

# AVX European Space Agency and CECC Surface Mount Ceramic Capacitor Products



## AVAILABLE TERMINATIONS

### Summary

| Type  | CECC<br>Level T2/T3/T5/T6 | ESA<br>Level B & C | Remark            |
|---|---------------------------|--------------------|-------------------|
| Ag - Pd - Pt                                    | AC                        | A3..               | -                 |
| Nickel Barrier + Tin Lead Finish <sup>(1)</sup> | AN                        | A6...              | Preferred Version |
| Nickel Barrier + Tin Finish <sup>(2)</sup>      | AD                        |                    |                   |

<sup>(1)</sup> "No Pure Tin" terminations.

<sup>(2)</sup> Lead Free terminations.

## TERMINATION CODES FOR ESA MLC PARTS

| TPC Code<br>eg: A.12 | ESA Version |  |
|----------------------|-------------|--|
|                      | Code        | Termination  |
| A312                 | 03          | Silver Palladium Platinum  |
| A612C...<br>A612G... | 06          | ESA Preferred Termination<br>Nickel Barrier + Tin Lead Finish                  |
| A612Z...             | 07          | X7R Dielectric + ESA Preferred Termination<br>Nickel Barrier + Tin Lead Finish |

## PACKAGING

- Plastic Tape – Minimum Order Quantity: 1000p for CECC and ESA products
- Waffle Pack – Anti-static material only ESA Products – Minimum Order Quantity: 50p for ESA products
- Vacuum Pack only CECC Products – Minimum Order Quantity: 1Kp for CECC products

## MARKING

### Chips:

|           |             |   |
|-----------|-------------|---|
| CECC      | T6/T5/T3/T2 | On packaging label only - versus TPC code |
| ESA Level | C & B       | On packaging label only - versus ESA code |

## AVAILABLE CLIMATIC AND ELECTRIC TESTS

| Test P/N      | Test Description   | Qty. of Parts | Average Lead Time |
|---------------|--|---------------|-------------------|
| XX00--5028--- | DPA versus EIA RS469   | 25/X + 25/Y   | 1 to 2 weeks      |
| MX00--5056--- | 85/85 Humidity test / ESA 3009 / 5.2.2<br>85°C / 85% HR / 1.5Vdc / 240h      | 50            | 3 weeks           |
| MX00--5059--- | 85/85 Humidity test / MIL STD 202 Method 103<br>40°C / 95 HR / 100Vdc / 240h | 50            | 3 weeks           |
| MX00--5060--- | 85°C/85% HR / 240h Humidity test   | 12            | 3 weeks           |
| XX00--5080-00 | 100% burn in (same as "5079" but limited to 48H)                             | 100%          | 1 week            |
| XX00--5079-00 | 100% burn in versus ESA 3009 (168H / 2x Ur)                                  | 100%          | 3 weeks           |
| XX00--5090-00 | Halt test (accelerated burn-in 140°C / 3Ur)                                  | 100pc         | 4 weeks           |
| XX00--5100-00 | Life test 1000 or 2000H versus ESA 3009/9.10                                 | 100pc         | 7 or 14 weeks     |
| XX00--5082-00 | Solderability test (bath method vs. ESA or CECC)                             | 20pc          | 2 weeks           |
| XX00--5091-00 | Electric test (Cr; DF; IR) 100%  | 100%          | Tbd               |
| XX00--5092-00 | Rapid change of temperature (-55° to 125°C)                                  | 50pc          | Tbd               |
| XX00--5093-00 | Climatic test sequence   | 50pc          | Tbd               |
| XX00--5094-00 | Visual insp. Versus ESA or customer spec.                                    | 100%          | Tbd               |



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## ESA QUALIFIED CHIPS TYPE I - NP0 (AVAILABLE RELIABILITY LEVEL: B & C)

| Size | TPC Code | Dielectric Class | Voltage (V)    | Capacitance Range |                   | Tol %         | Relevant Specification    |
|------|----------|------------------|----------------|-------------------|-------------------|---------------|---------------------------|
|      |          |                  |                | min.              | max.              |               |                           |
| 0805 | A.12C..  | NP0              | 50 & 100       | 4.7               | 1500pF            | 1, 2, 5, 10 % | QPL - ESA ESCC 3009 - 003 |
| 1206 | A.20C..  | NP0              | 50 & 100       | 10                | 3900pF            |               | QPL - ESA ESCC 3009 - 022 |
| 1210 | A.13C..  | NP0              | 50 & 100<br>50 | 22<br>8200        | 6800pF<br>10000pF | ±0.5pF        | QPL - ESA ESCC 3009 - 004 |
| 1812 | A.14C..  | NP0              | 50 & 100       | 0.1               | 15 nF             | for C <10pF   | QPL - ESA ESCC 3009 - 005 |
| 2220 | A.15C..  | NP0              | 50 & 100       | 0.47              | 33 nF             |               | QPL - ESA ESCC 3009 - 006 |

Available Terminations:

A3.. Silver Palladium Platinum (ESA variant 03) and

A6.. Nickel Barrier with Tin Lead Finish (ESA variant 06)

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## ESA QUALIFIED CHIPS TYPE II - 2C1 (AVAILABLE RELIABILITY LEVEL: B & C)

| Size | TPC Code | Dielectric Class | Voltage (V) | Capacitance Range |          | Tol %     | Qualified Following Specification |
|------|----------|------------------|-------------|-------------------|----------|-----------|-----------------------------------|
|      |          |                  |             | min.              | max.     |           |                                   |
| 0805 | A.12G    | 2C1              | 100         | 820               | 10000 pF | 5, 10, 20 | QPL - ESA ESCC 3009 - 008         |
|      |          |                  | 50          | 3.9               | 27 nF    |           |                                   |
|      |          |                  | 25          | 10                | 47 nF    |           |                                   |
| 1206 | A.20G    | 2C1              | 100         | 2.2               | 22 nF    | 5, 10, 20 | QPL - ESA ESCC 3009 - 023         |
|      |          |                  | 50          | 12                | 68 nF    |           |                                   |
|      |          |                  | 25          | 27                | 100 nF   |           |                                   |
| 1210 | A.13G    | 2C1              | 100         | 3.9               | 47 nF    | 5, 10, 20 | QPL - ESA ESCC 3009 - 009         |
|      |          |                  | 50          | 33                | 120 nF   |           |                                   |
|      |          |                  | 25          | 47                | 220 nF   |           |                                   |
| 1812 | A.14G    | 2C1              | 100         | 6.8               | 82 nF    | 5, 10, 20 | QPL - ESA ESCC 3009 - 010         |
|      |          |                  | 50          | 56                | 270 nF   |           |                                   |
|      |          |                  | 25          | 82                | 470 nF   |           |                                   |
| 2220 | A.15G    | 2C1              | 100         | 18                | 180 nF   | 5, 10, 20 | QPL - ESA ESCC 3009 - 011         |
|      |          |                  | 50          | 100               | 680 nF   |           |                                   |
|      |          |                  | 25          | 180               | 1000 nF  |           |                                   |

Available Terminations:

A3.. Silver Palladium Platinum (ESA variant 03) and

A6.. Nickel Barrier with Tin Lead Finish (ESA variant 06)

## ESA QUALIFIED CHIPS TYPE II - X7R ESA VARIANT 07 (AVAILABLE RELIABILITY LEVEL: B & C)

| Size | TPC Code | Dielectric Class | Voltage (V) | Capacitance Range |                 | Tol %     | Qualified Specification         |
|------|----------|------------------|-------------|-------------------|-----------------|-----------|---------------------------------|
|      |          |                  |             | min.              | max.            |           |                                 |
| 0805 | A612Z..  | X7R              | 100         | 10nF              | 47 nF           | 5, 10, 20 | QPL - ESA ESCC 3009 - 008       |
|      |          |                  | 50          | 27nF              | 68 nF           |           |                                 |
|      |          |                  | 25          | 27nF              | 100 nF          |           |                                 |
| 1206 | A620Z..  | X7R              | 100         | 27nF              | 100 nF          | 5, 10, 20 | QPL - ESA ESCC 3009 - 023       |
|      |          |                  | 50          | 47nF              | 150 nF          |           |                                 |
|      |          |                  | 25          | 47nF              | 220 nF          |           |                                 |
| 1210 | A613Z..  | X7R              | 100         | 47nF              | 220 nF          | 5, 10, 20 | QPL - ESA ESCC 3009 - 009       |
|      |          |                  | 50          | 100nF             | 330 nF          |           |                                 |
|      |          |                  | 25          | 100nF             | 470 nF          |           |                                 |
| 1812 | A614Z..  | X7R              | 100         | 82nF              | 470 nF          | 5, 10, 20 | QPL - ESA ESCC 3009 - 010       |
|      |          |                  | 50          | 220nF             | 680 nF          |           |                                 |
|      |          |                  | 25          | 220nF             | 1000 nF         |           |                                 |
| 2220 | A615Z..  | X7R              | 100         | 180nF             | 1000 nF         | 5, 10, 20 | QPL - ESA ESCC 3009 - 011       |
|      |          |                  | 50          | 470nF             | 1500 nF         |           |                                 |
|      |          |                  | 25          | 470nF             | 2200 nF         |           |                                 |
| 1206 | A.20Z    | X7R              | 200<br>400  | 0.470<br>0.27     | 33 nF<br>4.7 nF | 5, 10, 20 | According to<br>"ESA ESCC 3009" |
| 1210 | A.13Z    | X7R              | 200<br>400  | 0.680<br>0.680    | 68 nF<br>10 nF  | 5, 10, 20 |                                 |
| 1812 | A.14Z    | X7R              | 200<br>400  | 3.3<br>3.3        | 150 nF<br>47 nF | 5, 10, 20 |                                 |
| 2220 | A.15Z    | X7R              | 200         | 6.8               | 270 nF          | 5, 10, 20 |                                 |
|      |          |                  | 400         | 6.8               | 68 nF           |           |                                 |

One single termination type: A6.. Nickel Barrier with Tin Lead Finish



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## CECC CHIPS TYPE I – NP0 (AVAILABLE RELIABILITY LEVEL: T6 TO T2) CECC UPGRADED

| Size           | TPC Code | Dielectric Class | Voltage (V) | Capacitance Range |          | Tol %                                     | Relevant Specification                           |
|----------------|----------|------------------|-------------|-------------------|----------|---|--|
|                |          |                  |             | min.              | max.     |   |  |
| 0805/<br>CEC2  | A. 12CF  | NP0              | 200         | 4.7               | 470 pF   | 1, 2, 5, 10%<br><br>±0.5pF<br>if C < 10pF | IEC 384-8....10<br><br>CECC 32100 -<br>32101/801 |
|                | A. 12CE  |                  | 100         | 4.7               | 1800 pF  |   |  |
|                | A. 12CD  |                  | 50/25       | 4.7               | 1800 pF  |   |  |
| 1206/<br>CEC12 | A. 20CJ  | NP0              | 500         | 12                | 330 pF   |   |  |
|                | A. 20CF  |                  | 200         | 12                | 1500 pF  |   |  |
|                | A. 20CE  |                  | 100         | 12                | 4700 pF  |   |  |
|                | A. 20CD  |                  | 50/25       | 12                | 4700 pF  |   |  |
| 1210/<br>CEC4  | A. 13CJ  | NP0              | 500         | 15                | 1500 pF  |   |  |
|                | A. 13CF  |                  | 200         | 15                | 2700 pF  |   |  |
|                | A. 13CE  |                  | 100         | 15                | 10000 pF |   |  |
|                | A. 13CD  |                  | 50/25       | 15                | 10000 pF |   |  |
| 1812/<br>CEC6  | A. 14CJ  | NP0              | 500         | 100               | 1000 pF  |   |  |
|                | A. 14CF  |                  | 200         | 100               | 5600 pF  |   |  |
|                | A. 14CE  |                  | 100         | 100               | 18000 pF |   |  |
|                | A. 14CD  |                  | 50/25       | 100               | 18000 pF |   |  |
| 2220/<br>CEC7  | A. 15CJ  | NP0              | 500         | 470               | 3300 pF  |   |  |
|                | A. 15CF  |                  | 200         | 470               | 12000 pF |   |  |
|                | A. 15CE  |                  | 100         | 470               | 39000 pF |   |  |
|                | A. 15CD  |                  | 50/25       | 470               | 39000 pF |   |  |

Note: 3 terminations available: Ag Pd Pt ► AC, Nickel Barrier with Tin Lead finish ► AN, Nickel Barrier with Tin finish ► AD  
Size 2225 available on request

## CECC CHIPS TYPE II – X7R (AVAILABLE RELIABILITY LEVEL: T6 TO T2) CECC UPGRADED

| Size           | TPC Code | Dielectric Class | Voltage (V) | Capacitance Range |         | Tol %       | Relevant Specification                           |
|----------------|----------|------------------|-------------|-------------------|---------|-------------|--|
|                |          |                  |             | min.              | max.    |             |  |
| 0805/<br>CNC2  | A. 12ZF  | X7R              | 200         | 0.33              | 18 nF   | 5, 10 & 20% | IEC 384-8....10<br><br>CECC 32100 -<br>32101/801 |
|                | A. 12ZE  |                  | 100         | 0.33              | 47 nF   |             |  |
|                | A. 12ZD  |                  | 50          | 0.33              | 100 nF  |             |  |
| 1206/<br>CNC12 | A. 20ZJ  | X7R              | 500         | 1                 | 8.2 nF  |             |  |
|                | A. 20ZF  |                  | 200         | 1                 | 39 nF   |             |  |
|                | A. 20ZE  |                  | 100         | 1                 | 100 nF  |             |  |
|                | A. 20ZD  |                  | 50          | 1                 | 180 nF  |             |  |
| 1210/<br>CNC4  | A. 13ZJ  | X7R              | 500         | 2.2               | 22 nF   |             |  |
|                | A. 13ZF  |                  | 200         | 2.2               | 100 nF  |             |  |
|                | A. 13ZE  |                  | 100         | 2.2               | 220 nF  |             |  |
|                | A. 13ZD  |                  | 50          | 2.2               | 330 nF  |             |  |
| 1812/<br>CNC6  | A. 14ZJ  | X7R              | 500         | 2.7               | 47 nF   |             |  |
|                | A. 14ZF  |                  | 200         | 2.7               | 180 nF  |             |  |
|                | A. 14ZE  |                  | 100         | 2.7               | 470 nF  |             |  |
|                | A. 14ZD  |                  | 50          | 2.7               | 680 nF  |             |  |
|                | A. 14ZC  |                  | 25          | 1000              | 1000 nF |             |  |
| 2220/<br>CNC7  | A. 15ZJ  | X7R              | 500         | 4.7               | 68 nF   |             |  |
|                | A. 15ZF  |                  | 200         | 4.7               | 390 nF  |             |  |
|                | A. 15ZE  |                  | 100         | 4.7               | 1000 nF |             |  |
|                | A. 15ZD  |                  | 50          | 4.7               | 1500 nF |             |  |

Note: 3 terminations available: Ag Pd Pt ► AC, Nickel Barrier with Tin Lead finish ► AN, Nickel Barrier with Tin finish ► AD  
Size 2225 available on request

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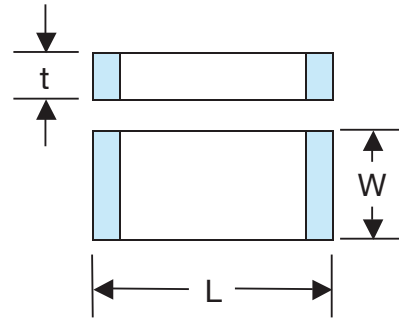


## DIMENSIONS

### I - Chips T2/T3/T5/T6 (vs CECC) AN... AC... & AD...

mm (inches)

| Size | L                            | W                             | t max.         |
|------|------------------------------|-------------------------------|----------------|
| 0805 | 2.0 ± 0.3<br>(0.079 ± 0.012) | 1.25 ± 0.3<br>(0.049 ± 0.012) | 1.3<br>(0.051) |
| 1206 | 3.2 ± 0.3<br>(0.126 ± 0.012) | 1.6 ± 0.3<br>(0.063 ± 0.012)  | 1.6<br>(0.063) |
| 1210 | 3.2 ± 0.3<br>(0.126 ± 0.012) | 2.5 ± 0.3<br>(0.098 ± 0.012)  | 1.8<br>(0.071) |
| 1812 | 4.5 ± 0.3<br>(0.177 ± 0.012) | 3.2 ± 0.3<br>(0.126 ± 0.012)  | 1.8<br>(0.071) |
| 2220 | 5.7 ± 0.4<br>(0.224 ± 0.016) | 5.0 ± 0.4<br>(0.197 ± 0.016)  | 1.8<br>(0.071) |



### II - Chips Level B and C (vs ESA 3009) A3... & A6...

mm (inches)

| Size | L           |             | W            |              | Thickness max. (t) |             |             |
|------|-------------|-------------|--------------|--------------|--------------------|-------------|-------------|
|      | min.        | max.        | min.         | max          | NP0 Class          | 2C1 Class   | X7R Class   |
| 0805 | 1.7 (0.067) | 2.3 (0.091) | 1.05 (0.041) | 1.45 (0.057) | 1.3 (0.051)        | 1.8 (0.071) | 1.3 (0.051) |
| 1206 | 2.8 (0.110) | 3.6 (0.142) | 1.3 (0.051)  | 1.9 (0.075)  | 1.8 (0.071)        | 2.3 (0.091) | 1.6 (0.063) |
| 1210 | 2.8 (0.110) | 3.6 (0.142) | 2.2 (0.087)  | 2.8 (0.110)  | 1.8 (0.071)        | 2.3 (0.091) | 1.8 (0.071) |
| 1812 | 4.0 (0.157) | 5.0 (0.197) | 2.8 (0.110)  | 3.6 (0.142)  | 1.8 (0.071)        | 2.3 (0.091) | 1.8 (0.071) |
| 2220 | 5.2 (0.205) | 6.2 (0.244) | 4.5 (0.177)  | 5.5 (0.217)  | 1.8 (0.071)        | 2.3 (0.091) | 1.8 (0.071) |

Part thickness manufactured "according to ESA" exceed above limits.



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## HOW TO ORDER ESA MLCC

|   |  |                               |   |  |  |                                 |                       |
|---|--|-------------------------------|---|--|--|---------------------------------|-----------------------|
| <b>A6</b>   | <b>14</b>  | <b>C</b>                      | <b>E</b>  | <b>0222</b>  | <b>K</b>   | <b>NC</b>                       |                       |
| <b>Termination</b>  | <b>Size</b>  | <b>Class</b>                  | <b>Voltage</b>  | <b>Capacitance</b>   | <b>Tolerance</b>   | <b>ESA Suffix</b>               | <b>TPC</b>            |
| A3 = AgPdPt Terminations<br>A6 = Nickel Barrier Terminations with Tin Lead Finish | 12 = 0805<br>13 = 1210<br>14 = 1812<br>15 = 2220<br>20 = 1206<br>43 = 2225 | Z = X7R<br>C = NPO<br>G = 2C1 | C = 25V<br>D = 50/63V<br>E = 100V<br>F = 200V<br>G = 250V<br>I = 400V<br>J = 500V | Capacitance expressed by 2 significant figures<br><b>7th digit:</b> 0 (zero)<br><b>8th and 9th digits:</b> the 2 significant figures of the capacitance value.<br><b>10th digit:</b><br>- for values $\blacktriangleright$ 10 pF and $\blacktriangleright$ 990 $\mu$ F: the number of ZEROS to be added to the capacitance value<br>- for values $\blacktriangleright$ 1 pF and $\blacktriangleright$ 9.9 pF: the figure 9 signifying that the capacitance value is to be multiplied by 0.1<br>- for values $<$ 1 pF: the figure 8 signifying that the capacitance value is to be multiplied by 0.01.<br><b>Examples:</b> 1000 pF: 0102<br>8.2 pF: 0829<br>0.47 pF: 0478 | <b>C <math>&lt;</math> 10 pF</b> Code<br>$\pm$ 0.5pF D<br><b>C <math>\blacktriangleright</math> 10 pF</b> Code<br>$\pm$ 1% F<br>$\pm$ 2% G<br>$\pm$ 5% J<br>$\pm$ 10% K<br>$\pm$ 20% M | ESA Level<br>B<br>C<br>C + Tape | TPC<br>NB<br>NC<br>2J |
|   |  |                               |   | Capacitance expressed by 3 significant figures<br><b>7th, 8th and 9th digits:</b> the 3 significant figures of the capacitance value<br><b>10th digit:</b><br>- for values $>$ 100 pF and $\blacktriangleright$ 990 $\mu$ F: the number of ZEROS to be added to the capacitance value<br>- for values $>$ 10 pF and $<$ 100 pF: the figure 9 signifying that the capacitance value is to be multiplied by 0.1<br>- for values $>$ 1 pF and $<$ 10 pF: the figure 8 signifying that the capacitance value is to be multiplied by 0.01.<br><b>Examples:</b> 196 pF: 1960<br>47.2 pF: 4729<br>8.28 pF: 8288   |  |                                 |                       |

**Not RoHS Compliant**



**LEAD-FREE**  
LEAD-FREE COMPATIBLE COMPONENT

*For RoHS compliant products, please select correct termination style.*

## HOW TO ORDER CECC MLCC

|   |  |                    |   |  |  |  |  |
|---|--|--------------------|---|--|--|--|--|
| <b>AN</b>   | <b>14</b>  | <b>C</b>           | <b>E</b>  | <b>0222</b>  | <b>K</b>   | <b>T6</b>  |  |
| <b>Termination</b>  | <b>Size</b>  | <b>Class</b>       | <b>Voltage</b>  | <b>Capacitance</b>   | <b>Tolerance</b>   | <b>CECC Suffix</b>   |  |
| AC = AgPdPt Terminations<br>AN = Nickel Barrier Terminations with Tin Lead Finish<br>AD = Nickel Barrier Terminations with Tin Finish | 12 = 0805<br>13 = 1210<br>14 = 1812<br>15 = 2220<br>20 = 1206<br>43 = 2225 | Z = X7R<br>C = NPO | C = 25V<br>D = 50/63V<br>E = 100V<br>F = 200V<br>G = 250V<br>I = 400V<br>J = 500V | Capacitance expressed by 2 significant figures<br><b>7th digit:</b> 0 (zero)<br><b>8th and 9th digits:</b> the 2 significant figures of the capacitance value.<br><b>10th digit:</b><br>- for values $\blacktriangleright$ 10 pF and $\blacktriangleright$ 990 $\mu$ F: the number of ZEROS to be added to the capacitance value<br>- for values $\blacktriangleright$ 1 pF and $\blacktriangleright$ 9.9 pF: the figure 9 signifying that the capacitance value is to be multiplied by 0.1<br>- for values $<$ 1 pF: the figure 8 signifying that the capacitance value is to be multiplied by 0.01.<br><b>Examples:</b> 1000 pF: 0102<br>8.2 pF: 0829<br>0.47 pF: 0478 | <b>C <math>&lt;</math> 10 pF</b> Code<br>$\pm$ 0.5pF D<br><b>C <math>\blacktriangleright</math> 10 pF</b> Code<br>$\pm$ 1% F<br>$\pm$ 2% G<br>$\pm$ 5% J<br>$\pm$ 10% K<br>$\pm$ 20% M | Burn-in 100% 168H +TS +HR<br>Burn-in 100% 168H<br>Burn-in 100% 48H<br>No Burn-in<br>T5 + Tape<br>T3 + Tape<br>T2 + Tape<br>T6 + Tape | T6<br>T5<br>T3<br>T2<br>2K<br>2L<br>2Y<br>24 |
|   |  |                    |   | Capacitance expressed by 3 significant figures<br><b>7th, 8th and 9th digits:</b> the 3 significant figures of the capacitance value<br><b>10th digit:</b><br>- for values $>$ 100 pF and $\blacktriangleright$ 990 $\mu$ F: the number of ZEROS to be added to the capacitance value<br>- for values $>$ 10 pF and $<$ 100 pF: the figure 9 signifying that the capacitance value is to be multiplied by 0.1<br>- for values $>$ 1 pF and $<$ 10 pF: the figure 8 signifying that the capacitance value is to be multiplied by 0.01.<br><b>Examples:</b> 196 pF: 1960<br>47.2 pF: 4729<br>8.28 pF: 8288   |  |  |  |

**Not RoHS Compliant**



**LEAD-FREE**  
LEAD-FREE COMPATIBLE COMPONENT

*For RoHS compliant products, please select correct termination style.*

