F93 Series

Resin-Molded Chip, Standard Tantalum J-Lead

FEATURES

- Compliant to the RoHS3 directive 2015/863/EU
- SMD J-Lead
- 100% Surge Current Tested

APPLICATIONS

- Low Power DC/DC

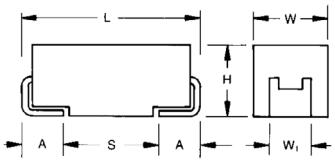
LEAD-FREE
LEAD-FREE COMPATIBLE COMPONENT

RoHS COMPLIANT

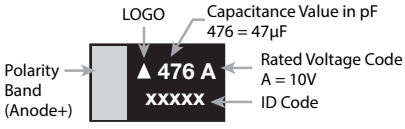
CASE DIMENSIONS: millimeters (inches)

Code	EIA Code	EIA Metric	L ± 0.20 (0.008)	W ± 0.20 (0.008) -0.10 (0.004)	H ± 0.20 (0.008) -0.10 (0.004)	W_1 ± 0.20 (0.008)	A ± 0.30 (0.012) -0.20 (0.008)	S Min.
A	1206	3216-18	3.20 (0.126)	1.60 (0.063)	1.60 (0.063)	1.20 (0.047)	0.80 (0.031)	1.10 (0.043)
B	1210	3528-21	3.50 (0.138)	2.80 (0.110)	1.90 (0.075)	2.20 (0.087)	0.80 (0.031)	1.40 (0.055)
C	2312	6032-28	6.00 (0.236)	3.20 (0.126)	2.60 (0.102)	2.20 (0.087)	1.30 (0.051)	2.90 (0.114)
N	2917	7343-31	7.30 (0.287)	4.30 (0.169)	2.90 (0.114)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)

W_1 dimension applies to the termination width for a dimensional area only



A, B, C, N CASE



4V	G	16V	C	35V	V
6.3V	J	20V	D		
10V	A	25V	E		

*Capacitance code of "P" case products are as shown below.

HOW TO ORDER

F93	1A	106	M	A	□
Type	**Rated Voltage**	**Capacitance Code** pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)	**Tolerance** K = ±10% M = ±20%	**Case Size** See table above	**Packaging** See Tape & Reel Packaging Section

TECHNICAL SPECIFICATIONS

Category Temperature Range	-55 to +125°C
Rated Temperature	+85°C
Capacitance Tolerance	±20%, ±10% at 120Hz
Dissipation Factor	Refer to next page
ESR 100kHz	Refer to next page
Leakage Current	After 1 minute's application of rated voltage, leakage current at 20°C is not more than 0.01CV or 0.5µA, whichever is greater.
	After 1 minute's application of rated voltage, leakage current at 85°C is not more than 0.1CV or 5µA, whichever is greater.
	After 1 minute's application of derated voltage, leakage current at 125°C is not more than 0.125CV or 6.3µA, whichever is greater.
Capacitance Change By Temperature	+15% Max. at +125°C
	+10% Max. at +85°C
	-10% Max. at -55°C

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CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage						
µF	Code	4V (0G)	6.3V (0J)	10V (1A)	16V (1C)	20V (1D)	25V (1E)	35V (1V)
0.33	334							A
0.47	474							A
0.68	684							A
1.0	105				A		A	A
1.5	155						A	A
2.2	225				A	A	A	A/B
3.3	335				A	A	A	B
4.7	475			A	A	A/B	A/B	B/C
6.8	685			A	A	A/B		C
10	106		A	A	A/B	B	B/C	C
15	156		A	A	A/B	C	C	N
22	226	A	A	A/B	A(M)/B/C	B/C	C/N	N
33	336	A	A	A/B	B/C	C/N	N	N
47	476	A	A/B	A/B/C	C/N	C/N	N	
68	686	A	B	B/C	C/N			
100	107	A/B	A/B/C	B/C/N	C/N	N		
150	157	B	B/C	C/N	N			
220	227	B/C	B/C/N	C/N	N			
330	337	C	N	N				
470	477	N	N					
680	687	N	N					

Released ratings (M tolerance only)

Please contact to your local KYOCERA AVX sales office when these series are being designed in your application.

RATINGS & PART NUMBER REFERENCE

Part Number	Case Size	Capacitance (µF)	Rated Voltage (V)	DCL (µA)	DF @ 120Hz (%)	ESR @ 100kHz (Ω)	100kHz RMS Current (mA)			*1 ΔC/C (%)	MSL
							25°C	85°C	125°C		
4 Volt											
F930G226#AA	A	22	4	0.9	6	2.5	173	156	69	*	1
F930G336#AA	A	33	4	1.3	8	2.5	173	156	69	*	1
F930G476#AA	A	47	4	1.9	18	2.5	173	156	69	*	1
F930G686#AA	A	68	4	2.7	24	2.5	173	156	69	*	1
F930G107#AA	A	100	4	4.0	30	2.0	194	174	77	*	1
F930G107#BA	B	100	4	4.0	14	0.9	307	277	123	*	1
F930G157#BA	B	150	4	6.0	16	0.7	348	314	139	*	1
F930G227#BA	B	220	4	8.8	18	0.7	348	314	139	*	1
F930G227#CC	C	220	4	8.8	12	0.7	396	357	159	*	1
F930G337#CC	C	330	4	13.2	14	0.7	396	357	159	*	1
F930G477#NC	N	470	4	18.8	16	0.3	707	636	283	*	1
F930G687#NC	N	680	4	27.2	18	0.3	707	636	283	*	1
6.3 Volt											
F930J106#AA	A	10	6.3	0.6	6	3.0	158	142	63	*	1
F930J156#AA	A	15	6.3	0.9	6	2.9	161	145	64	*	1
F930J226#AA	A	22	6.3	1.4	8	2.5	173	156	69	*	1
F930J336#AA	A	33	6.3	2.1	8	2.5	173	156	69	*	1
F930J476#AA	A	47	6.3	3.0	18	2.5	173	156	69	*	1
F930J476#BA	B	47	6.3	3.0	6	1.0	292	262	117	*	1
F930J686#BA	B	68	6.3	4.3	8	1.0	292	262	117	*	1
F930J107#AA	A	100	6.3	6.3	35	2.0	194	174	77	±15	1
F930J107#BA	B	100	6.3	6.3	14	0.9	307	277	123	*	1
F930J107#CC	C	100	6.3	6.3	8	0.7	396	357	159	*	1
F930J157#BA	B	150	6.3	9.5	18	0.9	307	277	123	*	1
F930J157#CC	C	150	6.3	9.5	12	0.7	396	357	159	*	1
F930J227#BA	B	220	6.3	13.9	30	1.2	266	240	106	±15	3
F930J227#CC	C	220	6.3	13.9	14	0.7	396	357	159	*	1
F930J227#NC	N	220	6.3	13.9	10	0.5	548	493	219	*	1
F930J337#NC	N	330	6.3	20.8	14	0.5	548	493	219	*	1
F930J477#NC	N	470	6.3	29.6	16	0.3	707	636	283	*	1
F930J687#NC	N	680	6.3	42.8	40	0.3	707	636	283	±15	3
10 Volt											
F931A475#AA	A	4.7	10	0.5	6	4.0	137	123	55	*	1
F931A685#AA	A	6.8	10	0.7	6	3.5	146	132	59	*	1
F931A106#AA	A	10	10	1.0	6	3.0	158	142	63	*	1
F931A156#AA	A	15	10	1.5	8	2.9	161	145	64	*	1
F931A226#AA	A	22	10	2.2	12	2.5	173	156	69	*	1

RATINGS & PART NUMBER REFERENCE

Part Number	Case Size	Capacitance (µF)	Rated Voltage (V)	DCL (µA)	DF @ 120Hz (%)	ESR @ 100kHz (Ω)	100kHz RMS Current (mA)			*1 ΔC/C (%)	MSL
							25°C	85°C	125°C		
F931A226#BA	B	22	10	2.2	6	1.9	212	190	85	*	1
F931A336#AA	A	33	10	3.3	18	2.5	173	156	69	*	1
F931A336#BA	B	33	10	3.3	8	1.4	246	222	99	*	1
F931A476#AA	A	47	10	4.7	40	2.0	194	174	77	±15	1
F931A476#BA	B	47	10	4.7	8	1.0	292	262	117	*	1
F931A476#CC	C	47	10	4.7	6	0.9	350	315	140	*	1
F931A686#BA	B	68	10	6.8	12	0.9	307	277	123	±15	1
F931A686#CC	C	68	10	6.8	8	0.8	371	334	148	*	1
F931A107#BA	B	100	10	10.0	18	1.2	266	240	106	±15	1
F931A107#CC	C	100	10	10.0	10	0.7	396	357	159	*	1
F931A107#NC	N	100	10	10.0	8	0.6	500	450	200	*	3
F931A157#CC	C	150	10	15.0	14	0.7	396	357	159	*	1
F931A157#NC	N	150	10	15.0	10	0.6	500	450	200	*	1
F931A227#CC	C	220	10	22.0	40	0.9	350	315	140	±15	1
F931A227#NC	N	220	10	22.0	12	0.5	548	493	219	*	3
F931A337#NC	N	330	10	33.0	18	0.5	548	493	219	*	1
16 Volt											
F931C105#AA	A	1	16	0.5	4	7.5	100	90	40	*	1
F931C225#AA	A	2.2	16	0.5	4	5.0	122	110	49	*	1
F931C335#AA	A	3.3	16	0.5	4	4.5	129	116	52	*	1
F931C475#AA	A	4.7	16	0.8	6	4.0	137	123	55	*	1
F931C685#AA	A	6.8	16	1.1	6	3.5	146	132	59	*	1
F931C106#AA	A	10	16	1.6	6	3.0	158	142	63	*	1
F931C106#BA	B	10	16	1.6	6	2.0	206	186	82	*	1
F931C156#AA	A	15	16	2.4	10	3.0	158	142	63	*	1
F931C156#BA	B	15	16	2.4	6	2.0	206	186	82	*	1
F931C226MAA	A	22	16	3.5	15	3.0	158	142	63	±15	1
F931C226#BA	B	22	16	3.5	8	1.9	212	190	85	*	1
F931C226#CC	C	22	16	3.5	6	1.1	316	285	126	*	1
F931C336#BA	B	33	16	5.3	8	1.9	212	190	85	*	1
F931C336#CC	C	33	16	5.3	6	1.1	316	285	126	*	1
F931C476#CC	C	47	16	7.5	8	0.9	350	315	140	*	1
F931C476#NC	N	47	16	7.5	6	0.7	463	417	185	*	1
F931C686#CC	C	68	16	10.9	10	0.8	371	334	148	±10	1
F931C686#NC	N	68	16	10.9	6	0.6	500	450	200	*	1
F931C107#CC	C	100	16	16.0	15	0.7	396	357	159	±10	1
F931C107#NC	N	100	16	16.0	10	0.6	500	450	200	*	3
F931C157#NC	N	150	16	24.0	15	0.6	500	450	200	*	1
F931C227#NC	N	220	16	35.2	25	0.7	463	417	185	±10	3
20 Volt											
F931D225#AA	A	2.2	20	0.5	4	5.0	122	110	49	*	1
F931D335#AA	A	3.3	20	0.7	4	4.5	129	116	52	*	1
F931D475#AA	A	4.7	20	0.9	6	3.0	158	142	63	*	1
F931D475#BA	B	4.7	20	0.9	6	2.8	174	157	70	*	1
F931D685#AA	A	6.8	20	1.4	6	3.5	146	132	59	*	1
F931D685#BA	B	6.8	20	1.4	6	2.5	184	166	74	*	1
F931D106#BA	B	10	20	2.0	6	2.1	201	181	80	*	1
F931D156#CC	C	15	20	3.0	6	1.2	303	272	121	*	1
F931D226#BA	B	22	20	4.4	8	1.9	212	190	85	*	1
F931D226#CC	C	22	20	4.4	8	1.1	316	285	126	*	1
F931D336#CC	C	33	20	6.6	8	1.1	316	285	126	*	1
F931D336#NC	N	33	20	6.6	6	0.7	463	417	185	*	1
F931D476#CC	C	47	20	9.4	10	1.1	316	285	126	*	1
F931D476#NC	N	47	20	9.4	8	0.7	463	417	185	*	1
F931D107#NC	N	100	20	20.0	12	0.5	548	493	219	±10	3
25 Volt											
F931E105#AA	A	1	25	0.5	4	7.5	100	90	40	*	1
F931E155#AA	A	1.5	25	0.5	4	6.7	106	95	42	*	1
F931E225#AA	A	2.2	25	0.6	6	6.3	109	98	44	*	1
F931E335#AA	A	3.3	25	0.8	6	6.0	112	101	45	*	1
F931E475#AA	A	4.7	25	1.2	8	4.0	137	123	55	*	1
F931E475#BA	B	4.7	25	1.2	6	2.8	174	157	70	*	1
F931E106#BA	B	10	25	2.5	12	1.9	212	190	85	*	1
F931E106#CC	C	10	25	2.5	6	1.5	271	244	108	*	1
F931E156#CC	C	15	25	3.8	8	1.2	303	272	121	*	1
F931E226#CC	C	22	25	5.5	8	1.1	316	285	126	*	1
F931E226#NC	N	22	25	5.5	6	0.7	463	417	185	*	1
F931E336#NC	N	33	25	8.3	8	0.7	463	417	185	*	1
F931E476#NC	N	47	25	11.8	8	0.7	463	417	185	*	1
F931E226#NC	N	22	25	5.5	6	0.7	463	417	185	*	1
F931E336#NC	N	33	25	8.3	8	0.7	463	417	185	*	1
F931E476#NC	N	47	25	11.8	8	0.7	463	417	185	*	1

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F93 Series

Resin-Molded Chip, Standard Tantalum J-Lead

RATINGS & PART NUMBER REFERENCE

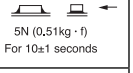
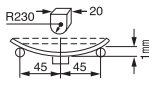
Part Number	Case Size	Capacitance (µF)	Rated Voltage (V)	DCL (µA)	DF @ 120Hz (%)	ESR @ 100kHz (Ω)	100kHz RMS Current (mA)			*1 ΔC/C (%)	MSL
							25°C	85°C	125°C		
35 Volt											
F931V334#AA	A	0.33	35	0.5	4	12.0	79	71	32	*	1
F931V474#AA	A	0.47	35	0.5	4	10.0	87	78	35	*	1
F931V684#AA	A	0.68	35	0.5	4	7.6	99	89	40	*	1
F931V105#AA	A	1	35	0.5	4	7.5	100	90	40	*	1
F931V155#AA	A	1.5	35	0.5	6	7.5	100	90	40	*	1
F931V225#AA	A	2.2	35	0.8	6	7.0	104	93	41	*	1
F931V225#BA	B	2.2	35	0.8	4	3.8	150	135	60	*	1
F931V335#BA	B	3.3	35	1.2	4	3.5	156	140	62	*	1
F931V475#BA	B	4.7	35	1.6	8	3.1	166	149	66	*	1
F931V475#CC	C	4.7	35	1.6	6	1.8	247	222	99	*	1
F931V685#CC	C	6.8	35	2.4	6	1.8	247	222	99	*	1
F931V106#CC	C	10	35	3.5	6	1.6	262	236	105	*	1
F931V156#NC	N	15	35	5.3	6	0.7	463	417	185	*	1
F931V226#NC	N	22	35	7.7	8	0.7	463	417	185	*	1
F931V336#NC	N	33	35	11.6	8	0.7	463	417	185	*	1

1: ΔC/C Marked ""

#: "M" for ±20% tolerance, "K" for ± 10% tolerance.
Moisture Sensitivity Level (MSL) is defined according to J-STD-020.

Item	All Case (%)
Damp Heat	±10
Temperature cycles	±5
Resistance soldering heat	±5
Surge	±5
Endurance	±10

QUALIFICATION TABLE

TEST	F93 series (Temperature range -55°C to +125°C)
	Condition
Damp Heat (Steady State)	At 40°C, 90 to 95% R.H., 500 hours (No voltage applied) Capacitance Change ..... Refer to the table above (*1) Dissipation Factor ..... Initial specified value or less Leakage Current ..... Initial specified value or less
Temperature Cycles	-55°C / +125°C, 30 minutes each, 5 cycles Capacitance Change ..... Refer to the table above (*1) Dissipation Factor ..... Initial specified value or less Leakage Current ..... Initial specified value or less
Resistance to Soldering Heat	10 seconds reflow at 260°C, 5 seconds immersion at 260°C. Capacitance Change ..... Refer to the table above (*1) Dissipation Factor ..... Initial specified value or less Leakage Current ..... Initial specified value or less
Surge	After application of surge voltage in series with a 33Ω resistor at the rate of 30 seconds ON, 30 seconds OFF, for 1000 successive test cycles at 85°C, capacitors shall meet the characteristic requirements in the table above. Capacitance Change ..... Refer to the table above (*1) Dissipation Factor ..... Initial specified value or less Leakage Current ..... Initial specified value or less
Endurance	After 2000 hours' application of rated voltage in series with a 3Ω resistor at 85°C, or derated voltage in series with a 3Ω resistor at 125°C, capacitors shall meet the characteristic requirements in the table above. Capacitance Change ..... Refer to the table above (*1) Dissipation Factor ..... Initial specified value or less Leakage Current ..... Initial specified value or less
Shear Test	After applying the pressure load of 5N for 10±1 seconds horizontally to the center of capacitor side body which has no electrode and has been soldered beforehand on a substrate, there shall be found neither exfoliation nor its sign at the terminal electrode. 
Terminal Strength	Keeping a capacitor surface-mounted on a substrate upside down and supporting the substrate at both of the opposite bottom points 45mm apart from the center of capacitor, the pressure strength is applied with a specified jig at the center of substrate so that the substrate may bend by 1mm as illustrated. Then, there shall be found no remarkable abnormality on the capacitor terminals. 
Failure Rate	1% per 1000 hours at 85°C, V_R with 0.1Ω/V series impedance, 60% confidence level.

We can supply the type of compliance to AEC-Q200. Please contact to your local KYOCERA AVX sales office when these series are being designed in your application.

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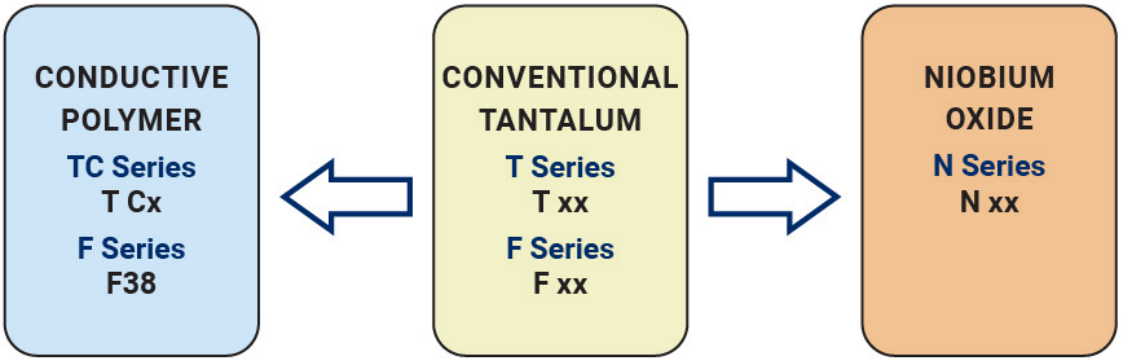
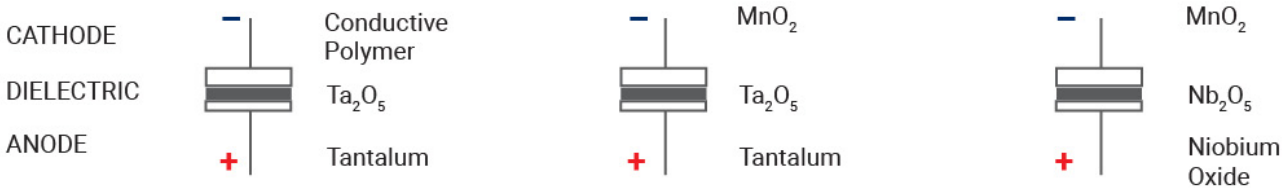
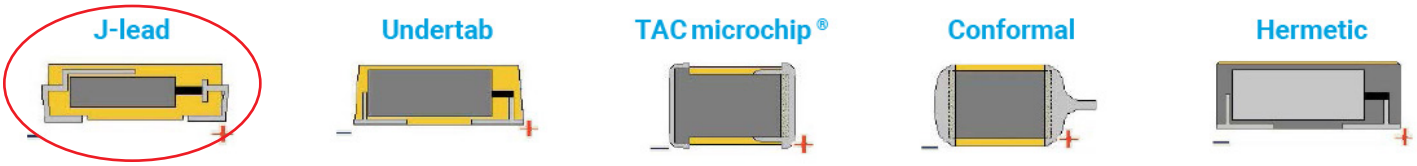
SOLID ELECTROLYTIC CAPACITOR ROADMAP

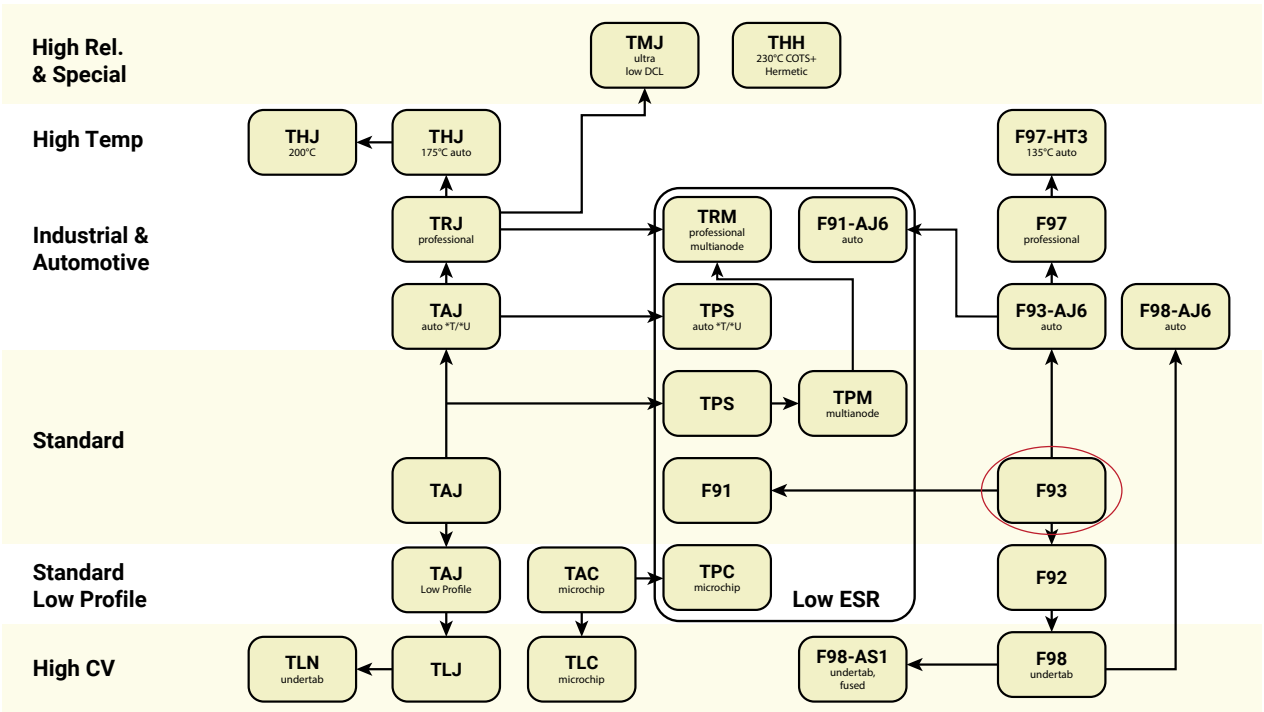




FIVE CAPACITOR CONSTRUCTION STYLES



SERIES LINE UP: CONVENTIONAL SMD MnO_2



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F930E227MBA F930E477MCC F930J686MCC F931D105MAA F930E477MNC F931A156MBA F931A686MNC F931C106KCC F931E156KNC F930G106MAA F930G475MAA F931A156KBA F931A106KBA F930E157MBA F930G476MBA F930E107MBA F930G337MNC F930G685MAA F930E337MCC F931E475KCC F930J226MSA F930E476MAA F930J107MNC F930G336MBA F931A106MBA F930G686MBA F931A107MBAAHA F931V105KBA F931A475MBA F930J106MBA F931C106MCC F931A226MB3 F931A155MAA F931V105MBA F931V106KNC F931C226MAABJZ F931D475MBABJ9 F930G226MAAAVA F931V335MBAENG F931V474KAAANS F931V684MAAENG F931V106KCGBNS F931V106MCCAVA F931V155MAAAST F931V225MBAANM F931V335KBAANS F931E335MAAAST F931E475MBAAVA F931E475MBAAZF F931V105KBABMA F931E105MAAAVA F931E225MAAENG F931D336KCCDNS F931D336MCG F931D475KAAANS F931D476MNCAVA F931E105MAAAST F931D105KAAANS F931D106KBAANS F931D106MBAAST F931D155KAAANS F931D225MAAAST F931C475MAAAST F931C475MAAAVA F931C475MAADKW F931C476MCCAST F931C476MCCAVA F931C685MBAAST F931C226MBAAH2 F931C226MBAAVA F931C226MCCAH1 F931C335MBA F931C106MAAENG F931C106MBAAVA F931C107MNCAVA F931C225MAAAVA F931C226KBADNS F931A685KAAANS F931A686MBAAST F931C105MAAAST F931C105MAAAVA F931C106MAAAST F931A476MBAAST F931A476MBAAVA F931A476MBABNM F931A476MBAENG F931A476MBAMUY F931A476MCCAE1 F931A336MBADTN F931A336MBAENG F931A337MNCMZE F931A475MAAAST F931A476KBAANS F931A225MAAAVA F931A226MAAAMD F931A226MAAAST F931A227KNGDNS F931A227MNCAST F931A106MAAAST F931A106MAAAVA