



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



# MGA-43728

## 2.62–2.69 GHz Linear Power Amplifier Module



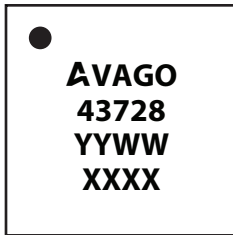
### Data Sheet

#### 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

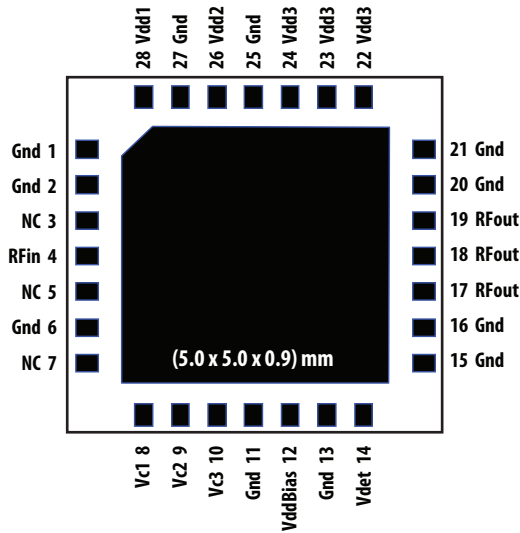
(5.0 × 5.0 × 0.9) mm Package Outline



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<sup>[1]</sup> 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 <sup>[2]</sup>
- 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<sub>out</sub> @ ACPR1 = -50 dBc<sup>[1]</sup>
- 38.3 dB Gain
- Detector range : 20 dB

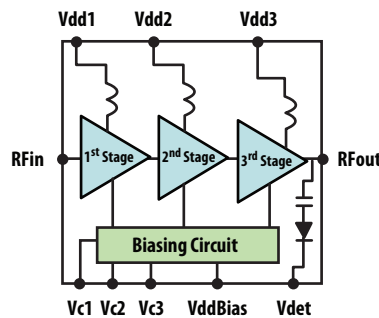
#### Applications

- 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<sub>GS</sub>, thereby eliminating the need of negative gate voltage associated with conventional depletion mode devices.

#### Functional Block Diagram



**Absolute Maximum Rating**<sup>[1]</sup>  $T_A=25^{\circ}\text{C}$ 

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

**Thermal Resistance**<sup>[2,3]</sup>

$\theta_{jc} = 14^{\circ}\text{C/W}$

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<sub>B</sub>) is 25 °C, for T<sub>B</sub> > 49.2 °C derate the device power at 71.4 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 <sub>out</sub> =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]

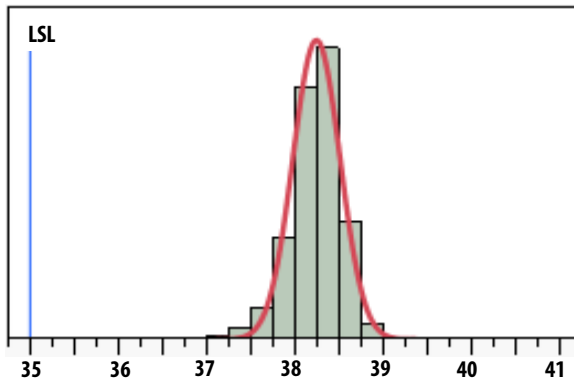


Figure 1. Gain at  $P_{out}=27.0$  dBm; LSL=35.0 dB, Nominal = 38.3dB

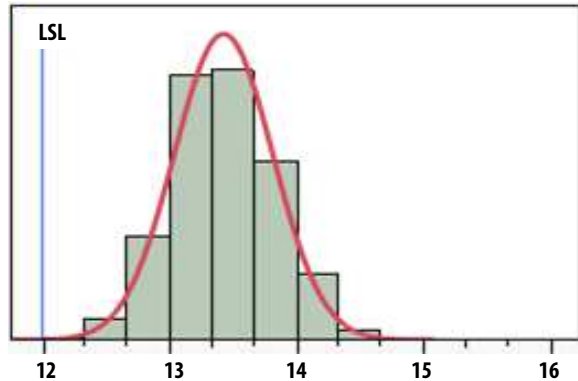


Figure 2. PAE at  $P_{out}=27.0$  dBm; LSL=12.0% Nominal = 13.4%

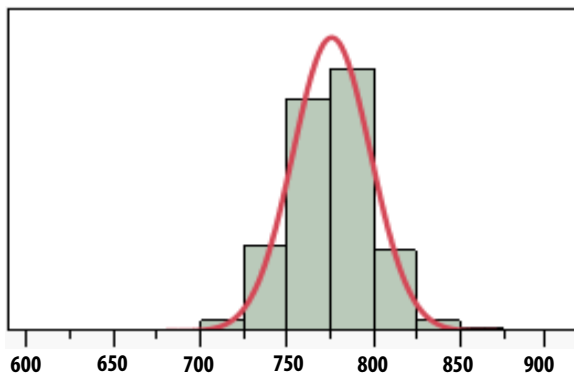


Figure 3.  $I_{dd\_Total}$  at  $P_{out}=27.0$  dBm, Nominal = 776 mA

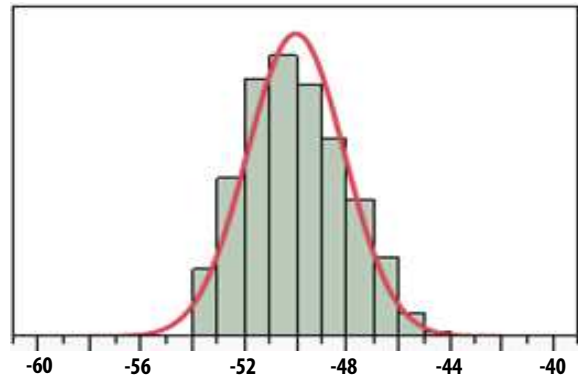


Figure 4. ACLR1 at  $P_{out}=27.0$  dBm, Nominal = -50.0 dBc

### 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

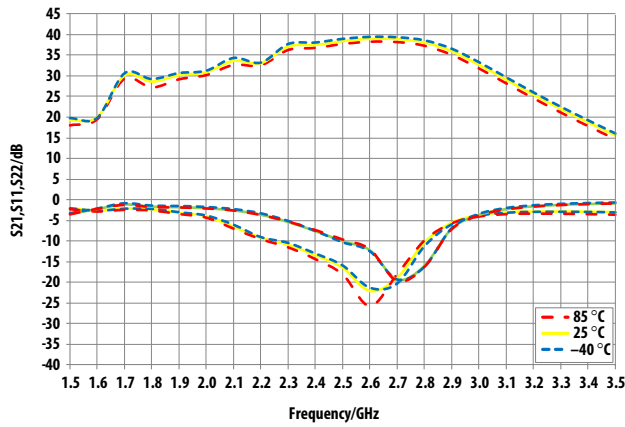


Figure 5. Small-signal performance Over-temperature  
 $V_{dd}=V_{ddBias}=5.0V$  operating voltage

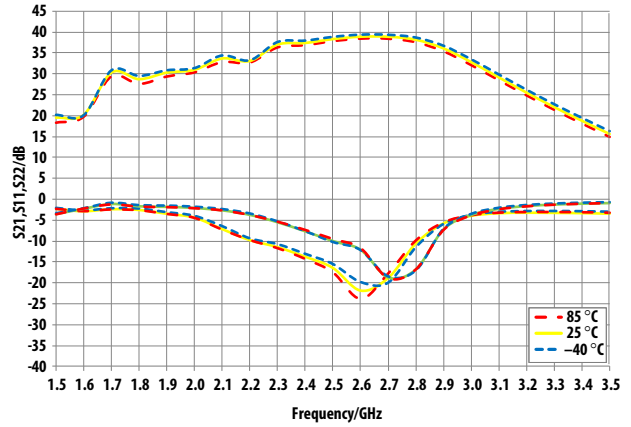


Figure 6. Small-signal performance Over-temperature  
 $V_{dd}=V_{ddBias}=5.5V$  operating voltage

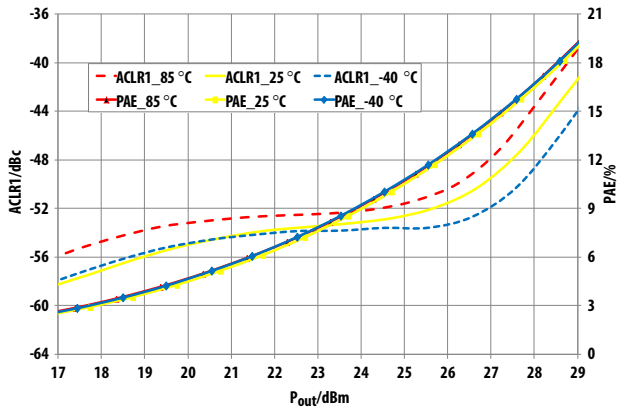


Figure 7. Over-temperature ACLR1, PAE vs  $P_{out}$  @ 2.62 GHz  
 $V_{dd}=V_{ddBias}=5.0V$  operating voltage

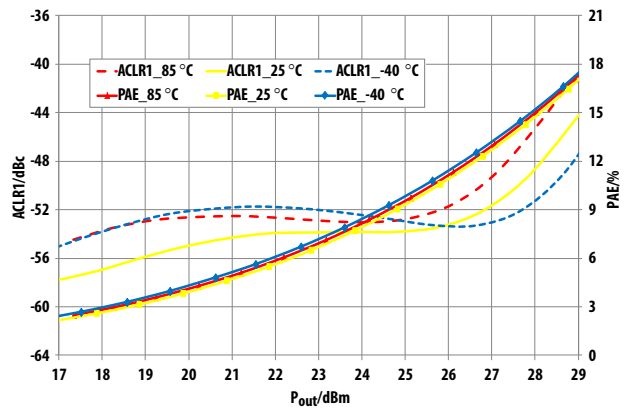


Figure 8. Over-temperature ACLR1, PAE vs  $P_{out}$  @ 2.62 GHz  
 $V_{dd}=V_{ddBias}=5.5V$  operating voltage

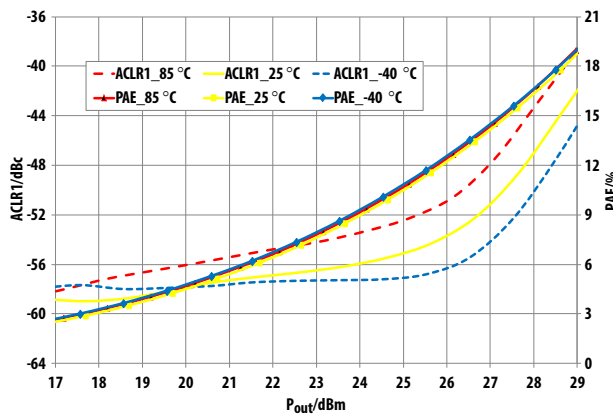


Figure 9. Over-temperature ACLR1, PAE vs  $P_{out}$  @ 2.65 GHz  
 $V_{dd}=V_{ddBias}=5.0V$  operating voltage

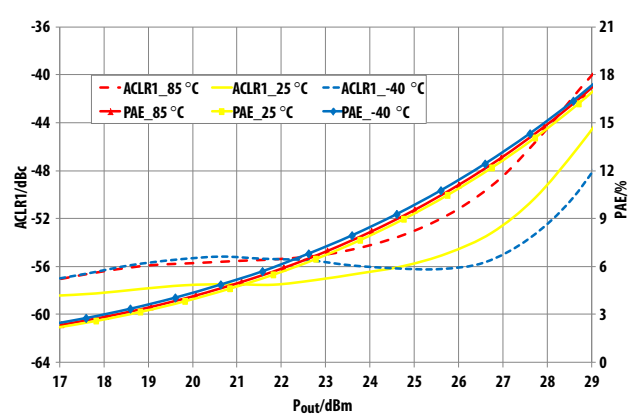
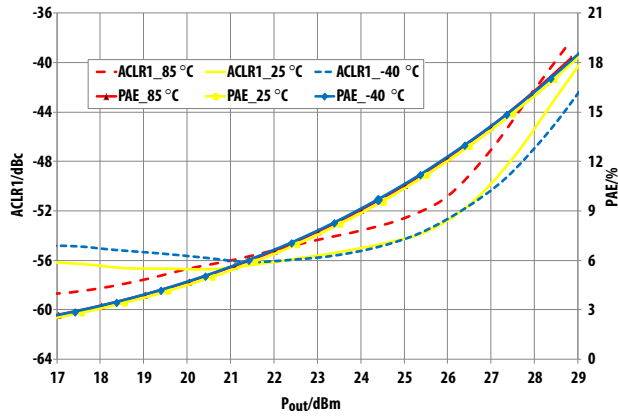
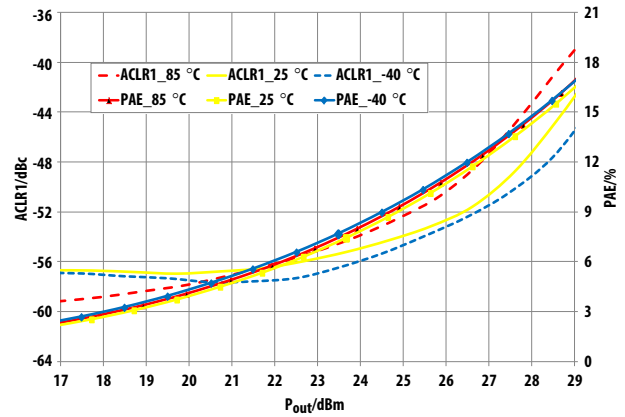


Figure 10. Over-temperature ACLR1, PAE vs  $P_{out}$  @ 2.65 GHz  
 $V_{dd}=V_{ddBias}=5.5V$  operating voltage

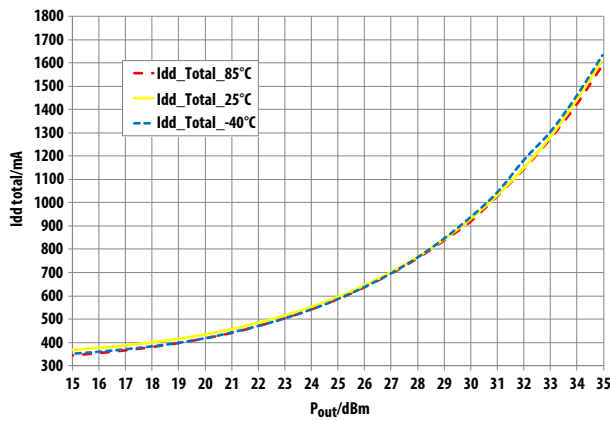
**MGA-43728 typical over-temperature performance at Vc1=2.2V, Vc2=2.0V, Vc3=2.2V, unless otherwise stated**



**Figure 11. Over-temperature ACLR1, PAE vs P<sub>out</sub> @ 2.69 GHz  
V<sub>dd</sub>=V<sub>ddBias</sub>=5.0V operating voltage**

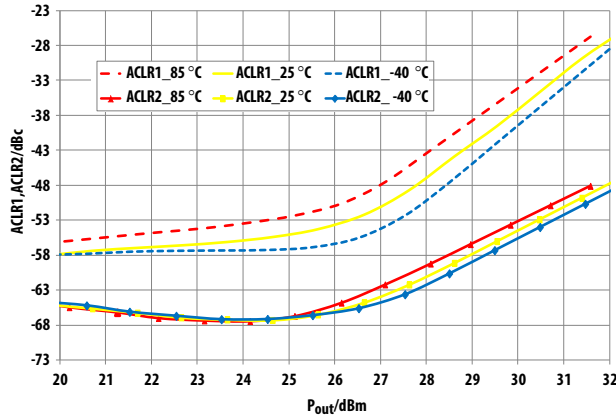


**Figure 12. Over-temperature ACLR1, PAE vs P<sub>out</sub> @ 2.69 GHz  
V<sub>dd</sub>=V<sub>ddBias</sub>=5.5V operating voltage**

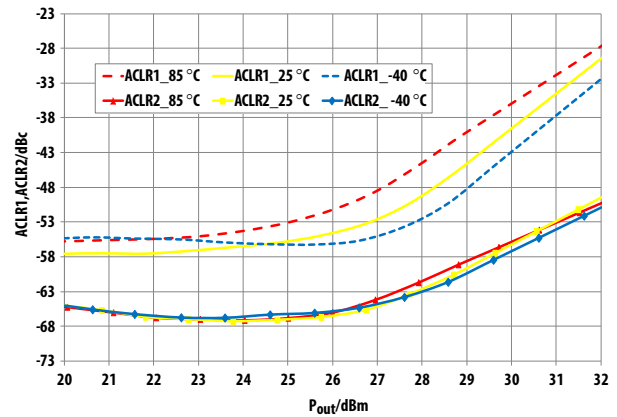


**Figure 13. Over-temperature I<sub>dd\_total</sub> vs P<sub>out</sub> @ 2.65 GHz  
V<sub>dd</sub>=V<sub>ddBias</sub>=5.0V operating voltage**

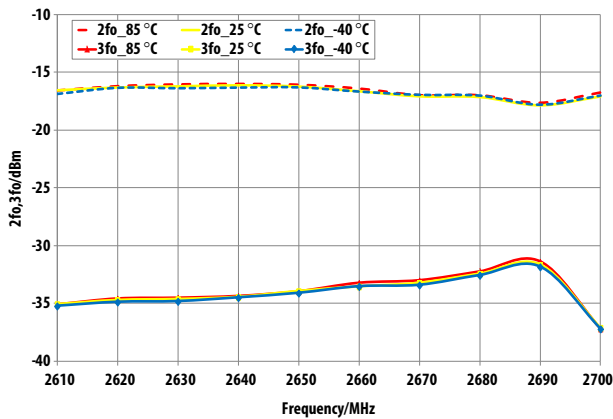
**MGA-43728 typical over-temperature performance at Vc1=2.2V, Vc2=2.0V, Vc3=2.2V, unless otherwise stated**



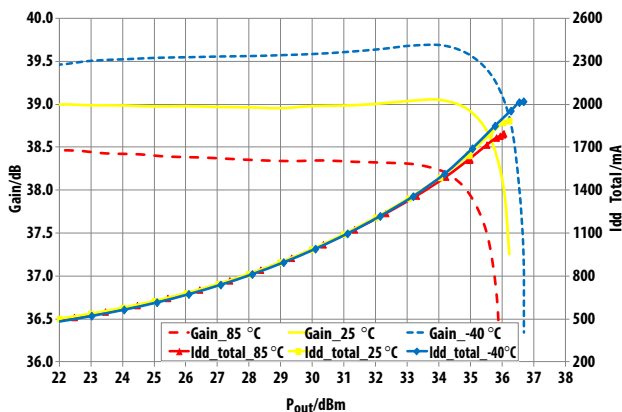
**Figure 14. Over-temperature ACLR1, ACLR2 vs. P<sub>out</sub> @ 2.65 GHz  
V<sub>dd</sub>=V<sub>ddBias</sub>=5.0V operating voltage**



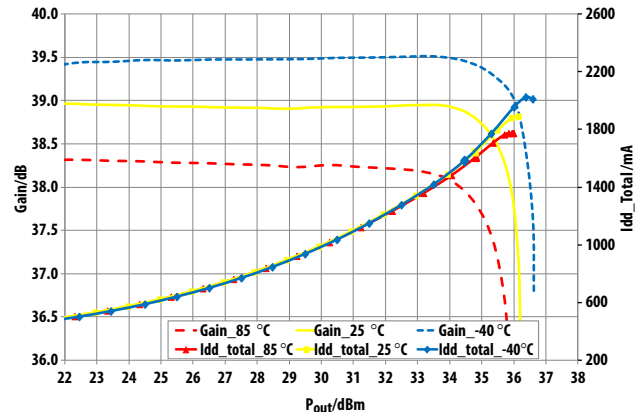
**Figure 15. Over-temperature ACLR1, ACLR2 vs. P<sub>out</sub> @ 2.65 GHz  
V<sub>dd</sub>=V<sub>ddBias</sub>=5.5V operating voltage**



**Figure 16. Over-temperature 2nd, 3rd Harmonics vs. Freq at P<sub>out</sub>=27.0 dBm,  
V<sub>dd</sub>=V<sub>ddBias</sub>=5.0V operating voltage**

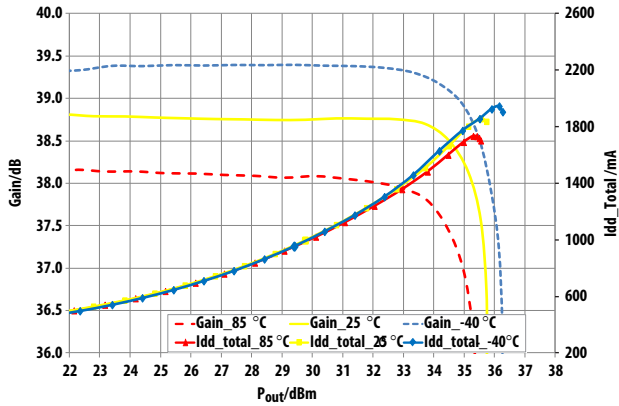


**Figure 17. Over-temperature Gain, I<sub>dd\_total</sub> vs. P<sub>out</sub> @ 2.62 GHz  
V<sub>dd</sub>=V<sub>ddBias</sub>=5.0V operating voltage**

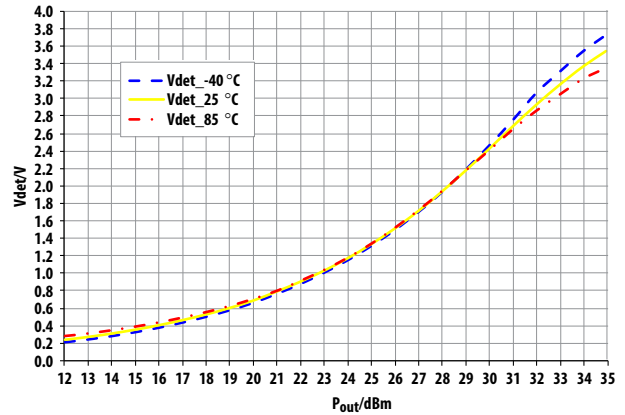


**Figure 18. Over-temperature Gain, I<sub>dd\_total</sub> vs. P<sub>out</sub> @ 2.65 GHz  
V<sub>dd</sub>=V<sub>ddBias</sub>=5.0V operating voltage**

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

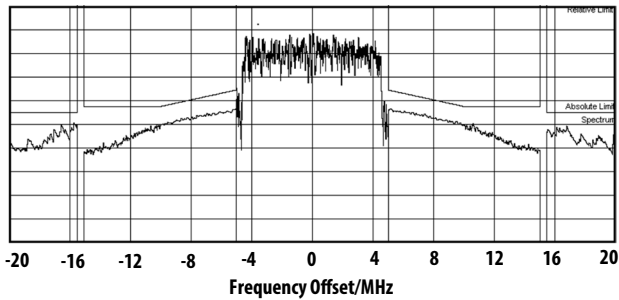


**Figure 19. Over-temperature Gain, Idd\_total vs. P<sub>out</sub> @ 2.69 GHz  
V<sub>dd</sub>=V<sub>ddBias</sub>=5.0V operating voltage**

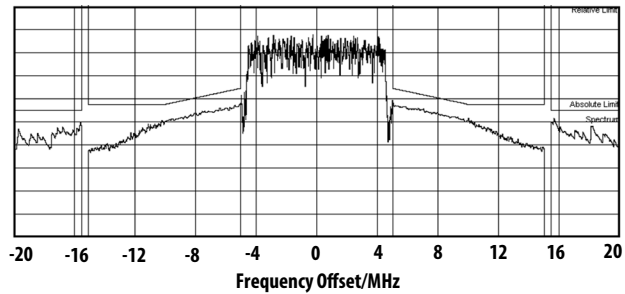


**Figure 20. Over-temperature Vdet vs. P<sub>out</sub> @ 2.69 GHz,  
V<sub>dd</sub>=V<sub>ddBias</sub>=5.0V operating voltage**

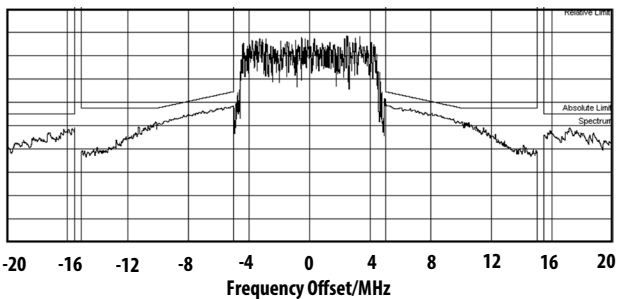
**MGA-43728 typical LTE 10MHz 50RB Test model 1.1 downlink signal Spectrum Emission Mask (3GPP TS 36.141v8.2.0 [2009-03] standard) performance at V<sub>dd</sub>=V<sub>ddBias</sub>=5.0V, Vc1=2.2V, Vc2=2.0V, Vc3=2.2V, unless otherwise stated**



**Figure 21. SEM at P<sub>out</sub>=31 dBm @ 2.62 GHz**



**Figure 22. SEM at P<sub>out</sub>=31 dBm @ 2.65 GHz**



**Figure 23. SEM at P<sub>out</sub>=31 dBm @ 2.69 GHz**



**MGA-43728 typical LTE 20MHz 100RB performance at Vdd=VddBias=5.0V, Vc1=2.4V, Vc2=2.3V, Vc3=2.3V, unless otherwise stated**

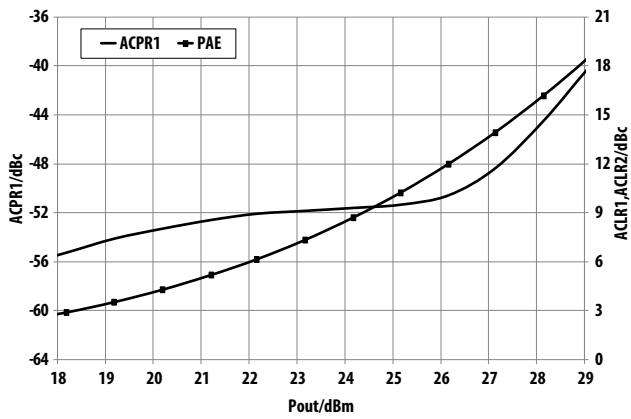


Figure 24. ACPR1, PAE vs Pout @ 2.63GHz

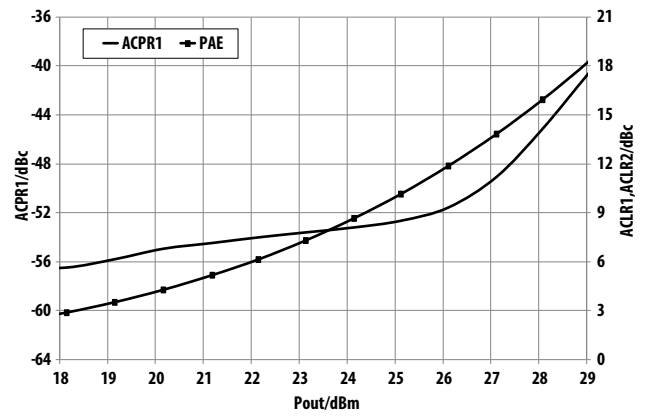


Figure 25. ACPR1, PAE vs Pout @ 2.65GHz

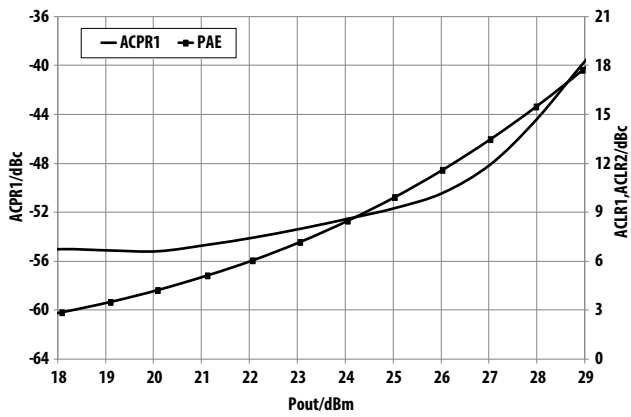


Figure 26. ACPR1, PAE vs Pout @ 2.68GHz

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

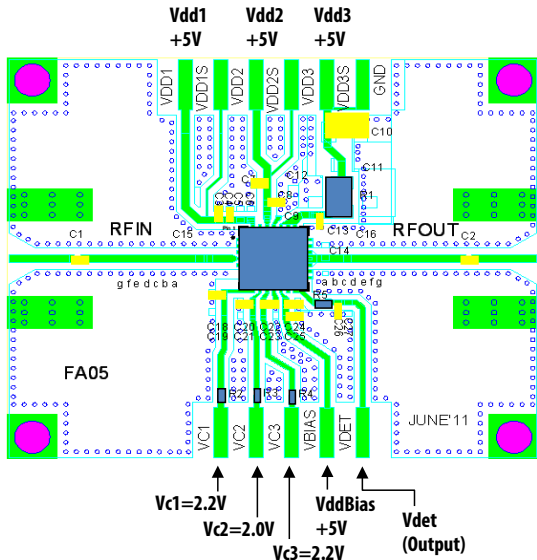
Freq (GHz)	S11 (dB)	S11 (ang)	S21 (dB)	S21 (ang)	S12 (dB)	S12 (ang)	S22 (dB)	S22 (ang)
0.1	-0.01	-34.34	-65.80	-44.41	-54.51	-24.21	-0.38	166.10
0.2	-0.03	-67.31	-66.10	64.27	-62.58	-52.03	-0.68	155.03
0.3	-0.10	-97.81	-61.97	-36.43	-65.44	-80.31	-0.91	144.88
0.4	-0.20	-125.47	-56.52	-41.90	-73.50	-40.66	-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 ± 0.5 pF	GJM1555C1H7R5BB01D
C3, C7, C13, C25	0.1 μF ± 10%	GRM155R71C104KA88D
C4, C8	8.2 pF ± 0.5 pF	GJM1555C1H8R2BB01D
C24	6.0 pF ± 0.5 pF	GJM1555C1H6R0CB01D
C10	2.2 μF ± 10%	GRM21BR71E225KA73L
C26	22 nF ± 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.

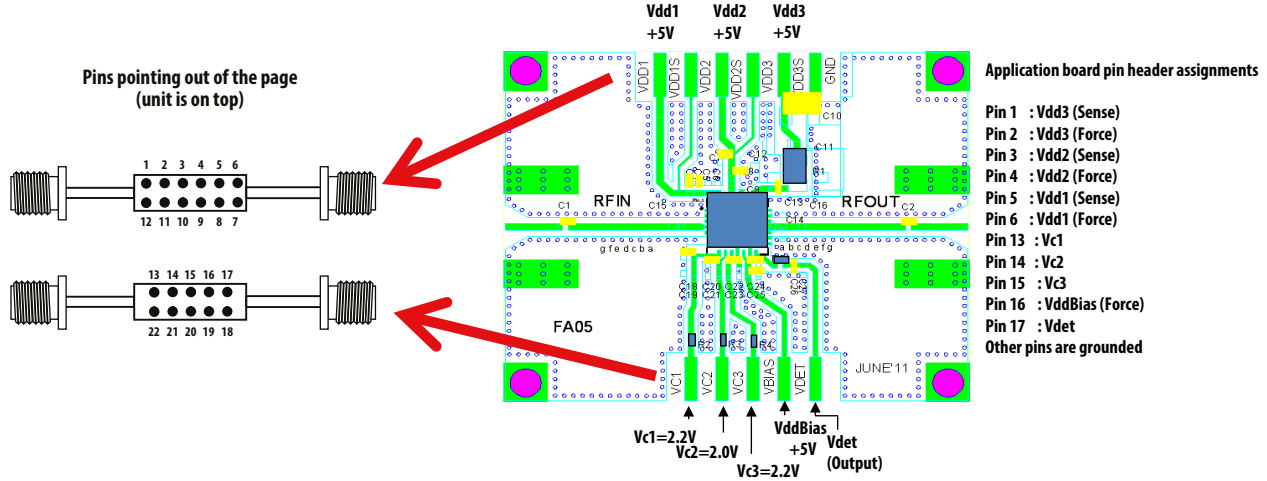


Figure 27. Demonstration board application circuit for MGA-43728 module

## Application Schematic

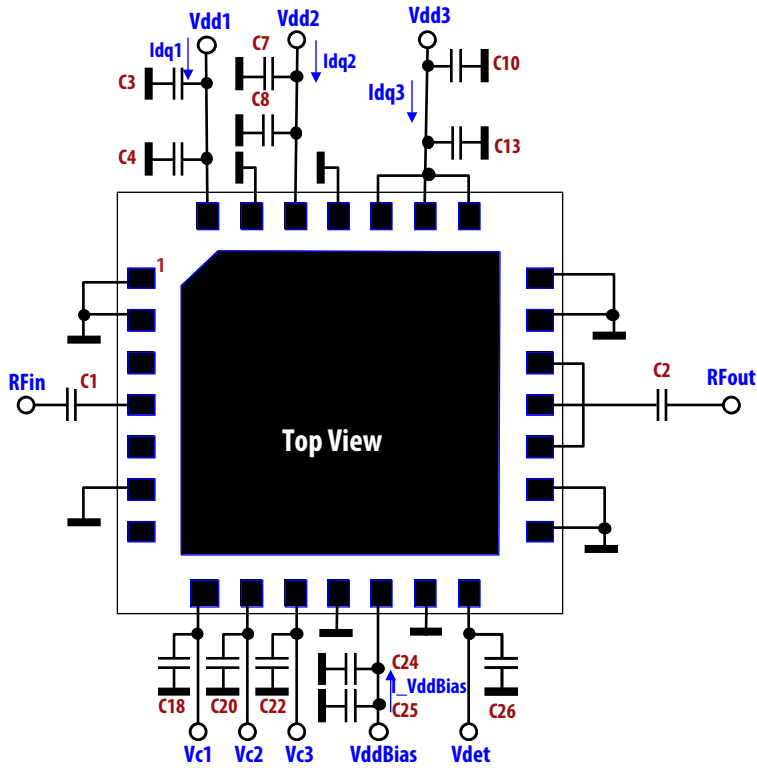


Figure 28. Application schematic in demonstration board

### 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 Vc1/2/3 respectively. These typical bias currents were obtained with Vc1/2/3 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

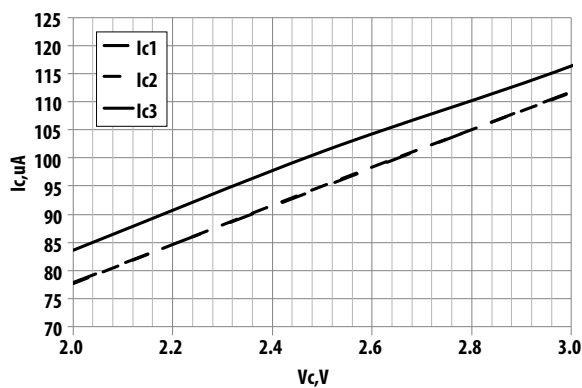


Figure 29.  $I_c$  Versus  $V_c$  at  $V_{dd}=V_{ddBias}=5.0\text{V}$

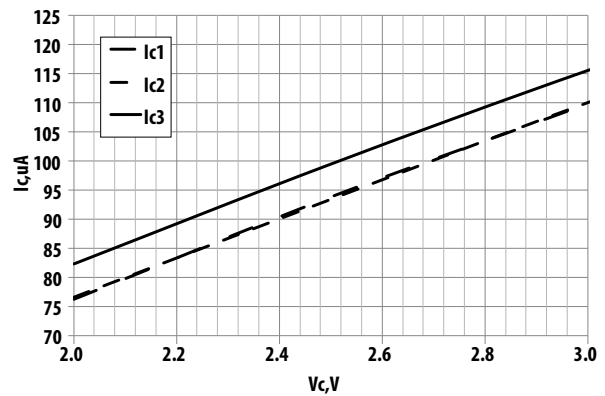
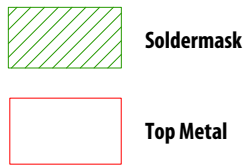
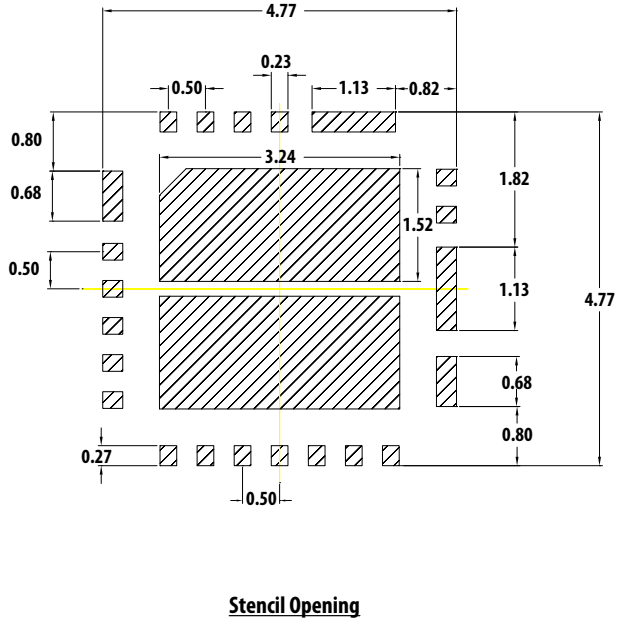
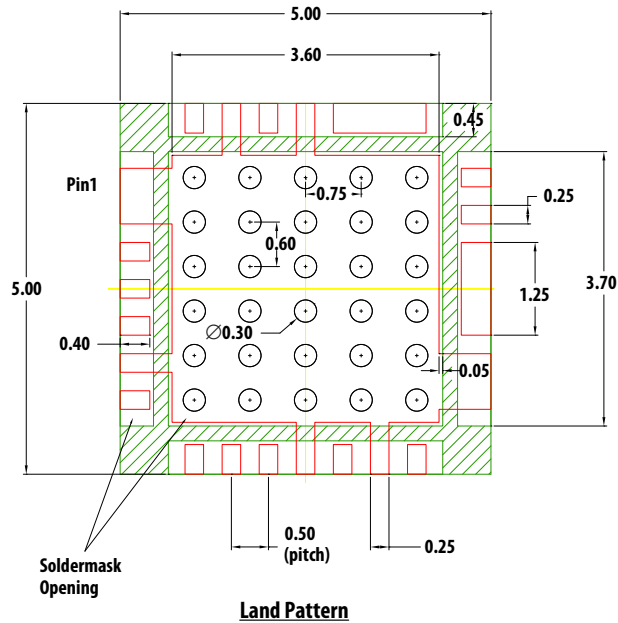


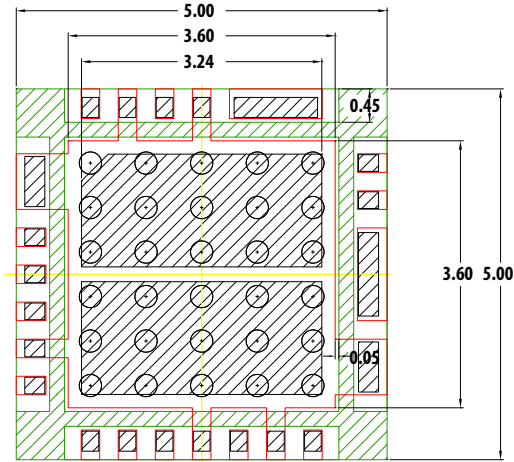
Figure 30.  $I_c$  Versus  $V_c$  at  $V_{dd}=V_{ddBias}=5.5\text{V}$



# PCB Land Pattern and Stencil Outline

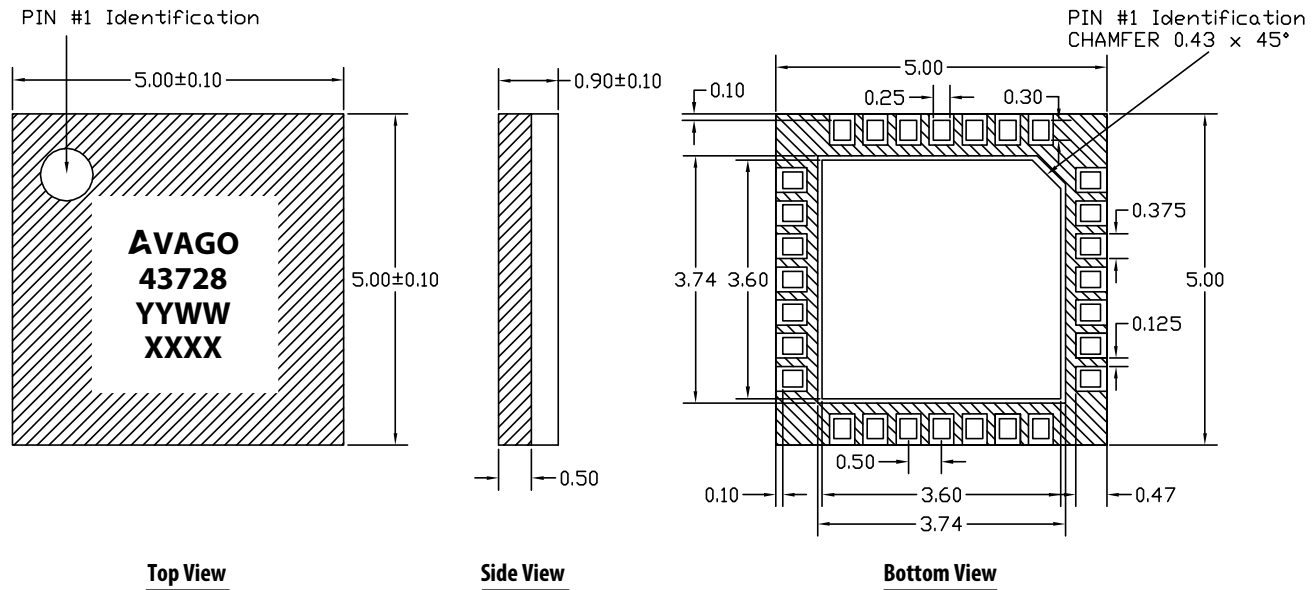


- Note :**
1. Recommended Land Pattern and Stencil.
  2. 4 mils stencil thickness recommended.
  3. All dimensions are in mm



**Combination of Land Pattern & Stencil Opening**

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



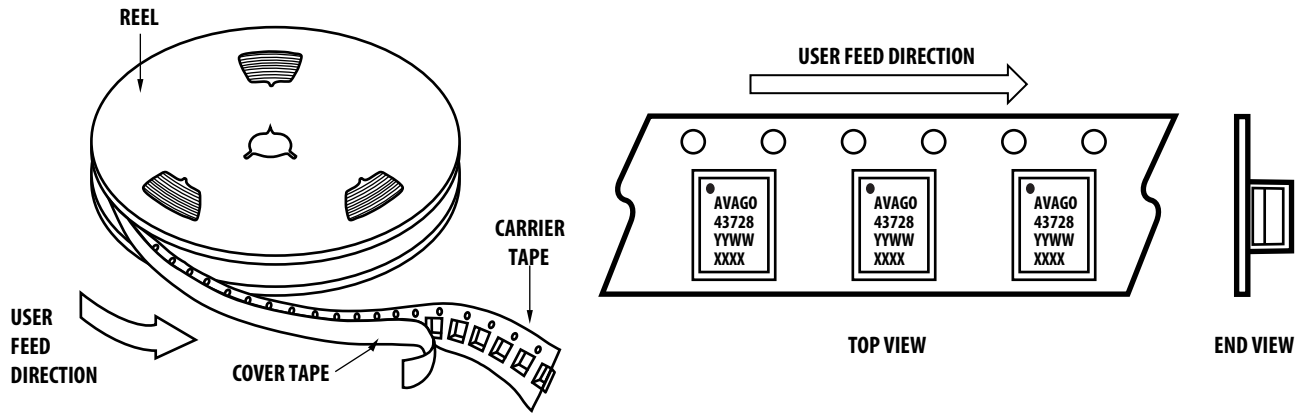
### Note

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

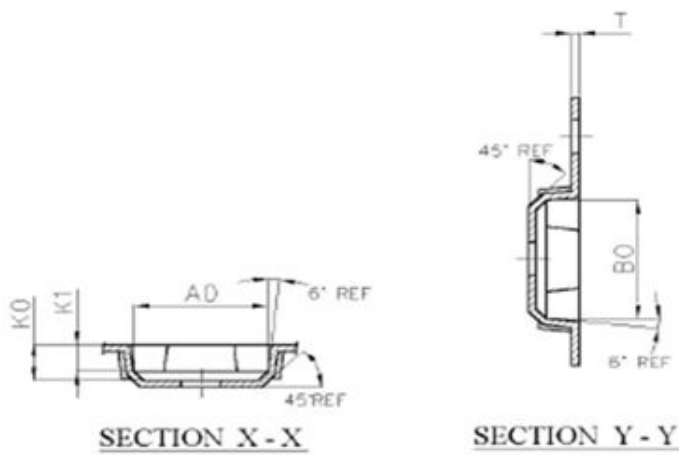
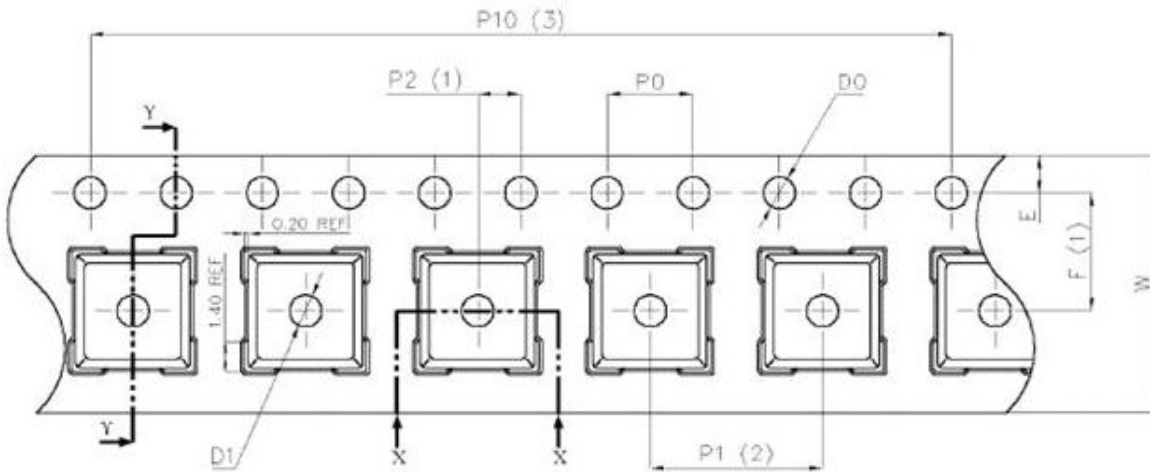
### Part Number Ordering Information

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

## Device Orientation

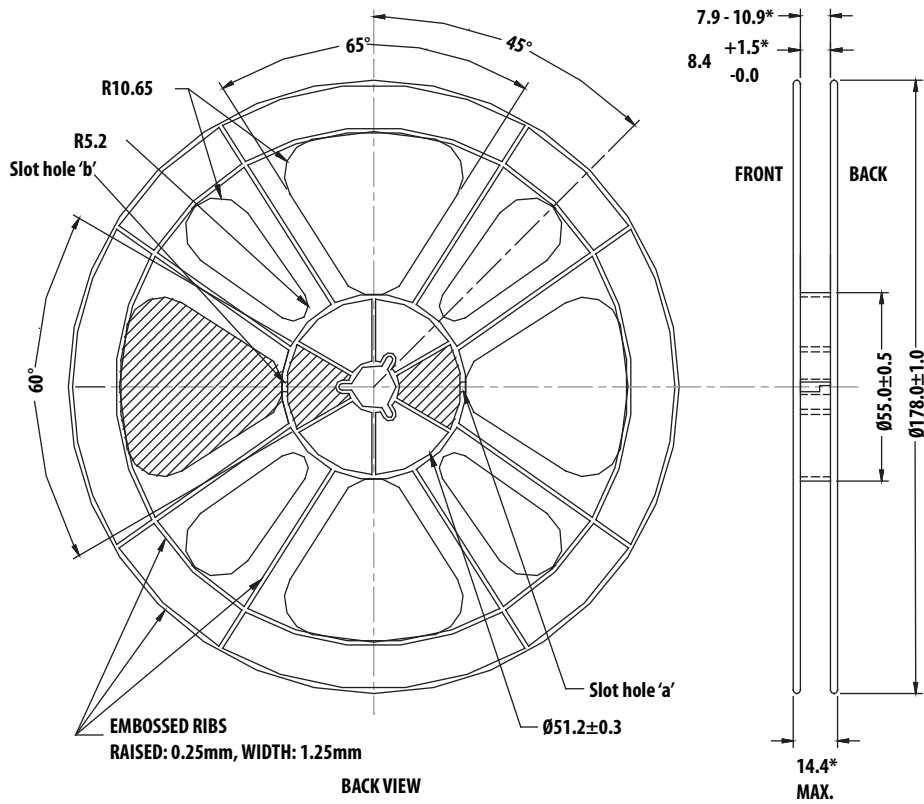
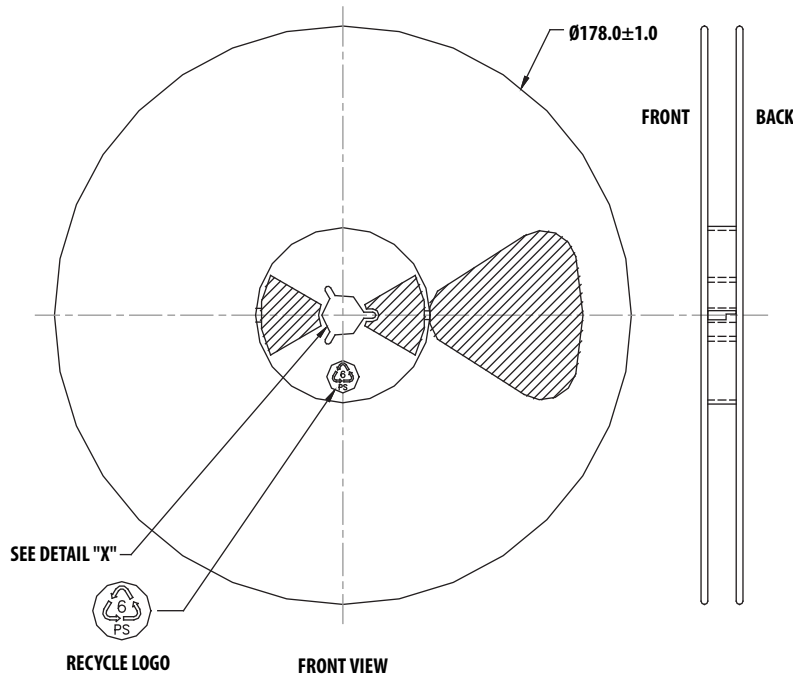


## Tape Dimensions



Dimension List			
Annote	Millimeter	Annote	Millimeter
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

# Reel Dimensions (7" reel)



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

Avago Technologies, and the A logo are trademarks of Avago Technologies in the United States and other countries.  
Data subject to change. Copyright © 2005-2015 Avago Technologies. All rights reserved.  
AV02-4221EN - November 5, 2015

