

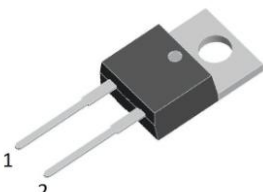
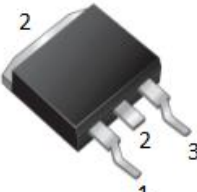
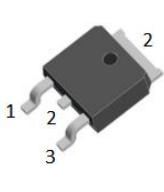
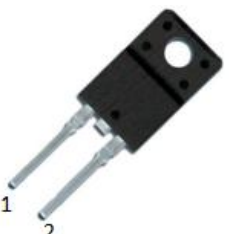
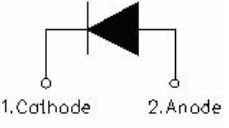
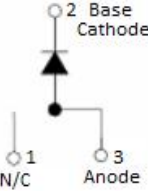
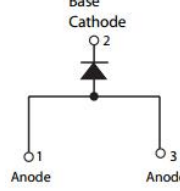
## ST5100/STB5100/STF5100/STD5100 SCHOTTKY RECTIFIER

### Applications

- Switching power supply
- Converters
- Free-Wheeling diodes
- Reverse battery protection

### Features

- 150 °C T<sub>J</sub> operation
- Center tap configuration
- Ultralow forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Trench MOS Schottky technology
- This is a Pb - Free Device
- All SMC parts are traceable to the wafer lot
- Additional testing can be offered upon request

| ST5100                                                                              | STB5100                                                                             | STD5100                                                                              | STF5100                                                                               |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|  |  |  |   |
|  |  |  |  |
| TO-220AC                                                                            | D <sup>2</sup> PAK                                                                  | DPAK                                                                                 | ITO-220AC                                                                             |

### Maximum Ratings:

| Characteristics                                                                        | Symbol                          | Condition                                                       | Max. | Units |
|----------------------------------------------------------------------------------------|---------------------------------|-----------------------------------------------------------------|------|-------|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | -                                                               | 100  | V     |
| Average Rectified Forward Current                                                      | $I_{F(AV)}$                     | 50% duty cycle @T <sub>c</sub> =130°C,<br>rectangular wave form | 5    | A     |
| Peak One Cycle Non-Repetitive Surge Current                                            | $I_{FSM}$                       | 8.3ms, Half Sine pulse, T <sub>c</sub> = 25 °C                  | 120  | A     |

## Electrical Characteristics:

| Characteristics       | Symbol   | Condition                                                                          | Typ.         | Max.      | Units |
|-----------------------|----------|------------------------------------------------------------------------------------|--------------|-----------|-------|
| Forward Voltage Drop* | $V_{F1}$ | @ 2.5A, Pulse, $T_J = 25^\circ\text{C}$<br>@ 5A, Pulse, $T_J = 25^\circ\text{C}$   | 0.55<br>0.69 | -<br>0.75 | V     |
|                       | $V_{F2}$ | @ 2.5A, Pulse, $T_J = 125^\circ\text{C}$<br>@ 5A, Pulse, $T_J = 125^\circ\text{C}$ | 0.50<br>0.61 | -<br>0.68 | V     |
| Reverse Current*      | $I_{R1}$ | @ $V_R = \text{rated } V_R$<br>$T_J = 25^\circ\text{C}$                            | 0.006        | 0.5       | mA    |
|                       | $I_{R2}$ | @ $V_R = \text{rated } V_R$<br>$T_J = 125^\circ\text{C}$                           | 2.0          | 20        | mA    |
| Junction Capacitance  | $C_T$    | @ $V_R = 5\text{V}$ , $T_C = 25^\circ\text{C}$<br>$f_{\text{SIG}} = 1\text{MHz}$   | 245          | -         | pF    |

\* Pulse width < 300  $\mu\text{s}$ , duty cycle < 2%

## Thermal-Mechanical Specifications:

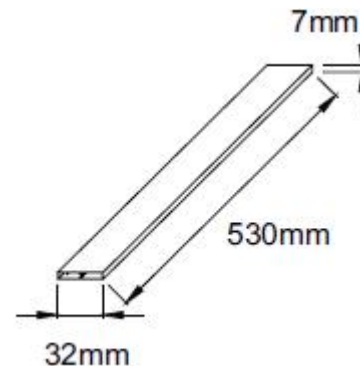
| Characteristics                             | Symbol                                        | ST5100      | STB5100 | STD5100 | STF5100 | Units              |
|---------------------------------------------|-----------------------------------------------|-------------|---------|---------|---------|--------------------|
| Junction Temperature                        | $T_J$                                         | -55 to +150 |         |         |         | $^\circ\text{C}$   |
| Storage Temperature                         | $T_{\text{stg}}$                              | -55 to +150 |         |         |         | $^\circ\text{C}$   |
| Typical Thermal Resistance Junction to Case | $R_{\theta\text{JC}}$                         | 3.5         | 3.5     | 3.0     | 6.5     | $^\circ\text{C/W}$ |
| Case Style                                  | TO-220AC/ D <sup>2</sup> PAK/ DPAK/ ITO-220AC |             |         |         |         |                    |

## Tube Specification

| Device  | Package            | Weight | Shipping       |
|---------|--------------------|--------|----------------|
| ST5100  | TO-220AC           | 1.6g   | 50pcs / tube   |
| STB5100 | D <sup>2</sup> PAK | 1.85g  | 800pcs / reel  |
| STD5100 | DPAK               | 0.39g  | 2500pcs / reel |
| STF5100 | ITO-220AC          | 1.6g   | 50pcs / tube   |

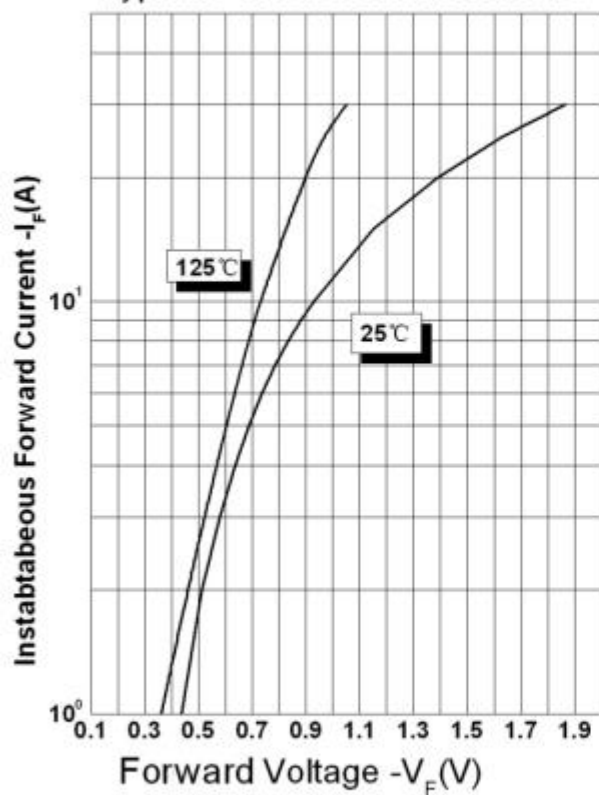
For information on tape and reel specifications, including part orientation and tape sizes, please refer to our tape and reel packaging specification.

## Tube Specification(TO-220AC/ITO-220AC)

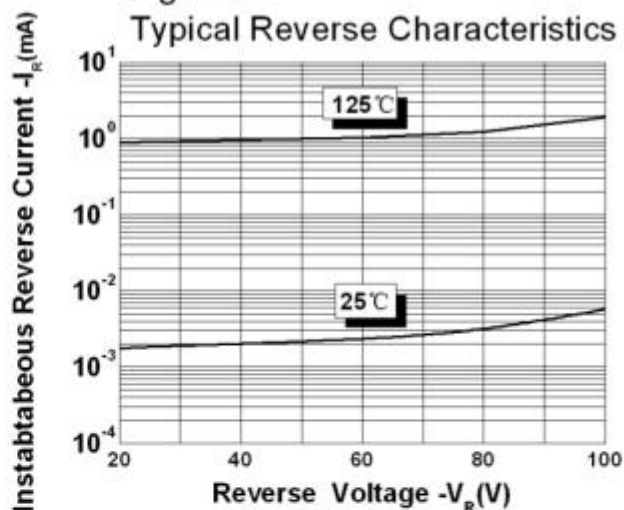


## Ratings and Characteristics Curves

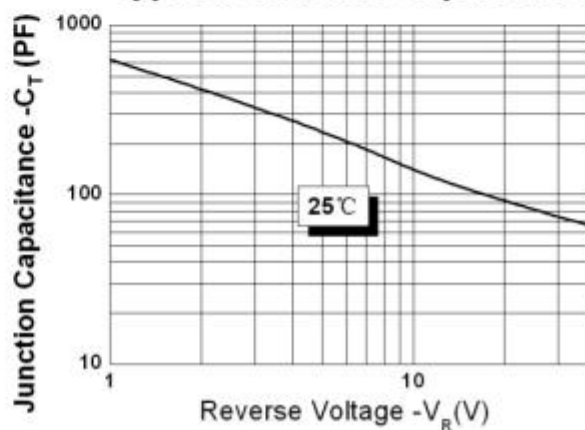
**Figure 1**  
Typical Forward Characteristics



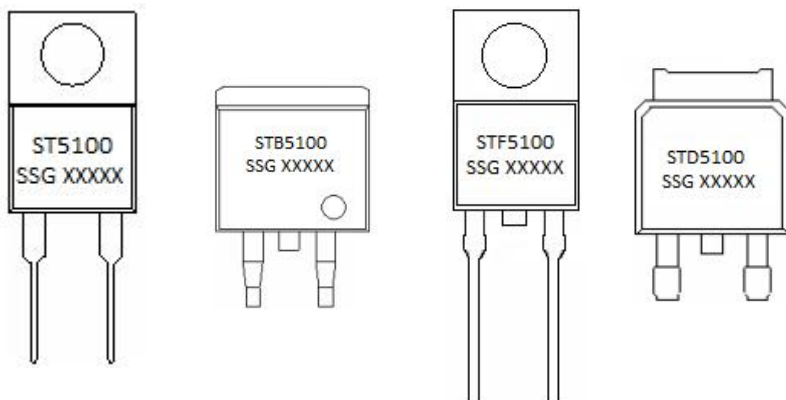
**Figure 2**  
Typical Reverse Characteristics



**Figure 3**  
Typical Junction Capacitance



## Marking Diagram

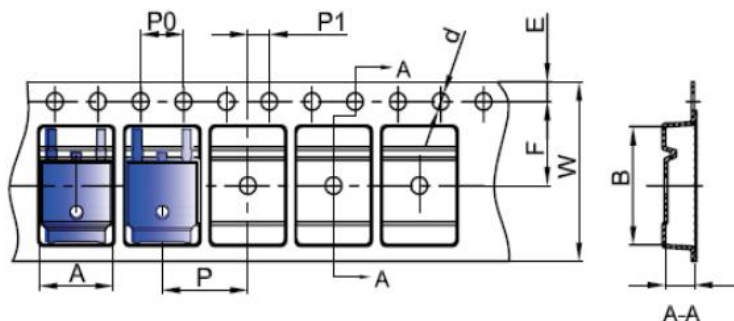


Where XXXXX is YYWWL

ST = Device Type  
B/D/F = Package type  
5 = Forward Current (5A)  
100 = Reverse Voltage (100V)  
SSG = SSG  
YY = Year  
WW = Week  
L = Lot Number

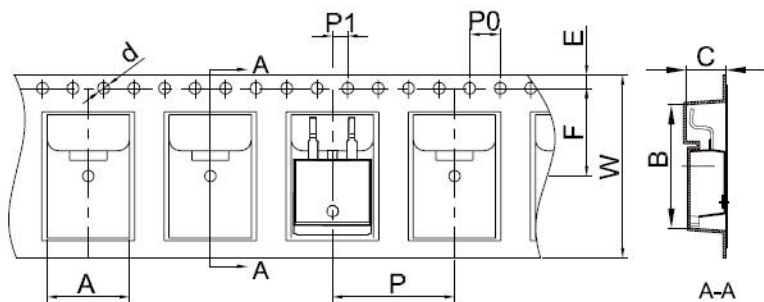
**Cautions:** Molding resin  
Epoxy resin UL-94V-0

## Carrier Tape Specification DPAK



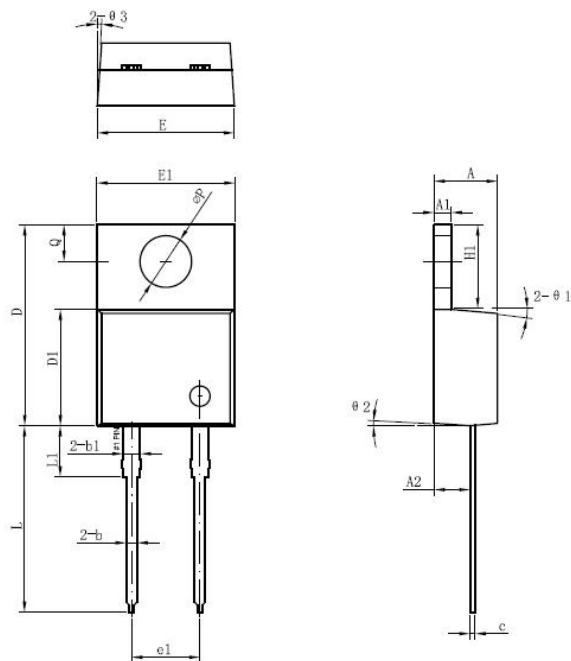
| SYMBOL | Millimeters |       |
|--------|-------------|-------|
|        | Min.        | Max.  |
| A      | 6.80        | 7.00  |
| B      | 10.40       | 10.60 |
| C      | 2.60        | 2.80  |
| d      | Φ1.45       | Φ1.65 |
| E      | 1.65        | 1.85  |
| F      | 7.40        | 7.60  |
| P0     | 3.90        | 4.10  |
| P      | 7.90        | 8.10  |
| P1     | 1.90        | 2.10  |
| W      | 15.90       | 16.30 |

## Carrier Tape Specification D<sup>2</sup>PAK



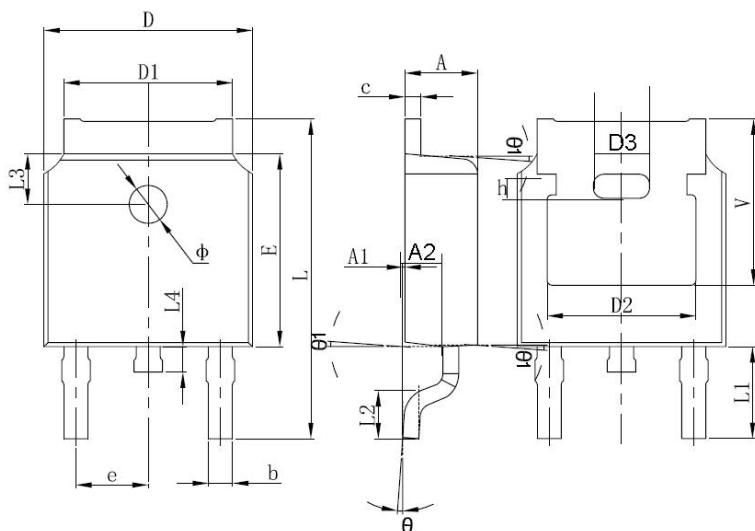
| SYMBOL | Millimeters |       |
|--------|-------------|-------|
|        | Min.        | Max.  |
| A      | 10.70       | 10.90 |
| B      | 16.03       | 16.23 |
| C      | 5.11        | 5.31  |
| d      | 1.45        | 1.65  |
| E      | 1.65        | 1.85  |
| F      | 11.40       | 11.60 |
| P0     | 3.90        | 4.10  |
| P      | 15.90       | 16.10 |
| P1     | 1.90        | 2.10  |
| W      | 23.90       | 24.30 |

## Mechanical Dimensions TO-220AC



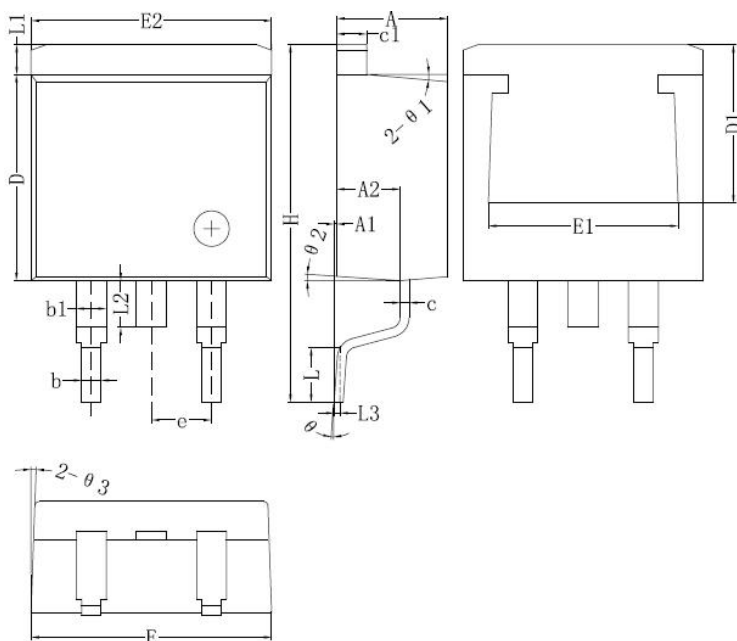
| Symbol     | Dimensions in millimeters |         |       |
|------------|---------------------------|---------|-------|
|            | Min.                      | Typical | Max.  |
| A          | 4.47                      | 4.70    | 4.85  |
| A1         | 1.17                      | 1.27    | 1.37  |
| A2         | 2.52                      | 2.69    | 2.89  |
| b          | 0.71                      | 0.81    | 0.96  |
| b1         | 1.17                      | 1.27    | 1.37  |
| c          | 0.31                      | 0.38    | 0.61  |
| D          | 14.64                     | 14.94   | 15.24 |
| D1         | 8.50                      | 8.07    | 8.90  |
| E          | 10.01                     | 10.16   | 10.31 |
| E1         | 9.98                      | 10.18   | 10.38 |
| e1         | 4.98                      | 5.08    | 5.18  |
| H1         | 6.04                      | 6.24    | 6.44  |
| L          | 13.00                     | 13.86   | 14.08 |
| L1         | 3.56                      | 3.80    | 3.96  |
| $\phi$ P   | 3.74                      | 3.84    | 4.04  |
| Q          | 2.54                      | 2.74    | 2.94  |
| $\theta$ 1 |                           | 5°      |       |
| $\theta$ 2 |                           | 4°      |       |
| $\theta$ 3 |                           | 4°      |       |

## Mechanical Dimensions DPAK



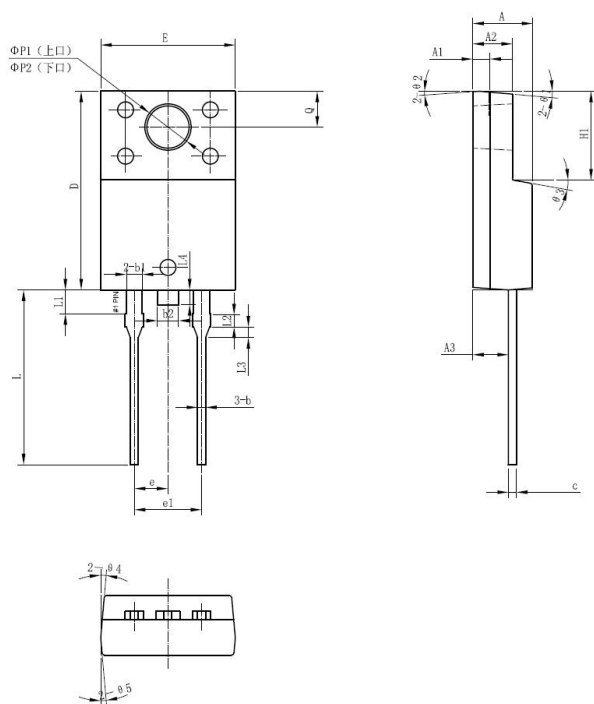
| SYMBOL   | Millimeters |       | Inches     |       |
|----------|-------------|-------|------------|-------|
|          | Min.        | Max.  | Min.       | Max.  |
| A        | 2.20        | 2.40  | 0.087      | 0.094 |
| A1       | 0.00        | 0.127 | 0.000      | 0.005 |
| b        | 0.66        | 0.86  | 0.026      | 0.034 |
| c        | 0.46        | 0.60  | 0.018      | 0.024 |
| D        | 6.50        | 6.70  | 0.256      | 0.264 |
| D1       | 5.13        | 5.46  | 0.202      | 0.215 |
| D2       | 4.83 REF.   |       | 0.190 REF. |       |
| E        | 6.00        | 6.20  | 0.236      | 0.244 |
| e        | 2.186       | 2.386 | 0.086      | 0.094 |
| L        | 9.70        | 10.40 | 0.381      | 0.409 |
| L1       | 2.90 REF.   |       | 0.144 REF. |       |
| L2       | 1.40        | 1.70  | 0.055      | 0.067 |
| L3       | 1.60 REF.   |       | 0.063 REF. |       |
| L4       | 0.60        | 1.00  | 0.024      | 0.039 |
| $\phi$   | 1.10        | 1.30  | 0.043      | 0.051 |
| $\theta$ | 0°          | 8°    | 0°         | 8°    |
| h        | 0.00        | 0.30  | 0.000      | 0.012 |
| V        | 5.35 REF.   |       | 0.211 REF. |       |

## Mechanical Dimensions D<sup>2</sup>PAK



| Symbol | Dimensions in millimeters |         |       |
|--------|---------------------------|---------|-------|
|        | Min.                      | Typical | Max.  |
| A      | 4.47                      | 4.70    | 4.85  |
| A1     | 0                         | 0.10    | 0.25  |
| A2     | 2.59                      | 2.69    | 2.89  |
| b      | 0.71                      | 0.81    | 0.96  |
| b1     | 1.17                      | 1.27    | 1.37  |
| c      | 0.31                      | 0.38    | 0.61  |
| c1     | 1.17                      | 1.27    | 1.37  |
| D      | 8.50                      | 8.70    | 8.90  |
| D1     | 6.40                      |         |       |
| E      | 10.01                     | 10.16   | 10.31 |
| E1     | 7.6                       |         |       |
| E2     | 9.98                      | 10.08   | 10.31 |
| e      |                           | 2.54    |       |
| H      | 14.6                      | 15.1    | 15.6  |
| L      | 2.00                      | 2.30    | 2.74  |
| L1     | 1.12                      | 1.27    | 1.42  |
| L2     | 1.30                      |         | 2.20  |
| L3     |                           | 0.25BSC |       |
| e      | 0                         | -       | 8°    |
| e1     |                           | 5°      |       |
| e2     |                           | 4°      |       |
| e3     |                           | 4°      |       |

## Mechanical Dimensions ITO-220AC



| SYMBOL  | Dimensions in millimeters |         |       |
|---------|---------------------------|---------|-------|
|         | Min.                      | Typical | Max.  |
| A       | 4.30                      | 4.50    | 4.70  |
| A1      | 1.10                      | 1.30    | 1.50  |
| A2      | 2.80                      | 3.00    | 3.20  |
| A3      | 2.50                      | 2.70    | 2.90  |
| b       | 0.50                      | 0.60    | 0.75  |
| b1      | 1.10                      | 1.20    | 1.35  |
| b2      | 1.50                      | 1.60    | 1.75  |
| c       | 0.50                      | 0.60    | 0.75  |
| D       | 14.80                     | 15.00   | 15.20 |
| E       | 9.96                      | 10.16   | 10.36 |
| e       | -                         | 2.55    | -     |
| e1      | 5.00                      | 5.10    | 5.16  |
| H1      | 6.50                      | 6.70    | 6.90  |
| L       | 12.70                     | 13.20   | 13.70 |
| L1      | 1.60                      | 1.80    | 2.00  |
| L2      | 0.80                      | 1.00    | 1.20  |
| L3      | 0.60                      | 0.80    | 1.00  |
| L4      | -                         | 1.10    | 1.50  |
| ΦP1(上□) | 3.30                      | 3.50    | 3.70  |
| ΦP2(下□) | 2.99                      | 3.19    | 3.39  |
| Q       | 2.50                      | 2.70    | 2.90  |
| θ1      |                           | 5°      |       |
| θ2      |                           | 4°      |       |
| θ3      |                           | 10°     |       |
| θ4      |                           | 5°      |       |
| θ5      |                           | 5°      |       |

Technical Data  
Data Sheet N1052, Rev. B



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