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CHAPTER 4 DRAWINGS

Tray Drawings

Carrier Tape Drawings

Tube Drawings
TRAY DRAWINGS
Dimensional drawings are available for each tray used in the shipment of Spansion products and are found beginning on page 4-3.

Consult your Spansion sales representative for additional information about the trays used with Spansion products.
Plastic Quad Flat Package: PQR 080 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Plastic Quad Flat Package: PQR 080 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.
Shrink Small Outline Package: SSO 056 (sheet 1 of 2)

Notes:
1 All dimensions are in millimeters.

(See next page for detailed views)
Shrink Small Outline Package: SSO 056 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.
Small Outline Package: SOA 008 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Small Outline Package: SOA 008 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.
Notes:
1 All dimensions are in millimeters.

(See next page for detailed views)
Small Outline Package: SOC 008 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.

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Small Outline Package: SO 044 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Notes:
1. All dimensions are in millimeters.
Small Outline Package: SL3 016, SO3 016, SS3 016 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Small Outline Package: SL3 016, SO3 016, SS3 016 (sheet 2 of 2)

Notes:
1 All dimensions are in millimeters.
Thin Small Outline Package: TS, TSR 032 (Type 1) (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Thin Small Outline Package: TS, TSR 032 (Type 1) (sheet 2 of 2)

Notes:
1 All dimensions are in millimeters.

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Notes:
1 All dimensions are in millimeters.

(See next page for detailed views)
Thin Small Outline Package: TS, TSR 040 (Type 1) (sheet 2 of 2)

Notes:
1 All dimensions are in millimeters.

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Thin Small Outline Package: T2, T2R 044 (040) (Type 2) (sheet 1 of 2)

Notes:

1. All dimensions are in millimeters.

(See next page for detailed views)
Chapter 4 Drawings

Thin Small Outline Package: T2, T2R 044 (040) (Type 2) (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.
Thin Small Outline Package: T2A 050 (Type 2) (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Thin Small Outline Package: T2A 050 (Type 2) (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.
Thin Small Outline Package: TS, TSR, TS2 048 (Type 1) (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Thin Small Outline Package: TS, TSR, TS2 048 (Type 1) (sheet 2 of 2)

Notes:
1 All dimensions are in millimeters.
Thin Small Outline Package: TS, TSR 056 (Type 1) (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Thin Small Outline Package: TS, TSR 056 (Type 1) (sheet 2 of 2)

Notes:
1  All dimensions are in millimeters.
Ultra Thin Small Outline No Lead Package: UNE 008 (sheet 1 of 2)

Notes:
1 All dimensions are in millimeters.

See next page for detailed views
Ultra Thin Small Outline No Lead Package: UNE 008 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.
Very Very Thin Small Outline No Lead Package: WND 008 (sheet 1 of 2)

Notes:
1 All dimensions are in millimeters.

(See next page for detailed views)
Very Very Thin Small Outline No Lead Package: WND 008 (sheet 2 of 2)

Notes:
1 All dimensions are in millimeters.
Very Very Thin Small Outline No Lead Package: WNF 008, WNG008, WNH 008

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Very Very Thin Small Outline No Lead Package: WNF 008, WNG 008, WNH 008 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.
Very Thin Quad Flat No Lead Package: VQA 024 (sheet 1 of 2)

Notes:
1 All dimensions are in millimeters.

(See next page for detailed views)
**Very Thin Quad Flat No Lead Package: VQA 024 (sheet 2 of 2)**

Notes:
1. All dimensions are in millimeters
Notes:
1. All dimensions are in millimeters.
Ball Grid Array: FAA 064 (sheet 1 of 2)

VACUUM PICKUP CELLS 10 PLACES

(See next page for detailed views)

Notes:
1. All dimensions are in millimeters.
Ball Grid Array: FAA 064 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.
Ball Grid Array: FAB 024, FAC 024, ZSA 024, FBA 048, TLF 048, VBF048, VBK 048 (sheet 1 of 2)

Notes:
1 All dimensions are in millimeters.
Ball Grid Array: FAB 024, FAC 024, ZSA 024, FBA 048, TLF 048, VBF048, VBK 048 (sheet 2 of 2)

**Notes:**
1. All dimensions are in millimeters.
Ball Grid Array: FBB 048 (sheet 1 of 2)

Notes:
1 All dimensions are in millimeters.
Ball Grid Array: FBB 048 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.
Ball Grid Array: FBC 048, VBD 064, VBJ 064 (sheet 1 of 2)

Notes:
1 All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: FBC 048, VBD 64, VBJ 064 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.
Ball Grid Array: FBD 048 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Notes:
1. All dimensions are in millimeters.
Ball Grid Array: FBD 063 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Notes:
1. All dimensions are in millimeters.
Ball Grid Array: FBE 040  (sheet 1 of 2)

Notes:
1 All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: FBE 040 (sheet 2 of 2)

**Detail E**

- **DAEWON**
- FBGA 8X15 / FBE 040
- 125°C BAKE / 140°C MAX
- TEMPERATURE RATING BLOCK
- DAEWON PART NO.
- RECYCLING LOGO

**Detail F**

- 16.53-40°/S
- 6.80-10°/S
- 3.80+10°/S
- 1.45±0.10
- 1.30±0.10
- 0.30±0.10
- 3.11
- 1.15
- 4.51
- 3.11
- 1.15
- 4.51

**Detail J**

- 3.35-5°/S
- 1.15
- 4.51

**Detail K**

- 40°
- 0.70
- 3.35-5°/S

**Detail L**

- 3.35-5°/S
- 1.15
- 4.51
- 40°

**Section A-A**

- 5.50+10°/S
- 5.00-10°/S
- 12.00-7°/S

**Section B-B**

- 8.15±0.10
- 5.80-7°/S
- 9.53-40°/S
- 2.00-7°/S

**Section I**

- MPSU 128-0815-D13
- MADE IN KOREA

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Ball Grid Array: FDD 047 (sheet 1 of 2)

Notes:
1 All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: FDD 047 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Notes:
1 All dimensions are in millimeters.

(See next page for detailed views)
Notes:
1. All dimensions are in millimeters.
Ball Grid Array: VCA 056 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

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Ball Grid Array: FBE 063, FSA 063, FSD 063, FBE 080, VBC 080, FBF 084 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Notes:
1 All dimensions are in millimeters.

Ball Grid Array: FBE 063, FSA 063, FSD 063, FBE 080, VBC 080, FBF 084 (sheet 2 of 2)
Notes:
1 All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: NLD 044, RLA 044, VDE 044, VDJ 044, RLA 056, RSD 056

Notes:
1 All dimensions are in millimeters.
Ball Grid Array: VBN 048, FMH 107 (sheet 1 of 2)

Notes:
1 All dimensions are in millimeters.

(See next page for detailed views)
Notes:
1 All dimensions are in millimeters.
Ball Grid Array: VDF 048, FMC 104 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: VDF 048, FMC 104 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.

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Ball Grid Array: VCC 056 (sheet 1 of 2)

All dimensions are in millimeters.

(See next page for detailed views)
Notes:

1. All dimensions are in millimeters.
Ball Grid Array: VBB 080, FTD 088, VBB 088 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: VBE 088, VBS 088 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: VBE 088, VBS 088 (sheet 2 of 2)

Notes:
1 All dimensions are in millimeters.
Ball Grid Array: FLA 069, VBG 080, FEC 088, FEE 088, TLE 088, TSA 088, VBG 088, VBL 088 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: FLA 069, VBG 080, FEC 088, FEE 088, TLE 088, TSA 088, VBG 088, VBL 088 (sheet 2 of 2)

Notes:
1 All dimensions are in millimeters.
Ball Grid Array: TLA 064, TSB 064, VBH 064, TLA 067, FLB 073, FLJ 073, FMD 073, FSB 073 FSC 073, FTA 073, TLA 073, FEB 084, FFB 084, FTA 084, TLA 084, TSB 084, TTA 084, VBH 084, VSA 084, FTA 088, FLB 093, TLA 093 (sheet 1 of 2)

Notes:
1 All dimensions are in millimeters.

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Ball Grid Array: TLA 064, TSB 064, VBH 064, TLA 067, FLB 073, FLJ 073, FMD 073, FSB 073 FSC 073, FTA 073, TLA 073, FEB 084, FFB 084, FTA 084, TLA 084, TSB 084, TTA 084, VBH 084, VSA 084, FTA 088, FLB 093, TLA 093 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.

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Ball Grid Array: FLK 073, FMB 073, FTE 073, FVC 093, FMB 104, FFC 115, FFD 115, FMB 115, FPB 115, FTE 115, FTL 115, BFA 188, BNB 188 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: FLK 073, FMB 073, FTE 073, FVC 093, FMB 104, FFC 115, FFD 115, FMB 115, FPB 115, FTE 115, FTL 115, BFA 188, BNB 188 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.
Ball Grid Array: LAA 064, LSA 064, LSE 064, LIA 064, LSH 064, LSF 064, LSG 064, LAA 080, LSB 080, MMB 112, FND 115, FTM 115, TMB 115, FIB 137, FJA 137, FMI 137, FND 137, FTM 137, FVE 137, FWC 137, FWD 137, TLK 137, TMB 137, T3A 137

VBP 137 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: LAA 064, LSA 064, LSE 064, LIA 064, LSH 064, LSF 064, LSG 064, LAA 080, LSB 080, MMB 112, FND 115, FTM 115, TMB 115, FIB 137, FJA 137, FMI 137, FND 137, FTM 137, FVE 137, FWC 137, FWD 137, TLK 137, TMB 137, T3A 137, VBP 137 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.
Ball Grid Array: LAB 080 (sheet 1 of 2)

Notes:
1 All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: LAB 080 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.
Notes:
1. All dimensions are in millimeters.
Ball Grid Array: LAC 064, LSC 080 (sheet 2 of 2)

Notes:
1 All dimensions are in millimeters.
Ball Grid Array: TLB 069, TLB 088, TSE 088, TLB 089 (sheet 1 of 2)

Notes:
1 All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: TLB 069, TLB 088, TSE 088, TLB 089 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.
Ball Grid Array: ALD 128, ALF 128, ALG 128, ALJ 128, AMB 128, ASC 128, ASF 128 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: ALD 128, ALF 128, ALG 128, ALJ 128, AMB 128, ASC 128, ASF 128 (sheet 2 of 2)

Notes:
1 All dimensions are in millimeters.
Ball Grid Array: NLB 044, NSB 044, VDA 044, VDD 044, NLB 056, NSB 056, NSD 056, VDD 064, VDH 064 (sheet 2 of 2)

Notes:
1) All dimensions are in millimeters.

(See next page for detailed views)
Notes:
1 All dimensions are in millimeters.
Ball Grid Array: RSB 044, VDL 044, RLF 052, RSB 052 (sheet 1 of 2)

SECTION "X-X" SECTION "Y-Y"
TRAY STACKING DETAIL

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: RSB 044, VDL 044, RLF 052, RSB 052 (sheet 2 of 2)

Notes:
1 All dimensions are in millimeters.
Ball Grid Array: VCB 048, VCD 056, VCE 056 (sheet 1 of 2)

Notes:
1 All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: VCB 048, VCD 056, VCE 056 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.

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Ball Grid Array: VBW 055, NSE 056, TSE 064, TSE 107, TLB 107, VLB 107, VSB 107 (sheet 1 of 2)

Notes:
1 All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: VBW 055, NSE 056, TSE 064, TSE 107, TLB 107, VLB 107, VSB 107 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.

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Ball Grid Array: TLM 137, TSH 137 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: TLM 137, TSH 137 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.
Ball Grid Array: FDE 048, NLA 048, NSA 048, VDC 048, NLA 060, RLD 133, RLE 133, MTA 133, NLC 133 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.
Ball Grid Array: FDE 048, NLA 048, NSA 048, VDC 048, NLA 060, RLD 133, RLE 133, MTA 133, NLC 133 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.
Ball Grid Array: TLC 056, TSC 056, VBU 056, TLC 080, TSC 080, VBR 080

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Notes:

1 All dimensions are in millimeters.
Ball Grid Array: LAE 064 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: LAE 064 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.
Ball Grid Array: NLE 133, NSC 133, RLB 133, RSC 133 (sheet 1 of 2)

Notes:
1 All dimensions are in millimeters.

(See next page for detailed views)
Notes:
1. All dimensions are in millimeters.
Ball Grid Array: ALH 160, AMA 160, ASE 160, ATA 160, BTA 160, BWA 160, BWB 160 (sheet 1 of 2)

Notes:
1 All dimensions are in millimeters.

Notes:
1. All dimensions are in millimeters.
Ball Grid Array: TLD 064, FEA 084, FED 084, FFA 084, FIA 084, FMC 084, FTF 084, FTI 084, TLD 084, TMA 084, TSD 084, FWA 084, FLL 096, FEA 104, FMC 107, FFA 115, FIA 115, FOA 115, FTF 115, FTG 115, FUB 115, FWA 115, FEA 137, FMC 137, FTF 137, TLD 137, TSD 137

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array:  TLD 064, FEA 084, FED 084, FFA 084, FIA 084, FMC 084, FTF 084, FTI 084, TLD 084, TMA 084, TSD 084, FWA 084, FLL 096, FEA 104, FMC 107, FFA 115, FMC 115, FOA 115, FTF 115, FTG 115, FUB 115, FWA 115, FEA 137, FMC 137, FTF 137, TLD 137, TSD 137 (sheet 2 of 2)

Notes:
1  All dimensions are in millimeters.

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Ball Grid Array: VBM 063, VLD 063, LAD 080, FEF 103, FLG 103, FME 103, FTJ 103, TLI 103, TSG 103, ASH 165 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: VBM 063, VLD 063, LAD 080, FEF 103, FLG 103, FME 103, FTJ 103, TLI 103, TSG 103, ASH 165 (sheet 2 of 2)

Notes:
1 All dimensions are in millimeters.
Ball Grid Array: FTK 107, TLH 107 (sheet 1 of 2)

Notes:
1 All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: FTK 107, TLH 107 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.
Ball Grid Array: PIA 107, PNA 107 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
**Notes:**

1. All dimensions are in millimeters.
Chapter 4 Drawings

Ball Grid Array: ASA 137 (sheet 1 of 2)

Notes:
1 All dimensions are in millimeters.

(See next page for detailed views)
Notes:
1. All dimensions are in millimeters.
Ball Grid Array: WZA 052 (sheet 1 of 2)

Notes:
1 All dimensions are in millimeters.

(See next page for detailed views)
Notes:
1. All dimensions are in millimeters.
Ball Grid Array: VBY 181, ASB 220 (sheet 1 of 4)

**OPTION 1**

![Diagram of Ball Grid Array]

**Notes:**
1. All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: VBY 181, ASB 220 (sheet 2 of 4)

Notes:
1. All dimensions are in millimeters.
Ball Grid Array: VBY 181, ASB 220 (sheet 3 of 4)

**Option 2**

**Vacuum Pickup Cells**
- 6 places (4 center cells, 2 side cells)
- 4 places
- 10 places

**Closed Cells**
- 4 places

Dimensions:
- Width: 315.0 mm
- Height: 315.0 mm
- Bumps:
  - 10 places
  - 40.25 mm
  - 135.9 mm

**Notes:**
1. All dimensions are in millimeters.

(See next page for detailed views)
Notes:
1  All dimensions are in millimeters.
Ball Grid Array: ALK 202, BNA 202 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: ALK 202, BNA 202 (sheet 2 of 2)

Notes:
1. All dimensions are in millimeters.
Chapter 4 Drawings

Ball Grid Array: ASD 188, BEA 188 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)

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Ball Grid Array: ASD 188, BEA 188 (sheet 2 of 2)

Notes:
1 All dimensions are in millimeters.
Ball Grid Array: VBV 138, TLJ 138 (sheet 1 of 2)

Notes:
1. All dimensions are in millimeters.

(See next page for detailed views)
Ball Grid Array: VBV 138, TLJ 138 (sheet 2 of 2)

Notes:
1 All dimensions are in millimeters
CARRIER TAPE DRAWINGS
Dimensional drawings are available for each carrier tape used in the shipment of Spansion products and are found beginning on page 4-129.
Consult your Spansion sales representative for additional information about the carrier tape used with Spansion products.
Chapter 4 Drawings

Ball Grid Array: FAB 024, FAC 024, ZSA 024

Notes:
1 All dimensions are in millimeters (* denotes critical dimension).
2 10 sprocket hole pitch cumulative tolerance ±0.2.
3 Camber not to exceed 1 mm in 100 mm.
4 Tolerances are .X = ±0.2 mm, .XX = ±0.1 mm, unless otherwise specified.

Ball Grid Array: FBE 040

Notes:
1 All dimensions are in millimeters (* denotes critical dimension).
2 10 sprocket hole pitch cumulative tolerance ±0.2.
3 Camber not to exceed 1 mm in 100 mm.
4 Tolerances are .X = ±0.2 mm, .XX = ±0.1 mm, unless otherwise specified.
Ball Grid Array: NLB 044, VDD 044, NLB 056, NSB 044, NSB 056, NSD 056, VDD 064, VDH 064

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch cumulative tolerance ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ±0.2 mm, .XX = ±0.1 mm, unless otherwise specified.

Ball Grid Array: NLD 044, RLA 044, VDJ 044, VDE 044, NLD 056, NSD 056, RLA 056, RSD 056

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch cumulative tolerance ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ±0.2 mm, .XX = ±0.1 mm, unless otherwise specified.
Ball Grid Array: RSB 044, VDL 044, RLF 052, RSB 052

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. 10 sprocket hole pitch cumulative tolerance ±0.2.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ± 0.2 mm, .XX = ±0.1 mm, unless otherwise specified.

Ball Grid Array: VDA 044

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. 10 sprocket hole pitch cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ± 0.2 mm, .XX = ±0.1 mm, unless otherwise specified.
**Ball Grid Array: FDD 047**

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. 10 sprocket hole pitch cumulative tolerance ±0.2.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ± 0.2 mm, .XX = ±0.1 mm, unless otherwise specified.

**Ball Grid Array: FBA 048, VBF 048, VBK 048**

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch has a cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ± 0.2 mm, .XX = ±0.1 mm, unless otherwise specified.
**Ball Grid Array: FBB 048**

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch has a cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ± 0.2 mm, .XX = ±0.1 mm, unless otherwise specified.

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**Ball Grid Array: FBC 048, VCE 056, VCD 056, VBD 064, VBJ 064**

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch has a cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ± 0.2 mm, .XX = ±0.1 mm, unless otherwise specified.
Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch has a cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ±0.2 mm, .XX = ±0.1 mm, unless otherwise specified.
Ball Grid Array: TLF 048

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch has a cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ±0.2 mm, .XX = ±0.1 mm, unless otherwise specified.

Ball Grid Array: VBN 048

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch has a cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ±0.2 mm, .XX = ±0.1 mm, unless otherwise specified.
Ball Grid Array: VCB 048

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. 10 sprocket hole pitch cumulative tolerance ±0.2.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ± 0.2 mm, .XX = ±0.1 mm, unless otherwise specified.

Ball Grid Array: VDF 048

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch has a cumulative tolerance of ±0.2.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ± 0.2 mm, .XX = ±0.1 mm, unless otherwise specified.
Ball Grid Array: UDA 048, VDG 048, RLG 052, RSE 052

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch has a cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ± 0.2 mm, .XX = ±0.1 mm, unless otherwise specified.

Ball Grid Array: WZA 052

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ± 0.2 mm, .XX = ±0.1 mm, unless otherwise specified.
Ball Grid Array: TLC 056, TLC 080, TSC 056, VBU 056, TSC 080, VBR 080

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ±0.2 mm, .XX = ±0.1 mm, unless otherwise specified.

Ball Grid Array: VCA 056

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch cumulative tolerance ±0.2.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ± 0.2 mm, .XX = ±0.1 mm, unless otherwise specified.
Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. 10 sprocket hole pitch cumulative tolerance ±0.2.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ± 0.2 mm, .XX = ± 0.1 mm, unless otherwise specified.

Ball Grid Array: VCC 056

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. 10 sprocket hole pitch cumulative tolerance ±0.2.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ± 0.2 mm, .XX = ± 0.1 mm, unless otherwise specified.

Ball Grid Array: FBD 063
Ball Grid Array: FBE 063, FSA 063, FSD 063, FBE 080, VBC 080, FBF 084

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ±0.2 mm, .XX = ±0.1 mm, unless otherwise specified.

Ball Grid Array: FAA 064

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ±0.2 mm, .XX = ±0.1 mm, unless otherwise specified.
Notes:
1 All dimensions are in millimeters (* denotes critical dimension).
2 Ten sprocket hole pitch cumulative tolerance of ±0.2 mm.
3 Camber not to exceed 1 mm in 100 mm.
4 Tolerances are .XX = ± 0.1 mm, unless otherwise specified.

Notes:
1 All dimensions are in millimeters (* denotes critical dimension).
2 Ten sprocket hole pitch cumulative tolerance of ±0.2 mm.
3 Camber not to exceed 1 mm in 100 mm.
4 Tolerances are $X = \pm 0.2\,\text{mm}$, $XX = \pm 0.1\,\text{mm}$, unless otherwise specified.

**Ball Grid Array:** TLA 064, TSB 064, VBH 064, TLA 067, FLB 073, FLJ 073, FMD 073, FSB 073, FSC 073, TLA 073, FEB 084, FFB 084, FTA 084, TLA 084, TSB 084, TTA 084, VBH 084, VSA 084, FTA 088, FLB 093, TLA 093

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch cumulative tolerance of $\pm 0.2\,\text{mm}$.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are $X = \pm 0.2\,\text{mm}$, $XX = \pm 0.1\,\text{mm}$, unless otherwise specified.

**Ball Grid Array:** FLA 069, VBG 080, FEC 088, FEE 088, TSA 088, TLE 088, VBG 088, VBL 088, ASA 137

Notes:
1. All dimensions are in millimeters (* denotes critical dimension). This tape is the 24-mm size.
2. Ten sprocket hole pitch cumulative tolerance of $\pm 0.2\,\text{mm}$.
3. Camber not to exceed 1 mm in 100 mm.
4  Tolerance is ±0.1 mm unless otherwise specified.

Ball Grid Array:  VBW 055, NSE 056, TSE 064, TLB 069, TLB 088, TSE 088, TLB 089, TLB 107, TSE 107, VSB 107

Notes:
1  All dimensions are in millimeters (* denotes critical dimension).
2  Tens sprocket hole pitch cumulative tolerance of ±0.2 mm.
3  Camber not to exceed 1 mm in 100 mm.
4  Tolerances are .X = ± 0.2 mm, .XX = ± 0.1 mm, unless otherwise specified.

Ball Grid Array:  FLK 073, FMB 073, FTE 073, FVC 093, FMB 104, FFC 115, FFD 115, FMB 115, FPB 115, FTE 115, FTL 115, BFA 188, BNB 188

Notes:
1  All dimensions are in millimeters (* denotes critical dimension).
2  Tens sprocket hole pitch cumulative tolerance of ±0.2 mm.
3  Camber not to exceed 1 mm in 100 mm.
4 Tolerances are $X = \pm 0.2$ mm, $XX = \pm 0.1$ mm, unless otherwise specified.

**Ball Grid Array: LAE 064**

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Camber not to exceed 1 mm in 100 mm.
3. Tolerances are $X = \pm 0.2$ mm, $XX = \pm 0.1$ mm, unless otherwise specified.

**Ball Grid Array: LAB 080**

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch cumulative tolerance of $\pm 0.2$ mm.
3. Camber not to exceed 1 mm in 100 mm.
4 Tolerances are $X = \pm 0.2$ mm, $XX = \pm 0.1$ mm, unless otherwise specified.

**Ball Grid Array: LAC 064, LSC 080**

Notes:
1 All dimensions are in millimeters (* denotes critical dimension).
2 Ten sprocket hole pitch cumulative tolerance of ±0.2 mm.
3 Camber not to exceed 1 mm in 100 mm.
4 Tolerances are $X = \pm 0.2$ mm, $XX = \pm 0.1$ mm, unless otherwise specified.

**Ball Grid Array: VBE 088, VBS 088**

Notes:
1 All dimensions are in millimeters (* denotes critical dimension).
2 Ten sprocket hole pitch cumulative tolerance of ±0.2 mm.
3 Camber not to exceed 1 mm in 100 mm.
4 Tolerances are $X = \pm 0.2$ mm, $XX = \pm 0.1$ mm, unless otherwise specified.
Ball Grid Array: VLD 063, VBM 063, LAD 080, FEF 103, FLG 103, FME 103, FTJ 103, TLI 103, TSG 103, ASH 165

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ±0.2 mm, .XX = ±0.1 mm, unless otherwise specified.

FTK 107, TLH 107

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch cumulative tolerance of ±0.2.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ±0.2 mm, .XX = ±0.1 mm, unless otherwise specified.
Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ± 0.2 mm, .XX = ± 0.1 mm, unless otherwise specified.

Ball Grid Array: ALD 128, ALF 128, ALG 128, ALJ 128, AMB 128, ASC 128, ASF 128, VBY 181, ASB 220
4. Tolerances are \( X = \pm 0.2 \) mm, \( XX = \pm 0.1 \) mm, unless otherwise specified.

**Ball Grid Array: NLE 133, NSC 133, RLB 133, RSC 133**

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are \( X = \pm 0.2 \) mm, \( XX = \pm 0.1 \) mm, unless otherwise specified.

**Ball Grid Array: VBB 080, FTD 088, VBB 088, TLM 137, TSH 137**

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are \( X = \pm 0.2 \) mm, \( XX = \pm 0.1 \) mm, unless otherwise specified.
Ball Grid Array: TLJ 138, VBV 138

Notes:
1 All dimensions are in millimeters (* denotes critical dimension).
2 Ten sprocket hole pitch cumulative tolerance of ±0.2 mm.
3 Camber not to exceed 1 mm in 100 mm.
4 Tolerances are .X = ± 0.2 mm, .XX = ± 0.1 mm, unless otherwise specified.

Ball Grid Array: , ALH 160, AMA 160, ASE 160, ATA 160, BTA 160, BWB 160

Notes:
1 All dimensions are in millimeters (* denotes critical dimension).
2 Ten sprocket hole pitch cumulative tolerance of ±0.2 mm.
3 Camber not to exceed 1 mm in 100 mm.
4 Tolerances are .X = ± 0.2 mm, .XX = ± 0.1 mm, unless otherwise specified.
Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ± 0.2 mm, .XX = ± 0.1 mm, unless otherwise specified.

Ball Grid Array: ALK 202, BNA 202

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ± 0.2 mm, .XX = ± 0.1 mm, unless otherwise specified.
Ultra Thin Small Outline No Lead Package: UNE 008

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch has a cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ±0.2 mm, .XX = ±0.1 mm, unless otherwise specified.

Very Very Thin Small Outline No Lead Package: WND 008

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch has a cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ±0.2 mm, .XX = ±0.1 mm, unless otherwise specified.
Very Very Thin Small Outline No Lead Package: WNF 008, WNG 008, WNH 008

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch has a cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ± 0.2 mm, .XX = ±0.1 mm, unless otherwise specified.

Very Thin Quad Flat No Lead Package: VQA 024

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch has a cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ± 0.2 mm, .XX = ±0.1 mm, unless otherwise specified.
Plastic Leaded Chip Carrier: PL 032

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. 10 sprocket hole pitch cumulative tolerance is ±0.2 mm.
3. Camber will not exceed 1 mm per 100 mm.
4. Tolerances are ±0.1 mm unless otherwise specified.

Plastic Quad Flat Package: PQR 080

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. 10 sprocket hole pitch cumulative tolerance is ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ±0.2 mm, .XX = ±0.1 mm, unless otherwise specified.
Shrink Small Outline Package: SSO 056

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. The camber will not exceed 1 mm per 100 mm.
3. Tolerance is ±0.1 mm unless otherwise specified.

Small Outline Package: SO 044

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. 50-sprocket hole pitch is 200 ± 0.3 mm.
3. Tolerance is ±0.2 mm unless otherwise specified.
Small Outline Package: SOA 008

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ± 0.2 mm, .XX = ±0.1 mm, unless otherwise specified.

Small Outline Package: SOC 008

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ± 0.2 mm, .XX = ±0.1 mm, unless otherwise specified.
Small Outline Package: SL3 016, SO3 016, SS3016

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch cumulative tolerance of ±0.2 mm.
3. Camber not to exceed 1 mm in 100 mm.
4. Tolerances are .X = ±0.2 mm, .XX = ±0.1 mm, unless otherwise specified.

Thin Small Outline Package: TS/TSR 032 (Type 1)

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. Ten sprocket hole pitch cumulative tolerance of ±0.2 mm.
3. The camber will not exceed 1 mm per 100 mm.
4. Tolerances are .X = ±0.2 mm, .XX = ±0.1 mm, unless otherwise specified.
Thin Small Outline Package: TS/TSR 040 (Type 1)

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. 10 sprocket hole pitch cumulative tolerance is ±0.2.
3. The camber will not exceed 1 mm per 100 mm.
4. Tolerance is ±0.1 mm unless otherwise specified.

Thin Small Outline Package: T2/T2R 044 (040) (Type 2)

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. 10 sprocket hole pitch cumulative tolerance is ±0.2.
3. The camber will not exceed 1 mm per 100 mm.
4. Tolerance is ±0.1 mm unless otherwise specified.
Thin Small Outline Package: TS/TSR 048, TS2 048 (Type 1)

Notes:
1 All dimensions are in millimeters (* denotes critical dimension).
2 10 sprocket hole pitch cumulative tolerance is ±0.2.
3 The camber will not exceed 1 mm per 100 mm.
4 Tolerances are .X = ±0.2 mm, .XX = ±0.1 mm, unless otherwise specified.

Thin Small Outline Package: T2A 050 (Type 2)

Notes:
1 All dimensions are in millimeters (* denotes critical dimension).
2 10 sprocket hole pitch cumulative tolerance is ±0.2.
3 The camber will not exceed 1 mm per 100 mm.
4 Tolerance is ±0.1 mm unless otherwise specified.
Thick Small Outline Package: 56-Lead (Type 1) TS, TSR

Notes:
1. All dimensions are in millimeters (* denotes critical dimension).
2. 10 sprocket hole pitch cumulative tolerance is ±0.2.
3. The camber will not exceed 1 mm per 100 mm.
4. Tolerance is ±0.1 mm unless otherwise specified.
TUBE DRAWINGS
The dimensional drawings, beginning on page 4-161, show the dimensions of the tube for each package family and leadcount, as well as the end-stopper style and dimensions, and the device pin one orientation.
Consult your Spansion sales representative for additional information about the tubes used with Spansion products.
Notes:
1 All dimensions are in inches.
2 Tolerances: ±0.010 inch, unless otherwise stated.
3 If the tube is not fully loaded, a cushion is used to help minimize movement of the packages within the tube.
4 Cushion protrusion not to exceed 0.125 inch from end of tube.
Plastic Leaded Chip Carrier

Notes:
1. All dimensions are in inches.
2. Tolerances: ±0.010 inch, unless otherwise stated.
3. If the tube is not fully loaded, a cushion is used to help minimize movement of the packages within the tube.
Small Outline Package: SO 044

Notes:
1. All dimensions are in inches.
2. Tolerances: ±0.010 inch, unless otherwise stated.
3. If the tube is not fully loaded, a cushion is used to help minimize movement of the packages within the tube.
4. Tube has a single hole at each of its ends.

Small Outline Package: SOA 008

Notes:
1. All dimensions are in inches.
2. Tolerances: ±0.010 inch, unless otherwise stated.
### Small Outline Package: SOC 008

All dimensions are in millimeters. Tolerances: ±0.25 millimeters, unless otherwise stated. If the tube is not fully loaded, a cushion is used to help minimize movement of the packages within the tube.

### Small Outline Package: SL3 016, SO3 016, SS3 016

All dimensions are in inches. Tolerances: ±0.010 inch, unless otherwise stated. If the tube is not fully loaded, a cushion is used to help minimize movement of the packages within the tube.
Ultra Thin Small Outline No Lead Package: UNE 008

Notes:
1 All dimensions are in millimeters.
2 Tolerances: ±0.25 millimeters, unless otherwise stated.
3 If the tube is not fully loaded, a cushion is used to help minimize movement of the packages within the tube.

Very Very Thin Small Outline No Lead Package: WNF 008, WNG 008, WNH 008

Notes:
1 All dimensions are in millimeters.
2 Tolerances: ±0.25 millimeters, unless otherwise stated.
3 If the tube is not fully loaded, a cushion is used to help minimize movement of the packages within the tube.
Very Very Thin Samll Outline No Lead Package: WND 008

Notes:
1. All dimensions are in millimeters.
2. Tolerances: ±0.25 millimeters, unless otherwise stated.
3. If the tube is not fully loaded, a cushion is used to help minimize movement of the packages within the tube.