SL432
1.24V Shunt Ref / Amplifier

DESCRIPTION

The SL432 is a low voltage reference/ amplifier suited for the control loop of low voltage power supplies. Functionally similar to the ubiquitous TL431, the SL432 has a lower 1.24V reference and a much wider range of operating currents. Particular care was taken in the design to minimize overshoot at start-up and to allow wide AC bandwidth. The SL432 is a drop-in replacement for any 1.24V shunt reference.

FEATURES

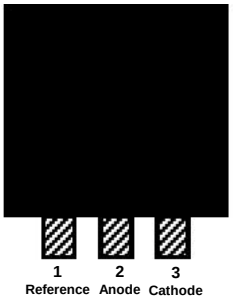
- Low voltage references: 1.24V
- 40 µA to 100mA operation
- Drop-in replaces any 1.24V shunt reference
- Low TC voltage reference
- RoHS compliant

APPLICATIONS

- Power supply control loop
- Low TC low voltage reference
- Power management applications

PIN CONFIGURATION – Top View

TO-92

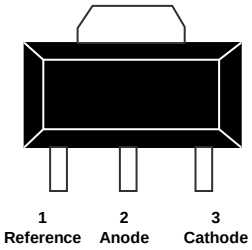


PACKAGE TOP MARKING:
(For TO-92)

SL432 FYMXXXS GYYWW

Line 1: Device
Line 2: Lot No. Code
F – Foundry Code (W)
YMXXX – 5 Character Lot No.
S – Split Code
Line 3: Date Code
G – Assembly Vendor Code
YY – Year
WW – Workweek

SOT-89

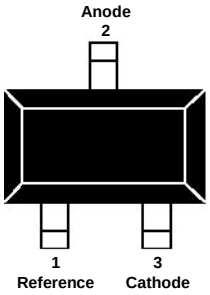


PACKAGE TOP MARKING:
(For SOT-89)

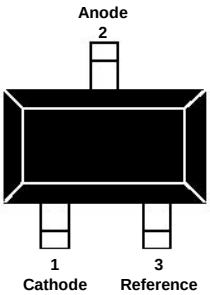
SL432 YMXXXS

Line 1: Device
Line 2: Lot No. Code
YMXXX –5 Character Lot No. mark excluding 1st letter character of lot no.
S – Split Code

3L SOT-23 VS



3L SOT-23 VF



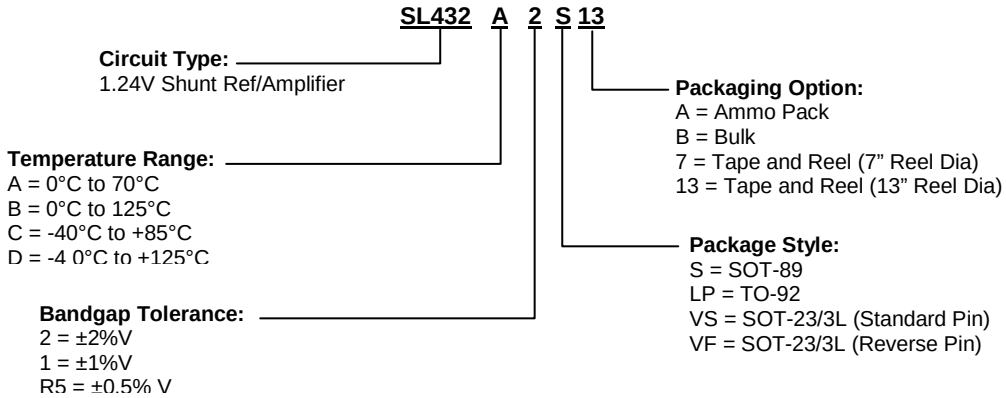
PACKAGE TOP MARKING:
(For 3L SOT-23)

BBB

Line 1: # BBB
- Device Number (single letter code)
BBB – Sequential Number

Note:
1. # is based on Silicon Link Device Marking Guidelines (refer to SLI form no. FM-40217)
2. BBB is based on Silicon Link Logbook Code

ORDERING INFORMATION



ABSOLUTE MAXIMUM RATINGS

Stress greater those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These stress ratings only, and functional of the device at these or any conditions beyond those indicated under recommended Operating Conditions is not implied. Exposure to "Absolute Maximum Rating" for extended periods may affect device reliability. Use of standard ESD handling precautions is required.

Parameter	Value	Units
CATH Voltage	18	V
REF Current	3	mA
CATH, ANODE Currents	150	mA
Operating Junction Temperature	150	°C
Lead Temperature (soldering 10 seconds)	260	°C
Storage Temperature Range	-65 to +150	°C

ELECTRICAL SPECIFICATIONS

Electrical characteristics are guaranteed over the full temperature range -40°C <Tj<105°C unless otherwise stated. Ambient temperature must be de-rated based upon power dissipation and package thermal characteristics.

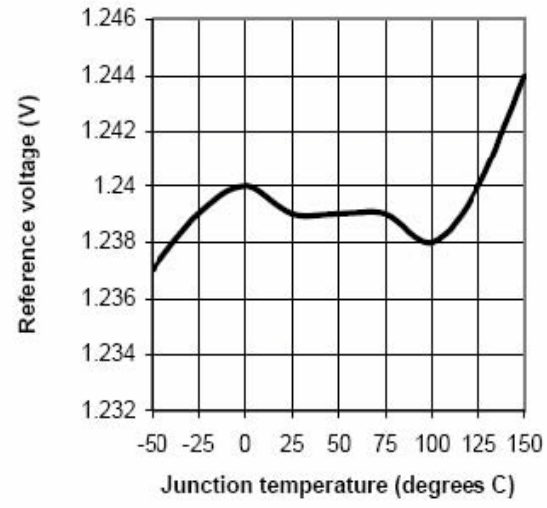
Symbol	Parameter	Conditions		Min	Typ	Max	Units
V_{REF}	Reference Voltage	25°C; V_{REF}=V_{CATH}; I_{CATH}=10mA	0.5% option	1.234	1.240	1.246	V
			1.0% option	1.228	1.240	1.252	V
			2.0% option	1.215	1.240	1.256	V
ΔV_{REF}	V_{REF} Temperature deviation	-40°C <Tj<105°C			4	12	mV
$\Delta V_{REF} \Delta V_{CATH}$	Ratio of V_{REF} Change toV_{CATH} Change (Line Reg; 1/gain)	I_{CATH}=10mA, V_{CATH} = V_{REF} to 6V			0.3	1	mV/V
I_{REF}	Reference input current	I_{CATH}=10mA			0.2	0.4	µA
ΔI_{REF}	I_{REF} Temperature Deviation				0.04	0.2	µA

ELECTRICAL SPECIFICATIONS (continued)

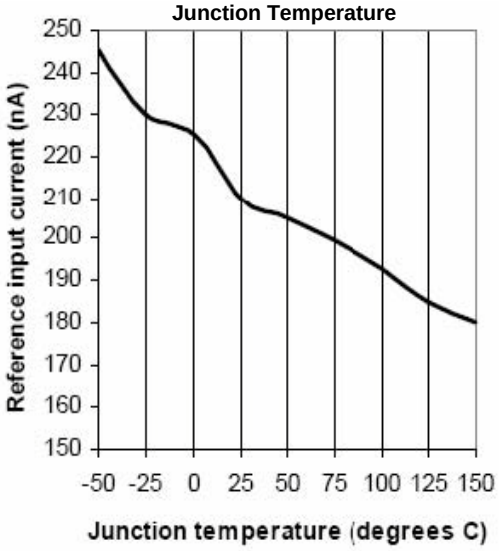
Symbol	Parameter	Conditions	Min	Typ	Max	Units
$I_{CATH\ (min)}$	Minimum Cathode Current			18	40	µA
$I_{CATH\ (OFF)}$	Off-State Cathode Current	V_{REF}=0V; V_{CATH}=16V			100	nA
r_{CATH}	Dynamic Output Impedance	I_{CATH}=0.1 to 100mAf ≤ 1.0 kHz		0.3	0.4	

TYPICAL PERFORMANCE CHARACTERISTICS

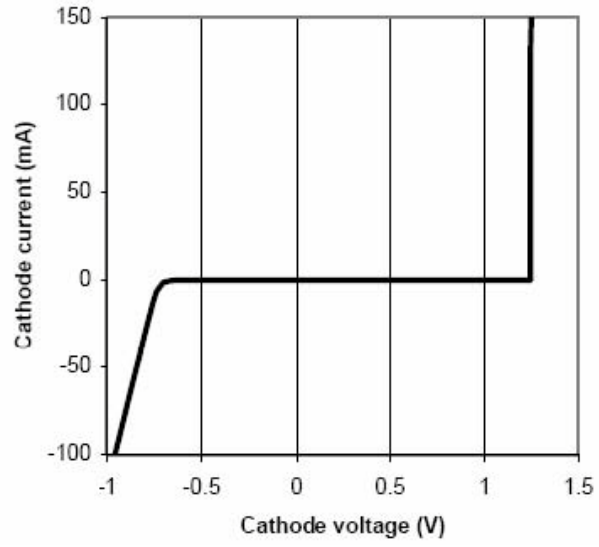
Reference Voltage Vs Junction Temperature



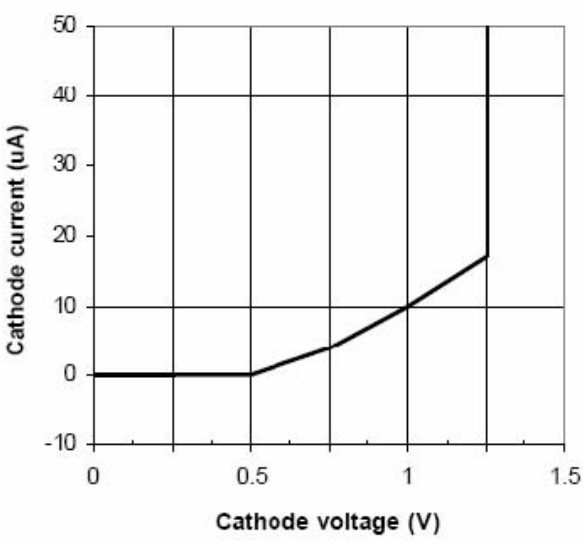
Reference Input Current Vs Junction Temperature



Cathode Current Vs Cathode Voltage

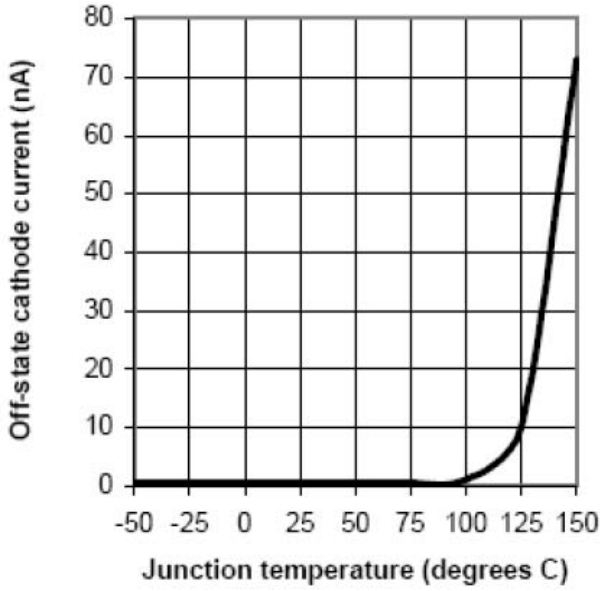


Cathode Current Vs Cathode Voltage

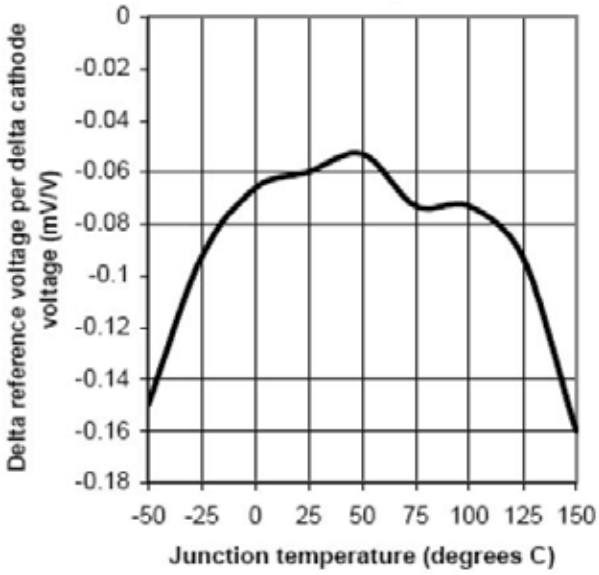


TYPICAL PERFORMANCE CHARACTERISTICS

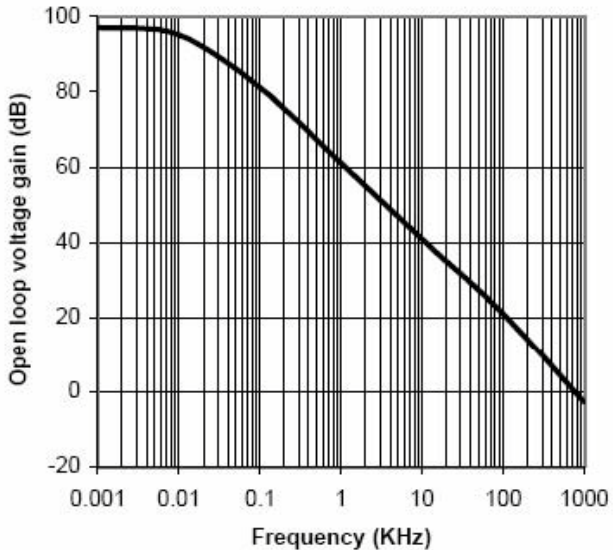
Off-state Cathode Current vs Junction Temperature



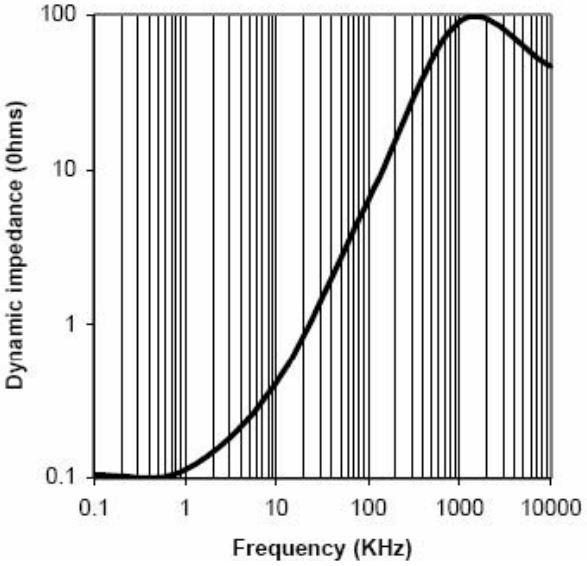
Delta Reference Voltage per Data Cathode Voltage vs Junction Temperature



Open Lop Voltage Gain vs Frequency

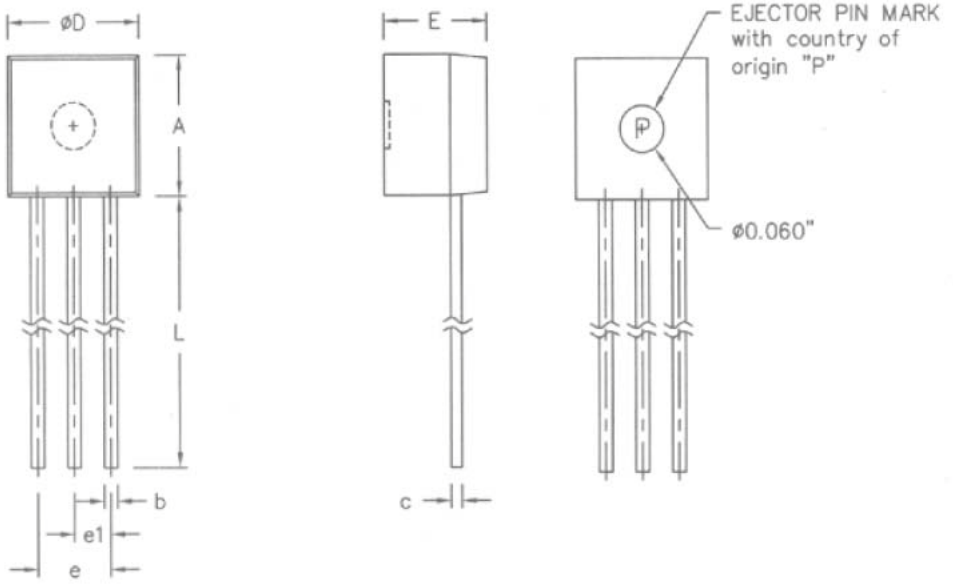


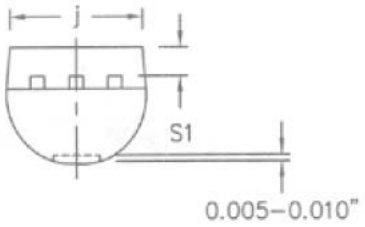
Open Lop Voltage Gain vs Frequency



TO-92 PACKAGE DIMENSION

3-Lead TO-92 Plastic Package SLI Package Code: LP





SYMBOL	INCHES		
	MIN	NOM	MAX
A	0.176	0.180	0.184
b	0.015	0.018	0.022
c	0.014	0.015	0.020
øD	0.176	0.180	0.184
e	0.098	0.100	0.102
e1	0.048	0.050	0.052
E	0.136	0.140	0.144
j	0.166	0.170	0.174
L	0.530	0.550	0.570
S1	0.031	0.035	0.039

NOTES:

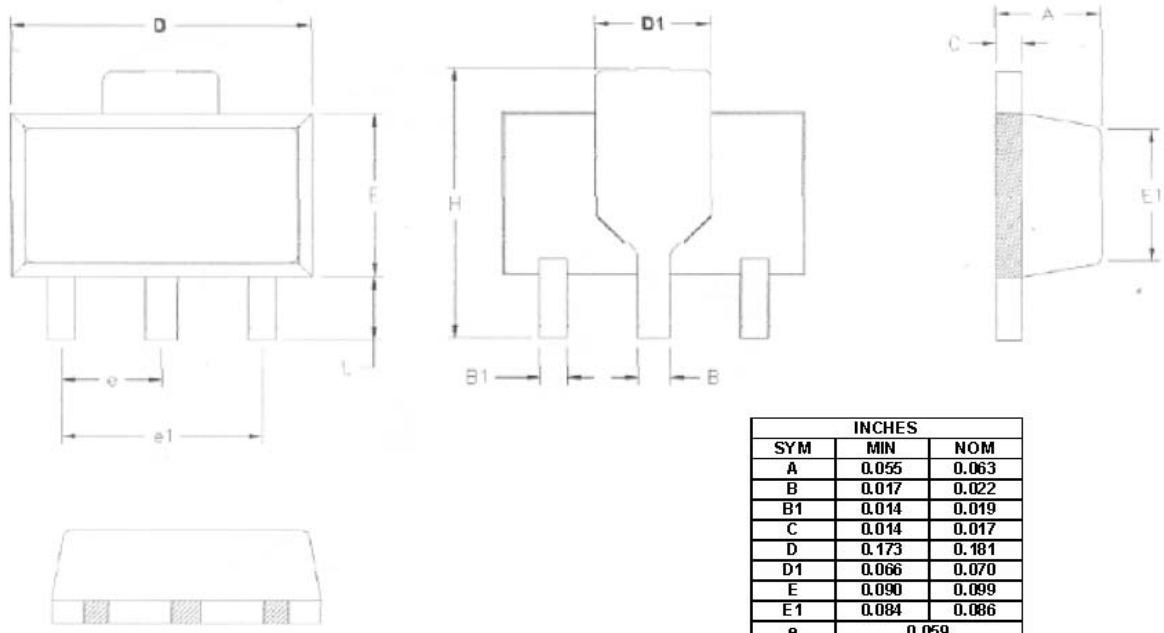
1. **ALL DIMENSIONS IN INCHES.**
2. **A MECHANICAL TOLERANCE OF ±0.002" APPLIES TO ALL DIMENSIONS WHERE NO TOLERANCE IS EXPLICITLY GIVEN.**
3. **BASED FROM JEDEC TO-226 VARIATION AA OUTLINE.**

SOT-89 PACKAGE DIMENSION

3-Lead SOT-89 Plastic

Surface Mounted Package

SLI Package Code: S



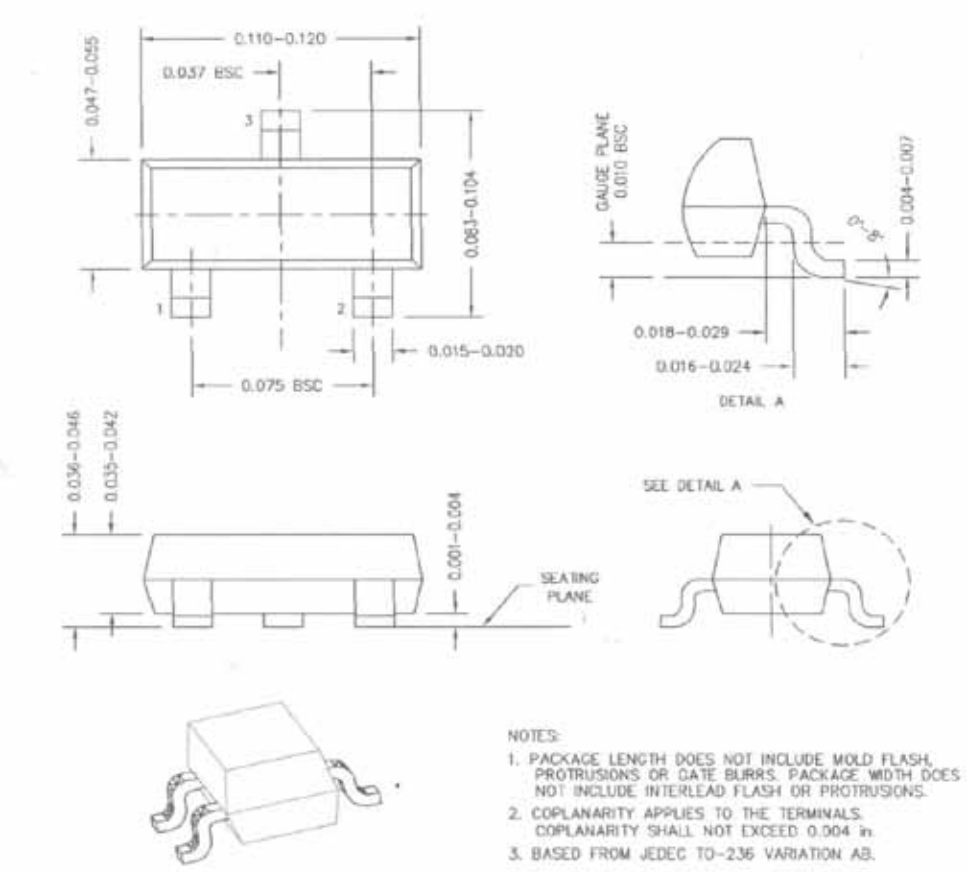
INCHES		
SYM	MIN	NOM
A	0.055	0.063
B	0.017	0.022
B1	0.014	0.019
C	0.014	0.017
D	0.173	0.181
D1	0.066	0.070
E	0.090	0.099
E1	0.084	0.086
e	0.059	
e1	0.118	
H	0.155	0.167
L	0.029	0.041

NOTE: ALL DIMENSION ARE IN INCHES

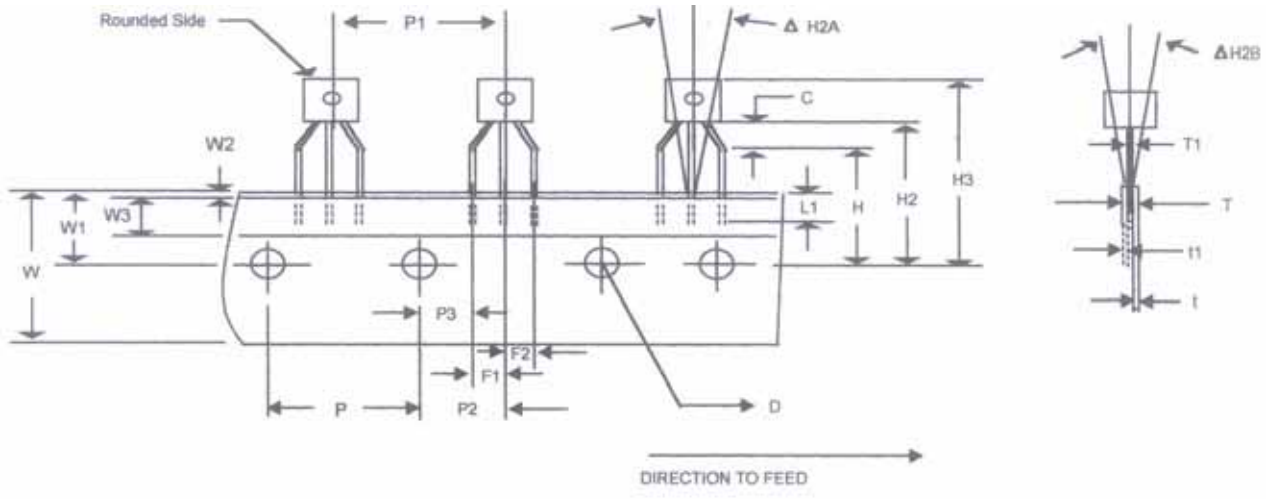
NOTES:
1. TOP PACKAGE ANGLE IS 9° +1°/-2° TOLERANCE. BOTTOM PACKAGE ANGLE IS 3° MAX.
2. PACKAGE CORNER RADIUS IS 5 MILS MAX ON ALL CORNERS.
3. SHINNY PACKAGE FINISH ON ALL SIDES EXCEPT TOP SIDE FINISH IS MINIMUM MATTE OF 10-14VDI.

3L-SOT23 PACKAGE DIMENSION

3-Lead SOT-23 Plastic
Surface Mounted Package
SLI Package Code: VS



TO-92 AMMO PACK SPECIFICATIONS

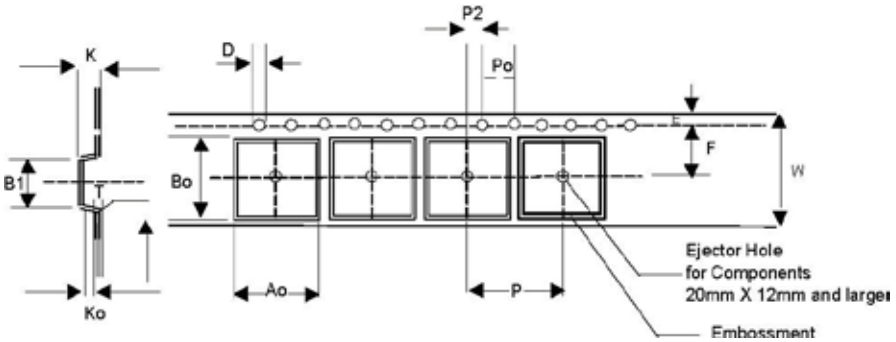


SYMBOL	DESCRIPTION	NOMINAL VALUE		TOLERANCES			
				min		max	
		mm	inch	mm	inch	mm	inch
D	Feed Hole Diameter	4.0	0.157	3.8	0.150	4.2	0.165
T1 (POD)	Component Lead Thickness	0.405	0.016	0.36	0.014	0.45	0.018
F1/F2	Lead Pitch (Left / Right)	2.54	0.100	2.4	0.094	2.8	0.110
C	Bottom of Component to Seating Plane	2.50	0.098	1.50	0.059	4.00	0.157
W1	Edge to Sprocket Hole Center	9.0	0.354	8.50	0.335	9.50	0.374
H2A	Deflection (Left or Right)	0.50	0.020	0	0	0.50	0.020
H2B	Deflection (Front or Rear)	1.0	0.039	0	0	1.0	0.039
H2 (H + C)	Feed Hole to Bottom of Component	18.5	0.728	17.00	0.669	20.50	0.087
H	Height of Seating Plane	16	0.630	15.5	0.610	16.5	0.650
H3	Feed Hole Center to Overall Transistor Height	27.75	1.092	23.5	0.925	32.0	1.260
L	Defective Unit Clipped Dimension	-	-	-	-	11.0	0.433
L1	Leadwire Enclosure	2.50	0.098	2.50	0.098	-	-
P	Feed Hole Pitch	12.7	0.500	12.40	0.488	13.0	0.512
P2	Center of Feed Hole to Center Lead	6.35	0.250	6.0	0.234	6.75	0.266
P3 (P2-F1)	First Lead Spacing Dimension	3.75	0.148	3.6	0.142	3.95	0.156
P1	Center Lead to Center Lead	12.7	0.500	12.2	0.500	13.2	0.520
t1	Adhesive Tape Thickness	0.18	0.007	0.16	0.006	0.20	0.008
T (t+t1+T1)	Overall Taped Package Thickness	-	-	-	-	1.55	0.061
T	Carrier Strip Thickness	0.37	0.015	0.27	0.011	0.47	0.018
W	Carrier Strip Width (18mm)	18.00	0.709	17.5	0.689	19.0	0.748
W3	Adhesive Tape Width (6mm)	6.00	0.236	5.5	0.217	6.3	0.248
W2	Adhesive Tape Position	0.25	0.010	0	0	0.50	0.020

TO-92 Ammo Pack Requirement		
Components	Tape Width (W) mm	Fan Fold Box
TO92 3L	18	2000

PACKAGE MECHANICAL DRAWING

Surface Mountable Tape & Reel Specifications in mm (inch)
(SOT-89 and SOT-23)



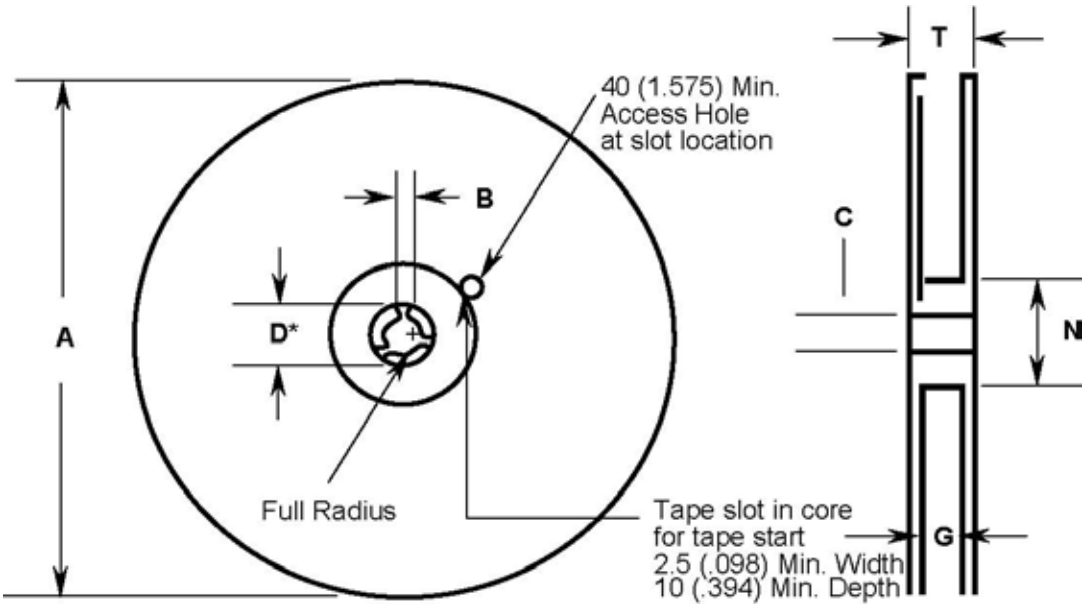
User direction of feed

Tape Size (W)	D	E	P0	T (Max)	A0, B0, K0	T1 (Max)	Constant
8, 12, 16, 24mm	1.55±0.05 (.061±.002)	1.75±0.10 (.069±.004)	4.0±0.10 (.157±.004)	0.400 (.016)	See Note	0.100 (.004)	Dimensions

Tape Size (W)	B1 Max.	D1 Min.	F	K Max.	P2	
8 mm	4.2 (.165)	1.0 (.039)	3.5±0.05 (.138±.002)	2.4 (.094)	2.0±.05	
12 mm	8.2 (.323)	1.5 (.059)	5.5±0.05 (.217±.002)	4.5 (.177)	.079±.002	Variable Dimensions

Per Package Requirement					
Components		Tape Width (W) mm	Cavity Pitch (P) mm	Devices per Reel	
				7” Reel	13” Reel
SOT-23	3L	8	4	3000	
SOT-89	3L	12	8	-	2500

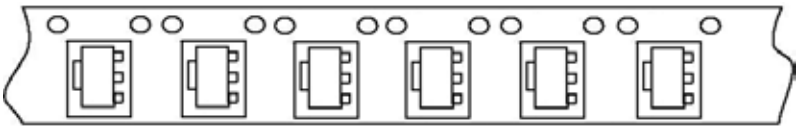
Note: Ao Bo Ko are determined by component size. The clearance between the component and the cavity must be within 0.05 [.002] min. to 0.50 [.020] max. for 8mm tape, 0.05 [.002] min to 0.65 [.026] max for 12mm tape.



REEL DIMENSIONS							
Tape Size	A Max.	B Min.	C	D* Min.	N Min.	G	T Max.
8mm	330 (12.992)	1.5 (.059)	13.0±0.20 (.152±.008)	20.2 (.795)	50 (1.973)	8.4±1.5 0.0 (.331±.059) 0.0	14.4 (.567)
12mm	330 (12.992)	1.5 (.059)	13.0±0.20 (.152±.008)	20.2 (.795)	50 (1.973)	12.4±2.0 0.0 (.488±.078) 0.0	14.4 (.567)

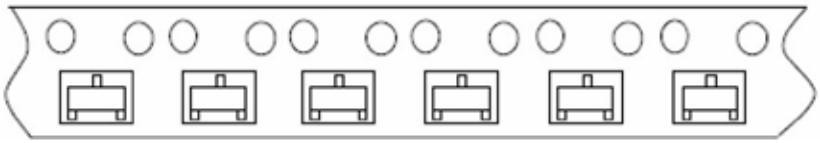
MECHANICAL POLARIZATION

SOT-89 DEVICE



User direction of feed - →

SOT-23 3L DEVICE



User direction of feed - →