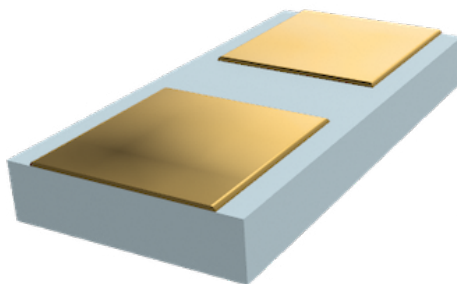


## Gap Capacitor

# XG2



## Product Overview

Eulex single layer SMD mount gap capacitor with (Pt or Au) metallization for solder, or epoxy die attach.

## Part Numbering System

| XG1       | A             | 15        | N               | 100         | K                     | P                  | W         |
|-----------|---------------|-----------|-----------------|-------------|-----------------------|--------------------|-----------|
| Eulex Gap | Rated Voltage | Case Size | Dielectric Type | Capacitance | Capacitance Tolerance | Metallization Type | Packaging |

## Dielectrics and Voltage Rating

| Dielectric Type |               | Dielectric Characteristics |                      |              |               | Voltage Code |        |
|-----------------|---------------|----------------------------|----------------------|--------------|---------------|--------------|--------|
|                 |               | Temp Coeff                 | Tolerance            | Temp Range   | Metallization |              |        |
| P               | Porcelain     | Neg.                       | B, C, D [G, J >10pF] | -55 to 125°C | Au/Pt         | A            | 6.3VDC |
| Q               | Class I/NPQ   | ±25ppm                     | B, C, D [G, J >10pF] | -55 to 125°C | Au/Pt         | C            | 10VDC  |
| N               | Class I/NP0   | ±30ppm                     | J, K, M              | -55 to 125°C | Au/Pt         | E            | 16VDC  |
| C               | Class I/NPS   | +0-5%                      | J, K, M              | -55 to 125°C | Au/Pt         | L            | 25VDC  |
| X               | Class II/X7R  | ±15%                       | K, M, P              | -55 to 125°C | Au/Pt         | G            | 50VDC  |
| Y               | Class III/Y5V | +22%-82%                   | M, P, Z              | -30 to 85°C  | Pt            | B            | 100VDC |

| Tolerance Code |          |          |          |     |     |      |      |            |            |
|----------------|----------|----------|----------|-----|-----|------|------|------------|------------|
| Code           | B        | C        | D        | G   | J   | K    | M    | P          | Z          |
| Tolerance      | ±0.10 pF | ±0.25 pF | ±0.50 pF | ±2% | ±5% | ±10% | ±20% | +100 / -0% | +80 / -20% |

## Termination Material (P/G)

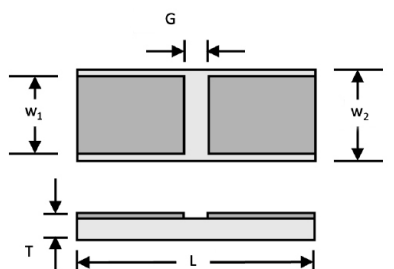
| Metallization |
|---------------|
| Pt 100µin min |
| Au 100µin min |

## Packaging (G/W/T)

| Package Type                   | Pack Qty |
|--------------------------------|----------|
| Gel-Pak/Waffle / Tape and Reel | N/A      |

## Case Size & Dimensions

| XG | Case Size | Length (L)<br>Inch (mm)        | Chip Width (W2)<br>Inch (mm)   | Thickness (T)<br>Inch (mm) | Pad Width (W1)<br>Inch (mm)     | Gap (G)<br>Inch (mm)     |
|----|-----------|--------------------------------|--------------------------------|----------------------------|---------------------------------|--------------------------|
| 50 | 0806      | 0.080 ±0.004<br>(2.032 ±0.102) | 0.060 ±0.004<br>(1.651 ±0.102) | 0.014 Max<br>(0.356 Max)   | 0.0048 ±0.003<br>(0.122 ±0.076) | 0.008 Min<br>(0.203 Min) |
| 40 | 0805      | 0.080 ±0.004<br>(2.032 ±0.102) | 0.050 ±0.004<br>(1.270 ±0.102) | 0.014 Max<br>(0.356 Max)   | 0.040 ±0.003<br>(1.016 ±0.076)  | 0.008 Min<br>(0.203 Min) |
| 25 | 0803      | 0.080 ±0.004<br>(2.032 ±0.102) | 0.030 ±0.003<br>(0.762 ±0.076) | 0.012 Max<br>(0.305 Max)   | 0.025 ±0.003<br>(0.635 ±0.076)  | 0.004 Min<br>(0.102 Min) |
| 22 | 0603      | 0.060 ±0.004<br>(1.524 ±0.102) | 0.030 ±0.003<br>(0.762 ±0.076) | 0.012 Max<br>(0.305 Max)   | 0.024 ±0.003<br>(0.610 ±0.076)  | 0.003 Min<br>(0.076 Min) |
| 20 | 0503      | 0.045 ±0.004<br>(1.143 ±0.102) | 0.025 ±0.003<br>(0.635 ±0.076) | 0.012 Max<br>(0.305 Max)   | 0.021 ±0.003<br>(0.533 ±0.076)  | 0.003 Min<br>(0.076 Min) |
| 15 | 0402      | 0.040 ±0.004<br>(1.016 ±0.102) | 0.020 ±0.002<br>(0.508 ±0.051) | 0.009 Max<br>(0.229 Max)   | 0.017 ±0.003<br>(0.432 ±0.076)  | 0.003 Min<br>(0.076 Min) |
| 12 | 0301      | 0.035 ±0.005<br>(0.889 ±0.127) | 0.012 Max<br>(0.305 Max)       | 0.009 Max<br>(0.229 Max)   | 0.008 ±0.003<br>(0.203 ±0.076)  | 0.003 Min<br>(0.076 Min) |
| 10 | 0201      | 0.020 ±0.004<br>(0.508 ±0.102) | 0.012 Max<br>(0.305 Max)       | 0.009 Max<br>(0.229 Max)   | 0.007 ±0.002<br>(0.178 ±0.051)  | 0.002 Min<br>(0.051 Min) |



Dimensions

## Capacitance Rating

| 6.3V       | 50       | 40       | 25       | 22       | 20       | 15       | 12       | 10       |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Dielectric | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) |
| P          | 22       | 15       | 11       | 7.5      | 4.7      | 3.6      | 1.8      | 0.5      |
| Q          | 43       | 30       | 18       | 15       | 8.2      | 6.2      | 3.3      | 0.8      |
| N          | 120      | 88       | 56       | 43       | 27       | 18       | 10       | 2.4      |
| C          | 470      | 360      | 220      | 180      | 100      | 75       | 41       | 10       |
| X          | 3000     | 2200     | 1300     | 1000     | 620      | 430      | 240      | 62       |
| Y          | 18000    | 13000    | 8200     | 5900     | 3900     | 2700     | 1500     | 360      |

| 10V | 50       | 40       | 25       | 22       | 20       | 15       | 12       | 10       |
|-----|----------|----------|----------|----------|----------|----------|----------|----------|
|     | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) |
| P   | 18       | 12       | 7.5      | 5.6      | 3.6      | 2.7      | 1.5      | 0.4      |
| Q   | 30       | 22       | 15       | 10       | 6.8      | 4.8      | 2.7      | 0.6      |
| N   | 91       | 68       | 43       | 30       | 20       | 15       | 7.5      | 2.0      |
| C   | 360      | 270      | 180      | 120      | 75       | 56       | 30       | 7.5      |
| X   | 2200     | 1600     | 910      | 750      | 47       | 330      | 180      | 47       |
| Y   | 13000    | 9100     | 5600     | 4700     | 2700     | 2200     | 1100     | 270      |

## Capacitance Rating

| 16V        | 50       | 40       | 25       | 22       | 20       | 15       | 12       | 10       |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Dielectric | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) |
| P          | 15       | 10       | 6.2      | 4.7      | 3.0      | 2.2      | 1.2      | 0.3      |
| Q          | 24       | 18       | 10       | 8.2      | 5.1      | 3.9      | 2.2      | 0.5      |
| N          | 73       | 51       | 33       | 24       | 15       | 12       | 6.2      | 1.5      |
| C          | 270      | 220      | 120      | 100      | 62       | 47       | 24       | 6.2      |
| X          | 1800     | 1200     | 750      | 600      | 360      | 270      | 150      | 36       |
| Y          | 10000    | 7500     | 4700     | 3600     | 2200     | 1600     | 880      | 220      |

| 25V        | 50       | 40       | 25       | 22       | 20       | 15       | 12       | 10       |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Dielectric | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) |
| P          | 12       | 8.2      | 5.1      | 4.0      | 2.4      | 2.0      | 1.0      | 0.25     |
| Q          | 20       | 15       | 9.1      | 6.8      | 4.3      | 3.3      | 1.8      | 0.4      |
| N          | 62       | 45       | 27       | 20       | 12       | 10       | 5.1      | 1.2      |
| C          | 240      | 180      | 110      | 82       | 51       | 40       | 20       | 5.1      |
| X          | 1500     | 1100     | 680      | 510      | 300      | 220      | 120      | 30       |
| Y          | 9100     | 6500     | 4000     | 3000     | 2000     | 1500     | 750      | 180      |

| 50V        | 50       | 40       | 25       | 22       | 20       | 15       | 12       | 10       |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Dielectric | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) |
| P          | 11       | 8.0      | 4.7      | 3.6      | 2.4      | 1.8      | 0.9      | 0.2      |
| Q          | 19       | 13       | 8.5      | 6.2      | 4.0      | 3.0      | 1.5      | 0.3      |
| N          | 56       | 43       | 27       | 20       | 12       | 9.1      | 4.7      | 1.2      |
| C          | 220      | 160      | 100      | 75       | 47       | 36       | 19       | 4.7      |
| X          | 1400     | 1000     | 600      | 470      | 290      | 200      | 110      | 30       |
| Y          | 8200     | 6000     | 3600     | 2700     | 1800     | 1300     | 680      | 180      |

| 100V       | 50       | 40       | 25       | 22       | 20       | 15       | 12       | 10       |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Dielectric | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) | Cap (pF) |
| P          | 10       | 7.2      | 4.4      | 3.3      | 2.1      | 1.6      | 0.8      | 0.1      |
| Q          | 16       | 12       | 7.5      | 5.6      | 3.6      | 2.7      | 1.4      | 0.2      |
| N          | 51       | 36       | 23       | 17       | 11       | 8.2      | 4.3      | 1.1      |
| C          | 200      | 150      | 90       | 70       | 43       | 33       | 17       | 4.4      |
| X          | 1200     | 900      | 560      | 430      | 270      | 180      | 100      | 25       |
| Y          | 7500     | 5500     | 3300     | 2500     | 1600     | 1200     | 620      | 150      |

## Test Conditions

| No. | Item                    | Test Condition                                                                                                                                                                                                                                                                                                                      | Requirements                                                                                                                                                                                                 |
|-----|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Visual & Dimensions     | Suitable optical or mechanical measurement system                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>No major defects</li> <li>Conforms to individual specification sheet"</li> </ul>                                                                                      |
| 2   | Capacitance             | <ul style="list-style-type: none"> <li>Measured at <math>1.0 \pm 0.2V_{rms}</math>, <math>1.0MHz \pm 10\%</math></li> <li>Measured at room temperature"</li> </ul>                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Shall not exceed specified capacitance plus allowed tolerance.</li> </ul>                                                                                             |
| 3   | Dielectric Strength     | <ul style="list-style-type: none"> <li>250% of rated voltage.</li> <li>Duration: 1 to 5 sec.</li> <li>Charge &amp; discharge current <math>&lt; 50mA</math>."</li> </ul>                                                                                                                                                            | <ul style="list-style-type: none"> <li>No evidence of damage or arc-over during test.</li> </ul>                                                                                                             |
| 4   | Insulation Resistance   | <ul style="list-style-type: none"> <li>Time rated voltage applied for 120 secs Max</li> <li>Test at room temperature"</li> </ul>                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li><math>\geq 100G\Omega</math> minimum</li> </ul>                                                                                                                       |
| 5   | Temperature Coefficient | <ul style="list-style-type: none"> <li>No electrical load</li> <li>Allow temperature to equilibrate prior to measure"</li> </ul>                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Capacitance change <math>\pm 30ppm</math> between <math>-55</math> to <math>+125^{\circ}C</math> from reference measurement at <math>20^{\circ}C</math>.</li> </ul>   |
| 6   | Termination Strength    | MIL-STD-883, device mounted to Au metalized alumina substrate with Au-Sn20. Apply force parallel to substrate until failure.                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Die bond strength 2N min.</li> </ul>                                                                                                                                  |
| 7   | High Temperature Load   | <ul style="list-style-type: none"> <li>Test temp.: <math>125 \pm 3^{\circ}C</math></li> <li>Applied voltage: Rated Volt</li> <li>Test time: <math>1000 \pm 24/-0</math> hrs.</li> <li>Cap. / DF / I.R. Measurement to be made after de-aging at <math>150^{\circ}C</math> for 1hr then <math>24 \pm 2</math>hr age at RT</li> </ul> | <ul style="list-style-type: none"> <li>No major damage</li> <li>Cap change: within <math>\pm 7.5\%</math> or <math>\pm 0.75pF</math> whichever is larger</li> <li>I.R. <math>\geq 1G\Omega</math></li> </ul> |

## Packaging Details

| Dimensions (mm)                         |   |   |   |   |   |
|-----------------------------------------|---|---|---|---|---|
| A                                       | B | P | W | L | T |
| Samples Provided in Gel-Pak AD-22T-00X8 |   |   |   |   |   |

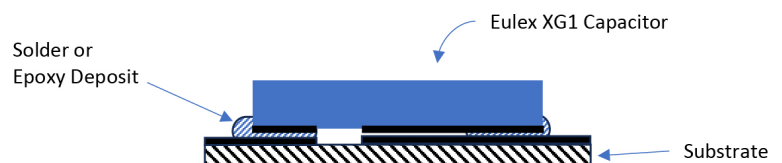
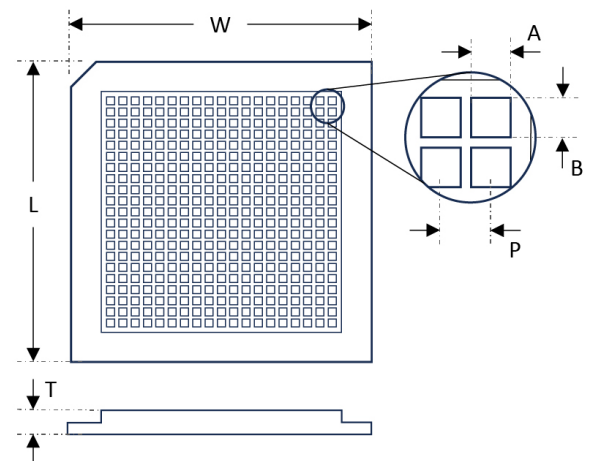
## Mounting Methods

### Solder Attach

Parts are mounted terminations down.  
Solder compositions suitable for Au attachment are acceptable.  
Au-Sn20 or In-Pb30 solder is recommended.  
Do not exceed  $320^{\circ}C$ .  
Heating cycle to remain below  $5^{\circ}C/sec$  and cooling below  $4^{\circ}C/sec$ .

### Epoxy Bonding

Parts are suitable for conductive epoxy bonding.  
Epoxy should be deposited towards edge of part, taking care not to short gap between terminals.



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