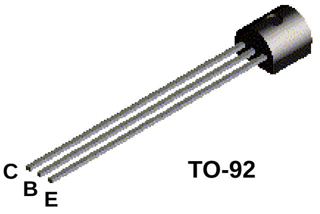
2N5769



NPN Switching Transistor

This device is designed for high speed saturated switching applications at currents to 100 mA. Sourced from Process 21. See PN2369A 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	40	V
V_{EBO}	Emitter-Base Voltage	4.5	V
I_C	Collector Current - Continuous	200	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
		2N5769	
P_D	Total Device Dissipation Derate above 25°C	350 2.8	mW mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	125	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	°C/W

Electrical Characteristics

TA = 25°C unless otherwise noted

OFF CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min	Max	Units
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage*	$I_C = 10$ mA, $I_B = 0$	15		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 10$ µA, $I_E = 0$	40		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10$ µA, $I_C = 0$	4.5		V
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	$I_C = 10$ µA, $I_B = 0$	40		V
I_{CBO}	Collector Cutoff Current	$V_{CB} = 20$ V, $I_E = 0$		0.4	µA
		$V_{CB} = 20$ V, $I_E = 0$, $T_A = 125$ °C		30	µA
I_{CES}	Collector Cutoff Current	$V_{CE} = 20$ V, $I_B = 0$		0.4	µA
I_{EBO}	Emitter Cutoff Current	$V_{EB} = 4.5$ V, $I_C = 0$		1.0	µA

ON CHARACTERISTICS*

Symbol	Parameter	Test Conditions	Min	Max	Units
h_{FE}	DC Current Gain	$I_C = 10$ mA, $V_{CE} = 0.35$ V	40	120	
		$I_C = 10$ mA, $V_{CE} = 0.35$ V $T_A = -55$ °C	20		
		$I_C = 30$ mA, $V_{CE} = 0.40$ V	30		
		$I_C = 100$ mA, $V_{CE} = 1.0$ V	20		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 10$ mA, $I_B = 1.0$ mA		0.2	V
		$I_C = 10$ mA, $I_B = 1.0$ mA $T_A = 125$ °C		0.3	V
		$I_C = 30$ mA, $I_B = 3.0$ mA		0.25	V
		$I_C = 100$ mA, $I_B = 10$ mA		0.5	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 10$ mA, $I_B = 1.0$ mA	0.7	0.85	V
		$I_C = 10$ mA, $I_B = 1.0$ mA $T_A = 125$ °C	0.59	1.02	V
		$I_C = 10$ mA, $I_B = 1.0$ mA $T_A = -55$ °C	0.59	1.02	V
		$I_C = 30$ mA, $I_B = 3.0$ mA		1.15	V
		$I_C = 100$ mA, $I_B = 10$ mA		1.6	V

SMALL SIGNAL CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min	Max	Units
C_{cb}	Collector-Base Capacitance	$V_{CB} = 5.0$ V, f = 1.0 MHz		4.0	pF
h_{fe}	Small-Signal Current Gain	$I_C = 10$ mA, $V_{CE} = 10$ V, f = 100 MHz	5.0		

SWITCHING CHARACTERISTICS

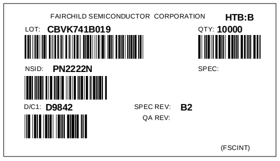
Symbol	Parameter	Test Conditions	Min	Max	Units
t_{on}	Turn-on Time	$I_C = 10$ mA, $I_{B1} = 3.0$ mA, $I_{B2} = 1.5$ mA		12	ns
t_{off}	Turn-off Time			18	ns
t_s	Storage Time	$I_C = I_{B1} = I_{B2} = 10$ mA		13	ns

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

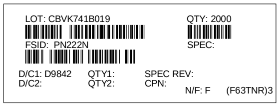
TO-92 Tape and Reel Data

TO-92 Packaging
Configuration: Figure 1.0

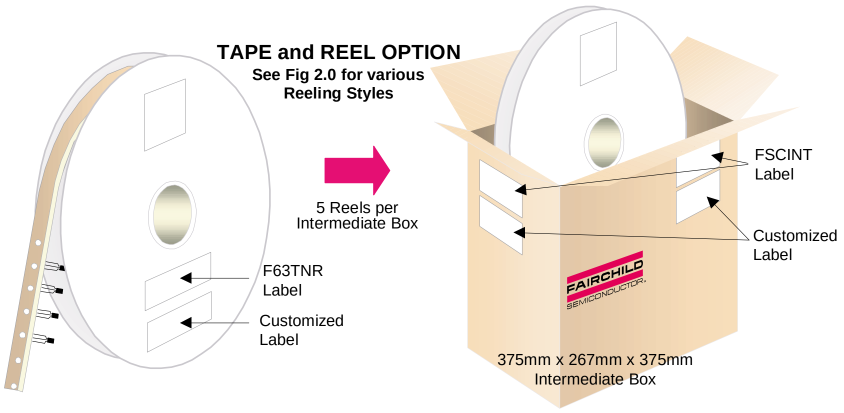
FSCINT Label sample


FAIRCHILD SEMICONDUCTOR CORPORATION **HTB:B**
LOT: **CBVK741B019** QTY: **10000**
NSID: **PN2222N** SPEC:
D/C1: **D9842** SPEC REV: **B2**
QA REV:
(FSCINT)

F63TNR Label sample


LOT: CBVK741B019 QTY: 2000
FSID: PN222N SPEC:
D/C1: D9842 QTY1: SPEC REV:
D/C2: QTY2: CPN:
N/F: F (F63TNR)3

TAPE and REEL OPTION
See Fig 2.0 for various Reeling Styles

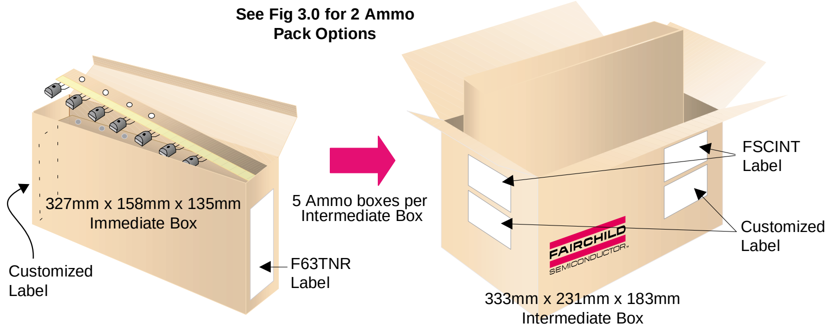


TO-92 TNR/AMMO PACKING INFROMATION

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

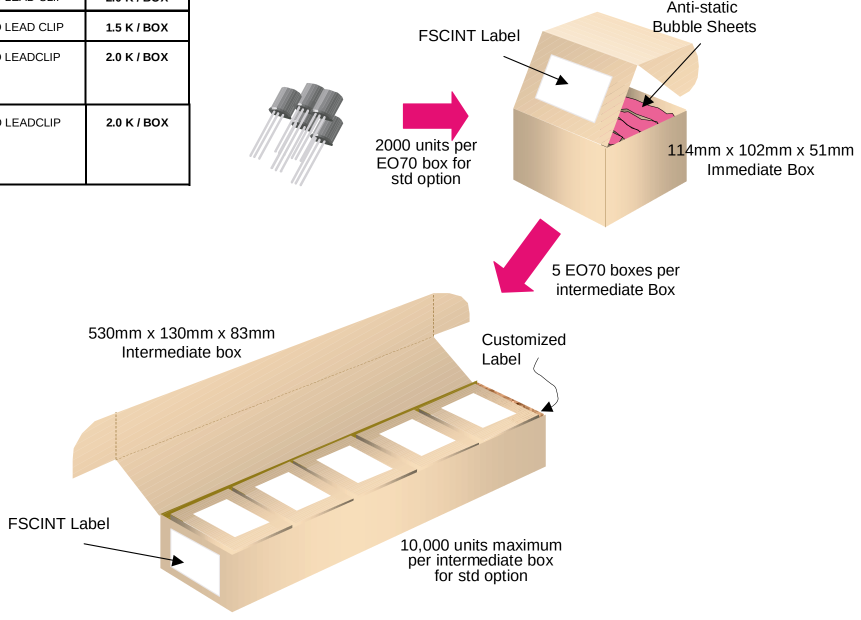
AMMO PACK OPTION
See Fig 3.0 for 2 Ammo Pack Options



(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

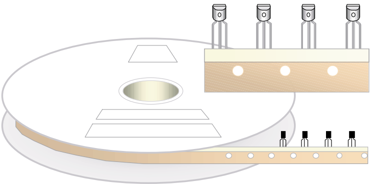


TO-92 Tape and Reel Data, continued

TO-92 Reeling Style

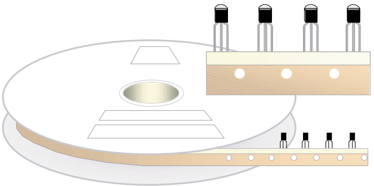
Configuration: Figure 2.0

Machine Option “A” (H)



Style “A”, D26Z, D70Z (s/h)

Machine Option “E” (J)

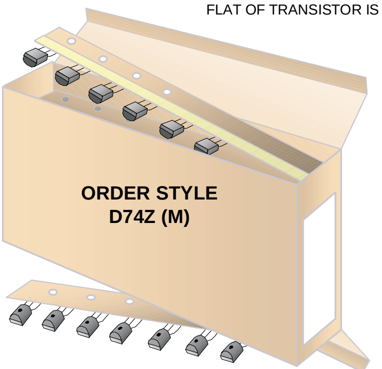


Style “E”, D27Z, D71Z (s/h)

TO-92 Radial Ammo Packaging

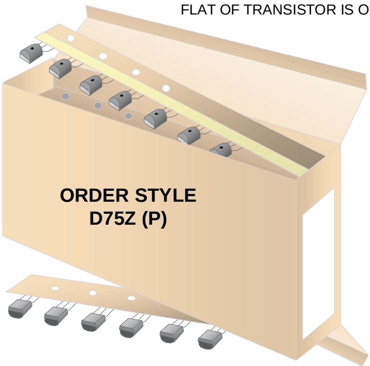
Configuration: Figure 3.0

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

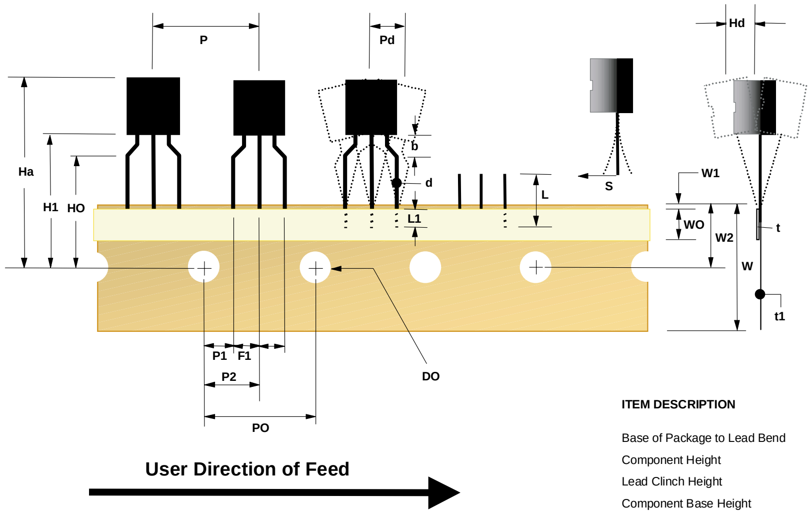
FIRST WIRE OFF IS EMITTER
ADHESIVE TAPE IS ON THE TOP SIDE
FLAT OF TRANSISTOR IS ON BOTTOM



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

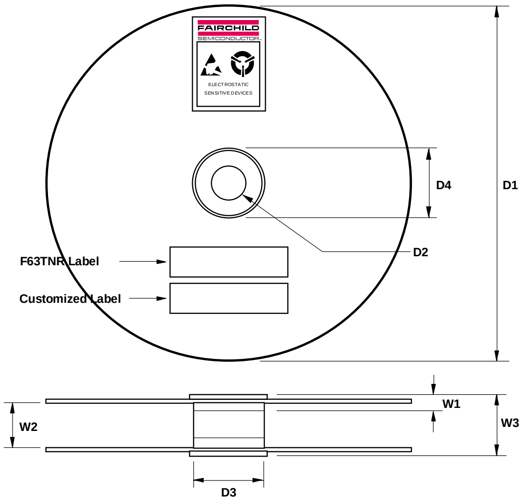
TO-92 Tape and Reel Taping
Dimension Configuration: Figure 4.0



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

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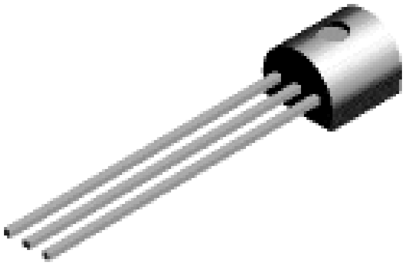
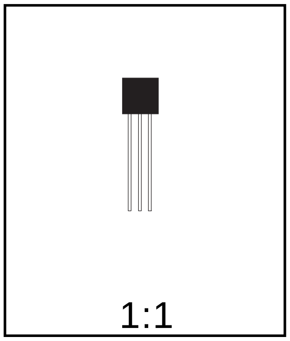
TO-92 (FS PKG Code 92, 94, 96)





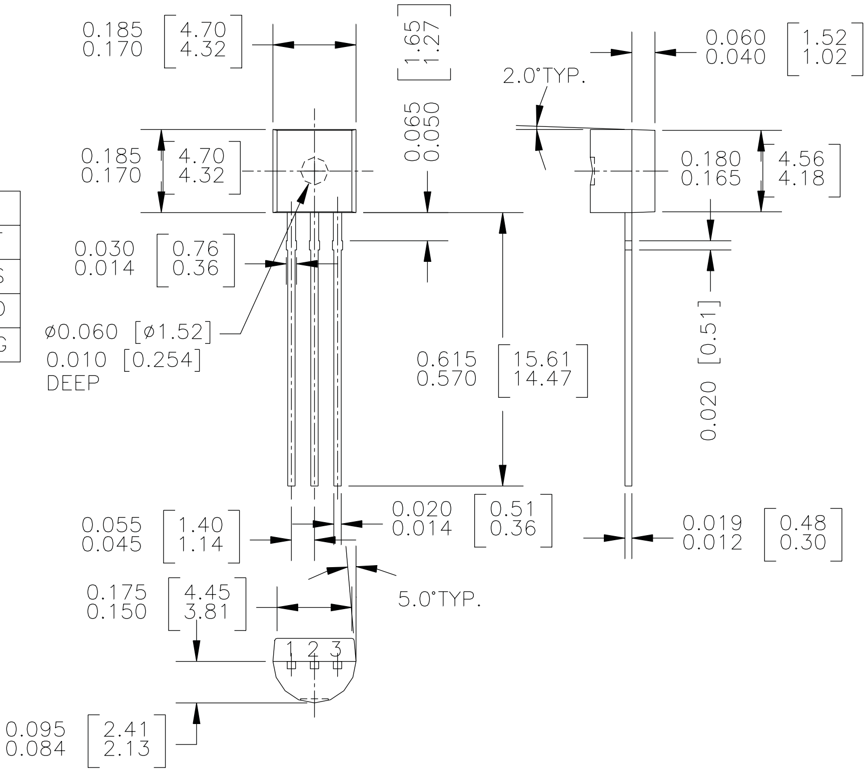
Scale 1:1 on letter size paper

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



January 2000, Rev. B

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