HS Series, Radial, Conformally Coated, 50 – 200 VDC (Space Grade)

Overview

KEMET's HS Series ceramic capacitors are designed with C0G and X7R dielectrics which feature a 125°C maximum operating temperature and are screened to MIL-PRF-49467. These devices are robustly designed and tested to meet demanding high reliability, defense and aerospace criteria. These devices are ideal for high voltage power supplies, DC/DC conversion and well suited for timing, resonant, bypass, and decoupling applications.

These high voltage capacitors are widely used in industries related to semiconductors, telecommunications, test/diagnostic equipment and power/grid.

The HS Series is part of KEMET's Harsh Environment PME (Precious Metal Electrode) portfolio which is ideal for industrial and high reliability applications.

Benefits

- Operating temperature range of −55°C to +125°C
- Capacitance range from 330 pF – 2.9 µF in X7R
- Capacitance range from 12 pF – 0.1 µF in C0G
- DC voltage ratings of 500 V, 1 kV, 2 kV, 3 kV, 4 kV, 5 kV
- High thermal stability

Applications

- Aerospace engine compartments
- Switch mode power supplies
- DC/DC Converters
- Measuring equipment
- Inverters
- High voltage coupling

Ordering Information

10	HS	24		B	102	K	C	F
Voltage	Series	Style/Size		Dielectric	Capacitance Code (pF)	Capacitance Tolerance[1]	Test Level[3]	Voltage Conditioning[3]
5 = 500V 10 = 1000V 20 = 2000V 30 = 3000V 40 = 4000V 50 = 5000V 75 = 7500V 100 = 10,000V	HS	20 21 22 23 24 25 26	30 31 33 34 35 36	N = BP C0G (NP0) B = X7R	Two significant digits and number of zeros	J = ±5% K= ±10% M = ±20%	Blank = Standard Screening C = CSAM (optional)	F = Burn In (optional)

[1] Additional capacitance tolerance offerings may be available. Contact KEMET for details.
[2] Please refer to the Construction section in the datasheet.
[3] CSAM must be included if burn-in option is selected.

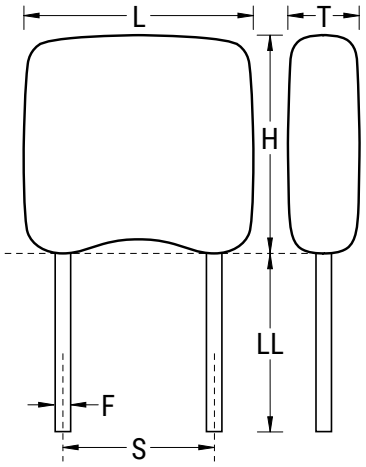
Environmental Compliance

Industrial PME (precious metal electrode) part types are not RoHS compliant.

Post Environmental Limits

Post Environmental Limits					
Dielectric	Rated DC Voltage	Capacitance Value	Dissipation Factor (Maximum %)	Capacitance Shift	Insulation Resistance
C0G	All	All	0.25	0.3% or ±0.50 pF	10% of Initial Limit
X7R	All	All	3.0	±20%	

Dimensions – Inches (Millimeters)



Series	Style/ Size	Length (L)	Height (H)	Thickness (T)	Lead Spacing ±0.030 (S)	Lead Diameter (F)	Lead Length Minimum (LL)
HS	20	0.250 (6.35)	0.220 (5.59)	0.200 (5.08)	0.170 (4.32)	0.025 +0.004/-0.002 (0.635 +0.102/-0.051)	0.125 (3.175)
	21	0.320 (8.13)	0.280 (7.11)	0.250 (6.35)	0.220 (5.59)		
	22	0.370 (9.40)	0.300 (7.62)	0.250 (6.35)	0.250 (6.35)		
	23	0.470 (11.94)	0.400 (10.16)	0.270 (6.89)	0.375 (9.53)		
	24	0.570 (14.48)	0.500 (12.70)	0.270 (6.89)	0.475 (12.07)		
	25	0.670 (17.02)	0.600 (15.24)	0.270 (6.89)	0.575 (14.61)		
	26	0.770 (19.56)	0.720 (18.29)	0.270 (6.89)	0.675 (17.15)		
	30	0.450 (11.43)	0.220 (5.59)	0.200 (5.08)	.300 (7.62)		
	31	0.550 (13.97)	0.280 (7.11)	0.250 (6.35)	.400 (10.16)		
	33	0.850 (21.59)	0.400 (10.16)	0.270 (6.89)	.700 (17.78)		
	34	1.050 (26.67)	0.500 (12.70)	0.270 (6.89)	.975 (24.76)		
	35	1.250 (31.75)	0.600 (15.24)	0.270 (6.89)	1.175 (29.84)		
	36	1.450 (36.83)	0.720 (18.29)	0.270 (6.89)	1.375 (34.92)		

Table 1A – HS X7R Waterfall

Style/Size		HS20			HS21			HS22			HS23				HS24					HS25						HS26					
		Voltage																													
Capacitance	Cap Code	500	1000	2000	500	1000	2000	500	1000	2000	500	1000	2000	3000	500	1000	2000	3000	4000	500	1000	2000	3000	4000	5000	500	1000	2000	3000	4000	5000
270 pF	271	X	X	X																											
330 pF	331	X	X	X																											
390 pF	391	X	X	X																											
470 pF	471	X	X	X																											
560 pF	561	X	X	X	X	X	X																								
680 pF	681	X	X	X	X	X	X	X	X	X																					
820 pF	821	X	X	X	X	X	X	X	X	X																					
1000 pF	102	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
1200 pF	122	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
1500 pF	152	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
1800 pF	182	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
2200 pF	222	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
2700 pF	272	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
3300 pF	332	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
3900 pF	392	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4700 pF	472	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5000 pF	502	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
5600 pF	562	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
6800 pF	682	X	X		X	X		X	X		X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
8200 pF	822	X	X		X	X		X	X		X	X	X		X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	
10000 pF	103	X	X		X	X		X	X		X	X	X		X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	
12000 pF	123	X			X	X		X	X		X	X	X		X	X	X	X		X	X	X	X	X		X	X	X	X	X	
15000 pF	153	X			X	X		X	X		X	X	X		X	X	X			X	X	X	X	X		X	X	X	X	X	
18000 pF	183	X			X	X		X	X		X	X	X		X	X	X			X	X	X	X	X		X	X	X	X		
22000 pF	223	X			X	X		X	X		X	X			X	X	X			X	X	X	X			X	X	X	X		
27000 pF	273	X			X	X		X	X		X	X			X	X	X			X	X	X	X			X	X	X	X		
33000 pF	333				X	X		X	X		X	X			X	X	X			X	X	X				X	X	X	X		
39000 pF	393				X	X		X	X		X	X			X	X	X			X	X	X				X	X	X	X		
47000 pF	473				X	X		X	X		X	X			X	X	X			X	X	X				X	X	X			
56000 pF	563				X			X	X		X	X			X	X	X			X	X	X				X	X	X			
68000 pF	683				X			X	X		X	X			X	X	X			X	X	X				X	X	X			
82000 pF	823				X			X	X		X	X			X	X	X			X	X	X				X	X	X			
0.10 uF	104							X	X		X				X	X	X			X	X					X	X	X			
0.12 uF	124										X				X	X				X	X					X	X				
0.15 uF	154										X				X	X				X	X					X	X				
0.18 uF	184										X				X	X				X						X	X				
0.22 uF	224										X				X	X				X						X	X				
0.27 uF	274										X				X	X				X						X	X				
0.33 uF	334														X	X				X						X	X				
0.39 uF	394														X	X				X						X	X				
0.47 uF	474														X	X				X						X	X				
0.56 uF	564																			X						X	X				
0.68 uF	684																			X						X	X				
0.82 uF	824																			X						X	X				
1.0 uF	105																			X						X	X				
1.2 uF	125																									X					
1.5 uF	155																									X					
1.8 uF	185																									X					
Capacitance	Cap Code	500	1000	2000	500	1000	2000	500	1000	2000	500	1000	2000	3000	500	1000	2000	3000	4000	500	1000	2000	3000	4000	5000	500	1000	2000	3000	4000	5000
Style/Size		Voltage																													
		HS20			HS21			HS22			HS23				HS24					HS25						HS26					

Table 1A – HS X7R Waterfall cont.

Style/Size		HS30				HS31						HS33							HS34							HS35						HS36					
		Voltage																																			
Capacitance	Cap Code	500	1000	2000	3000	500	1000	2000	3000	4000	5000	500	1000	2000	3000	4000	5000	7500	500	1000	2000	3000	4000	5000	7500	500	1000	2000	3000	4000	5000	500	1000	2000	3000	4000	5000
270 pF	271	X	X	X	X																																
330 pF	331	X	X	X	X																																
390 pF	391	X	X	X	X																																
470 pF	471	X	X	X	X	X	X	X	X	X	X																										
560 pF	561	X	X	X	X	X	X	X	X	X	X																										
680 pF	681	X	X	X	X	X	X	X	X	X	X																										
820 pF	821	X	X	X	X	X	X	X	X	X	X																										
1000 pF	102	X	X	X	X	X	X	X	X	X	X								X	X	X	X	X	X	X												
1200 pF	122	X	X	X	X	X	X	X	X	X	X								X	X	X	X	X	X	X												
1500 pF	152	X	X	X		X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X												
1800 pF	182	X	X	X		X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X												
2200 pF	222	X	X	X		X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X												
2700 pF	272	X	X	X		X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X												
3300 pF	332	X	X	X		X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X												
3900 pF	392	X	X			X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X												
4700 pF	472	X	X			X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5000 pF	502	X	X			X	X	X				X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
5600 pF	562	X	X			X	X	X				X	X	X	X	X			X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
6800 pF	682	X	X			X	X	X				X	X	X	X	X			X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
8200 pF	822	X	X			X	X	X				X	X	X	X				X	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X
10000 pF	103	X				X	X	X				X	X	X	X				X	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X
12000 pF	123	X				X	X					X	X	X	X				X	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X
15000 pF	153	X				X	X					X	X	X					X	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X
18000 pF	183	X				X	X					X	X	X					X	X	X	X				X	X	X	X	X	X	X	X	X	X	X	X
22000 pF	223	X				X	X					X	X	X					X	X	X	X				X	X	X	X	X		X	X	X	X	X	X
27000 pF	273	X				X	X					X	X	X					X	X	X	X				X	X	X	X	X		X	X	X	X	X	
33000 pF	333	X				X	X					X	X	X					X	X	X	X				X	X	X	X			X	X	X	X	X	
39000 pF	393	X				X						X	X	X					X	X	X					X	X	X	X			X	X	X	X	X	
47000 pF	473	X				X						X	X						X	X	X					X	X	X	X			X	X	X	X		
56000 pF	563	X				X						X	X						X	X	X					X	X	X	X			X	X	X	X		
68000 pF	683					X						X	X						X	X	X					X	X	X				X	X	X	X		
82000 pF	823					X						X	X						X	X	X					X	X	X				X	X	X			
0.10 uF	104					X						X							X	X						X	X	X				X	X	X			
0.12 uF	124					X						X							X	X						X	X	X				X	X	X			
0.15 uF	154					X						X							X	X						X	X					X	X	X			
0.18 uF	184					X						X							X	X						X	X					X	X	X			
0.22 uF	224					X						X							X							X	X					X	X				
0.27 uF	274					X						X							X							X	X					X	X				
0.33 uF	334					X						X							X							X						X	X				
0.39 uF	394					X						X							X							X						X	X				
0.47 uF	474											X							X							X						X	X				
0.56 uF	564											X							X							X						X	X				
0.68 uF	684											X							X							X						X	X				
0.82 uF	824																		X							X						X	X				
1.0 uF	105																		X							X						X	X				
1.2 uF	125																									X						X	X				
1.5 uF	155																									X						X	X				
1.8 uF	185																									X						X	X				
2.2 uF	225																									X						X	X				
2.7 uF	275																															X					
2.9 uF	295																															X					
3.3 uF	335																															X					
3.9 uF	395																															X					
4.7 uF	475																															X					
5.6 uF	565																															X					
Capacitance	Cap Code	500	1000	2000	3000	500	1000	2000	3000	4000	5000	500	1000	2000	3000	4000	5000	7500	500	1000	2000	3000	4000	5000	7500	500	1000	2000	3000	4000	5000	500	1000	2000	3000	4000	5000
Style/Size		Voltage																																			
		HS30				HS31						HS33							HS34							HS35						HS36					

Table 1B – HS C0G Waterfall

Style/Size		HS20			HS21			HS22			HS23				HS24						HS25						HS26					
		Voltage																														
Capacitance	Cap Code	500	1000	2000	500	1000	2000	500	1000	2000	500	1000	2000	3000	500	1000	2000	3000	4000	5000	500	1000	2000	3000	4000	5000	500	1000	2000	3000	4000	5000
12 pF	120	X	X	X																												
15 pF	150	X	X	X																												
18 pF	180	X	X	X																												
22 pF	220	X	X	X	X	X	X																									
27 pF	270	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
33 pF	330	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
39 pF	390	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
47 pF	470	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							X	X	X	X	X	X
56 pF	560	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X
68 pF	680	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X
82 pF	820	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X
100 pF	101	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X
120 pF	121	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X
150 pF	151	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X
180 pF	181	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X
220 pF	221	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X
270 pF	271	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
330 pF	331	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
390 pF	391	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
470 pF	471	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
560 pF	561	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
680 pF	681	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	
820 pF	821	X			X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X	X		X	X	X	X	X	
1,000 pF	102	X			X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X	X		X	X	X	X	X	
1,200 pF	122	X			X	X	X	X	X	X	X	X	X		X	X	X	X	X		X	X	X	X	X		X	X	X	X	X	
1,500 pF	152	X			X	X	X	X	X		X	X	X		X	X	X	X	X		X	X	X	X	X		X	X	X	X	X	
1,800 pF	182	X			X	X	X	X	X		X	X	X		X	X	X				X	X	X	X	X		X	X	X	X	X	
2,200 pF	222	X			X	X	X	X	X		X	X	X		X	X	X				X	X	X	X	X		X	X	X	X		
2,700 pF	272				X	X	X	X	X		X	X			X	X	X				X	X	X				X	X	X	X		
3,300 pF	332				X			X	X		X	X			X	X	X				X	X	X				X	X	X	X		
3,900 pF	392				X			X			X	X			X	X	X				X	X	X				X	X	X	X		
4,700 pF	472				X			X			X	X			X	X	X				X	X	X				X	X	X	X		
5,600 pF	562				X			X			X	X			X	X					X	X	X				X	X	X			
6,800 pF	682							X			X				X	X					X	X	X				X	X	X			
7,500 pF	752										X				X	X					X	X	X				X	X	X			
8,200 pF	822										X				X	X					X	X	X				X	X	X			
10,000 pF	103										X				X	X					X	X	X				X	X	X			
12,000 pF	123										X				X						X	X					X	X	X			
15,000 pF	153										X				X						X	X					X	X	X			
18,000 pF	183										X				X						X						X	X	X			
22,000 pF	223														X						X						X	X	X			
27,000 pF	273														X						X						X					
33,000 pF	333														X						X						X					
39,000 pF	393														X						X						X					
47,000 pF	473														X						X						X					
56,000 pF	563																										X					
68,000 pF	683																										X					
Capacitance	Cap Code	500	1000	2000	500	1000	2000	500	1000	2000	500	1000	2000	3000	500	1000	2000	3000	4000	5000	500	1000	2000	3000	4000	5000	500	1000	2000	3000	4000	5000
Style/ Size		Voltage																														
		HS20			HS21			HS22			HS23				HS24						HS25						HS26					

Table 1B – HS C0G Waterfall cont.

Style/Size		HS30				HS31						HS33						HS34							HS35								HS36							
		Voltage																																					
Capacitance	Cap Code	500	1000	2000	3000	500	1000	2000	3000	4000	5000	500	1000	2000	3000	4000	5000	500	1000	2000	3000	4000	5000	7500	500	1000	2000	3000	4000	5000	7500	10000	500	1000	2000	3000	4000	5000	7500	10000
15 pF	150	X	X	X	X																																		
18 pF	180	X	X	X	X																																		
22 pF	220	X	X	X	X	X	X	X	X	X	X																												
27 pF	270	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																						
33 pF	330	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																						
39 pF	390	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X															
47 pF	470	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X							X	X							
56 pF	560	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X															
68 pF	680	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X															
82 pF	820	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X															
100 pF	101	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X															
120 pF	121	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X															
150 pF	151	X	X	X		X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X															
180 pF	181	X	X	X		X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X															
220 pF	221	X	X	X		X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
270 pF	271	X	X	X		X	X	X				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	
330 pF	331	X	X	X		X	X	X				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	
390 pF	391	X	X	X		X	X	X				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	
470 pF	471	X	X	X		X	X	X				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	
560 pF	561	X	X	X		X	X	X				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	
680 pF	681	X	X	X		X	X	X				X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X			X	X	X	X	X	X	
820 pF	821	X	X			X	X	X				X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X			X	X	X	X	X	X	
1,000 pF	102	X	X			X	X	X				X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	
1,200 pF	122	X	X			X	X	X				X	X	X	X	X		X	X	X	X	X	X		X	X	X	X	X	X			X	X	X	X	X	X	
1,500 pF	152	X	X			X						X	X	X	X	X		X	X	X	X	X	X		X	X	X	X	X	X			X	X	X	X	X	X	X	X
1,800 pF	182	X	X			X						X	X	X				X	X	X	X	X	X		X	X	X	X	X	X			X	X	X	X	X	X	
2,200 pF	222	X				X						X	X	X				X	X	X	X	X	X		X	X	X	X	X				X	X	X	X	X	X	
2,700 pF	272	X				X						X	X	X				X	X	X	X	X			X	X	X	X	X				X	X	X	X	X	X	
3,300 pF	332	X				X						X	X	X				X	X	X					X	X	X	X	X				X	X	X	X	X	X	
3,900 pF	392	X				X						X	X	X				X	X	X					X	X	X	X	X				X	X	X	X	X		
4,700 pF	472	X				X						X	X	X				X	X	X					X	X	X						X	X	X	X	X		
5,600 pF	562	X				X						X	X	X				X	X	X					X	X	X						X	X	X	X	X		
6,800 pF	682					X						X	X					X	X	X					X	X	X						X	X	X	X	X		
7,500 pF	752					X						X	X					X	X	X					X	X	X						X	X	X	X			
8,200 pF	822					X						X	X					X	X	X					X	X	X						X	X	X	X			
10,000 pF	103					X						X	X					X	X	X					X	X	X						X	X	X	X			
12,000 pF	123					X						X	X					X	X	X					X	X	X						X	X	X				
15,000 pF	153											X	X					X	X	X					X	X	X						X	X	X				
18,000 pF	183											X	X					X	X						X	X	X						X	X	X				
22,000 pF	223											X						X	X						X	X	X						X	X	X				
27,000 pF	273											X						X							X	X							X	X	X				
33,000 pF	333											X						X							X	X							X	X					
39,000 pF	393											X						X							X	X							X	X					
47,000 pF	473											X						X							X	X							X	X					
56,000 pF	563																	X							X								X	X					
68,000 pF	683																								X								X						
82,000 pF	823																								X								X						
0.1 uF	104																								X								X						
0.12 uF	124																								X								X						
0.15 uF	154																								X								X						
Capacitance	Cap Code	500	1000	2000	3000	500	1000	2000	3000	4000	5000	500	1000	2000	3000	4000	5000	500	1000	2000	3000	4000	5000	7500	500	1000	2000	3000	4000	5000	7500	10000	500	1000	2000	3000	4000	5000	7500	10000
Style/Size		Voltage																																					
		HS30				HS31						HS33						HS34							HS35								HS36							

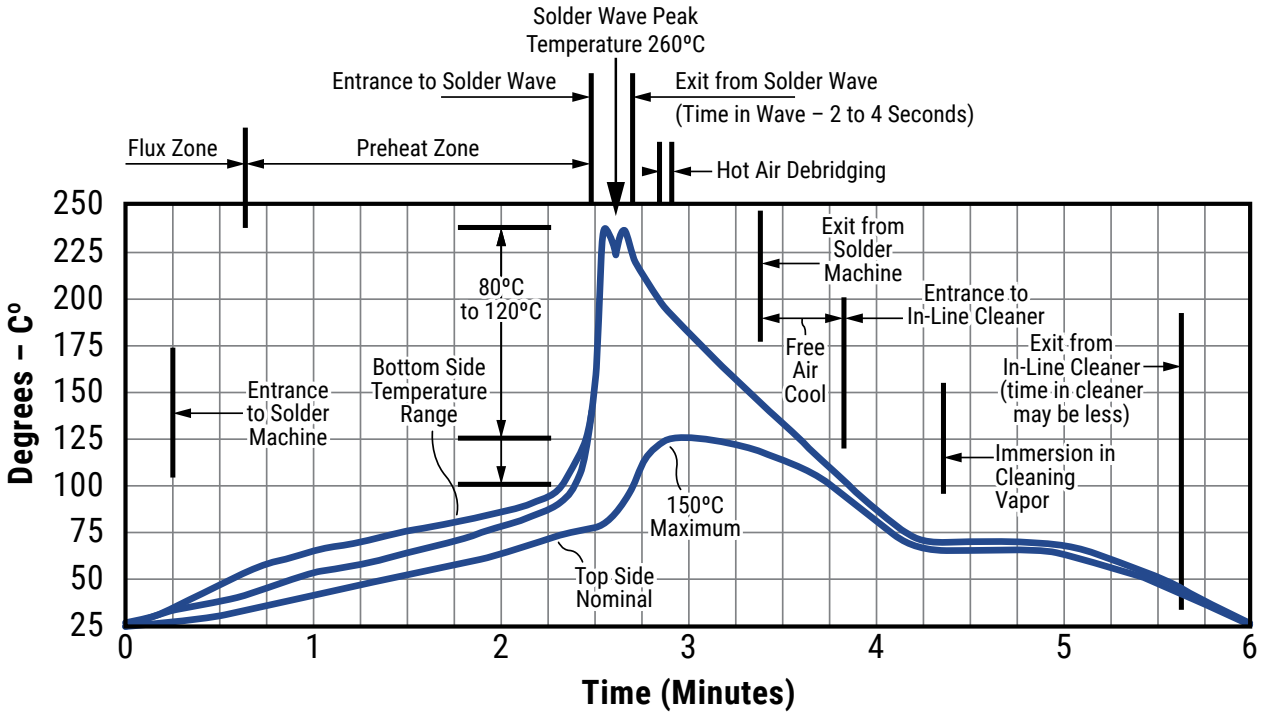
Packaging Quantities

Style	Waffle Pack Quantity	Style	Waffle Pack Quantity
HS20	28	HS25	28
HS21	28	HS26	20
HS22	28	HS33	20
HV30	28	HS34	4
HS23	20	HS35	4
HS31	20	HS36	4
HS24	20	–	–

Soldering Process

Recommended Soldering Technique:
- Solder Wave
- Hand Soldering (Manual)

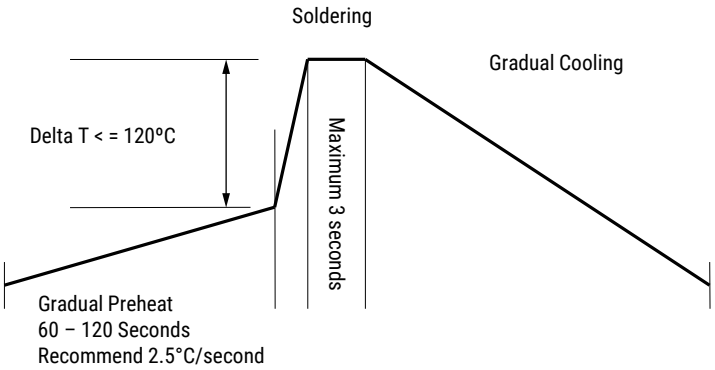
Recommended Soldering Profile:
- Optimum Wave Solder Profile



Soldering Process cont.

- Hand Soldering (Manual)

Manual Solder Profile with Pre-heating



KEMET recommends following the guidelines and techniques outlined in technical bulletins F2103 and F9207.

Table 2 – Performance & Reliability: Test Methods and Conditions

Stress	Reference	Test or Inspection Method	Limits
Visual and Mechanical	KEMET Internal	No defects that may affect performance (10X)	Dimensions according KEMET Spec Sheet
Capacitance (Cap)	MIL-STD-202 Method 305	C ≤ 100 pF: 1 MHz ± 100 kHz and 1.0 ±0.2 Vrms C > 100 pF: 1 kHz ± 100 Hz and 1.0 ±0.2 Vrms	Dimensions according KEMET Spec Sheet
Dissipation Factor (DF)	KEMET Internal	C ≤ 100 pF: 1 MHz ± 100 kHz and 1.0 ±0.2 Vrms C > 100 pF: 1 kHz ± 100 Hz and 1.0 ±0.2 Vrms	X7R: 2.5% C0G: 0.15%
Insulation Resistance (IR)	MIL-STD-202 Method 302	Test potential: 500 V DC between capacitor element terminals Surge current: limited to 30mA Special condition: If failure at relative humidity of ≥ 50%, IR may be measured again at a relative humidity of less than 50%	Within Specification To obtain IR limit, divide MΩ-µF value by the capacitance and compare to GΩ limit. Select the lower of the two limits. At 25°C: 100,000 megohms or 1,000 Megohm-microfarad, whichever is less. At 125°C: 10,000 megohms or 100 Megohm-microfarad, whichever is less.
Temperature Coefficient of Capacitance (TCC)	KEMET Internal	C0G (P): 0 ppm/°C ±30 ppm/°C X7R (R or Z): ±15%	Within Specification
Temperature Coefficient of Capacitance at Applied Voltage (TCVC)	KEMET Internal	C0G (P): 0 ppm/°C ±30 ppm/°C X7R (R or Z): +15%/-70%	C0G: Within Specification X7R: Within KEMET Specification limits

Table 2 – Performance & Reliability: Test Methods and Conditions cont.

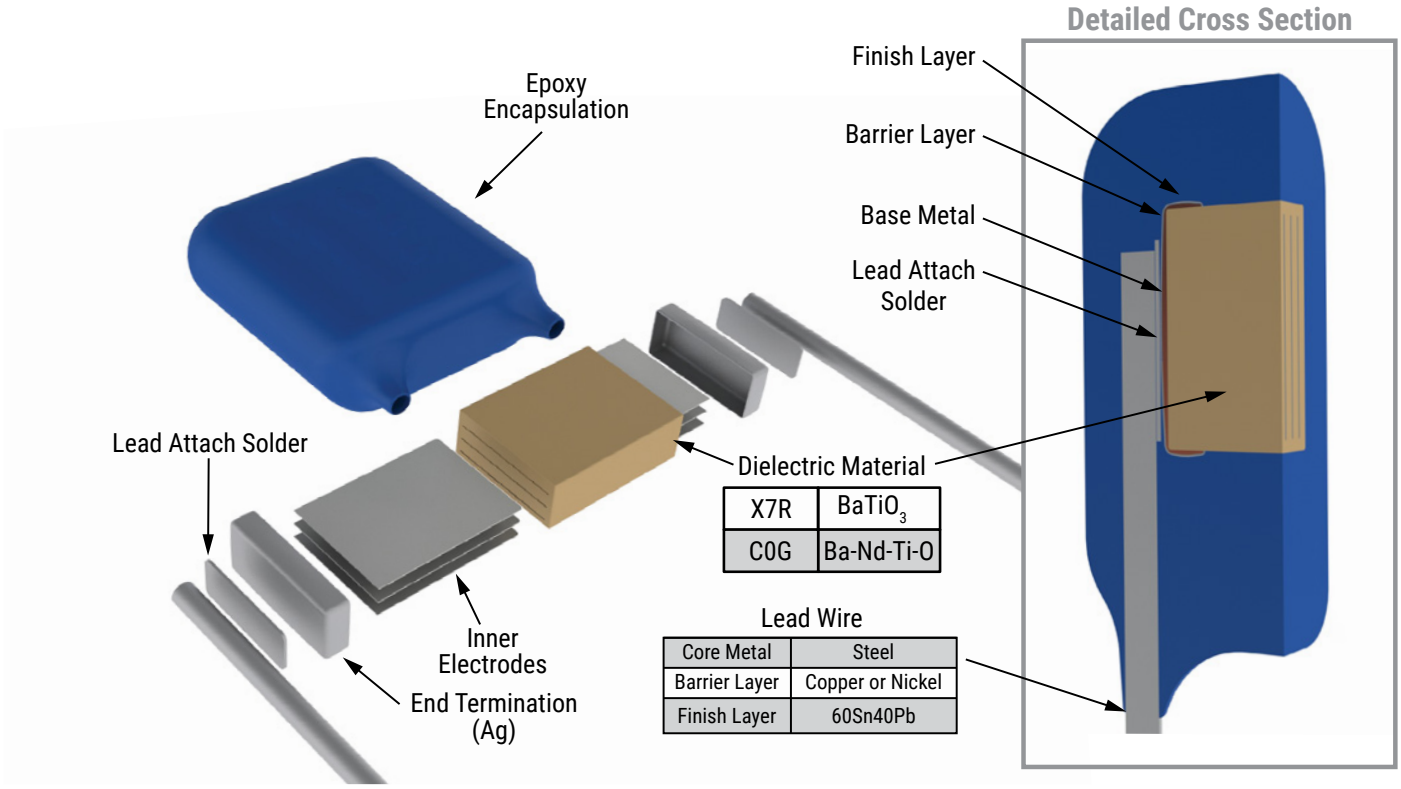
Stress	Reference	Test or Inspection Method	Limits
Dielectric Withstanding Voltage (DWV)	KEMET Internal	150% of rated voltage for voltage rating of 500 V ≤ V < 1,000 V 120% of rated voltage for voltage rating of ≥ 1,000 V (5 ±1 seconds and charge/discharge not exceeding 50 mA at 25°C)	Cap: Initial Limit DF: Initial Limit IR: Initial Limit Withstand test voltage without insulation breakdown or damage.
Aging Rate (Maximum % Capacitance Loss/ Decade Hour)	KEMET Internal	Capacitance measurements (including tolerance) are indexed to a referee time of 48 or 1,000 hours. Please refer to a part number specific datasheet for referee time details.	Please refer to a part number specification sheet for specific Aging rate
Terminal Strength	MIL-STD-202 Method 211	Applied force: 5 pounds (2.3 kg)	No evidence of mechanical damage
Solderability	MIL-STD-202 Method 208	Condition: 4 hours ± 15 minutes at 155°C dry bake apply all methods Test 245 ± 5°C (SnPb & Pb-Free)	Visual Inspection. 95% coverage on termination. No leaching
Temperature Cycling	JESD22 Method JA-104	Test condition A (5 cycles) except that in step 3, sample units shall be tested at +125°C.	Measurement at 24 hours ±4 hours after test conclusion. Cap: Initial Limit DF: Initial Limit IR: Initial Limit
Moisture Resistance	MIL-STD-202 Method 106	Number of cycles required 10, 24 hours per cycle. Steps 7a and 7b not required	Visual examination: No mechanical damage. Marking shall remain legible Measurement at 24 hours ±4 hours after test conclusion. Within Post Environmental Limits Cap: X7R: Change not to exceed ±10% of initial measured value Cap: C0G: ±0.5 percent or 5 pF, whichever is greater, of initial measured value IR: 10% of Initial Limit of the initial +25°C requirement
Thermal Shock	MIL-STD-202 Method 107	Number of cycles required 5, (–55°C to 125°C) Dwell time 15 minutes.	Cap: Initial Limit DF: Initial Limit IR: Initial Limit
High Temperature Life	MIL-STD-202 Method 108	2,000 hours at +125°C, +4°C, –0°C. With rated voltage, ±5 percent.	Within Post Environmental Limits Visual examination: No mechanical damage. Marking shall remain legible. IR: (at +25°C): Shall not be less than 30 percent of the value specified IR: (at elevated ambient temperature): Shall not be less than 30 percent of the value specified
Storage Life		1,000 hours at 125°C, Unpowered	
Vibration	MIL-STD-202 Method 204	5 g's for 20 minutes, 12 cycles each of 3 orientations. Test from 10 – 2,000 Hz	Cap: Initial Limit DF: Initial Limit IR: Initial Limit
Mechanical Shock	MIL-STD-202 Method 213	1,500 g's 0.5 ms Half-sine, Velocity Change 15.4 feet/ second (Condition F)	Cap: Initial Limit DF: Initial Limit IR: Initial Limit
Resistance to Solvents	MIL-STD-202 Method 215	Add Aqueous wash chemical OKEMCLEAN (A 6% concentrated Oakite cleaner) or equivalent. Do not use banned solvents	Capacitors shall be visually examined for evidence of mechanical damage and marking.

Storage & Handling

The un-mounted storage life of a leaded ceramic capacitor is dependent upon storage and atmospheric conditions as well as packaging materials. While the ceramic chips enveloped under the epoxy coating themselves are quite robust in most environments, solderability of the wire lead on the final epoxy-coated product will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature and exposure to direct sunlight–reels may soften or warp, and tape peel force may increase.

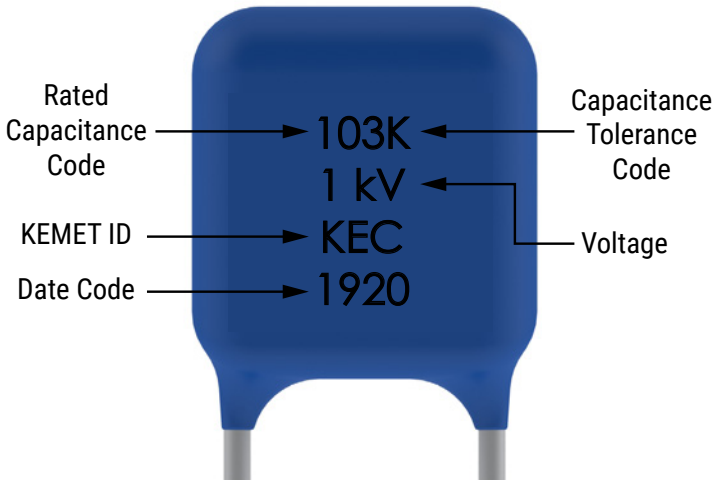
KEMET recommends storing the un-mounted capacitors in their original packaging, in a location away from direct sunlight, and where the temperature and relative humidity do not exceed 40 degrees centigrade and 70% respectively. For optimum solderability, capacitor stock should be used promptly, preferably within 18 months of receipt. For applications requiring pre-tinning of components, storage life may be extended if solderability is verified. Before cleaning, bonding or molding these devices, it is important to verify that your process does not affect product quality and performance. KEMET recommends testing and evaluating the performance of a cleaned, bonded or molded product prior to implementing and/or qualifying any of these processes.

Construction

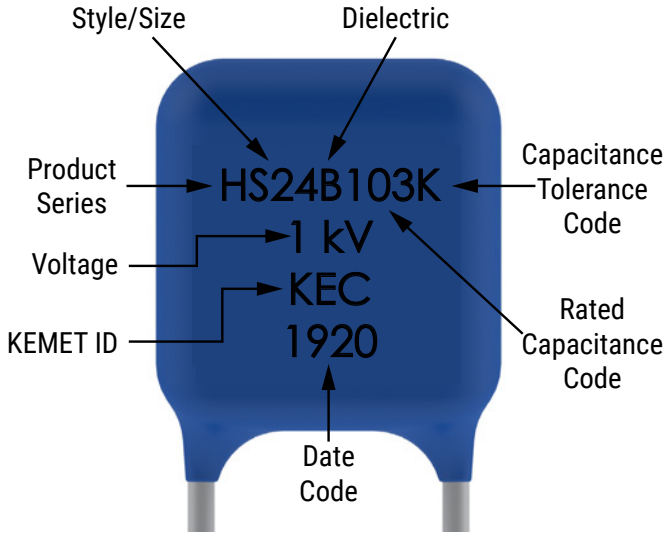


Marking

HS20, HS21



All Other Sizes



Date Code	
19	20
Manufacturing Year: 19 = 2019	Manufacturing Week: 20 = Week 20 (of manufacturing calendar year)

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Although all product–related warnings, cautions and notes must be observed, the customer should not assume that all safety measures are indicted or that other measures may not be required.