

KEC70A (.055" x .055")

◆ Product Features

High Q, High Power, Low ESR/ESL, Low Noise, High Self-Resonance,
Ultra-Stable Performance.

◆ Product Application

Typical Functional Applications: Tuning, Bypass, Coupling, Feedback, D.C. Blocking and
Impedance Matching.

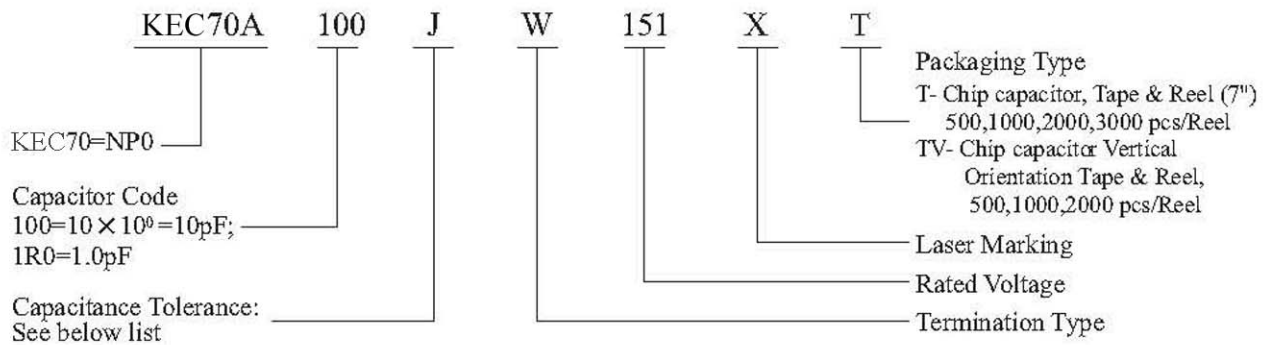
Typical Circuit Applications: UHF/Microwave RF Power Amplifiers, Mixers, Oscillators,
Low Noise Amplifiers, Filter Networks, Timing Circuits and
Delay Lines.

◆ KEC70A Capacitance Table

Cap.pF	Code	Tol.	Rated WVDC	Cap.pF	Code	Tol.	Rated WVDC	Cap.pF	Code	Tol.	Rated WVDC	Cap.pF	Code	Tol.	Rated WVDC
0.1	0R1			2.4	2R4			20	200			160	161		150V
0.2	0R2			2.7	2R7			22	220			180	181		Code
0.3	0R3			3.0	3R0			24	240			200	201		151
0.4	0R4			3.3	3R3			27	270		150V	220	221		or
0.5	0R5			3.6	3R6			30	300		151	240	241		200V
0.6	0R6			3.9	3R9	A,		33	330		or	270	271		Code
0.7	0R7			4.3	4R3	B,		36	360		300V	300	301		201
0.8	0R8			4.7	4R7	C,		39	390		Code	330	331	F,	
0.9	0R9		150V	5.1	5R1	D	150V	43	430	F,		360	361	G,	
1.0	1R0	A,	151	5.6	5R6		151	47	470	G,		390	391	J	
1.1	1R1	B,	or	6.2	6R2		or	51	510	J		430	431		150V
1.2	1R2	C,	300V	6.8	6R8	B,	300V	56	560			470	471		Code
1.3	1R3	D	Code	7.5	7R5	C,	Code	62	620		150V	510	511		151
1.4	1R4		301	8.2	8R2	J	301	68	680		Code	560	561		
1.5	1R5			9.1	9R1			75	750		151	620	621		
1.6	1R6			10	100			82	820		or	680	681		50V
1.7	1R7			11	110			91	910		200V	750	751		Code
1.8	1R8			12	120	F,		100	101		Code	820	821		500
1.9	1R9			13	130	G,		110	111		201	910	911		or
2.0	2R0			15	150	J		120	121			1000	102		100V
2.1	2R1			16	160			130	131						Code
2.2	2R2			18	180			150	151						101

Remark: special capacitance, tolerance and WVDC are available, consult with Kete.

◆ **Part Numbering**



Code	A	B	C	D	F	G	J
Tolerance	$\pm 0.05\text{pF}$	$\pm 0.1\text{pF}$	$\pm 0.25\text{pF}$	$\pm 0.5\text{pF}$	$\pm 1\%$	$\pm 2\%$	$\pm 5\%$

Note: Tolerance of $\pm 0.02\text{pF}$ is a possibility. Please contact Kete.

◆ **KEC70A Capacitor Dimensions**

unit: inch (millimeter)

Series	Term. Code	Type / Outlines	Capacitor Dimensions				Plated Material
			Length (Lc)	Width (Wc)	Thickness (Tc)	Overlap (B)	
KEC70A	W	 Chip	.055 +.015~ -.010 (1.40+ 0.38~ -0.25)	.055 ±.010 (1.40 ±0.25)	.057 (1.45) max	.020 (0.51) max	100% Sn Solder over Nickel Plating
	L						90 Sn10Pb Solder over Nickel Plating
KEC70A	P (Non-Mag)	 Chip (Non-Mag)					100% Sn Solder over Copper Plating

Note: Non-Mag is no magnetism.

◆ Performance

Item	Specifications
Quality Factor (Q)	greater than 10,000 at 1 MHz
Insulation Resistance (IR)	10 ⁵ Megohms min. @ +25 °C at rated WVDC. 10 ⁴ Megohms min. @ +125 °C at rated WVDC.
Rated Voltage	See Rated Voltage Table
Dielectric Withstanding Voltage (DWV)	250% of Rated Voltage for 5 seconds.
Operating Temperature Range	–55 °C to +200 °C
Temperature Coefficient (TC)	0 ± 30 ppm/°C (–55 °C to +175 °C)
Capacitance Drift	± 0.02% or ± 0.02pF, whichever is greater.
Piezoelectric Effects	None
Termination Type	See Termination Type Table

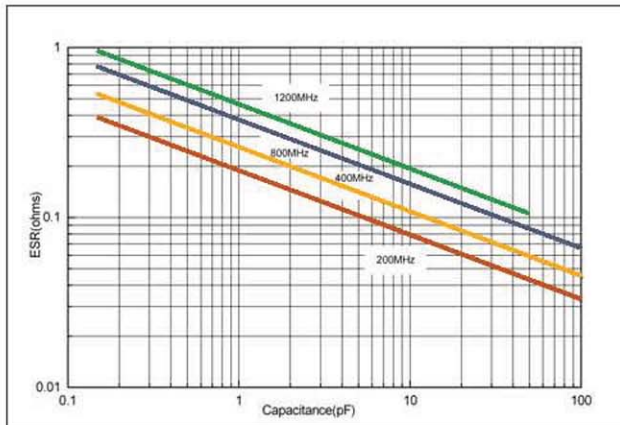
Capacitors are designed and manufactured to meet the requirements of MIL-PRF-55681 and MIL-PRF-123.

◆ Environmental Tests

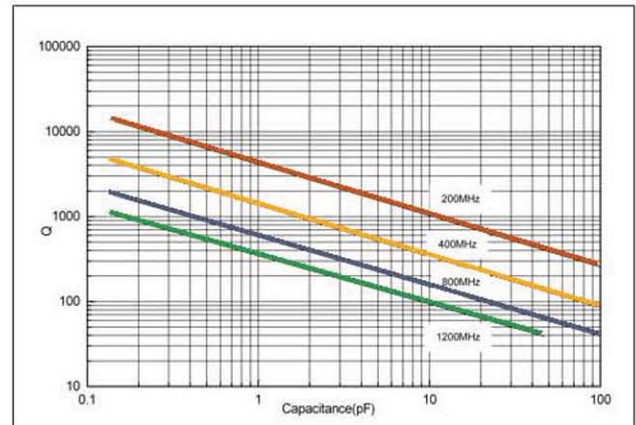
Item	Specifications	Method
Thermal Shock	DWV: the initial value IR: Shall not be less than 30% of the initial value Capacitance change: no more than 0.5% or 0.5pF, whichever is greater.	MIL-STD-202, Method 107, Condition A. At the maximum rated temperature(–55°C and 200°C) stay 30 minutes. The time of removing shall not be more than 3 minutes. Perform the five cycles.
Moisture Resistance		MIL-STD-202, Method 106.
Humidity (steady state)	DWV: the initial value IR: the initial value Capacitance change: no more than 0.3% or 0.3pF, whichever is greater.	MIL-STD-202, Method 103, Condition A, with 1.5 Volts D.C. applied while subjected to an environment of 85°C with 85% relative humidity for 240 hours minimum.
Life	IR: Shall not be less than 30% of the initial value Capacitance change: no more than 2.0% or 0.5pF, whichever is greater.	MIL-STD-202, Method 108, for 2000 hours, at 200°C. 200% Rated voltage D.C. applies

◆ **KEC70A Performance Curve**

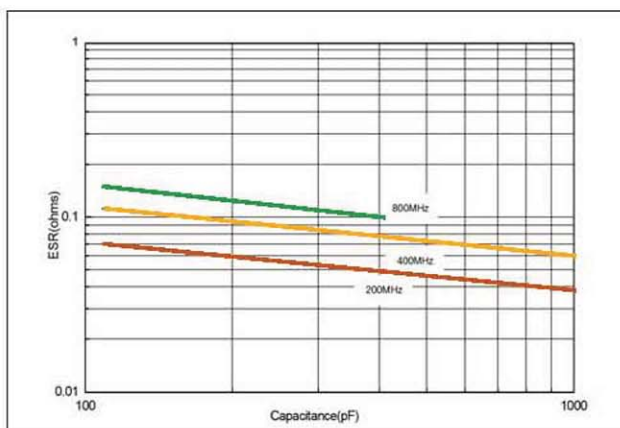
ESR vs Capacitance



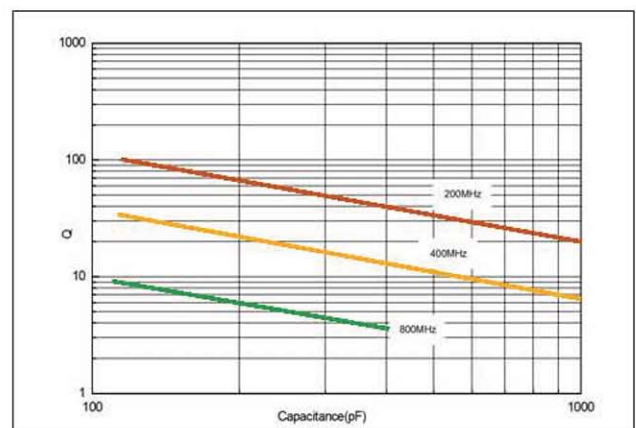
Q vs Capacitance



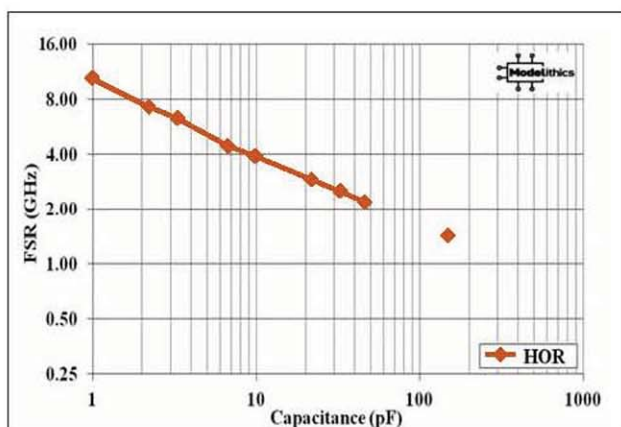
ESR vs Capacitance



Q vs Capacitance



KEC70A Horizontal First Series Resonance (FSRs)



Definitions and Measurement Conditions

For a capacitor in a series configuration, i.e., mounted across a gap in a microstrip trace, with 50-Ohm source and termination resistances, the First Series Resonance, FSR, is defined as the lowest frequency at which the imaginary part of the input impedance, $\text{Im}[Z_{in}]$, equals zero when reference planes are at the sample edges.

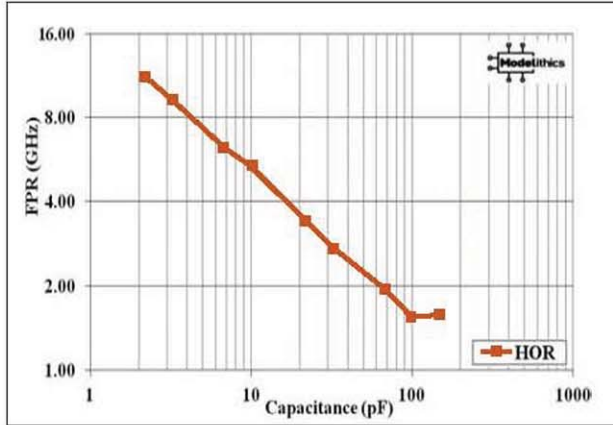
The FSR shall be considered as undefined (gap in plot above) if, over the measured or model-validated frequency range: (a) $\text{Im}[Z_{in}]$ never reaches zero; or, (b) at frequencies lower than that at which $\text{Im}[Z_{in}] = 0$, $\text{Im}[Z_{in}]$ is not monotonic with frequency and/or the real part of the input impedance, $\text{Re}[Z_{in}]$, deviates more than once from monotonicity.

FSR is dependent on internal capacitor structure; substrate thickness and dielectric constant; capacitor orientation, as defined above; and mounting pad dimensions. The measurement conditions are: substrate -- Rogers RO4350; substrate dielectric constant -- 3.66; horizontal mount substrate thickness (mils) -- 25; gap in microstrip trace (mils) -- 15; horizontal mount microstrip trace width (mils) -- 55. Reference planes at sample edges.

All data has been derived from electrical models created by Modelithics, Inc., a specialty vendor contracted by Kete. The models are derived from measurements on a large number of parts disposed on several different substrates.

◆ KEC70A Performance Curve

KEC70A Horizontal First Parallel Resonance(FPRs)



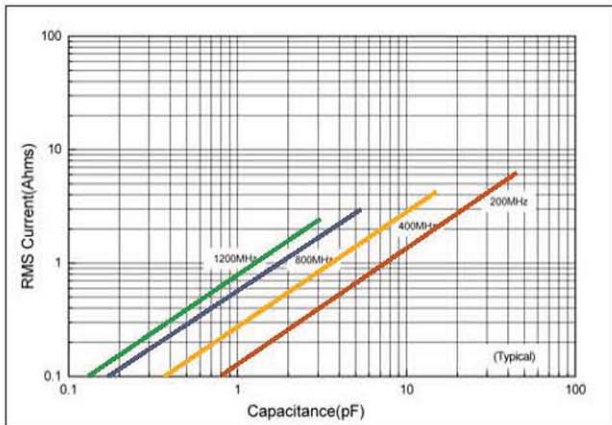
Definitions and Measurement conditions:

For a capacitor in a series configuration, i.e., mounted across a gap in a microstrip trace, with 50-Ohm source and termination resistances, the First Parallel Resonance, FPR, is defined as the lowest frequency at which a suckout or notch appears in |S21|. It is generally independent of substrate thickness or dielectric constant, but does depend on capacitor orientation. A horizontal orientation means the capacitor electrode planes are parallel to the plane of the substrate; a vertical orientation means the electrode planes are perpendicular to the substrate.

The measurement conditions are: substrate -- Rogers RO4350; substrate dielectric constant -- 3.66; horizontal mount substrate thickness (mils) -- 25; gap in microstrip trace (mils) -- 15; horizontal mount microstrip trace width (mils) -- 55. Reference planes at sample edges.

All data has been derived from electrical models created by Modelithics, Inc., a specialty vendor contracted by Kete. The models are derived from measurements on a large number of parts disposed on several different substrates.

Current Rating vs Capacitance

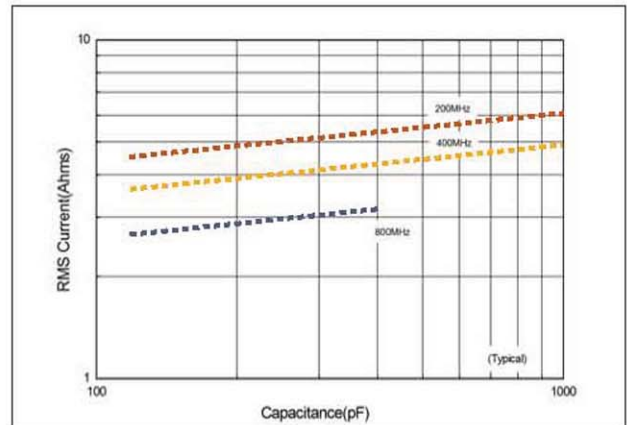


The current depends on voltage limited:

$$I = \frac{\sqrt{2}}{2} I_{peak} = \frac{\sqrt{2}}{2} \times \frac{V_{rated}}{X_c} = \sqrt{2\pi f C V_{rated}}$$

The current depends on power dissipation limited: $I = \sqrt{\frac{P_{dissipation}}{ESR}}$

Current Rating vs Capacitance



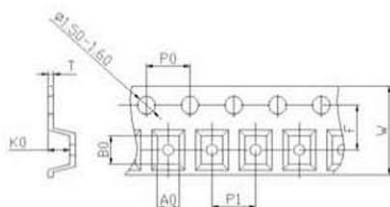
Note: If the thermal resistance of mounting surface is 40°C/W.

then a power dissipation of 1.5 W will result in the current limited

we can calculate the current limited: $I = \sqrt{\frac{P_{dissipation}}{ESR}}$

◆ Tape & Reel Specifications

Orientation	EIA	A0	B0	K0	W	P0	P1	T	F	Qty/reel	Tape Material
Horizontal	0505	1.38	1.68	0.98	8.00	4.00	4.00	0.22	3.50	3000	Plastic
Vertical	0505	1.10	1.60	1.40	12.00	4.00	4.00	0.30	5.50	2000	Plastic



◆ Design Kits

These capacitors are 100% RoHS. Kits are available in Magnetic and Non-Magnetic that contain 10(ten) pieces per value;16 values per kit.

Design Kit	Description (pF)	Values (pF)	Tolerance
DKKEC70A01	0.1 - 2.0	0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.1, 1.2, 1.5,	$\pm 0.10\text{pF}$
		1.6, 1.8, 2.0	$\pm 0.25\text{pF}$
DKKEC70A02	1.0 - 10	1.0, 1.2, 1.5, 1.8, 2.0, 2.2, 2.4, 2.7,	$\pm 0.10\text{pF}$
		3.0, 3.3, 3.9, 4.7, 5.6, 6.8, 8.2	$\pm 0.25\text{pF}$
		10	$\pm 5\%$
DKKEC70A03	10 - 100	10, 12, 15, 18, 20, 22, 24, 27, 30, 33, 39, 47, 56, 68, 82, 100	$\pm 5\%$
DKKEC70A04	100 - 1000	100, 120, 150, 180, 200, 220, 240, 270, 300, 330, 390, 470, 560, 680, 820, 1000	$\pm 5\%$
DKKEC70A05	0.1 - 2.0 Non-magnetic	0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.1, 1.2, 1.5,	$\pm 0.10\text{pF}$
		1.6, 1.8, 2.0	$\pm 0.25\text{pF}$
DKKEC70A06	1.0 - 10 Non-magnetic	1.0, 1.2, 1.5, 1.8, 2.0, 2.2, 2.4, 2.7,	$\pm 0.10\text{pF}$
		3.0, 3.3, 3.9, 4.7, 5.6, 6.8, 8.2	$\pm 0.25\text{pF}$
		10	$\pm 5\%$
DKKEC70A07	10 - 100 Non-magnetic	10, 12, 15, 18, 20, 22, 24, 27, 30, 33, 39, 47, 56, 68, 82, 100	$\pm 5\%$
DKKEC70A08	100 - 1000 Non-magnetic	100, 120, 150, 180, 200, 220, 240, 270, 300, 330, 390, 470, 560, 680, 820, 1000	$\pm 5\%$

