

# ALM-40220

2.010GHz – 2.025GHz

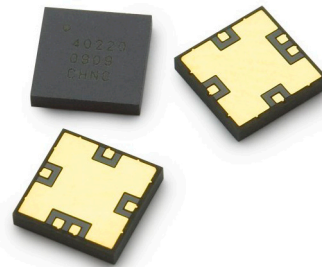
TD-SCDMA 10 Watt High Power SPDT Switch



## Data Sheet



Lead (Pb) Free  
RoHS 6 fully  
compliant



### Description

Avago Technologies' ALM-40220 is a high power SPDT switch with 10W power handling capability, high linearity performance, low insertion loss and fast switching speed through the use of Avago Technologies' low distortion silicon pin diode technologies. ALM-40220 is specifically designed for TD-SCDMA wireless infrastructure application.

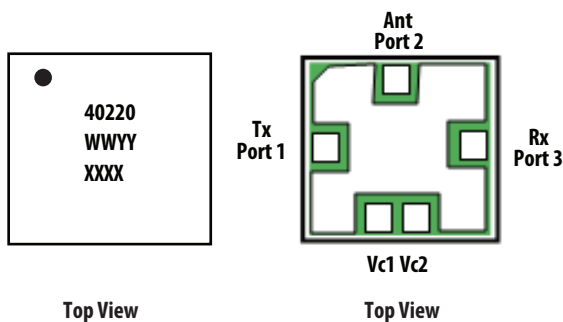
The ALM-40220 is reflective SPDT switches and having flexibility converting to absorptive mode with 50ohm load configured externally. The circuitry needs dual positive biasing control for Tx and Rx operation.

All matching components are fully integrated within the module which makes the ALM-40220 extremely easy to use. The only external parts are DC supply bypass capacitors and RF choke inductor (refers to figure 16, page 10).

The ALM-40220 is housed in a miniature 5.0 x 5.0 x 1.0 mm<sup>3</sup> multiple-chips-on-board (MCOB) module package with 5 pin configuration pads.

### Component Image

5.0 x 5.0 x 1.0 mm<sup>3</sup> 5-PIN MCOB Package



Note:  
Package marking provides orientation and identification  
"40220" = Device Part Number  
"WWYY" = Work week and year of manufacturer  
"XXXX" = Last 4 digit of assembly lot number

### Features

- Fully matched
- High power handling capability
- High Linearity
- Fast switching speed
- Applicable in both reflective & absorptive
- 5V operating voltage
- Match diode for consistent performance
- Tape-and-Reel packaging option available
- MSL-3 with lead-free & halogen free

### Specifications

- Tx band: Typical Performance at 2.01GHz
  - Insertion loss: 0.45dB max
  - Rx-Tx Isolation: 40dB typical
  - 60 dBm Input IP3
  - 41 dBm Input Power at 0.1dB Gain Compression
- Rx band: Typical performance at 2.01GHz
  - Insertion loss: 0.6dB typical
  - Tx-Rx Isolation: 26dB typical

### Applications

- LNA Protection Switch for TD-SCDMA base station



**Attention: Observe precautions for handling electrostatic sensitive devices.**  
ESD Machine Model = 250 V  
ESD Human Body Model = 850 V  
Refer to Avago Application Note A004R:  
*Electrostatic Discharge, Damage and Control.*

**Absolute Maximum Rating** <sup>[2]</sup>  $T_A=25^{\circ}\text{C}$ 

Symbol	Parameter	Units	Absolute Max.
$V_{ctrl\ 1,max}$	Device Control Voltage 1	V	7
$I_{ctrl\ 1,max}$	Device Control Current 1	mA	60
$V_{ctrl\ 2,max}$	Device Control Voltage 2	V	7
$I_{ctrl\ 2,max}$	Device Control Current 2	mA	60
$P_{in,max}$	CW RF Input Power	dBm	42
$P_{diss}$	Total Power Dissipation <sup>[4]</sup>	W	4.25
$T_{j,max}$	Junction Temperature	$^{\circ}\text{C}$	150
$T_{STG}$	Storage Temperature	$^{\circ}\text{C}$	-65 to 150

**Thermal Resistance** <sup>[3]</sup>  $\theta_{jc} = 12.2^{\circ}\text{C/W}$   
 ( $V_{c1} = 5\text{V}, V_{c2} = 0\text{V}, I_{c1} = 50\text{mA}, T_c = 85^{\circ}\text{C}$ )

Notes:

2. Operation of this device in excess of any of these limits may cause permanent damage.
3. Thermal resistance measured using Infra-Red measurement technique.
4. This is limited by maximum  $V_{ctrl\ 1}$  and  $P_{in}$ .

**Device Operating Truth Table** <sup>[5]</sup>

$V_{ctrl\ 1}$	$V_{ctrl\ 2}$	Tx – Ant Port	Ant – Rx Port
5V	0V	Low Insertion Loss	High Isolation
0V	5V	Isolation	Low Insertion Loss

Notes:

5. Any stated other than described in the truth table may put the switch into an undefined state.

## 10 Watt SPDT Switch for TD-SCDMA (2.01GHz – 2.025GHz) Application

### Electrical Specifications [6]

#### Tx To Ant Port

$T_A = 25^\circ\text{C}$ ,  $V_{ctrl\ 1} = 5\text{V}$ ,  $V_{ctrl\ 2} = 0\text{V}$ , RF performance at 2.01GHz, measured on demo board (see Figure 16) unless otherwise specified.

Symbol	Parameter and Test Condition	Units	Min.	Typ.	Max.
Ictrl 1	Vctrl 1 current	mA	35	39	45
Ictrl 2	Vctrl 2 current	mA	-45	-39	-35
S11 <sup>[7]</sup>	Input Return Loss, 50Ω source	dB	25	30	–
S21 <sup>[7]</sup>	Tx-Ant Insertion Loss	dB	–	0.42	0.45
S31 <sup>[7]</sup>	Tx-Rx Isolation	dB	35	40	–
S32 <sup>[7]</sup>	Ant-Rx Isolation	dB	35	40	–
IIP3 <sup>[8]</sup>	Input Third Order Intercept Point	dBm	–	60	–
IPO.1dB <sup>[9]</sup>	Input Power at 0.1dB Gain Compression	dBm	–	41	–
Switching <sup>[10]</sup>	Switching Speed [t-RISE]	uS	–	0.3	–
Switching <sup>[10]</sup>	Switching Speed [t-FALL]	uS	–	0.5	–

#### Ant To Rx Port

$T_A = 25^\circ\text{C}$ ,  $V_{ctrl\ 1} = 0\text{V}$ ,  $V_{ctrl\ 2} = 5\text{V}$ , RF performance at 2.01GHz, measured on demo board (see Figure 16) unless otherwise specified.

Symbol	Parameter and Test Condition	Units	Min.	Typ.	Max.
Ictrl 1	Vctrl 1 current	mA	-50	-47	-40
Ictrl 2	Vctrl 2 current	mA	40	47	50
S33 <sup>[7]</sup>	Input Return Loss, 50Ω source	dB	25	27	–
S32 <sup>[7]</sup>	Insertion Loss	dB	–	0.6	0.7
S31 <sup>[7]</sup>	Tx-Rx Isolation	dB	24	27	–
S21 <sup>[7]</sup>	Ant-Tx Isolation	dB	17	27	–
IIP3 <sup>[8]</sup>	Input Third Order Intercept Point	dBm	–	50	–
IPO.1dB <sup>[9]</sup>	Input Power at 0.1dB Gain Compression	dBm	–	28	–
Switching <sup>[10]</sup>	Switching Speed [t-RISE]	uS	–	0.2	–
Switching <sup>[10]</sup>	Switching Speed [t-FALL]	uS	–	0.5	–

Notes:

6. Measurements at 2.01GHz obtained using demo board described in Figure 15 and 16.
7. Port connection: Port 1 = Tx, port 2 = Ant and port 3 = Rx.
8. IIP3 test condition:  $F_{RF1} - F_{RF2} = 1.1\text{MHz}$  with input power of 23dBm per tone measured at worst side band.
9. IPO.1dB tested with 50% duty cycle.
10. [t-RISE]: Time for RF signal to rise from 10% to 90% of the “on” level. [t-FALL]: Time for RF signal to fall from 90% to 10% of the “off” level.
11. Use proper biasing, heat sink and de-rating to ensure maximum channel temperature is not exceeded. See absolute maximum ratings and application note (if applicable) for more details.

## ALM-40220 Tx Typical S-Parameters

(Vctrl 1 = 5V, Vctrl 2 = 0V, Tc = 25°C, matched 50Ω)

Freq GHz	S11 Mag.	S11 Ang.	S12 Mag.	S12 Ang.	S13 Mag.	S13 Ang.	S21 Mag.	S21 Ang.	S22 Mag.	S22 Ang.	S23 Mag.	S23 Ang.	S31 Mag.	S31 Ang.	S32 Mag.	S32 Ang.	S33 Mag.	S33 Ang.
0.1	0.79	-111.6	0.27	-6.6	0.11	-24.1	0.27	-6.5	0.87	-134.4	0.09	-31.4	0.11	-24.0	0.09	-31.5	0.78	-42.1
0.2	0.94	-174.0	0.16	79.2	0.05	2.7	0.16	79.3	0.93	176.6	0.05	-5.5	0.05	2.7	0.05	-5.5	0.65	-78.8
0.3	0.72	147.2	0.46	37.4	0.13	-135.4	0.46	37.6	0.73	146.2	0.13	-139.1	0.13	-135.3	0.13	-139.1	0.24	-19.4
0.4	0.37	-173.2	0.59	-34.0	0.06	128.2	0.59	-33.9	0.48	173.6	0.06	127.3	0.06	128.0	0.06	127.1	0.41	1.9
0.5	0.78	156.1	0.08	-9.7	0.02	100.5	0.08	-9.7	0.91	144.2	0.02	121.6	0.02	100.2	0.02	121.7	0.87	-68.1
0.6	0.86	127.4	0.30	24.9	0.03	90.2	0.30	24.9	0.88	120.0	0.03	91.4	0.03	89.9	0.03	91.1	0.90	-102.3
0.7	0.80	106.7	0.45	8.5	0.03	61.0	0.45	8.4	0.81	102.0	0.03	61.8	0.03	61.1	0.03	61.8	0.90	-127.5
0.8	0.73	88.5	0.56	-8.1	0.03	35.7	0.56	-7.9	0.73	85.5	0.03	36.7	0.03	35.7	0.03	36.7	0.90	-148.9
0.9	0.64	71.3	0.66	-24.5	0.04	12.3	0.66	-24.5	0.64	70.1	0.04	13.4	0.04	12.3	0.04	13.4	0.89	-168.1
1	0.50	54.6	0.74	-43.1	0.05	-14.5	0.74	-43.1	0.52	56.0	0.05	-13.8	0.05	-14.5	0.05	-13.9	0.87	173.8
1.1	0.39	76.9	0.59	-66.8	0.07	-82.0	0.59	-66.9	0.47	69.2	0.06	-83.8	0.07	-81.9	0.06	-83.6	0.86	157.5
1.2	0.54	43.3	0.71	-57.7	0.01	-114.9	0.71	-57.6	0.55	37.5	0.01	-74.4	0.01	-114.9	0.01	-74.4	0.86	141.7
1.3	0.45	23.5	0.81	-72.9	0.01	-67.1	0.81	-72.8	0.45	18.9	0.01	-41.4	0.01	-67.1	0.01	-41.6	0.85	126.0
1.4	0.36	8.1	0.86	-87.1	0.02	-73.0	0.86	-87.1	0.36	3.7	0.02	-54.3	0.02	-72.9	0.02	-54.5	0.84	110.7
1.5	0.29	-5.1	0.89	-100.6	0.02	-84.4	0.89	-100.5	0.29	-10.3	0.02	-66.7	0.02	-84.2	0.02	-67.1	0.83	95.9
1.6	0.22	-17.1	0.91	-113.5	0.01	-95.2	0.91	-113.4	0.22	-24.2	0.01	-77.1	0.01	-95.3	0.01	-77.3	0.82	81.0
1.7	0.16	-27.2	0.93	-126.0	0.01	-102.7	0.93	-125.8	0.15	-38.9	0.01	-82.9	0.01	-102.7	0.01	-83.2	0.81	66.2
1.8	0.10	-34.8	0.93	-138.0	0.01	-103.5	0.93	-138.0	0.10	-55.7	0.01	-81.2	0.01	-103.7	0.01	-81.3	0.80	51.6
1.9	0.06	-34.1	0.94	-149.9	0.01	-90.1	0.94	-149.9	0.05	-79.0	0.01	-63.6	0.01	-89.9	0.01	-63.8	0.79	36.7
2	0.03	-4.1	0.94	-161.4	0.01	-57.2	0.94	-161.5	0.02	-145.2	0.01	-37.0	0.01	-57.2	0.01	-37.2	0.78	21.8
2.01	0.03	2.4	0.94	-162.5	0.01	-54.4	0.94	-162.6	0.02	-157.8	0.01	-35.5	0.01	-54.9	0.01	-34.9	0.78	20.3
2.02	0.03	9.1	0.94	-163.6	0.01	-52.8	0.94	-163.7	0.02	-168.8	0.01	-33.1	0.01	-53.3	0.01	-33.5	0.78	18.7
2.03	0.03	14.5	0.94	-164.8	0.01	-51.3	0.94	-164.9	0.02	-177.7	0.01	-32.0	0.01	-51.5	0.01	-31.9	0.78	17.3
2.04	0.03	21.6	0.94	-166.0	0.01	-50.0	0.94	-166.0	0.03	173.1	0.01	-30.2	0.01	-49.7	0.01	-31.1	0.78	15.7
2.05	0.03	27.5	0.94	-167.2	0.01	-48.1	0.94	-167.1	0.03	165.1	0.01	-29.8	0.01	-48.4	0.01	-29.7	0.78	14.2
2.1	0.04	45.8	0.93	-172.6	0.01	-44.1	0.93	-172.7	0.04	138.1	0.01	-27.1	0.01	-43.9	0.01	-27.3	0.78	6.5
2.5	0.13	29.8	0.91	143.9	0.04	-76.7	0.91	144.1	0.14	70.3	0.04	-56.6	0.04	-76.4	0.04	-56.6	0.74	-57.3
3	0.20	-27.2	0.88	92.2	0.08	-140.0	0.88	92.4	0.21	15.2	0.08	-114.7	0.08	-140.2	0.08	-115.0	0.74	-141.5
3.5	0.22	-86.4	0.84	41.3	0.13	155.0	0.84	41.5	0.25	-35.0	0.13	-175.2	0.12	154.9	0.13	-175.6	0.76	136.5
4	0.21	-149.3	0.80	-9.8	0.17	91.9	0.80	-9.8	0.26	-85.9	0.17	124.4	0.17	92.0	0.17	124.4	0.76	58.5
4.5	0.18	143.6	0.77	-62.4	0.21	30.2	0.76	-62.1	0.25	-137.7	0.19	65.0	0.21	30.0	0.19	64.6	0.70	-16.5
5	0.11	59.7	0.72	-118.8	0.25	-31.7	0.72	-118.9	0.20	176.4	0.21	0.8	0.25	-32.2	0.21	0.7	0.68	-95.9
5.5	0.17	-111.4	0.60	175.1	0.30	-93.2	0.60	175.1	0.16	-176.7	0.17	-62.1	0.30	-93.2	0.17	-62.2	0.62	-174.8
6	0.47	146.2	0.31	104.6	0.35	-162.3	0.31	104.4	0.48	150.3	0.09	-82.1	0.35	-162.2	0.09	-81.9	0.56	112.0

12. S-parameter is measured with reference plane at SMA end launch using demo board shown in Figure 16.

13. Demo board 50Ω transmission line is CPWG with W = 23 mils, G = 18.5 mils, L = 383.7 mils, 10 mils Rogers RO4350, 0.5oz Cu.

14. Demo board SMA end launch is Johnson 142-0701-851.

## ALM-40220 Rx Typical S-Parameter

(Vctrl 1 = 0V, Vctrl 2 = 5V, Tc = 25°C, matched 50Ω)

Freq GHz	S11 Mag.	S11 Ang.	S12 Mag.	S12 Ang.	S13 Mag.	S13 Ang.	S21 Mag.	S21 Ang.	S22 Mag.	S22 Ang.	S23 Mag.	S23 Ang.	S31 Mag.	S31 Ang.	S32 Mag.	S32 Ang.	S33 Mag.	S33 Ang.
0.1	0.82	-109.2	0.10	78.1	0.09	-108.1	0.10	78.2	0.64	-92.1	0.11	-22.8	0.09	-107.9	0.11	-22.8	0.94	-45.5
0.2	0.95	-174.3	0.10	100.5	0.01	-53.8	0.10	100.6	0.93	-147.4	0.01	-78.9	0.01	-53.7	0.01	-79.0	0.96	-92.0
0.3	0.78	143.0	0.36	59.1	0.09	-106.1	0.36	59.2	0.84	171.1	0.06	155.3	0.09	-106.1	0.05	155.3	0.87	-135.2
0.4	0.42	159.9	0.46	-12.0	0.35	145.1	0.46	-11.9	0.57	154.5	0.33	128.7	0.35	145.1	0.33	128.7	0.56	-166.4
0.5	0.73	142.0	0.27	-37.7	0.38	72.7	0.27	-37.8	0.62	148.7	0.49	72.6	0.38	72.6	0.49	72.7	0.57	-176.7
0.6	0.78	115.2	0.24	-32.3	0.38	31.6	0.24	-32.3	0.63	131.1	0.54	40.6	0.38	31.8	0.54	40.7	0.56	161.4
0.7	0.74	90.9	0.30	-38.7	0.39	0.8	0.30	-38.8	0.59	115.7	0.58	17.7	0.39	0.8	0.58	17.7	0.51	142.1
0.8	0.67	66.5	0.35	-54.2	0.41	-27.2	0.35	-54.0	0.54	102.6	0.61	-1.5	0.41	-27.1	0.61	-1.5	0.46	126.0
0.9	0.56	39.1	0.39	-74.2	0.43	-55.1	0.39	-74.1	0.50	91.8	0.63	-18.1	0.43	-55.0	0.63	-18.1	0.43	112.7
1	0.39	3.0	0.41	-99.1	0.43	-85.6	0.41	-99.1	0.47	82.2	0.63	-32.0	0.43	-85.6	0.63	-32.0	0.41	100.5
1.1	0.14	88.5	0.28	-126.8	0.28	-117.7	0.28	-126.9	0.47	66.9	0.67	-40.5	0.28	-117.7	0.66	-40.4	0.43	81.2
1.2	0.35	-6.9	0.34	-123.6	0.33	-117.9	0.34	-123.7	0.39	55.0	0.72	-56.4	0.33	-117.9	0.72	-56.4	0.35	65.3
1.3	0.26	-68.9	0.33	-148.9	0.33	-146.6	0.33	-148.8	0.36	44.2	0.74	-68.7	0.33	-146.7	0.74	-68.7	0.32	51.0
1.4	0.23	-132.0	0.29	-171.5	0.28	-172.3	0.29	-171.4	0.32	31.0	0.78	-80.7	0.28	-172.4	0.78	-80.7	0.29	33.8
1.5	0.28	178.0	0.23	168.8	0.22	164.9	0.23	168.8	0.26	17.2	0.82	-93.4	0.22	164.9	0.82	-93.5	0.23	15.9
1.6	0.34	142.9	0.17	152.0	0.17	145.3	0.17	152.0	0.21	4.2	0.86	-106.7	0.17	145.2	0.86	-106.8	0.18	-1.7
1.7	0.39	116.1	0.13	138.6	0.13	129.1	0.13	138.5	0.15	-7.0	0.89	-120.0	0.13	128.8	0.89	-120.1	0.12	-18.0
1.8	0.42	93.9	0.09	128.6	0.09	116.2	0.09	128.6	0.09	-14.2	0.90	-133.2	0.09	115.8	0.90	-133.4	0.07	-32.7
1.9	0.45	74.3	0.06	123.3	0.06	107.0	0.06	123.3	0.04	-8.8	0.91	-146.2	0.06	106.9	0.91	-146.3	0.02	-38.5
2	0.47	56.2	0.04	123.6	0.04	101.9	0.04	123.5	0.03	55.1	0.92	-158.8	0.04	101.9	0.92	-158.9	0.02	92.7
2.01	0.47	54.5	0.04	124.0	0.04	101.7	0.04	123.9	0.03	62.0	0.91	-160.1	0.04	101.6	0.92	-160.1	0.02	95.3
2.02	0.47	52.7	0.04	124.4	0.04	101.5	0.04	124.2	0.03	67.2	0.92	-161.3	0.04	101.4	0.92	-161.4	0.03	94.7
2.03	0.47	50.9	0.03	125.0	0.04	101.2	0.03	124.9	0.03	71.5	0.92	-162.6	0.04	101.1	0.92	-162.6	0.03	94.7
2.04	0.47	49.1	0.03	125.7	0.04	101.1	0.03	125.4	0.04	76.6	0.92	-163.7	0.04	101.1	0.92	-163.9	0.03	94.4
2.05	0.47	47.5	0.03	126.2	0.04	101.1	0.03	126.3	0.04	79.3	0.92	-164.9	0.04	100.9	0.92	-165.1	0.04	92.5
2.1	0.48	38.9	0.03	130.8	0.03	101.4	0.03	131.0	0.05	86.3	0.92	-171.1	0.03	101.4	0.91	-171.2	0.05	88.8
2.5	0.46	-27.7	0.02	-133.0	0.01	-175.5	0.02	-132.9	0.16	62.8	0.90	141.7	0.01	-174.8	0.90	141.7	0.14	33.8
3	0.41	-120.1	0.10	-134.1	0.08	-165.1	0.10	-133.7	0.22	18.5	0.85	85.1	0.08	-164.9	0.85	84.9	0.19	-47.6
3.5	0.38	129.0	0.25	170.3	0.21	124.1	0.25	170.4	0.26	-28.2	0.77	29.4	0.21	124.1	0.77	29.3	0.25	-136.0
4	0.41	17.7	0.38	104.6	0.33	46.4	0.38	104.7	0.28	-76.2	0.67	-23.5	0.33	46.3	0.67	-23.5	0.33	141.0
4.5	0.44	-75.2	0.44	42.4	0.37	-27.4	0.44	42.7	0.29	-117.3	0.57	-74.6	0.37	-27.8	0.57	-74.6	0.37	66.4
5	0.49	-150.4	0.45	-17.2	0.36	-96.8	0.45	-17.4	0.35	-153.1	0.47	-126.0	0.36	-97.1	0.47	-125.8	0.38	-9.5
5.5	0.53	146.5	0.41	-73.3	0.31	-159.3	0.41	-73.5	0.49	162.6	0.32	-170.5	0.31	-159.1	0.32	-170.6	0.36	-93.9
6	0.56	88.2	0.32	-120.0	0.28	149.2	0.32	-120.2	0.62	109.1	0.27	165.1	0.28	148.8	0.27	165.0	0.36	-179.9

# ALM-40220 Tx Typical Over-Temperature Performance

(Tx: Vctrl 1 = 5V, Vctrl 2 = 0V)

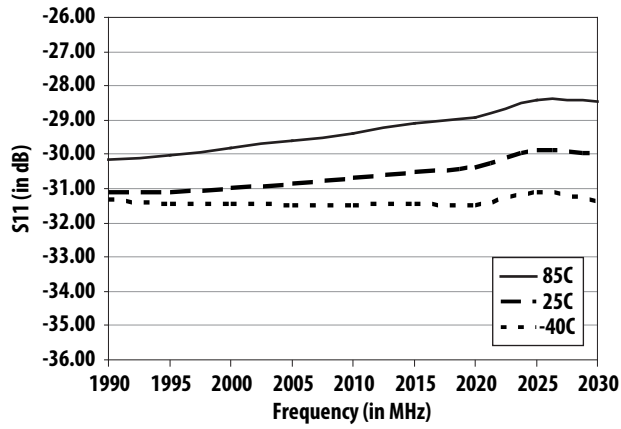


Figure 1. S11 (Return Loss) vs Frequency vs Temperature

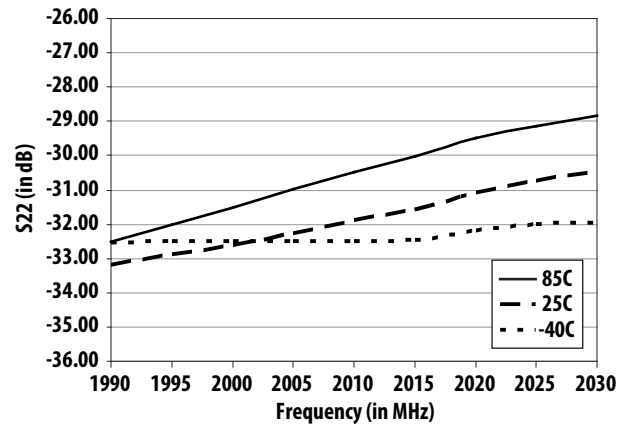


Figure 2. S22 (Return Loss) vs Frequency vs Temperature

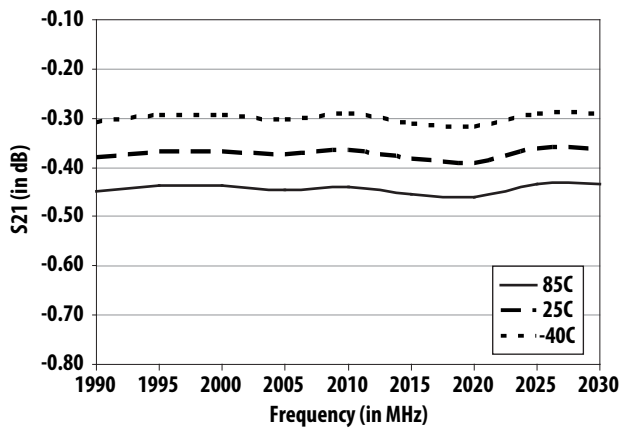


Figure 3. S21 (Insertion Loss) vs Frequency vs Temperature

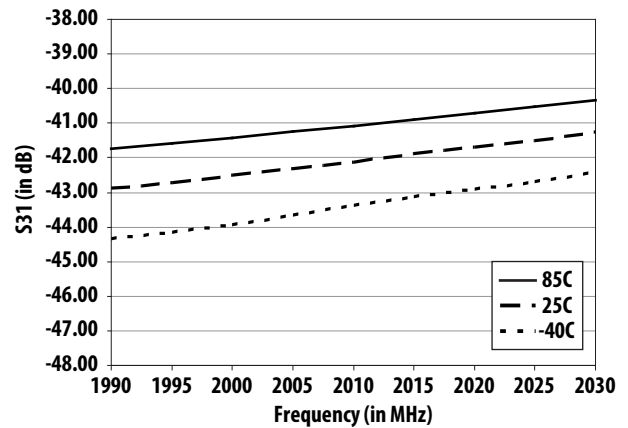


Figure 4. S31 (Isolation) vs Frequency vs Temperature

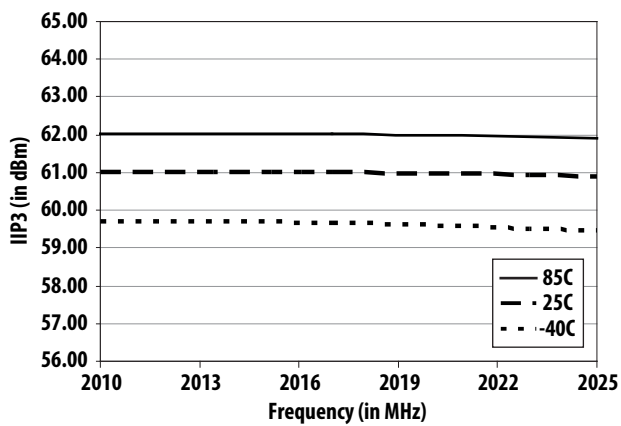


Figure 5. Input IP3 vs Frequency vs Temperature

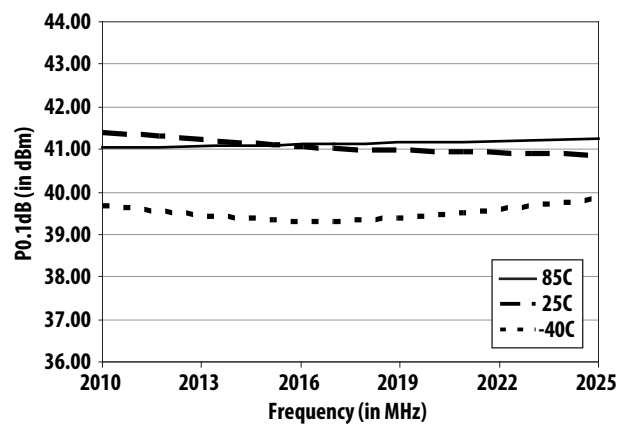


Figure 6. Input P0.1dB vs Frequency vs Temperature

# ALM-40220 Rx Typical Over-Temperature Performance

(Rx: Vctrl 1 = 0V, Vctrl 2 = 5V)

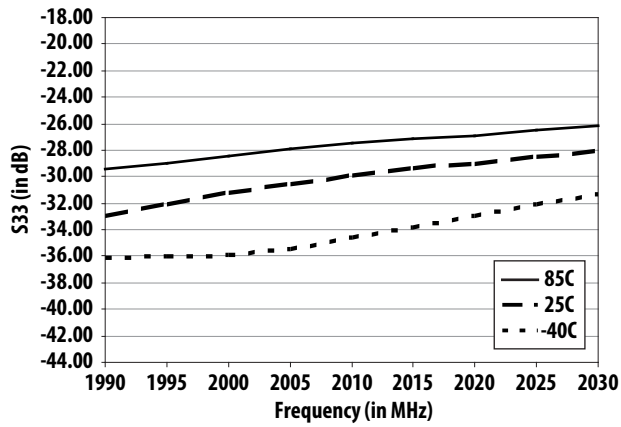


Figure 7. S33 (Return Loss) vs Frequency vs Temperature

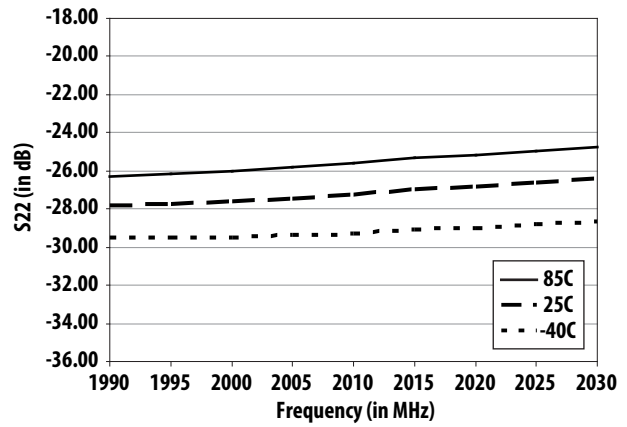


Figure 8. S22 (Return Loss) vs Frequency vs Temperature

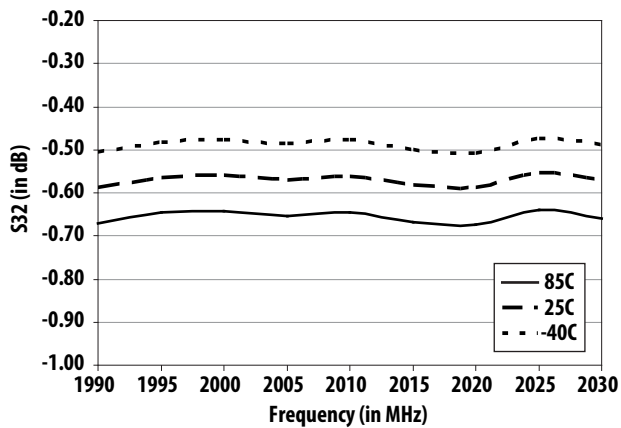


Figure 9. S32 (Insertion Loss) vs Frequency vs Temperature

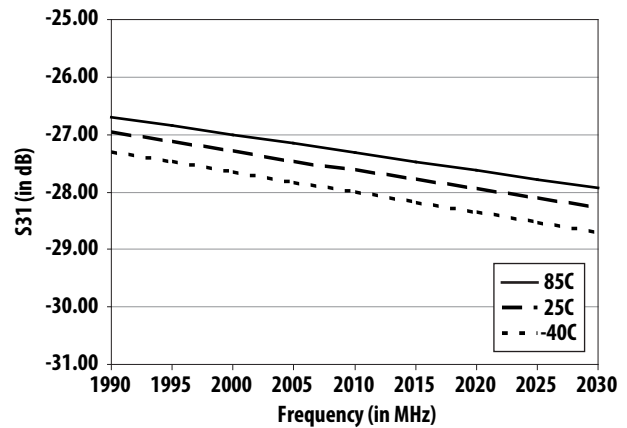


Figure 10. S31 (Isolation) vs Frequency vs Temperature

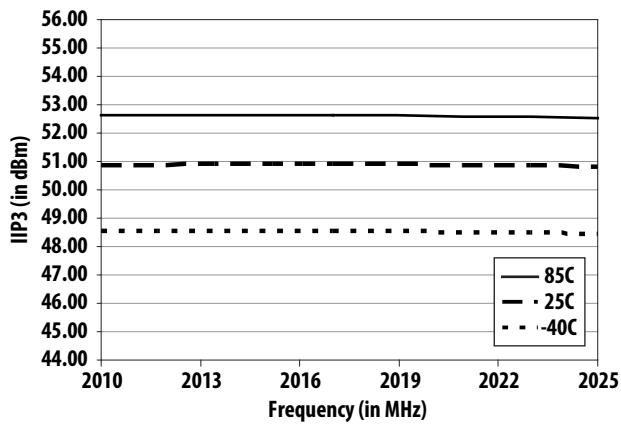


Figure 11. Input IP3 vs Frequency vs Temperature

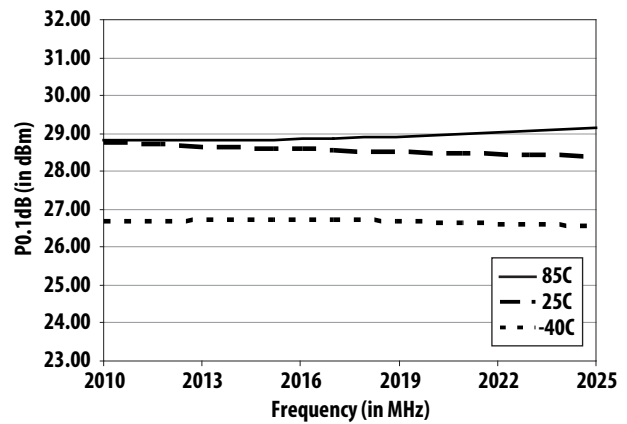


Figure 12. Input P0.1dB vs Frequency vs Temperature

## ALM-40220 Typical Performance

(Tx: Vctrl 1 = 5V, Vctrl 2 = 0V)

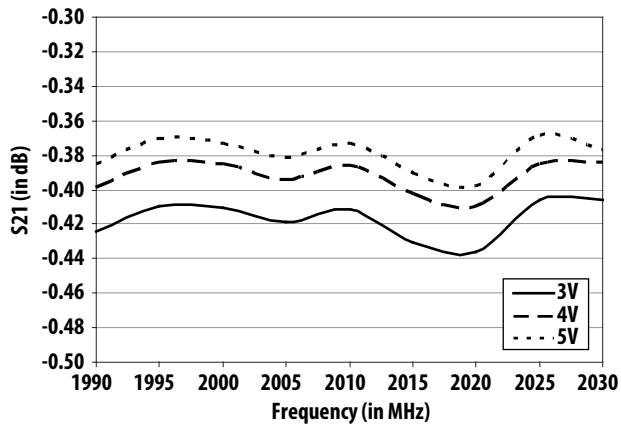


Figure 13. Insertion loss vs Frequency Vs Vc

(Rx: Vctrl 1 = 0V, Vctrl 2 = 5V)

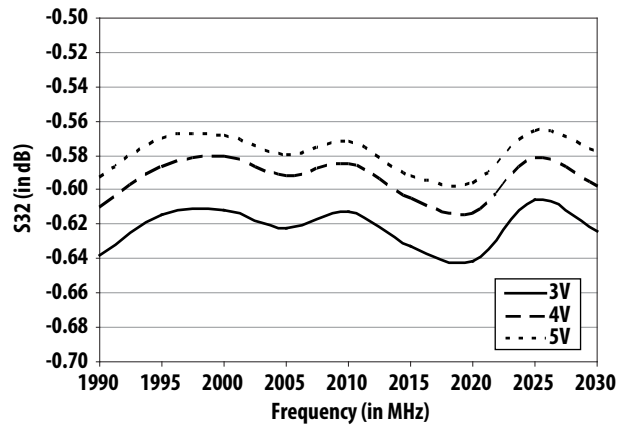
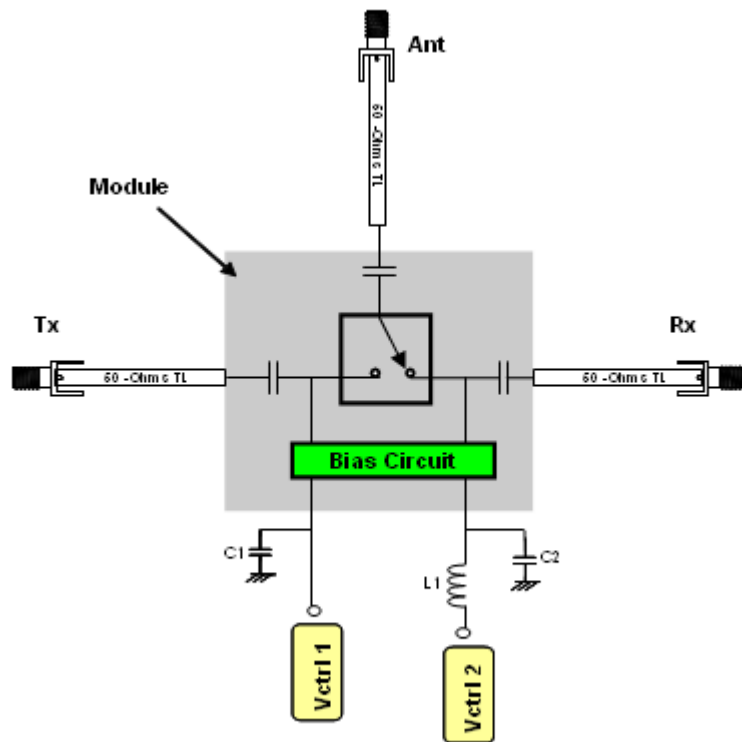


Figure 14. Insertion loss vs Frequency Vs Vc



Circuit Symbol	Size	Value	Description
C1	0402	1000pF	Ceramic Chip Capacitor
C2	0402	3.3pF	Ceramic Chip Capacitor
L1	0402	100nH	Ceramic Chip Inductor

Figure 15. Demo board application schematics and components table



## Demo board layout

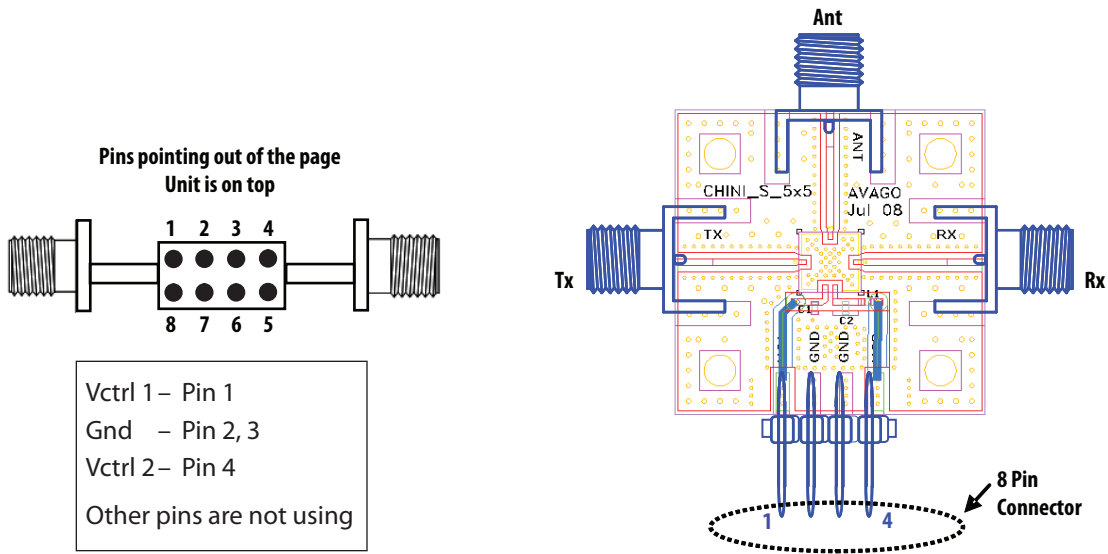


Figure 16. Demo board layout diagram

- Recommended PCB material is 10 mils Rogers RO4350, with FR4 backing for mechanical strength.
- Suggested component values may vary according to layout and PCB material.

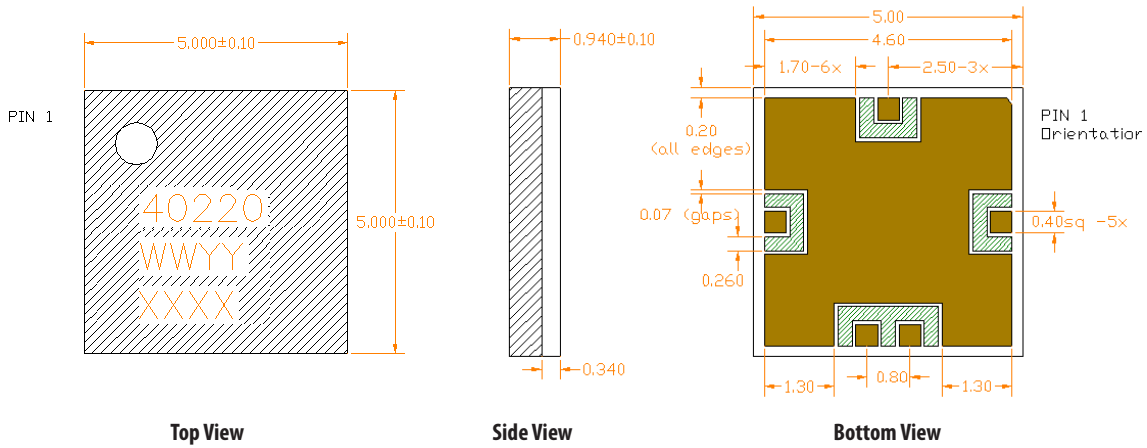
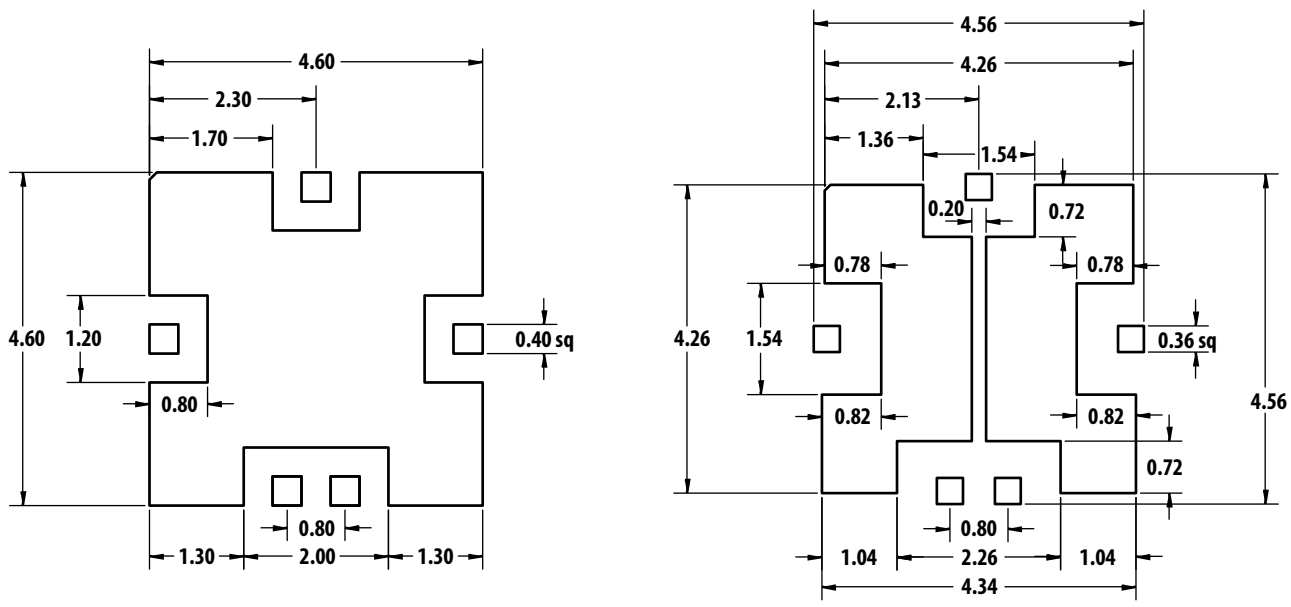
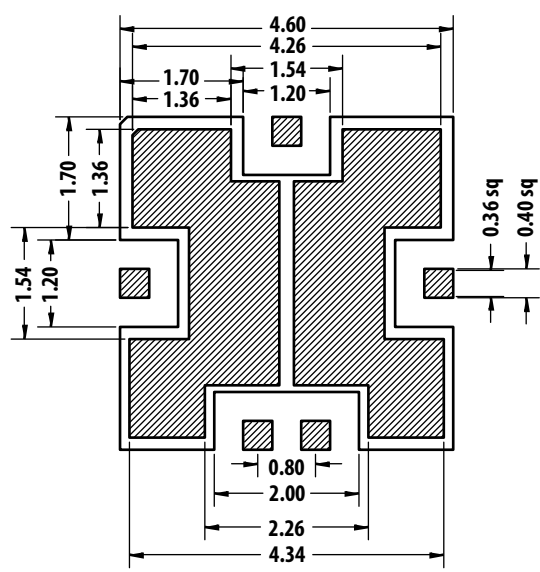


Figure 17. Package Drawing Dimensions



Land Pattern

Stencil Opening

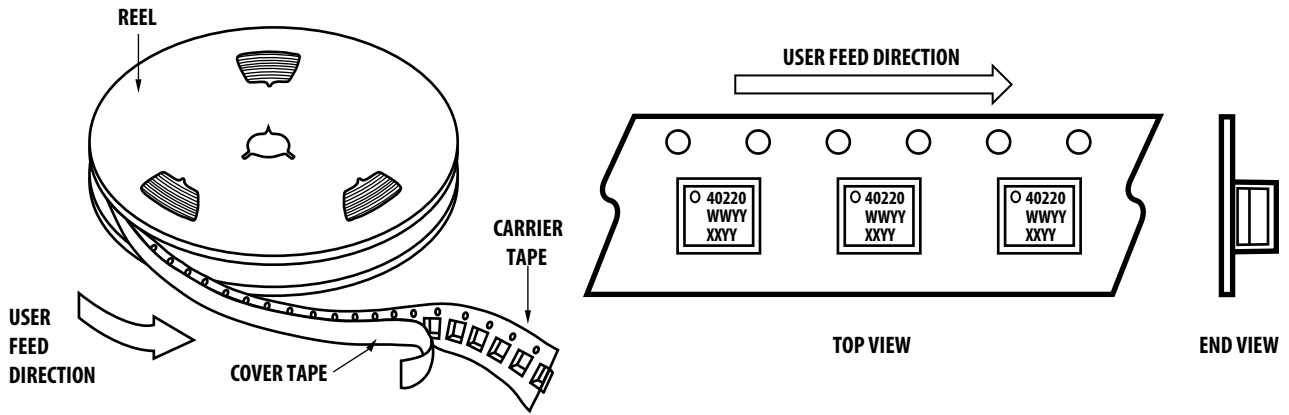


Combined Land Pattern and Stencil Opening

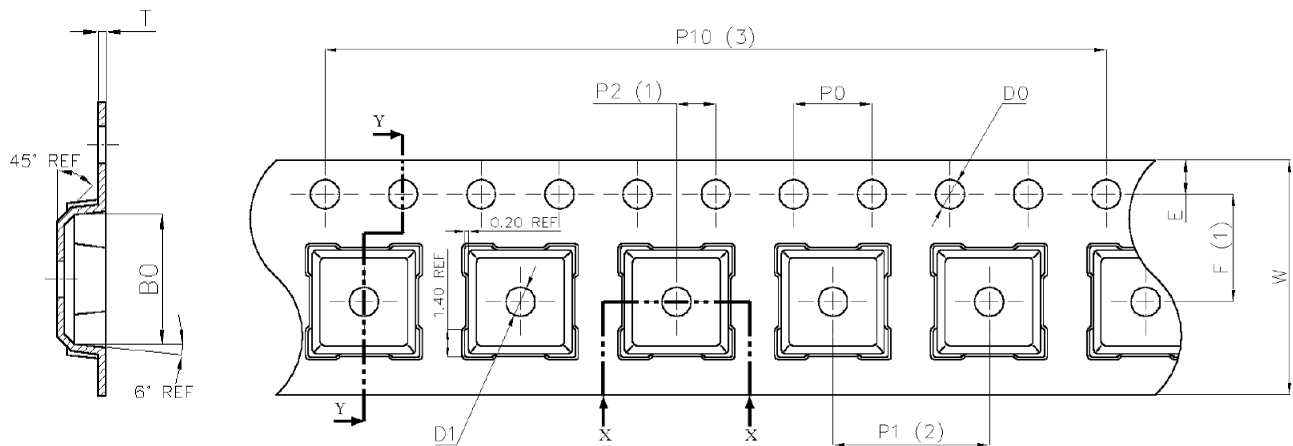
All dimensions are in millimeters

Figure 18. PC Board and stencil design

## Device Orientation

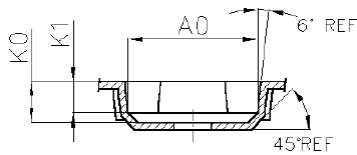


## Tape Dimensions



## SECTION Y - Y

Dimension List			
Annote	Milimeter	Annote	Milimeter
A0	5.40±0.10	P0	4.00±0.10
B0	5.40±0.10	P2	2.00±0.10
D0	1.50 <sup>+0.10</sup> <sub>0</sub>	P10	40.00±0.20
D1	1.60±0.10	E	1.75±0.10
K0	1.90±0.10	F	5.50±0.10
K1	1.50±0.10	T	0.30±0.03
P1	8.00±0.10	W	12.00±0.30

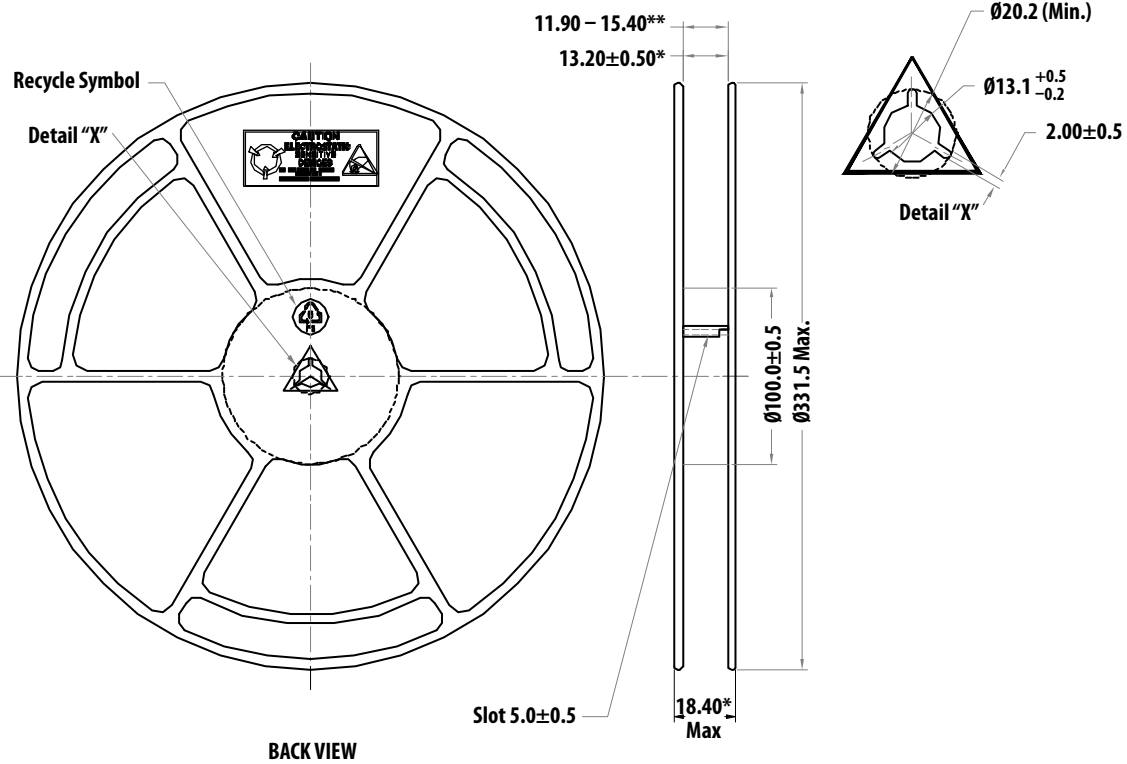
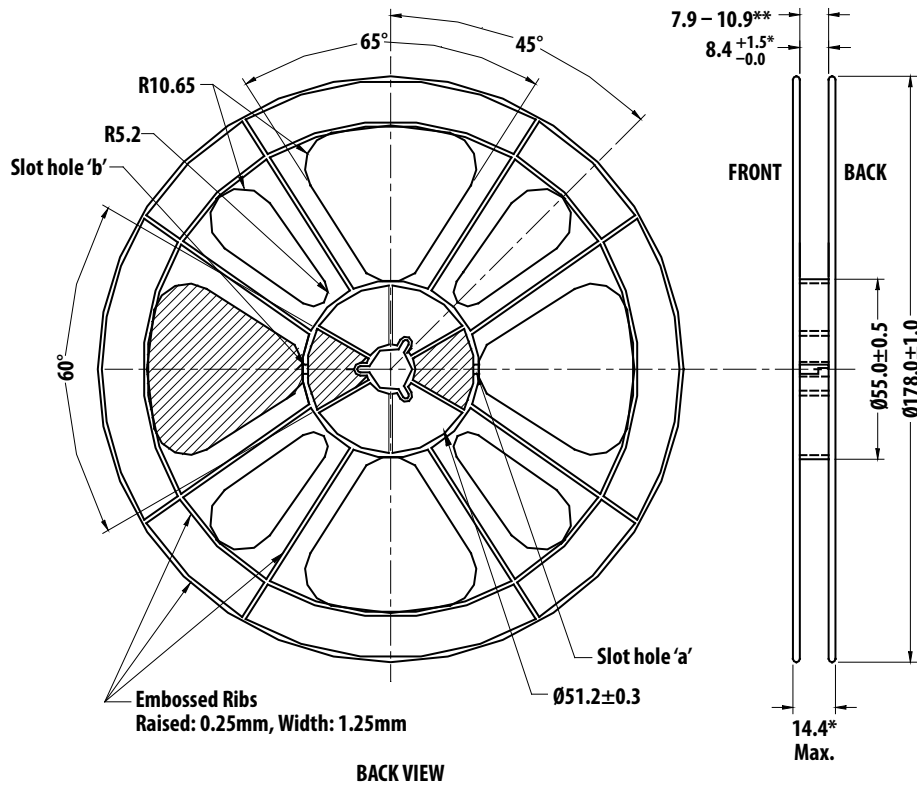


## SECTION X - X

## Part Number Ordering Information

Part #	Qty	Container
ALM-40220-BLKG	100	Antistatic Bag
ALM-40220-TR1G	3000	13" Reel

# Reel Dimensions (13" reel)



For product information and a complete list of distributors, please go to our web site: [www.avagotech.com](http://www.avagotech.com)

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