0 ± 0.05 (.079 ± .002)	1.5 ± 0.1 - 0.0 (.06 ± .004) - .000	4.0 MAX (.16 max)	0.6 MAX (.024 MAX)	8.0 ± 0.1 (.315 ± .004)