Application Note

AN_116

FTDI Devices Tape, Reel, Tray & Tube Dimensions

Version 2.0

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This document provides information on the Tape, Reel, Tray and Tube dimensions for FT232BL, FT245BL, FT232BQ, FT245BQ, FT232RL, FT245RL, FT232RQ, FT245RQ, FT2232D, FT232HL, FT232HQ, FT2232HL, FT232HQ, FT4232HL, FT4232HQ, FT-X series chips, FT120, FT311D, FT312D FT313H, FT4222HQ, VNC1L, VNC2, FT600, FT601, FT602.

This Application Note supersedes the FTDI Application Note AN232B-11.

Use of FTDI devices in life support and/or safety applications is entirely at the user’s risk, and the user agrees to defend, indemnify and hold FTDI harmless from any and all damages, claims, suits or expense resulting from such use.
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1 Introduction

This document provides information on the tape and reel dimensions for FT232BL, FT245BL, FT232BQ, FT245BQ, FT232RL, FT245RL, FT232RQ, FT245RQ, FT2232D, FT2232H, FT2232HL, FT2232HQ, FT4232HQ, FT4232HL, FT4232H, VNC1L, VNC2, FT600, FT601 and FT602.
2 Packaging options

FTDI can supply devices packaged in tape and reel packaging or in trays or tubes. The quantities in each package type are described below.

2.1 Tape and Reel Packaging

<table>
<thead>
<tr>
<th>IC – Tape and Reel</th>
<th>Package</th>
<th>Quantities (pieces)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FT232BL, FT245BL – R</td>
<td>LQFP</td>
<td>1000</td>
</tr>
<tr>
<td>FT232BQ</td>
<td>QFN</td>
<td>2500</td>
</tr>
<tr>
<td>FT232RL, FT245RL – R</td>
<td>SSOP</td>
<td>2000</td>
</tr>
<tr>
<td>FT232RQ, FT245RQ – R</td>
<td>QFN</td>
<td>6000</td>
</tr>
<tr>
<td>FT2232D – R</td>
<td>LQFP</td>
<td>1000</td>
</tr>
<tr>
<td>FT2232HL – R</td>
<td>LQFP</td>
<td>1000</td>
</tr>
<tr>
<td>FT2232HQ – R 9x9</td>
<td>QFN</td>
<td>4000</td>
</tr>
<tr>
<td>FT4232HL – R</td>
<td>LQFP</td>
<td>1000</td>
</tr>
<tr>
<td>FT4232HQ – R 9x9</td>
<td>QFN</td>
<td>4000</td>
</tr>
<tr>
<td>FT2232H-56Q – R 8x8</td>
<td>QFN</td>
<td>3000</td>
</tr>
<tr>
<td>FT2232H-56Q – R 8x8</td>
<td>QFN</td>
<td>3000</td>
</tr>
<tr>
<td>FT311DLQFP</td>
<td>LQFP</td>
<td>1500</td>
</tr>
<tr>
<td>FT311D QFN 7x7</td>
<td>QFN</td>
<td>3000</td>
</tr>
<tr>
<td>FT312DLQFP</td>
<td>LQFP</td>
<td>1500</td>
</tr>
<tr>
<td>FT312D QFN 7x7</td>
<td>QFN</td>
<td>3000</td>
</tr>
<tr>
<td>FT200XD- R, FT234XD-R</td>
<td>DFN</td>
<td>5000</td>
</tr>
<tr>
<td>FT201XS – R, FT220XS – R,</td>
<td>SSOP</td>
<td>3000</td>
</tr>
<tr>
<td>FT221XS – R, FT230XS – R,</td>
<td>SSOP</td>
<td>3000</td>
</tr>
<tr>
<td>FT240XS – R</td>
<td>SSOP</td>
<td>2000</td>
</tr>
<tr>
<td>FT201XQ- R, FT220XQ – R,</td>
<td>QFN</td>
<td>5000</td>
</tr>
<tr>
<td>FT221XQ – R, FT230XQ – R,</td>
<td>QFN</td>
<td>5000</td>
</tr>
<tr>
<td>FT231XQ – R, FT240XQ – R</td>
<td>QFN</td>
<td>5000</td>
</tr>
<tr>
<td>FT313HQ – R</td>
<td>QFN</td>
<td>3000</td>
</tr>
<tr>
<td>FT313HL – R</td>
<td>LQFP</td>
<td>1000</td>
</tr>
<tr>
<td>FT313HP – R</td>
<td>TQFP</td>
<td>2500</td>
</tr>
<tr>
<td>FT4222HQ-R</td>
<td>VQFN</td>
<td>5000</td>
</tr>
</tbody>
</table>

Table 2.1 – Tape and Reel Quantities
## 2.2 Tray/Tube Packaging

<table>
<thead>
<tr>
<th>IC – Tray/Tube</th>
<th>Package</th>
<th>Quantities (pieces)</th>
<th>Box of Trays/Tube (pieces)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FT232BL, FT245BL – Tray</td>
<td>LQFP</td>
<td>250</td>
<td>2500</td>
</tr>
<tr>
<td>FT232RQ, FT245RQ – Tray</td>
<td>QFN</td>
<td>490</td>
<td>4900</td>
</tr>
<tr>
<td>FT2232D – Tray</td>
<td>LQFP</td>
<td>250</td>
<td>2500</td>
</tr>
<tr>
<td>FT2232HL – Tray</td>
<td>LQFP</td>
<td>160</td>
<td>1600</td>
</tr>
<tr>
<td>FT2232HQ – Tray</td>
<td>QFN</td>
<td>260</td>
<td>2600</td>
</tr>
<tr>
<td>FT4232HL – Tray</td>
<td>LQFP</td>
<td>160</td>
<td>1600</td>
</tr>
<tr>
<td>FT4232HQ – Tray</td>
<td>QFN</td>
<td>260</td>
<td>2600</td>
</tr>
<tr>
<td>VINC1L – A – Tray</td>
<td>LQFP</td>
<td>250</td>
<td>2500</td>
</tr>
<tr>
<td>VNC2-32LQFP</td>
<td>LQFP</td>
<td>250</td>
<td>2500</td>
</tr>
<tr>
<td>VNC2-48LQFP</td>
<td>LQFP</td>
<td>250</td>
<td>2500</td>
</tr>
<tr>
<td>VNC2-32 QFN 7x7x.9</td>
<td>QFN</td>
<td>260</td>
<td>2600</td>
</tr>
<tr>
<td>VNC2-48 QFN 8x8x.9</td>
<td>QFN</td>
<td>260</td>
<td>2600</td>
</tr>
<tr>
<td>FT311DLQFP</td>
<td>LQFP</td>
<td>250</td>
<td>2500</td>
</tr>
<tr>
<td>FT311D QFN 7X 7 X .9</td>
<td>QFN</td>
<td>260</td>
<td>2600</td>
</tr>
<tr>
<td>FT200XD- T, FT234XD-T</td>
<td>DFN</td>
<td>490</td>
<td>4900</td>
</tr>
<tr>
<td>FT201XS- U, FT220XS- U, FT230XS- U</td>
<td>SSOP</td>
<td>100</td>
<td>10000</td>
</tr>
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<td>FT240XS - U, FT231XS- U</td>
<td>SSOP</td>
<td>58</td>
<td>5800</td>
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<td>FT201XQ- T, FT220XQ- T, FT230XQ- T, FT240XQ- T</td>
<td>QFN</td>
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<td>4900</td>
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<td>FT120T- U</td>
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<td>3000</td>
</tr>
<tr>
<td>FT120Q- T</td>
<td>QFN</td>
<td>490</td>
<td></td>
</tr>
<tr>
<td>FT313HP – T</td>
<td>TQFP</td>
<td>250</td>
<td>2500</td>
</tr>
<tr>
<td>FT313HQ – T</td>
<td>QFN</td>
<td>260</td>
<td>2600</td>
</tr>
<tr>
<td>FT313HL – T</td>
<td>LQFP</td>
<td>160</td>
<td>1600</td>
</tr>
</tbody>
</table>

*Table 2.2 – Tube/Tray Quantities*
3 FT232BL, FT245BL and FT2232D Tape Dimensions

Figure 3.1 – FT232BL, FT245BL and FT2232D Tape Dimensions
4 FT232BL, FT245BL and FT2232D Reel Dimensions

Figure 4.1 – FT232BL, FT245BL and FT2232D Reel Dimensions
5 FT232BQ and FT245BQ Tape Dimensions

Notes:
1. 10 sprocket hole pitch cumulative tolerance ± 0.2
3. A0 and B0 measured from a plane 0.35mm above the bottom of the pocket.
4. Ki measured from a plane parallel to the edge of the corner of the pocket.
5. Position of sprocket hole, measured from the position of pocket, not pocket hole.

Figure 5.1 – FT232BQ and FT245BQ Tape Dimensions
6 FT232BQ and FT245BQ Reel Dimensions

![Diagram of FT232BQ and FT245BQ Reel Dimensions]

Figure 6.1 – FT232BQ and FT245BQ Reel Dimensions
7 FT232RL and FT245RL Tape Dimensions

NOTES:

1. 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ±0.2
2. CAMBER IN COMPLIANCE WITH EA.481
3. POCKET POSITION RELATIVE TO SPROCKET HOLE MEASURED AS TRUE POSITION OF POCKET, NOT POCKET HOLE

Figure 7.1 – FT232RL and FT245RL Tape Dimensions
8 FT232RL and FT245RL Reel Dimensions

Figure 8.1 – FT232RL and FT245RL Reel Dimensions
9 FT232RL and FT245RL Tube Dimensions

Figure 9.1 – FT232RL and FT245RL Tube Dimensions
10 FT232RQ and FT245RQ Tape Dimensions

Figure 10.1 – FT232RQ and FT245RQ Tape Dimensions
11 FT232RQ and FT245RQ Reel Dimensions

Figure 11.1 – FT232RQ and FT245RQ Reel Dimensions
12  FT232RQ and FT245RQ Tray Dimensions

Figure 12.1 FT232RQ and FT245RQ Tray Dimensions
13 FT2232HL and FT4232HL Tape Dimensions

Figure 13.1 – FT2232HL and FT4232HL Tape Dimensions
14 FT2232HL and FT4232HL Reel Dimensions

Figure 14.1 – FT2232HL and FT4232HL Reel Dimensions
15 FT2232HL and FT4232HL Tray Dimensions

Figure 15.1 FT2232HL and FT4232HL Tray Dimensions
16 FT2232HQ and FT4232HQ Tape Dimensions

Figure 16.1 – FT2232HQ and FT4232HQ Tape Dimensions
17 FT2232HQ and FT4232HQ Reel Dimensions

Figure 17.1 – FT2232HQ and FT4232HQ Reel Dimensions
18 FT2232HQ and FT4232HQ Tray Dimensions

Figure 18.1 FT2232HQ and FT4232HQ Tray Dimensions
19 FT2232H-56Q, FT4232H-56Q, VNC2-48Q1C, FT232HQ – QFN Reel Dimensions

Figure 19.1– FT2232H-56Q, FT4232H-56Q, VNC2-48Q1C, FT232HQ – QFN Reel Dimensions
20 FT2232H-56Q, FT4232H-56Q, VNC2-48Q1C, FT232HQ – QFN Tape Dimensions

Notes:
1. Tolerances are ± 0.2 mm from nominal dimensions.
2. Pin 1 not to exceed 0.5 mm from the tape edge.
3. Centering: ± 0.1 mm from the center of the part.
4. reels not to exceed 0.5 mm from the center of the part.
5. No measured from the center of the part.
6. pocket to the edge of the part.
7. pocket to the edge of the part.
8. pocket to the edge of the part.
9. pocket to the edge of the part.

Figure 20.1 - FT2232H-56Q, FT4232H-56Q, VNC2-48Q1C, FT232HQ – QFN Tape Dimensions
21 FT2232H-56Q, FT4232H-56Q, VNC2-48Q1C, FT232HQ – QFN Tray Dimensions

Figure 21.1 – FT2232H-56Q, FT4232H-56Q, VNC2-48Q1C, FT232HQ – QFN Tray Dimensions
22 VNC1L – A – Reel Vendor Part No. RD33008SW

Figure 22.1 – VNC1L – A – Reel Vendor Part No. RD33008SW
23  VNC1L – A – Cover Tape Vendor Part No. AA13305NP

![Diagram of VNC1L – A – Cover Tape Vendor Part No. AA13305NP]

Figure 23.1 – VNC1L – A – Cover Tape Vendor Part No. AA13305NP
24  VNC1L – A – Carrier Tape Vendor Part No. Q07X07-A

Figure 24.1 – VNC1L – A – Carrier Tape Vendor Part No. Q07X07-A
25 FT311D-32L1C, FT312D-32L1C, VNC2-32L1C – LQFP Reel Dimensions

Figure 25.1 – FT311D-32L1C, FT312D-32L1C, VNC2-32L1C – LQFP Reel Dimensions
26 FT311D-32L1C, FT312D-32L1C, VNC2-32L1C – LQFP Carrier Tape Dimensions

Figure 26.1 - FT311D-32L1C, FT312D-32L1C, VNC2-32L1C – LQFP Carrier Tape Dimensions
27 VNC2-48L1C, FT232H – LQFP Reel Dimensions

Figure 27.1 - VNC2-48L1C, FT232H – LQFP Reel Dimensions
28  VNC2-48L1C, FT232HL – LQFP Carrier Tape Dimensions

Figure 28.1 - VNC2-48L1C, FT232HL – LQFP Carrier Tape Dimensions

Figure 29.1- FT311D-32L1C, FT312D-32L1C, VNC2-32L1C, VNC2-48L1C, FT232HL - LQFP Tray Dimensions
30 FT311D-32Q1C, FT312D-32Q1C, VNC2-32Q1C –QFN Reel Dimensions

Figure 30.1 - FT311D-32Q1C, FT312D-32Q1C, VNC2-32Q1C –QFN Reel Dimensions
31 FT311D-32Q1C, FT312D-32Q1C, VNC2-32Q1C – QFN Carrier Tape Dimensions

Figure 31.1 FT311D-32Q1C, FT312D-32Q1C, VNC2-32Q1C – QFN Carrier Tape Dimensions
32 FT311D-32Q1C, FT312D-32Q1C, VNC2-32Q1C – QFN Tray Dimensions

Pin 1 Identifier

Figure 32.1 FT311D-32Q1C, FT312D-32Q1C, VNC2-32Q1C – QFN Tray Dimensions
33 FT200XD, FT234XD Reel Dimensions

Figure 33.1 FT200XD, FT234XD Reel Dimensions
34 FT200XD, FT234XD Tape Dimensions

Notes:
1. Sprocket hole pitch cumulative tolerance ± 0.2
2. Camber not to exceed ±1mm in 100mm.
4. A0 and Be measured on a plane 0.3mm above the bottom of the socket.
5. Hole measured from a plane of the inside bottom of the socket hole.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.
7. Cover tape width 9.3±0.1mm.

Figure 34.1 FT200XD, FT234XD Tape Dimensions
35 FT201XQ, FT220XQ, FT221XQ, FT230XQ, FT231XQ, FT240XQ QFN Reel Dimensions

Figure 35.1 FT201XQ, FT220XQ, FT221XQ, FT230XQ, FT231XQ, FT240XQ QFN Reel Dimensions
36 FT201XQ, FT220XQ, FT221XQ, FT230XQ, FT231XQ, FT240XQ QFN Tape Dimensions

Notes:
1. Sprocket hole pitch cumulative tolerance ± 0.2
2. Camber not to exceed 1 mm in 100 mm.
4. Ao and Bo measured on a plane 0.3 mm above the bottom of the pocket.
5. Kc measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position tolerance, sprocket hole, pocket, not pocket hole.

Figure 36.1 FT201XQ, FT220XQ, FT221XQ, FT230XQ, FT231XQ, FT240XQ QFN Tape Dimensions
37 FT201XQ, FT220XQ, FT230XQ SSOP Reel Dimensions

Figure 37.1 FT201XQ, FT220XQ, FT230XQ SSOP Reel Dimensions
FT201XQ, FT220XQ, FT230XQ SSOP Tape Dimensions

Notes:
1. 10 sprocket hole pitch cumulative tolerance ± 0.2mm
2. Material: Anti-Static Black Adhesive Polyethylene
3. Camber not to exceed 1mm in 100mm.
4. Ao and Bo measured on a plane 0.3mm above the bottom of the pocket.
5. K1a measured from the top surface of the carrier.
6. Pocket position relative to the sprocket hole measured as true position of pocket, not pocket hole.

Figure 38.1 FT201XQ, FT220XQ, FT230XQ SSOP Tape Dimensions
39 FT221XQ, FT231XQ, FT240XQ SSOP Reel Dimensions

Figure 39.1 FT221XQ, FT231XQ, FT240XQ SSOP Reel Dimensions
40 FT221XQ, FT231XQ, FT240XQ SSOP Tape Dimensions

Notes:
1. Sprocket hole pitch cumulative tolerance ± 0.2
2. Camber not to exceed 1mm in 100mm.
4. Aa and Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from the top surface of the corner.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

Figure 40.1 FT221XQ, FT231XQ, FT240XQ SSOP Tape Dimensions
41 FT120T TSSOP Reel Dimensions

Figure 41.1 FT120T TSSOP Reel Dimensions
42 FT120T TSSOP Tape Dimensions

Figure 42.1 FT120T TSSOP Tape Dimensions
43 FT120Q Reel Dimensions

Figure 43.1 FT120Q Reel Dimensions
44 FT120Q QFN Tape Dimensions

Figure 44.1 FT120Q QFN Tape Dimensions
45 FT201XS, FT220XS, FT230XS, FT240XS Reel Dimensions

![Diagram of FT201XS, FT220XS, FT230XS, FT240XS Reel Dimensions]

Figure 45.1 FT201XS, FT220XS, FT230XS, FT240XS Reel Dimensions
46  FT221XS, FT231XS Reel Dimensions

Figure 46.1 FT221XS, FT231XS Reel Dimensions
47 FT231XS Tube Dimensions

Figure 47.1 FT231XS Tube Dimensions
48 FT313H-QFN Reel Dimensions

Figure 48.1 FT313H-QFN Reel Dimensions
49  FT313H-QFN Tape Dimensions

Notes:
1. Center hole drill cumulative tolerance ± 0.2
2. Center hole not drilled term 0.5mm to 1.0mm
3. Material: Black Adhesive Polyethylene
4. Aa and Bb measured on a plane 0.5mm above
5. the bottom of the pocket to the top surface of the carrier
6. Pocket position relates to top surface of pocket, not pocket hole.

Pin 1 Identifier

Figure 49.1 FT313H-QFN Tape Dimensions
50  FT313H-LQFP Reel Dimensions

Figure 50.1 FT313H-LQFP Reel Dimensions
51  FT313H-LQFP Tape Dimensions

**Figure 51.1 FT313H-LQFP Tape Dimensions**
52 FT313H-TQFP Reel Dimensions

Figure 52.1 FT313H-TQFP Reel Dimensions
53 FT313H-TQFP Tape Dimensions

NOTES:
1. SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ±0.2
2. CAMBER IN COMPLIANCE WITH EA 481
3. POCKET POSITION RELATIVE TO SPROCKET HOLE MEASURED AS TRUE POSITION OF POCKET, NOT POCKET HOLE
4. COVER TAPE WIDTH: 13±0.1

Figure 53.1 FT313H-TQFP Tape Dimensions
54 FT600Q Reel Dimensions

Figure 54.1 FT600Q Reel Dimensions
55 FT600Q Tape Dimensions

Figure 55.1 FT600Q Tape Dimensions
56  FT601Q, FT602Q Reel Dimensions

Figure 56.1 FT601Q, FT602Q Reel Dimensions
57 FT601Q, FT602Q Tape Dimensions

Notes:
1. 10 screw hole pitch cumulative tolerance ± 0.2
2. Camber: Check to meet 1mm in 1000mm.
4. Molded-in: Tolerance a: 0.005mm above the pocket to the edge of the package surface of the carton.
5. Pin 1 Identifier:

Figure 57.1 FT601Q, FT602Q Tape Dimensions
58  FT4222HQ Reel Dimensions

Figure 58.1 FT4222HQ Reel Dimensions
59  FT4222HQ Tape Dimensions

Notes:
1. 10 sprocket hole pitch cumulative tolerance ± 0.2
2. Camber: Black Advantek Polyethylene
3. Alloy: Black Advantage Polyethylene
4. Pin 1 identifier
5. Pocket position relative to sprocket hole measured from plane of the inside bottom of pocket
6. Pocket from edge of tape:

Figure 59.1 FT4222HQ Tape Dimensions
60 FT4222HQ Tray Dimensions

**NOTES:**
1. USE CHIPS MEANS SURFACE ELECTRIC RESISTIVITY OF THE TRAY.
2. THE MOLDED TRAYS MATERIAL SHALL BE RIGID ENOUGH TO AVOID DAMAGE TO THE COMPONENTS DURING SHIPPING AND HANDLING TESTING.
3. TRAYS ARE STICKABLE WITHOUT INTERFERENCE AND WILL NOT SHIP TOGETHER DURING HANDLING.
4. WARPING IS WITHIN Tolerance (allowance).
5. THE CELLS WERE MARKED WITH A CROSS SYMBOL.
6. TOTAL LABLE CELLS VOLUME 100%. 
7. ALL DIMENSIONS ARE IN MILLIMETERS.

**SECTION A (A1)**

**Figure 60.1 FT4222HQ Tape Dimensions**
61  Contact Information

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Appendix A – References

Document References

NA

Acronyms and Abbreviations

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<td>QFN</td>
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<td>Think Shrink Small Outline Package</td>
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<td>Added the VNC2 tray and T&amp;R dimensions drawings</td>
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<td>Updated VNC2 tray dimensions drawings</td>
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<td>Added pin 1 identifier to tapes</td>
<td>2011-02-17</td>
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<td>Added FT232H tape/reel /tray dimensions</td>
<td>2011-11-07</td>
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<td>1.5</td>
<td>Add Reel &amp; Tape information of FTX series chips, FT12 series chips, FT311D and FT313H ; Updated contacts page ;</td>
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<td>Added section FT231XS tube dimension; Added FT234XD tape and reel (same as FT200XD); Added FT200XD, FT234XD pin 1 identifier; Added FT600Q, FT601Q and FT602Q</td>
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<td>Added Reel &amp; Tape information for FT4222HQ</td>
<td>2017-11-02</td>
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<td>Added Pin 1 identifier for FT4222HQ</td>
<td>2018-05-08</td>
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<td>Correction Pin 1 identifier for FT200XD &amp; FT234XD</td>
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