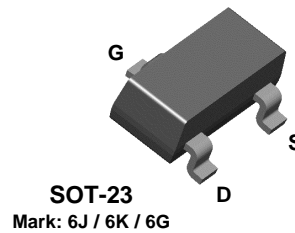
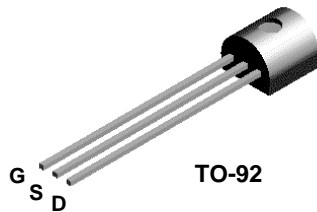


**PN4391
PN4392
PN4393**

**MMBF4391
MMBF4392
MMBF4393**



NOTE: Source & Drain
are interchangeable

N-Channel Switch

This device is designed for low level analog switching, sample and hold circuits and chopper stabilized amplifiers. Sourced from Process 51. See J111 for characteristics.

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

Symbol	Parameter	Value	Units
V_{DG}	Drain-Gate Voltage	30	V
V_{GS}	Gate-Source Voltage	- 30	V
I_{GF}	Forward Gate Current	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
		PN4391-4393	*MMBF4391-4393	
P_D	Total Device Dissipation Derate above 25°C	625	350	mW
		5.0	2.8	mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	125		°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	556	°C/W

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

N-Channel Switch

(continued)

Electrical Characteristics

TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
OFF CHARACTERISTICS					
V _{(BR)GSS}	Gate-Source Breakdown Voltage	I _G = 1.0 μA, V _{DS} = 0	- 30		V
I _{GSS}	Gate Reverse Current	V _{GS} = - 15 V, V _{DS} = 0 V _{GS} = - 15 V, V _{DS} = 0, T _A = 150°C		- 1.0 - 0.2	nA μA
V _{GS(off)}	Gate-Source Cutoff Voltage	V _{DS} = 20 V, I _D = 1.0 nA	4391 4392 4393	- 4.0 - 2.0 - 3.0	V V V
V _{GS(f)}	Gate-Source Forward Voltage	I _G = 1.0 mA, V _{DS} = 0		1.0	V
I _{D(off)}	Drain Cutoff Leakage Current	V _{DS} = 20 V, V _{GS} = - 12 V V _{DS} = 20 V, V _{GS} = - 7.0 V V _{DS} = 20 V, V _{GS} = - 5.0 V V _{DS} = 20 V, V _{GS} = - 12 V, T _A = 150°C V _{DS} = 20 V, V _{GS} = - 7.0 V, T _A = 150°C V _{DS} = 20 V, V _{GS} = - 5.0 V, T _A = 150°C	4391 4392 4393 4391 4392 4393	0.1 0.1 0.1 0.2 0.2 0.2	nA nA nA μA μA μA
ON CHARACTERISTICS					
I _{DSS}	Zero-Gate Voltage Drain Current*	V _{DS} = 20 V, V _{GS} = 0	4391 4392 4393	50 25 5.0	150 75 30 mA mA mA
V _{DS(on)}	Drain-Source On Voltage	I _D = 12 mA, V _{GS} = 0 I _D = 6.0 mA, V _{GS} = 0 I _D = 3.0 mA, V _{GS} = 0	4391 4392 4393	0.4 0.4 0.4	V V V
r _{DS(on)}	Drain-Source On Resistance	I _D = 1.0 mA, V _{GS} = 0	4391 4392 4393	30 60 100	Ω Ω Ω
SMALL-SIGNAL CHARACTERISTICS					
r _{DS(on)}	Drain-Source On Resistance	V _{DS} = V _{GS} = 0, f = 1.0 kHz	4391 4392 4393	30 60 100	Ω Ω Ω
C _{iss}	Input Capacitance	V _{DS} = 20, V _{GS} = 0, f = 1.0 MHz		14	pF
C _{rss}	Reverse Transfer Capacitance	V _{GS} = - 12 V, f = 1.0 MHz V _{GS} = - 7.0 V, f = 1.0 MHz V _{GS} = - 5.0 V, f = 1.0 MHz	4391 4392 4393	3.5 3.5 3.5	pF pF pF
SWITCHING CHARACTERISTICS					
t _r	Rise Time	I _{D(on)} = 12 mA I _{D(on)} = 6.0 mA I _{D(on)} = 3.0 mA	4391 4392 4393	5.0 5.0 5.0	ns ns ns
t _f	Fall Time	V _{GS(off)} = 12 V V _{GS(off)} = 6.0 V V _{GS(off)} = 3.0 V	4391 4392 4393	15 20 30	ns ns ns
t _{on}	Turn-On Time	I _{D(on)} = 12 mA I _{D(on)} = 6.0 mA I _{D(on)} = 3.0 mA	4391 4392 4393	15 15 15	ns ns ns
t _{off}	Turn-Off Time	V _{GS(off)} = 12 V V _{GS(off)} = 6.0 V V _{GS(off)} = 3.0 V	4391 4392 4393	20 35 50	ns ns ns

*Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 1.0%

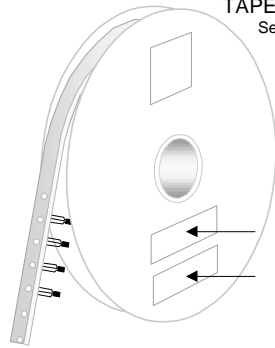
PN4391 / 4392 / 4393 / MMBF4391 / 4392 / 4393

FSCINT Label sample

F63TNR Label sample

LOT: CBVK741B019	QTY: 2000
FSID: PN222N	SPEC:
D/C1: D9942	QTY1:
D/C2:	QTY2:
SPEC REV: N/F: F (F63TNR)3	CPN:

TAPE and REEL OPTION
See Fig 2.0 for various Reeling Styles



FAIRCHILD
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SEMICONDUCTOR

L34Z	94 (NON PROELECTRON SERIES), 96	NO LEADCLIP	2.0 K / BOX
	TO-92 STANDARD STRAIGHT FOR: PKG 94 (PROELECTRON SERIES BCXXX, BFXXX, BSRXXX), 97, 98		

5 EO70 boxes per intermediate Box

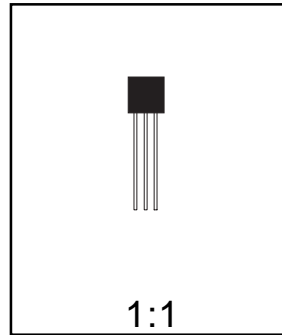
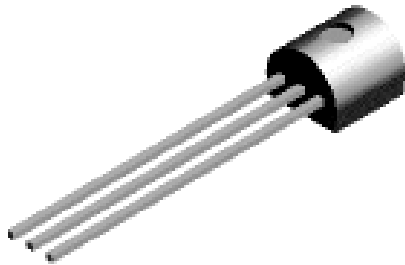
Customized Label



TO-92 Package Dimensions



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



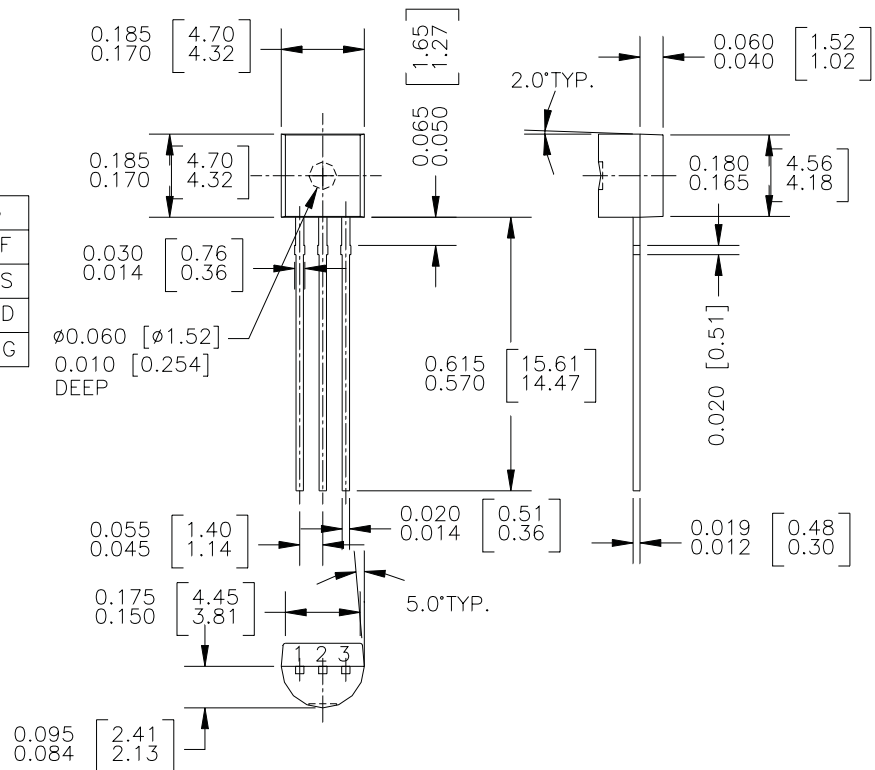
Scale 1:1 on letter size paper

Dimensions shown below are in:
inches [millimeters]

Part Weight per unit (gram): 0.1977

TO-92 (92,94,96)

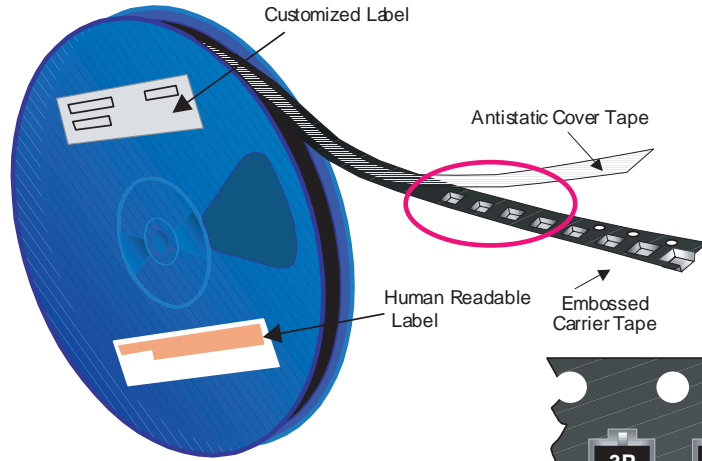
PIN	92		94		96	
	B	F	B	F	B	F
1	E	D	E	D	B	S
2	B	S	C	G	E	D
3	C	G	B	S	C	G



SOT-23 Tape and Reel Data



SOT-23 Packaging Configuration: Figure 10

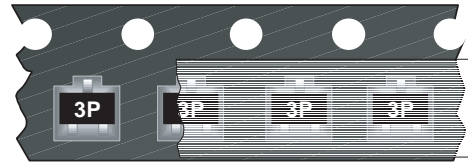


Packaging Description:

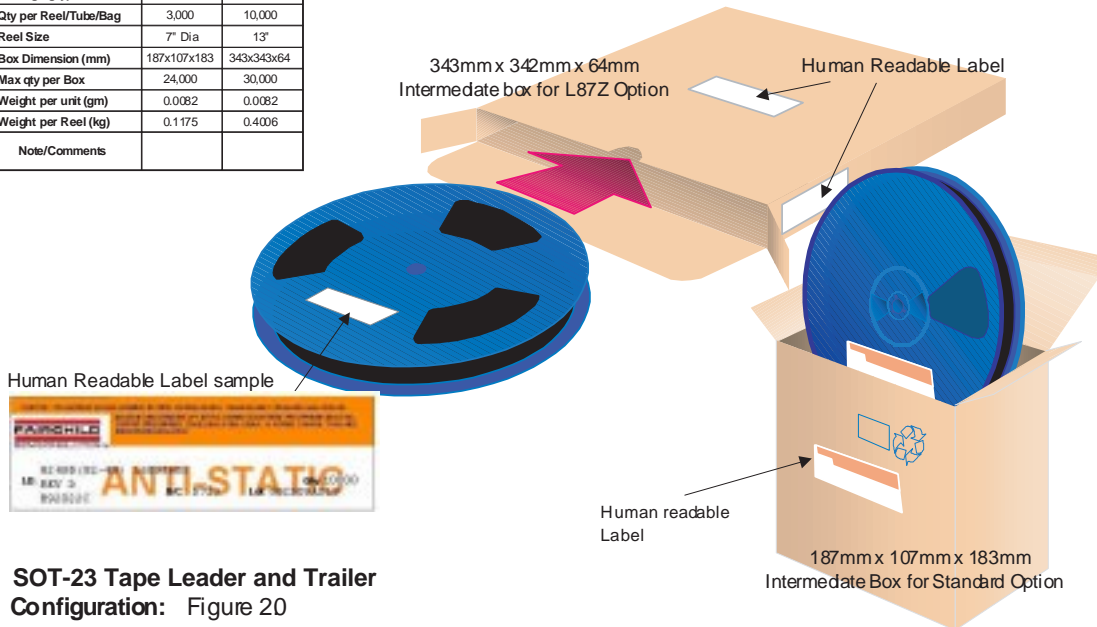
SOT-23 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 177mm 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 330mm 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.

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		



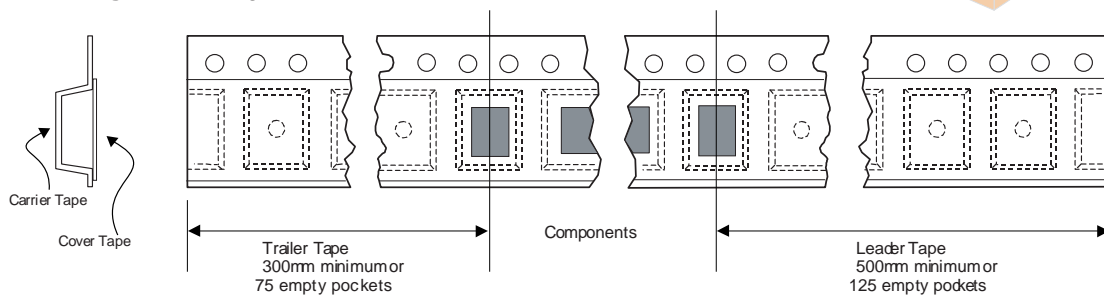
SOT-23 Unit Orientation



Human Readable Label sample

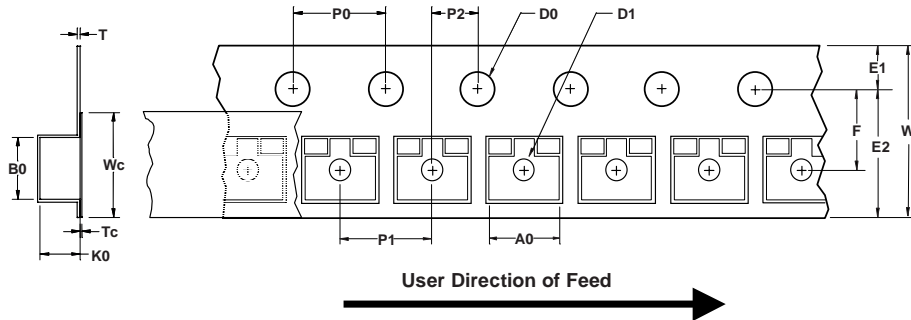


SOT-23 Tape Leader and Trailer Configuration: Figure 20



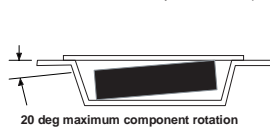
SOT-23 Tape and Reel Data, continued

SOT-23 Embossed Carrier Tape Configuration: Figure 3.0

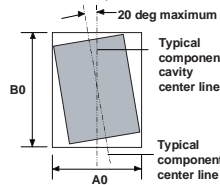


Dimensions are in millimeter														
Pkg type	A0	B0	W	D0	D1	E1	E2	F	P1	P0	K0	T	Wc	Tc
SOT-23 (8mm)	3.15 ±0.10	2.77 ±0.10	8.0 ±0.3	1.55 ±0.05	1.125 ±0.125	1.75 ±0.10	6.25 min	3.50 ±0.05	4.0 ±0.1	4.0 ±0.1	1.30 ±0.10	0.228 ±0.013	5.2 ±0.3	0.06 ±0.02

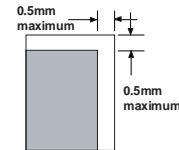
Notes: A0, B0, and K0 dimensions are determined with respect to the EIA/Jedec RS-481 rotational and lateral movement requirements (see sketches A, B, and C).



Sketch A (Side or Front Sectional View)
Component Rotation

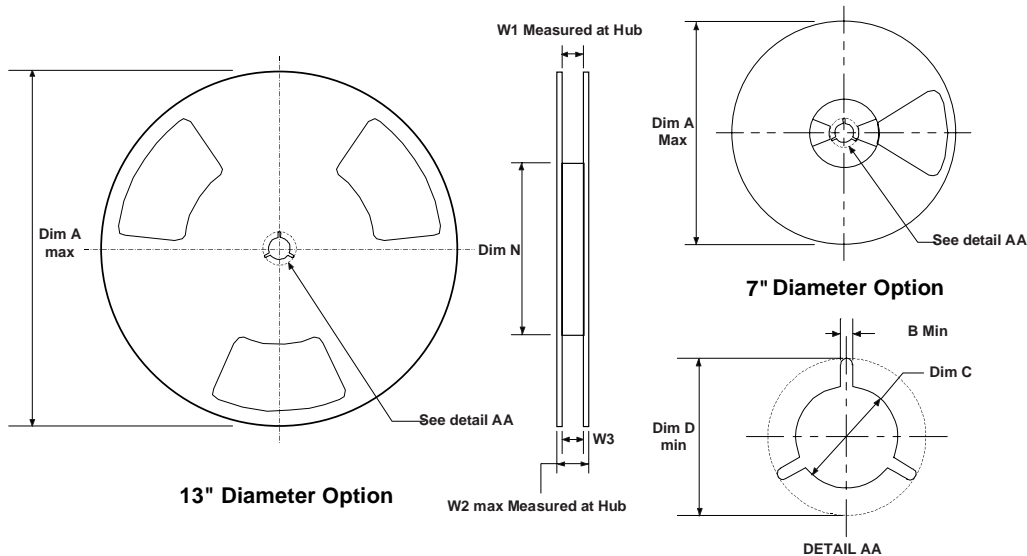


Sketch B (Top View)
Component Rotation



Sketch C (Top View)
Component lateral movement

SOT-23 Reel Configuration: Figure 4.0

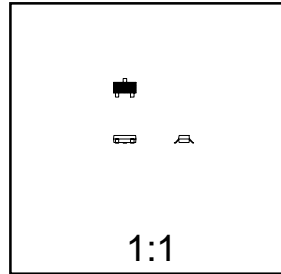
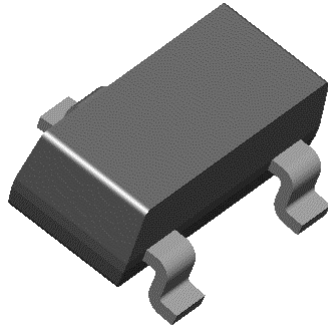


Dimensions are in inches and millimeters									
Tape Size	Reel Option	Dim A	Dim B	Dim C	Dim D	Dim N	Dim W1	Dim W2	Dim W3 (LSL-USL)
8mm	7" Dia	7.00 177.8	0.059 1.5	512 +0.020/-0.008 13 +0.5/-0.2	0.795 20.2	2.165 55	0.331 +0.059/-0.000 8.4 +1.5/0	0.567 14.4	0.311 -0.429 7.9 - 10.9
8mm	13" Dia	13.00 330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



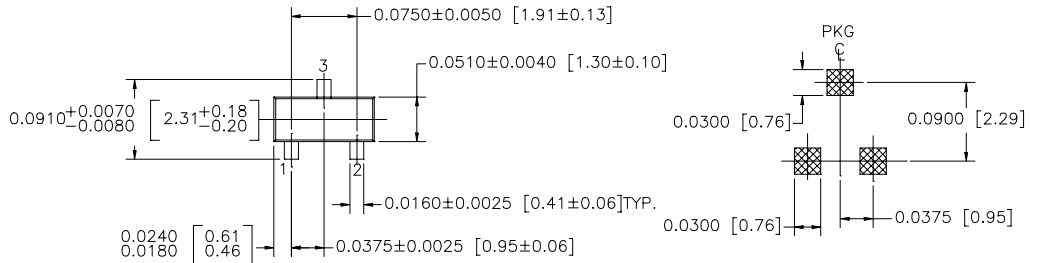
SOT-23 (FS PKG Code 49)



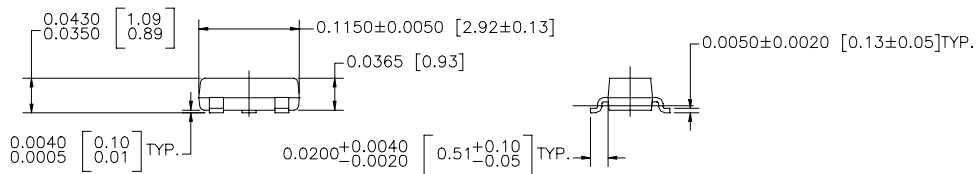
Scale 1:1 on letter size paper

Dimensions shown below are in:
inches [millimeters]

Part Weight per unit (gram): 0.0082



LAND PATTERN RECOMMENDATION



CONTROLLING DIMENSION IS INCH
VALUES IN [] ARE MILLIMETERS

SOT 23, 3 LEADS LOW PROFILE

NOTE : UNLESS OTHERWISE SPECIFIED

1. STANDARD LEAD FINISH 150 MICRONS / 3.81 MICROMETERS
MINIMUM TIN / LEAD (SOLDER) ON ALLOY 42
2. REFERENCE JEDEC REGISTRATION TO-236, VARIATION AB, ISSUE G, DATED JUL 1993

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Bottomless TM	GlobalOptoisolator TM	QFET TM	TinyLogic TM
CoolFET TM	GTO TM	QS TM	UHC TM
CROSSVOLT TM	HiSeC TM	QT Optoelectronics TM	VCX TM
DOME TM	ISOPLANAR TM	Quiet Series TM	
E ² CMOS TM	MICROWIRE TM	SILENT SWITCHER [®]	
EnSigna TM	OPTOLOGIC TM	SMART START TM	
FACT TM	OPTOPLANAR TM	SuperSOT TM -3	
FACT Quiet Series TM	PACMAN TM	SuperSOT TM -6	
FAST [®]	POP TM	SuperSOT TM -8	

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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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