MGA-43728

## 2.62–2.69 GHz Linear Power Amplifier Module

Avago TECHNOLOGIES

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.
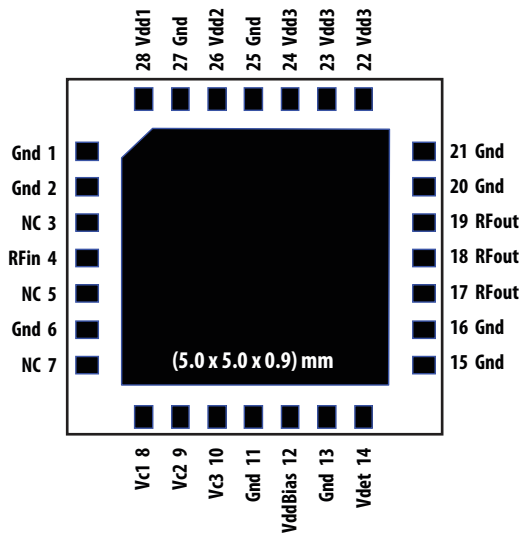
Component Image

(5.0 × 5.0 × 0.9) mm Package Outline

AVAGO
43728
YYWW
XXXX
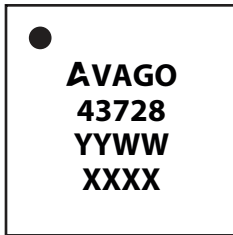
TOP VIEW

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

Pin Configuration

28 Vdd1 27 Gnd 26 Vdd2 25 Gnd 24 Vdd3 23 Vdd3 22 Vdd3

Gnd 1
Gnd 2
NC 3
RFin 4
NC 5
Gnd 6
NC 7

(5.0 x 5.0 x 0.9) mm

21 Gnd
20 Gnd
19 RFout
18 RFout
17 RFout
16 Gnd
15 Gnd

Vc1 8 Vc2 9 Vc3 10 Gnd 11 VddBias 12 Gnd 13 Vdet 14

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
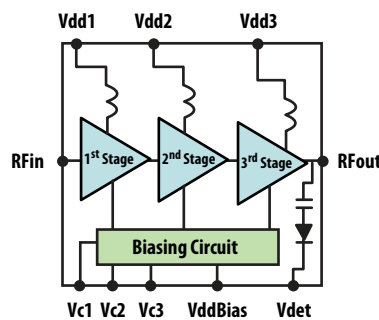- Detector range : 20 dB

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

Vdd1   Vdd2   Vdd3

RFin 1st Stage 2nd Stage 3rd Stage RFout

Biasing Circuit

Vc1 Vc2 Vc3 VddBias Vdet

Absolute Maximum Rating [1] T_A=25°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]

θ_{jc} = 14 °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 > 49.2 °C derate the device power at 71.4 mW per °C rise in Board (package belly) temperature.

Electrical Specifications

T_A = 25 °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	

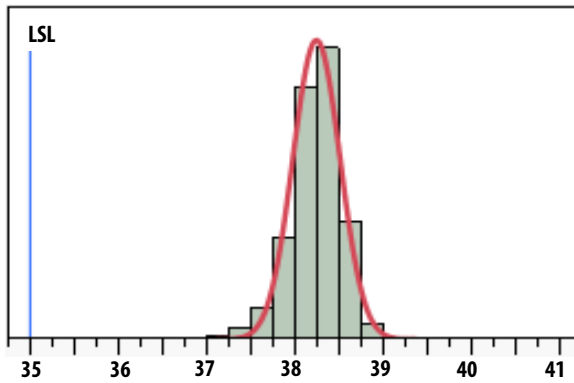## Product Consistency Distribution Charts [1]

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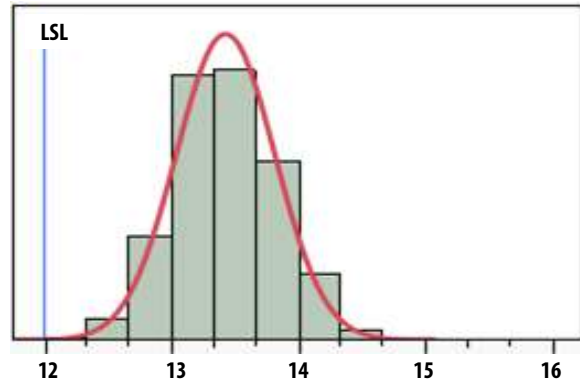

Figure 2. PAE at P_{out}=27.0 dBm; LSL=12.0% Nominal = 13.4%
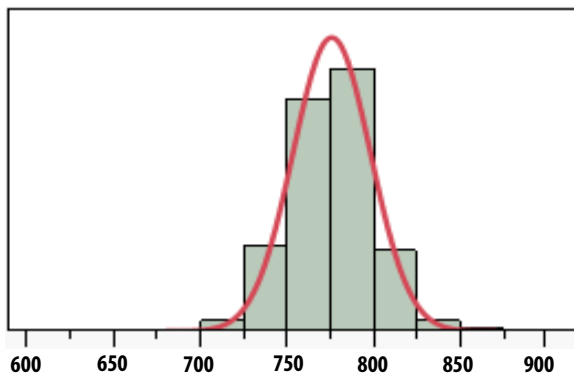

Figure 3. Idd_Total at P_{out}=27.0 dBm, Nominal = 776 mA
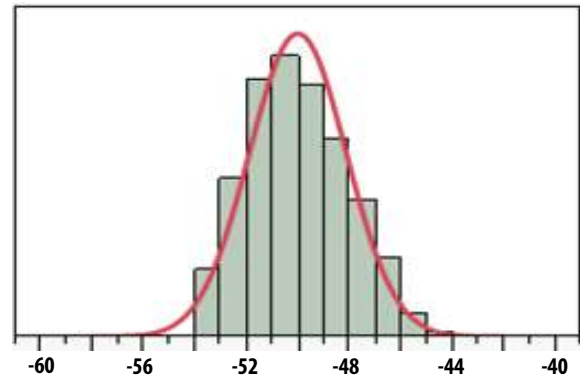

Figure 4. ACLR1 at P_{out}=27.0 dBm, Nominal = -50.0 dBc

Note:
1. Distribution data sample size is 1700 samples taken from 3 different wafer lots. T_A = 25*C, Vdd=VddBias = 5.0V, Vc1=2.2V, Vc2=2.0V, Vc3=2.2V, 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.

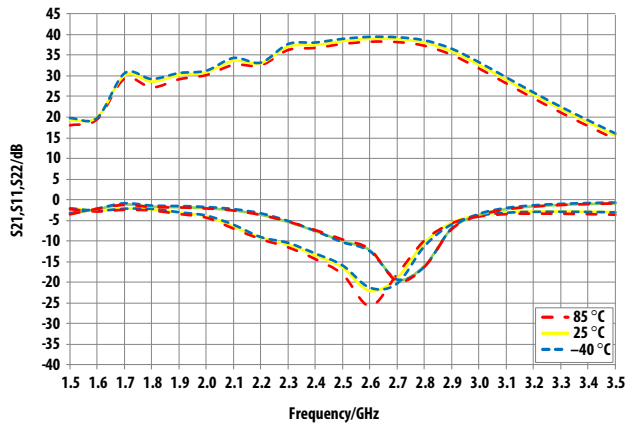**MGA-43728 typical over-temperature performance at Vc1=2.2V, Vc2=2.0V, Vc3=2.2V as shown in Figure 27, unless otherwise stated**

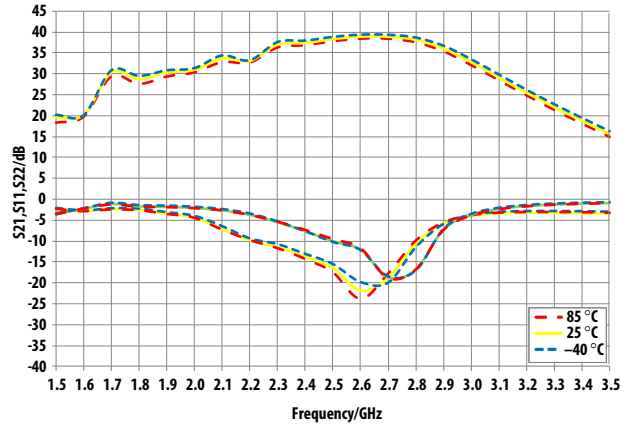Figure 5. Small-signal performance Over-temperature
Vdd=VddBias=5.0V operating voltage

Figure 6. Small-signal performance Over-temperature
Vdd=VddBias=5.5V operating voltage

Figure 7. Over-temperature ACLR1, PAE vs P_{out} @ 2.62 GHz
Vdd=VddBias=5.0V operating voltage

Figure 8. Over-temperature ACLR1, PAE vs P_{out} @ 2.62 GHz
Vdd=VddBias=5.5V operating voltage

Figure 9. Over-temperature ACLR1, PAE vs P_{out} @ 2.65 GHz
Vdd=VddBias=5.0V operating voltage

Figure 10. Over-temperature ACLR1, PAE vs P_{out} @ 2.65 GHz
Vdd=VddBias=5.5V operating voltage

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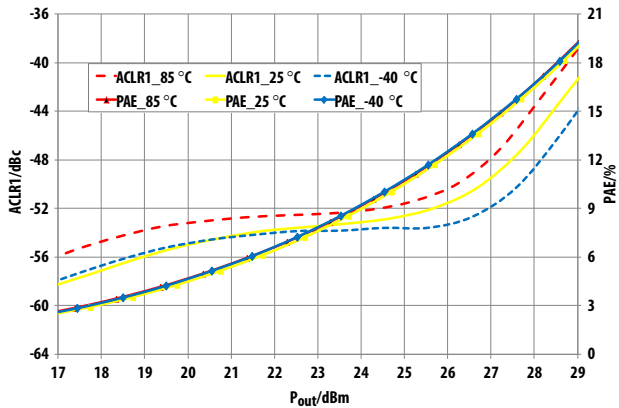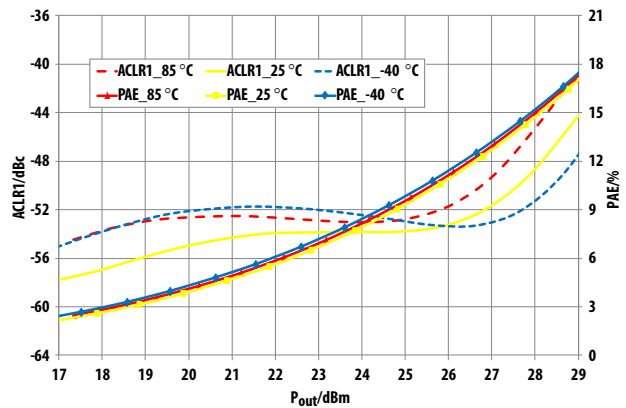# MGA-43728 typical over-temperature performance at Vc1=2.2V, Vc2=2.0V, Vc3=2.2V, unless otherwise stated

Figure 11. Over-temperature ACLR1, PAE vs P$_{out}$ @ 2.69 GHz
Vdd=VddBias=5.0V operating voltage
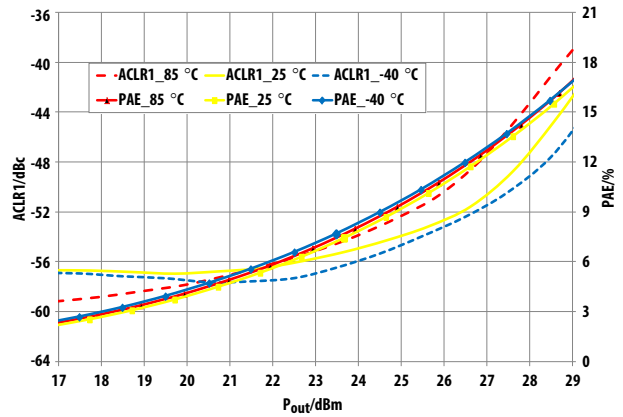
Figure 12. Over-temperature ACLR1, PAE vs P$_{out}$ @ 2.69 GHz
Vdd=VddBias=5.5V operating voltage

Figure 13. Over-temperature Idd_total vs P$_{out}$ @ 2.65 GHz
Vdd=VddBias=5.0V operating voltage

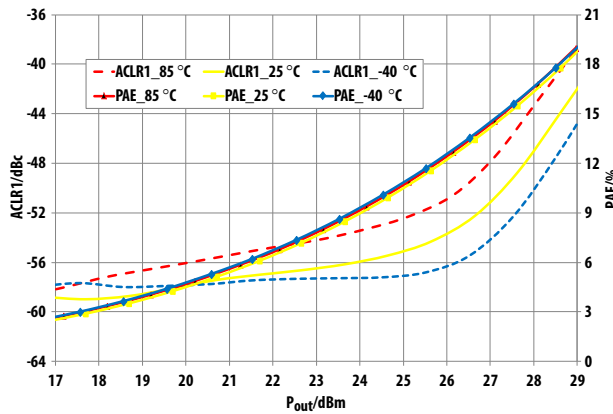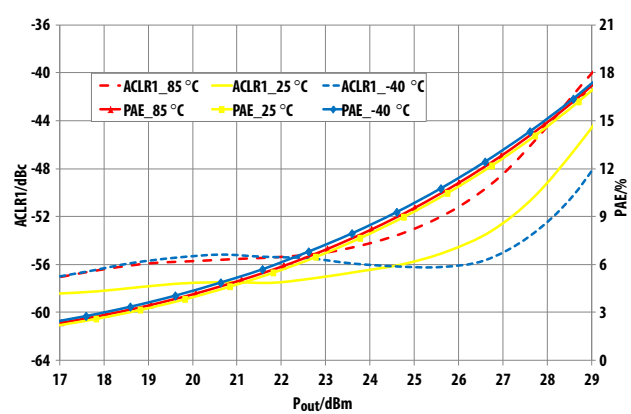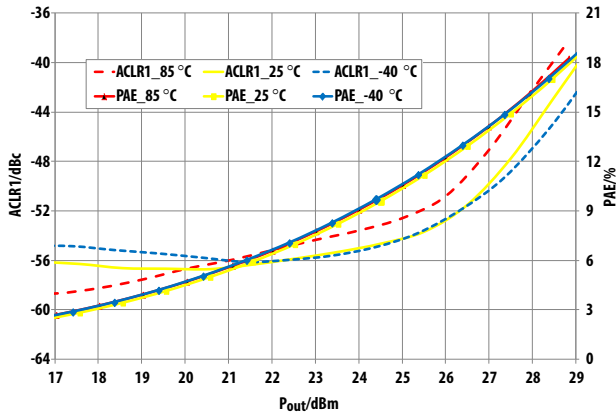# MGA-43728 typical over-temperature performance at Vc1=2.2V, Vc2=2.0V, Vc3=2.2V, unless otherwise stated
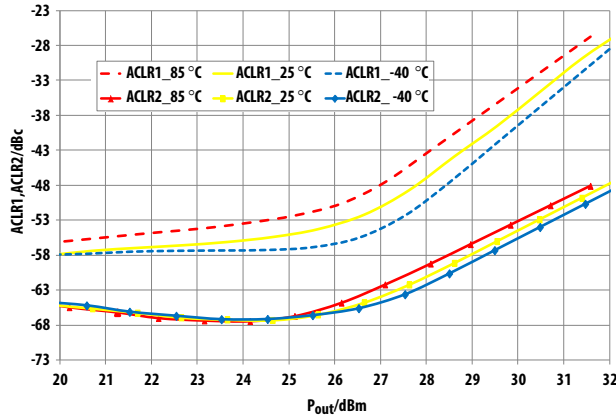
Figure 14. Over-temperature ACLR1, ACLR2 vs. P_{out} @ 2.65 GHz
Vdd=VddBias=5.0V operating voltage
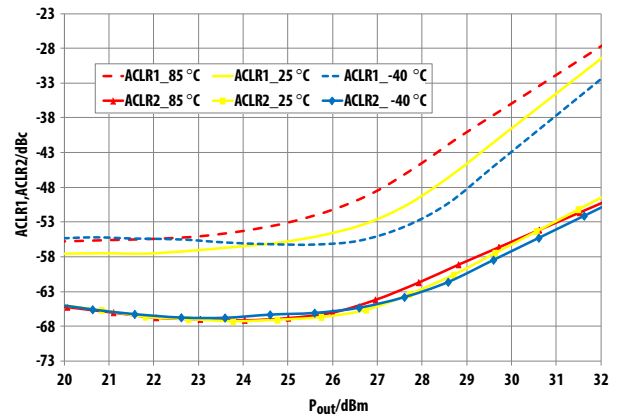
Figure 15. Over-temperature ACLR1, ACLR2 vs. P_{out} @ 2.65 GHz
Vdd=VddBias=5.5V operating voltage
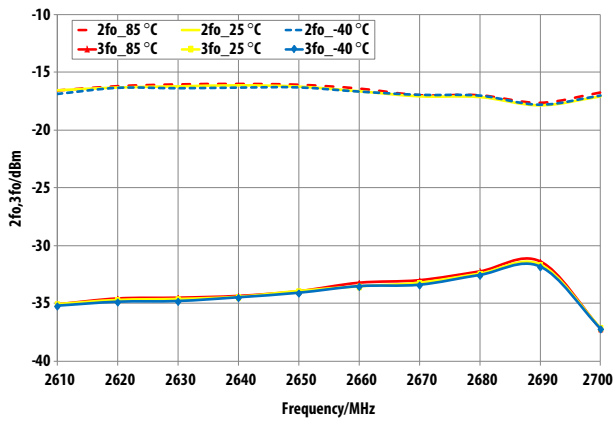
Figure 16. Over-temperature 2nd, 3rd Harmonics vs. Freq at P_{out}=27.0 dBm,
Vdd=VddBias=5.0V operating voltage
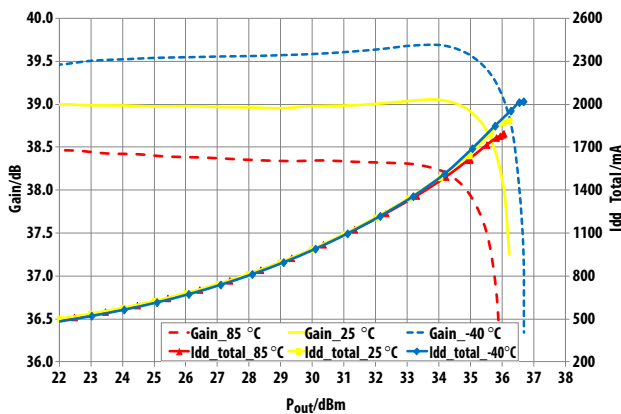
Figure 17. Over-temperature Gain, Idd_total vs. P_{out} @ 2.62 GHz
Vdd=VddBias=5.0V operating voltage

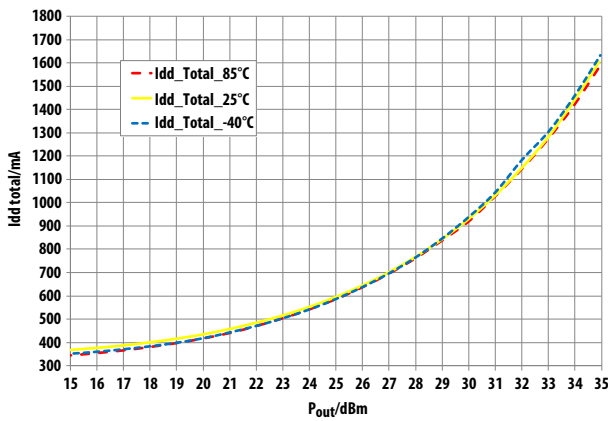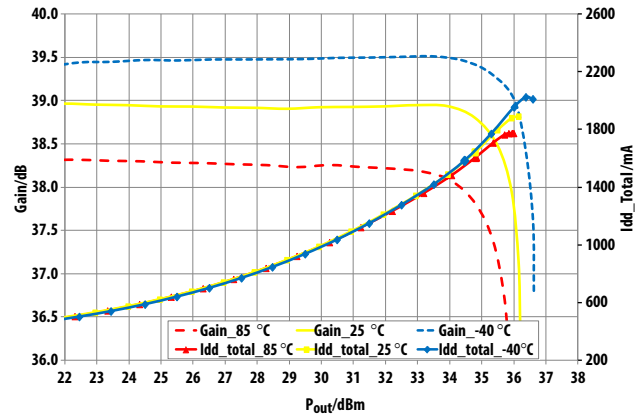Figure 18. Over-temperature Gain, Idd_total vs. P_{out} @ 2.65 GHz
Vdd=VddBias=5.0V voltage

MGA-43728 typical over-temperature performance at Vc1=2.2V, Vc2=2.0V, Vc3=2.2V, unless otherwise stated
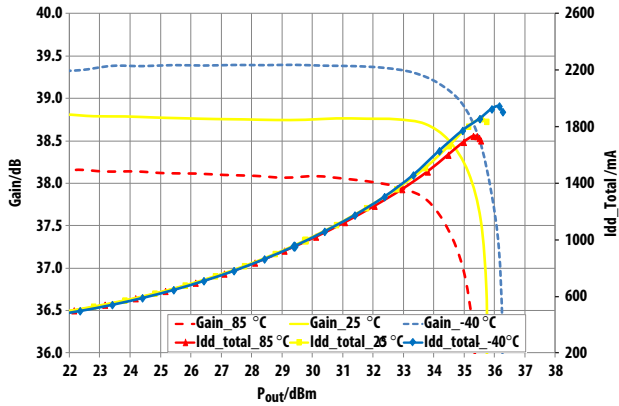
Figure 19. Over-temperature Gain, Idd_total vs. P$_{out}$ @ 2.69 GHz Vdd=VddBias=5.0V operating voltage
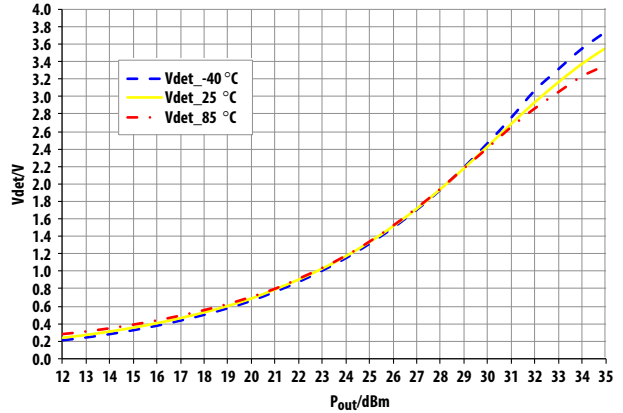
Figure 20. Over-temperature Vdet vs. P$_{out}$ @ 2.69 GHz, Vdd=VddBias=5.0V operating voltage

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 Vdd=VddBias=5.0V, Vc1=2.2V, Vc2=2.0V, Vc3=2.2V, unless otherwise stated
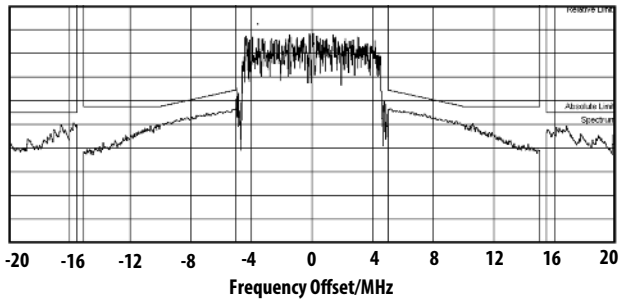
Figure 21. SEM at P$_{out}$=31 dBm @ 2.62 GHz

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

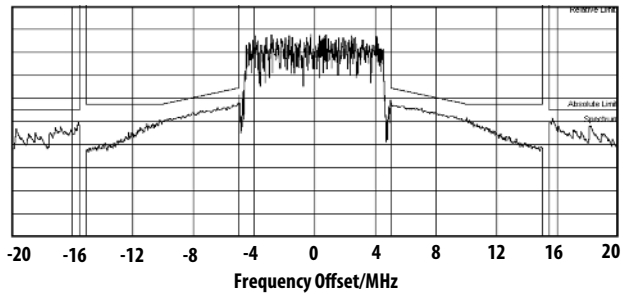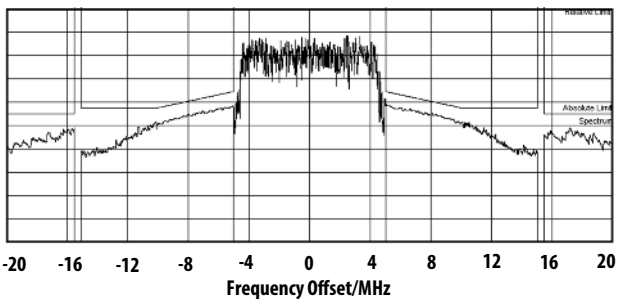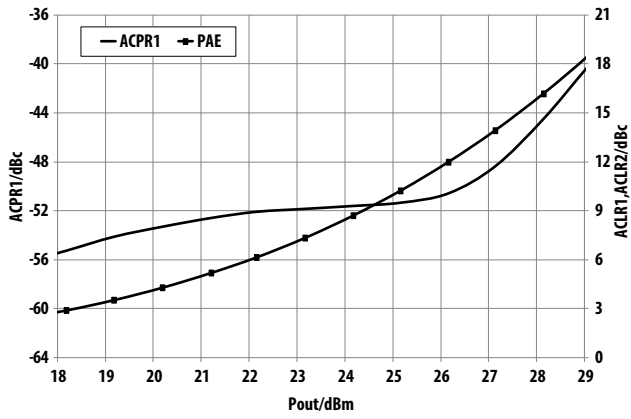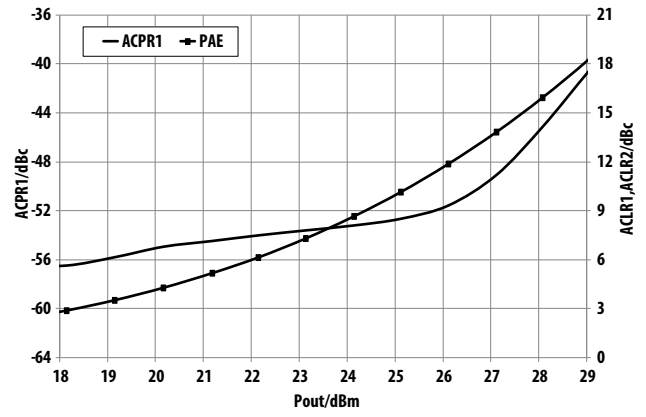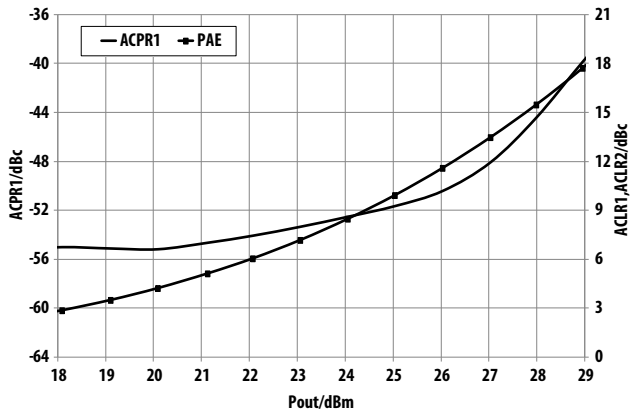| Freq (GHz)	S11 (dB)	S11 (ang)	S21 (dB)	S21 (ang)	S12 (dB)	S12 (ang)	S22 (dB)	S22 (ang)
0.1	-0.02	-34.40	-60.68	59.73	-60.23	128.69	-0.36	166.30
0.2	-0.04	-67.37	-63.52	14.97	-59.18	5.31	-0.67	155.18
0.3	-0.10	-97.79	-67.50	-67.21	-66.31	57.08	-0.90	145.01
0.4	-0.20	-125.48	-53.74	-47.51	-64.36	-46.51	-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

Freq (GHz)	S11 (dB)	S11 (ang)	S21 (dB)	S21 (ang)	S12 (dB)	S12 (ang)	S22 (dB)	S22 (ang)
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)
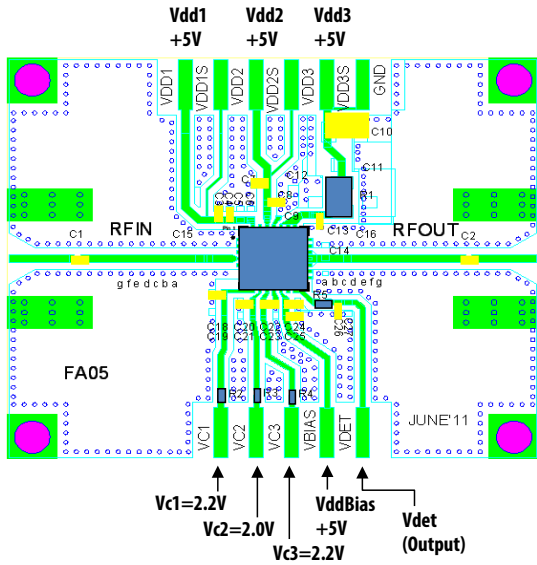
Component	Value	Part Number
C1, C2, C18, C20, C22	7.5 pF ± 0.5 pF	GJM1555C1H7R5BB01D
C3, C7, C13, C25	0.1 µF ± 10%	GRM155R71C104KA88D
C4, C8	8.2 pF ± 0.5 pF	GJM1555C1H8R2BB01D
C24	6.0 pF ± 0.5 pF	GJM1555C1H6R0CB01D
C10	2.2 µF ± 10%	GRM21BR71E225KA73L
C26	22 nF ± 10%	CM05X7R223K16AHF
R1	0 Ω	RMC1/10 JPTP
R2, R3, R4, R5	0 Ω	RMC1/16S JPTH

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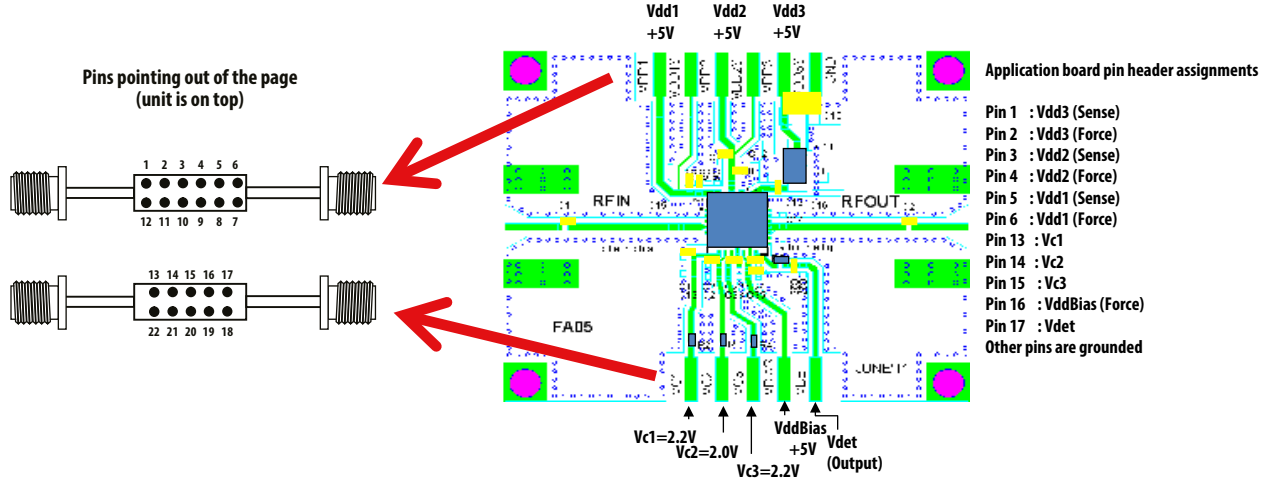

Application board pin header assignments

Pin 1 : Vdd3 (Sense)
Pin 2 : Vdd3 (Force)
Pin 3 : Vdd2 (Sense)
Pin 4 : Vdd2 (Force)
Pin 5 : Vdd1 (Sense)
Pin 6 : Vdd1 (Force)
Pin 13 : Vc1
Pin 14 : Vc2
Pin 15 : Vc3
Pin 16 : VddBias (Force)
Pin 17 : Vdet
Other pins are grounded

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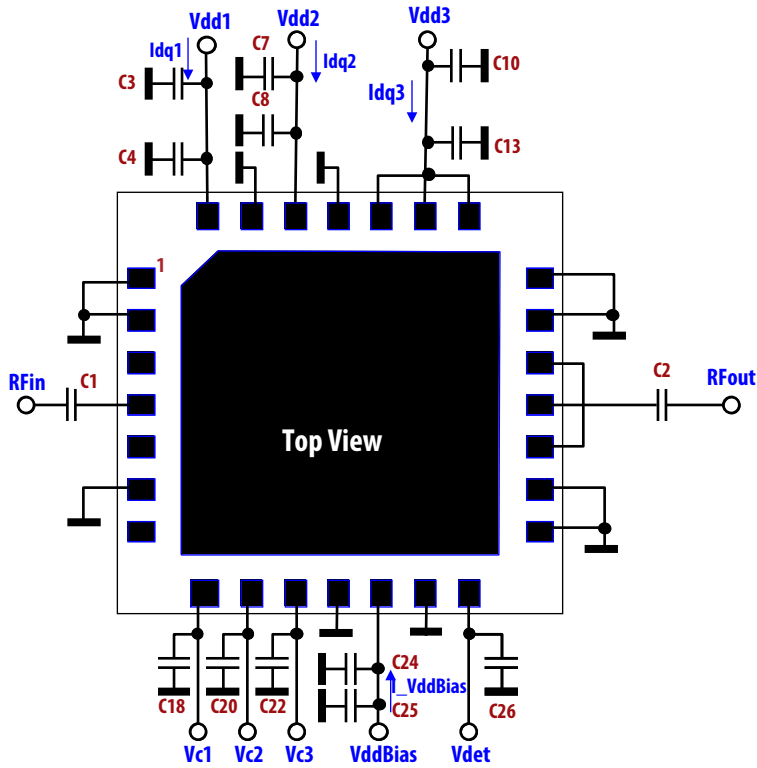
Application Schematic

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. Idq1= 45.0mA, Idq2 = 100.0mA, Idq3 = 200.0mA, I_VddBias = 14.0mA. Idq1/2/3 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.

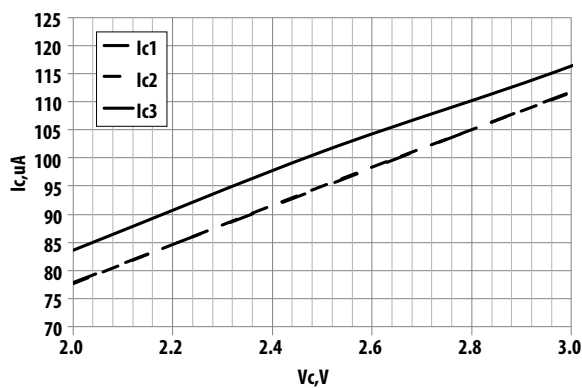## MGA-43728 typical Ic1, Ic2, Ic3 Vs Vc performance, unless otherwise stated

Figure 29. Ic Versus Vc at Vdd=VddBias=5.0V

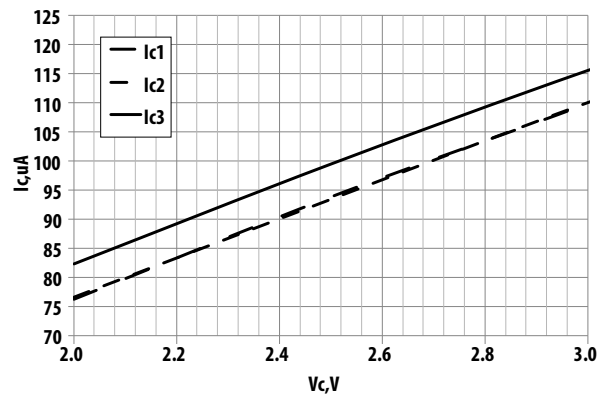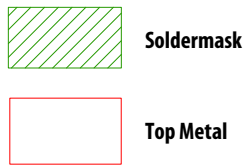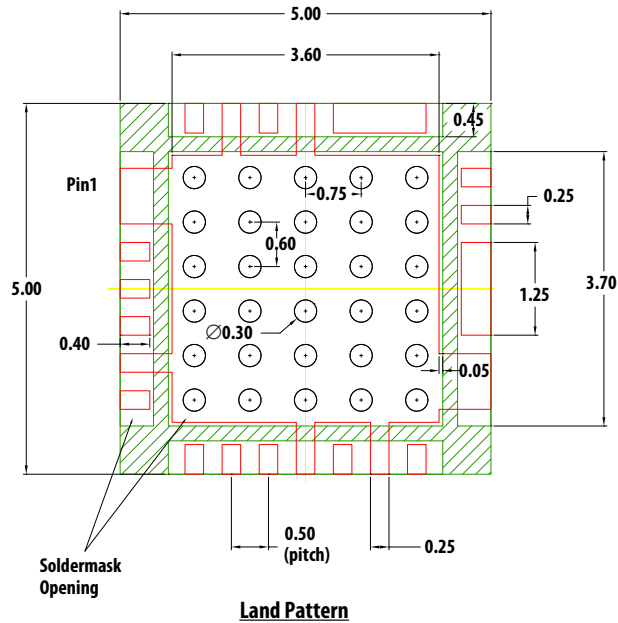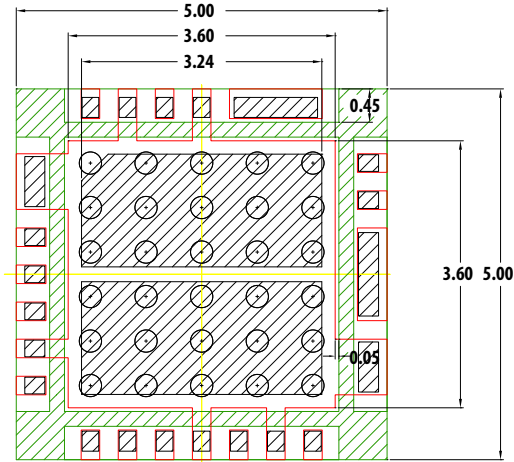**Figure 30. Ic Versus Vc at Vdd=VddBias=5.5V**

PCB Land Pattern and Stencil Outline

Land Pattern

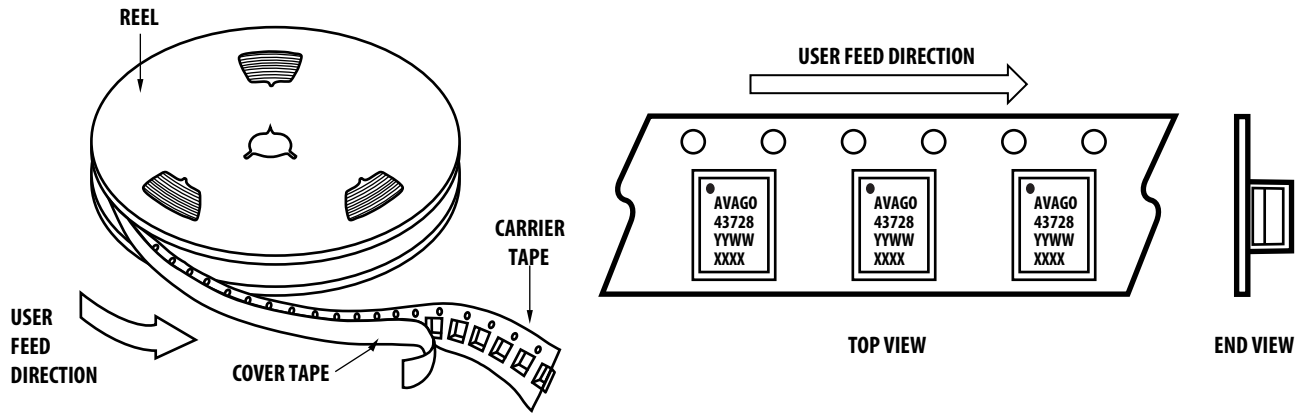**Stencil Opening**

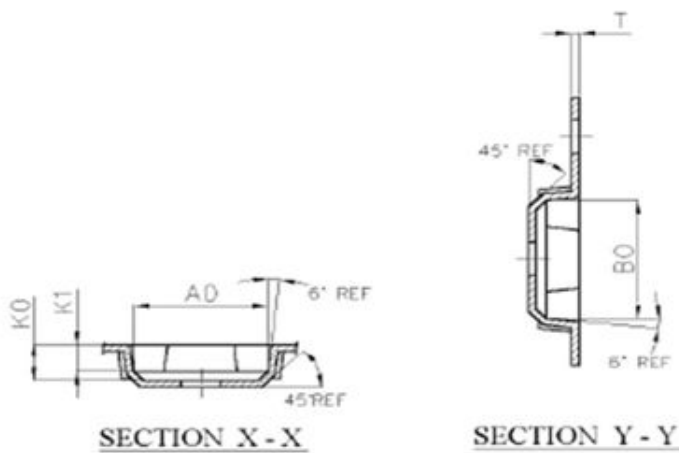**Combination of Land Pattern & Stencil Opening**

 Soldermask

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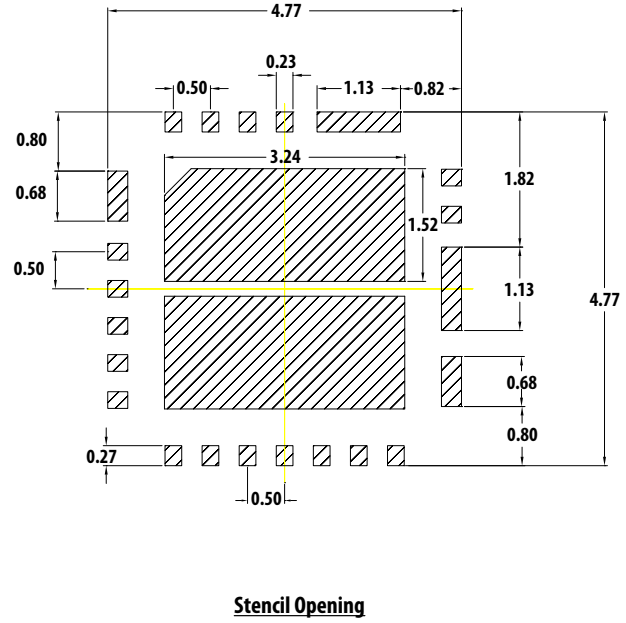
Note :
1. Recommended Land Pattern and Stencil.
2. 4 mils stencil thickness recommended.
3. All dimensions are in mm

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

PIN #1 Identification

PIN #1 Identification
CHAMFER 0.43 x 45°

5.00±0.10

0.90±0.10

5.00

0.10

0.25

0.30

AVAGO
43728
YYWW
XXXX

5.00±0.10

0.375

3.74 3.60

5.00

0.125

0.50

0.50

0.10

3.60

0.47

3.74

Top View

Side View

Bottom View

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

REEL

USER FEED DIRECTION

CARRIER TAPE

USER FEED DIRECTION

COVER TAPE

```
AVAGO
43728
YYWW
XXXX
```

```
AVAGO
43728
YYWW
XXXX
```

```
AVAGO
43728
YYWW
XXXX
```

TOP VIEW

END VIEW

Tape Dimensions

P10 (3)

P2 (1)

P0

D0

Y

0.20 REF

1.40 REF

E

F (1)

W

D1

X X

P1 (2)

T

45° REF

B0

6° REF

K0

K1

A0

6° REF

45 REF

SECTION X - X

6° REF

SECTION Y - Y

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	$1.50^{+0.10}_{-0}$	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)

Ø178.0±1.0

FRONT   BACK

SEE DETAIL "X"

RECYCLE LOGO   FRONT VIEW

65°   45°

R10.65

R5.2

Slot hole 'b'

60°

7.9 - 10.9*

8.4 +1.5*
-0.0

FRONT   BACK

Ø55.0±0.5

Ø178.0±1.0

Slot hole 'a'

Ø51.2±0.3

EMBOSSED RIBS
RAISED: 0.25mm, WIDTH: 1.25mm

BACK VIEW

14.4*
MAX.
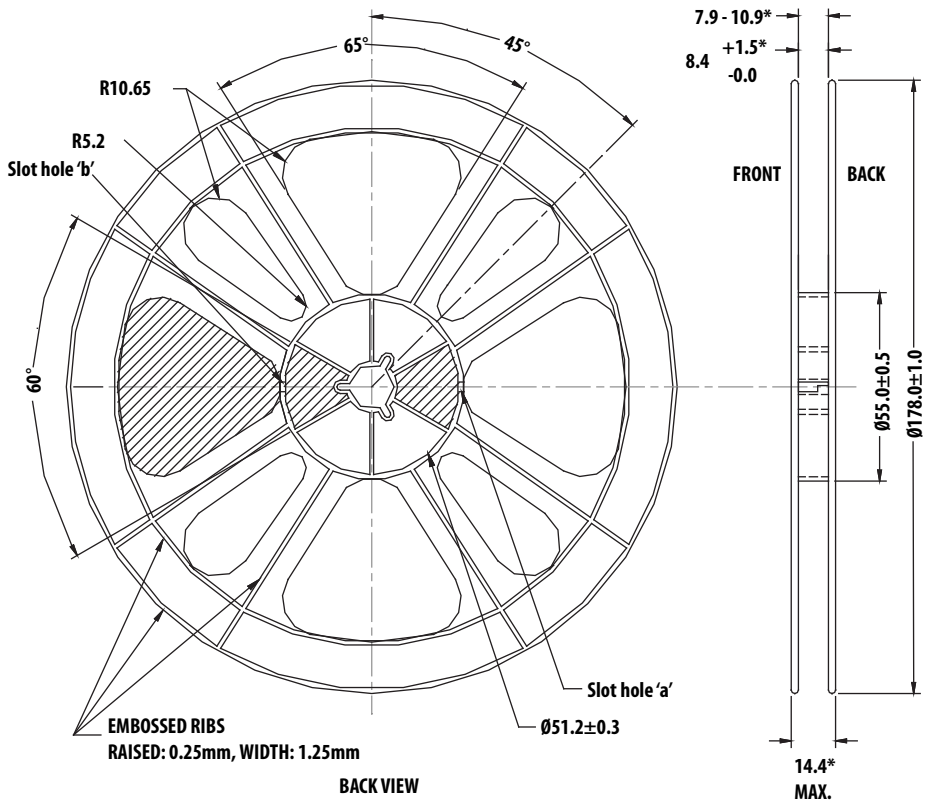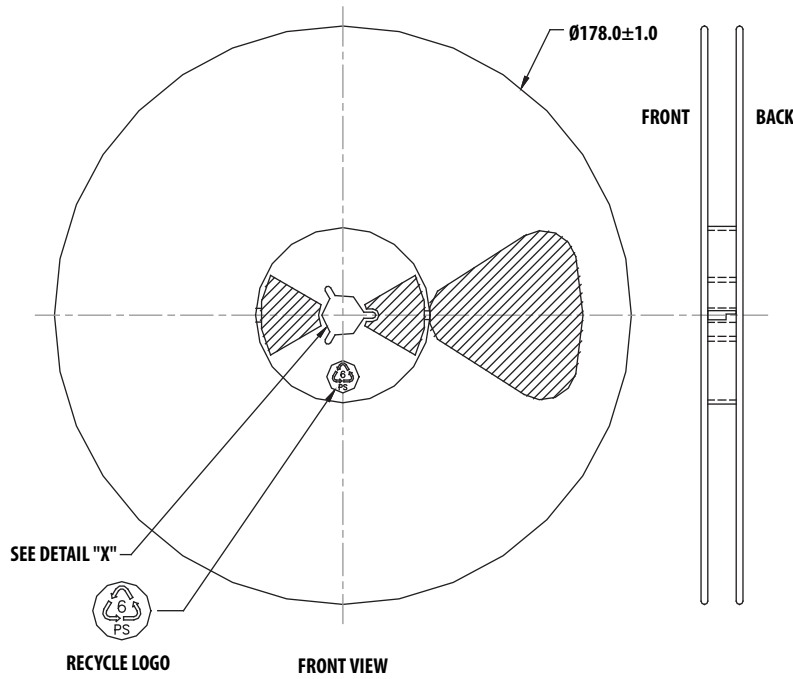
For product information and a complete list of distributors, please go to our web site: **www.avagotech.com**

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TECHNOLOGIES