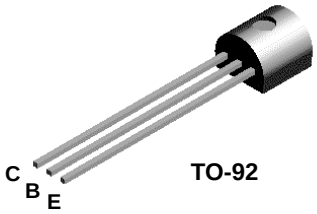
FAIRCHILD
SEMICONDUCTOR TM

# PN3563




TO-92

## NPN RF Amplifier

This device is designed for use as RF amplifiers, oscillators and multipliers with collector currents in the 1.0 mA to 30 mA range. Sourced from Process 43. See PN918 for characteristics.

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

| Symbol | Parameter | Value | Units |
|---|---|---|---|
| $V_{CEO}$ | Collector-Emitter Voltage | 15 | V |
| $V_{CBO}$ | Collector-Base Voltage | 30 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 2.0 | V |
| $I_C$ | Collector Current - Continuous | 50 | 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 |
|---|---|---|---|
| | | PN3563 | |
| $P_D$ | Total Device Dissipation<br>Derate above 25°C | 350<br>2.8 | mW<br>mW/°C |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 125 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 357 | °C/W |

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## Electrical Characteristics

TA= 25°C unless otherwise noted

| Symbol | Parameter | Test Conditions | Min | Max | Units |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | |
| $V_{CEO(sus)}$ | Collector-Emitter Sustaining Voltage* | $I_C$ = 3.0 mA, $I_B$ = 0 | 15 | | V |
| $V_{(BR)CBO}$ | Collector-Base Breakdown Voltage | $I_C$ = 100 μA, $I_E$ = 0 | 30 | | V |
| $V_{(BR)EBO}$ | Emitter-Base Breakdown Voltage | $I_E$ = 10 μA, $I_C$ = 0 | 2.0 | | V |
| $I_{CBO}$ | Collector Cutoff Current | $V_{CB}$ = 15 V, $I_E$ = 0<br>$V_{CB}$ = 15 V, $T_A$ = 150°C | | 0.05<br>5.0 | μA<br>nA |
| **ON CHARACTERISTICS*** | | | | | |
| $h_{FE}$ | DC Current Gain | $I_C$ = 8.0 mA, $V_{CE}$ = 10 V | 20 | 200 | |
| **SMALL SIGNAL CHARACTERISTICS** | | | | | |
| $f_T$ | Current Gain - Bandwidth Product | $I_C$ = 8.0 mA, $V_{CE}$ = 10 V, f = 100 MHz | 600 | 1500 | MHz |
| $C_{obo}$ | Output Capacitance | $V_{CB}$ = 10 V, $I_E$ = 0, f = 1.0 MHz<br>$V_{CB}$ = 0, $I_E$ = 0, f = 1.0 MHz | | 1.7<br>3.0 | pF<br>pF |
| $C_{ibo}$ | Input Capacitance | $V_{BE}$= 0.5 V, $I_C$ = 0, f = 140 MHz | | 2.0 | pF |
| $h_{fe}$ | Small-Signal Current Gain | $I_C$ = 8.0 mA, $V_{CE}$ = 10 V, f = 1.0 MHz | 20 | 250 | |
| rb'$C_C$ | Collector Base Time Constant | $I_C$ = 8.0 mA, $V_{CE}$ = 10 V, f = 79.8 MHz | 8.0 | 25 | pS |
| **FUNCTIONAL TEST** | | | | | |
| $G_{pe}$ | Amplifier Power Gain | $I_C$ = 8.0 mA, $V_{CB}$ = 10 V, f = 200 MHz | 14 | 26 | dB |

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

# TO-92 Tape and Reel Data

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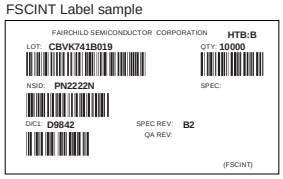
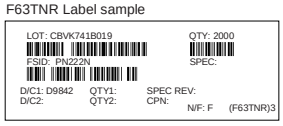
## TO-92 Packaging
**Configuration:** Figure 1.0

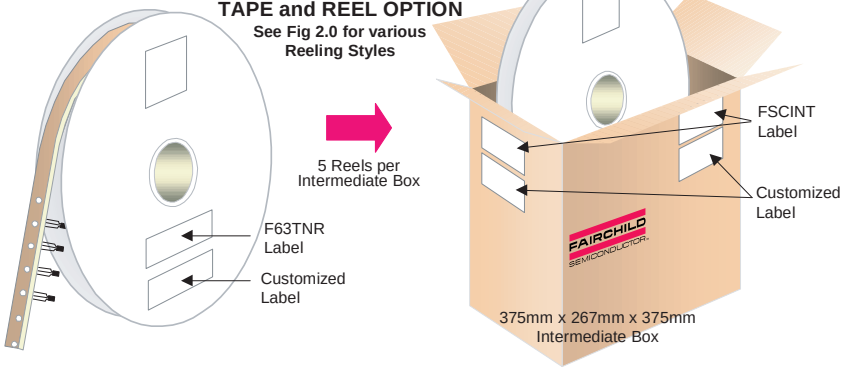
FSCINT Label sample




F63TNR Label sample




### TAPE and REEL OPTION
**See Fig 2.0 for various Reeling Styles**

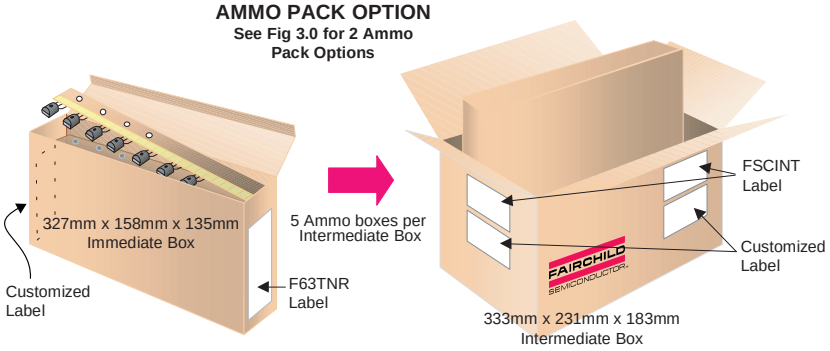



**TO-92 TNR/AMMO PACKING INFROMATION**

| 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

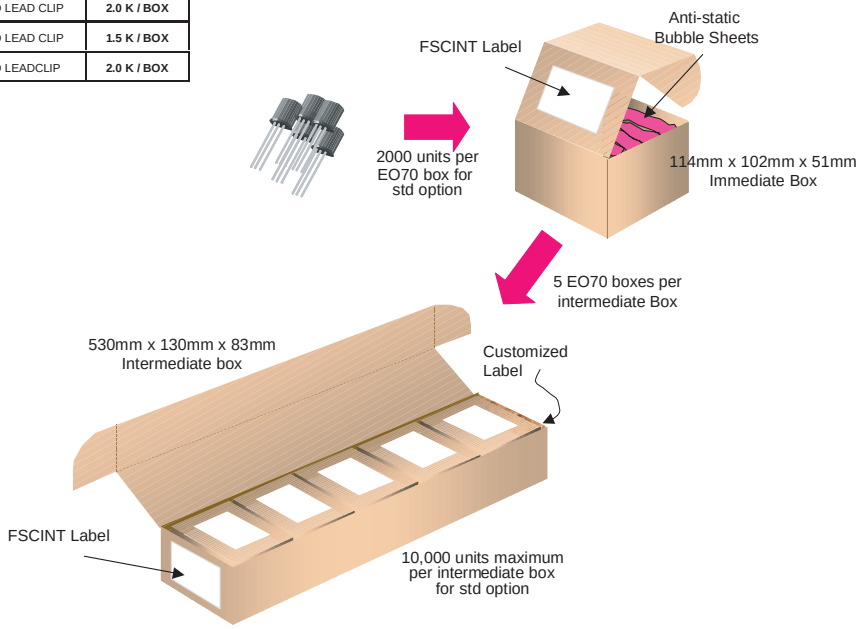
### AMMO PACK OPTION
**See Fig 3.0 for 2 Ammo Pack Options**




**(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 | NO LEADCLIP | 2.0 K / BOX |

### BULK OPTION
**See Bulk Packing Information table**

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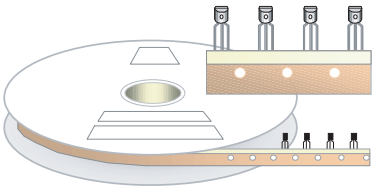
# TO-92 Tape and Reel Data, continued

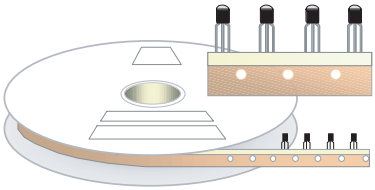
## TO-92 Reeling Style
**Configuration:** Figure 2.0

**Machine Option “A” (H)**



**Style “A”, D26Z, D70Z (s/h)**

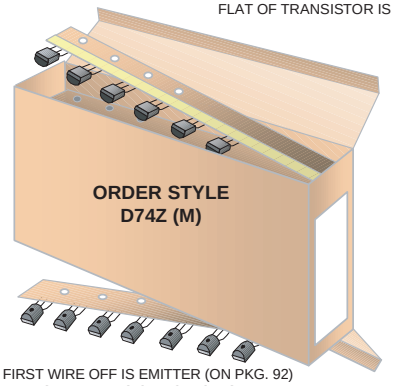
**Machine Option “E” (J)**



**Style “E”, D27Z, D71Z (s/h)**

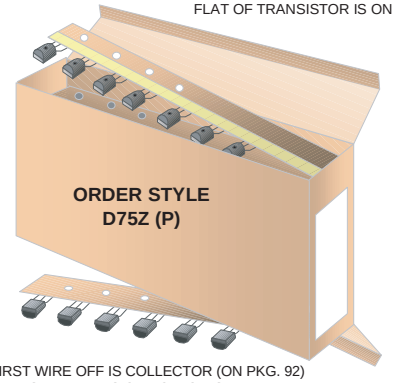
## TO-92 Radial Ammo Packaging
**Configuration:** Figure 3.0

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

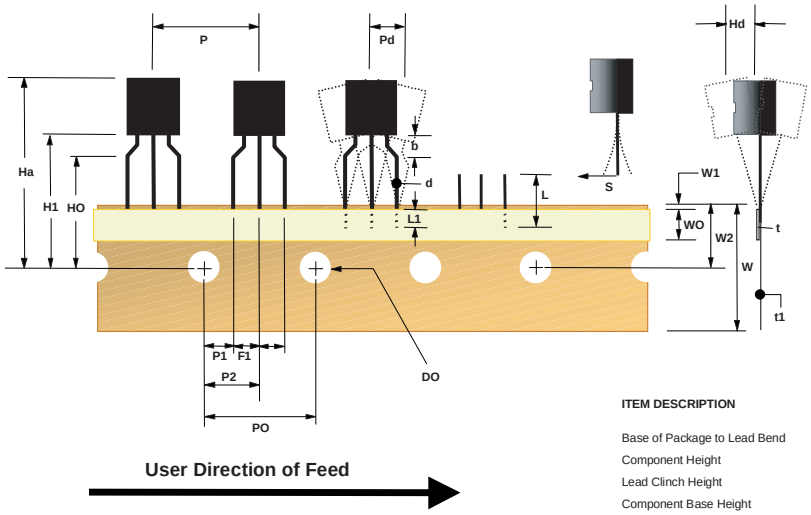
FIRST WIRE OFF IS EMITTER
ADHESIVE TAPE IS ON THE TOP SIDE
FLAT OF TRANSISTOR IS ON BOTTOM




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

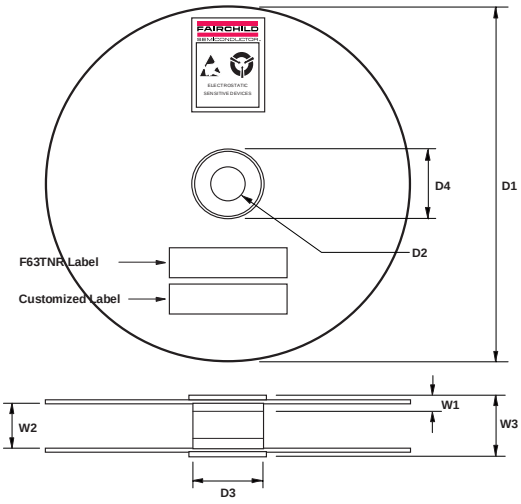
## TO-92 Tape and Reel Taping
**Dimension Configuration:** Figure 4.0




| 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

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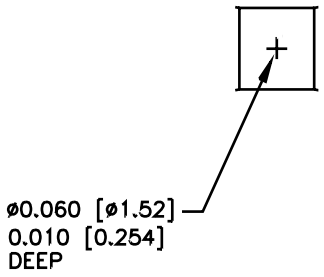
TO-92 (92,94,96)

| PIN | 92 | | 94 | | 96 | |
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