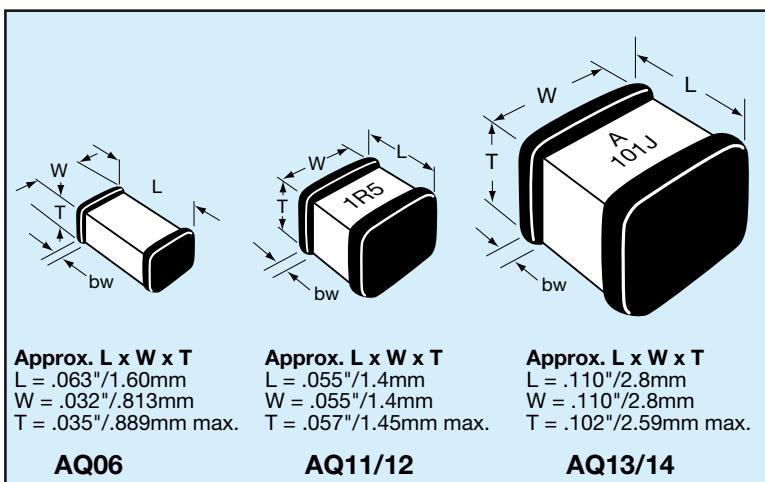


Microwave MLC's

AQ Series



These porcelain and ceramic dielectric multilayer capacitor (MLC) chips are best suited for RF/Microwave applications typically ranging from 10 MHz to 4.2 GHz. Characteristic is a fine grained, high density, high purity dielectric material impervious to moisture with heavy internal palladium electrodes.

These characteristics lend well to applications requiring:

- 1) high current carrying capabilities;
- 2) high quality factors;
- 3) very low equivalent series resistance;
- 4) very high series resonance;
- 5) excellent stability under stresses of changing voltage, frequency, time and temperature.

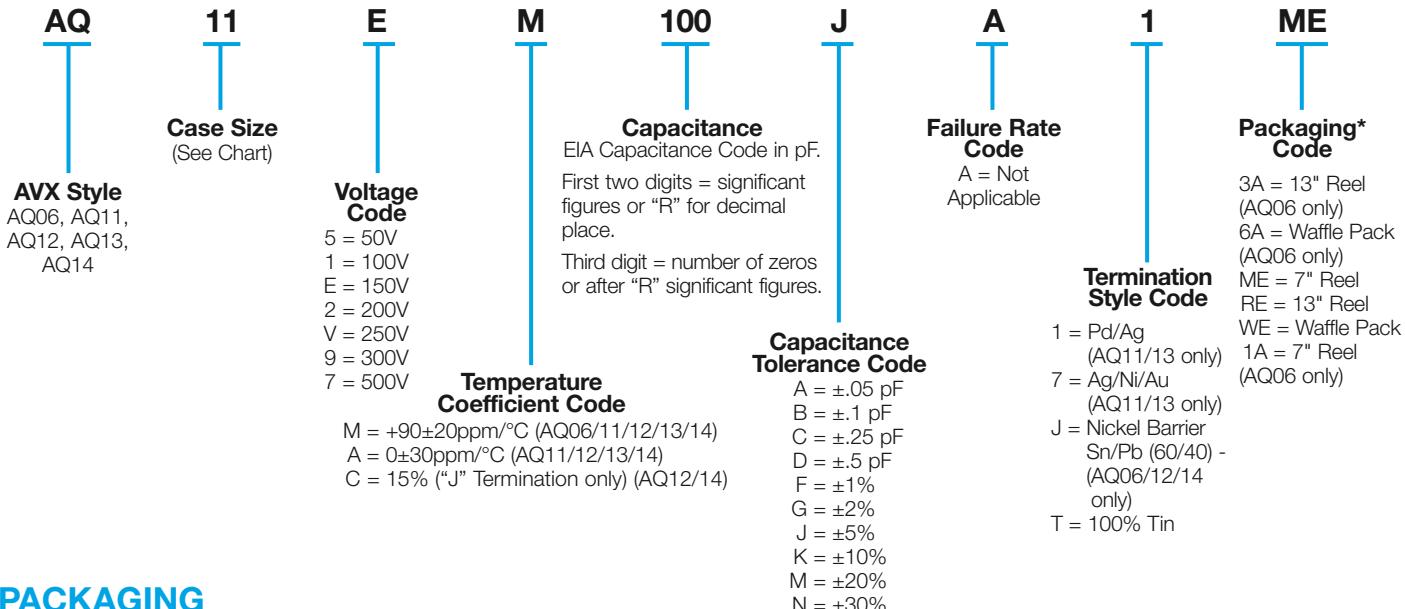
MECHANICAL DIMENSIONS: inches (millimeters)

Case	Length (L)	Width (W)	Thickness (T)	Band Width (bw)
AQ06	.063±.006 (1.60±.152)	.032±.006 (.813±.152)	.035 Max. (.889)	.014±.006 (.357 ± .152)
AQ11	.055±.015 (1.40±.381)	.055±.015 (1.40±.381)	.020/.057 (.508/1.45)	.010 + .010 -.005 (.254 +.254 -.127)
AQ12	.055 + .015 - .010 (1.40+ .381 -.254)	.055±.015 (1.40±.381)	.020/.057 (.508/1.45)	.010 + .010 -.005 (.254 +.254 -.127)
AQ13	.110±.020 (2.79±.508)	.110±.020 (2.79±.508)	.030/.102 (.762/2.59)	.015±.010 (.381±.254)
AQ14	.110 + .020 - .010 (2.79 +.889 -.254)	.110±.010 (2.79±.508)	.030/.102 (.762/2.59)	.015±.010 (.381±.254)

*For Tape and Reel packaging details see page 102

HOW TO ORDER

6



PACKAGING

Standard Packaging = Waffle Pack (for T&R packaging see page 102)
AQ11/12 maximum quantity per waffle pack is 100.
AQ13/14 maximum quantity is 80.

Microwave MLC's

AQ Series



ELECTRICAL SPECIFICATIONS

AQ06, AQ11, AQ12, AQ13, AQ14		
	M & A	C
Temperature Coefficient	(M) +90 ±20PPM/°C and (A) 0 ±30PPM/°C	±15%
Capacitance Range	0.1 pF to 5100 pF	0.001µF to 0.1µF
Capacitance Tolerance	±0.1 pF to ±20%	±10%, ±20%, ±30%
Operating Temperature	-55°C + 125°C	-55°C to +125°C
Quality Factor or Dissipation Factor	Per MIL-PRF-55681/4	2.5% @ 1kHz
Insulation Resistance	Per MIL-PRF-55681 10 ⁶ megohm to 470 pF @ +25°C 10 ⁵ megohm to 470 pF @ +125°C 10 ⁵ megohm above 470 pF @ +25°C 10 ⁴ megohm above 470 pF @ +125°C	10 ⁴ megohm min @ 25°C & R VDC 10 ³ megohm min @ 25°C & R VDC
Aging	None	<3% per decade hour
Piezoelectric Effects	None	None
Dielectric Withstanding Voltage	2.5 x rated voltage (for 500V rated 1.5 x rated voltage)	2.5 x rated voltage (for 500V rated 1.5 x rated voltage)

ENVIRONMENTAL CHARACTERISTICS

Will meet or exceed performance characteristics as outlined in MIL-PRF-55681/4.

REQUIREMENT	MIL-STD-202 METHOD
Life	108, Condition F
Shock	213, Condition J
Vibration	204, Condition B
Immersion	104, Condition B
Salt Spray	101, Condition B
Solderability	208
Thermal Shock	107, Condition B
Terminal Strength	211
Temperature Cycling	102, Condition C
Moisture Resistance	106
Barometric Pressure	105, Condition B
Resistance to Soldering Heat	210, Condition C

QUALITY FACTOR vs. FREQUENCY (Typical)

Capacitance	@ 30 MHz	@ 150 MHz	@ 500 MHz	@ 1000 MHz
1 pF	30000	4000	800	350
10 pF	9000	2000	400	150
30 pF	5000	800	200	60
100 pF	2800	400	70	25
200 pF	1500	250	40	12

CAPACITANCE AND SIZE vs. SERIES SELF RESONANT FREQUENCY (Typical)

DIMENSIONS: inches (millimeters)

Case	Size (Nominal)	1 pF	10 pF	50 pF	100 pF
AQ06	.063 x .032 x .035 (1.60 x .813 x .889)	9.6 GHz	3.2 GHz	1.5 GHz	1.0 GHz
AQ11/12	.055 x .055 x .057 (1.40 x 1.40 x 1.45)	9.6 GHz	3.2 GHz	1.5 GHz	1.0 GHz
AQ13/14	.110 x .110 x .102 (2.79 x 2.79 x 2.59)	6.4 GHz	2.2 GHz	1.0 GHz	0.7 GHz

Microwave MLC's



AQ Series Available Capacitance/Size/WVDC/T.C.

TABLE I: TC: M (+90±20PPM/°C)

CASE SIZE 06, 11, 12, 13 & 14

DIMENSIONS: inches (millimeters)

Case	Length	Width	Thickness	Band Width	Avail. Term.
06	.063±.006 (1.60±.152)	.032±.006 (.813±.152)	.035 Max. (.889)	.014±.006 (.357 ±.152)	J
11	.055±.015 (1.40±.381)	.055±.015 (1.40±.381)	.020/.057 (.508/1.45)	.010 +.010 -.005 (.254 ±.254 -.127)	1 & 7
12	.055±.025 (1.40±.635)	.055±.015 (1.40±.381)	.020/.057 (.508/1.45)	.010 +.010 -.005 (.254 ±.254 -.127)	J
13	.110±.020 (2.79±.508)	.110±.020 (2.79±.508)	.030/.102 (.762/2.59)	.015±.010 (.381±.254)	1 & 7
14	.110 +.035 -.020 (2.79 +.889 -.508)	.110±.020 (2.79±.508)	.030/.102 (.762/2.59)	.015±.010 (.381±.254)	J
Case: AQ06		Case: AQ11, AQ12		Case: AQ13, AQ14	
Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC
0.1	B	250	0.1	B	150
0.2	B	250	0.2	B	150
0.3	B,C	250	0.3	B,C	150
0.4	B,C	250	0.4	B,C	150
0.5	B, C, D	250	0.5	B, C, D	150
0.6	B, C, D	250	0.6	B, C, D	150
0.7	B, C, D	250	0.7	B, C, D	150
0.8	B, C, D	250	0.8	B, C, D	150
0.9	B, C, D	250	0.9	B, C, D	150
1.0	B, C, D	250	1.0	B, C, D	150
1.1	B, C, D	250	1.1	B, C, D	150
1.2	B, C, D	250	1.2	B, C, D	150
1.3	B, C, D	250	1.3	B, C, D	150
1.4	B, C, D	250	1.4	B, C, D	150
1.5	B, C, D	250	1.5	B, C, D	150
1.6	B, C, D	250	1.6	B, C, D	150
1.7	B, C, D	250	1.7	B, C, D	150
1.8	B, C, D	250	1.8	B, C, D	150
1.9	B, C, D	250	1.9	B, C, D	150
2.0	B, C, D	250	2.0	B, C, D	150
2.2	B, C, D	250	2.2	B, C, D	150
2.4	B, C, D	250	2.4	B, C, D	150
2.7	B, C, D	250	2.7	B, C, D	150
3.0	B, C, D	250	3.0	B, C, D	150
3.3	B, C, D	250	3.3	B, C, D	150
3.6	B, C, D	250	3.6	B, C, D	150
3.9	B, C, D	250	3.9	B, C, D	150
4.3	B, C, D	250	4.3	B, C, D	150
4.7	B, C, D	250	4.7	B, C, D	150
5.1	B, C, D	250	5.1	B, C, D	150
5.6	B, C, D	250	5.6	B, C, D	150
6.2	B, C, D	250	6.2	B, C, D	150
6.8	B, C, J, K, M	250	6.8	B, C, J, K, M	150
7.5	B, C, J, K, M	250	7.5	B, C, J, K, M	150
8.2	B, C, J, K, M	250	8.2	B, C, J, K, M	150
9.1	B, C, J, K, M	250	9.1	B, C, J, K, M	150
10	F, G, J, K, M	250	10	F, G, J, K, M	150
11	F, G, J, K, M	250	11	F, G, J, K, M	150
12	F, G, J, K, M	250	12	F, G, J, K, M	150
13	F, G, J, K, M	250	13	F, G, J, K, M	150
15	F, G, J, K, M	250	15	F, G, J, K, M	150
16	F, G, J, K, M	250	16	F, G, J, K, M	150
18	F, G, J, K, M	250	18	F, G, J, K, M	150
20	F, G, J, K, M	250	20	F, G, J, K, M	150
22	F, G, J, K, M	250	22	F, G, J, K, M	150
24	F, G, J, K, M	250	24	F, G, J, K, M	150
27	F, G, J, K, M	250	27	F, G, J, K, M	150
30	F, G, J, K, M	250	30	F, G, J, K, M	150
33	F, G, J, K, M	250	33	F, G, J, K, M	150
36	F, G, J, K, M	50	36	F, G, J, K, M	150
39	F, G, J, K, M	50	39	F, G, J, K, M	150
43	F, G, J, K, M	50	43	F, G, J, K, M	150
47	F, G, J, K, M	50	47	F, G, J, K, M	150
51	F, G, J, K, M	50	51	F, G, J, K, M	150
56	F, G, J, K, M	50	56	F, G, J, K, M	150
62	F, G, J, K, M	50	62	F, G, J, K, M	150
68	F, G, J, K, M	50	68	F, G, J, K, M	150
75	F, G, J, K, M	50	75	F, G, J, K, M	150
82	F, G, J, K, M	50	82	F, G, J, K, M	150
91	F, G, J, K, M	50	91	F, G, J, K, M	150
100	F, G, J, K, M	50	100	F, G, J, K, M	150
120	F, G, J, K, M	50			



Microwave MLC's

AQ Series Available Capacitance/Size/WVDC/T.C.

TABLE II: TC: A (0±30PPM/°C)

CASE SIZE 06, 11, 12, 13 & 14

DIMENSIONS: inches (millimeters)

Case	Length	Width	Thickness	Band Width	Avail. Term.
06	.063±.006 (1.60±.152)	.032±.006 (.813±.152)	.035 Max. (.889)	.014±.006 (.357 ±.152)	J
11	.055±.015 (1.40±.381)	.055±.015 (1.40±.381)	.020/.057 (.508/1.45)	.010 +.010 -.005 (.254 +.254 -.127)	1 & 7
12	.055±.025 (1.40±.635)	.055±.015 (1.40±.381)	.020/.057 (.508/1.45)	.010 +.010 -.005 (.254 +.254 -.127)	J
13	.110±.020 (2.79±.508)	.110±.020 (2.79±.508)	.030/.102 (.762/2.59)	.015±.010 (.381±.254)	1 & 7
14	.110 +.035 -.020 (2.79+.889 -.508)	.110±.020 (2.79±.508)	.030/.102 (.762/2.59)	.015±.010 (.381±.254)	J

Case: AQ06

Cap. pF	Cap. Tol.	WVDC
0.1	B	250
0.2	B	250
0.3	B,C	250
0.4	B,C	250
0.5	B, C, D	250
0.6	B, C, D	250
0.7	B, C, D	250
0.8	B, C, D	250
0.9	B, C, D	250
1.0	B, C, D	250
1.1	B, C, D	250
1.2	B, C, D	250
1.3	B, C, D	250
1.4	B, C, D	250
1.5	B, C, D	250
1.6	B, C, D	250
1.7	B, C, D	250
1.8	B, C, D	250
1.9	B, C, D	250
2.0	B, C, D	250
2.2	B, C, D	250
2.4	B, C, D	250
2.7	B, C, D	250
3.0	B, C, D	250
3.3	B, C, D	250
3.6	B, C, D	250
3.9	B, C, D	250
4.3	B, C, D	250
4.7	B, C, D	250
5.1	B, C, D	250
5.6	B, C, D	250
6.2	B, C, D	250
6.8	B, C, J, K, M	250
7.5	B, C, J, K, M	250
8.2	B, C, J, K, M	250
9.1	B, C, J, K, M	250
10	F, G, J, K, M	250
11	F, G, J, K, M	250
12	F, G, J, K, M	250
13	F, G, J, K, M	250
15	F, G, J, K, M	250
16	F, G, J, K, M	250
18	F, G, J, K, M	250
20	F, G, J, K, M	250
22	F, G, J, K, M	250
24	F, G, J, K, M	250
27	F, G, J, K, M	250
30	F, G, J, K, M	250
33	F, G, J, K, M	250
36	F, G, J, K, M	50
39	F, G, J, K, M	50
43	F, G, J, K, M	50
47	F, G, J, K, M	50
51	F, G, J, K, M	50
56	F, G, J, K, M	50
62	F, G, J, K, M	50
68	F, G, J, K, M	50
75	F, G, J, K, M	50
82	F, G, J, K, M	50
91	F, G, J, K, M	50
100	F, G, J, K, M	50
120	F, G, J, K, M	50

Case: AQ11, AQ12

Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC
0.1	B	150	24	F, G, J, K, M	150
0.2	B	150	27	F, G, J, K, M	150
0.3	B,C	150	30	F, G, J, K, M	150
0.4	B,C	150	33	F, G, J, K, M	150
0.5	B, C, D	150	36	F, G, J, K, M	150
0.6	B, C, D	150	39	F, G, J, K, M	150
0.7	B, C, D	150	43	F, G, J, K, M	150
0.8	B, C, D	150	47	F, G, J, K, M	150
0.9	B, C, D	150	51	F, G, J, K, M	150
1.0	B, C, D	150	56	F, G, J, K, M	150
1.1	B, C, D	150	62	F, G, J, K, M	150
1.2	B, C, D	150	68	F, G, J, K, M	150
1.3	B, C, D	150	75	F, G, J, K, M	150
1.4	B, C, D	150	82	F, G, J, K, M	150
1.5	B, C, D	150	91	F, G, J, K, M	150
1.6	B, C, D	150	100	F, G, J, K, M	150
1.7	B, C, D	150	110	F, G, J, K, M	50
1.8	B, C, D	150	120	F, G, J, K, M	50
1.9	B, C, D	150	130	F, G, J, K, M	50
2.0	B, C, D	150	150	F, G, J, K, M	50
2.2	B, C, D	150	160	F, G, J, K, M	50
2.4	B, C, D	150	180	F, G, J, K, M	50
2.7	B, C, D	150	200	F, G, J, K, M	50
3.0	B, C, D	150	220	F, G, J, K, M	50
3.3	B, C, D	150	240	F, G, J, K, M	50
3.6	B, C, D	150	270	F, G, J, K, M	50
3.9	B, C, D	150	300	F, G, J, K, M	50
4.3	B, C, D	150	330	F, G, J, K, M	50
4.7	B, C, D	150	360	F, G, J, K, M	50
5.1	B, C, D	150	390	F, G, J, K, M	50
5.6	B, C, D	150	430	F, G, J, K, M	50
6.2	B, C, D	150	470	F, G, J, K, M	50
6.8	B, C, J, K, M	150	510	F, G, J, K, M	50
7.5	B, C, J, K, M	150	560	F, G, J, K, M	50
8.2	B, C, J, K, M	150	620	F, G, J, K, M	50
9.1	B, C, J, K, M	150	680	F, G, J, K, M	50
10	F, G, J, K, M	150	750	F, G, J, K, M	50
11	F, G, J, K, M	150	820	F, G, J, K, M	50
12	F, G, J, K, M	150	910	F, G, J, K, M	50
13	F, G, J, K, M	150	1000	F, G, J, K, M	50
15	F, G, J, K, M	150			
16	F, G, J, K, M	150			
18	F, G, J, K, M	150			
20	F, G, J, K, M	150			
22	F, G, J, K, M	150			

Case: AQ13, AQ14

Cap. pF	Cap. Tol.	WVDC	Cap. pF	Cap. Tol.	WVDC
51	F, G, J, K, M	500	51	F, G, J, K, M	500
56	F, G, J, K, M	500	56	F, G, J, K, M	500
62	F, G, J, K, M	500	62	F, G, J, K, M	500
68	F, G, J, K, M	500	68	F, G, J, K, M	500
75	F, G, J, K, M	500	75	F, G, J, K, M	500
82	F, G, J, K, M	500	82	F, G, J, K, M	500
91	F, G, J, K, M	500	91	F, G, J, K, M	500
100	F, G, J, K, M	500	100	F, G, J, K, M	500
100	F, G, J, K, M	300	100	F, G, J, K, M	300
110	F, G, J, K, M	300	110	F, G, J, K, M	300
120	F, G, J, K, M	300	120	F, G, J, K, M	300
130	F, G, J, K, M	300	130	F, G, J, K, M	300
140	F, G, J, K, M	200	140	F, G, J, K, M	200
150	F, G, J, K, M	200	150	F, G, J, K, M	200
160	F, G, J, K, M	200	160	F, G, J, K, M	200
170	F, G, J, K, M	200	170	F, G, J, K, M	200
180	F, G, J, K, M	200	180	F, G, J, K, M	200
190	F, G, J, K, M	200	190	F, G, J, K, M	200
200	F, G, J, K, M	200	200	F, G, J, K, M	200
210	F, G, J, K, M	200	210	F, G, J, K, M	200
220	F, G, J, K, M	200	220	F, G, J, K, M	200
230	F, G, J, K, M	200	230	F, G, J, K, M	200
240	F, G, J, K, M	200	240	F, G, J, K, M	200
250	F, G, J, K, M	200	250	F, G, J, K, M	200
260	F, G, J, K, M	200	260	F, G, J, K, M	200
270	F, G, J, K, M	200	270	F, G, J, K, M	200
280	F, G, J, K, M	200	280	F, G, J, K, M	200
290	F, G, J, K, M	200	290	F, G, J, K, M	200
300	F, G, J, K, M	200	300	F, G, J, K, M	200
310	F, G, J, K, M	200	310	F, G, J, K, M	200
320	F, G, J, K, M	200	320	F, G, J, K, M	200
330	F, G, J, K, M	200	330	F, G, J, K, M	200
340	F, G, J, K, M	200	340	F, G, J, K, M	200
350	F, G, J, K, M	200	350	F, G, J, K, M	200
360	F, G, J, K, M	200	360	F, G, J, K, M	200
370	F, G, J, K, M	200	370	F, G, J, K, M	200
380	F, G, J, K, M	200	380	F, G, J, K, M	200
390	F, G, J, K, M	200	390	F, G, J, K, M	200
400	F, G, J, K, M	200	400	F, G, J, K, M	200
410	F, G, J, K, M	200	410	F, G, J, K, M	200
420	F, G, J, K, M	200	420	F, G, J, K, M	200
430	F, G, J, K, M	200	430	F, G, J, K, M	200
440	F, G, J, K, M	200	440	F, G, J, K, M	200
450	F, G, J, K, M	200	450	F, G, J, K, M	200
460	F, G, J, K, M	200	460	F, G, J, K, M	200
470	F, G, J, K, M	200	470	F, G, J, K, M	200
480	F, G, J, K, M	200	480	F, G, J, K, M	200
490	F, G, J, K, M	200	490	F, G, J, K, M	200
500	F, G, J, K, M	200	500	F, G, J, K, M	200
510	F, G, J, K, M	200	510	F, G, J, K, M	200
520	F, G, J, K, M	200	520	F, G, J, K, M	200
530	F, G, J, K, M	200	530	F, G, J, K, M	200
540	F, G, J, K, M	200	540	F, G, J, K, M	200
550	F, G, J, K, M	200	550	F, G, J, K, M	200
560	F, G, J, K, M	200	560	F, G, J, K, M	200
570	F, G, J, K, M	200	570	F, G, J, K, M	200
580	F, G, J, K, M	200	580	F, G, J, K, M	200
590	F, G, J, K, M	200	590	F, G, J, K, M	200
600	F, G, J, K, M	200	600	F, G, J, K, M	200
610	F, G, J, K, M	200	610	F, G, J, K, M	200
620	F, G, J, K, M	200	620	F, G, J, K, M	200
630	F, G, J, K, M	200	630	F, G, J, K, M	200
640	F, G, J, K, M	200	640	F, G, J, K, M	200
650	F, G, J, K, M	200	650	F, G, J, K, M	200
660	F, G, J, K, M	200	660	F, G, J, K, M	200
670	F, G, J, K, M	200	670	F, G, J, K, M	200
680	F, G, J, K, M	200	680	F, G, J, K, M	200
690	F, G, J, K, M	200	690	F, G, J, K, M	200
700	F, G, J, K, M	200	700	F, G, J, K, M	200
710	F, G, J, K, M	200	710	F, G, J, K, M	200
720	F, G, J, K, M	200	720	F, G, J, K, M	200
730	F, G, J, K, M	200	730	F, G, J, K, M	200
740	F, G, J, K, M	200	740	F, G, J, K, M	200
750	F, G, J, K, M	200	750	F, G, J, K, M	200
760	F, G, J, K, M	200	760	F, G, J, K, M	200
770	F, G, J, K, M	200	770	F, G, J, K, M	200
780	F, G, J, K, M	200	780	F, G, J, K, M	200
790	F, G, J,				

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[AQ13EA102FA1WE](#) [AQ145M102JAJME](#) [AQ135M821JA1ME](#) [AQ13EM621JA1BE](#) [AQ065M120GAJ3A](#)
[AQ135M821JA1BE](#) [AQ065M470GAJ3A](#) [AQ135M911JA1BE](#) [AQ065M1R5BAJ1A](#) [AQ135M911JA1ME](#)
[AQ145M102JAJBE](#) [AQ137M5R1DA7WE](#) [AQ11EM0R9CA1ME](#) [AQ135M751JA1BE](#) [AQ147M1R1CAJWE](#)
[AQ147M1R1CAJME](#) [AQ147M5R1CAJME](#) [AQ147M5R1CAJWE](#) [AQ147M5R1CAJBE](#) [AQ147M9R1CAJWE](#)
[AQ147M9R1CAJME](#) [AQ137M5R6CA1BE](#) [AQ11EA510GA1WE](#) [AQ147A4R7CAJWE](#) [AQ11EM1R2CA1WE](#)
[AQ06EM0R8BAJ1A](#) [AQ06EM1R8BAJ1A](#) [AQ147M4R7CAJWE](#) [AQ06EM6R8BAJ1A](#) [AQ147M2R7CAJBE](#)
[AQ06EM1R8BAJ6A](#) [AQ149M111FAJRE](#) [AQ149M121FAJME](#) [AQ147M0R7CAJWE](#) [AQ149A111FAJME](#)
[AQ06EM0R8BAJ6A](#) [AQ149M111FAJME](#) [AQ149M131FAJME](#) [AQ149M161FAJME](#) [AQ149M151FAJBE](#)
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[AQ06VA3R3BAJ1A](#) [AQ147M180GAJME](#) [AQ147M390GAJME](#) [AQ147M680GAJME](#) [AQ12EM9R1CAJWE](#)