

MGA-43728

2.62–2.69 GHz Linear Power Amplifier Module



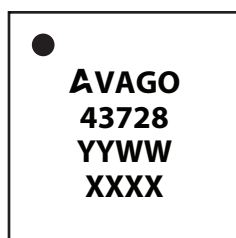
Data Sheet

Description

The Avago MGA-43728 is a fully matched, highly linear power amplifier (PA) designed for use in the 2.62–2.69 GHz band. Based on Avago's proprietary 0.25um GaAs E-pHEMT technology, the device features high linearity, gain and power-added efficiency (PAE) with integrated power detector and shutdown functions. The MGA-43728 is ideal for use as a final stage PA for Small Cell base transceiver station (BTS) applications.

Component Image

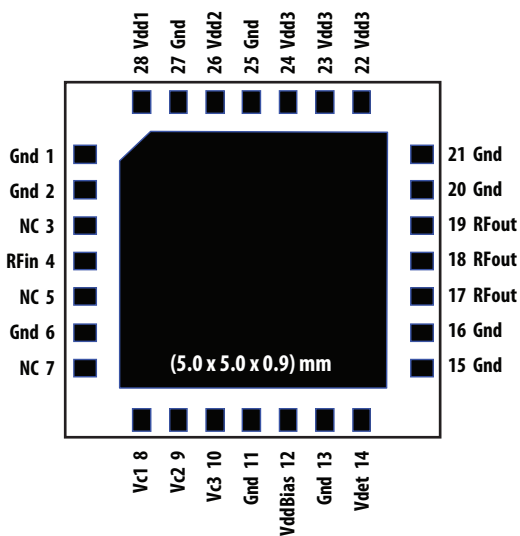
(5.0 × 5.0 × 0.9) mm Package Outline



TOP VIEW

Notes:
Package marking provides orientation and identification
"43728" = Device part number
"YYWW" = Year and work week
"XXXX" = Assembly lot number

Pin Configuration



Features

- High linearity performance : Typ -50 dBc ACPR1^[1] at 27.0 dBm linear output power (biased with 5.0V supply)
- High Gain : 38.8 dB
- Good efficiency
- Fully matched
- Built-in detector
- GaAs E-pHEMT Technology ^[2]
- Low cost small package size: (5.0 × 5.0 × 0.9) mm

Specifications

2.65 GHz; 5.0 V, Idqtotal = 350 mA (typ), LTE 10 MHz 50 RB

- PAE : 13.4%
- 27.0 dBm linear P_{out} @ ACPR1 = -50 dBc^[1]
- 38.3 dB Gain
- Detector range : 20 dB

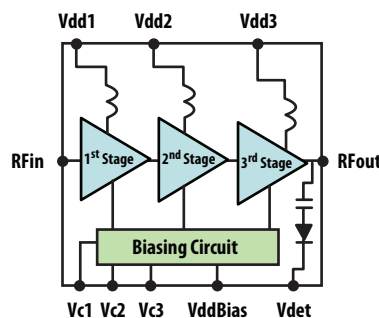
Applications

- Final stage high linearity amplifier for Picocell and Enterprise Femtocell PA targeted for small cell BTS downlink applications.

Note:

1. LTE 10MHz 50 RB Test Mode 1.1 downlink signal.
2. Enhancement mode technology employs positive V_{GS}, thereby eliminating the need of negative gate voltage associated with conventional depletion mode devices.

Functional Block Diagram



Absolute Maximum Rating^[1] $T_A=25^{\circ}\text{C}$

Symbol	Parameter	Units	Absolute Max.
Vdd, VddBias	Supply voltages, bias supply voltage	V	6.0
Vc	Control Voltage	V	(Vdd)
P _{in,max}	CW RF Input Power	dBm	20
P _{diss}	Total Power Dissipation ^[3]	W	7.2
T _j	Junction Temperature	°C	150
T _{STG}	Storage Temperature	°C	-65 to 150

Thermal Resistance^[2,3] $\theta_{jc} = 16^{\circ}\text{C/W}$

Notes:

1. Operation of this device in excess of any of these limits may cause permanent damage.
2. Thermal resistance measured using Infra-Red Measurement Technique at Vdd=5.5V operating voltage.
3. Board temperature (T_B) is 25 °C, for T_B > 34.8 °C derate the device power at 62.5 mW per °C rise in Board (package belly) temperature.

Electrical Specifications

$T_A = 25^{\circ}\text{C}$, Vdd1,2,3 = VddBias=5.0V, Idqtotal = 350mA, RF performance at 2.65 GHz, LTE 10MHz 50RB Test model 1.1 downlink signal operation unless otherwise stated.

Symbol	Parameter and Test Condition	Units	Min.	Typ.	Max.
Vdd	Supply Voltage	V		5.0	
Idqtotal	Quiescent Supply Current	mA		350	600
Gain	Gain	dB	35	38.3	
OP1dB	Output Power at 1dB Gain Compression	dBm		36	
ACPR1 @ P _{out} =27.0 dBm	LTE 10MHz 50RB Test Mode 1.1 downlink signal	dBc		-50	
PAE	Power Added Efficiency	%	12	13.4	
S11	Input Return Loss, 50Ω source	dB		22	
DetR	Detector RF dynamic range	dB		20	
2fo	2fo Harmonics (LTE 10MHz 50RB Test Mode 1.1 downlink signal)	dBc		-34	

Product Consistency Distribution Charts^[1]

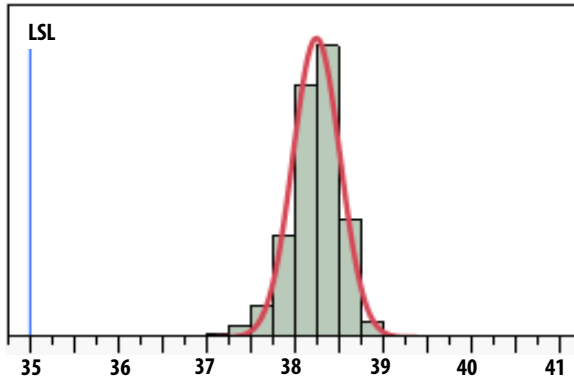


Figure 1. Gain at $P_{out}=27.0$ dBm; LSL=35.0 dB, Nominal = 38.3dB

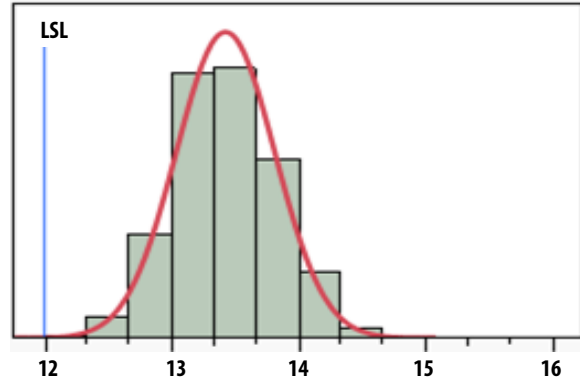


Figure 2. PAE at $P_{out}=27.0$ dBm; LSL=12.0% Nominal = 13.4%

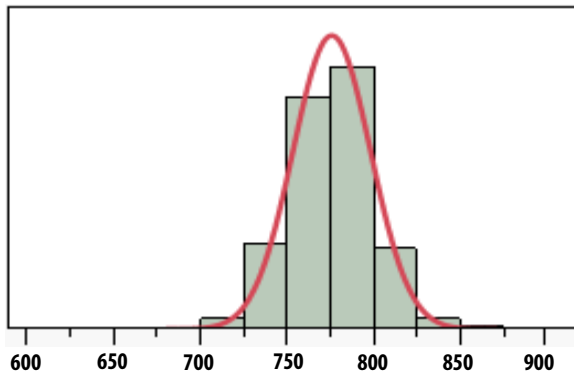


Figure 3. I_{dd_Total} at $P_{out}=27.0$ dBm, Nominal = 776 mA

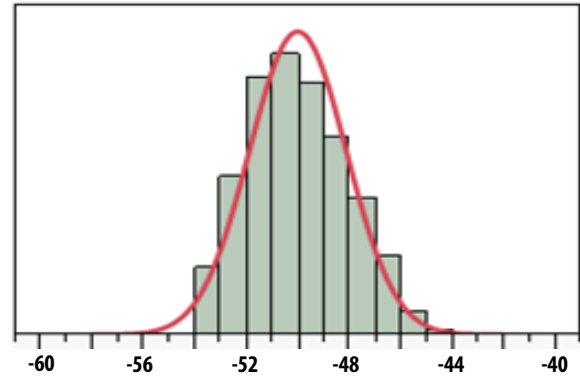


Figure 4. ACLR1 at $P_{out}=27.0$ dBm, Nominal = -50.0 dBc

Note:

1. Distribution data sample size is 1700 samples taken from 3 different wafer lots. $T_A = 25^\circ\text{C}$, $V_{dd}=V_{ddBias} = 5.0\text{V}$, $V_{c1}=2.2\text{V}$, $V_{c2}=2.0\text{V}$, $V_{c3}=2.2\text{V}$, RF performance at 2.65 GHz, unless otherwise stated. Future wafers allocated to this product may have nominal values anywhere between the upper and lower limits.

MGA-43728 typical over-temperature performance at $V_{c1}=2.2V$, $V_{c2}=2.0V$, $V_{c3}=2.2V$ as shown in Figure 27, unless otherwise stated

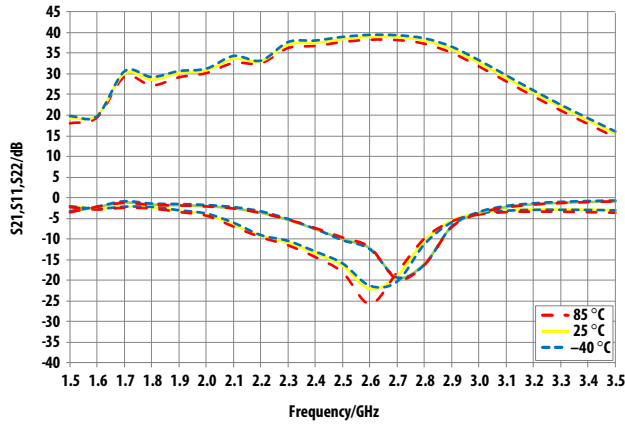


Figure 5. Small-signal performance Over-temperature
 $V_{dd}=V_{ddBias}=5.0V$ operating voltage

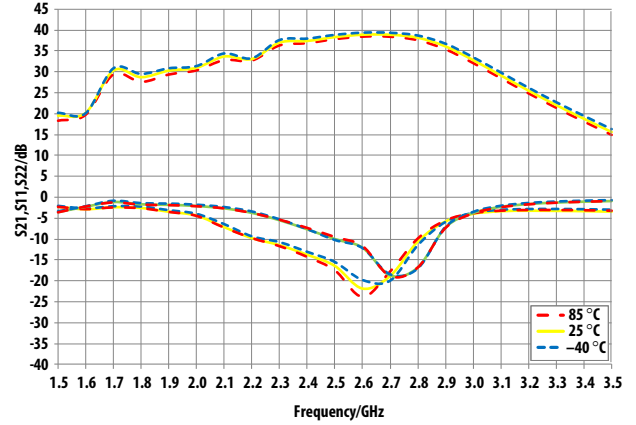


Figure 6. Small-signal performance Over-temperature
 $V_{dd}=V_{ddBias}=5.5V$ operating voltage

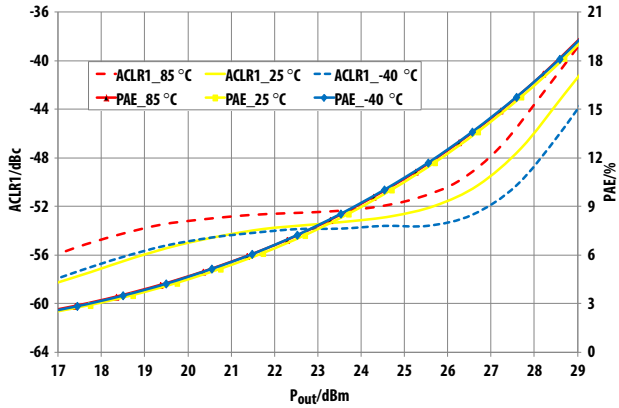


Figure 7. Over-temperature ACLR1, PAE vs P_{out} @ 2.62 GHz
 $V_{dd}=V_{ddBias}=5.0V$ operating voltage

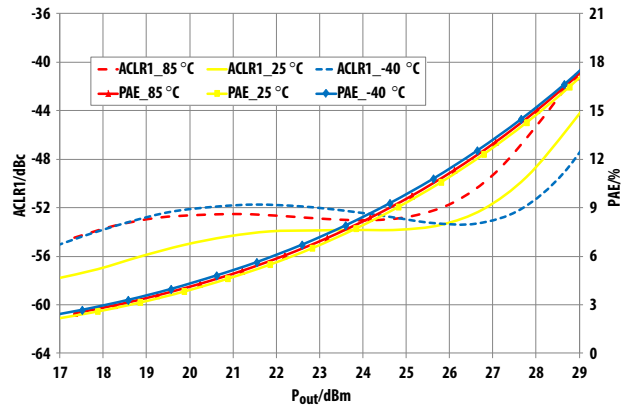


Figure 8. Over-temperature ACLR1, PAE vs P_{out} @ 2.62 GHz
 $V_{dd}=V_{ddBias}=5.5V$ operating voltage

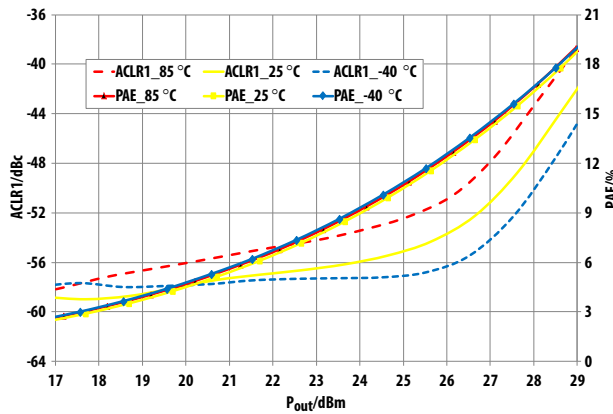


Figure 9. Over-temperature ACLR1, PAE vs P_{out} @ 2.65 GHz
 $V_{dd}=V_{ddBias}=5.0V$ operating voltage

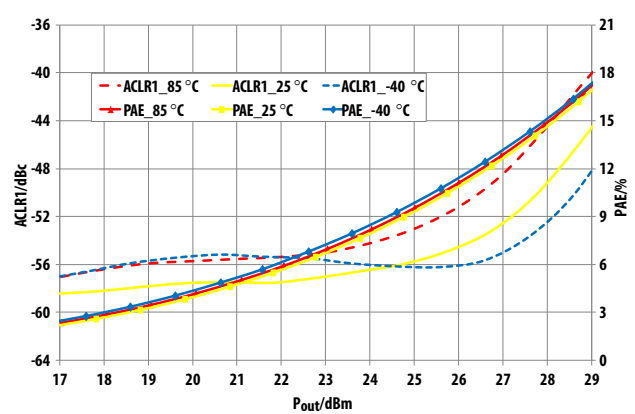
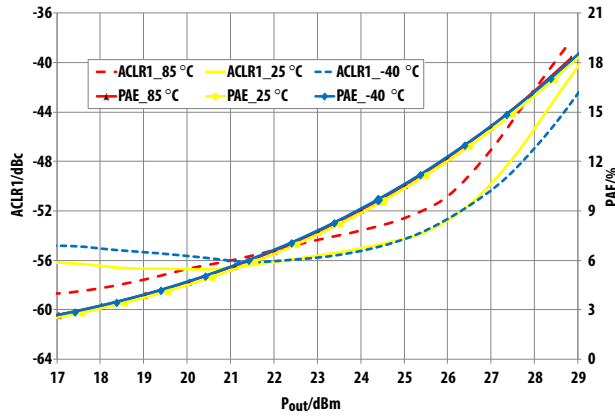
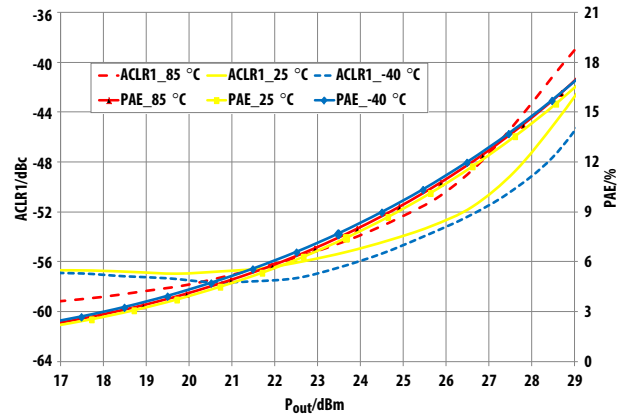


Figure 10. Over-temperature ACLR1, PAE vs P_{out} @ 2.65 GHz
 $V_{dd}=V_{ddBias}=5.5V$ operating voltage

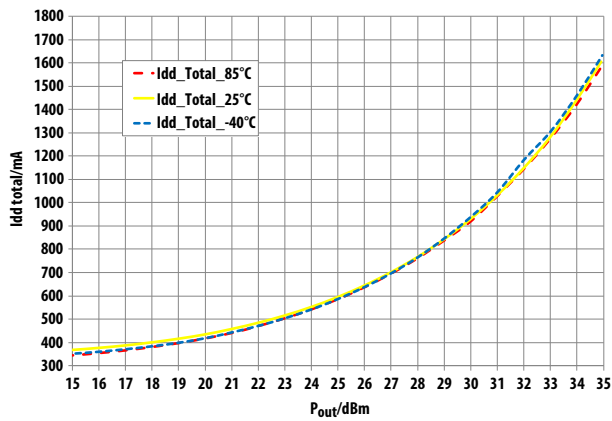
MGA-43728 typical over-temperature performance at $V_{c1}=2.2V$, $V_{c2}=2.0V$, $V_{c3}=2.2V$, unless otherwise stated



**Figure 11. Over-temperature ACLR1, PAE vs P_{out} @ 2.69 GHz
 $V_{dd}=V_{ddBias}=5.0V$ operating voltage**



**Figure 12. Over-temperature ACLR1, PAE vs P_{out} @ 2.69 GHz
 $V_{dd}=V_{ddBias}=5.5V$ operating voltage**



**Figure 13. Over-temperature I_{dd_total} vs P_{out} @ 2.65 GHz
 $V_{dd}=V_{ddBias}=5.0V$ operating voltage**

MGA-43728 typical over-temperature performance at Vc1=2.2V, Vc2=2.0V, Vc3=2.2V, unless otherwise stated

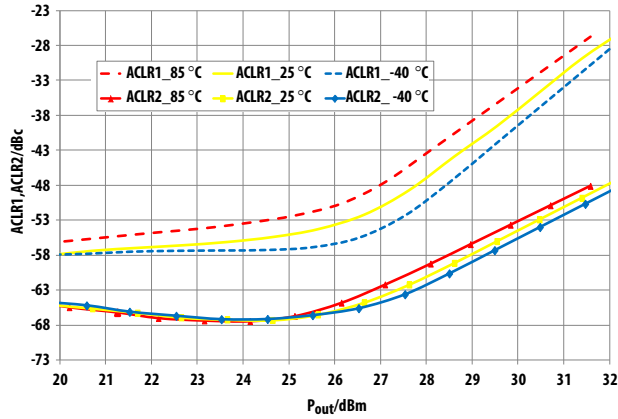


Figure 14. Over-temperature ACLR1, ACLR2 vs. P_{out} @ 2.65 GHz
Vdd=VddBias=5.0V operating voltage

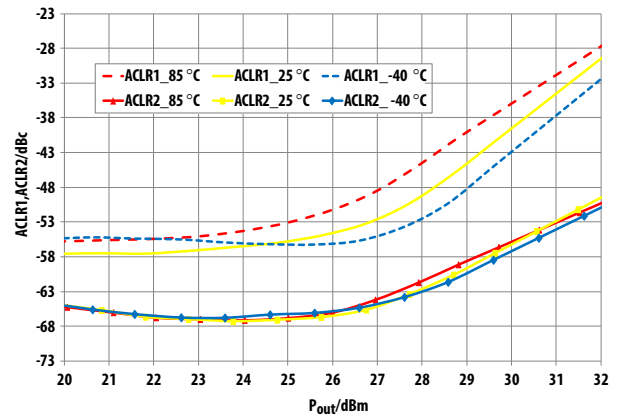


Figure 15. Over-temperature ACLR1, ACLR2 vs. P_{out} @ 2.65 GHz
Vdd=VddBias=5.5V operating voltage

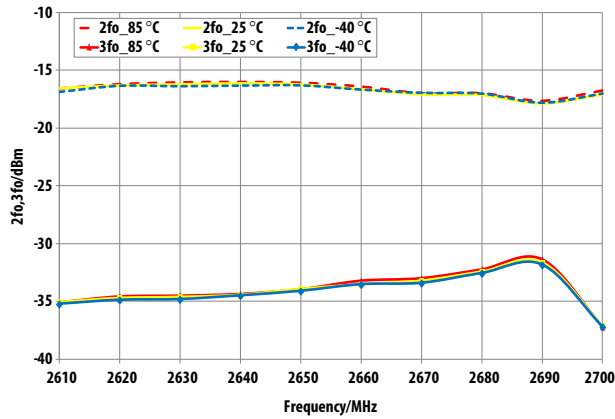


Figure 16. Over-temperature 2nd, 3rd Harmonics vs. Freq at P_{out} =27.0 dBm,
Vdd=VddBias=5.0V operating voltage

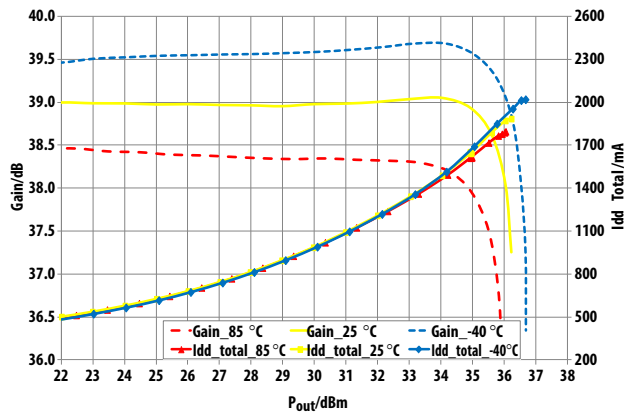


Figure 17. Over-temperature Gain, Idd_total vs. P_{out} @ 2.62 GHz
Vdd=VddBias=5.0V operating voltage

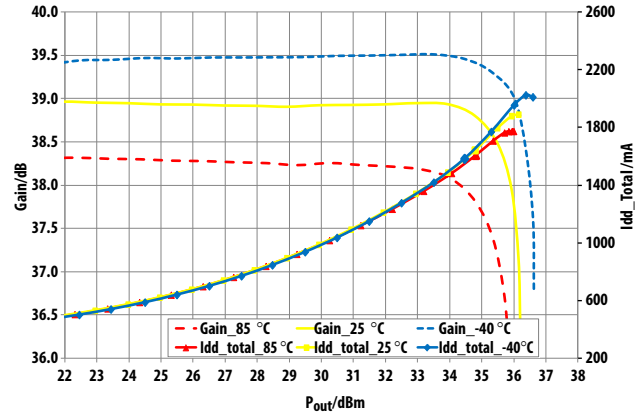
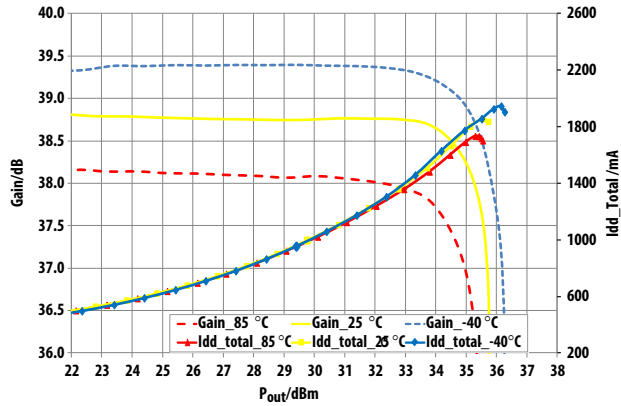
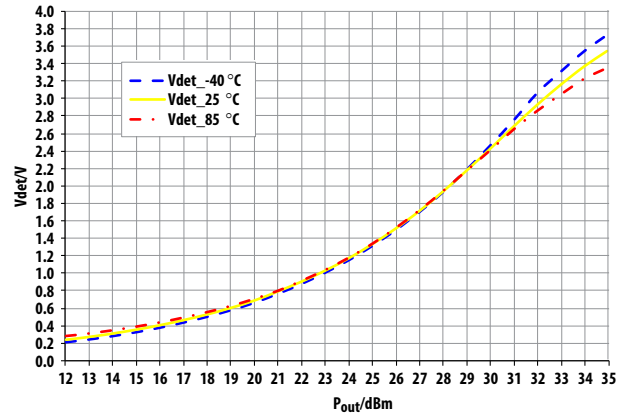


Figure 18. Over-temperature Gain, Idd_total vs. P_{out} @ 2.65 GHz
Vdd=VddBias=5.0V voltage

MGA-43728 typical over-temperature performance at $V_{c1}=2.2V$, $V_{c2}=2.0V$, $V_{c3}=2.2V$, unless otherwise stated



**Figure 19. Over-temperature Gain, I_{dd_total} vs. P_{out} @ 2.69 GHz
 $V_{dd}=V_{ddBias}=5.0V$ operating voltage**



**Figure 20. Over-temperature V_{det} vs. P_{out} @ 2.69 GHz,
 $V_{dd}=V_{ddBias}=5.0V$ operating voltage**

MGA-43728 typical LTE 10MHz 50RB Test model 1.1 downlink signal Spectrum Emission Mask (3GPP TS 36.141v8.2.0 [2009-03] standard) performance at $V_{dd}=V_{ddBias}=5.0V$, $V_{c1}=2.2V$, $V_{c2}=2.0V$, $V_{c3}=2.2V$, unless otherwise stated

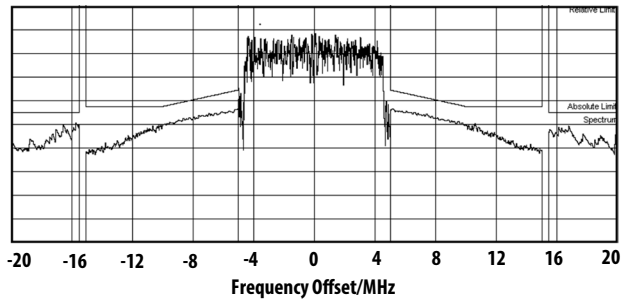


Figure 21. SEM at $P_{out}=31$ dBm @ 2.62 GHz

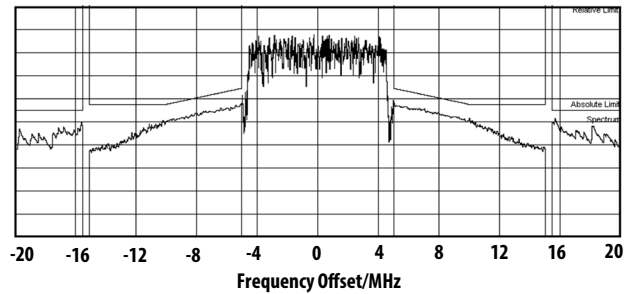


Figure 22. SEM at $P_{out}=31$ dBm @ 2.65 GHz

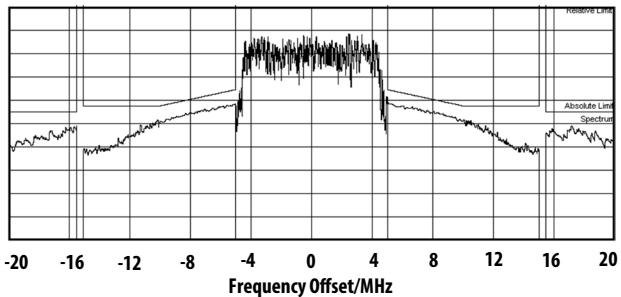


Figure 23. SEM at $P_{out}=31$ dBm @ 2.69 GHz

MGA-43728 typical LTE 20MHz 100RB performance at $V_{dd}=V_{ddBias}=5.0V$, $V_{c1}=2.4V$, $V_{c2}=2.3V$, $V_{c3}=2.3V$, unless otherwise stated

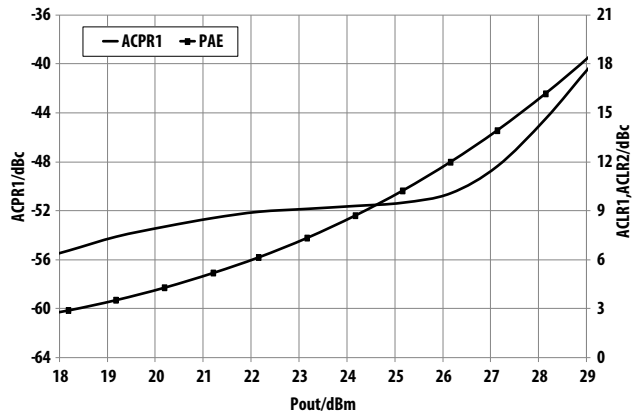


Figure 24. ACPR1, PAE vs Pout @ 2.63GHz

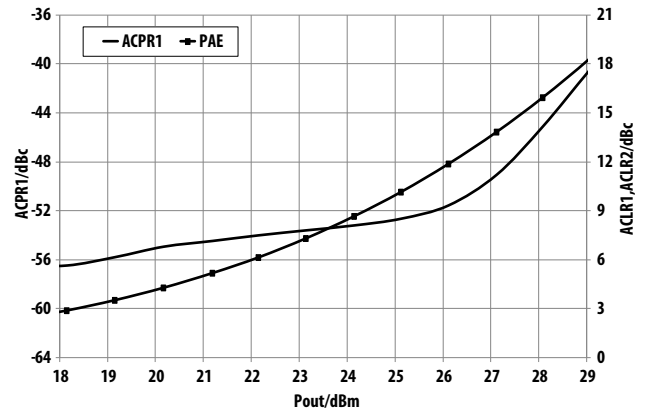


Figure 25. ACPR1, PAE vs Pout @ 2.65GHz

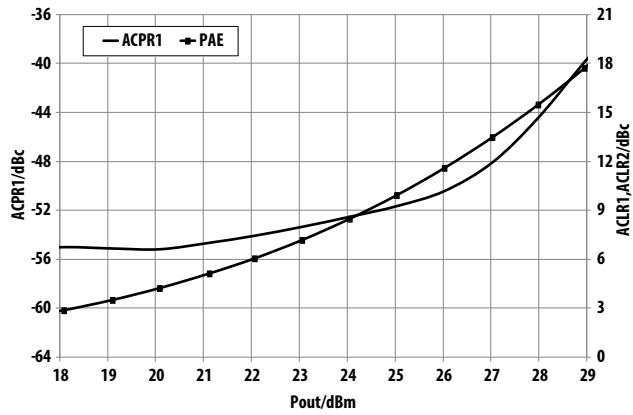


Figure 26. ACPR1, PAE vs Pout @ 2.68GHz

S-Parameter^[1] (Vdd=VddBias=5.0V, Vc1=2.2V, Vc2=2.0V, Vc3=2.2V), T=25 °C, 50 Ω matched)

Freq (GHz)	S11 (dB)	S11 (ang)	S21 (dB)	S21 (ang)	S12 (dB)	S12 (ang)	S22 (dB)	S22 (ang)
0.1	-0.02	-34.40	-60.68	59.73	-60.23	128.69	-0.36	166.30
0.2	-0.04	-67.37	-63.52	14.97	-59.18	5.31	-0.67	155.18
0.3	-0.10	-97.79	-67.50	-67.21	-66.31	57.08	-0.90	145.01
0.4	-0.20	-125.48	-53.74	-47.51	-64.36	-46.51	-1.00	134.75
0.5	-0.28	-150.38	-41.70	-49.55	-66.10	79.33	-1.11	124.39
0.6	-0.32	-173.17	-28.45	-72.49	-68.49	149.55	-1.20	114.04
0.7	-0.33	165.59	-16.16	-103.41	-65.82	63.98	-1.27	103.65
0.8	-0.34	144.26	-3.64	-146.70	-65.91	71.56	-1.36	93.26
0.9	-1.17	122.06	7.99	132.57	-67.60	30.82	-1.45	82.80
1.0	-1.62	111.26	10.15	48.80	-66.49	20.24	-1.57	72.58
1.1	-1.33	95.87	11.42	-1.57	-63.37	17.31	-1.66	62.78
1.2	-1.22	79.18	13.36	-47.43	-60.74	-8.20	-1.63	53.67
1.3	-1.36	62.53	9.27	-84.49	-66.62	-2.40	-1.03	42.09
1.4	-1.21	46.64	18.82	-82.29	-61.09	-11.27	-1.79	26.55
1.5	-1.56	26.94	22.45	-147.92	-58.43	-46.14	-2.44	21.19
1.6	-2.30	15.25	20.18	-161.36	-57.84	-74.21	-1.65	14.71
1.7	-2.09	1.53	28.83	159.04	-59.90	-94.94	-0.72	0.86
1.8	-1.91	-17.74	27.06	69.42	-60.70	-105.36	-1.33	-16.62
1.9	-2.43	-36.36	22.73	83.08	-60.48	-86.10	-1.42	-28.21
2.0	-3.15	-57.05	29.27	63.59	-63.62	-97.01	-1.57	-41.94
2.1	-4.84	-82.36	33.36	20.37	-59.22	-86.18	-1.94	-57.45
2.2	-10.50	-89.78	33.75	-36.40	-56.17	-106.46	-2.85	-72.30
2.3	-10.37	-87.69	35.13	-54.12	-55.02	-119.03	-4.01	-86.89
2.4	-13.05	-85.24	37.62	-105.77	-52.71	-127.09	-5.62	-96.96
2.5	-13.52	-72.73	38.48	-151.40	-51.31	-155.90	-6.71	-105.13
2.6	-12.66	-70.09	38.67	161.17	-49.40	-3.01	-7.93	-121.64
2.7	-11.89	-59.83	38.44	114.17	-48.38	152.67	-12.65	-147.56
2.8	-8.09	-57.36	37.57	65.03	-48.18	120.20	-20.22	73.21
2.9	-4.83	-74.50	35.49	16.46	-49.60	89.32	-9.01	-23.72
3.0	-3.33	-96.30	32.40	-26.10	-51.59	61.67	-4.45	-55.63
3.1	-2.80	-116.04	29.01	-61.72	-53.83	47.39	-2.64	-80.03
3.2	-2.69	-133.35	25.69	-92.18	-57.05	28.60	-1.80	-99.60
3.3	-2.76	-148.65	22.53	-119.03	-60.51	20.35	-1.36	-116.31
3.4	-2.86	-162.71	19.55	-143.46	-61.36	-6.36	-1.11	-131.21
3.5	-3.01	-176.10	16.71	-166.19	-63.62	-13.29	-0.95	-144.98
3.6	-3.22	171.31	13.99	172.45	-66.28	-16.78	-0.86	-157.98
3.7	-3.40	159.49	11.36	152.16	-68.28	17.49	-0.79	-170.33
3.8	-3.53	148.11	8.76	132.58	-69.69	-5.35	-0.77	177.66
3.9	-3.62	136.71	6.14	113.60	-70.85	5.60	-0.75	165.99
4.0	-3.72	125.31	3.39	95.28	-61.47	22.84	-0.74	154.50
4.1	-3.80	113.97	0.46	77.64	-65.27	19.13	-0.75	143.20
4.2	-3.88	102.65	-2.87	61.13	-63.90	26.35	-0.76	132.01
4.3	-3.97	91.43	-6.96	46.92	-63.28	-8.95	-0.77	120.85
4.4	-4.03	80.26	-12.73	41.80	-61.88	9.38	-0.80	109.87
4.5	-4.08	69.11	-17.06	74.23	-62.47	-0.60	-0.81	98.84
4.6	-4.15	57.93	-17.02	104.76	-60.38	-25.12	-0.85	87.77
4.7	-4.19	46.87	-11.81	118.08	-60.46	-10.13	-0.89	76.81
4.8	-4.23	35.90	-8.10	105.69	-59.79	-23.10	-0.93	65.77
4.9	-4.26	25.12	-5.56	87.65	-58.18	-49.38	-0.99	54.67

5.0	-4.26	14.39	-3.60	66.28	-57.03	-54.35	-1.07	43.55
5.1	-4.22	3.93	-2.09	41.50	-55.73	-64.12	-1.20	32.48
5.2	-4.13	-6.41	-1.23	12.10	-55.04	-79.97	-1.38	21.57
5.3	-3.99	-16.65	-2.02	-20.94	-54.33	-105.82	-1.60	11.53
5.4	-3.70	-26.46	-5.72	-34.73	-54.39	-126.07	-1.69	2.54
5.5	-3.06	-37.88	-2.62	-26.71	-55.93	-134.66	-1.57	-6.98
5.6	-2.68	-53.09	0.43	-65.71	-56.43	-153.44	-1.42	-17.51
5.7	-2.85	-67.65	-0.16	-105.50	-55.76	-155.99	-1.33	-28.44
5.8	-3.12	-80.15	-1.88	-136.97	-58.46	-174.53	-1.27	-39.44
5.9	-3.35	-91.32	-3.82	-162.74	-59.03	174.87	-1.23	-50.47
6.0	-3.52	-102.07	-5.70	174.80	-58.37	163.85	-1.20	-61.45
7.0	-3.94	156.18	-21.58	-16.68	-58.83	77.65	-1.06	-168.16
8.0	-3.91	50.31	-23.18	-5.77	-57.82	-30.72	-1.05	89.43
9.0	-4.08	-54.33	-29.29	-83.88	-55.40	-129.15	-0.91	-9.39
10.0	-4.27	-159.19	-30.01	133.70	-53.13	124.23	-1.29	-118.90
11.0	-4.55	92.04	-31.20	-5.77	-54.30	-5.06	-1.83	125.37
12.0	-3.70	-21.80	-33.32	-145.93	-52.58	-114.41	-1.85	8.38
13.0	-2.76	-123.32	-36.65	75.45	-53.24	142.18	-1.62	-104.69
14.0	-2.51	141.66	-41.40	-71.66	-57.91	22.50	-1.53	151.99
15.0	-3.30	34.24	-48.00	-3.21	-53.75	-58.83	-1.84	44.89
16.0	-4.41	-95.00	-41.00	-156.42	-46.24	-128.35	-3.35	-97.02
17.0	-4.41	145.78	-41.81	46.49	-48.30	67.23	-4.00	131.04
18.0	-2.46	49.63	-42.63	-74.92	-47.45	-39.31	-2.25	38.64
19.0	-1.76	-49.30	-42.04	171.81	-47.18	-145.00	-1.79	-52.13
20.0	-2.43	-169.80	-38.88	44.24	-41.59	88.78	-2.61	-161.34

S-Parameter^[1] (Vdd=VddBias=5.5V, Vc1=2.2V, Vc2=2.0V, Vc3=2.0V), T=25 °C, 50 Ω matched)

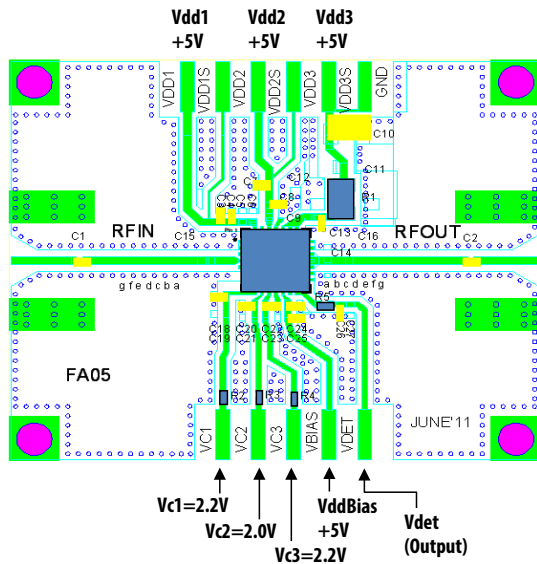
Freq (GHz)	S11 (dB)	S11 (ang)	S21 (dB)	S21 (ang)	S12 (dB)	S12 (ang)	S22 (dB)	S22 (ang)
0.1	-0.01	-34.34	-65.80	-44.41	-54.51	-24.21	-0.38	166.10
0.2	-0.03	-67.31	-66.10	64.27	-62.58	-52.03	-0.68	155.03
0.3	-0.10	-97.81	-61.97	-36.43	-65.44	-80.31	-0.91	144.88
0.4	-0.20	-125.47	-56.52	-41.90	-73.50	-40.66	-1.02	134.68
0.5	-0.28	-150.36	-41.04	-48.57	-64.63	97.94	-1.13	124.32
0.6	-0.32	-173.14	-28.13	-73.41	-68.11	74.78	-1.22	114.01
0.7	-0.32	165.58	-15.86	-104.01	-72.33	-12.21	-1.30	103.62
0.8	-0.33	144.22	-3.36	-147.24	-64.01	74.39	-1.39	93.24
0.9	-1.18	121.97	8.25	132.18	-68.30	10.47	-1.48	82.84
1.0	-1.64	111.29	10.45	48.51	-64.96	25.14	-1.60	72.64
1.1	-1.34	95.92	11.74	-1.99	-61.65	6.42	-1.69	62.91
1.2	-1.23	79.18	13.69	-47.99	-61.96	-1.00	-1.65	53.85
1.3	-1.37	62.49	9.51	-84.48	-65.72	-26.62	-1.03	42.10
1.4	-1.22	46.58	19.30	-82.39	-60.25	-9.53	-1.82	26.45
1.5	-1.60	26.66	22.96	-149.62	-58.15	-41.97	-2.50	21.46
1.6	-2.36	15.36	20.49	-163.39	-59.29	-68.59	-1.66	15.03
1.7	-2.12	1.67	29.11	157.25	-58.46	-83.28	-0.70	1.06
1.8	-1.96	-17.82	27.26	67.51	-61.91	-94.43	-1.35	-16.52
1.9	-2.52	-36.42	22.96	81.80	-63.80	-95.81	-1.42	-28.12
2.0	-3.30	-57.10	29.48	61.74	-62.99	-88.62	-1.58	-41.90
2.1	-5.12	-82.06	33.53	18.39	-59.50	-94.92	-1.98	-57.38
2.2	-10.83	-86.19	33.82	-38.01	-56.48	-93.20	-2.90	-71.91
2.3	-10.38	-83.74	35.15	-55.95	-55.31	-116.44	-4.07	-86.16

2.4	-12.54	-81.61	37.59	-106.76	-52.71	-131.85	-5.57	-95.84
2.5	-12.84	-72.89	38.46	-151.78	-51.26	-157.55	-6.59	-104.08
2.6	-12.30	-71.96	38.71	161.22	-49.36	-0.86	-7.78	-120.62
2.7	-11.82	-61.63	38.55	114.36	-48.60	152.76	-12.21	-145.87
2.8	-8.10	-58.00	37.74	65.13	-48.78	120.36	-20.39	74.86
2.9	-4.78	-74.82	35.70	16.30	-49.60	88.60	-9.18	-23.66
3.0	-3.27	-96.61	32.62	-26.51	-52.02	65.61	-4.49	-55.59
3.1	-2.74	-116.44	29.23	-62.29	-54.50	42.81	-2.67	-80.08
3.2	-2.64	-133.75	25.90	-92.83	-57.19	19.43	-1.82	-99.67
3.3	-2.71	-149.05	22.73	-119.74	-57.47	12.53	-1.36	-116.36
3.4	-2.83	-163.12	19.74	-144.21	-60.96	12.00	-1.11	-131.24
3.5	-3.00	-176.48	16.90	-166.94	-63.05	17.86	-0.95	-144.98
3.6	-3.21	171.04	14.18	171.69	-66.43	2.22	-0.86	-157.99
3.7	-3.39	159.32	11.55	151.35	-65.99	34.17	-0.80	-170.34
3.8	-3.51	147.93	8.95	131.74	-70.78	107.07	-0.78	177.67
3.9	-3.60	136.53	6.32	112.71	-65.11	35.74	-0.75	165.99
4.0	-3.70	125.16	3.57	94.36	-66.32	11.79	-0.74	154.51
4.1	-3.78	113.82	0.63	76.71	-66.00	45.82	-0.75	143.23
4.2	-3.86	102.52	-2.69	60.19	-65.21	28.66	-0.76	132.03
4.3	-3.94	91.31	-6.79	45.94	-65.35	5.62	-0.78	120.85
4.4	-4.01	80.13	-12.57	40.90	-61.66	-7.85	-0.80	109.88
4.5	-4.06	68.98	-16.88	73.17	-61.20	-1.80	-0.82	98.84
4.6	-4.12	57.82	-16.85	103.65	-60.49	-3.68	-0.85	87.73
4.7	-4.17	46.74	-11.65	116.89	-60.80	-13.05	-0.89	76.79
4.8	-4.20	35.76	-7.97	104.45	-58.58	-29.71	-0.94	65.74
4.9	-4.23	24.97	-5.44	86.38	-59.19	-44.50	-1.00	54.65
5.0	-4.23	14.21	-3.50	64.97	-56.49	-59.15	-1.08	43.51
5.1	-4.20	3.72	-2.01	40.25	-56.80	-66.37	-1.20	32.45
5.2	-4.11	-6.62	-1.19	10.99	-55.98	-87.47	-1.38	21.54
5.3	-3.97	-16.91	-2.00	-21.70	-55.31	-99.13	-1.61	11.43
5.4	-3.69	-26.75	-5.66	-35.05	-54.41	-133.79	-1.70	2.35
5.5	-3.07	-38.16	-2.49	-27.35	-57.87	-141.05	-1.58	-7.16
5.6	-2.69	-53.27	0.55	-66.47	-56.52	-149.49	-1.44	-17.67
5.7	-2.86	-67.71	-0.04	-106.23	-56.66	-168.73	-1.35	-28.56
5.8	-3.13	-80.15	-1.76	-137.73	-58.16	0.75	-1.28	-39.58
5.9	-3.35	-91.37	-3.69	-163.58	-58.12	-1.66	-1.25	-50.59
6.0	-3.51	-102.11	-5.58	173.94	-59.00	174.04	-1.22	-61.56
7.0	-3.93	156.02	-21.54	-17.44	-59.00	75.92	-1.07	-168.23
8.0	-3.90	50.10	-23.09	173.38	-58.48	-29.55	-1.06	89.37
9.0	-4.08	-54.56	-29.23	-84.75	-56.21	-132.72	-0.91	-9.52
10.0	-4.29	-159.31	-29.93	132.57	-53.74	123.42	-1.28	-118.91
11.0	-4.61	92.24	-31.28	-7.37	-54.32	3.69	-1.77	125.87
12.0	-3.75	-21.28	-33.22	-147.61	-52.92	-112.01	-1.75	8.22
13.0	-2.75	-123.09	-36.73	74.37	-53.08	141.58	-1.58	-105.16
14.0	-2.53	141.64	-41.16	-73.48	-56.22	36.53	-1.50	151.88
15.0	-3.32	34.10	-48.65	-0.46	-53.44	-61.14	-1.84	44.77
16.0	-4.39	-95.26	-40.70	-154.65	-46.47	-127.22	-3.33	-97.63
17.0	-4.37	145.65	-41.85	44.10	-48.49	66.41	-3.88	129.93
18.0	-2.45	49.58	-42.76	-74.57	-48.06	-36.92	-2.22	38.30
19.0	-1.75	-49.40	-41.72	172.94	-46.61	-144.48	-1.78	-52.35
20.0	-2.43	-169.97	-38.62	43.74	-41.30	88.29	-2.62	-161.56

Note:

1. S-parameter is measured with deembedded reference plane at DUT RFin and RFout pins.

Demonstration Board Top View (Vdd=VddBias=5.0V operating voltage)



Component	Value	Part Number
C1, C2, C18, C20, C22	7.5 pF $\pm$ 0.5 pF	GJM1555C1H7R5BB01D
C3, C7, C13, C25	0.1 μ F $\pm$ 10%	GRM155R71C104KA88D
C4, C8	8.2 pF $\pm$ 0.5 pF	GJM1555C1H8R2BB01D
C24	6.0 pF $\pm$ 0.5 pF	GJM1555C1H6R0CB01D
C10	2.2 μ F $\pm$ 10%	GRM21BR71E225KA73L
C26	22 nF $\pm$ 10%	CM05X7R223K16AHF
R1	0 Ω	RMC1/10 JPTP
R2, R3, R4, R5	0 Ω	RMC1/16S JPTH

Note:

For performance optimization control voltage for individual stages can be adjusted by varying R2, R3 and R4 resistor value.

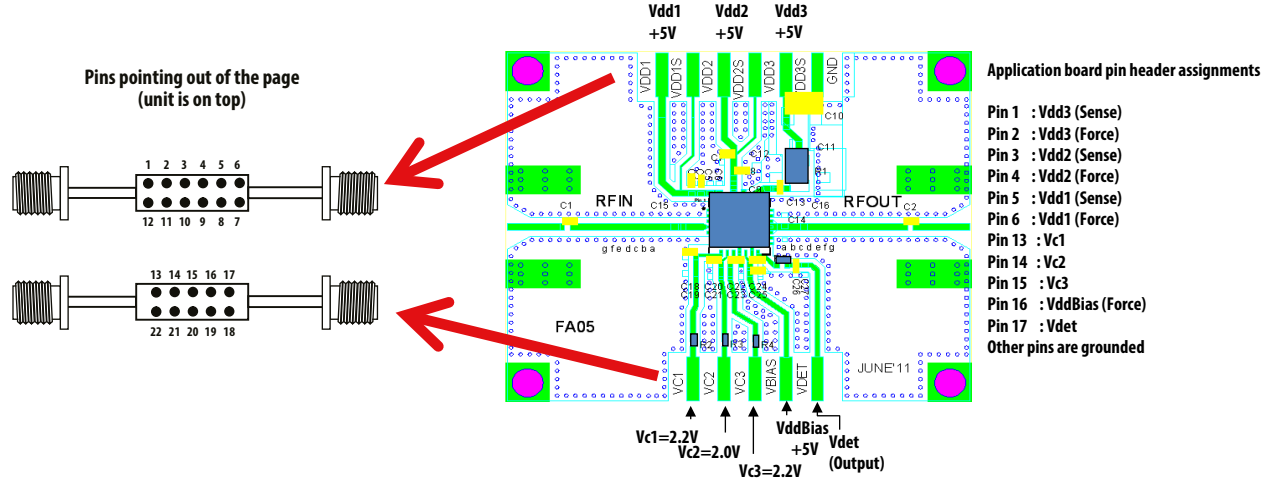


Figure 27. Demonstration board application circuit for MGA-43728 module

Application Schematic

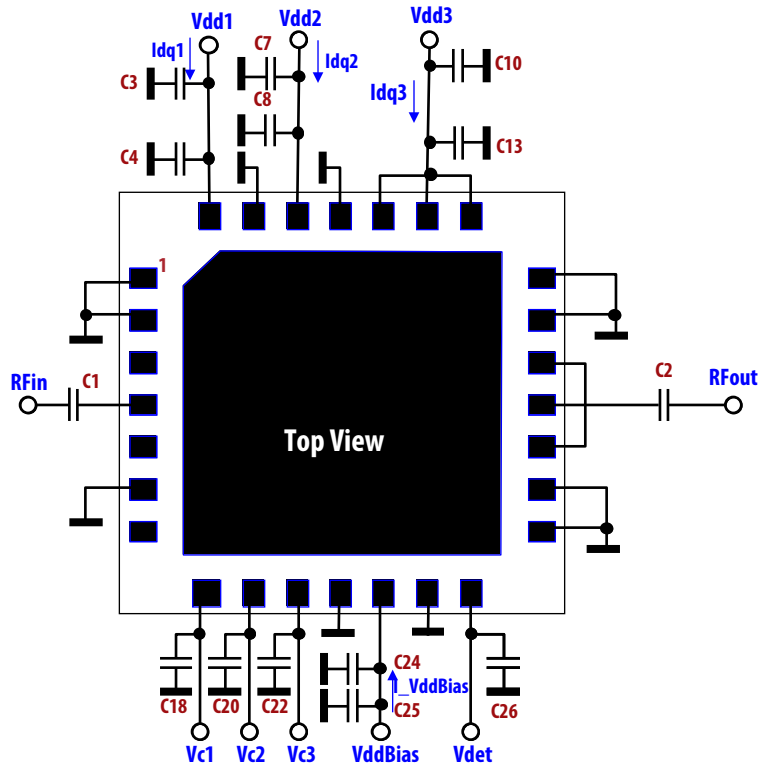


Figure 28. Application schematic in demonstration board

Notes

1. All capacitors on supply lines are bypass capacitors
2. C1 / C2 are RF coupling capacitors.
3. $I_{dq1} = 45.0\text{mA}$, $I_{dq2} = 100.0\text{mA}$, $I_{dq3} = 200.0\text{mA}$, $I_{VddBias} = 14.0\text{mA}$. $I_{dq1/2/3}$ are adjusted by voltages to CMOS-compatible control pins $V_{c1/2/3}$ respectively. These typical bias currents were obtained with $V_{c1/2/3}$ voltages, as in Figure 28. Adjustment of these currents enable optimum bias conditions to be achieved for best linearity and efficiency for a given modulation type.

MGA-43728 typical I_{c1} , I_{c2} , I_{c3} Vs V_c performance, unless otherwise stated

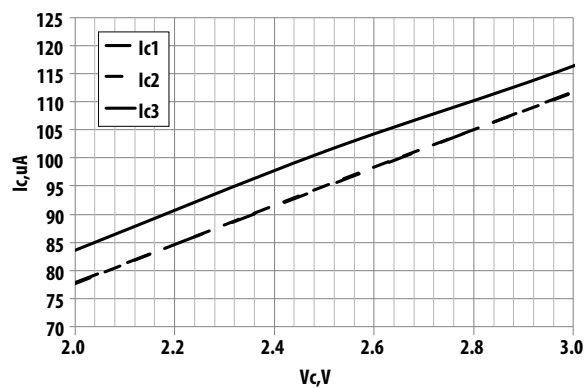


Figure 29. I_c Versus V_c at $V_{dd}=V_{ddBias}=5.0\text{V}$

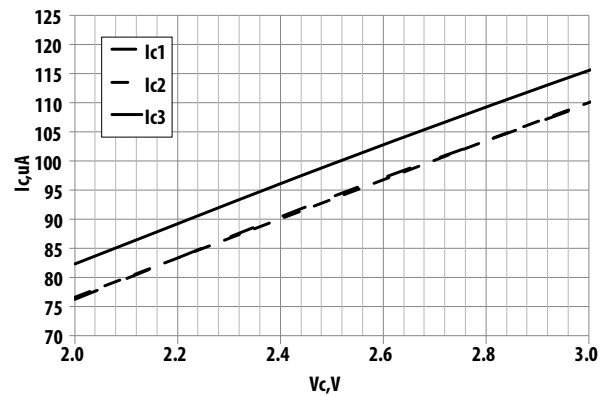


Figure 30. I_c Versus V_c at $V_{dd}=V_{ddBias}=5.5\text{V}$

[illegible]

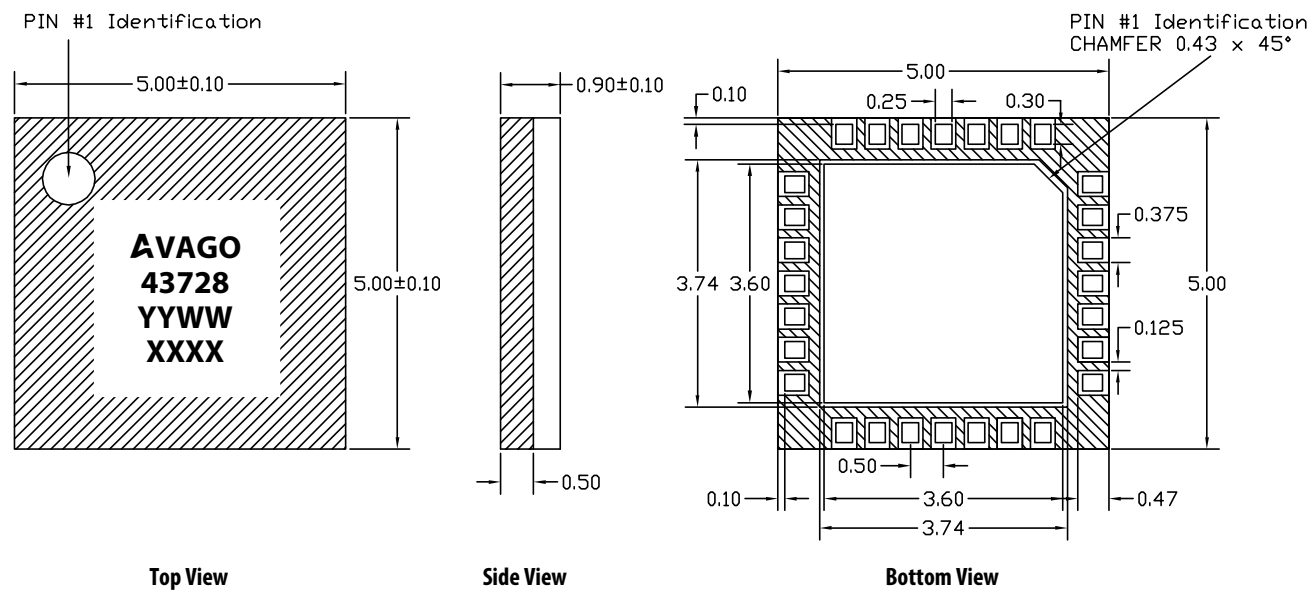
Soldermask

Top Metal

1. Recommended Land Pattern and Stencil.
2. 4 mils stencil thickness recommended.
3. All dimensions are in mm

Combination of Land Pattern & Stencil Opening

MCOB (5.0 x 5.0 x 0.9) mm 28-Lead Package Dimensions



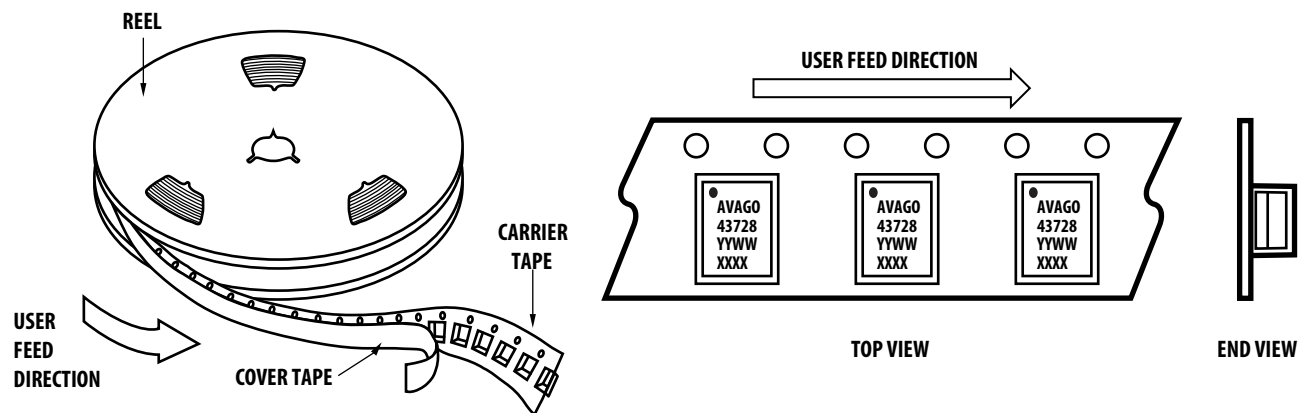
Note

1. All dimensions are in millimeters.
2. Dimensions are inclusive of plating.
3. Dimensions are exclusive of mold flash and metal burr

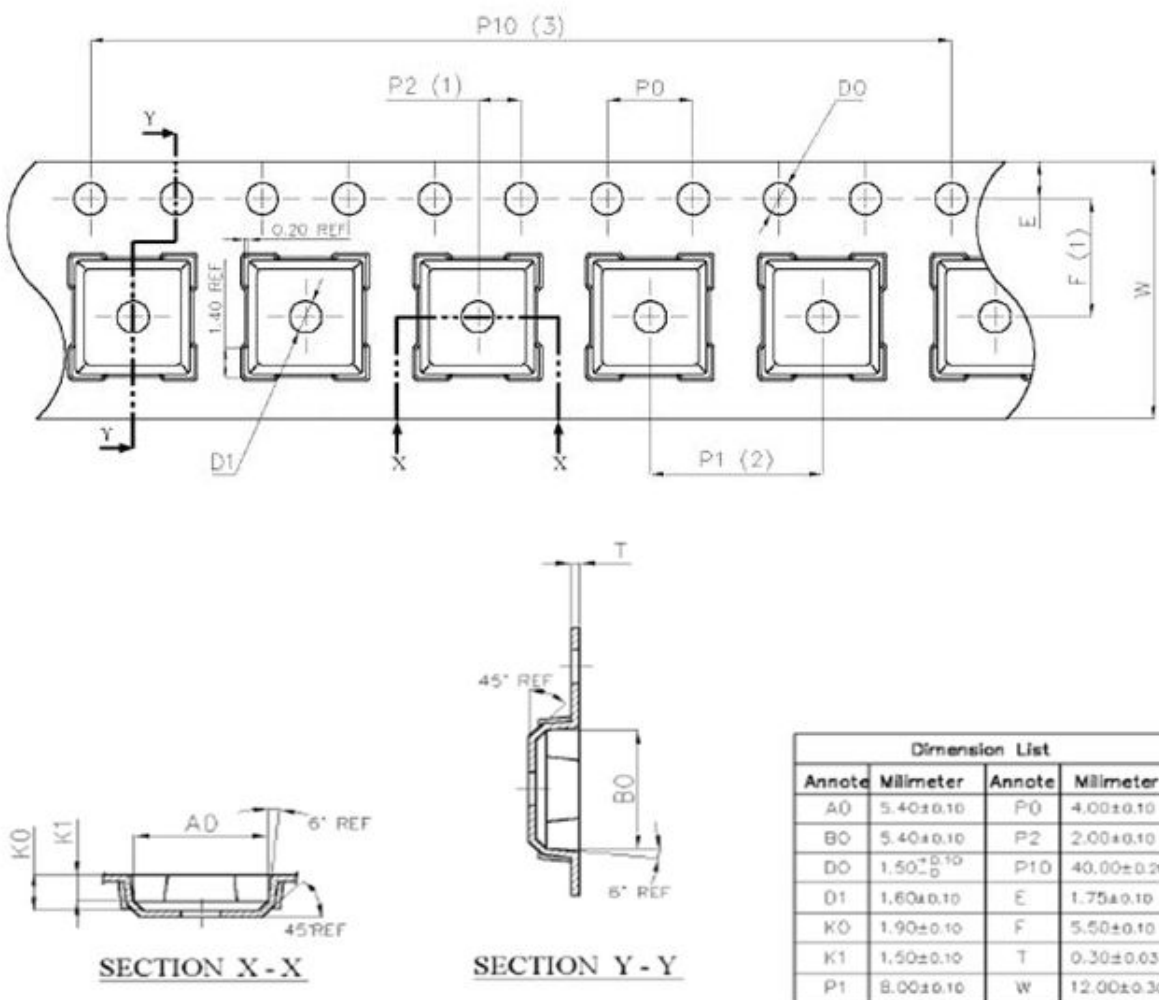
Part Number Ordering Information

Part #	Qty	Container
MGA-43728-BLKG	100	Antistatic Bag
MGA-43728-TR1G	1000	7" Reel

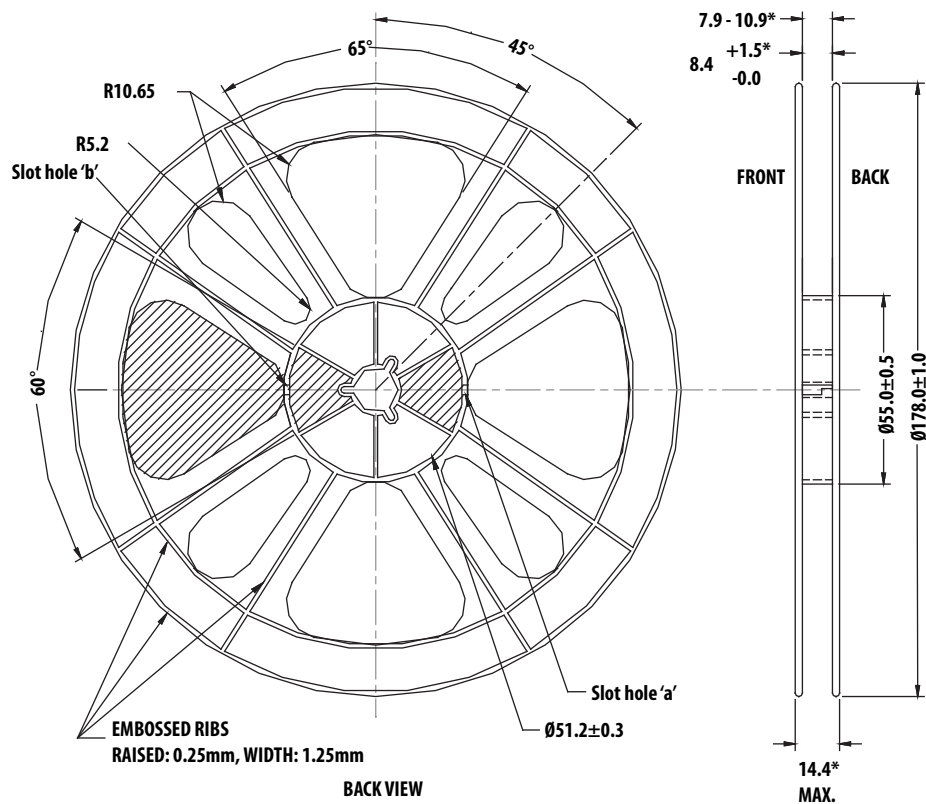
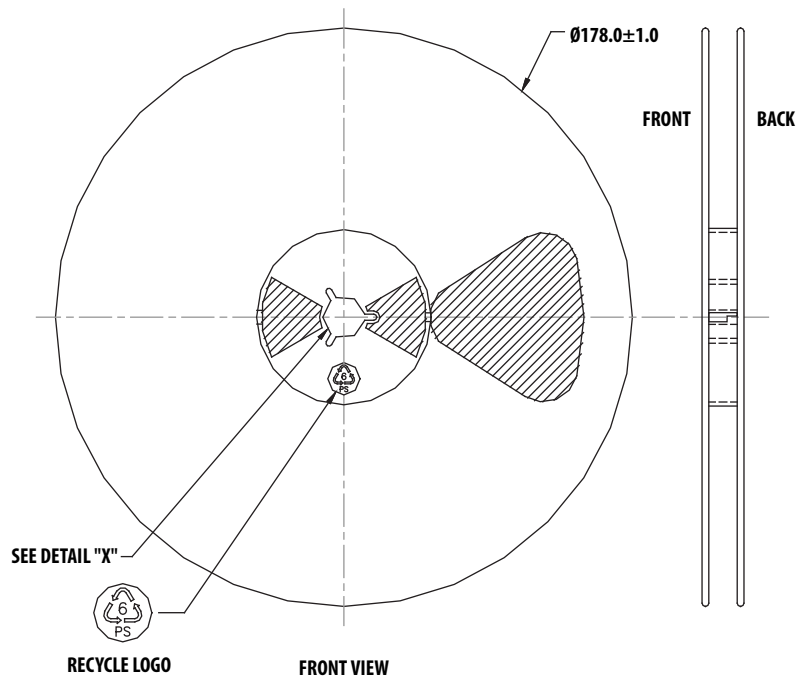
Device Orientation



Tape Dimensions



Reel Dimensions (7" reel)



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

Avago, Avago Technologies, and the A logo are trademarks of Avago Technologies in the United States and other countries.
Data subject to change. Copyright © 2005-2014 Avago Technologies. All rights reserved.
AV02-4221EN - March 6, 2014

Avago
TECHNOLOGIES