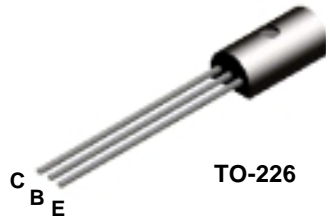
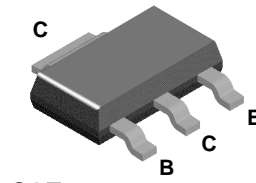


TN6715A



TO-226

NZT6715



SOT-223

NPN General Purpose Amplifier

This device is designed for general purpose medium power amplifiers and switches requiring collector currents to 1.2 A. Sourced from Process 38.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

| Symbol | Parameter | Value | Units |
|-----------------------------------|--|-------------|-------|
| V _{CEO} | Collector-Emitter Voltage | 40 | V |
| V _{CBO} | Collector-Base Voltage | 50 | V |
| V _{EBO} | Emitter-Base Voltage | 5.0 | V |
| I _C | Collector Current - Continuous | 1.5 | A |
| T _J , T _{stg} | Operating and Storage Junction Temperature Range | -55 to +150 | °C |

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:

- 1) These ratings are based on a maximum junction temperature of 150 degrees C.
- 2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics

TA = 25°C unless otherwise noted

| Symbol | Characteristic | Max | | Units |
|------------------|---|---------|----------|-------|
| | | TN6715A | *NZT6715 | |
| P _D | Total Device Dissipation | 1.0 | 1.0 | W |
| | Derate above 25°C | 8.0 | 8.0 | mW/°C |
| R _{θJC} | Thermal Resistance, Junction to Case | 50 | | °C/W |
| R _{θJA} | Thermal Resistance, Junction to Ambient | 125 | 125 | °C/W |

*Device mounted on FR-4 PCB 36 mm X 18 mm X 1.5 mm; mounting pad for the collector lead min. 6 cm².

NPN General Purpose Amplifier

(continued)

TN6715A / NZT6715

Electrical Characteristics

TA = 25°C unless otherwise noted

| Symbol | Parameter | Test Conditions | Min | Max | Units |
|----------------------------|--------------------------------------|--|-----|-----|---------------|
| OFF CHARACTERISTICS | | | | | |
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage* | $I_C = 10 \text{ mA}, I_B = 0$ | 40 | | V |
| $V_{(BR)CBO}$ | Collector-Base Breakdown Voltage | $I_C = 100 \text{ }\mu\text{A}, I_E = 0$ | 50 | | V |
| $V_{(BR)EBO}$ | Emitter-Base Breakdown Voltage | $I_E = 100 \text{ }\mu\text{A}, I_C = 0$ | 5.0 | | V |
| I_{CBO} | Collector-Cutoff Current | $V_{CB} = 50 \text{ V}, I_E = 0$ | | 0.1 | μA |
| I_{EBO} | Emitter-Cutoff Current | $V_{EB} = 5.0 \text{ V}, I_C = 0$ | | 0.1 | μA |

ON CHARACTERISTICS

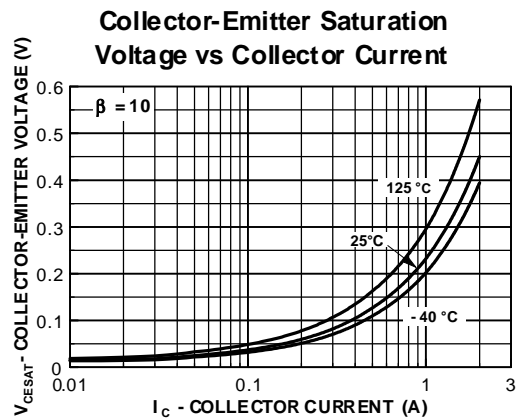
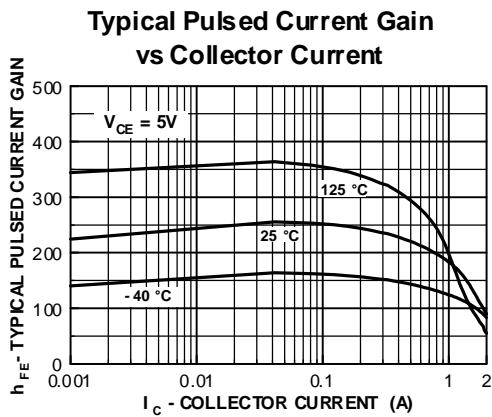
| | | | | | |
|---------------|--------------------------------------|--|----------------|-----|---|
| h_{FE} | DC Current Gain | $I_C = 10 \text{ mA}, V_{CE} = 1.0 \text{ V}$ $I_C = 100 \text{ mA}, V_{CE} = 1.0 \text{ V}$ $I_C = 1.0 \text{ A}, V_{CE} = 1.0 \text{ V}$ | 55 60 50 | | |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $I_C = 1.0 \text{ A}, I_B = 100 \text{ mA}$ | | 0.5 | V |
| $V_{BE(on)}$ | Base-Emitter On Voltage | $I_C = 1.0 \text{ A}, V_{CE} = 1.0 \text{ V}$ | | 1.2 | V |

SMALL SIGNAL CHARACTERISTICS

| | | | | | |
|----------|----------------------------|---|-----|----|----|
| h_{fe} | Small-Signal Current Gain | $I_C = 50 \text{ mA}, V_{CE} = 10 \text{ V},$ $f = 20 \text{ MHz}$ | 2.5 | 20 | |
| C_{cb} | Collector-Base Capacitance | $V_{CB} = 10 \text{ V}, I_E = 0, f = 1.0 \text{ MHz}$ | | 30 | pF |

*Pulse Test: Pulse Width $\leq 300 \text{ }\mu\text{s}$, Duty Cycle $\leq 1.0\%$

Typical Characteristics



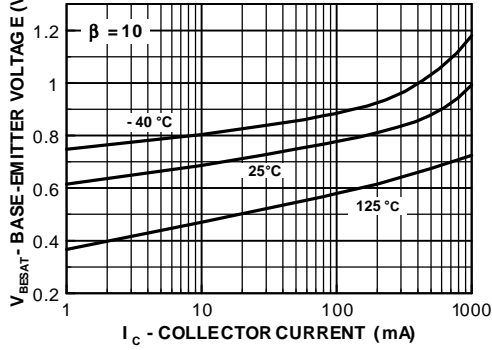
NPN General Purpose Amplifier

(continued)

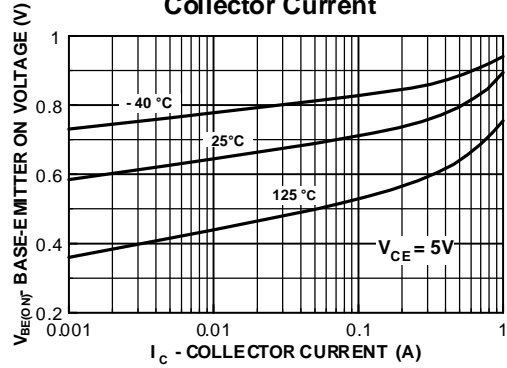
TN6715A / NZT6715

Typical Characteristics (continued)

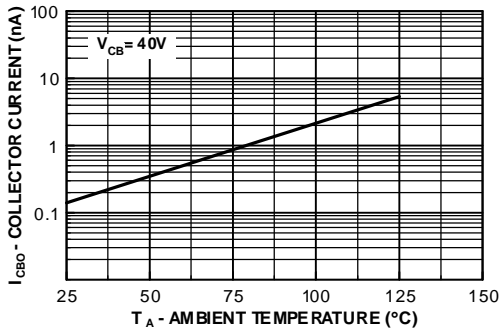
Base-Emitter Saturation Voltage vs Collector Current



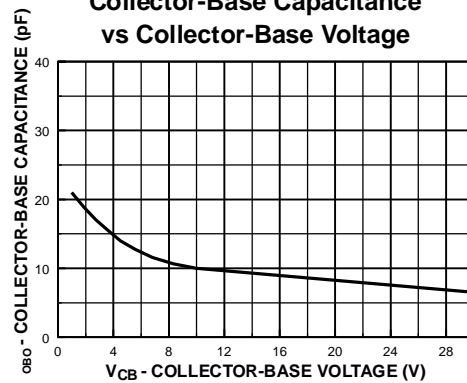
Base-Emitter ON Voltage vs Collector Current



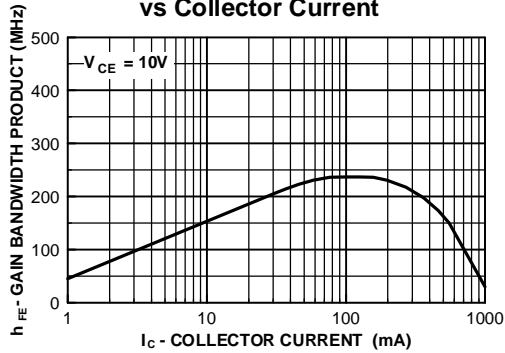
Collector-Cutoff Current vs Ambient Temperature



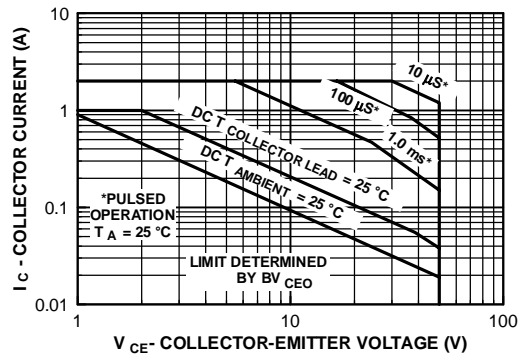
Collector-Base Capacitance vs Collector-Base Voltage



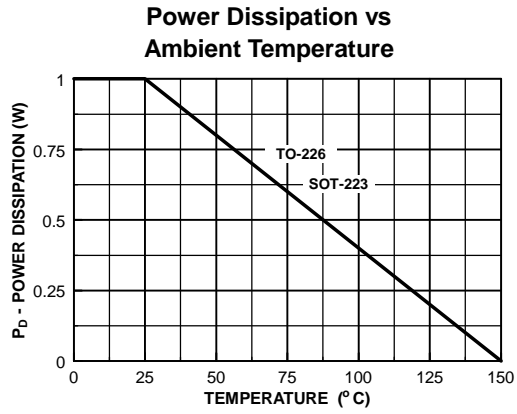
Gain Bandwidth Product vs Collector Current



Safe Operating Area TO-226 / SOT-223



Typical Characteristics (continued)

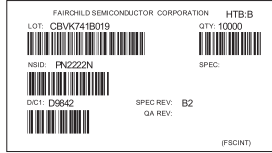


TO-226AE Tape and Reel Data



TO-226AE Packaging Configuration: Figure 1.0

FSCINT Label sample



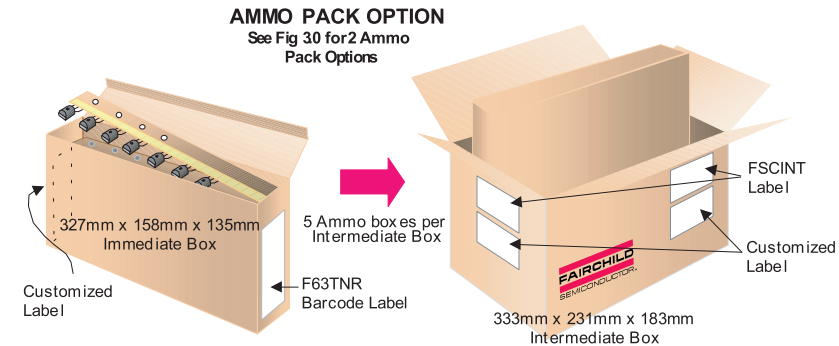
F63TNR Label sample



TO-226AE TNR/AMMO PACKING INFORMATION

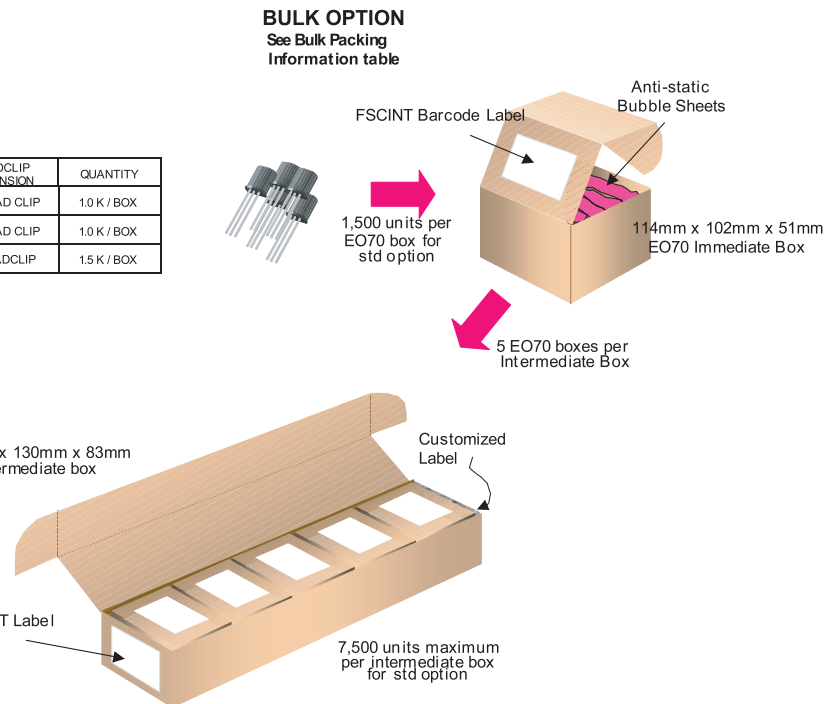
| Packing | Style | Quantity | EOL code |
|---------|-------|----------|----------|
| Reel | A | 2,000 | D26Z |
| | E | 2,000 | D27Z |
| Ammo | M | 2,000 | D74Z |
| | P | 2,000 | D75Z |

Unit weight = 0.300gm
 Reel weight with components = 0.868 kg
 Ammo weight with components = 0.880 kg
 Max quantity per intermediate box = 10,000 units



(TO-226AE) BULK PACKING INFORMATION

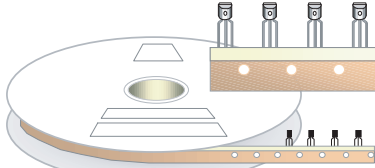
| EOL CODE | DESCRIPTION | LEADCLIP DIMENSION | QUANTITY |
|-------------|--------------------------|--------------------|-------------|
| J18Z | TO-18 OPTION STD | NO LEAD CLIP | 1.0 K / BOX |
| J05Z | TO-5 OPTION STD | NO LEAD CLIP | 1.0 K / BOX |
| NO EOL CODE | TO-226 STANDARD STRAIGHT | NO LEADCLIP | 1.5 K / BOX |



TO-226AE Tape and Reel Data, continued

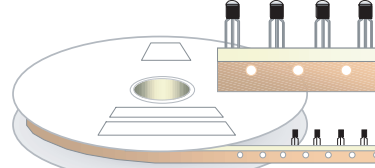
TO-226AE Reeling Style Configuration: Figure 2.0

Machine Option "A"(H)



Style "A" D26Z, D70Z (s/h)

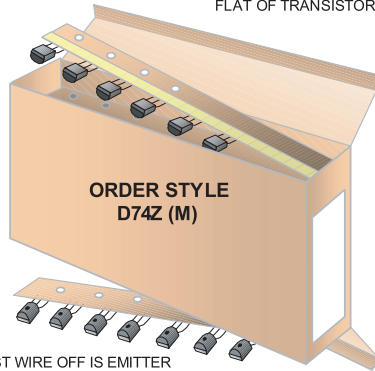
Machine Option "E"(J)



Style "E" D27Z, D71Z (s/h)

TO-226AE Radial Ammo Packaging Configuration: Figure 3.0

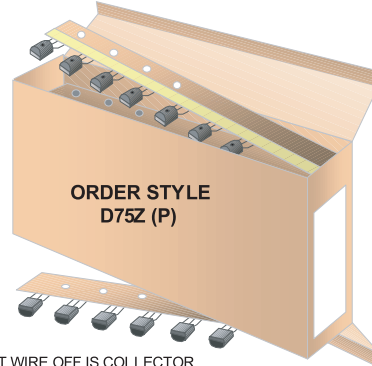
FIRST WIRE OFF IS COLLECTOR (ON PKG. 92)
ADHESIVE TAPE IS ON THE TOP SIDE
FLAT OF TRANSISTOR IS ON TOP



ORDER STYLE
D74Z (M)

FIRST WIRE OFF IS EMITTER
ADHESIVE TAPE IS ON BOTTOM SIDE
FLAT OF TRANSISTOR IS ON BOTTOM

FIRST WIRE OFF IS EMITTER (ON PKG. 92)
ADHESIVE TAPE IS ON THE TOP SIDE
FLAT OF TRANSISTOR IS ON BOTTOM



ORDER STYLE
D75Z (P)

FIRST WIRE OFF IS COLLECTOR
ADHESIVE TAPE IS ON BOTTOM SIDE
FLAT OF TRANSISTOR IS ON TOP

TO-226AE Tape and Reel Data, continued

**TO-226AE Tape and Reel Taping
Dimension Configuration:** Figure 4.0



| ITEM DESCRIPTION | SYMBOL | DIMENSION |
|----------------------------------|--------|------------------------|
| Base of Package to Lead Bend | b | 0.098 (max) |
| Component Height | Hb | 1.078 (+/- 0.050) |
| Lead Clinch Height | HO | 0.630 (+/- 0.020) |
| Component Base Height | H1 | 0.748 (+/- 0.020) |
| Component Alignment (side/side) | Pd | 0.040 (max) |
| Component Alignment (front/back) | Hd | 0.031 (max) |
| Component Pitch | P | 0.500 (+/- 0.020) |
| Feed Hole Pitch | PO | 0.500 (+/- 0.008) |
| Hole Center to First Lead | P1 | 0.150 (+0.009, -0.010) |
| Hole Center to Component Center | P2 | 0.247 (+/- 0.007) |
| Lead Spread | F1/F2 | 0.104 (+/- 0.010) |
| Lead Thickness | d | 0.018 (+0.002, -0.003) |
| Out Lead Length | L | 0.429 (max) |
| Taped Lead Length | L1 | 0.209 (+0.051, -0.052) |
| Taped Lead Thickness | t | 0.032 (+/- 0.006) |
| Carrier Tape Thickness | t1 | 0.021 (+/- 0.006) |
| Carrier Tape Width | W | 0.708 (+0.02, -0.019) |
| Hold - down Tape Width | W0 | 0.236 (+/- 0.012) |
| Hold - down Tape position | W1 | 0.035 (max) |
| Feed Hole Position | W2 | 0.360 (+/- 0.025) |
| Sprocket Hole Diameter | DO | 0.157 (+0.008, -0.007) |
| Lead Spring Out | S | 0.004 (max) |

Note: All dimensions are in inches.

**TO-226AE Reel
Configuration:** Figure 5.0



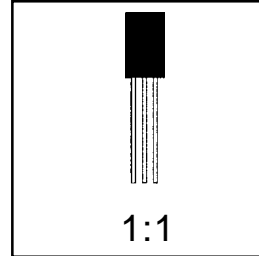
| ITEM DESCRIPTION | SYMBOL | MINIMUM | MAXIMUM |
|--------------------------------|--------|---------|---------|
| Reel Diameter | D1 | 1.3975 | 14.025 |
| Arbor Hole Diameter (Standard) | D2 | 1.160 | 1.200 |
| (Small Hole) | D2 | 0.650 | 0.700 |
| Core Diameter | D3 | 3.100 | 3.300 |
| Hub Recess Inner Diameter | D4 | 2.700 | 3.100 |
| Hub Recess Depth | W1 | 0.370 | 0.570 |
| Flange to Flange Inner Width | W2 | 1.630 | 1.690 |
| Hub to Hub Center Width | W3 | | 2.090 |

Note: All dimensions are in inches

TO-226AE Package Dimensions



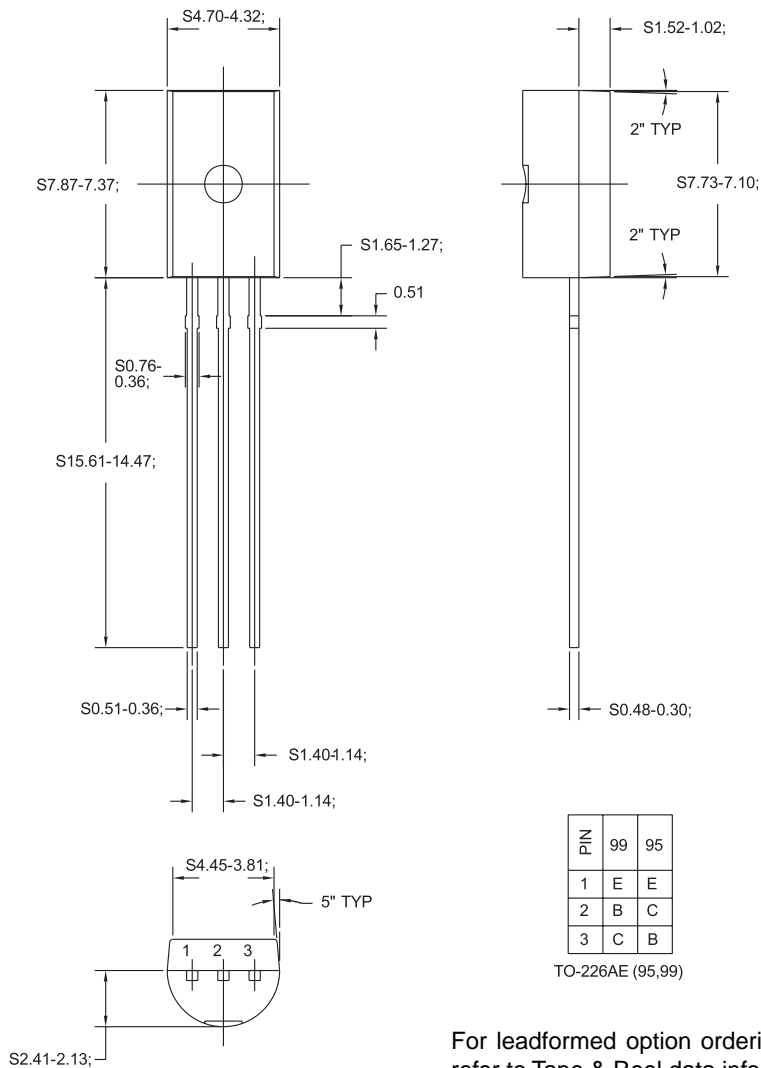
TO-226AE (FS PKG Code 95, 99)



Scale 1:1 on letter size paper

Dimensions shown below are in:
inches [millimeters]

Part Weight per unit (gram): 0.300



| DIN | 99 | 95 |
|-----|----|----|
| 1 | E | E |
| 2 | B | C |
| 3 | C | B |

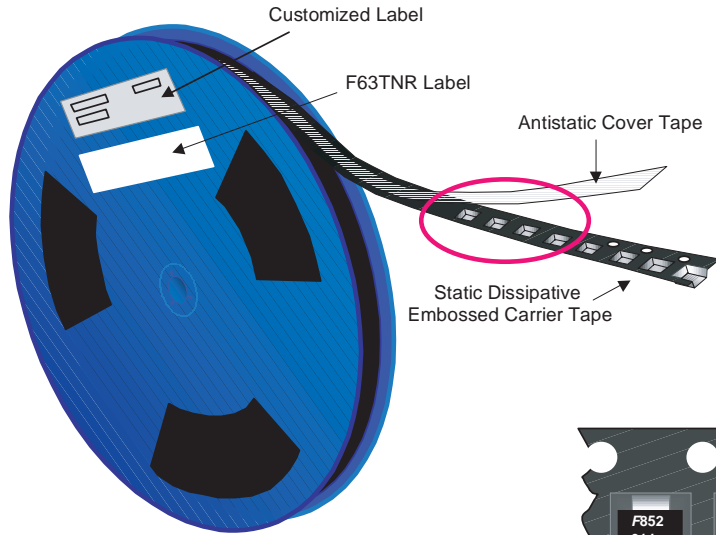
TO-226AE (95,99)

For leadformed option ordering,
refer to Tape & Reel data information.

SOT-223 Tape and Reel Data

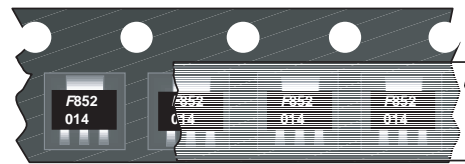


SOT-223 Packaging Configuration: Figure 1.0

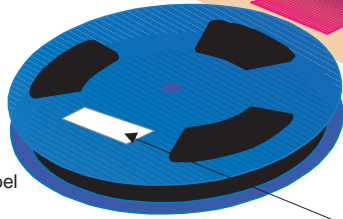


Packaging Description:
 SOT-223 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 2,500 units per 13" or 330cm diameter reel. The reels are dark blue in color and is made of polystyrene plastic (anti-static coated). Other option comes in 500 units per 7" or 177cm diameter reel. This and some other options are further described in the Packaging Information table.
 These full reels are individually barcode labeled and placed inside a standard intermediate box (illustrated in figure 1.0) made of recyclable corrugated brown paper. One box contains two reels maximum. And these boxes are placed inside a barcode labeled shipping box which comes in different sizes depending on the number of parts shipped.

| SOT-223 Packaging Information | | |
|-------------------------------|-------------------------|------------|
| Packaging Option | Standard (no flow code) | D84Z |
| Packaging type | TNR | TNR |
| Qty per Reel/Tube/Bag | 2,500 | 500 |
| Reel Size | 13" Dia | 7" Dia |
| Box Dimension (mm) | 343x64x343 | 184x187x47 |
| Max qty per Box | 5,000 | 1,000 |
| Weight per unit (gm) | 0.1246 | 0.1246 |
| Weight per Reel (kg) | 0.7250 | 0.1532 |
| Note/Comments | | |



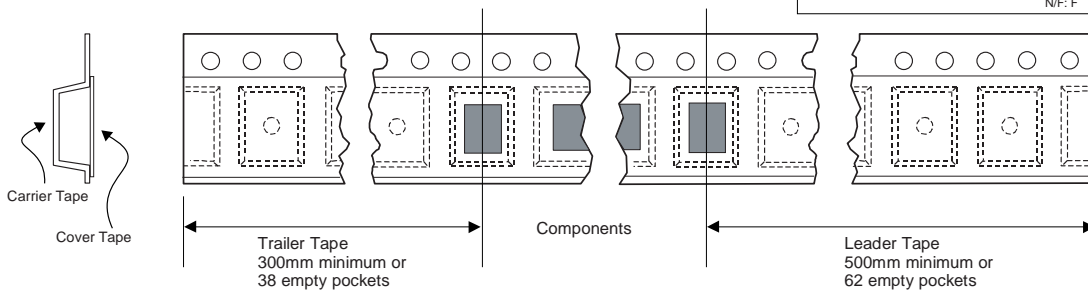
SOT-223 Unit Orientation



F63TNR Label sample

| | |
|------------------|-----------|
| LOT: CBVK741B019 | QTY: 3000 |
| FSID: PN2222A | SPEC: |
| D/C1: D9842 | QTY1: |
| D/C2: | QTY2: |
| SPEC REV: CPN: | N/F: F |
| (F63TNR)3 | |

SOT-223 Tape Leader and Trailer Configuration: Figure 2.0



SOT-223 Tape and Reel Data, continued

SOT-223 Embossed Carrier Tape Configuration: Figure 3.0

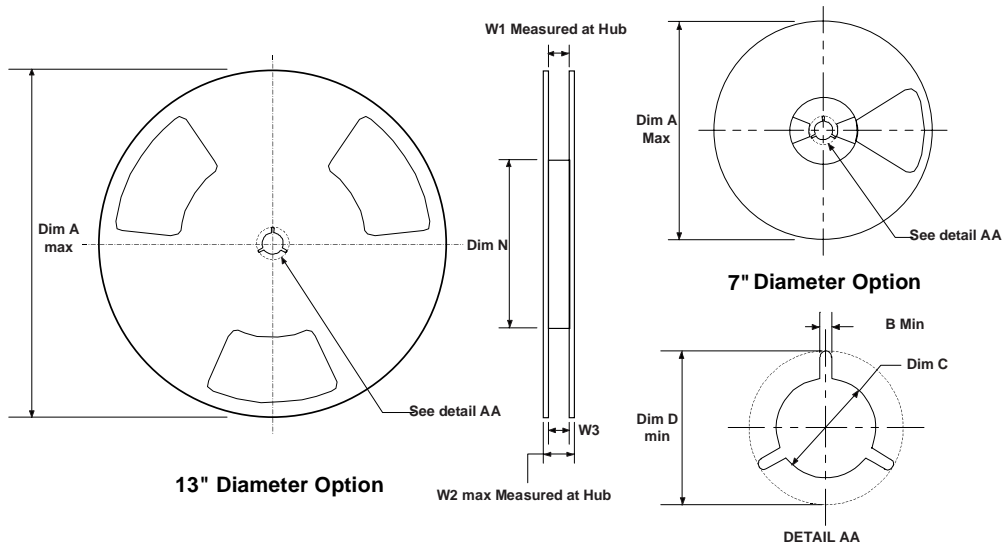


| Dimensions are in millimeter | | | | | | | | | | | | | | |
|------------------------------|-----------------|-----------------|----------------|-----------------|-----------------|-----------------|--------------|-----------------|---------------|---------------|-----------------|------------------------|-----------------|-----------------|
| Pkg type | A0 | B0 | W | D0 | D1 | E1 | E2 | F | P1 | P0 | K0 | T | Wc | Tc |
| SOT-223 (12mm) | 6.83 +/-0.10 | 7.42 +/-0.10 | 12.0 +/-0.3 | 1.55 +/-0.05 | 1.50 +/-0.10 | 1.75 +/-0.10 | 10.25 min | 5.50 +/-0.05 | 8.0 +/-0.1 | 4.0 +/-0.1 | 1.88 +/-0.10 | 0.292 +/- 0.0130 | 9.5 +/-0.025 | 0.06 +/-0.02 |

Notes: A0, B0, and K0 dimensions are determined with respect to the EIA/Jedec RS-481 rotational and lateral movement requirements (see sketches A, B, and C).



SOT-223 Reel Configuration: Figure 4.0

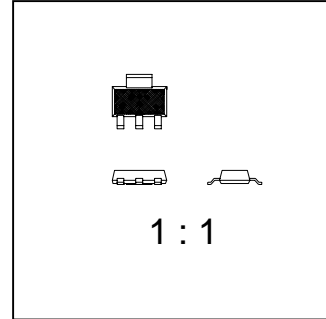
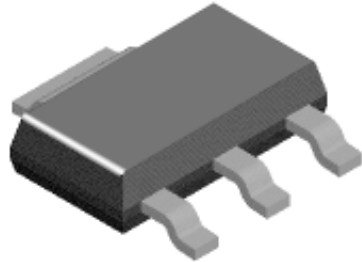


| Dimensions are in inches and millimeters | | | | | | | | | |
|--|-------------|---------------|--------------|-----------------------------------|---------------|--------------|----------------------------------|---------------|------------------------------|
| Tape Size | Reel Option | Dim A | Dim B | Dim C | Dim D | Dim N | Dim W1 | Dim W2 | Dim W3 (LSL-USL) |
| 12mm | 7" Dia | 7.00 177.8 | 0.059 1.5 | 512 +0.020/-0.008 13 +0.5/-0.2 | 0.795 20.2 | 5.906 150 | 0.488 +0.078/-0.000 12.4 +2/0 | 0.724 18.4 | 0.469 - 0.606 11.9 - 15.4 |
| 12mm | 13" Dia | 13.00 330 | 0.059 1.5 | 512 +0.020/-0.008 13 +0.5/-0.2 | 0.795 20.2 | 7.00 178 | 0.488 +0.078/-0.000 12.4 +2/0 | 0.724 18.4 | 0.469 - 0.606 11.9 - 15.4 |

SOT-223 Package Dimensions

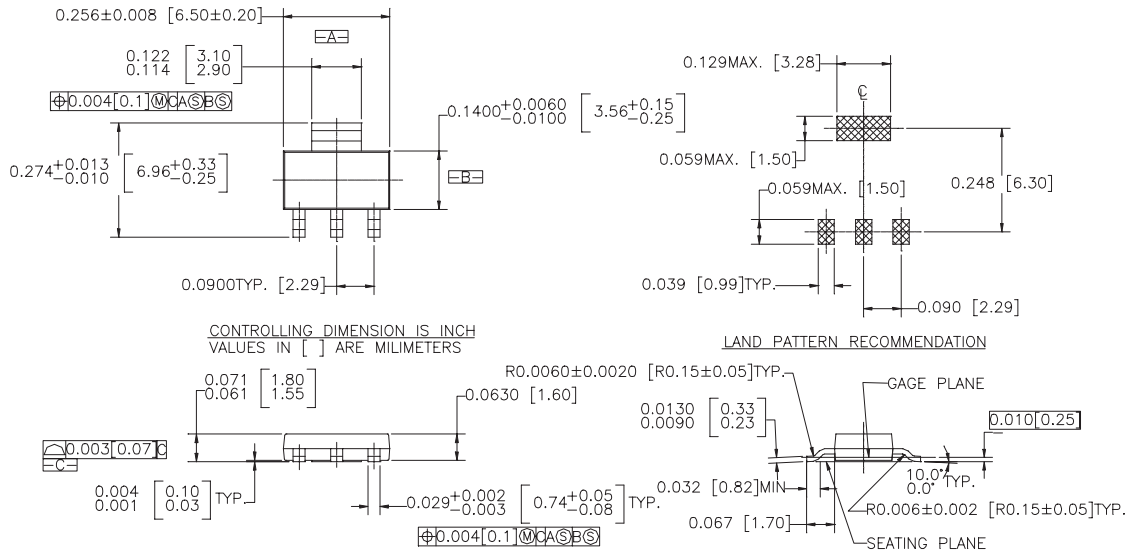


SOT-223 (FS PKG Code 47)



Scale 1:1 on letter size paper

Part Weight per unit (gram): 0.1246



- NOTES : UNLESS OTHERWISE SPECIFIED
- STANDARD LEAD FINISH TO BE 150 MICRONS/ 3.81 MICROMETERS MINIMUM TIN/LEAD (SOLDER) ON COPPER.
 - REFERENCE JEDEC REGISTRATION TO-261, VARIATION AA, ISSUE A, DATED JAN 1990

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| CoolFET TM | GTO TM | QS TM | UHC TM |
| CROSSVOLT TM | HiSeC TM | QT Optoelectronics TM | VCX TM |
| DOME TM | ISOPLANAR TM | Quiet Series TM | |
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| EnSigna TM | OPTOLOGIC TM | SMART START TM | |
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