MGA-565P8

20 dBm P_{sat} High Isolation Buffer Amplifier

Data Sheet

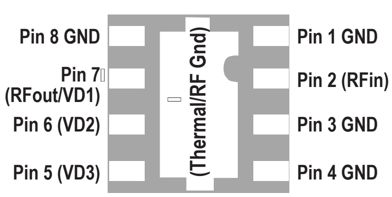
Description

The MGA-565P8 is designed for use in LO chains to drive high dynamic range passive mixers. It provides high isolation, high gain, and consistent output power. It is a GaAs MMIC, fabricated using Avago Technologies' cost effective, reliable enhancement mode PHEMT (Pseudomorphic High Electron Mobility Transistor)[1] process. This device is housed in the LPCC 2x2 mm package. This package offers good thermal dissipation and RF characteristics.

MGA-565P8 features a saturated power of 20 dBm (with 0 dBm input power) and reverse isolation in excess of 40 dB at 2 GHz. The saturated output power can be set between 9 dBm and 20 dBm using an external resistor, with a corresponding adjustment in current consumption.

Notes:
1. Enhancement mode technology employs a single positive V_{gs}, eliminating the need of negative gate voltage associated with conventional depletion mode devices.
2. Conform to JEDEC reference outline MO229 for DRP-N

Pin Connections and Package Marking



Bottom View

Top View

Note:
Package marking provides orientation and identification

"1B" = Device Code
"x" = Data code indicates the month of manufacture.

Features

- Up to 3.5 GHz operating frequency
- 2:1 VSWR input and output at 2GHz
- Small package size: 2.0 x 2.0 x 0.75 mm LPCC[3]
- MSL-1 and lead-free
- Tape-and-reel packaging option available

Specifications

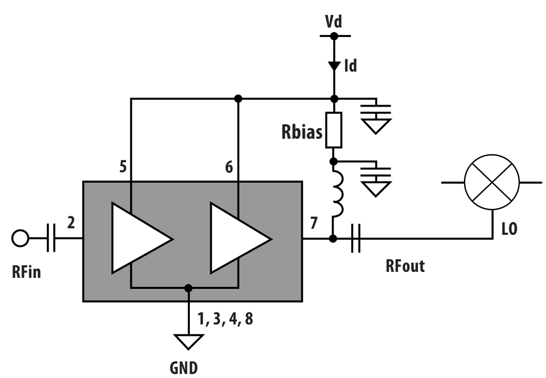
@ 2 GHz, V_d = 5 V, P_{in} = 0 dBm

- P_{sat} = 20 dBm
- I_{dsat} = 67 mA
- Isolation = 42 dB
- Small Signal Gain = 22 dB

Applications

- VCO buffer amplifier for Cellular/PCS or other wireless infrastructures

Simplified Schematic



Attention: Observe precautions for handling electrostatic sensitive devices.
ESD Machine Model (Class A)
ESD Human Body Model (Class 0)
Refer to Avago Application Note A004R: Electrostatic Discharge Damage and Control.

MGA-565P8 Absolute Maximum Ratings[1]

Symbol	Parameter	Units	Absolute Maximum
V_d	DC Supply Voltage	V	8
P_{diss}	Total Power Dissipation [2]	mW	448
P_{in} max.	RF Input Power (Vd = 5V)	dBm	15
T_{CH}	Channel Temperature	°C	150
T_{STG}	Storage Temperature	°C	-65 to 150
θ_{ch_b}	Thermal Resistance[3]	°C/W	91
	ESD (Human Body Model)	V	100
	ESD (Machine Model)	V	30

Notes:
1. Operation of this device in excess of any one of these parameters may cause permanent damage.
2. Board (package belly) temperature T_B is 25°C. Derate 11 mW/°C for T_B > 109°C.
3. Channel-to-board thermal resistance measured using 150°C Liquid Crystal Measurement method.

Electrical Specifications

T_A = 25°C, Frequency = 2 GHz, R_{bias} = 0Ω (unless specified otherwise)

Symbol	Parameter and Test Condition		Units	Min.	Typ.	Max.
P_{sat}	Saturated Power at 0 dBm input	Vd = 5V[1]	dBm	18.5	20	
		Vd = 3V	dBm		17	
I_{dsat}	Saturation Current	Vd = 5V[1]	mA	58	67	
		Vd = 3V	mA		45	
ISL [1]	Reverse Isolation		dB	42	50	
Gain	Small Signal Gain	Vd = 5V[1]	dB	20	21.8	23.5
		Vd = 3V			20	
I_{ds}	Small Signal Current (P_{in} = -10 dBm)	Vd = 5V[1]	mA	33	37	
		Vd = 3V			27	
RL [1]	Return Loss Input		dB		-8	
	Output				-10	

Notes:
1. Typical value determined from a sample size of 500 parts from 3 wafers.
2. Measurement obtained using production test board described in the block diagram below. Circuit losses have been de-embedded from actual measurements.

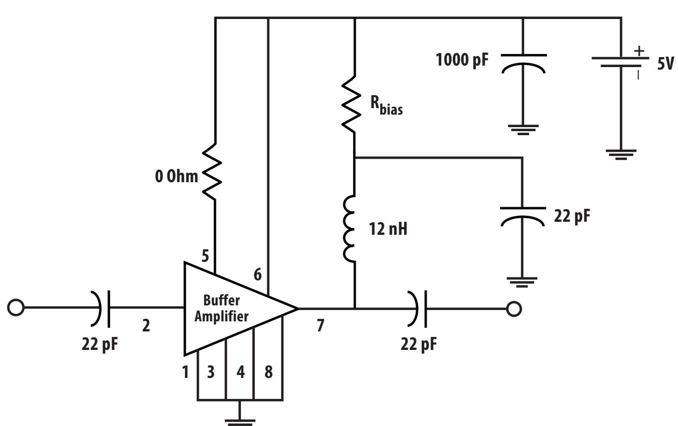


Figure 1. Production Test Circuit Schematic at 2 GHz.

Product Consistency Distribution Charts at 2 GHz[1, 2]

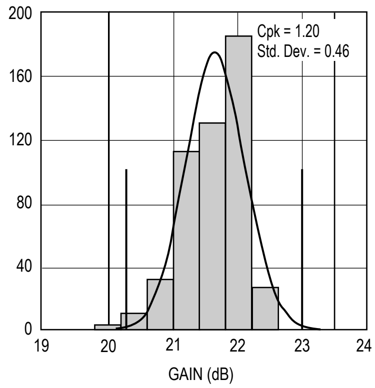


Figure 2. Gain Distribution.
LSL = 20.0 dB, USL = 23.5 dB.

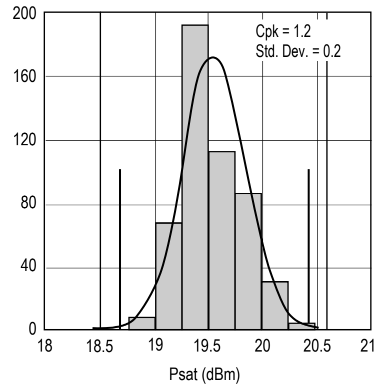


Figure 3. Psat Distribution.
LSL = 18.5 dBm, USL = 20.6

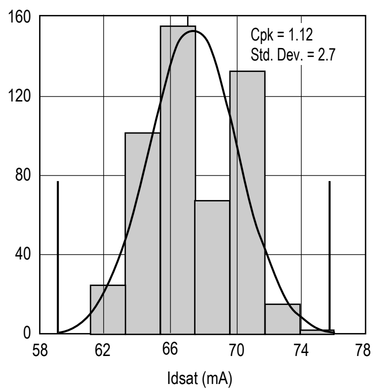


Figure 4. Idsat Distribution.
LSL = 58.0 dBm, USL = 78.0 dBm.

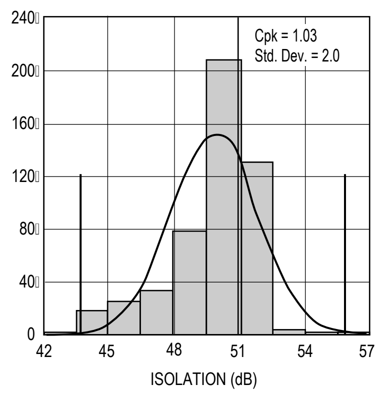


Figure 5. Isolation Distribution.
LSL = 42.0 dB, USL = 56.0 dB.

Notes:
1. Statistical distribution determined from a sample size of 500 parts from 3 wafers.
2. Future wafers allocated to this product may have typical values anywhere between the minimum and maximum specification limits.

MGA-565P8 Typical Performance Curves (at 25°C, 2 GHz, R_{bias} = 0Ω, unless specified otherwise)

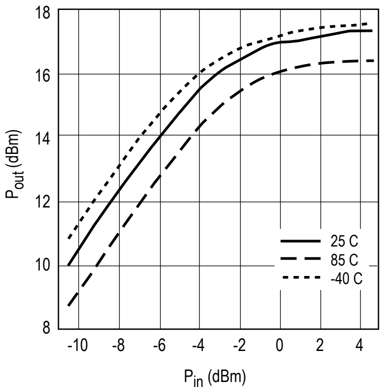


Figure 6. P_{out} vs. P_{in}, V_d = 3V.

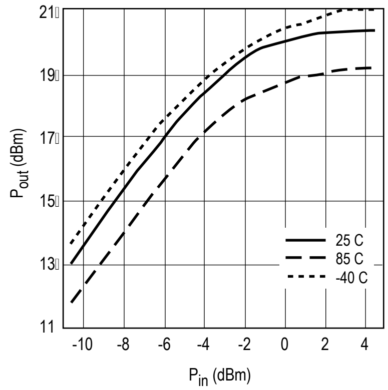


Figure 7. P_{out} vs. P_{in}, V_d = 5V.

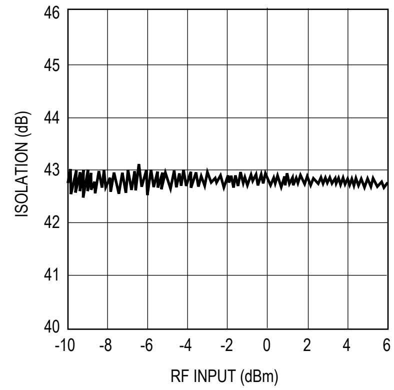


Figure 8. Isolation vs P_{in}, V_d = 3V.

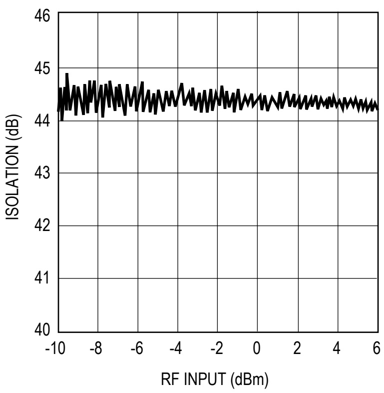


Figure 9. Isolation vs. P_{in}, V_d = 5V.

MGA-565P8 Typical Performance Curves (R_{bias} = 0Ω, temperature variation)

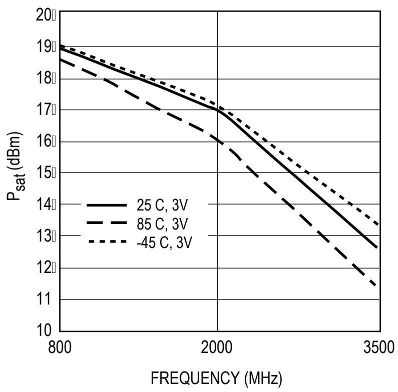


Figure 10. P_{sat} vs. Frequency.
(P_{in} = 0 dBm, V_d = 3V)

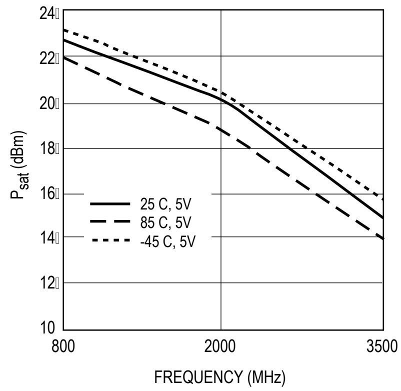


Figure 11. P_{sat} vs. Frequency.
(P_{in} = 0 dBm, V_d = 5V)

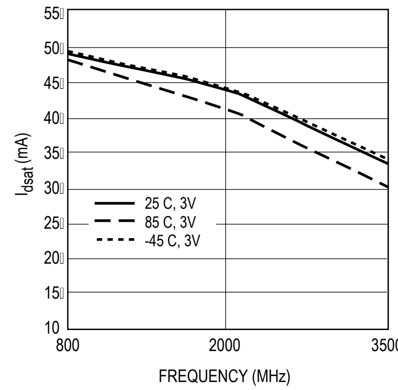


Figure 12. I_{dsat} vs. Frequency.
(P_{in} = 0 dBm, V_d = 3V)

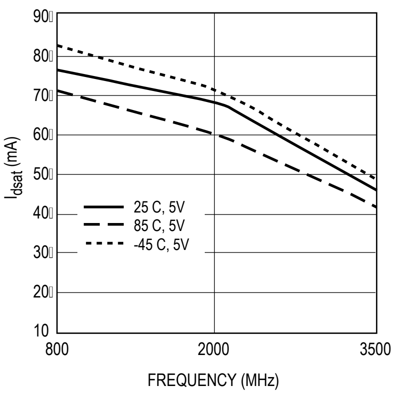


Figure 13. I_{dsat} vs. Frequency.
(P_{in} = 0 dBm, V_d = 5V)

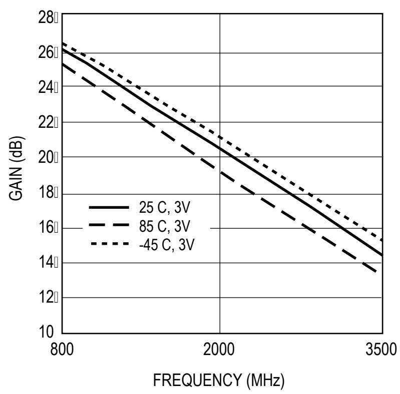


Figure 14. Gain vs. Frequency.
(P_{in} = -10 dBm, V_d = 3V)

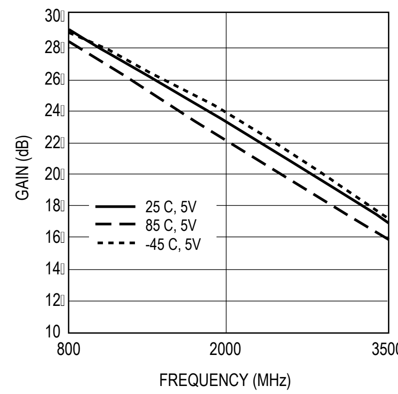


Figure 15. Gain vs Frequency.
(P_{in} = -10 dBm, V_d = 5V)

MGA-565P8 Typical Performance Curves (R_{bias} = 0Ω, temperature variation), continued

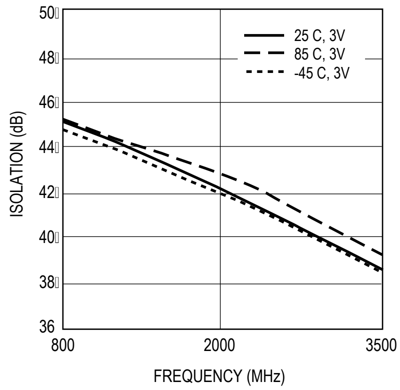


Figure 16. Isolation vs. Frequency.
(P_{in} = -10 dBm, V_d = 3V)

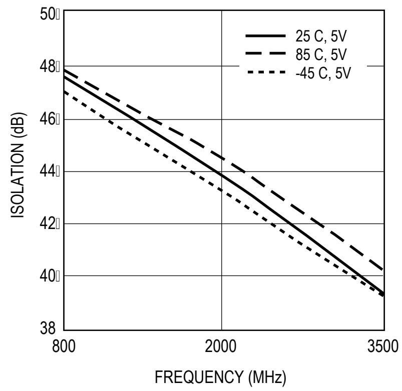


Figure 17. Isolation vs. Frequency.
(P_{in} = -10 dBm, V_d = 5V)

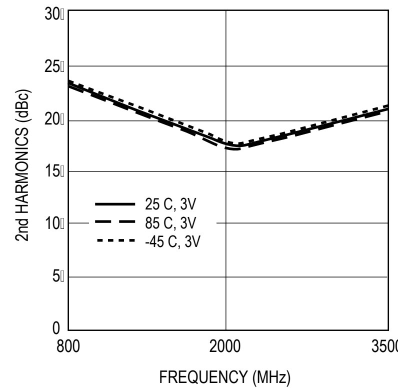


Figure 18. Second Harmonics vs. Frequency.
(P_{in} = 0 dBm, V_d = 3V)

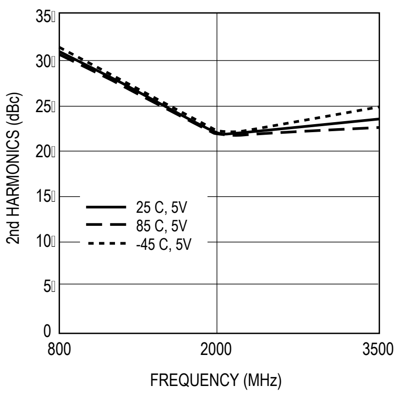


Figure 19. Second Harmonics vs. Frequency.
(P_{in} = 0 dBm, V_d = 5V)

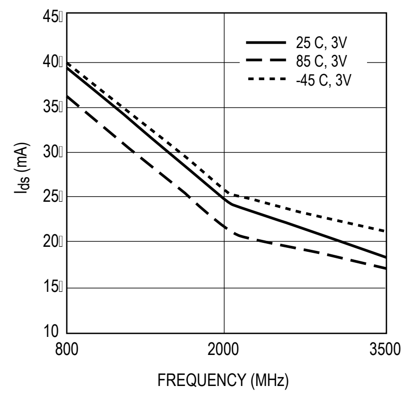


Figure 20. I_{ds} vs. Frequency.
(P_{in} = -10 dBm, V_d = 3V)

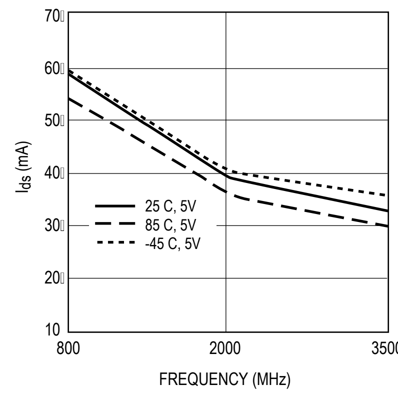


Figure 21. I_{ds} vs. Frequency.
(P_{in} = -10 dBm, V_d = 5V)

MGA-565P8 Typical Performance Curves (at 25°C, 2 GHz, unless specified otherwise)

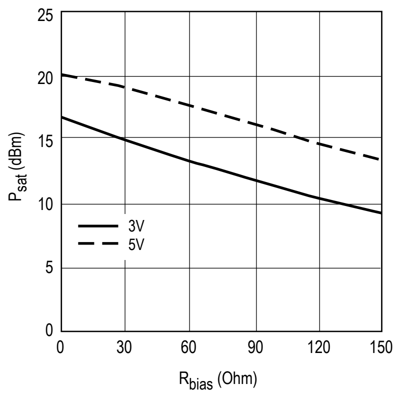


Figure 22. P_{sat} vs. R_{bias},
P_{in} = 0 dBm for V_d = 3V and 5V.

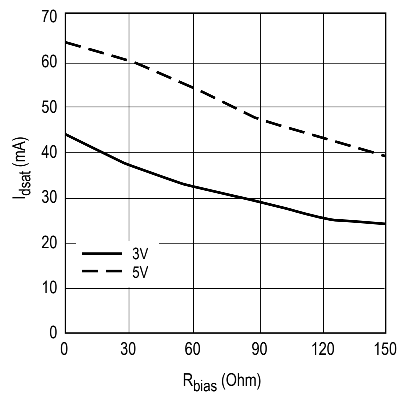


Figure 23. I_{dsat} vs. R_{bias},
P_{in} = 0 dBm for V_d = 3V and 5V.

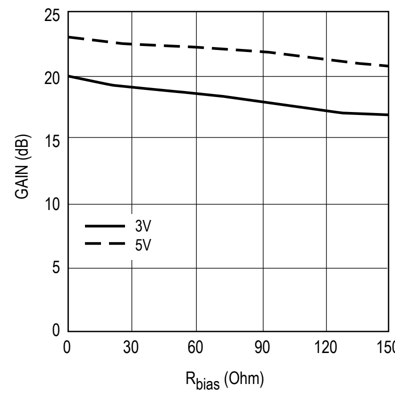


Figure 24. Gain vs. R_{bias},
P_{in} = -10 dBm for V_d = 3V and 5V.

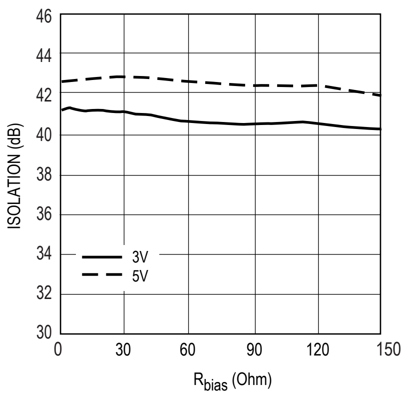


Figure 25. Isolation vs. R_{bias},
P_{in} = -10 dBm for V_d = 3V and 5V.

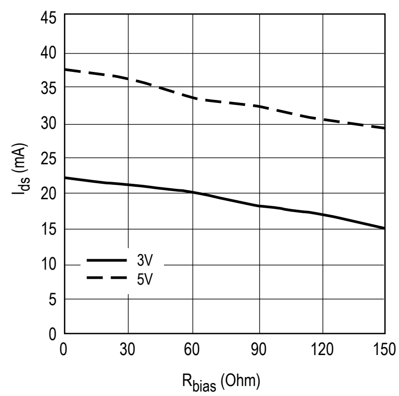


Figure 26. I_{ds} vs. R_{bias},
P_{in} = -10 dBm for V_d = 3V and 5V.

MGA-565P8 Typical Scattering Parameters (at 25°C, V_d = 5V, I_d = 35 mA, R_{bias} = 0Ω)

Freq.	S_{11}		S_{21}			S_{12}			S_{22}		K
GHz	Mag.	Ang.	dB	Mag.	Ang.	dB	Mag.	Ang.	Mag.	Ang.	
0.1	0.48	-82.9	33.7	48.51	20.3	-66.0	0.001	96.5	0.46	-27.5	12.7
0.2	0.19	-136.9	33.9	49.83	-21.5	-60.1	0.001	86.2	0.43	-34.8	8.1
0.3	0.08	127.4	33.5	47.25	-48.8	-56.0	0.002	61.1	0.40	-49.9	5.6
0.4	0.14	54.5	32.3	41.22	-70.5	-53.1	0.002	39.3	0.38	-61.2	4.6
0.5	0.20	23.2	32.2	40.90	-90.8	-52.6	0.002	26.6	0.36	-77.0	4.3
0.6	0.25	0.2	31.5	37.47	-109.9	-51.6	0.003	13.3	0.34	-89.5	4.1
0.7	0.29	-18.7	30.8	34.58	-127.1	-50.6	0.003	1.3	0.33	-101.8	4.0
0.8	0.33	-36.0	30.1	32.04	-143.8	-49.5	0.003	-9.5	0.32	-114.5	3.7
0.9	0.36	-54.3	29.3	29.32	-161.1	-48.0	0.004	-25.4	0.31	-129.7	3.3
1.0	0.36	-71.0	28.4	26.32	-176.0	-48.1	0.004	-44.9	0.27	-141.3	3.9
1.1	0.36	-85.0	27.7	24.18	170.1	-48.6	0.004	-56.7	0.25	-149.8	4.5
1.2	0.37	-98.1	27.1	22.60	156.4	-48.7	0.004	-66.7	0.24	-159.4	4.9
1.3	0.37	-111.5	26.4	21.01	142.3	-48.7	0.004	-75.9	0.24	-169.0	5.2
1.4	0.37	-124.1	25.8	19.56	129.1	-48.7	0.004	-85.4	0.23	-178.8	5.6
1.5	0.38	-135.9	25.3	18.36	116.2	-48.6	0.004	-94.0	0.22	171.5	6.0
1.6	0.38	-148.7	24.8	17.36	102.6	-48.5	0.004	-102.9	0.22	161.7	6.2
1.7	0.38	-160.8	24.2	16.26	89.5	-48.5	0.004	-111.9	0.21	151.9	6.6
1.8	0.38	-172.4	23.7	15.28	76.8	-48.4	0.004	-120.6	0.21	142.2	7.0
1.9	0.38	176.3	23.2	14.43	64.4	-48.3	0.004	-129.1	0.20	132.2	7.4
2.0	0.38	165.0	22.8	13.73	51.9	-48.3	0.004	-137.0	0.20	122.5	7.7
2.1	0.37	153.7	22.3	12.99	39.3	-48.1	0.004	-143.4	0.19	113.1	8.1
2.2	0.37	143.3	21.8	12.33	27.3	-46.8	0.005	-151.2	0.19	105.0	7.4
2.3	0.37	131.1	21.5	11.86	15.1	-47.0	0.004	-168.4	0.19	93.0	7.8
2.4	0.37	119.5	21.1	11.31	2.6	-47.5	0.004	-177.2	0.19	82.3	8.7
2.5	0.36	108.2	20.7	10.80	-9.6	-47.5	0.004	174.1	0.18	71.7	9.2
2.6	0.36	96.8	20.3	10.33	-21.5	-47.4	0.004	165.1	0.18	61.5	9.5
2.7	0.35	85.6	19.9	9.91	-33.7	-47.4	0.004	155.8	0.18	51.0	10.0
2.8	0.34	74.0	19.6	9.50	-45.9	-47.3	0.004	144.5	0.17	40.0	10.4
2.9	0.34	62.5	19.2	9.13	-58.1	-47.5	0.004	131.2	0.17	28.7	11.1
3.0	0.32	51.1	18.8	8.70	-70.3	-49.6	0.003	112.5	0.16	16.0	15.2
3.1	0.32	43.0	18.4	8.33	-81.6	-50.7	0.003	131.5	0.16	8.4	18.0
3.2	0.32	31.4	18.1	8.08	-93.5	-49.1	0.004	123.9	0.16	-0.7	15.4
3.3	0.31	19.7	17.8	7.78	-105.6	-48.8	0.004	113.8	0.16	-11.8	15.5
3.4	0.30	8.1	17.5	7.49	-117.6	-48.9	0.004	105.4	0.16	-21.8	16.4
3.5	0.30	-3.7	17.2	7.22	-129.7	-48.8	0.004	97.3	0.16	-31.9	16.8
3.6	0.29	-16.1	16.8	6.93	-142.1	-49.3	0.003	87.8	0.17	-42.7	18.8
3.7	0.27	-29.6	16.4	6.61	-153.3	-49.7	0.003	93.0	0.16	-68.1	20.8
3.8	0.25	-43.8	16.1	6.37	-165.9	-49.3	0.003	87.1	0.14	-70.2	21.0
3.9	0.22	-59.0	15.5	5.96	-178.3	-48.7	0.004	90.2	0.13	-77.6	21.5
4.0	0.14	-64.5	14.7	5.44	171.9	-45.6	0.005	91.4	0.14	-84.1	16.9
4.1	0.16	-41.6	14.6	5.37	165.1	-43.9	0.006	68.4	0.15	-95.7	13.8
4.2	0.22	-56.0	14.8	5.50	153.7	-43.7	0.007	42.7	0.15	-111.2	12.9
4.3	0.23	-73.2	14.7	5.42	141.0	-44.0	0.006	19.5	0.15	-124.9	13.6
4.4	0.22	-87.9	14.4	5.26	128.9	-44.3	0.006	7.6	0.15	-137.1	14.5
4.5	0.21	-99.6	14.1	5.06	117.2	-45.1	0.006	-21.7	0.14	-153.5	16.5
4.6	0.20	-110.4	13.7	4.86	106.0	-47.2	0.004	-55.1	0.13	-168.4	22.2
4.7	0.19	-111.2	13.6	4.77	96.6	-48.8	0.004	-176.2	0.09	-170.7	27.6
4.8	0.23	-127.2	13.6	4.76	83.4	-44.0	0.006	32.8	0.12	-175.4	15.6
4.9	0.22	-140.4	13.2	4.59	72.3	-47.0	0.004	5.6	0.11	170.3	22.9
5.0	0.21	-153.3	13.0	4.48	60.8	-46.4	0.005	-11.0	0.11	160.7	22.1
5.1	0.21	-165.3	12.8	4.37	49.3	-46.9	0.005	-22.0	0.11	152.2	24.0
5.2	0.20	-177.2	12.6	4.25	37.7	-47.5	0.004	-28.1	0.11	142.3	26.3
5.3	0.20	170.5	12.3	4.14	26.2	-47.8	0.004	-30.1	0.11	132.3	28.3
5.4	0.19	158.7	12.1	4.02	14.7	-47.4	0.004	-25.1	0.12	124.4	27.7
5.5	0.19	146.7	11.8	3.90	3.4	-44.5	0.006	-27.6	0.13	113.5	20.3
5.6	0.18	135.4	11.6	3.79	-8.0	-42.6	0.007	-47.1	0.13	100.8	16.8
5.7	0.18	123.7	11.3	3.68	-19.4	-42.5	0.008	-66.0	0.14	88.9	17.1
5.8	0.18	111.4	11.0	3.56	-30.5	-43.2	0.007	-80.4	0.14	77.2	19.3
5.9	0.18	100.4	10.8	3.45	-41.7	-44.2	0.006	-85.9	0.14	70.6	22.1
6.0	0.18	88.9	10.4	3.32	-52.7	-44.1	0.006	-88.2	0.16	62.3	22.6

MGA-565P8 Typical Scattering Parameters (at 25°C, V_d = 3V, I_d = 20 mA, R_{bias} = 0Ω)

Freq.	S_{11}		S_{21}			S_{12}			S_{22}		K
GHz	Mag.	Ang.	dB	Mag.	Ang.	dB	Mag.	Ang.	Mag.	Ang.	
0.1	0.53	-75.3	30.8	34.87	27.3	-62.9	0.001	105.7	0.48	-27.5	11.2
0.2	0.17	-116.2	31.1	35.82	-21.4	-55.2	0.002	89.1	0.45	-34.4	6.3
0.3	0.00	162.6	30.6	34.07	-47.6	-52.3	0.002	61.2	0.43	-53.8	5.0
0.4	0.12	26.9	29.4	29.48	-71.1	-50.5	0.003	36.9	0.40	-72.6	4.7
0.5	0.18	3.8	29.4	29.43	-89.6	-48.9	0.004	25.1	0.38	-83.5	3.9
0.6	0.24	-13.8	28.6	26.95	-108.7	-47.9	0.004	10.7	0.36	-97.1	3.8
0.7	0.28	-30.1	27.9	24.85	-126.0	-47.0	0.004	-3.0	0.34	-111.3	3.7
0.8	0.31	-45.9	27.2	22.90	-142.7	-46.2	0.005	-16.6	0.32	-125.3	3.6
0.9	0.33	-61.5	26.4	20.95	-159.2	-45.7	0.005	-30.3	0.30	-138.5	3.7
1.0	0.34	-75.5	25.6	19.15	-174.2	-45.4	0.005	-43.6	0.27	-150.8	4.0
1.1	0.35	-89.0	24.9	17.63	171.4	-45.3	0.005	-55.7	0.25	-162.2	4.3
1.2	0.36	-101.9	24.3	16.46	157.5	-45.2	0.005	-67.1	0.24	-173.9	4.5
1.3	0.37	-114.8	23.7	15.30	143.4	-45.2	0.005	-77.7	0.22	175.0	4.9
1.4	0.37	-127.0	23.1	14.25	130.1	-45.2	0.006	-88.0	0.21	164.8	5.2
1.5	0.37	-138.4	22.5	13.38	117.2	-45.1	0.006	-97.1	0.19	155.1	5.6
1.6	0.38	-150.8	22.1	12.67	103.7	-45.0	0.006	-106.8	0.19	144.7	5.8
1.7	0.37	-162.4	21.5	11.89	90.4	-45.0	0.006	-116.1	0.18	134.0	6.2
1.8	0.37	-173.8	21.0	11.20	77.8	-44.9	0.006	-125.0	0.16	124.2	6.6
1.9	0.37	175.2	20.5	10.59	65.3	-44.9	0.006	-134.0	0.16	114.5	6.9
2.0	0.37	164.3	20.1	10.09	52.7	-44.8	0.006	-142.2	0.15	104.7	7.2
2.1	0.37	153.2	19.6	9.57	40.0	-44.7	0.006	-150.0	0.14	94.9	7.6
2.2	0.37	142.9	19.1	9.05	27.9	-43.8	0.006	-157.7	0.14	87.3	7.3
2.3	0.37	131.2	18.8	8.75	15.6	-43.8	0.006	-172.5	0.13	76.1	7.5
2.4	0.36	119.9	18.4	8.35	3.1	-44.1	0.006	178.3	0.12	64.7	8.2
2.5	0.35	108.8	18.1	7.99	-9.2	-44.2	0.006	169.9	0.12	53.6	8.7
2.6	0.35	97.8	17.7	7.65	-21.2	-44.1	0.006	161.0	0.11	43.9	9.0
2.7	0.35	86.8	17.3	7.34	-33.5	-44.0	0.006	151.0	0.11	34.0	9.3
2.8	0.34	75.7	17.0	7.04	-45.8	-43.8	0.006	140.5	0.10	23.2	9.7
2.9	0.33	64.4	16.6	6.76	-58.0	-43.9	0.006	128.6	0.10	12.0	10.2
3.0	0.32	53.6	16.2	6.45	-70.2	-45.1	0.006	115.1	0.10	-0.7	12.5
3.1	0.32	44.9	15.9	6.20	-81.7	-45.5	0.005	119.6	0.09	-8.0	13.5
3.2	0.32	33.7	15.6	6.00	-93.8	-44.6	0.006	111.0	0.09	-15.5	12.6
3.3	0.31	22.3	15.2	5.78	-106.0	-44.4	0.006	101.1	0.09	-26.4	12.9
3.4	0.31	11.3	14.9	5.56	-118.0	-44.5	0.006	91.5	0.08	-34.8	13.5
3.5	0.30	-0.1	14.6	5.35	-130.0	-44.5	0.006	82.2	0.09	-43.1	14.2
3.6	0.29	-11.9	14.2	5.15	-142.1	-45.1	0.006	72.4	0.10	-54.3	15.8
3.7	0.28	-24.4	14.0	5.00	-154.1	-45.1	0.006	76.0	0.10	-92.6	16.4
3.8	0.27	-37.4	13.6	4.79	-166.8	-44.5	0.006	63.6	0.06	-97.0	16.1
3.9	0.25	-51.6	13.1	4.53	-179.4	-44.9	0.006	56.0	0.05	-99.7	18.2
4.0	0.20	-66.7	12.5	4.21	168.6	-45.2	0.006	58.1	0.05	-100.9	20.6
4.1	0.13	-63.3	11.7	3.85	159.7	-43.6	0.007	61.7	0.06	-101.1	19.3
4.2	0.18	-48.6	11.8	3.87	152.0	-43.5	0.007	39.9	0.06	-115.6	18.7
4.3	0.21	-64.6	11.8	3.89	140.0	-43.2	0.007	13.8	0.06	-132.4	17.7
4.4	0.22	-80.1	11.6	3.80	127.7	-43.6	0.007	2.6	0.06	-143.7	18.9
4.5	0.21	-91.4	11.3	3.66	116.0	-44.3	0.006	-23.8	0.06	-165.6	21.2
4.6	0.21	-102.3	10.9	3.52	104.7	-44.2	0.006	-50.6	0.05	172.5	22.0
4.7	0.20	-105.6	10.7	3.42	95.0	-44.9	0.006	-115.3	0.02	156.2	24.6
4.8	0.24	-120.3	10.6	3.41	82.1	-44.4	0.006	4.5	0.04	-175.3	23.0
4.9	0.23	-133.3	10.3	3.28	71.1	-44.6	0.006	-34.5	0.03	166.0	24.5
5.0	0.22	-146.0	10.1	3.20	59.8	-43.8	0.006	-47.7	0.03	164.1	23.1
5.1	0.22	-158.0	9.8	3.10	48.4	-44.1	0.006	-61.1	0.03	166.9	24.6
5.2	0.22	-170.0	9.6	3.01	37.0	-44.8	0.006	-72.7	0.03	162.5	27.4
5.3	0.21	177.7	9.3	2.92	25.6	-45.9	0.005	-82.5	0.04	157.3	32.4
5.4	0.21	165.5	9.0	2.82	14.3	-48.1	0.004	-84.1	0.04	153.6	43.1
5.5	0.20	152.8	8.7	2.73	3.4	-48.1	0.004	-64.4	0.06	139.9	44.3
5.6	0.20	142.6	8.5	2.66	-7.4	-44.2	0.006	-70.4	0.06	125.5	29.2
5.7	0.20	131.3	8.2	2.58	-18.6	-43.0	0.007	-90.9	0.07	111.2	26.2
5.8	0.20	118.6	8.0	2.50	-29.4	-43.7	0.007	-109.0	0.08	97.5	29.4
5.9	0.19	106.8	7.7	2.43	-40.0	-45.6	0.005	-115.0	0.09	89.2	37.4
6.0	0.19	94.9	7.5	2.36	-50.3	-46.4	0.005	-106.5	0.12	73.1	42.2

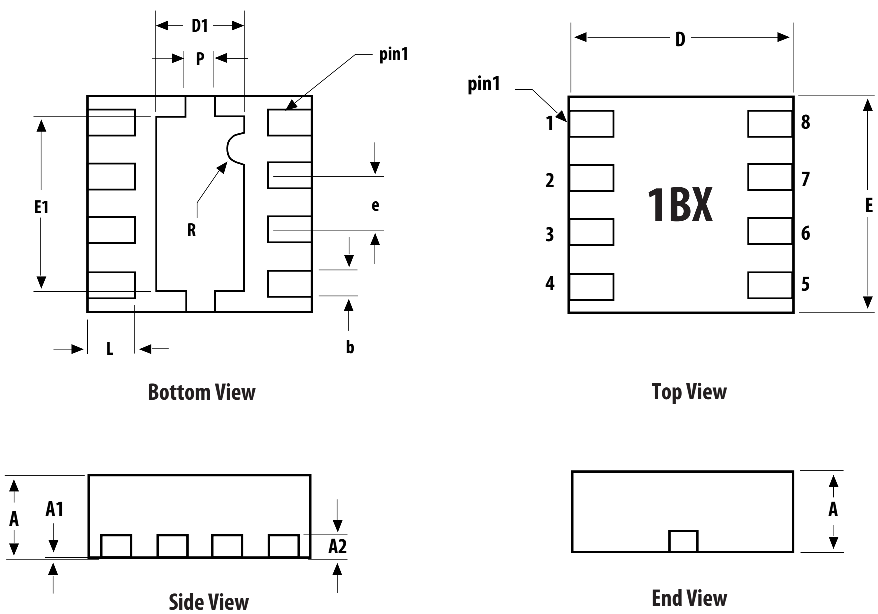
Device Models

Refer to the Avago Technologies Web Site

Ordering Information

Part Number	No. of Devices	Container
MGA-565P8-TR1	3000	7" Reel
MGA-565P8-TR2	10000	13"Reel
MGA-565P8-BLK	100	antistatic bag

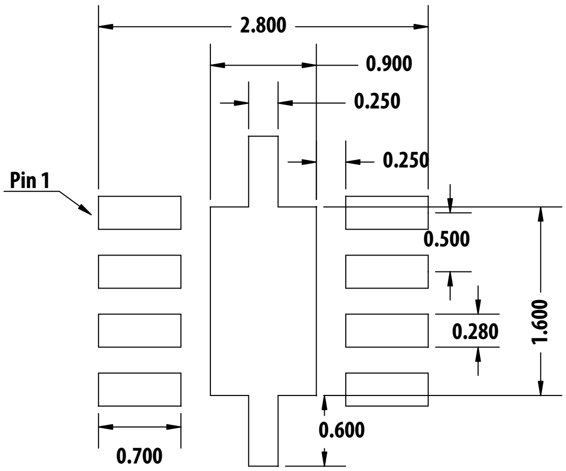
2 x 2 LPCC (JEDEC DFP-N) Package Dimensions



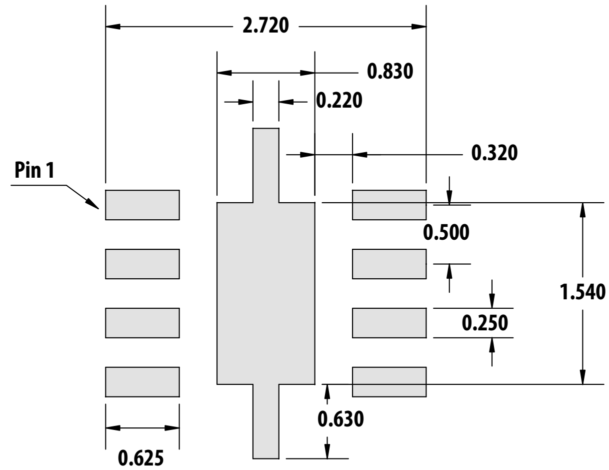
SYMBOL	DIMENSIONS		
	MIN.	NOM.	MAX.
A	0.70	0.75	0.80
A1	0	0.02	0.05
A2		0.203 REF	
b	0.225	0.25	0.275
D	1.9	2.0	2.1
D1	0.95	1.00	1.05
E	1.9	2.0	2.1
E1	1.55	1.60	1.65
L	0.25	0.30	0.35
e		0.50 BSC	
P	0.2	0.25	0.3
L		0.4 REF	

DIMENSIONS ARE IN MILLIMETERS

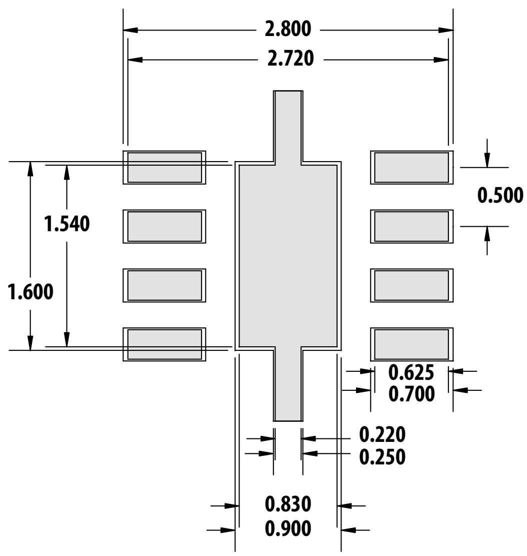
PCB Land Patterns and stencil Design



PCB Land Pattern

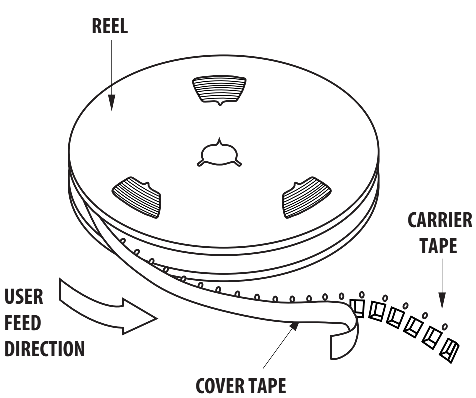


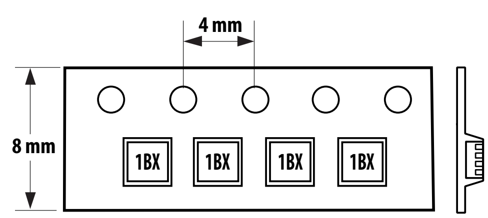
Stencil Outline Drawing



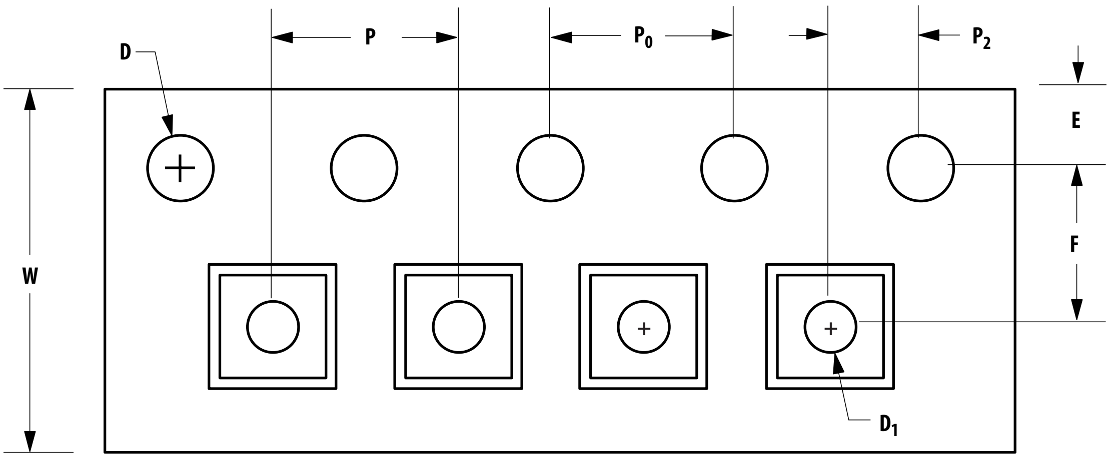
Combined PCB and Stencil Layouts

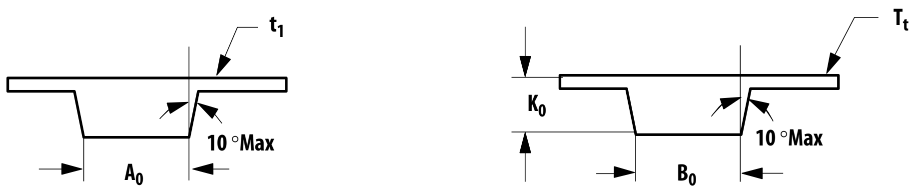
Device Orientation





Tape Dimensions





DESCRIPTION		SYMBOL	SIZE (mm)	SIZE (inches)
CAVITY	LENGTH	A_0	2.30 ± 0.05	0.091 ± 0.004
	WIDTH	B_0	2.30 ± 0.05	0.091 ± 0.004
	DEPTH	K_0	1.00 ± 0.05	0.039 ± 0.002
	PITCH	P	4.00 ± 0.10	0.157 ± 0.004
	BOTTOM HOLE DIAMETER	D_1	1.00 + 0.25	0.039 + 0.002
PERFORATION	DIAMETER	D	1.50 ± 0.10	0.060 ± 0.004
	PITCH	P_0	4.00 ± 0.10	0.157 ± 0.004
	POSITION	E	1.75 ± 0.10	0.069 ± 0.004
CARRIER TAPE	WIDTH	W	8.00 + 0.30 8.00 – 0.10	0.315 ± 0.012 0.315 ± 0.004
	THICKNESS	t_1	0.254 ± 0.02	0.010 ± 0.0008
COVER TAPE	WIDTH	C	5.4 ± 0.10	0.205 ± 0.004
	TAPE THICKNESS	T_t	0.062 ± 0.001	0.0025 ± 0.0004
DISTANCE	CAVITY TO PERFORATION (WIDTH DIRECTION)	F	3.50 ± 0.05	0.138 ± 0.002
	CAVITY TO PERFORATION (LENGTH DIRECTION)	P_2	2.00 ± 0.05	0.079 ± 0.002

For product information and a complete list of distributors, please go to our web site: **www.avagotech.com**

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