

RADIAL LEADS

SkyCap®/SR Series



GENERAL INFORMATION

AVX SR Series

Conformally Coated Radial Leaded MLC

Temperature Coefficients: C0G (NP0), X7R, Z5U

200, 100, 50 Volts (300V, 400V & 500V also available)

Case Material: Epoxy

Lead Material: RoHS Compliant, 100% Tin



HOW TO ORDER

SR21

5

E

104

M

A

R

TR1

AVX Style

Voltage

Temperature Coefficient

Capacitance

Capacitance Tolerance

Failure Rate

Leads

Packaging

SR15  
SR20  
SR21  
SR22  
SR27  
SR30  
SR40  
SR50

5 = 50V  
1 = 100V  
2 = 200V  
9 = 300V  
8 = 400V  
7 = 500V

A = C0G (NP0)  
C = X7R  
E = Z5U

First two digits are the significant figures of capacitance. Third digit indicates the additional number of zeros. For example, order 100,000 pF as 104. (For values below 10pF use "R" in place of decimal point, e.g., 1R4 = 1.4pF.)

C0G (NP0):  
C =  $\pm 0.25\text{pF}$   
D =  $\pm 0.5\text{pF}$   
F =  $\pm 1\%$  ( $>50\text{pF}$  only)  
G =  $\pm 2\%$  ( $>25\text{pF}$  only)  
J =  $\pm 5\%$   
K =  $\pm 10\%$   
X7R:  
J =  $\pm 5\%$   
K =  $\pm 10\%$   
M =  $\pm 20\%$   
Z5U:  
M =  $\pm 20\%$   
Z =  $+80\%$  -20%

A = Not Applicable

R = RoHS

Blank: Bulk Packaging 1.0" minimum of lead length  
T: Trimmed leads .230"  $\pm$  .030"  
Bulk packaging  
TR1: Tape and Reel Packaging  
AP1: Ammopack packaging

See packaging specification pages 33-34



MARKING

FRONT



BACK



PACKAGING REQUIREMENTS

|                          | Quantity per Bag |
|--------------------------|------------------|
| SR15, 20, 21, 22, 27, 30 | 1000 Pieces      |
| SR40, 50                 | 500 Pieces       |

Note: SR15, SR20, SR21, SR30, and SR40 available on tape and reel per EIA specifications RS-468. See Pages 33 and 34.



# RADIAL LEADS

## COG (NP0) Dielectric

### SIZE AND CAPACITANCE SPECIFICATIONS

EIA Characteristic

Dimensions: Millimeters (Inches)

| AVX Style            | SR15                                 | SR20            | SR21            | SR22            | SR27            | SR30           | SR40            | SR50            |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
|----------------------|--------------------------------------|-----------------|-----------------|-----------------|-----------------|----------------|-----------------|-----------------|-----|----|------|-----|----|------|-----|----|------|----|-----|------|-----|----|
| AVX “Insertable”     | SR07                                 | SR29            | SR59            | N/A             | N/A             | SR65           | SR75            | N/A             |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| Width (W)            | 3.81<br>(.150)                       | 5.08<br>(.200)  | 5.08<br>(.200)  | 5.08<br>(.200)  | 6.604<br>(.260) | 7.62<br>(.300) | 10.16<br>(.400) | 12.70<br>(.500) |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| Height (H)           | 3.81<br>(.150)                       | 5.08<br>(.200)  | 5.08<br>(.200)  | 5.08<br>(.200)  | 6.35<br>(.250)  | 7.62<br>(.300) | 10.16<br>(.400) | 12.70<br>(.500) |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| Thickness (T)        | 2.54<br>(.100)                       | 3.175<br>(.125) | 3.175<br>(.125) | 3.175<br>(.125) | 4.06<br>(.160)  | 3.81<br>(.150) | 3.81<br>(.150)  | 5.08<br>(.200)  |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| Lead Spacing (L.S.)  | 2.54<br>(.100)                       | 2.54<br>(.100)  | 5.08<br>(.200)  | 6.35<br>(.250)  | 7.62<br>(.300)  | 5.08<br>(.200) | 5.08<br>(.200)  | 10.16<br>(.400) |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| Lead Diameter (L.D.) | .508<br>(.020)                       | .508<br>(.020)  | .508<br>(.020)  | .508<br>(.020)  | .508<br>(.020)  | .508<br>(.020) | .508<br>(.020)  | .635<br>(.025)  |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| Cap. in.*<br>pF      | Industry Preferred<br>Values in Blue | WVDC            |                 |                 | WVDC            |                |                 | WVDC            |     |    | WVDC |     |    | WVDC |     |    | WVDC |    |     | WVDC |     |    |
|                      |                                      | 200             | 100             | 50              | 200             | 100            | 50              | 200             | 100 | 50 | 200  | 100 | 50 | 200  | 100 | 50 | 100  | 50 | 100 | 50   | 100 | 50 |
| 1.0-9.9              | SR151A1R0DAR                         |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 10                   | SR151A100KAR                         |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 15                   | SR....A150KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 22                   | SR....A220KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 33                   | SR....A330KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 39                   | SR....A390KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 47                   | SR....A470KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 68                   | SR....A680KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 100                  | SR151A101KAR                         |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 150                  | SR....A151KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 220                  | SR....A221KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 330                  | SR....A331KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 390                  | SR....A391KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 470                  | SR....A471KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 680                  | SR....A681KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 1000                 | SR211A102KAR                         |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 1500                 | SR....A152KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 2200                 | SR....A222KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 3900                 | SR....A392KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 4700                 | SR....A472KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 6800                 | SR....A682KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 8200                 | SR....A822KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 10,000               | SR....A103KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 15,000               | SR....A153KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 22,000               | SR....A223KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 33,000               | SR....A333KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 39,000               | SR....A393KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 47,000               | SR....A473KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 68,000               | SR....A683KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |
| 100,000              | SR....A104KAR                        |                 |                 |                 |                 |                |                 |                 |     |    |      |     |    |      |     |    |      |    |     |      |     |    |

For other styles, voltages, tolerances and lead lengths see Part No. Codes or contact factory.

\*Other capacitance values available upon special request.

 = Industry preferred values  
 = SR20 only

Capacitance ranges available for  
 SR12 and SR07 same as SR15  
 SR62 and SR59 same as SR21  
 SR64 and SR65 same as SR30  
 SR75 same as SR40  
 SR13 same as SR21

**NOTE:** For others voltages, tolerances, electrical specifications and NPO typical characteristics, see the AVX Multilayer Ceramic Leaded Capacitors Catalog.

RADIAL LEADS

X7R Dielectric



SIZE AND CAPACITANCE SPECIFICATIONS

|                    |                                      |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
|--------------------|--------------------------------------|----------------|-----------------|-----------------|-----------------|-----------------|----------------|-----------------|-----------------|----------------------------------|------|-----|----|------|-----|----|------|-----|----|
| EIA Characteristic |                                      |                |                 |                 |                 |                 |                |                 |                 | Dimensions: Millimeters (Inches) |      |     |    |      |     |    |      |     |    |
|                    | AVX Style                            | SR15           | SR20            | SR21            | SR22            | SR27            | SR30           | SR40            | SR50            |                                  |      |     |    |      |     |    |      |     |    |
|                    | AVX "Insertable"                     | SR07           | SR29            | SR59            | N/A             | N/A             | SR65           | SR75            | N/A             |                                  |      |     |    |      |     |    |      |     |    |
|                    | Width (W)                            | 3.81<br>(.150) | 5.08<br>(.200)  | 5.08<br>(.200)  | 5.08<br>(.200)  | 6.604<br>(.260) | 7.62<br>(.300) | 10.16<br>(.400) | 12.70<br>(.500) |                                  |      |     |    |      |     |    |      |     |    |
|                    | Height (H)                           | 3.81<br>(.150) | 5.08<br>(.200)  | 5.08<br>(.200)  | 5.08<br>(.200)  | 6.35<br>(.250)  | 7.62<br>(.300) | 10.16<br>(.400) | 12.70<br>(.500) |                                  |      |     |    |      |     |    |      |     |    |
|                    | Thickness (T)                        | 2.54<br>(.100) | 3.175<br>(.125) | 3.175<br>(.125) | 3.175<br>(.125) | 4.06<br>(.160)  | 3.81<br>(.150) | 3.81<br>(.150)  | 5.08<br>(.200)  |                                  |      |     |    |      |     |    |      |     |    |
|                    | Lead Spacing (L.S.)                  | 2.54<br>(.100) | 2.54<br>(.100)  | 5.08<br>(.200)  | 6.35<br>(.250)  | 7.62<br>(.300)  | 5.08<br>(.200) | 5.08<br>(.200)  | 10.16<br>(.400) |                                  |      |     |    |      |     |    |      |     |    |
|                    | Lead Diameter (L.D.)                 | .508<br>(.020) | .508<br>(.020)  | .508<br>(.020)  | .508<br>(.020)  | .508<br>(.020)  | .508<br>(.020) | .508<br>(.020)  | .635<br>(.025)  |                                  |      |     |    |      |     |    |      |     |    |
| Cap. in.*<br>pF    | Industry Preferred<br>Values in Blue | WVDC           |                 |                 | WVDC            |                 |                | WVDC            |                 |                                  | WVDC |     |    | WVDC |     |    | WVDC |     |    |
|                    |                                      | 200            | 100             | 50              | 200             | 100             | 50             | 200             | 100             | 50                               | 200  | 100 | 50 | 200  | 100 | 50 | 200  | 100 | 50 |
| 470                | SR____C471KAR                        |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 1000               | SR155C102KAR                         |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 1500               | SR____C152KAR                        |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 2200               | SR____C222KAR                        |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 3300               | SR____C332KAR                        |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 4700               | SR____C472KAR                        |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 6800               | SR____C682KAR                        |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 10,000             | SR215C103KAR                         |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 15,000             | SR____C153KAR                        |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 22,000             | SR____C223KAR                        |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 33,000             | SR____C333KAR                        |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 47,000             | SR____C473KAR                        |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 68,000             | SR____C683KAR                        |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 100,000            | SR215C104KAR                         |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 150,000            | SR____C154KAR                        |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 220,000            | SR215C224KAR                         |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 330,000            | SR____C334KAR                        |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 390,000            | SR____C394KAR                        |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 470,000            | SR305C474KAR                         |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 1.0 uF             | SR305C105KAR                         |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 2.2 uF             | SR405C225KAR                         |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 2.7 uF             | SR505C275KAR                         |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 4.7 uF             | SR505C475KAR                         |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |
| 10.0 uF            | SR655C106KAR                         |                |                 |                 |                 |                 |                |                 |                 |                                  |      |     |    |      |     |    |      |     |    |

For other styles, voltages, tolerances and lead lengths see Part No. Codes or contact factory.

- = Industry preferred values
- = Extended range
- = Extended range with 0.150" thickness maximum

# RADIAL LEADS

## Z5U Dielectric

### SIZE AND CAPACITANCE SPECIFICATIONS

EIA Characteristic

Dimensions: Millimeters (Inches)

| AVX Style            | SR15                                 | SR20            | SR21            | SR22            | SR27            | SR30           | SR40            | SR50            |    |      |    |      |    |      |    |      |    |
|----------------------|--------------------------------------|-----------------|-----------------|-----------------|-----------------|----------------|-----------------|-----------------|----|------|----|------|----|------|----|------|----|
| AVX “Insertable”     | SR07                                 | SR29            | SR59            | N/A             | N/A             | SR65           | SR75            | N/A             |    |      |    |      |    |      |    |      |    |
| Width (W)            | 3.81<br>(.150)                       | 5.08<br>(.200)  | 5.08<br>(.200)  | 5.08<br>(.200)  | 6.604<br>(.260) | 7.62<br>(.300) | 10.16<br>(.400) | 12.70<br>(.500) |    |      |    |      |    |      |    |      |    |
| Height (H)           | 3.81<br>(.150)                       | 5.08<br>(.200)  | 5.08<br>(.200)  | 5.08<br>(.200)  | 6.35<br>(.250)  | 7.62<br>(.300) | 10.16<br>(.400) | 12.70<br>(.500) |    |      |    |      |    |      |    |      |    |
| Thickness (T)        | 2.54<br>(.100)                       | 3.175<br>(.125) | 3.175<br>(.125) | 3.175<br>(.125) | 4.06<br>(.160)  | 3.81<br>(.150) | 3.81<br>(.150)  | 5.08<br>(.200)  |    |      |    |      |    |      |    |      |    |
| Lead Spacing (L.S.)  | 2.54<br>(.100)                       | 2.54<br>(.100)  | 5.08<br>(.200)  | 6.35<br>(.250)  | 7.62<br>(.300)  | 5.08<br>(.200) | 5.08<br>(.200)  | 10.16<br>(.400) |    |      |    |      |    |      |    |      |    |
| Lead Diameter (L.D.) | .508<br>(.020)                       | .508<br>(.020)  | .508<br>(.020)  | .508<br>(.020)  | .508<br>(.020)  | .508<br>(.020) | .508<br>(.020)  | .635<br>(.025)  |    |      |    |      |    |      |    |      |    |
| Cap. in.*<br>pF      | Industry Preferred<br>Values in Blue | WVDC            |                 | WVDC            |                 | WVDC           |                 | WVDC            |    | WVDC |    | WVDC |    | WVDC |    | WVDC |    |
|                      |                                      | 100             | 50              | 100             | 50              | 100            | 50              | 100             | 50 | 100  | 50 | 100  | 50 | 100  | 50 | 100  | 50 |
| 10,000               | SR155E103ZAR                         |                 |                 |                 |                 |                |                 |                 |    |      |    |      |    |      |    |      |    |
| 47,000               | SR.....E473ZAR                       |                 |                 |                 |                 |                |                 |                 |    |      |    |      |    |      |    |      |    |
| 100,000              | SR215E104ZAR                         |                 |                 |                 |                 |                |                 |                 |    |      |    |      |    |      |    |      |    |
| 150,000              | SR.....E154ZAR                       |                 |                 |                 |                 |                |                 |                 |    |      |    |      |    |      |    |      |    |
| 220,000              | SR215E224ZAR                         |                 |                 |                 |                 |                |                 |                 |    |      |    |      |    |      |    |      |    |
| 330,000              | SR215E334ZAR                         |                 |                 |                 |                 |                |                 |                 |    |      |    |      |    |      |    |      |    |
| 470,000              | SR215E474ZAR                         |                 |                 |                 |                 |                |                 |                 |    |      |    |      |    |      |    |      |    |
| 680,000              | SR.....E684ZAR                       |                 |                 |                 |                 |                |                 |                 |    |      |    |      |    |      |    |      |    |
| 1.0 µF               | SR.....105ZAR                        |                 |                 |                 |                 |                |                 |                 |    |      |    |      |    |      |    |      |    |
| 1.5 µF               | SR30E155ZAR                          |                 |                 |                 |                 |                |                 |                 |    |      |    |      |    |      |    |      |    |
| 2.2 µF               | SR30E225ZAR                          |                 |                 |                 |                 |                |                 |                 |    |      |    |      |    |      |    |      |    |
| 3.3 µF               | SR30E335ZAR                          |                 |                 |                 |                 |                |                 |                 |    |      |    |      |    |      |    |      |    |
| 4.7 µF               | SR30E475ZAR                          |                 |                 |                 |                 |                |                 |                 |    |      |    |      |    |      |    |      |    |

For other styles, voltages, tolerances and lead lengths see Part No. Codes or contact factory.

\*Other capacitance values available upon special request.

 = Industry preferred values  
 = SR20 only

Capacitance ranges available for SR12 and SR07 same as SR15  
SR62 and SR59 same as SR21  
SR64 and SR65 same as SR30  
SR75 same as SR40  
SR13 same as SR21

**NOTE:** For others voltages, tolerances, electrical specifications and NPO typical characteristics, see the AVX Multilayer Ceramic Leaded Capacitors Catalog.

### AVX 500 VOLT SKYCAPS\*\*

| STYLE*               | MAXIMUM CAPACITANCE VALUE |         |
|----------------------|---------------------------|---------|
|                      | C0G (NPO)                 | X7R     |
| SR29                 | 900 pF                    | .015 µF |
| SR20                 | 1800 pF                   | .033 µF |
| SR28<br>SR59         | 900 pF                    | .015 µF |
| SR13<br>SR21         | 1800 pF                   | .033 µF |
| SR30<br>SR61<br>SR65 | 7200 pF                   | .12 µF  |
| SR40<br>SR75         | .015 µF                   | .27 µF  |
| SR22                 | 1800 pF                   | .033 µF |
| SR27                 | 1800 pF                   | .033 µF |
| SR76                 | .015 µF                   | .27 µF  |

\*Consult pages 27 and 28 for style sizes.

\*\*Voltage rating based on DWV of 150% of rated voltage.

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



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