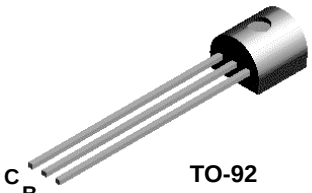
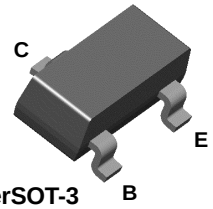
FAIRCHILD
SEMICONDUCTOR TM

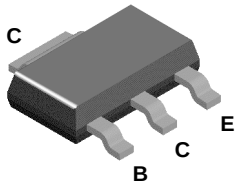
MPSA28 MMBTA28 PZTA28



TO-92



SuperSOT-3
Mark: 3SS



SOT-223

NPN Darlington Transistor

This device is designed for applications requiring extremely high current gain at collector currents to 500 mA. Sourced from Process 03.

Absolute Maximum Ratings* TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage	80	V
V_{CBO}	Collector-Base Voltage	80	V
V_{EBO}	Emitter-Base Voltage	12	V
I_C	Collector Current - Continuous	800	mA
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
		MPSA28	*MMBTA28	**PZTA28	
P_D	Total Device Dissipation Derate above 25°C	625 5.0	350 2.8	1,000 8.0	mW mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	83.3			°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	357	125	°C/W

*Device mounted on FR-4 PCB 1.6" X 1.6" X 0.06."

**Device mounted on FR-4 PCB 36 mm X 18 mm X 1.5 mm; mounting pad for the collector lead min. 6 cm^2.

NPN Darlington Transistor
(continued)

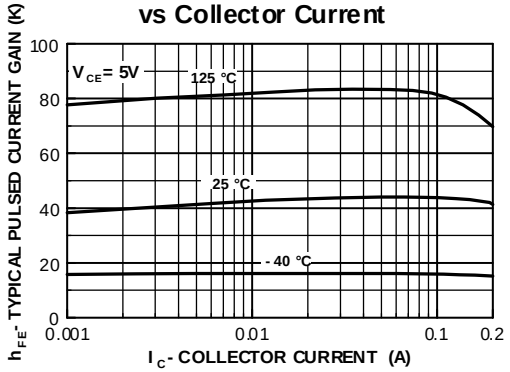
Electrical Characteristics
TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
OFF CHARACTERISTICS					
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	I_C = 100 µA, V_{BE} = 0	80		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = 100 µA, I_E = 0	80		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 10 µA, I_C = 0	12		V
I_{CBO}	Collector Cutoff Current	V_{CB} = 60 V, I_E = 0		100	nA
I_{CES}	Collector Cutoff Current	V_{CE} = 60 V, V_{BE} = 0		500	nA
I_{EBO}	Emitter Cutoff Current	V_{EB} = 10 V, I_C = 0		100	nA
ON CHARACTERISTICS					
h_{FE}	DC Current Gain	I_C = 10 mA, V_{CE} = 5.0 V I_C = 100 mA, V_{CE} = 5.0 V	10,000 10,000		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 10 mA, I_B = 0.01 mA I_C = 100 mA, I_B = 0.1 mA		1.2 1.5	V
$V_{BE(on)}$	Base-Emitter On Voltage	I_C = 100 mA, V_{CE} = 5.0 V		2.0	V
SMALL SIGNAL CHARACTERISTICS					
f_T	Current Gain - Bandwidth Product	I_C = 10 mA, V_{CE} = 5.0, f = 100 MHz	125		MHz
C_{obo}	Output Capacitance	V_{CB} = 1.0 V, I_E = 0, f = 1.0 MHz		8.0	pF

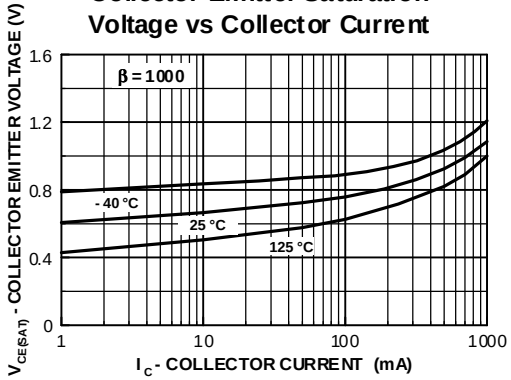
*Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2.0%

Typical Characteristics

Typical Pulsed Current Gain vs Collector Current

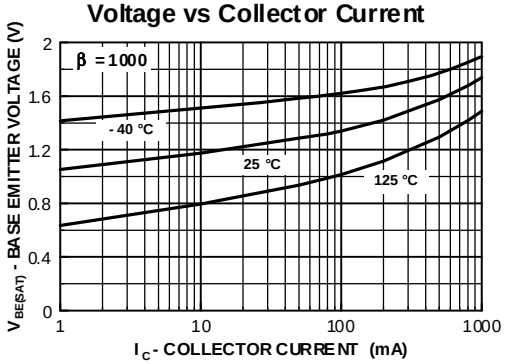


Collector-Emitter Saturation Voltage vs Collector Current

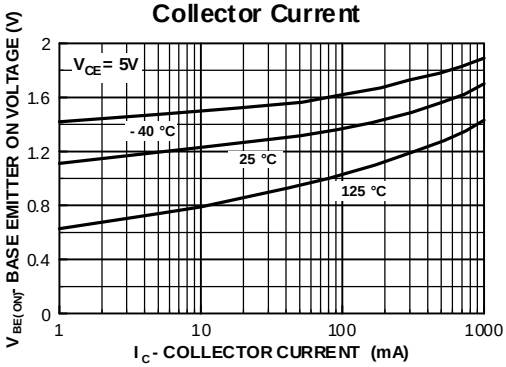


Typical Characteristics (continued)

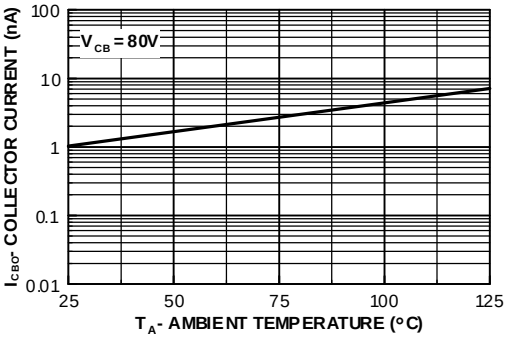
Base-Emitter Saturation Voltage vs Collector Current



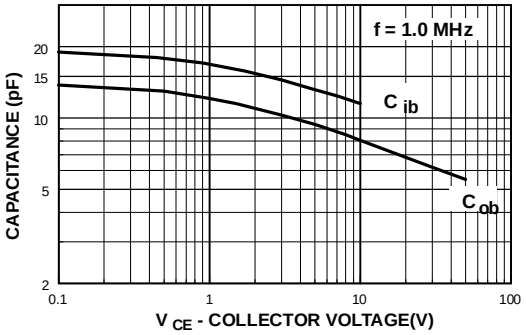
Base Emitter ON Voltage vs Collector Current



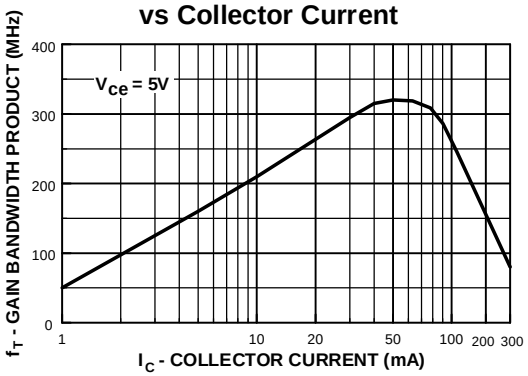
Collector-Cutoff Current vs Ambient Temperature



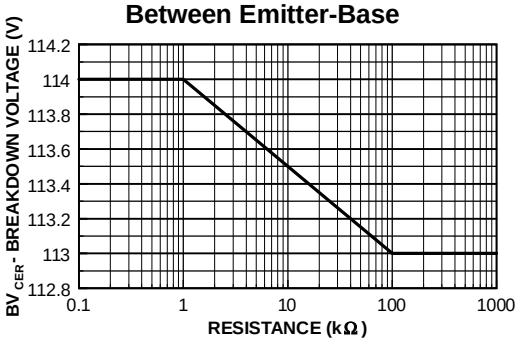
Input and Output Capacitance vs Reverse Voltage



Gain Bandwidth Product vs Collector Current

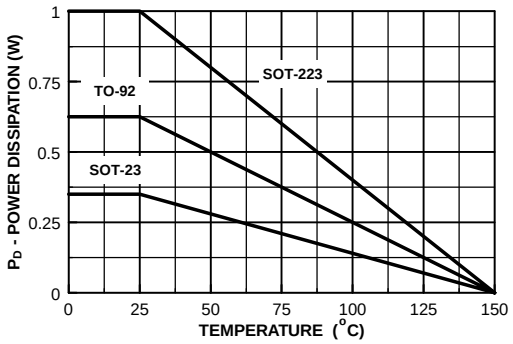


Collector-Emitter Breakdown Voltage with Resistance Between Emitter-Base



Typical Characteristics (continued)

Power Dissipation vs Ambient Temperature

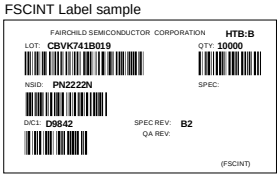


TO-92 Tape and Reel Data

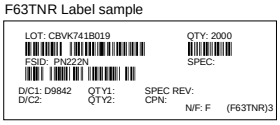
FAIRCHILD SEMICONDUCTOR TM

TO-92 Packaging Configuration: Figure 1.0

FSCINT Label sample

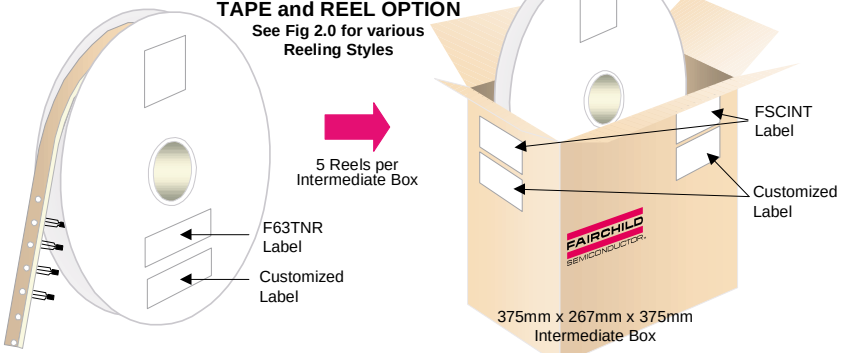


F63TNR Label sample



TAPE and REEL OPTION

See Fig 2.0 for various Reeling Styles



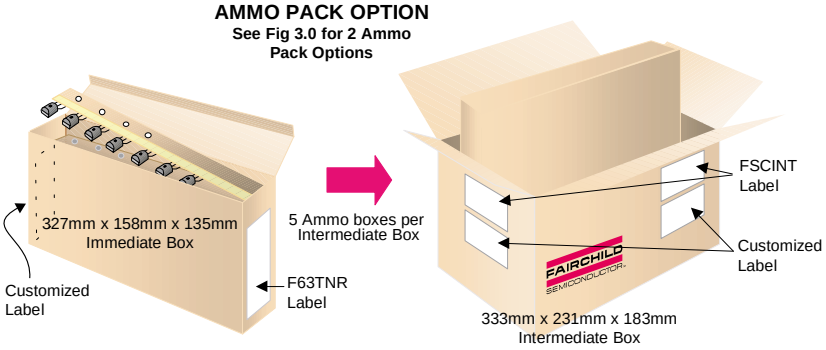
TO-92 TNR/AMMO PACKING INFROMATION

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 = 0.22 gm
Reel weight with components = 1.04 kg
Ammo weight with components = 1.02 kg
Max quantity per intermediate box = 10,000 units

AMMO PACK OPTION

See Fig 3.0 for 2 Ammo Pack Options

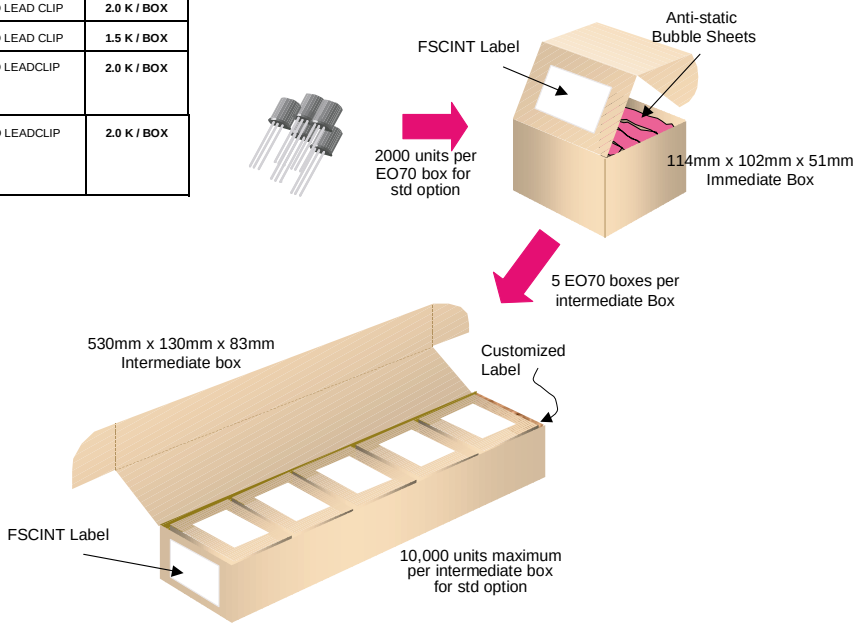


(TO-92) BULK PACKING INFORMATION

EOL CODE	DESCRIPTION	LEADCLIP DIMENSION	QUANTITY
J18Z	TO-18 OPTION STD	NO LEAD CLIP	2.0 K / BOX
J05Z	TO-5 OPTION STD	NO LEAD CLIP	1.5 K / BOX
NO EOL CODE	TO-92 STANDARD STRAIGHT FOR: PKG 92, 94 (NON PROELECTRON SERIES), 96	NO LEADCLIP	2.0 K / BOX
L34Z	TO-92 STANDARD STRAIGHT FOR: PKG 94 (PROELECTRON SERIES BCXXX, BFXXX, BSRXXX), 97, 98	NO LEADCLIP	2.0 K / BOX

BULK OPTION

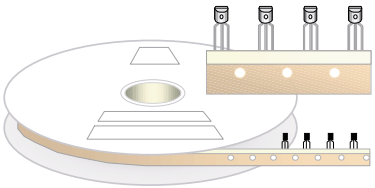
See Bulk Packing Information table



TO-92 Tape and Reel Data, continued

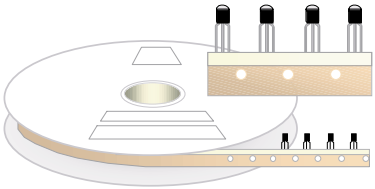
TO-92 Reeling Style
Configuration: Figure 2.0

Machine Option “A” (H)



Style “A”, D26Z, D70Z (s/h)

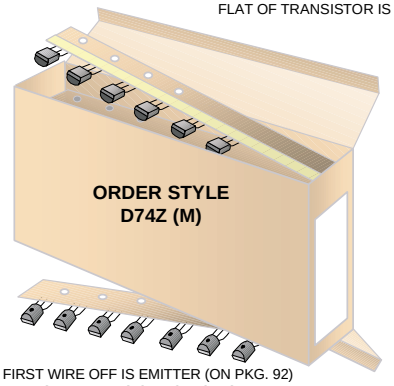
Machine Option “E” (J)



Style “E”, D27Z, D71Z (s/h)

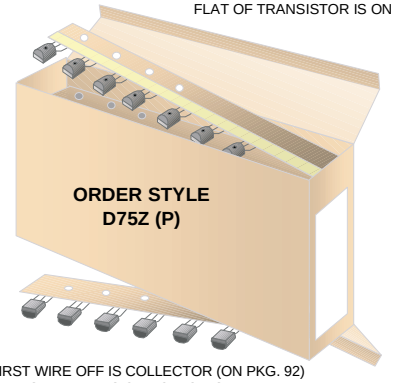
TO-92 Radial Ammo Packaging
Configuration: Figure 3.0

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



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

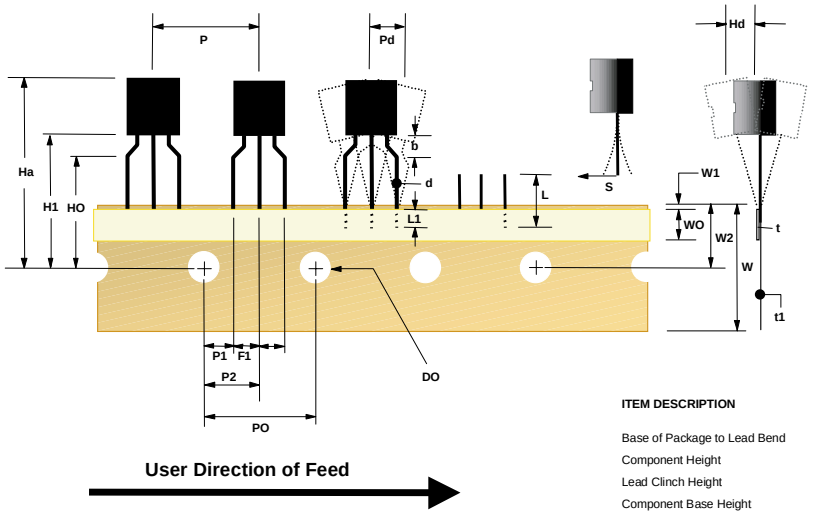
FIRST WIRE OFF IS EMITTER
ADHESIVE TAPE IS ON THE TOP SIDE
FLAT OF TRANSISTOR IS ON BOTTOM



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

TO-92 Tape and Reel Data, continued

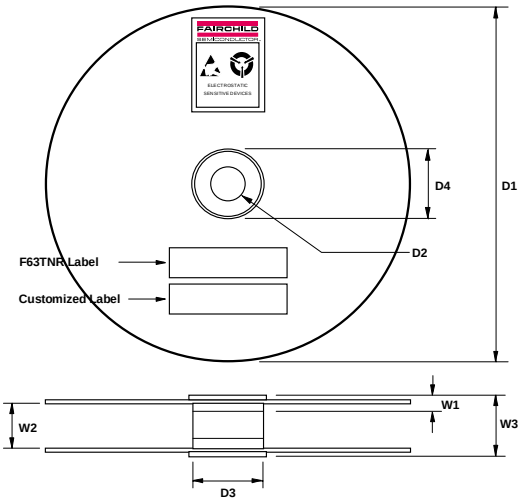
TO-92 Tape and Reel Taping
Dimension Configuration: Figure 4.0



ITEM DESCRIPTION	SYMBOL	DIMENSION
Base of Package to Lead Bend	b	0.098 (max)
Component Height	Ha	0.928 (+/- 0.025)
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)
Cut 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 (+0.020, -0.019)
Hold - down Tape Width	WO	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-92 Reel
Configuration: Figure 5.0



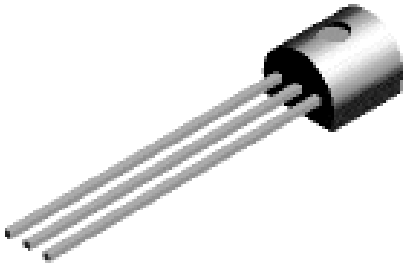
ITEM DESCRIPTION	SYSMBOL	MINIMUM	MAXIMUM
Reel Diameter	D1	13.975	14.025
Arbor Hole Diameter (Standard)	D2	1.160	1.200
(Small Hole)	D2	0.650	0.700
Core Diameter	D3	3.100	3.300
Hub Recess Inner Diameter	D4	2.700	3.100
Hub Recess Depth	W1	0.370	0.570
Flange to Flange Inner Width	W2	1.630	1.690
Hub to Hub Center Width	W3		2.090

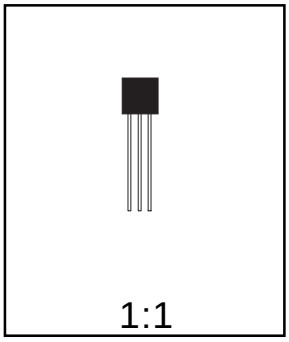
Note: All dimensions are inches

TO-92 Package Dimensions

FAIRCHILD SEMICONDUCTOR™

TO-92 (FS PKG Code 92, 94, 96)





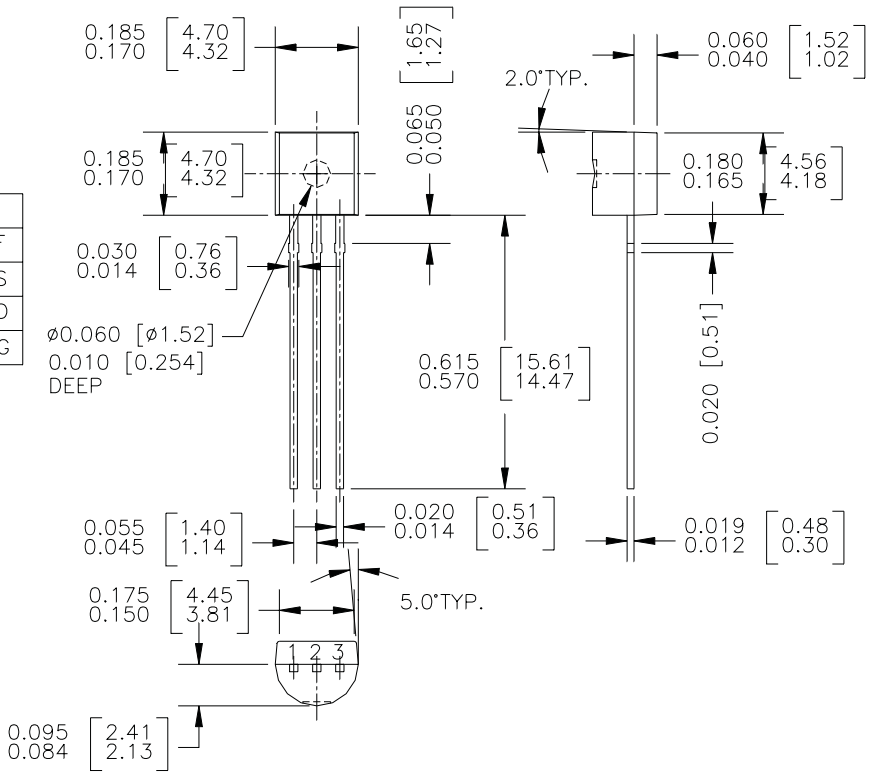
Scale 1:1 on letter size paper

Dimensions shown below are in:
inches [millimeters]

Part Weight per unit (gram): 0.1977

TO−92 (92,94,96)

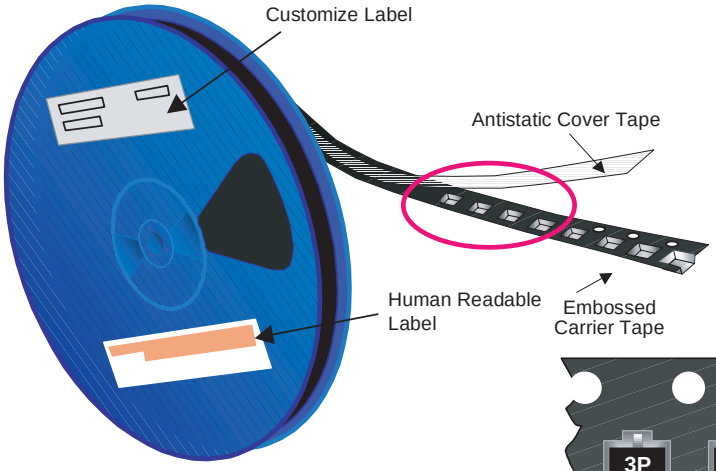
PIN	92		94		96	
	B	F	B	F	B	F
1	E	D	E	D	B	S
2	B	S	C	G	E	D
3	C	G	B	S	C	G



SuperSOT™-3 Tape and Reel Data

FAIRCHILD SEMICONDUCTOR™

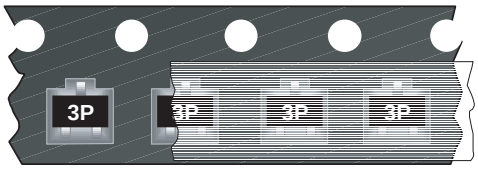
SSOT-3 Packaging
Configuration: Figure 1.0



Packaging Description:

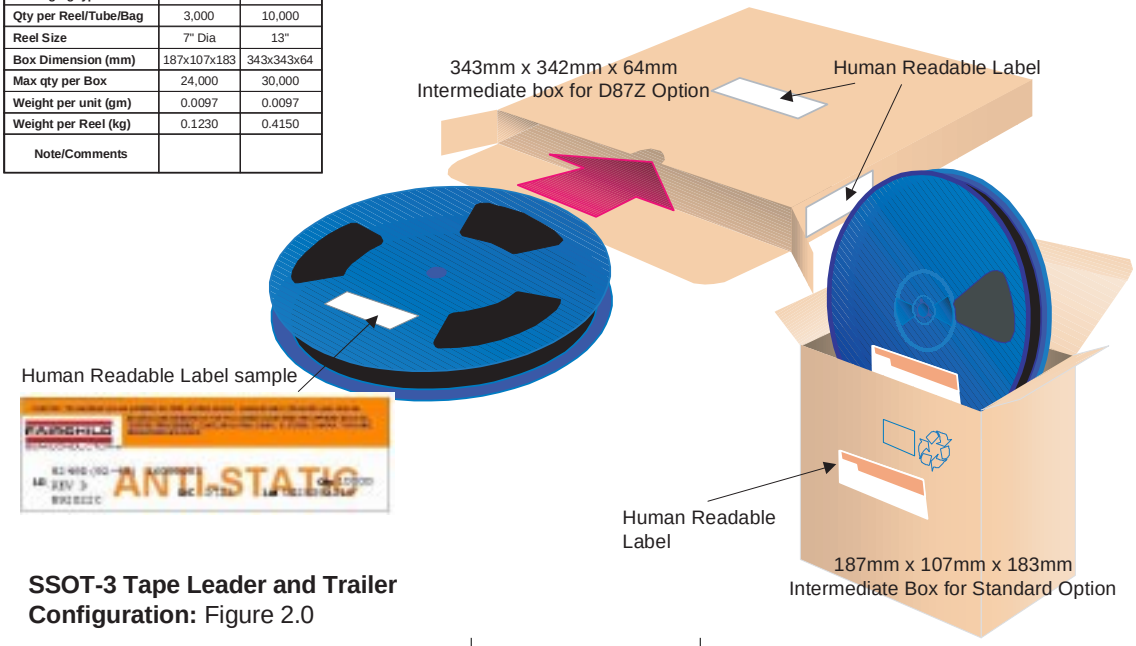
SSOT-3 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 177cm diameter reel. The reels are dark blue in color and is made of polystyrene plastic (anti-static coated). Other option comes in 10,000 units per 13" or 330cm diameter reel. This and some other options are described in the Packaging Information table.

These full reels are individually labeled and placed inside a standard intermediate made of recyclable corrugated brown paper with a Fairchild logo printing. One pizza box contains eight reels maximum. And these intermediate boxes are placed inside a labeled shipping box which comes in different sizes depending on the number of parts shipped.

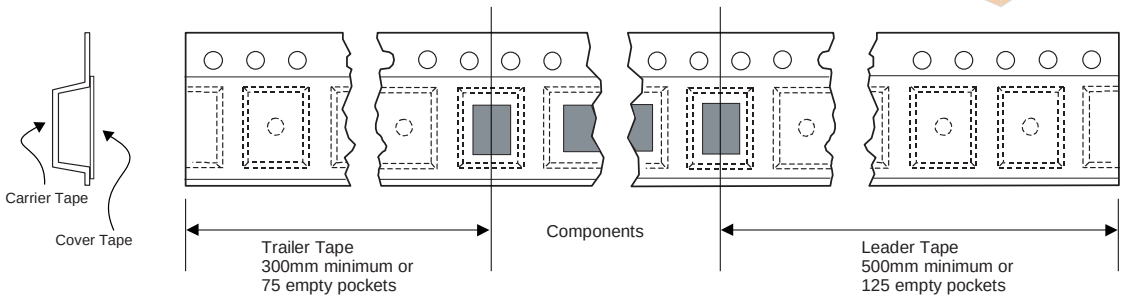


SSOT-3 Std Packaging Information		
Packaging Option	Standard (no flow code)	D87Z
Packaging type	TNR	TNR
Qty per Reel/Tube/Bag	3,000	10,000
Reel Size	7" Dia	13"
Box Dimension (mm)	187x107x183	343x343x64
Max qty per Box	24,000	30,000
Weight per unit (gm)	0.0097	0.0097
Weight per Reel (kg)	0.1230	0.4150
Note/Comments		

SSOT-3 Std Unit Orientation

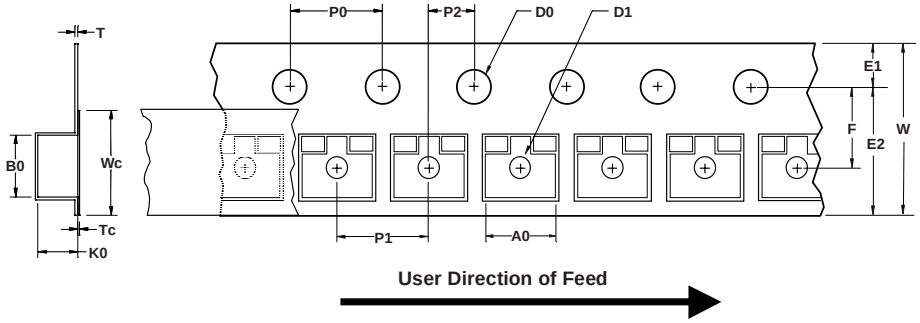


SSOT-3 Tape Leader and Trailer
Configuration: Figure 2.0



SuperSOT™-3 Tape and Reel Data, continued

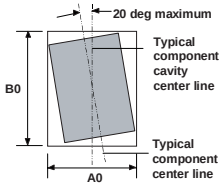
SSOT-3 Embossed Carrier Tape
Configuration: Figure 3.0



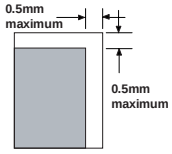
Dimensions are in millimeter														
Pkg type	**A0**	**B0**	**W**	**D0**	**D1**	**E1**	**E2**	**F**	**P1**	**P0**	**K0**	**T**	**Wc**	**Tc**
SSOT-3 (8mm)	3.15 +/-0.10	2.77 +/-0.10	8.0 +/-0.3	1.55 +/-0.05	1.125 +/-0.125	1.75 +/-0.10	6.25 min	3.50 +/-0.05	4.0 +/-0.1	4.0 +/-0.1	1.30 +/-0.10	0.228 +/-0.013	5.2 +/-0.3	0.06 +/-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).

Sketch A (Side or Front Sectional View)
Component Rotation

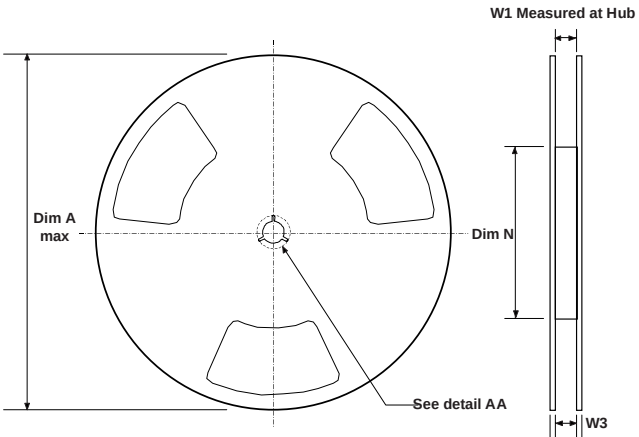


Sketch B (Top View)
Component Rotation

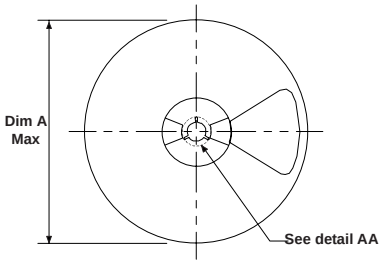


Sketch C (Top View)
Component lateral movement

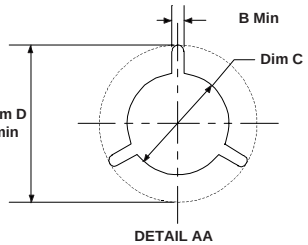
SSOT-3 Reel Configuration: Figure 4.0



13" Diameter Option



7" Diameter Option

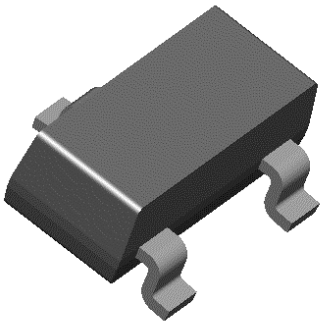


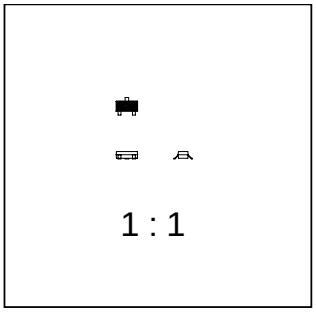
Dimensions are in inches and millimeters									
Tape Size	**Reel Option**	**Dim A**	**Dim B**	**Dim C**	**Dim D**	**Dim N**	**Dim W1**	**Dim W2**	**Dim W3 (LSL-USL)**
8mm	7" Dia	7.00 177.8	0.059 1.5	512 +0.020/-0.008 13 +0.5/-0.2	0.795 20.2	2.165 55	0.331 +0.059/-0.000 8.4 +1.5/0	0.567 14.4	0.311 – 0.429 7.9 – 10.9
8mm	13" Dia	13.00 330	0.059 1.5	512 +0.020/-0.008 13 +0.5/-0.2	0.795 20.2	4.00 100	0.331 +0.059/-0.000 8.4 +1.5/0	0.567 14.4	0.311 – 0.429 7.9 – 10.9

SuperSOT™-3 Package Dimensions

FAIRCHILD SEMICONDUCTOR™

SuperSOT™-3 (FS PKG Code 32)

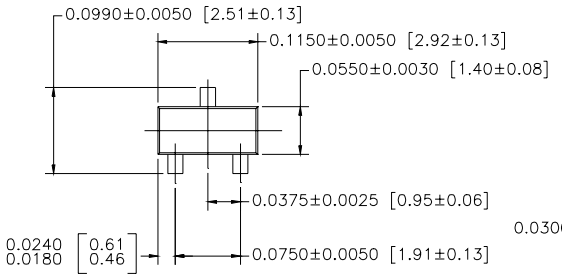


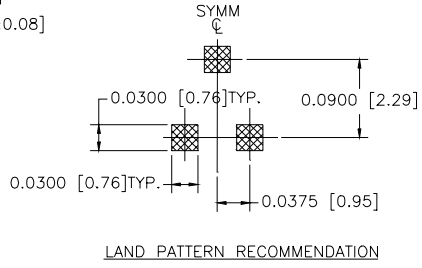


Scale 1:1 on letter size paper

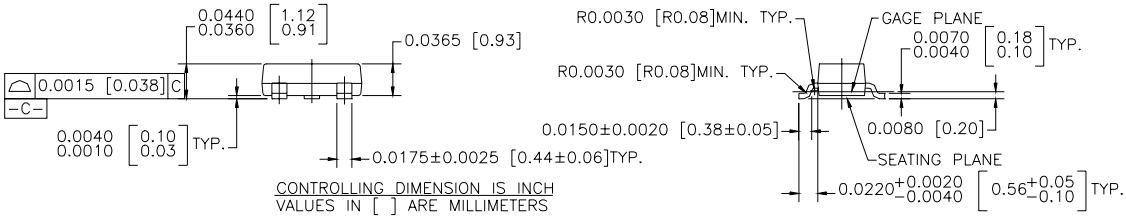
Dimensions shown below are in:
inches [millimeters]

Part Weight per unit (gram): 0.0097





LAND PATTERN RECOMMENDATION



NOTES : UNLESS OTHERWISE SPECIFIED

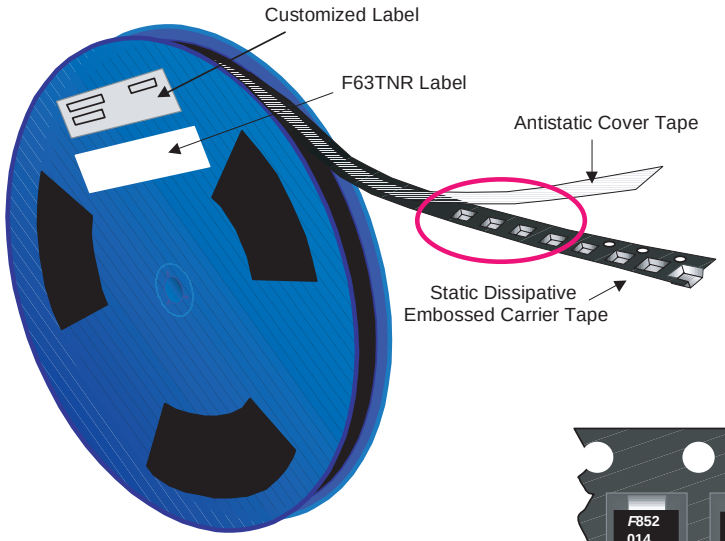
SUPER SOT , 3 LEADS

1. STANDARD LEAD FINISH TO BE 150 MICROINCHES / 3.81 MICROMETERS MINIMUM TIN/LEAD (SOLDER) ON COPPER.
2. NO JEDEC REGISTRATION AS OF DEC. 1995.

SOT-223 Tape and Reel Data

FAIRCHILD SEMICONDUCTOR™

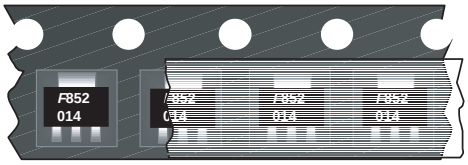
SOT-223 Packaging
Configuration: Figure 1.0



Packaging Description:

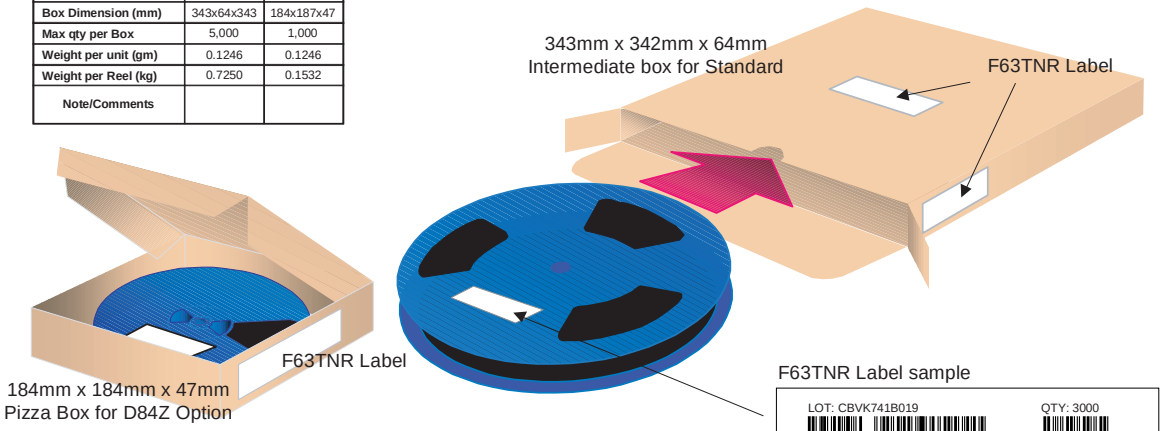
SOT-223 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts 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.

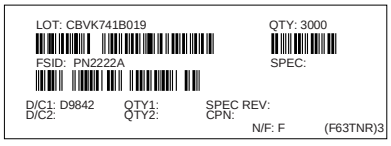


SOT-223 Unit Orientation

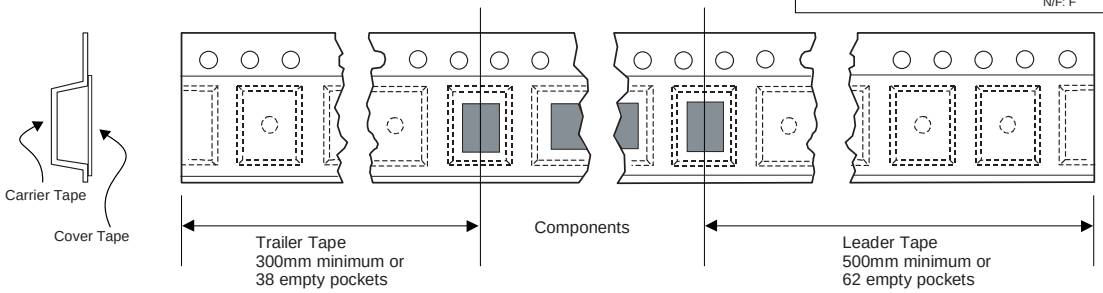
SOT-223 Packaging Information		
Packaging Option	Standard (no flow code)	D84Z
Packaging type	TNR	TNR
Qty per Reel/Tube/Bag	2,500	500
Reel Size	13" Dia	7" Dia
Box Dimension (mm)	343x64x343	184x187x47
Max qty per Box	5,000	1,000
Weight per unit (gm)	0.1246	0.1246
Weight per Reel (kg)	0.7250	0.1532
Note/Comments		



F63TNR Label sample

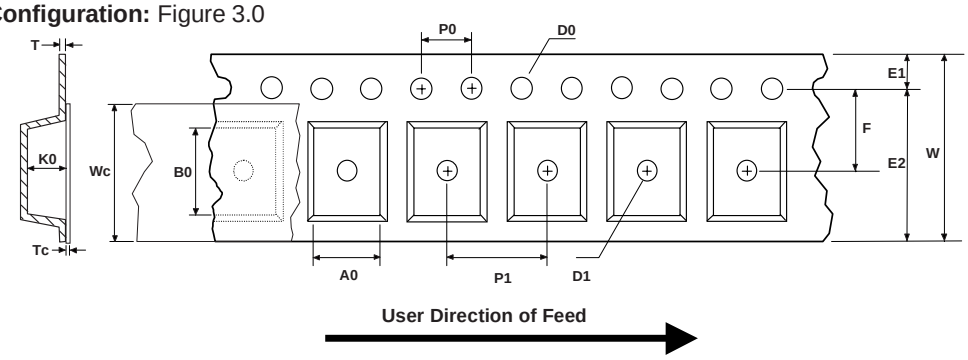


SOT-223 Tape Leader and Trailer
Configuration: Figure 2.0



SOT-223 Tape and Reel Data, continued

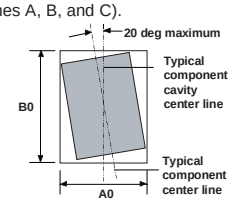
SOT-223 Embossed Carrier Tape
Configuration: Figure 3.0



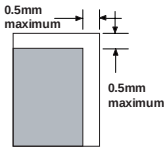
Dimensions are in millimeter														
Pkg type	**A0**	**B0**	**W**	**D0**	**D1**	**E1**	**E2**	**F**	**P1**	**P0**	**K0**	**T**	**Wc**	**Tc**
SOT-223 (12mm)	6.83 +/-0.10	7.42 +/-0.10	12.0 +/-0.3	1.55 +/-0.05	1.50 +/-0.10	1.75 +/-0.10	10.25 min	5.50 +/-0.05	8.0 +/-0.1	4.0 +/-0.1	1.88 +/-0.10	0.292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

Sketch A (Side or Front Sectional View)
Component Rotation

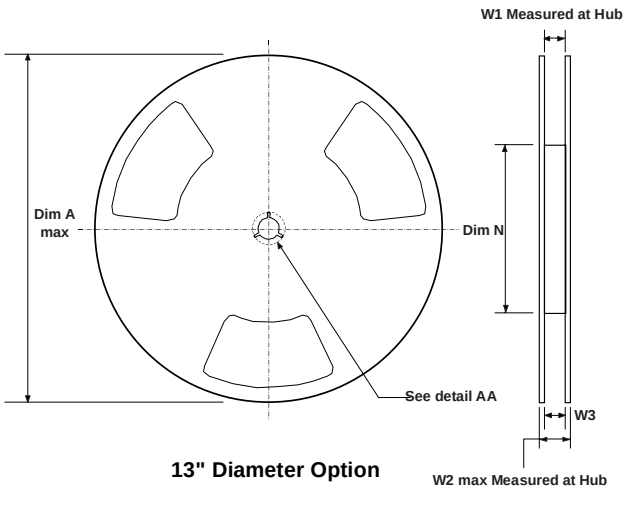


Sketch B (Top View)
Component Rotation

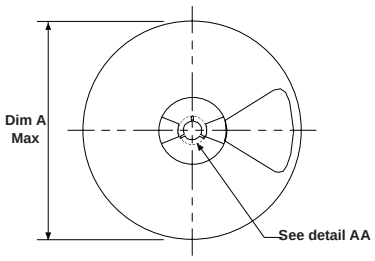


Sketch C (Top View)
Component lateral movement

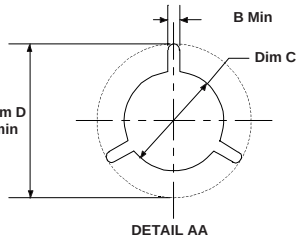
SOT-223 Reel Configuration: Figure 4.0



13" Diameter Option



7" Diameter Option



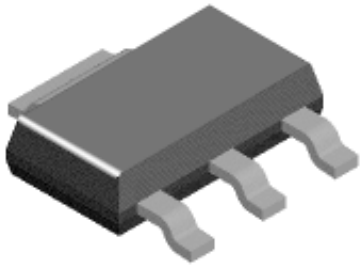
DETAIL AA

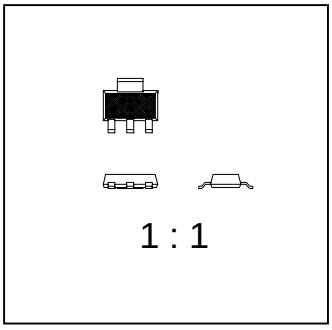
Dimensions are in inches and millimeters									
Tape Size	**Reel Option**	**Dim A**	**Dim B**	**Dim C**	**Dim D**	**Dim N**	**Dim W1**	**Dim W2**	**Dim W3 (LSL-USL)**
12mm	7" Dia	7.00 177.8	0.059 1.5	512 +0.020/-0.008 13 +0.5/-0.2	0.795 20.2	5.906 150	0.488 +0.078/-0.000 12.4 +2/0	0.724 18.4	0.469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

FAIRCHILD SEMICONDUCTOR™

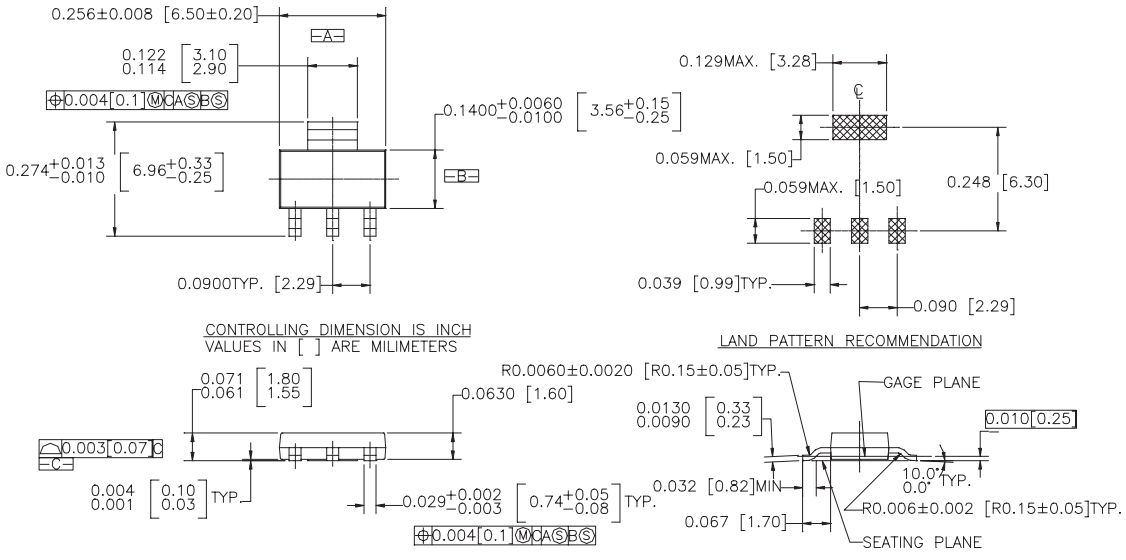
SOT-223 (FS PKG Code 47)





Scale 1:1 on letter size paper

Part Weight per unit (gram): 0.1246



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

SOT223, 4 LEADS

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SuperSOT™-6
SuperSOT™-8
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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
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