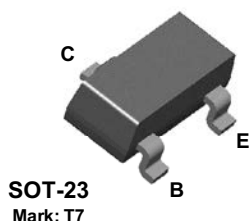




## BSR15



### PNP General Purpose Amplifier

This device is designed for use as general purpose amplifier and switches requiring collector currents to 500 mA. Sourced from Process 63. See BCW68G 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	60	V
$V_{EBO}$	Emitter-Base Voltage	5.0	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.
- 3) All voltages (V) and currents (A) are negative polarity for PNP transistors.

#### Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max	Units
		*BSR15	
$P_D$	Total Device Dissipation Derate above 25°C	350 2.8	mW mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	°C/W

\*Device mounted on FR-4 PCB 40 mm X 40 mm X 1.5 mm.

## PNP General Purpose Amplifier

(continued)

## Electrical Characteristics

TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
<b>OFF CHARACTERISTICS</b>					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	$I_C = 100\ \mu A, I_B = 0$	60		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 10\ \mu A, I_E = 0$	40		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10\ \mu A, I_C = 0$	5.0		V
$I_{CBO}$	Collector-Cutoff Current	$V_{CB} = 50\ V$ $V_{CB} = 50\ V, T_A = 150^\circ C$		20 20	nA $\mu A$
$I_{CEX}$	Collector-Cutoff Current	$V_{CE} = 30\ V, V_{EB} = 0.5\ V$		50	nA
$I_{BEX}$	Reverse Base Current	$V_{CE} = 30\ V, V_{EB} = 3.0\ V$		50	nA

## ON CHARACTERISTICS

$h_{FE}$	DC Current Gain	$I_C = 0.1\ mA, V_{CE} = 10\ V$ $I_C = 1.0\ mA, V_{CE} = 10\ V$ $I_C = 10\ mA, V_{CE} = 10\ V$ $I_C = 150\ mA, V_{CE} = 10\ V$ $I_C = 500\ mA, V_{CE} = 10\ V$	35 50 75 100 30	300	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 150\ mA, I_B = 15\ mA$ $I_C = 500\ mA, I_B = 50\ mA$		0.4 1.6	V V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 150\ mA, I_B = 15\ mA$ $I_C = 500\ mA, I_B = 50\ mA$		1.3 2.6	V V

## SMALL SIGNAL CHARACTERISTICS

$f_T$	Current Gain - Bandwidth Product	$I_C = 50\ mA, V_{CE} = 20,$ $f = 100\ MHz, T_A = 25^\circ C$	200		MHz
$C_{cb}$	Collector-Base Capacitance	$V_{CB} = 10\ V, I_E = 0, f = 1.0\ MHz$		8.0	pF
$C_{eb}$	Emitter-Base Capacitance	$V_{EB} = 2.0\ V, I_E = 0, f = 1.0\ MHz$		30	pF

## SWITCHING CHARACTERISTICS

$t_{on}$	Turn-on Time	$V_{CC} = 30\ V, I_C = 150\ mA,$ $I_{B1} = 15\ mA$		45	ns
$t_d$	Delay Time			10	ns
$t_r$	Rise Time			40	ns
$t_{off}$	Turn-off Time	$V_{CC} = 6.0\ V, I_C = 150\ mA$ $I_{B1} = I_{B2} = 15\ mA$		100	ns
$t_s$	Storage Time			80	ns
$t_f$	Fall Time			30	ns

NOTE: All voltages (V) and currents (A) are negative polarity for PNP transistors.

## Spice Model

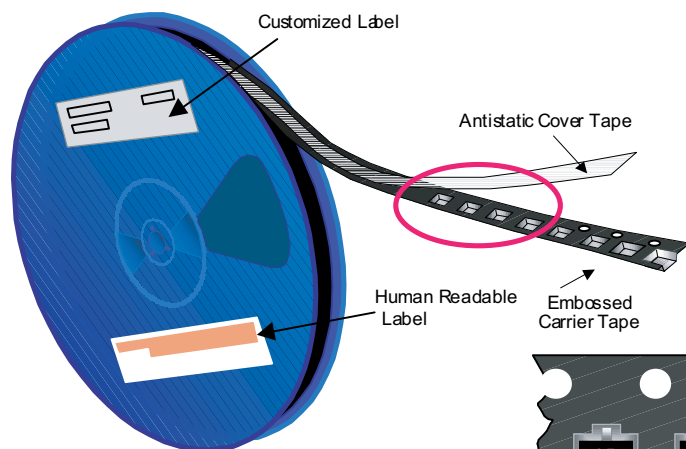
PNP (Is=650.6E-18 Xti=3 Eg=1.11 Vaf=115.7 Bf=231.7 Ne=1.829 Ise=54.81f Ikf=1.079 Xtb=1.5 Br=3.563 Nc=2  
Isc=0 Ikr=0 Rc=.715 Cjc=14.76p Mjc=.5383 Vjc=.75 Fc=.5 Cje=19.82p Mje=.335z Vje=.75 Tr=111.3n Tf=603.7p  
Itf=.65 Vtf=5 Xtf=1.7 Rb=10)

## SOT-23 Tape and Reel Data



### SOT-23 Packaging

Configuration: Figure 10



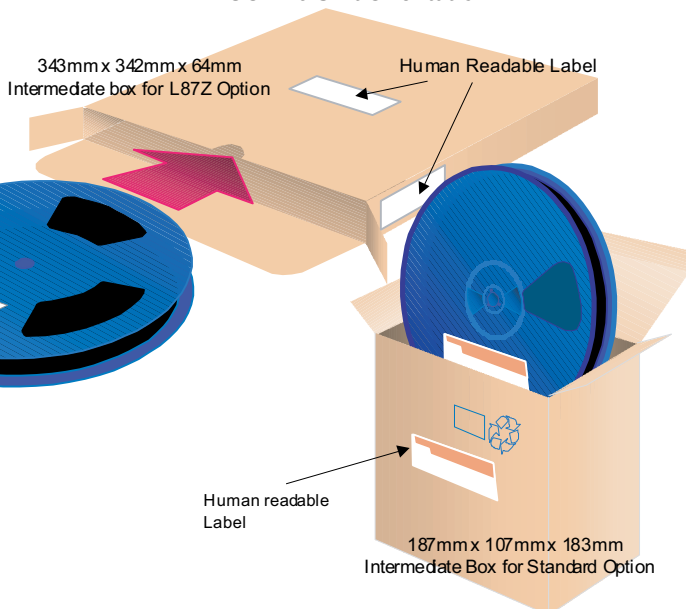
#### Packaging Description:

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

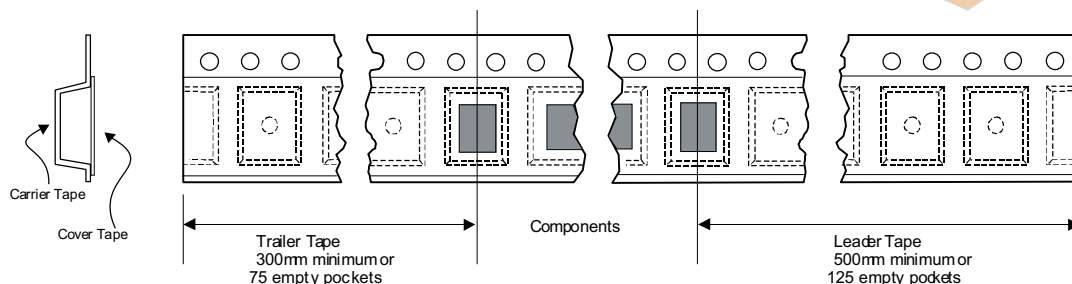


Human Readable Label sample



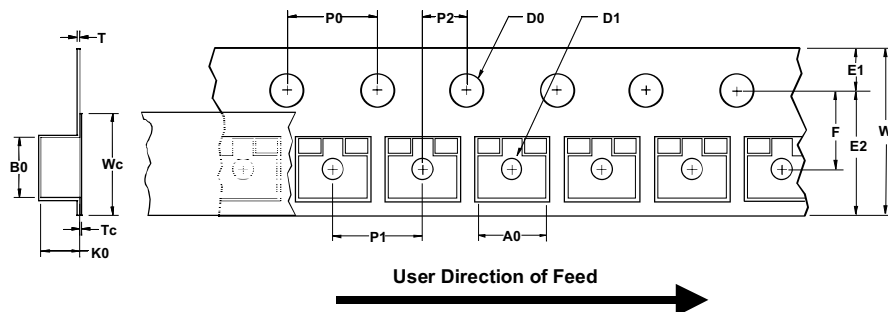
### SOT-23 Tape Leader and Trailer Configuration: Figure 20

Configuration: Figure 20



## SOT-23 Tape and Reel Data, continued

### SOT-23 Embossed Carrier Tape Configuration: Figure 3.0

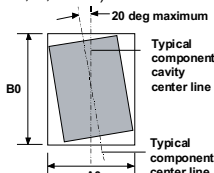


Dimensions are in millimeter														
Pkg type	A0	B0	W	D0	D1	E1	E2	F	P1	P0	K0	T	Wc	Tc
SOT-23 (8mm)	3.15 +/-0.10	2.77 +/-0.10	8.0 +/-0.3	1.55 +/-0.05	1.125 +/-0.125	1.75 +/-0.10	6.25 min	3.50 +/-0.05	4.0 +/-0.1	4.0 +/-0.1	1.30 +/-0.10	0.228 +/-0.013	5.2 +/-0.3	0.06 +/-0.02

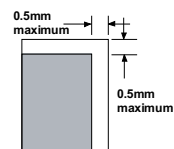
Notes: A0, B0, and K0 dimensions are determined with respect to the EIA/Jedec RS-481 rotational and lateral movement requirements (see sketches A, B, and C).



Sketch A (Side or Front Sectional View)  
Component Rotation

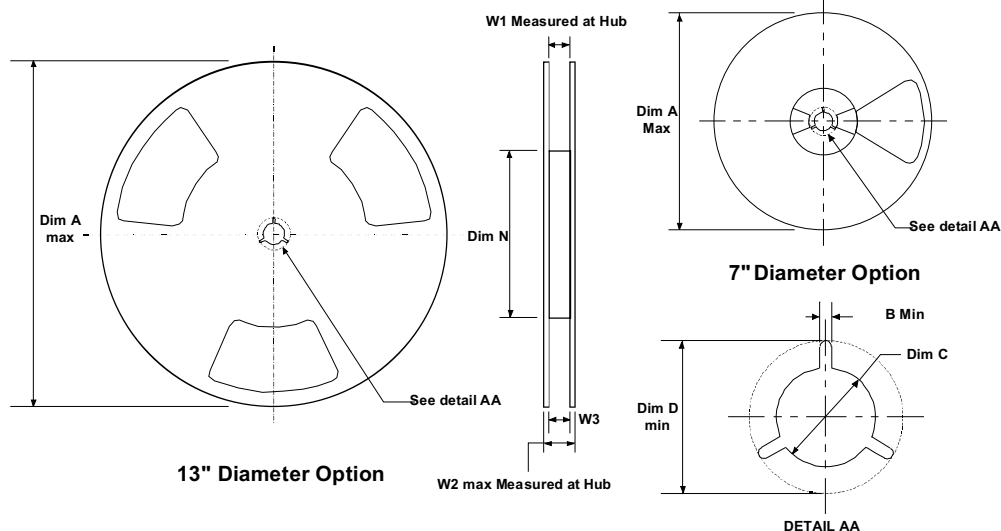


Sketch B (Top View)  
Component Rotation



Sketch C (Top View)  
Component lateral movement

### SOT-23 Reel Configuration: Figure 4.0

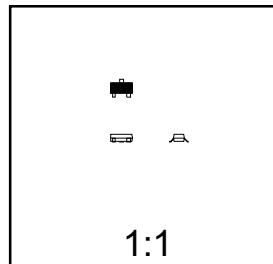
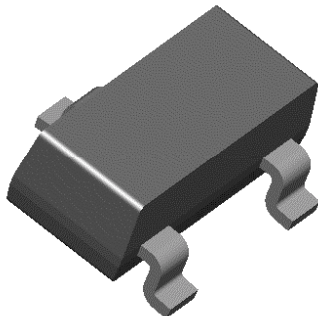


Dimensions are in inches and millimeters									
Tape Size	Reel Option	Dim A	Dim B	Dim C	Dim D	Dim N	Dim W1	Dim W2	Dim W3 (LSL-USL)
8mm	7" Dia	7.00 177.8	0.059 1.5	512 +0.020/-0.008 13 +0.5/-0.2	0.795 20.2	2.165 55	0.331 +0.059/-0.000 8.4 +1.5/0	0.567 14.4	0.311 - 0.429 7.9 - 10.9
8mm	13" Dia	13.00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



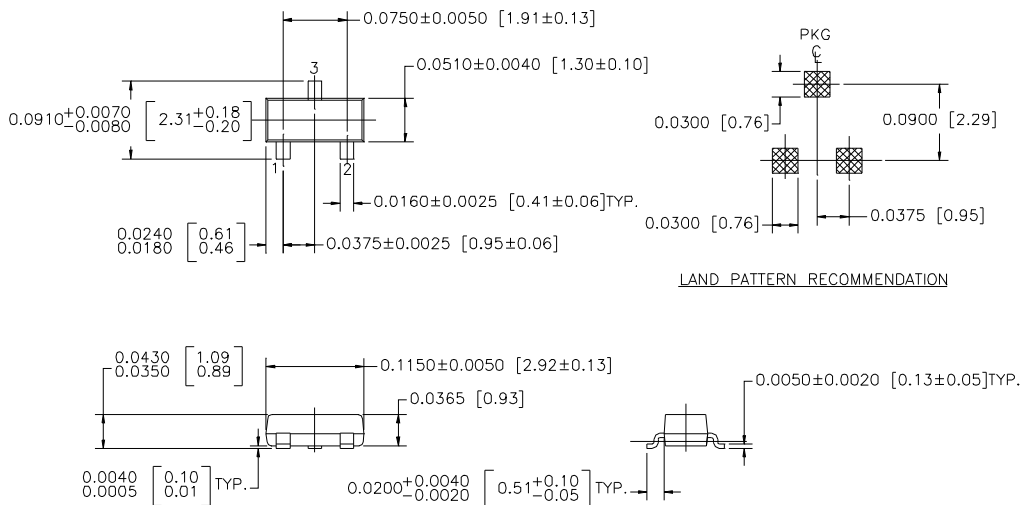
### SOT-23 (FS PKG Code 49)



Scale 1:1 on letter size paper

Dimensions shown below are in:  
inches [millimeters]

Part Weight per unit (gram): 0.0082



CONTROLLING DIMENSION IS INCH  
VALUES IN [ ] ARE MILLIMETERS

SOT 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-236, VARIATION AB, ISSUE G, DATED JUL 1993

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EnSigna <sup>™</sup>	OPTOLOGIC <sup>™</sup>	SMART START <sup>™</sup>	
FACT <sup>™</sup>	OPTOPLANAR <sup>™</sup>	SuperSOT <sup>™</sup> -3	
FACT Quiet Series <sup>™</sup>	PACMAN <sup>™</sup>	SuperSOT <sup>™</sup> -6	
FAST <sup>®</sup>	POP <sup>™</sup>	SuperSOT <sup>™</sup> -8	

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