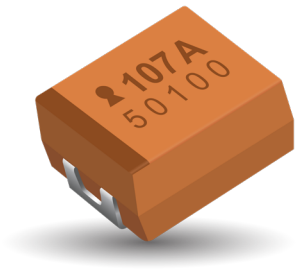
THE DATASHEET OF

NOJA156M006RWJ

OxiCap® NOJ Series

Standard and Low Profile Niobium Oxide Capacitors



FEATURES

- Non-Burn Safe Technology
- Reliability Level: 0.5%/1000 Hours at 85ºC
- 100% Surge Current Tested
- 5 Case Sizes Available, Standard and Low Profile
- Environmentally Friendly, RoHS Compliant
- CV Range: 4.7-470µF / 1.8-10V
- Elektra Component of the Year Award, 2005

LEAD-FREE
LEAD-FREE COMPATIBLE COMPONENT

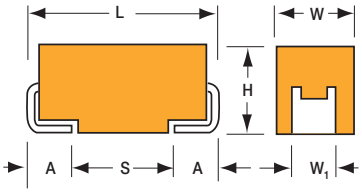
RoHS COMPLIANT

NON-BURN NON-SMOKE

Elektra Award 2005

APPLICATIONS

- Automotive, Avionics, Digital, FPGA, Industrial Low Voltage Control Circuits
- Downsized Industrial and Automotive DC/DC Converters



STANDARD CASE DIMENSIONS:

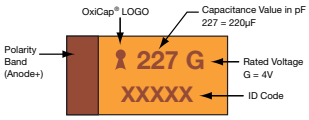
millimeters (inches)

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)
D	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.

MARKING

A, B, C, D, Y CASE



LOW PROFILE CASE DIMENSIONS:

millimeters (inches)

Code	EIA Code	EIA Metric	L±0.20 (0.008)	W+0.20 (0.008) −0.10 (0.004)	H Max	W_1 ±0.20 (0.008)	A+0.30 (0.012) −0.20 (0.008)	S Min.
Y	2917	7343-20	7.30 (0.287)	4.30 (0.169)	2.00 (0.079)	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.
Pad Stand-off is 0.1±0.1.

HOW TO ORDER

NOJ	D	107	M	006	R	WJ	–
Type	**Case Size** See table above	**Capacitance Code** 1st two digits represent significant figures, 3rd digit represents multiplier in pF	**Tolerance** M = ±20%	**Rated DC Voltage** 001 = 1.8Vdc 002 = 2.5Vdc 004 = 4Vdc 006 = 6.3Vdc 010 = 10Vdc	**Packaging** R = Pure Tin 7" Reel S = Pure Tin 13" Reel	**Specification Suffix** WJ = Standard WB = Low ESR	**Additional characters may be added for special requirements** V = dry pack option (selected ratings only - dry pack is standard for all D & Y case size ratings)

TECHNICAL SPECIFICATIONS

Technical Data:		All technical data relate to an ambient temperature of +25°C is not stated					
Capacitance Range:		4.7 µF to 470 µF					
Capacitance Tolerance:		±20%					
Leakage Current DCL:		0.02CV or 1.0µA whichever is the greater					
Rated Voltage (V_R)	≤ +85°C:	1.8	2.5	4	6.3	10	
Category Voltage (V_C)	≤ +105°C:	1.2	1.7	2.7	4	7	
Surge Voltage (V_S)	≤ +85°C:	2.3	3.3	5.2	8	13	
Surge Voltage (V_S)	≤ +105°C:	1.6	2.2	3.4	5	8	
Temperature Range:		-55°C to +105°C					
Reliability:		0.5% per 1000 hours at 85°C, V_R, 0.1Ω/V series impedance, 60% confidence level					
		Meets requirements of AEC-Q200					

STANDARD NIOBIUM OXIDE CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V_R) to 85°C				
µF	Code	1.8V (x)	2.5V (e)	4V (G)	6.3V (J)	10V (A)
4.7	475				A	A
6.8	685				A	A
10	106				A	A/B
15	156			A	A/B	A/B
22	226		A	A/B	A/B	B/C/B(700)
33	336		A/B	A/B	B/C/B(700)	C
47	476	A/B	A/B	A/B	B/C	C
68	686	B	B	B	B/C	C
100	107	B	B	B/C	B/C/D	D
150	157				C/D	
220	227		C	C/D	C/D	
330	337		C	D	D	
470	477			D		

LOW PROFILE NIOBIUM OXIDE CAPACITANCE AND RATED VOLTAGE RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V_R) to 85°C	
µF	Code	4V (G)	6.3V (J)
100	107		Y
150	157		Y
220	227	Y	

Released ratings (ESR ratings in mOhms in parentheses)

Note: Voltage ratings are minimum values. KYOCERA AVX reserves the right to supply higher voltage ratings in the same case size, to the same reliability standards

RATINGS & PART NUMBER REFERENCE

Part Number	Case Size	Capacitance (µF)	Rated Voltage (V)	Rated Temperature (°C)	Category Voltage (V)	Category Temperature (°C)	DCL Max. (µA)	DF Max. (%)	ESR Max. @ 100kHz (Ω)	100kHz RMS Current (A)			MSL
										25°C	85°C	105°C	
1.8 Volt @ 85°C													
NOJA476M001#WJ	A	47	1.8	85	1.2	105	1.7	8	1.6	0.237	0.213	0.095	1
NOJB476M001#WJ	B	47	1.8	85	1.2	105	1.7	6	1.6	0.252	0.227	0.101	1
NOJB686M001#WJ	B	68	1.8	85	1.2	105	2.5	6	1.5	0.261	0.235	0.104	1
NOJB107M001#WJ	B	100	1.8	85	1.2	105	3.6	6	1.4	0.270	0.243	0.108	1
2.5 Volt @ 85°C													
NOJA226M002#WJ	A	22	2.5	85	1.7	105	1.1	6	1.9	0.218	0.196	0.087	1
NOJA336M002#WJ	A	33	2.5	85	1.7	105	1.7	6	1.7	0.230	0.207	0.092	1
NOJB336M002#WJ	B	33	2.5	85	1.7	105	1.7	6	1.7	0.245	0.220	0.098	1
NOJA476M002#WJ	A	47	2.5	85	1.7	105	2.4	8	1.6	0.237	0.213	0.095	1
NOJB476M002#WJ	B	47	2.5	85	1.7	105	2.4	6	1.6	0.252	0.227	0.101	1
NOJB686M002#WJ	B	68	2.5	85	1.7	105	3.4	6	1.5	0.261	0.235	0.104	1
NOJB107M002#WJ	B	100	2.5	85	1.7	105	5.0	6	1.4	0.270	0.243	0.108	1
NOJC227M002#WJ	C	220	2.5	85	1.7	105	11.0	8	0.4	0.574	0.517	0.230	1
NOJC337M002#WJ	C	330	2.5	85	1.7	105	16.5	10	0.3	0.663	0.597	0.265	1
4 Volt @ 85°C													
NOJA156M004#WJ	A	15	4	85	2.7	105	1.2	6	2	0.212	0.191	0.085	1
NOJA226M004#WJ	A	22	4	85	2.7	105	1.8	6	1.9	0.218	0.196	0.087	1
NOJB226M004#WJ	B	22	4	85	2.7	105	1.8	6	1.9	0.232	0.209	0.093	1
NOJA336M004#WJ	A	33	4	85	2.7	105	2.6	10	1.7	0.230	0.207	0.092	1
NOJB336M004#WJ	B	33	4	85	2.7	105	2.6	6	1.7	0.245	0.220	0.098	1
NOJA476M004#WJ	A	47	4	85	2.7	105	3.8	18	2.2	0.202	0.182	0.081	1
NOJB476M004#WJ	B	47	4	85	2.7	105	3.8	6	1.6	0.252	0.227	0.101	1
NOJB686M004#WJ	B	68	4	85	2.7	105	5.4	6	1.5	0.261	0.235	0.104	1
NOJB107M004#WJ	B	100	4	85	2.7	105	8.0	16	1.4	0.270	0.243	0.108	1
NOJC107M004#WJ	C	100	4	85	2.7	105	8.0	6	0.4	0.574	0.517	0.230	1
NOJC227M004#WJ	C	220	4	85	2.7	105	17.6	8	0.4	0.574	0.517	0.230	1
NOJD227M004#WJ	D	220	4	85	2.7	105	17.6	8	0.4	0.671	0.604	0.268	3
NOJY227M004#WJ	Y	220	4	85	2.7	105	17.6	10	0.4	0.612	0.551	0.245	3
NOJD337M004#WJ	D	330	4	85	2.7	105	26.4	8	0.3	0.775	0.697	0.310	3
NOJD477M004#WJ	D	470	4	85	2.7	105	37.6	12	0.3	0.775	0.697	0.310	3
6.3 Volt @ 85°C													
NOJA475M006#WJ	A	4.7	6.3	85	4	105	1.1	6	3.2	0168	0.151	0.067	1
NOJA685M006#WJ	A	6.8	6.3	85	4	105	1.1	6	2.6	0.186	0.167	0.074	1
NOJA106M006#WJ	A	10	6.3	85	4	105	1.2	6	2.2	0.202	0.182	0.081	1
NOJA156M006#WJ	A	15	6.3	85	4	105	1.8	8	2	0.212	0.191	0.085	1
NOJB156M006#WJ	B	15	6.3	85	4	105	1.8	6	2	0.226	0.203	0.090	1
NOJA226M006#WJ	A	22	6.3	85	4	105	2.6	8	1.8	0.224	0.201	0.089	1
NOJB226M006#WJ	B	22	6.3	85	4	105	2.6	6	1.9	0.232	0.209	0.093	1
NOJB336M006#WJ	B	33	6.3	85	4	105	4.0	6	1.7	0.245	0.220	0.098	1
NOJB336M006#WB	B	33	6.3	85	4	105	4.0	6	0.7	0.382	0.344	0.153	3
NOJC336M006#WJ	C	33	6.3	85	4	105	4.0	6	0.5	0.514	0.462	0.206	1
NOJB476M006#WJ	B	47	6.3	85	4	105	5.6	6	0.8	0.357	0.321	0.143	1
NOJC476M006#WJ	C	47	6.3	85	4	105	5.7	6	0.5	0.514	0.462	0.206	1
NOJB686M006#WJ	B	68	6.3	85	4	105	8.2	20	1.5	0.261	0.235	0.104	1
NOJC686M006#WJ	C	68	6.3	85	4	105	8.2	6	0.5	0.514	0.462	0.206	1
NOJB107M006#WJ	B	100	6.3	85	4	105	60.0	20	1.7	0.245	0.220	0.098	1
NOJC107M006#WJ	C	100	6.3	85	4	105	12.0	8	0.4	0.574	0.517	0.230	1
NOJD107M006#WJ	D	100	6.3	85	4	105	12.0	6	0.4	0.671	0.604	0.268	3
NOJY107M006#WJ	Y	100	6.3	85	4	105	12.0	6	0.4	0.612	0.551	0.245	3
NOJC157M006#WJ	C	150	6.3	85	4	105	18.0	6	0.4	0.574	0.517	0.230	1
NOJD157M006#WJ	D	150	6.3	85	4	105	18.0	6	0.4	0.671	0.604	0.268	3
NOJY157M006#WJ	Y	150	6.3	85	4	105	18.0	6	0.4	0.612	0.551	0.245	3
NOJC227M006#WJ	C	220	6.3	85	4	105	26.4	14	0.4	0.574	0.517	0.230	1
NOJD227M006#WJ	D	220	6.3	85	4	105	26.4	8	0.4	0.671	0.604	0.268	3
NOJD337M006#WJ	D	330	6.3	85	4	105	39.6	10	0.3	0.775	0.697	0.310	3
10 Volt @ 85°C													
NOJA475M010#WJ	A	4.7	10	85	7	105	1.0	6	3.1	0.170	0.153	0.068	1
NOJA685M010#WJ	A	6.8	10	85	7	105	1.4	6	2.6	0.186	0.167	0.074	1
NOJA106M010#WJ	A	10	10	85	7	105	2.0	6	2.2	0.202	0.182	0.081	1
NOJB106M010#WJ	B	10	10	85	7	105	2.0	6	1	0.319	0.287	0.128	1
NOJA156M010#WJ	A	15	10	85	7	105	3.0	6	2	0.212	0.191	0.085	1
NOJB156M010#WJ	B	15	10	85	7	105	3.0	6	2	0.226	0.203	0.090	1
NOJB226M010#WJ	B	22	10	85	7	105	4.4	6	1.8	0.238	0.214	0.095	1
NOJB226M010#WB	B	22	10	85	7	105	4.4	6	0.7	0.382	0.344	0.153	3

RATINGS & PART NUMBER REFERENCE

Part Number	Case Size	Capacitance (µF)	Rated Voltage (V)	Rated Temperature (°C)	Category Voltage (V)	Category Temperature (°C)	DCL Max. (µA)	DF Max. (%)	ESR Max. @ 100kHz (Ω)	100kHz RMS Current (A)			MSL
										25°C	85°C	105°C	
NOJC226M010#WJ	C	22	10	85	7	105	4.4	6	0.5	0.514	0.462	0.206	1
NOJC336M010#WJ	C	33	10	85	7	105	6.6	6	0.5	0.514	0.462	0.206	1
NOJC476M010#WJ	C	47	10	85	7	105	9.4	6	0.4	0.574	0.517	0.230	1
NOJC686M010#WJ	C	68	10	85	7	105	13.6	12	0.5	0.514	0.462	0.206	1
NOJD107M010#WJ	D	100	10	85	7	105	20.0	12	0.4	0.671	0.604	0.268	3

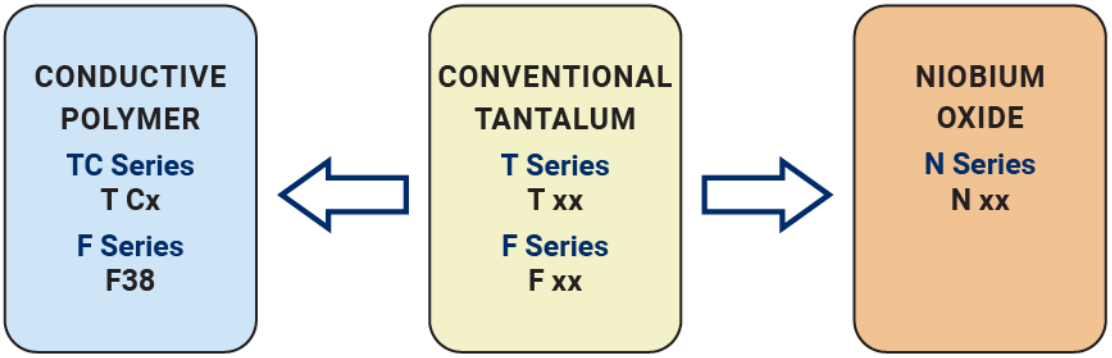
Moisture Sensitivity Level (MSL) is defined according to J-STD-020.
All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts.
DCL is measured at rated voltage after 5 minutes.
The EIA & CECC standards for capacitors allow an ESR movement to 1.25 times catalog limit post mounting.
For typical weight and composition, refer to the *Product Safety Information Datasheet* at the end of the Polymer, Tantalum and Niobium Oxide Capacitors catalog.
NOTE: KYOCERA AVX reserves the right to supply higher voltage ratings in the same case size, to the same reliability standards.

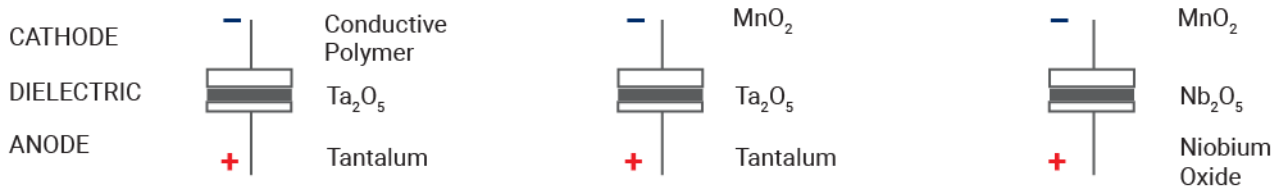
QUALIFICATION TABLE

<table>
<tr><th rowspan="2">TEST</th><th colspan="8">NOJ series (Temperature range -55ºC to +105ºC)</th></tr>
<tr><th colspan="3">Condition</th><th colspan="5">Characteristics</th></tr>
<tr><td rowspan="5">Endurance</td><td colspan="3" rowspan="5">Apply rated voltage (Ur) at 85ºC and / or category voltage (Uc) at 105ºC for 2000 hours through a circuit impedance of ≤0.1Ω/V. Stabilize at room temperature for 1-2 hours before measuring.</td><td>Visual examination</td><td colspan="4">no visible damage</td></tr>
<tr><td>DCL</td><td colspan="4">initial limit</td></tr>
<tr><td>ΔC/C</td><td colspan="4">within ±10% of initial value</td></tr>
<tr><td>DF</td><td colspan="4">initial limit</td></tr>
<tr><td>ESR</td><td colspan="4">1.25 x initial limit</td></tr>
<tr><td rowspan="5">Storage Life</td><td colspan="3" rowspan="5">Store at 105ºC, no voltage applied, for 2000 hours. Stabilize at room temperature for 1-2 hours before measuring.</td><td>Visual examination</td><td colspan="4">no visible damage</td></tr>
<tr><td>DCL</td><td colspan="4">initial limit</td></tr>
<tr><td>ΔC/C</td><td colspan="4">within ±10% of initial value</td></tr>
<tr><td>DF</td><td colspan="4">initial limit</td></tr>
<tr><td>ESR</td><td colspan="4">1.25 x initial limit</td></tr>
<tr><td rowspan="5">Humidity</td><td colspan="3" rowspan="5">Store at 65ºC and 95% relative humidity for 500 hours, with no applied voltage. Stabilize at room temperature and humidity for 1-2 hours before measuring.</td><td>Visual examination</td><td colspan="4">no visible damage</td></tr>
<tr><td>DCL</td><td colspan="4">1.5 x initial limit</td></tr>
<tr><td>ΔC/C</td><td colspan="4">within ±10% of initial value</td></tr>
<tr><td>DF</td><td colspan="4">1.2 x initial limit</td></tr>
<tr><td>ESR</td><td colspan="4">1.25 x initial limit</td></tr>
<tr><td rowspan="5">Biased Humidity</td><td colspan="3" rowspan="5">Apply rated voltage (Ur) at 85°C, 85°C relative humidity for 1000 hours. Stabilize at room temperature and humidity for 1-2 hours before measuring.</td><td>Visual examination</td><td colspan="4">no visible damage</td></tr>
<tr><td>DCL</td><td colspan="4">2 x initial limit</td></tr>
<tr><td>ΔC/C</td><td colspan="4">within ±10% of initial value</td></tr>
<tr><td>DF</td><td colspan="4">1.2 x initial limit</td></tr>
<tr><td>ESR</td><td colspan="4">1.25 x initial limit</td></tr>
<tr><td rowspan="8">Temperature Stability</td><td>Step</td><td>Temperature°C</td><td>Duration(min)</td><td></td><td>+20ºC</td><td>-55ºC</td><td>+20ºC</td><td>+85ºC</td><td>+105ºC</td><td>+20ºC</td></tr>
<tr><td>1</td><td>+20</td><td>15</td><td>DCL</td><td>IL*</td><td>n/a</td><td>IL*</td><td>10 x IL*</td><td>12.5 x IL*</td><td>IL*</td></tr>
<tr><td>2</td><td>-55</td><td>15</td><td>ΔC/C</td><td>n/a</td><td>+0/-10%</td><td>±5%</td><td>+10/-0%</td><td>+12/-0%</td><td>±5%</td></tr>
<tr><td>3</td><td>+20</td><td>15</td><td>DF</td><td>IL*</td><td>1.5 x IL*</td><td>IL*</td><td>1.5 x IL*</td><td>2 x IL*</td><td>IL*</td></tr>
<tr><td>4</td><td>+85</td><td>15</td><td>ESR</td><td>1.25 x IL*</td><td>2.5 x IL*</td><td>1.25 x IL*</td><td>1.25 x IL*</td><td>1.25 x IL*</td><td>1.25 x IL*</td></tr>
<tr><td>5</td><td>+105</td><td>15</td><td colspan="6"></td></tr>
<tr><td>6</td><td>+20</td><td>15</td><td colspan="6"></td></tr>
<tr><td rowspan="5">Surge Voltage</td><td colspan="3" rowspan="5">Apply 1.3x category voltage (Uc) at 105ºC for 1000 cycles of duration 6 min (30 sec charge, 5 min 30 sec discharge) through a charge / discharge resistance of 1000Ω</td><td>Visual examination</td><td colspan="4">no visible damage</td></tr>
<tr><td>DCL</td><td colspan="4">initial limit</td></tr>
<tr><td>ΔC/C</td><td colspan="4">within ±5% of initial value</td></tr>
<tr><td>DF</td><td colspan="4">initial limit</td></tr>
<tr><td>ESR</td><td colspan="4">1.25 x initial limit</td></tr>
<tr><td rowspan="5">Mechanical Shock</td><td colspan="3" rowspan="5">MIL-STD-202, Method 213, Condition F</td><td>Visual examination</td><td colspan="4">no visible damage</td></tr>
<tr><td>DCL</td><td colspan="4">initial limit</td></tr>
<tr><td>ΔC/C</td><td colspan="4">within ±5% of initial value</td></tr>
<tr><td>DF</td><td colspan="4">initial limit</td></tr>
<tr><td>ESR</td><td colspan="4">1.25 x initial limit</td></tr>
<tr><td rowspan="5">Vibration</td><td colspan="3" rowspan="5">MIL-STD-202, Method 204, Condition D</td><td>Visual examination</td><td colspan="4">no visible damage</td></tr>
<tr><td>DCL</td><td colspan="4">initial limit</td></tr>
<tr><td>ΔC/C</td><td colspan="4">within ±5% of initial value</td></tr>
<tr><td>DF</td><td colspan="4">initial limit</td></tr>
<tr><td>ESR</td><td colspan="4">1.25 x initial limit</td></tr>
</table>

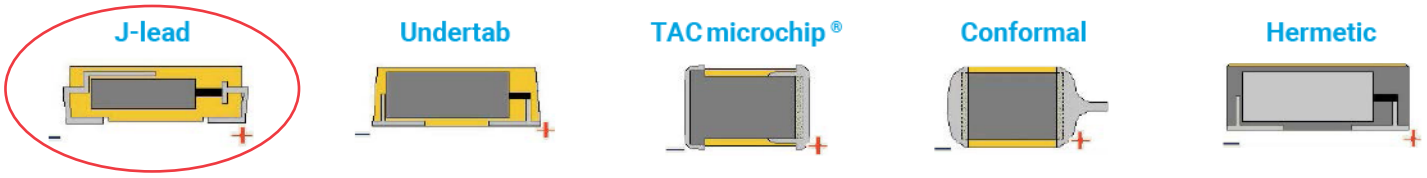
*Initial Limit

SOLID ELECTROLYTIC CAPACITOR ROADMAP

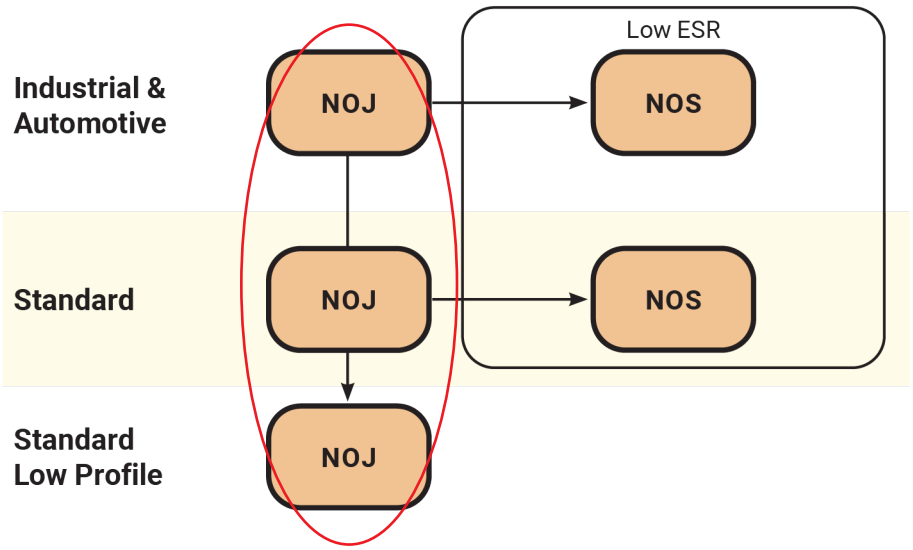




FIVE CAPACITOR CONSTRUCTION STYLES



SERIES LINE UP :



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