



Details are subject to change without notice

### 10+1-Channel Buffer for TFT LCD

#### Features

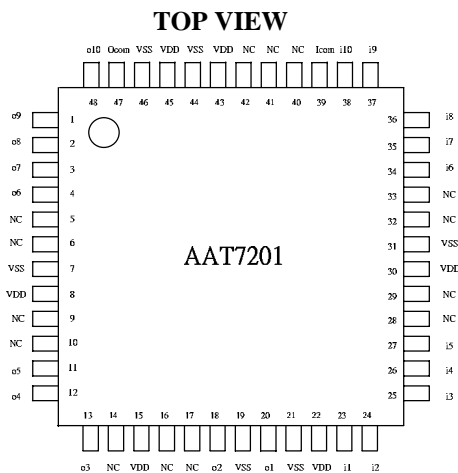
- 10 Channels with Output Current:  $\pm 30\text{mA}$  (MAX)
- 1  $V_{\text{com}}$  with Output Current:  $\pm 100\text{mA}$  (MAX)
- Unity Gain Buffer Capable of Driving Large Capacitive Loads
- Input Range Matched to LCD Reference Requirements
- $V_{\text{DD}}$  Specified for 6.5V to 16.0V
- TQFP48 Package

#### General Description

The AAT7201 is a 10+1-channel buffer designed to increase the driving capability for thin film transistor liquid crystal display (TFT LCD). This device includes a  $V_{\text{com}}$  buffer circuit, four rail-to-rail buffer amplifier circuits and six buffer amplifier circuits. Each buffer is capable of driving heavy capacitive loads and offering fast current loading ( $V_{\text{com}}$ : 100mA, the others: 30mA).

AAT7201 comes in a space-saving TQFP48 package, which makes it an ideal component in LCD TV and monitors.

#### Pin Configuration



TQFP48

**Pin Description**

Pin No.	Name	I/O	Description
1	o9	O	Buffer Channel 9 Output
2	o8	O	Buffer Channel 8 Output
3	o7	O	Buffer Channel 7 Output
4	o6	O	Buffer Channel 6 Output
5	NC	-	-
6	NC	-	-
7	GND	I	Ground
8	V <sub>DD</sub>	I	Power Supply
9	NC	-	-
10	NC	-	-
11	o5	O	Buffer Channel 5 Output
12	o4	O	Buffer Channel 4 Output
13	o3	O	Buffer Channel 3 Output
14	NC	-	-
15	V <sub>DD</sub>	I	Power Supply
16	NC	-	-
17	NC	-	-
18	o2	O	Buffer Channel 2 Output
19	GND	I	Ground
20	o1	O	Buffer Channel 1 Output
21	GND	I	Ground
22	V <sub>DD</sub>	I	Power Supply
23	i1	I	Buffer Channel 1 Input
24	i2	I	Buffer Channel 2 Input
25	i3	I	Buffer Channel 3 Input
26	i4	I	Buffer Channel 4 Input
27	i5	I	Buffer Channel 5 Input
28	NC	-	-
29	NC	-	-
30	V <sub>DD</sub>	I	Power Supply

**Pin Description (Cont.)**

Pin No.	Name	I/O	Description
31	GND	I	Ground
32	NC	-	-
33	NC	-	-
34	i6	I	Buffer Channel 6 Input
35	i7	I	Buffer Channel 7 Input
36	i8	I	Buffer Channel 8 Input
37	i9	I	Buffer Channel 9 Input
38	i10	I	Buffer Channel 10 Input
39	I <sub>com</sub>	I	Com Buffer Input
40	NC	-	-
41	NC	-	-
42	NC	-	-
43	V <sub>DD</sub>	I	Power Supply
44	GND	I	Ground
45	V <sub>DD</sub>	I	Power Supply
46	GND	I	Ground
47	O <sub>com</sub>	O	Com Buffer Output
48	o10	O	Buffer Channel 10 Output

**Absolute Maximum Ratings**

CHARACTERISTICS	SYMBOL	VALUE	UNIT
Supply Voltage	$V_{DD}$	+18	V
Input Voltage	$V_I$	-0.5 to $V_{DD} + 0.5$	V
Output Voltage	$V_O$	-0.5 to $V_{DD} + 0.5$	V
Output Loading Current for Gamma , Rail-to-Rail Buffer	$I_L$	$\pm 30$	mA
Output Loading Current for Com Buffer		$\pm 100$	mA
Maximum Junction Temperature	$T_J$	+125	°C
Operating Temperature	$T_C$	- 20 to +85	°C
Storage Temperature	$T_{storage}$	- 45 to +125	°C
Lead Temperature (Soldering for 10 seconds)	-	260	°C

Note 1: Value beyond absolute maximum ratings may cause permanent damage to the device.



**Electrical Characteristics** ( $V_{DD}=10V$ ,  $T_C=25^\circ C$  unless otherwise specified.)

**Power Supply Performance**

Parameter		Test Conditions	Min	Typ	Max	Units
Power Supply Rejection Ratio	PSRR	$V_{DD}$ varies from 6.5V to 16.0V	-	80	-	dB
Supply Current	$I_S$		-	9	-	mA

**Input Characteristics**

Parameter		Test Conditions	Min	Typ	Max	Units
Input Offset Voltage	$V_{OS}$	$V_I = V_{DD}/2, V_O = V_{DD}/2$	-	2	12	mV
Input Bias Current	$I_B$	$V_I = V_{DD}/2, V_O = V_{DD}/2$	-	2	50	nA

**Output Characteristics**

Parameter		Test Conditions	Min	Typ	Max	Unit
Output Swing Low	$V_{OL}$	$I_L = 5mA$ (Buffer 1, 2, 9, 10) $V_I = 0V$	-	0.08	0.15	V
		$I_L = 10mA$ (Buffer 3, 4, ..., 7, 8) $V_I = 1V$	-	1.02	1.05	V
Output Swing High	$V_{OH}$	$I_L = -5mA$ (Buffer 1, 2, 9, 10) $V_I = 10V$	9.85	9.92	-	V
		$I_L = -10mA$ (Buffer 3, 4, ..., 7, 8) $V_I = 9V$	8.95	8.98	-	V
Output Swing (Buffer 3, 4, ..., 7, 8)	$V_{OL}$	$I_L = 10mA, V_I = 5V$	-	5.02	5.04	V
	$V_{OH}$	$I_L = -10mA, V_I = 5V$	4.96	4.98	-	V
Output Swing (COM)	$V_{OL}$	$I_L = 50mA, V_I = 5V$	-	5.03	5.05	V
	$V_{OH}$	$I_L = -50mA, V_I = 5V$	4.95	4.97	-	V
Short Circuit Current	$I_{SC}$	(Buffer 1~10)	-	$\pm 70$	-	mA
		(Com Buffer)	-	$\pm 180$	-	mA



**Electrical Characteristics** ( $V_{DD}=10V$ ,  $T_C=25^\circ C$  unless otherwise specified.) (Cont.)

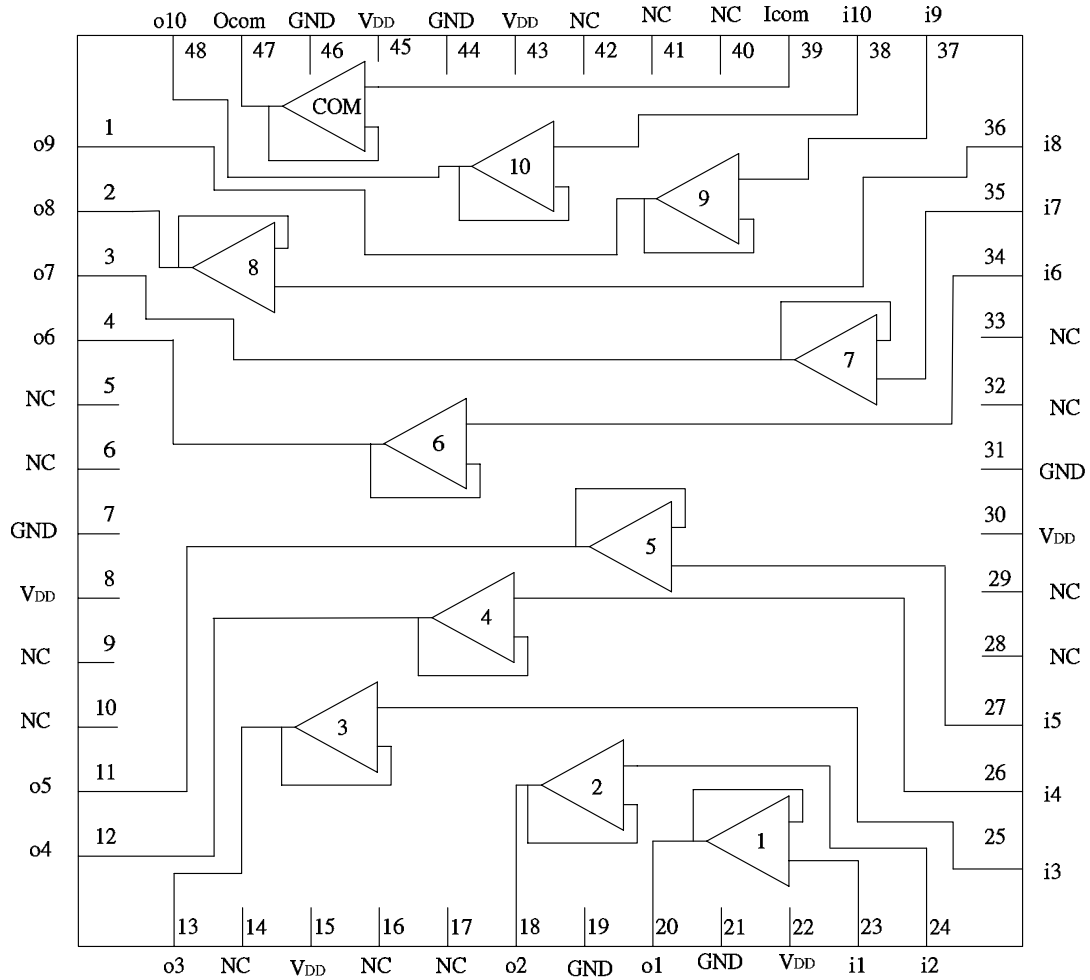
**AC Characteristics**

Parameter		Test Conditions	Min	Typ	Max	Units
Slew Rate (Note 2)	SR	$V_I=2V$ to $8V$ , 20% to 80%	-	1	-	$V/\mu s$
Settling Time	$t_s$	$V_I=4.5V$ to $5.5V$ 0.1%	-	5	-	$\mu s$
		$V_I=5.5V$ to $4.5V$ 0.1%				

Note 2: Slew rate is measured on rising and falling edges.

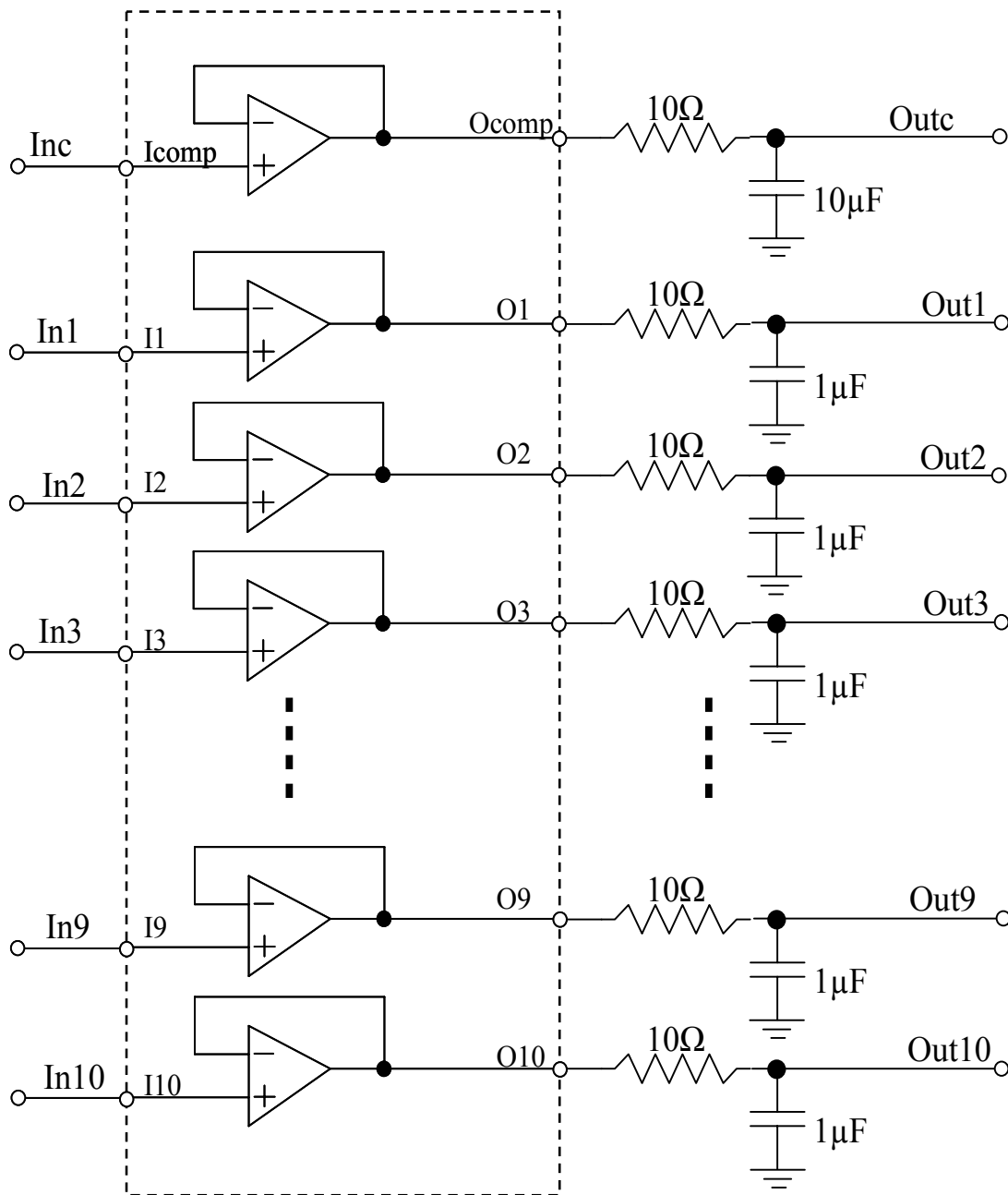


**Block Diagram**





Application Circuit

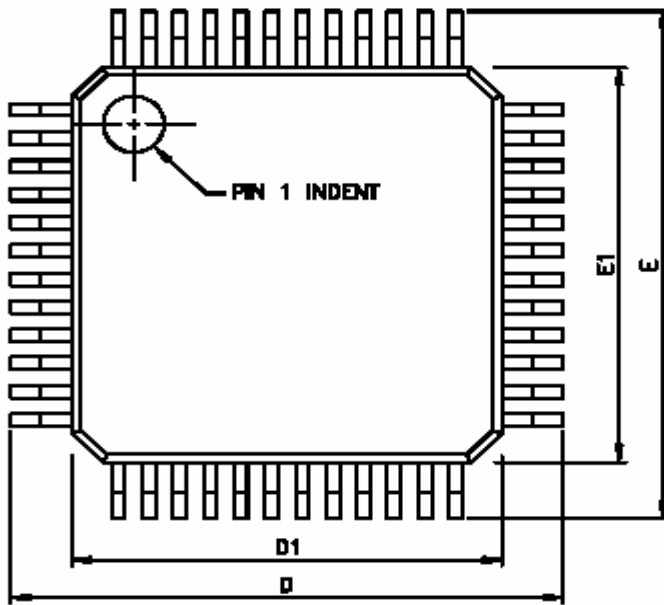




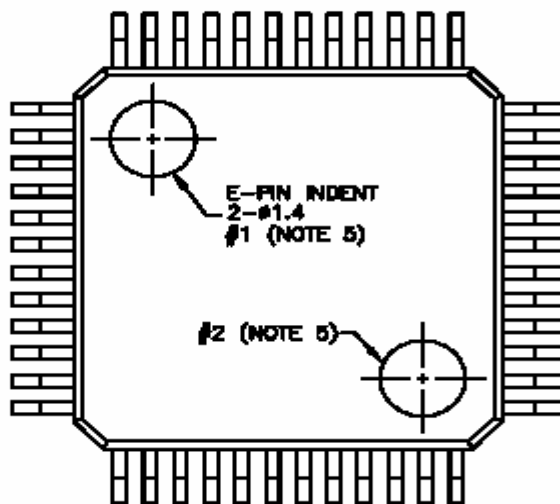


Package Dimension  
TQFP48

TOP VIEW

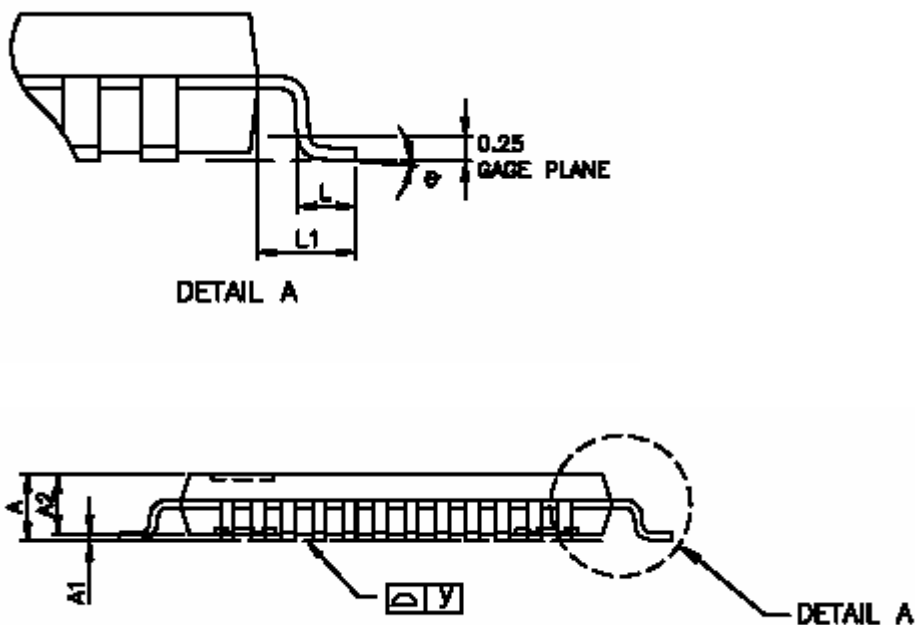


BOTTOM VIEW





Package Dimension (Cont.)  
TQFP48



NOTE:

1. CONTROLLING DIMENSION: MILLIMETER
2. LEAD FRAME MATERIAL: COPPER C7025
3. PACKAGE DIMENSION EXCLUSIVE MOLDING FLASH ALLOWABLE PROTRUSION IS 0.25 MILLIMETERS PER SIDE.
4. DIMENSION **b** DOES NOT INCLUDE DAMBER PROTRUSION. ALLOWABLE DAMBER PROTRUSION SHALL NOT CAUSE THE LEAD WIDTH TO EXCEED THE MAXIMUM **b** DIMENSION BY MORE THAN 0.08 MILLIMETERS.
5. BOTTOM E-PIN INDENT ARE MARKED AS BELOW



X : A, B, C, ...  
 Y : 1 ~ 12  
 NO : DENOTE MOLD SET NUMBER

6. ALL EDGE CORNERS HAVE TO BE R 0.20 MAX.
7. JEDEC NUMBER: MS-026

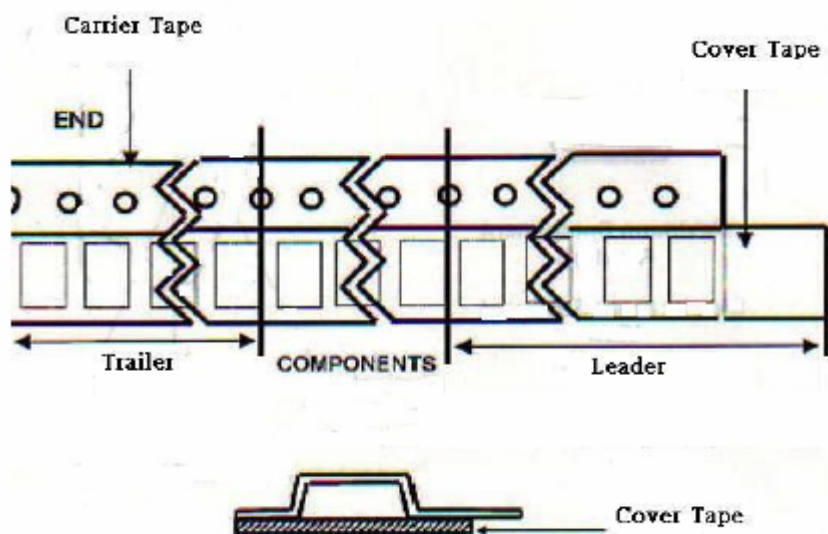
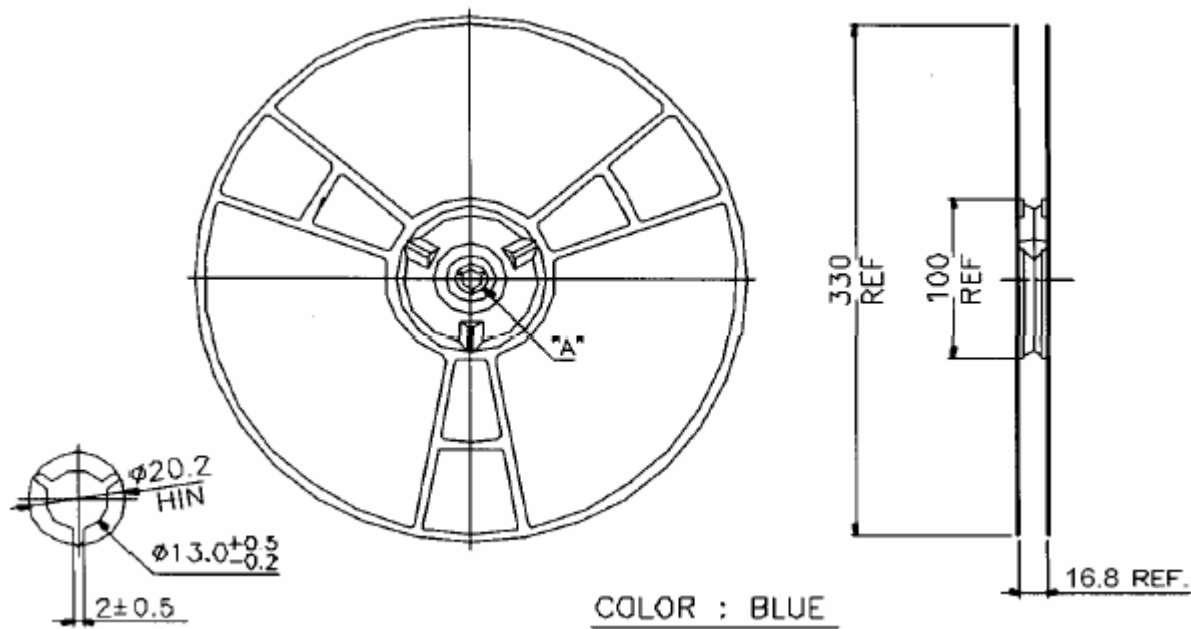


**Package Dimension (Cont.)**  
**TQFP48**

SYMBOL	DIMENSIONS IN MILLIMETERS		
	MIN	TYP	MAX
A	-	-	1.20
A1	0.05	-	0.15
A2	0.95	1.00	1.05
b	0.17	0.22	0.27
C	0.09	-	0.20
E	-	9.00	-
E1	-	7.00	-
D	-	9.00	-
D1	-	7.00	-
e	-	0.50	-
L	0.45	0.60	0.75
L1	-	1.00	-
$\theta$	0° C	3.5° C	7.0° C
y	0.0	-	0.08

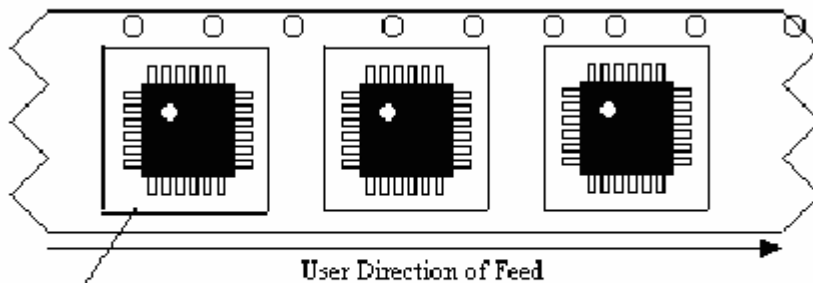
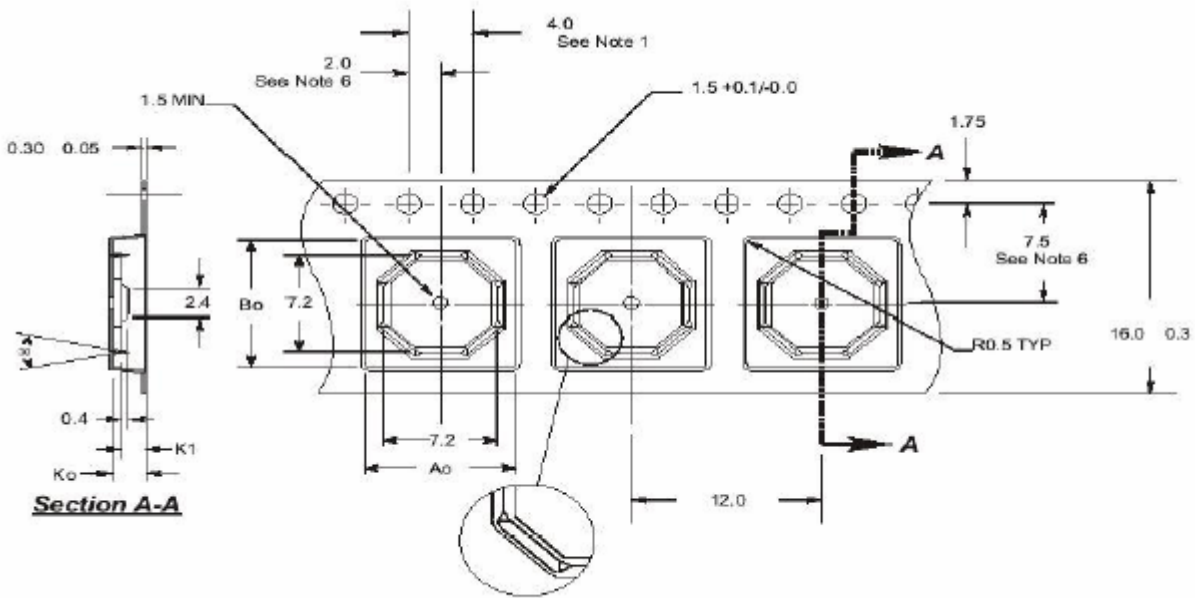


Tape and Reel





Tape and Reel (Cont.)



Pin #1  
Adjacent to  
Sprocket Holes

Ao = 9.50 mm  
Bo = 9.50 mm  
Ko = 2.00 mm  
K1 = 1.45 mm



**Tape and Reel (Cont.)**

**NOTE:**

1. 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE .02
2. CAMBER NOT TO EXCEED 1 MILLIMETER IN 100 MILLIMETERS
3. MATERIAL: PS+C
4. A<sub>0</sub> AND B<sub>0</sub> MEASURED ON A PLANE 0.3 MILLIMETERS ABOVE THE BOTTOM OF THE POCKET
5. K<sub>0</sub> MEASURED FROM A PLANE ON THE INSIDE BOTTOM OF THE POCKET TO THE TOP SURFACE OF THE CARRIER
6. POCKET POSITION RELATIVE TO SPROCKET HOLE MEASURED AS TRUE POSITION OF POCKET, NOT POCKET HOLE.

**Ordering Information**

**AAT xxxxx-xx-x**

AAT Part Number

Package Code 1  
TQFP48: T3

Package Code 2  
T=Taping Reel  
Blank=Tube or Tray

**Remark:**  
T=Taping Reel  
TQFP48→ 1,000pcs/reel

**Blank=Tube**