FAIRCHILD

SEMICONDUCTOR ™
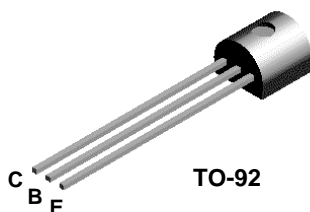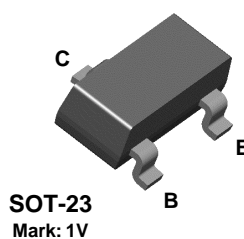
2N6427

MMBT6427

C
E
B
TO-92

C
E
B
SOT-23
Mark: 1V

NPN Darlington Transistor

This device is designed for applications requiring extremely high current gain at collector currents to 1.0 A. Sourced from Process 05. See MPSA14 for characteristics.

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	40	V
V_{EBO}	Emitter-Base Voltage	12	V
I_C	Collector Current - Continuous	1.2	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
		2N6427	*MMBT6427	
P_D	Total Device Dissipation Derate above 25°C	625 5.0	350 2.8	mW mW/°CCC
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	357	°C/W

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

NPN Darlington Transistor

(continued)

Electrical Characteristics
$T_A = 25°C$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
OFF CHARACTERISTICS					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage*	$I_C = 10$ mA, $I_B = 0$	40		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 100$ µA, $I_E = 0$	40		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10$ µA, $I_C = 0$	12		V
I_{CEO}	Collector Cutoff Current	$V_{CE} = 25$ V, $I_B = 0$		1.0	µA
I_{CBO}	Collector Cutoff Current	$V_{CB} = 30$ V, $I_E = 0$		50	nA
I_{EBO}	Emitter Cutoff Current	$V_{EB} = 10$ V, $I_C = 0$		50	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 $I_C = 500$ mA, $V_{CE} = 5.0$ V	10,000 20,000 14,000	100,000 200,000 140,000	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 50$ mA, $I_B = 0.5$ mA $I_C = 500$ mA, $I_B = 0.5$ mA		1.2 1.5	V V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 500$ mA, $I_B = 0.5$ mA		2.0	V
$V_{BE(on)}$	Base-Emitter On Voltage	$I_C = 50$ mA, $V_{CE} = 5.0$ mA		1.75	V
SMALL SIGNAL CHARACTERISTICS					
C_{obo}	Output Capacitance	$V_{CB} = 10$ V, $I_E = 0$, $f = 1.0$ MHz		7.0	pF
C_{ibo}	Input Capcitance	$V_{BE} = 1.0$ V, $I_C = 0$, $f = 1.0$ MHz		15	pF

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

TO-92 Ta[...]

FAIRCHILD
SEMICONDUCTOR ™

LOT: **CBVK741B019**   QTY: **10000**

D/C1: **D9842**   SPEC REV: **B2**
QA REV:

(FSCINT)
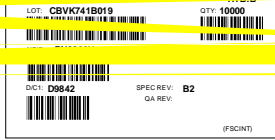
F63TNR Label sample

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
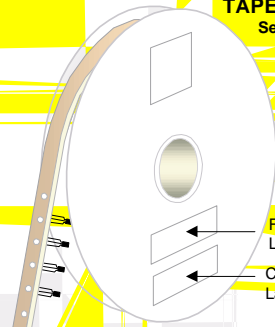
5 Reels per
Intermediate Box

F63TNR
Label

Customized
Label

375mm x 267   375mm

FAIRCHILD SEMICONDUCTOR

A

[...]mo bo[...]
[...]termed[...]

F6[...]
[...]

FAIRCHILD SEMICONDUCTOR

Intermediate Box

BULK OPTION
See Bulk Packing
Information table

Anti-static
Bubble Sheets

FSCINT Label

2000 units per
EO70 box for

114mm x 10[...]mm x [...]mm
[...]ediate Box

(TO-			
EOL CODE			
J18Z			
J05Z			
NO F[...]	94 (NON PROELECTRON SERIES), 96		
L34Z	TO-92 STANDARD STRAIGHT FOR: PKG 94 (PROELECTRON SERIES BCXXX, BFXXX, BSRXXX), 97, 98	NO LEADCLIP	2.0 K / BOX
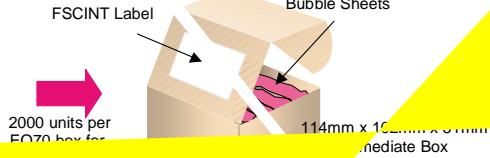
5 EO70 boxes per
intermediate Box

Customized
Label

10,000 units maximum
per intermediate box
for std option

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)

TO-92 Tape and Reel Data, continued

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

User Direction of Feed

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

FAIRCHILD
SEMICONDUCTOR TM

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

1:1

Scale 1:1 on letter size paper

Dimensions shown below are in:
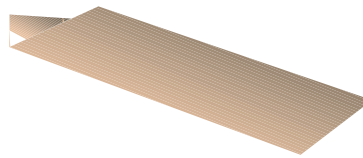inches [millimeters]

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

0.185 / 0.170 [4.70 / 4.32]

1.65 / 1.27

0.065 / 0.050

0.060 / 0.040 [1.52 / 1.02]

2.0°TYP.

0.185 / 0.170 [4.70 / 4.32]

0.180 / 0.165 [4.56 / 4.18]

0.030 / 0.014 [0.76 / 0.36]

Ø0.060 [Ø1.52]
0.010 [0.254]
DEEP

0.615 / 0.570 [15.61 / 14.47]

0.020 [0.51]

0.055 / 0.045 [1.40 / 1.14]

0.020 / 0.014 [0.51 / 0.36]

0.019 / 0.012 [0.48 / 0.30]

0.175 / 0.150 [4.45 / 3.81]

5.0°TYP.

1 2 3

0.095 / 0.084 [2.41 / 2.13]

SOT-23 Packaging
Configuration: Figure 10

SOT-23 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)	0.0082	0.0082
Weight per Reel (kg)	0.1175	0.4006
Note/Comments		

Human readable
Label

SOT-23 Tape Leader and Trailer
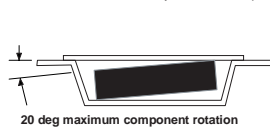**Configuration:**   Figure 20

Carrier Tape

Cover Tape

Trailer Tape
300mm minimum or
75 empty pockets

Components

Leader Tape
500mm minimum or
125 empty pockets
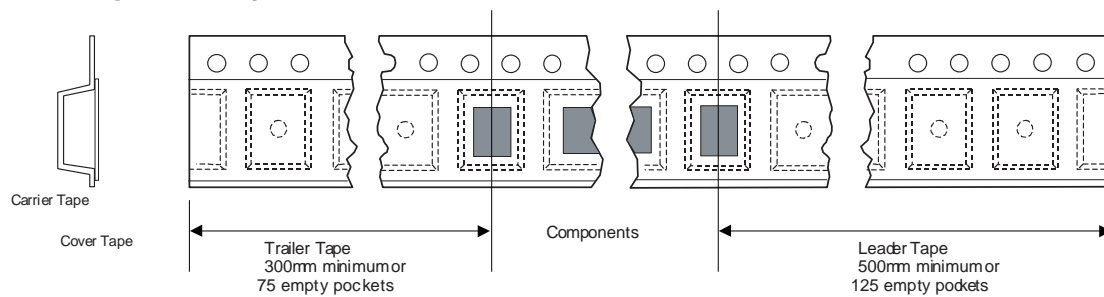
SOT-23 Tape and Reel Data, continued

SOT-23 Embossed Carrier Tape
Configuration: Figure 3.0

User Direction of Feed

							Dimensions are in millimeter						
Pkg type	A0	B0	W	D0	D1	E1	E2	F	P1	P0	K0	T	Wc	Tc
SOT-23 (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 +/-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).

20 deg maximum component rotation
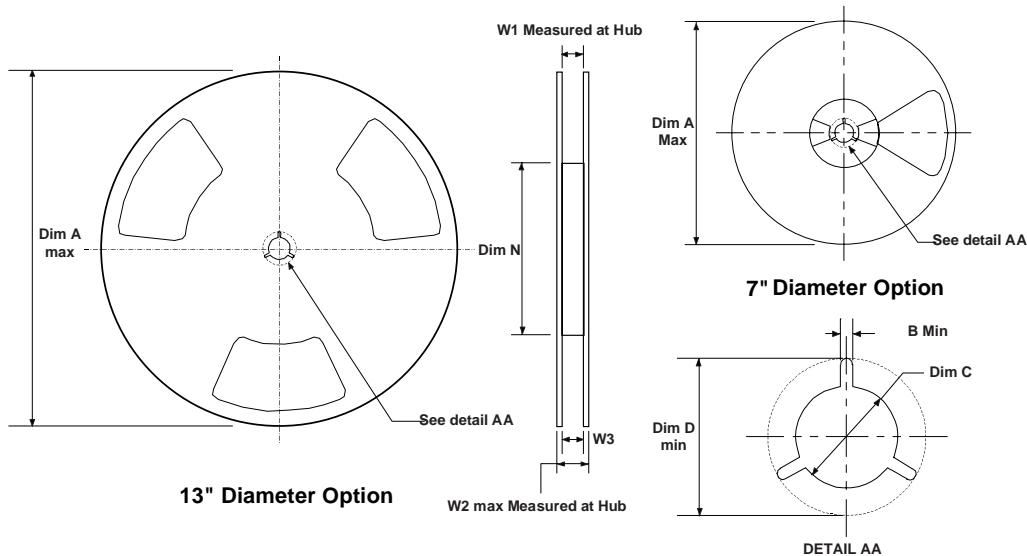
Sketch A (Side or Front Sectional View)
Component Rotation
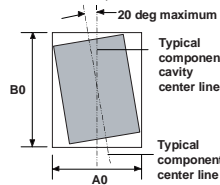
Sketch B (Top View)
Component Rotation

Sketch C (Top View)
**Component lateral movement**

SOT-23 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)
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

SOT-23 Package Dimensions
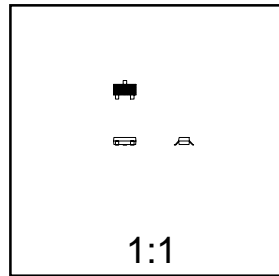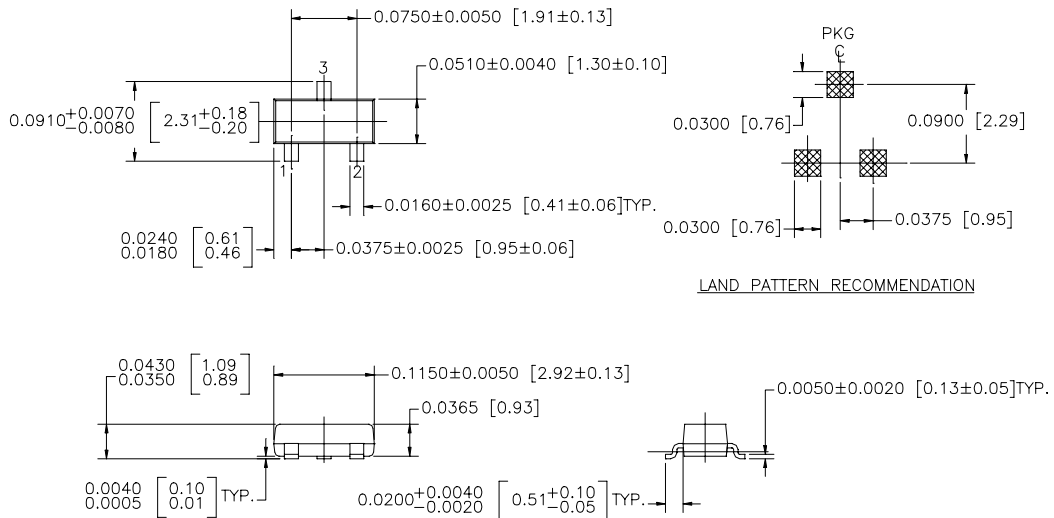
FAIRCHILD
SEMICONDUCTOR TM

SOT-23 (FS PKG Code 49)

1:1

Scale 1:1 on letter size paper

Dimensions shown below are in:
inches [millimeters]

Part Weight per unit (gram): 0.0082

0.0750±0.0050 [1.91±0.13]

0.0510±0.0040 [1.30±0.10]

3

$0.0910^{+0.0070}_{-0.0080}$ $\left[2.31^{+0.18}_{-0.20}\right]$

1   2

0.0160±0.0025 [0.41±0.06]TYP.

$\begin{bmatrix} 0.0240 \\ 0.0180 \end{bmatrix}$ $\begin{bmatrix} 0.61 \\ 0.46 \end{bmatrix}$

0.0375±0.0025 [0.95±0.06]

PKG
C

0.0300 [0.76]

0.0900 [2.29]

0.0300 [0.76]

0.0375 [0.95]

LAND PATTERN RECOMMENDATION

$\begin{bmatrix} 0.0430 \\ 0.0350 \end{bmatrix}$ $\begin{bmatrix} 1.09 \\ 0.89 \end{bmatrix}$

0.1150±0.0050 [2.92±0.13]

0.0365 [0.93]

0.0050±0.0020 [0.13±0.05]TYP.

$\begin{bmatrix} 0.0040 \\ 0.0005 \end{bmatrix}$ $\begin{bmatrix} 0.10 \\ 0.01 \end{bmatrix}$ TYP.

$0.0200^{+0.0040}_{-0.0020}$ $\left[0.51^{+0.10}_{-0.05}\right]$ TYP.

CONTROLLING DIMENSION IS INCH
VALUES IN [ ] ARE MILLIMETERS

OT 23, 3 LEADS LOW PROFILE

NOTE : UNLESS OTHERWISE SPECIFIED
1.   STANDARD LEAD FINISH 150 MICROINCHES / 3.81 MICROMETERS
      MINIMUM TIN / LEAD (SOLDER) ON ALLOY 42

2.   REFERENCE JEDEC REGISTRATION TO-2

TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACEx™	FASTr™	PowerTrench ®	SyncFET™
Bottomless™	GlobalOptoisolator™	QFET™	TinyLogic™
CoolFET™	GTO™	QS™	UHC™
CROSSVOLT™	HiSeC™	QT Optoelectronics™	VCX™
DOME™	ISOPLANAR™	Quiet Series™	
E²CMOS™	MICROWIRE™	SILENT SWITCHER ®	
EnSigna™	OPTOLOGIC™	SMART START™	
FACT™	OPTOPLANAR™	SuperSOT™-3	
FACT Quiet Series™	PACMAN™	SuperSOT™-6	
FAST ®	POP™	SuperSOT™-8	

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

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.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
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.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.