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MGA-43003

High Linearity (1.805 – 1.88) GHz Power Amplifier Module

Data Sheet

Avago
TECHNOLOGIES
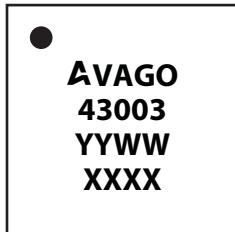
Description

Avago Technologies' MGA-43003 is a fully matched power amplifier for use in the (1.805-1.88) GHz band. High linear output power at 5V is achieved through the use of Avago Technologies' proprietary 0.25um GaAs Enhancement-mode pHEMT process. MGA-43003 is housed in a miniature 5.0mm x 5.0mm molded-chip-on-board (MCOB) module package. A detector is also included on-chip. The compact footprint coupled with high gain, high linearity and good efficiency makes the MGA-43003 an ideal choice as a power amplifier for small cell BTS PA applications.

Applications

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

Component Image

AVAGO
43003
YYWW
XXXX

TOP VIEW

Features

- High linearity performance : Typ -48dBc ACLR1 [1] at 27.0dBm linear output power (biased with 5V supply)

- High Gain : 41.7dB

- Good efficiency

- Fully matched

- Built-in detector

- GaAs E-pHEMT Technology [2]

- Low cost small package size: (5.0 x 5.0 x 0.9) mm

Specifications

1.842GHz; 5.0V, Idq=360mA (typ), LTE DL E-TM1.1, 20MHz 100RB, downlink signal
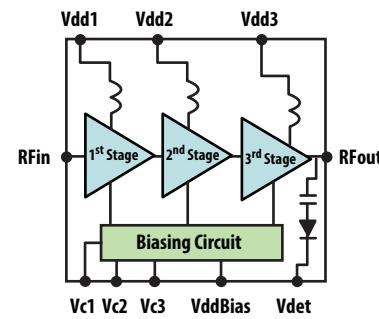
- PAE : 14%

- 27.0dBm linear Pout @ ACLR1 =-48dBc [1]

- 41.7dB Gain

- Detector range : 20dB

Note:
1. LTE DL E-TM1.1, 20MHz 100RB, downlink signal
2. Enhancement mode technology employs positive Vgs, thereby eliminating the need of negative gate voltage associated with conventional depletion mode devices.

5.0 x 5.0 x 0.9 mm Package Outline

Notes:
Package marking provides orientation and identification
"43003" = Device part number
"YYWW" = Year and work week
"XXXX" = Assembly lot number

Pin Configuration

(5.0 x 5.0 x 0.9) mm

Functional Block Diagram

Attention: Observe precautions for handling electrostatic sensitive devices.
ESD Machine Model = 60 V
ESD Human Body Model = 400 V
Refer to Avago Application Note A004R: Electrostatic Discharge, Damage and Control.

Absolute Maximum Rating [1] $T_A = 25°C$

Symbol	Parameter	Units	Absolute Max.
Vdd, VddBias	Supply voltages, bias supply voltage	V	6
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]

$\theta_{jc} = 14°C/W$

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 (TB) is 25 °C , for TB >49.2°C derate the device power at 71.4mW per °C rise in Board (package belly) temperature.

Electrical Specifications

TA = 25°C, Vdd1,2,3 = VddBias=5.0V, Idqtotal = 360mA, RF performance at 1.842GHz, LTE DL E-TM1.1, 20MHz 100RB downlink signal operation unless otherwise stated.

Symbol	Parameter and Test Condition	Units	Min.	Typ.	Max.
Vdd	Supply Voltage	V		5.0	
Iqtotal	Quiescent Supply Current	mA		360	
Gain	Gain	dB	35	41.7	
OP1dB	Output Power at 1dB Gain Compression	dBm		36.8	
ACLR1 @ Pout=27.0dBm	LTE DL E-TM1.1, 20MHz 100RB downlink signal	dBc		-48	-45
PAE	Power Added Efficiency	%	12	14	
S11	Input Return Loss, 50Ω source	dB		14	
DetR	Detector RF dynamic range	dB		20	
2fo	2fo Harmonics (LTE DL E-TM1.1, 20MHz 100RB downlink signal)	dBc		-40	

## Product Consistency Distribution Charts [1]
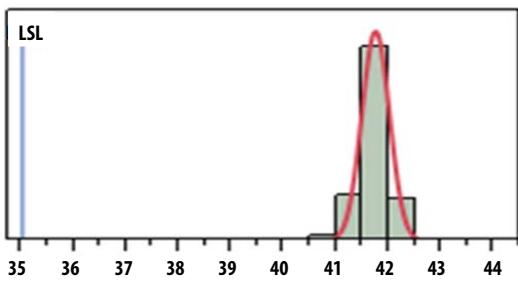
Figure 1. Gain at Pout=27.0dBm; LSL=35.0dB, Nominal = 41.7dB
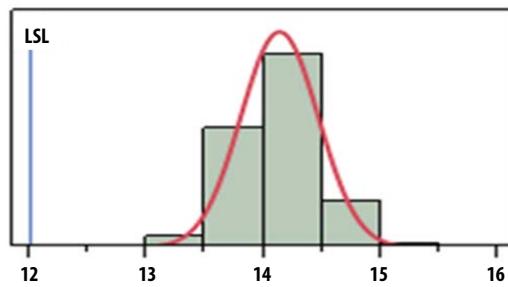
Figure 2. PAE at Pout=27.0dBm; LSL=12.0% Nominal = 14.1%
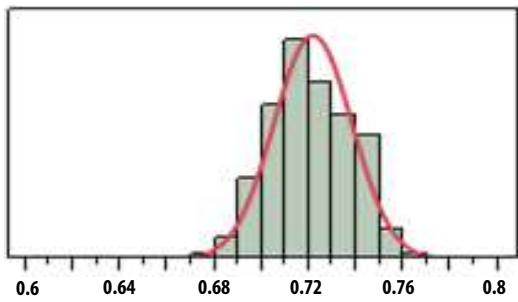

Figure 3. Idd_total at Pout=27.0dBm, Nominal = 720mA
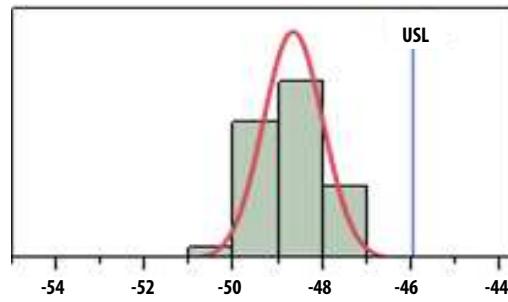
Figure 4. ACLR1 at Pout=27.0dBm, Nominal = -48.7dBc

Note:
1. Distribution data sample size is 3853 samples taken from 3 different wafer lots. T_A = 25°C, Vdd=VddBias = 5.0V, Vc1=1.8V, Vc2=1.6V, Vc3=2.0V, RF performance at 1.842GHz unless otherwise stated. Future wafers allocated to this product may have nominal values anywhere between the upper and lower limits.

3

MGA-43003 typical over-temperature performance at Vc1=1.8V, Vc2=1.6V, Vc3=2.0V as shown in Figure 23 unless otherwise stated
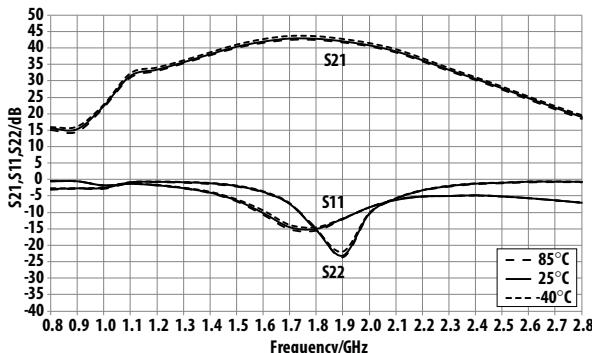

Figure 5. Small-signal performance Over-temperature
Vdd=VddBias=5.0V operating voltage
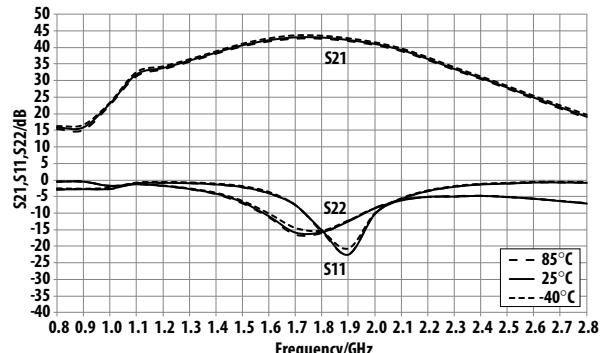
Figure 6. Small-signal performance Over-temperature
Vdd=VddBias=5.5V operating voltage
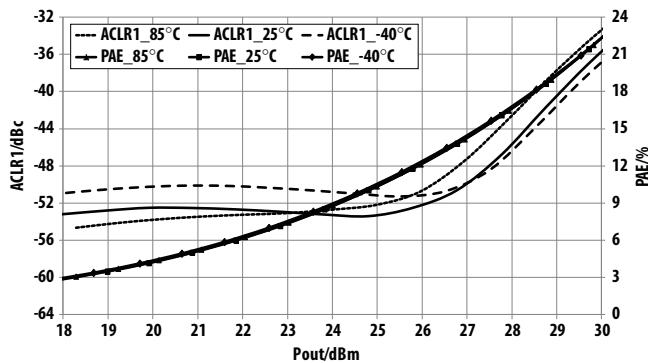
Figure 7. Over-temperature ACLR1, PAE vs Pout @ 1.815GHz
Vdd=VddBias=5.0V operating voltage
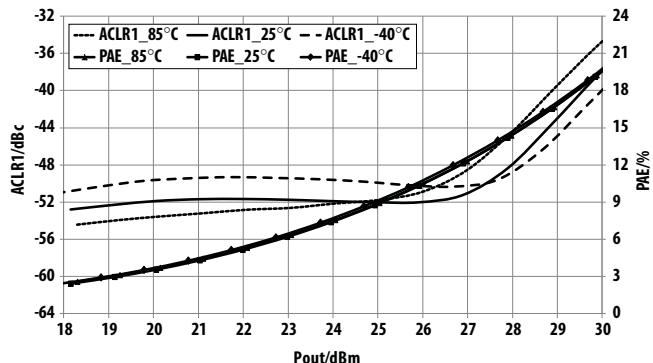
Figure 8. Over-temperature ACLR1, PAE vs Pout @ 1.815GHz
Vdd=VddBias=5.5V operating voltage
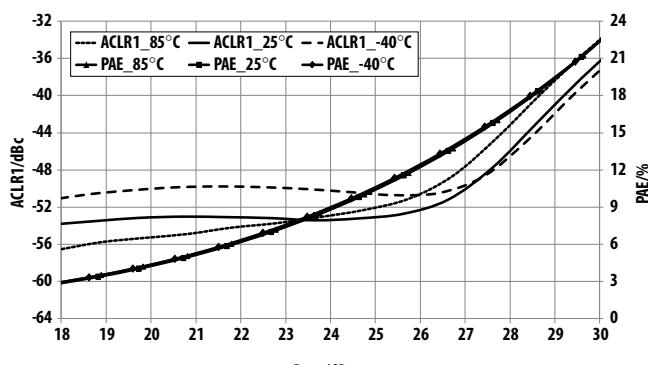
Figure 9. Over-temperature ACLR1, PAE vs Pout @ 1.842GHz
Vdd=VddBias=5.0V operating voltage
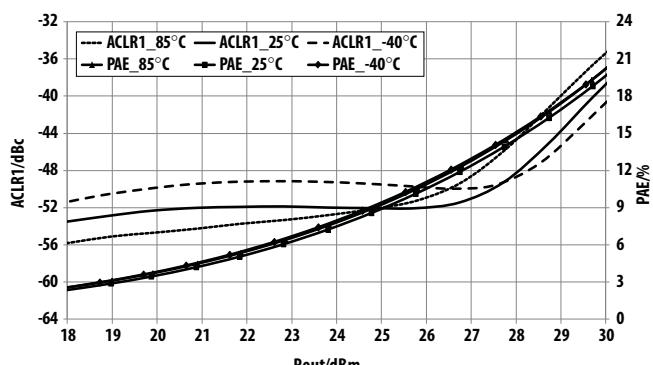
Figure 10. Over-temperature ACLR1, PAE vs Pout @ 1.842GHz
Vdd=VddBias=5.5V operating voltage

# MGA-43003 typical over-temperature performance at Vc1=1.8V, Vc2=1.6V, Vc3=2.0V unless otherwise stated
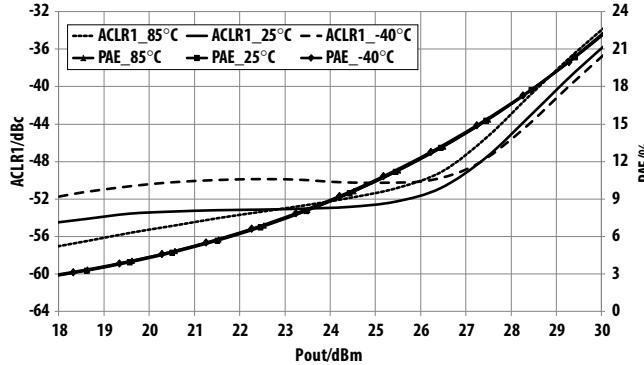
Figure 11. Over-temperature ACLR1, PAE vs Pout @ 1.87GHz Vdd=VddBias=5.0V operating voltage
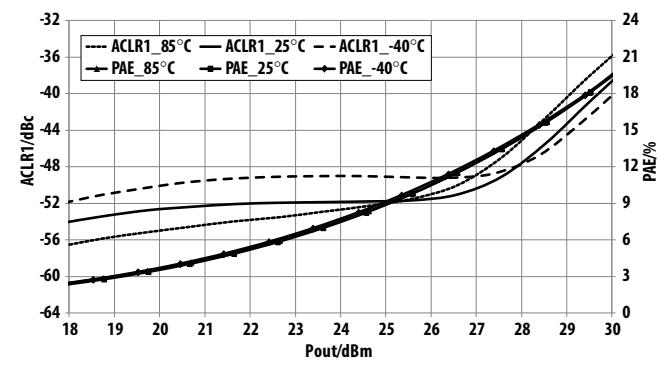
Figure 12. Over-temperature ACLR1, PAE vs Pout @ 1.87GHz Vdd=VddBias=5.5V operating voltage
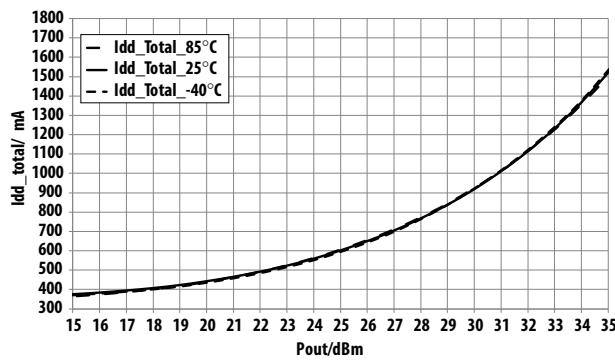
Figure 13. Over-temperature Idd_total vs Pout @ 1.842GHz Vdd=VddBias=5.0V operating voltage
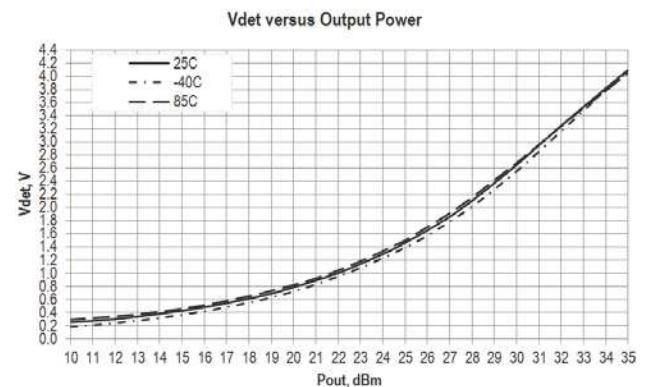
Figure 14. Over-temperature Vdet vs Pout @ 1.842 GHz, Vdd=VddBias=5.0V operating voltage
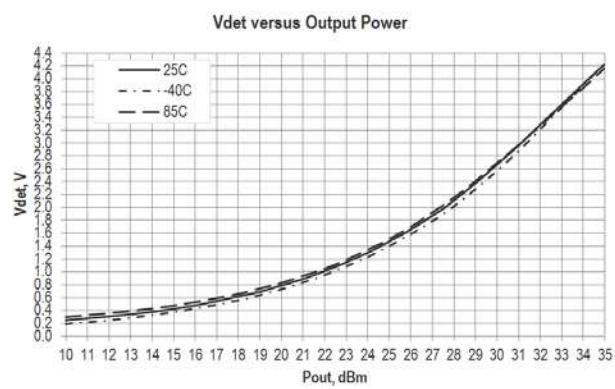
Figure 15. Over-temperature Vdet vs Pout @ 1.842 GHz, Vdd=VddBias=5.5V operating voltage

5

MGA-43003 typical over-temperature performance at Vc1=1.8V, Vc2=1.6V, Vc3=2.0V unless otherwise stated
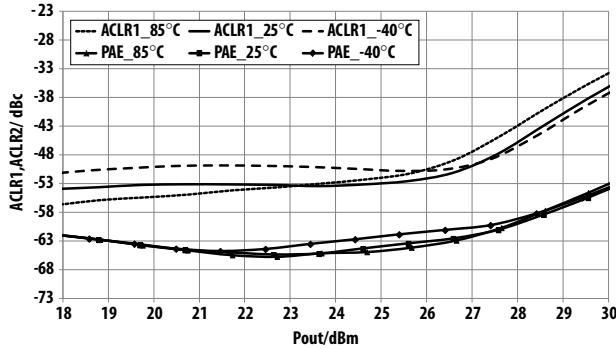
**Figure 16. Over-temperature ACLR1, ACLR2 Pout @ 1.842GHz Vdd=VddBias=5.0V operating voltage**
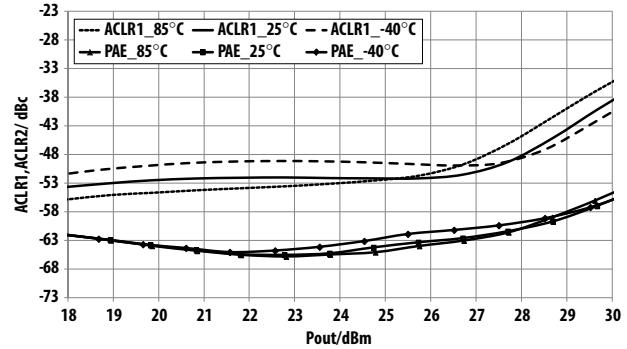
Figure 17. Over-temperature ACLR1, ACLR2 vs Pout @ 1.842GHz Vdd=VddBias=5.5V operating voltage
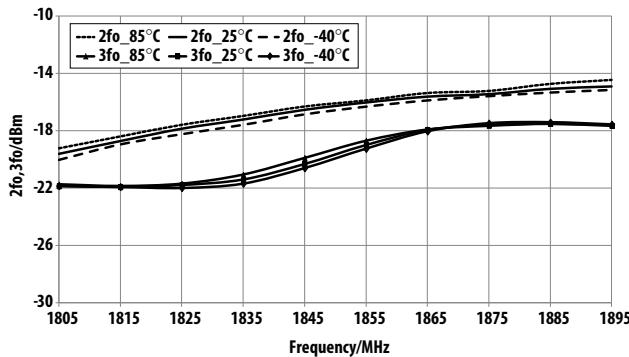
Figure 18. Over-temperature 2nd, 3rd Harmonics vs Freq at Pout=27.2dBm, Vdd=VddBias=5.0V operating voltage
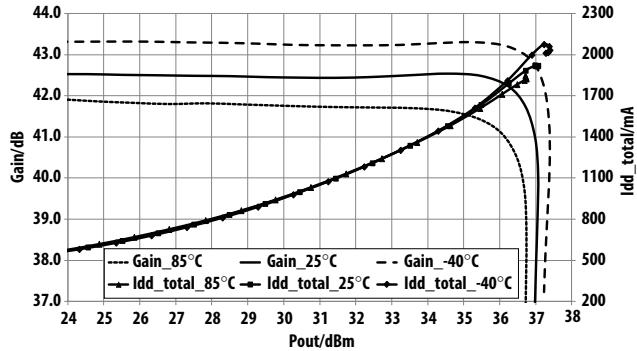
Figure 19. Over-temperature Gain, Idd_total vs Pout @ 1.815GHz Vdd=VddBias=5.0V operating voltage
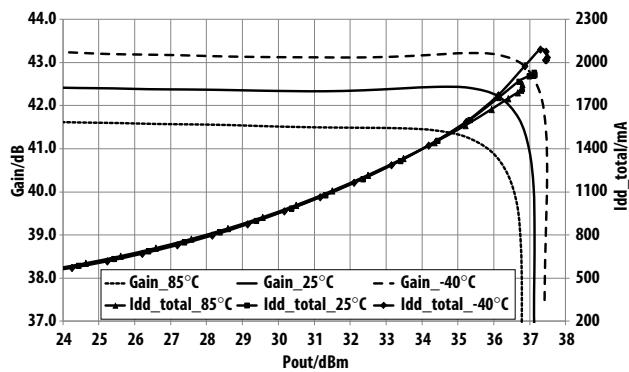
Figure 20. Over-temperature Gain, Idd_total vs Pout @ 1.842GHz Vdd=VddBias=5.0V operating voltage
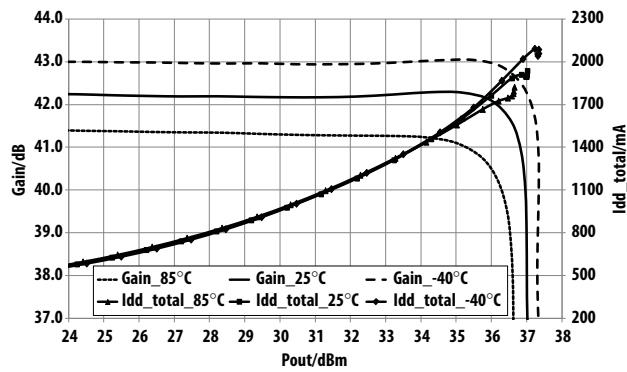
Figure 21. Over-temperature Gain, Idd_total vs Pout @ 1.87GHz Vdd=VddBias=5.0V operating voltage

MGA-43003 typical LTE DL E-TM1.1, 20MHz 100RB downlink signal Spectrum Emission Mask (3GPP TS 36.141v8.2.0 [2009-03] standard) performance at Vdd=VddBias=5.0V, Vc1=1.8V, Vc2=1.6V, Vc3=2.0V unless otherwise stated
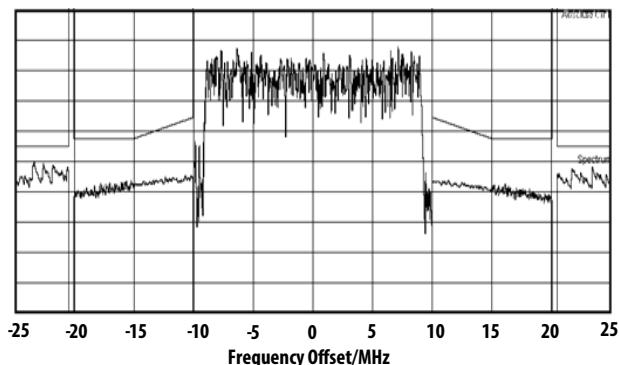
Figure 22. SEM at Pout=29dBm @ 1.815GHz
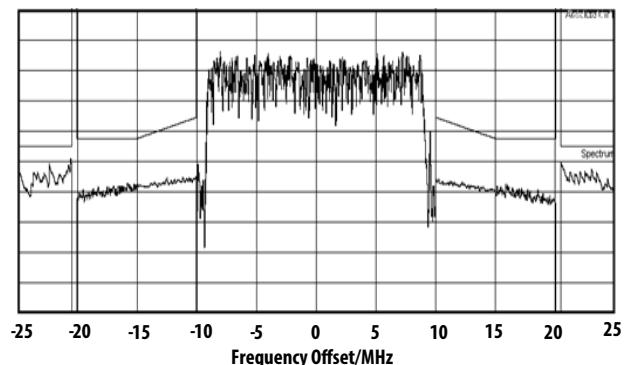
Figure 23. SEM at Pout=29dBm @ 1.842GHz
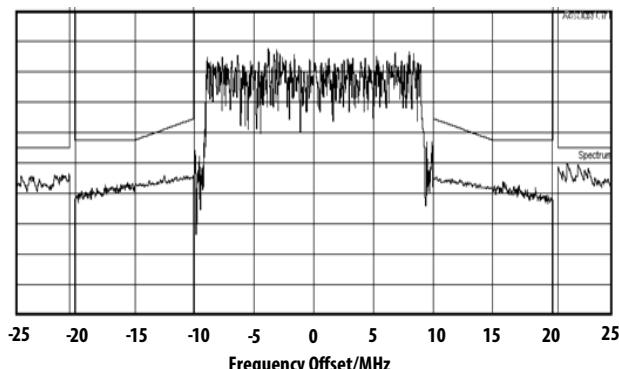
Figure 24. SEM at Pout=29dBm @ 1.87GHz

S-Parameter [5] (Vdd=VddBias=5.0V, Vc1=1.8V, Vc2=1.6V, Vc3=2.0V), T=25 °C, 50ohm matched)

| Freq (GHz)	S11 (dB)	S11 (ang)	S21 (dB)	S21 (ang)	S12 (dB)	S12 (ang)	S22 (dB)	S22 (ang)
0.1	0.02	-12.18	-53.22	-113.21	-61.81	-61.45	-0.33	174.99
0.2	-0.05	-24.76	-62.17	91.05	-59.88	16.11	-0.71	172.67
0.3	-0.13	-37.48	-50.87	49.37	-61.41	-8.51	-1.00	171.15
0.4	-0.15	-50.25	-27.10	26.63	-62.19	16.69	-1.22	170.39
0.5	-0.23	-62.53	-17.17	-106.40	-66.10	-38.14	-1.23	170.94
0.6	-0.21	-75.28	-10.72	-16.93	-67.69	3.06	-0.86	165.36
0.7	-0.70	-90.22	14.88	-112.32	-61.38	-15.52	-1.57	164.23
0.8	-0.78	-98.74	16.50	146.55	-73.02	117.70	-1.99	164.17
0.9	-0.74	-112.15	16.51	90.18	-60.95	-20.09	-1.97	167.39
1.0	-2.01	-125.59	23.25	140.55	-59.10	101.96	-1.96	162.80
1.1	-1.48	-132.03	30.98	33.36	-58.75	95.96	-0.48	165.02
1.2	-1.75	-148.04	32.31	-13.95	-59.09	92.21	-0.34	156.35
1.3	-2.37	-164.49	34.10	-52.54	-59.72	85.52	-0.48	148.90
1.4	-3.35	177.93	36.14	-88.47	-59.83	90.76	-0.81	140.82
1.5	-4.85	158.44	38.39	-125.22	-58.44	79.14	-1.47	130.92
1.6	-7.33	137.04	40.54	-165.96	-61.01	93.92	-2.99	118.37
1.7	-10.96	115.06	42.07	148.46	-56.02	74.28	-6.31	105.66
1.8	-14.92	86.57	42.53	100.93	-53.82	65.28	-13.68	107.12
1.9	-15.94	25.56	42.01	54.32	-53.16	53.46	-16.70	-163.90
2.0	-11.09	-34.91	40.62	10.02	-54.51	29.22	-8.63	-146.33
2.1	-7.88	-74.95	37.99	-30.72	-52.38	8.13	-4.61	-153.16
2.2	-5.26	-98.87	35.59	-63.76	-54.74	-12.61	-2.41	-163.53
2.3	-4.32	-122.98	32.42	-95.66	-58.92	-12.13	-1.34	-173.20
2.4	-4.28	-140.69	28.98	-121.61	-60.91	-18.61	-0.84	179.27
2.5	-4.61	-153.25	25.61	-142.42	-61.09	-12.03	-0.58	173.34
2.6	-4.86	-162.31	22.64	-159.89	-63.46	-4.17	-0.43	168.67
2.7	-5.16	-170.59	19.79	-177.05	-66.55	-63.25	-0.33	164.81
2.8	-5.57	-177.31	16.92	167.26	-66.50	-24.26	-0.27	161.52
2.9	-6.00	177.57	14.06	152.66	-70.35	-61.20	-0.22	158.59
3.0	-6.41	173.63	11.11	138.82	-63.63	-21.39	-0.19	155.95
3.1	-6.74	170.48	7.91	125.69	-67.73	8.56	-0.17	153.58
3.2	-7.05	168.22	4.20	113.39	-68.24	-32.37	-0.15	151.39
3.3	-7.27	166.88	-0.77	103.68	-69.91	31.40	-0.14	149.31
3.4	-7.39	165.96	-9.14	112.95	-63.83	27.19	-0.12	147.35
3.5	-7.29	165.72	-8.62	-166.09	-66.55	37.37	-0.12	145.44
3.6	-6.98	164.79	-1.67	-167.55	-64.47	44.29	-0.13	143.64
3.7	-6.52	162.00	1.30	170.54	-62.24	30.98	-0.16	141.93
3.8	-6.28	157.47	1.95	145.51	-62.33	-0.72	-0.17	140.39
3.9	-6.30	152.98	1.10	122.79	-65.81	43.97	-0.16	138.88
4.0	-6.52	149.50	-0.61	104.10	-63.27	4.34	-0.17	137.36
4.1	-6.72	147.31	-2.94	89.19	-65.10	48.03	-0.17	135.76
4.2	-6.87	145.97	-6.33	81.65	-63.92	20.30	-0.17	134.12

S-Parameter [5] (Vdd=VddBias=5.0V, Vc1=1.8V, Vc2=1.6V, Vc3=2.0V), T=25 °C, 50ohm matched) Cont.

Freq (GHz)	S11 (dB)	S11 (ang)	S21 (dB)	S21 (ang)	S12 (dB)	S12 (ang)	S22 (dB)	S22 (ang)
4.3	-6.79	145.06	-6.45	107.23	-60.57	40.03	-0.20	132.54
4.4	-6.96	142.22	-4.10	68.90	-68.21	51.65	-0.21	131.15
4.5	-7.10	142.38	-7.49	47.19	-67.57	58.95	-0.20	129.43
4.6	-6.95	142.44	-11.52	37.89	-62.71	63.97	-0.20	127.81
4.7	-6.73	140.79	-13.72	46.27	-60.40	36.87	-0.22	126.09
4.8	-6.77	139.70	-14.73	36.88	-65.41	38.72	-0.24	124.36
4.9	-6.63	139.90	-17.65	27.01	-62.36	60.80	-0.25	122.55
5.0	-6.44	139.23	-22.00	23.96	-61.98	37.52	-0.28	120.14
5.1	-6.19	136.72	-27.45	42.11	-60.09	40.81	-0.31	117.42
5.2	-5.45	132.68	-28.97	84.01	-58.87	29.68	-0.33	115.51
5.3	-4.86	124.46	-29.44	134.62	-58.95	22.78	-0.34	113.63
5.4	-4.95	113.92	-16.70	-2.45	-57.28	3.49	-0.38	111.56
5.5	-5.58	105.38	-5.38	139.67	-56.66	-11.62	-0.51	109.48
5.6	-6.53	98.03	-2.17	60.33	-60.03	-38.51	-0.57	109.13
5.7	-7.60	95.21	-5.78	15.29	-64.40	-36.65	-0.44	107.45
5.8	-8.37	93.99	-8.46	-7.79	-64.51	-5.03	-0.42	105.20
5.9	-8.91	93.42	-9.93	-26.68	-67.65	7.36	-0.42	103.15
6.0	-9.28	93.03	-10.11	-50.17	-65.82	-11.19	-0.45	100.97
7.0	-9.44	88.94	-43.86	-20.96	-65.23	1.20	-0.33	81.15
8.0	-6.99	92.65	-38.89	14.17	-59.33	-19.34	-0.25	57.99
9.0	-5.37	94.02	-38.76	-24.58	-59.43	-25.98	-0.31	34.72
10.0	-5.34	82.43	-38.90	-60.68	-57.52	-30.13	-0.73	10.01
11.0	-5.90	51.47	-40.96	-105.14	-59.26	-90.50	-0.80	-12.94
12.0	-4.59	19.47	-44.46	-140.43	-59.54	-82.99	-0.53	-31.07
13.0	-2.66	14.93	-48.34	-158.88	-62.23	-85.69	-0.31	-45.43
14.0	-1.76	22.63	-45.78	170.33	-63.35	-13.45	-0.46	-62.69
15.0	-2.29	9.47	-48.60	95.13	-52.08	-26.50	-0.87	-86.21
16.0	-2.94	-49.06	-47.19	14.21	-48.33	-67.90	-0.77	-103.76
17.0	-1.84	-108.03	-43.74	-50.70	-46.28	-82.71	-0.58	-109.24
18.0	-3.97	-7.55	-40.92	-94.62	-42.77	-119.59	-0.17	-108.26
19.0	-3.37	32.65	-41.60	-3.51	-43.88	-164.24	-0.26	-116.06
20.0	-1.76	13.85	-44.07	-144.61	-45.33	-144.82	-0.50	-130.43

S-Parameter [5] (Vdd=VddBias=5.5V, Vc1=1.8V, Vc2=1.6V, Vc3=2.0V), T=25 °C, 50ohm matched)

Freq	S11	S11	S21	S21	S12	S12	S22	S22
(GHz)	(dB)	(ang)	(dB)	(ang)	(dB)	(ang)	(dB)	(ang)
0.1	0.02	-12.26	-52.99	32.05	-55.38	-165.54	-0.34	175.02
0.2	-0.05	-24.76	-58.04	-113.23	-57.83	-41.45	-0.71	172.83
0.3	-0.14	-37.49	-50.90	76.80	-59.78	-127.57	-0.98	171.30
0.4	-0.15	-50.21	-26.79	25.07	-62.51	105.44	-1.18	170.44
0.5	-0.24	-62.52	-16.75	-107.05	-60.46	91.97	-1.19	170.90
0.6	-0.22	-75.28	-10.17	-18.11	-60.75	-151.29	-0.84	165.51
0.7	-0.72	-90.20	15.20	-113.74	-64.79	-10.97	-1.51	164.20
0.8	-0.79	-98.69	16.88	146.06	-68.09	127.58	-1.91	163.99
0.9	-0.75	-112.12	17.03	90.15	-60.23	-11.50	-1.94	166.97
1.0	-2.04	-125.41	23.87	137.41	-61.24	134.02	-1.92	162.77
1.1	-1.50	-132.01	31.33	31.53	-59.37	95.45	-0.49	164.49
1.2	-1.80	-148.07	32.67	-15.64	-62.22	107.74	-0.36	155.93
1.3	-2.47	-164.56	34.43	-54.27	-61.65	77.08	-0.50	148.55
1.4	-3.50	177.91	36.45	-90.23	-62.11	84.84	-0.85	140.40
1.5	-5.11	158.82	38.66	-127.04	-61.01	100.53	-1.54	130.64
1.6	-7.70	138.20	40.75	-167.80	-56.98	83.96	-3.07	117.99
1.7	-11.47	118.35	42.21	146.88	-55.45	71.63	-6.52	105.84
1.8	-15.52	91.99	42.65	99.90	-54.32	76.98	-13.86	108.14
1.9	-16.59	27.79	42.14	53.80	-53.27	57.81	-16.53	-163.36
2.0	-11.30	-35.55	40.80	9.74	-53.44	20.87	-8.68	-146.65
2.1	-7.80	-75.81	38.24	-31.01	-53.41	3.79	-4.62	-152.91
2.2	-5.22	-99.77	35.83	-64.10	-54.43	-19.54	-2.39	-163.22
2.3	-4.27	-123.91	32.67	-96.12	-59.46	-11.06	-1.32	-173.05
2.4	-4.25	-141.60	29.22	-122.05	-62.04	-32.43	-0.82	179.31
2.5	-4.58	-154.07	25.85	-142.85	-61.00	-21.77	-0.57	173.40
2.6	-4.85	-163.04	22.87	-160.27	-64.78	-57.14	-0.43	168.76
2.7	-5.17	-171.17	20.02	-177.39	-64.36	3.87	-0.33	164.90
2.8	-5.56	-177.79	17.14	166.98	-64.78	-25.02	-0.27	161.57
2.9	-6.00	177.13	14.28	152.48	-66.20	47.47	-0.22	158.68
3.0	-6.40	173.35	11.33	138.70	-75.73	43.47	-0.18	156.09
3.1	-6.73	170.30	8.13	125.65	-66.66	25.20	-0.16	153.72
3.2	-7.02	168.15	4.44	113.38	-65.99	64.41	-0.14	151.54
3.3	-7.23	166.81	-0.52	103.74	-65.73	20.30	-0.13	149.47
3.4	-7.34	165.92	-8.88	113.21	-68.13	48.97	-0.11	147.53
3.5	-7.24	165.88	-8.28	-166.14	-61.78	25.49	-0.11	145.63
3.6	-6.90	164.90	-1.33	-168.00	-67.35	82.38	-0.13	143.84
3.7	-6.43	161.99	1.61	169.76	-61.69	26.24	-0.15	142.15
3.8	-6.20	157.42	2.21	144.60	-61.13	36.14	-0.16	140.60
3.9	-6.25	152.81	1.29	121.96	-68.09	70.71	-0.16	139.12
4.0	-6.45	149.46	-0.45	103.48	-67.82	-37.04	-0.16	137.62
4.1	-6.66	147.31	-2.80	88.77	-66.35	16.58	-0.17	136.03
4.2	-6.81	146.03	-6.20	81.63	-65.67	42.55	-0.17	134.46
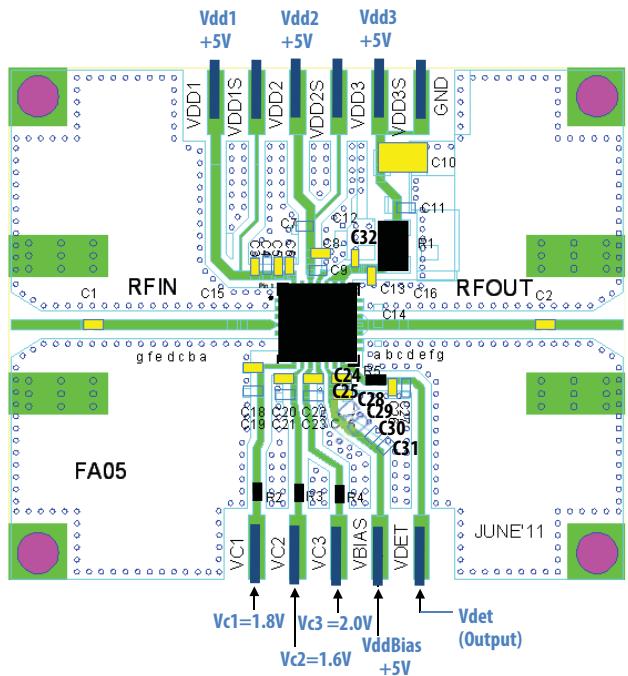
S-Parameter [5] (Vdd=VddBias=5.5V, Vc1=1.8V, Vc2=1.6V, Vc3=2.0V), T=25 °C, 50ohm matched) Cont.

Freq (GHz)	S11 (dB)	S11 (ang)	S21 (dB)	S21 (ang)	S12 (dB)	S12 (ang)	S22 (dB)	S22 (ang)
4.3	-6.73	145.09	-6.23	106.85	-65.05	33.32	-0.20	132.86
4.4	-6.90	142.21	-3.98	68.76	-67.23	36.21	-0.21	131.52
4.5	-7.04	142.33	-7.36	47.30	-66.38	35.96	-0.19	129.86
4.6	-6.90	142.38	-11.36	38.21	-62.34	14.90	-0.20	128.24
4.7	-6.69	140.65	-13.54	46.44	-63.24	37.89	-0.21	126.50
4.8	-6.74	139.57	-14.54	36.92	-62.19	56.23	-0.23	124.74
4.9	-6.61	139.68	-17.48	27.16	-62.79	42.79	-0.24	122.95
5.0	-6.43	138.98	-21.83	24.15	-59.87	29.35	-0.27	120.51
5.1	-6.19	136.43	-27.31	42.39	-62.62	50.95	-0.30	117.75
5.2	-5.48	132.32	-28.76	84.21	-58.57	29.40	-0.32	115.82
5.3	-4.93	124.24	-29.21	135.36	-59.18	26.78	-0.34	113.92
5.4	-5.02	113.88	-16.47	-2.90	-58.22	12.27	-0.37	111.82
5.5	-5.65	105.57	-5.22	139.20	-57.13	-0.63	-0.51	109.71
5.6	-6.57	98.37	-2.09	60.18	-61.53	-44.07	-0.56	109.37
5.7	-7.62	95.50	-5.70	15.51	-65.35	1.13	-0.43	107.64
5.8	-8.35	94.38	-8.36	-7.49	-62.34	-29.35	-0.41	105.44
5.9	-8.88	93.72	-9.82	-26.15	-69.08	-30.82	-0.41	103.41
6.0	-9.22	93.31	-9.99	-49.72	-64.77	-19.58	-0.44	101.23
7.0	-9.40	88.81	-44.00	-19.50	-61.85	3.64	-0.31	81.41
8.0	-7.02	92.52	-38.56	16.91	-60.62	7.26	-0.25	58.37
9.0	-5.40	94.06	-38.50	-23.70	-59.21	-29.55	-0.33	35.08
10.0	-5.40	82.91	-38.71	-58.44	-57.47	-40.69	-0.73	10.52
11.0	-5.98	52.21	-40.79	-103.76	-59.42	-78.22	-0.80	-12.50
12.0	-4.67	20.54	-44.75	-140.47	-60.73	-94.41	-0.52	-30.11
13.0	-2.68	16.08	-47.88	-152.48	-61.73	-85.07	-0.31	-44.91
14.0	-1.80	23.47	-45.63	172.49	-61.57	-34.42	-0.42	-62.03
15.0	-2.31	10.32	-47.97	100.28	-51.49	-25.39	-0.87	-85.45
16.0	-2.97	-47.89	-47.56	12.07	-47.76	-67.84	-0.75	-103.23
17.0	-1.89	-107.22	-43.40	-46.37	-46.31	-83.79	-0.55	-108.08
18.0	-3.98	-7.49	-41.22	-93.11	-43.24	-120.74	-0.17	-107.59
19.0	-3.48	35.04	-41.01	-7.28	-43.70	-166.91	-0.24	-115.31
20.0	-1.89	14.22	-43.65	-143.65	-44.08	-144.54	-0.49	-129.83

Notes:
5.   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, C6, C18, C20, C22, C24	8.2pF ± 0.5pF	GJM1555C1H8R2WB01D
C3, C8, C13, C25	0.1uF ± 10%	GRM155R71C104KA88D
C5, C32	82pF ± 5%	GRM1555C1H820JA01D
C10	2.2uF ± 10%	GRM21BR71E225KA73L
C26	22nF ± 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
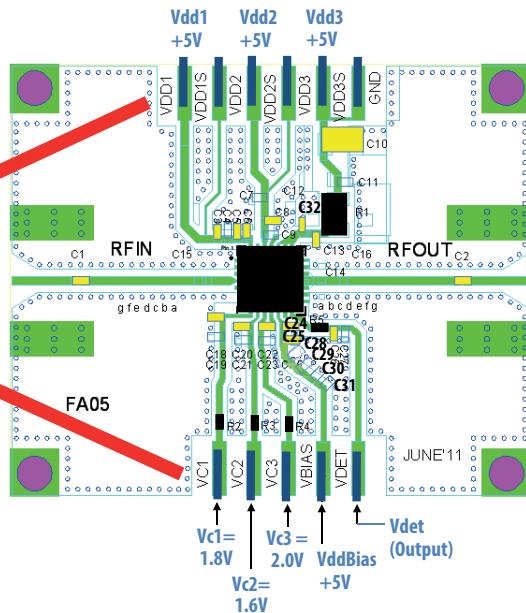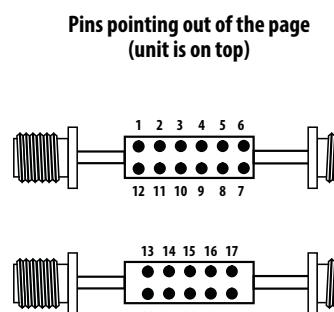
Figure 25. Demonstration board application circuit for MGA-43003 module

Application Schematic
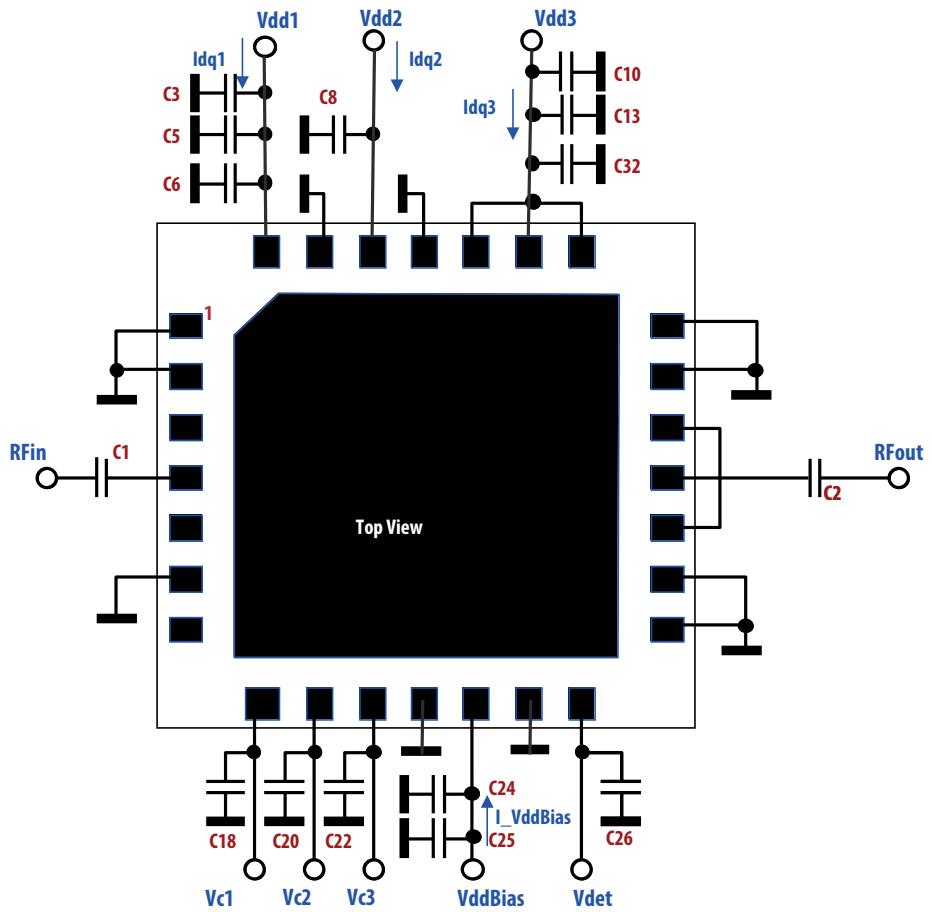
Figure 26. Application schematic in demonstration board

Notes
1. All capacitors on supply lines are bypass capacitors
2. C1 / C2 are RF coupling capacitors.
3. Idq1= 55.0mA, Idq2 = 105.0mA, 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 in Figure 23 above. Adjustment of these currents enable optimum bias conditions to be achieved for best linearity and efficiency for a given modulation type.

13

## MGA-43003 typical Ic2, Ic3 Vs Vc performance unless otherwise stated
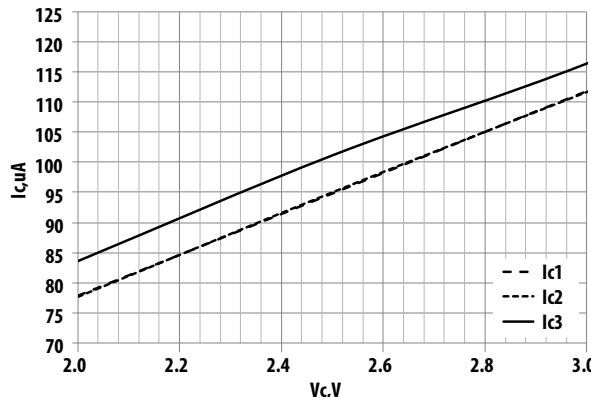
Figure 27. Ic Versus Vc at Vdd=VddBias=5.0V
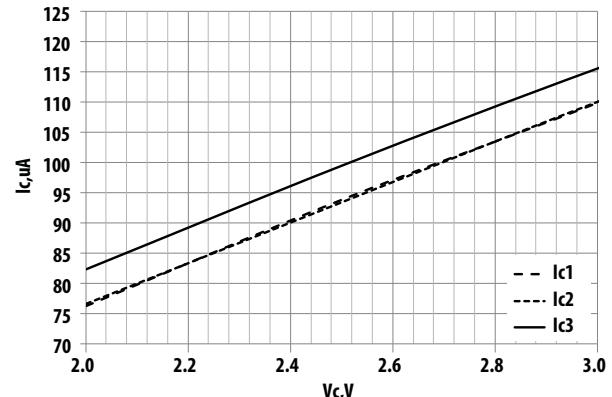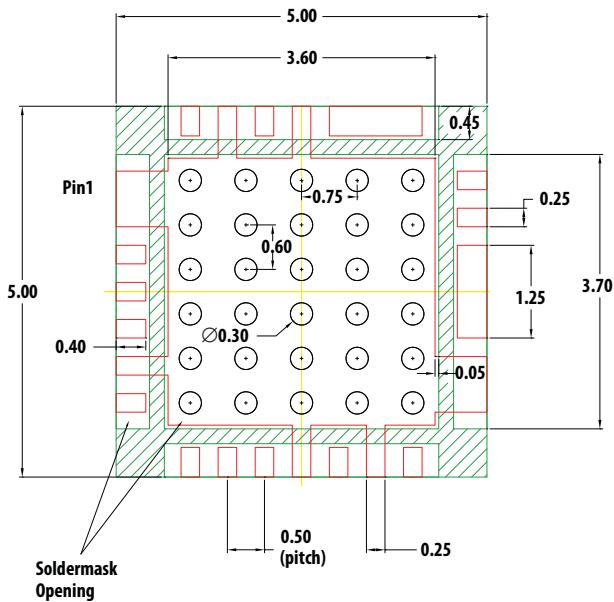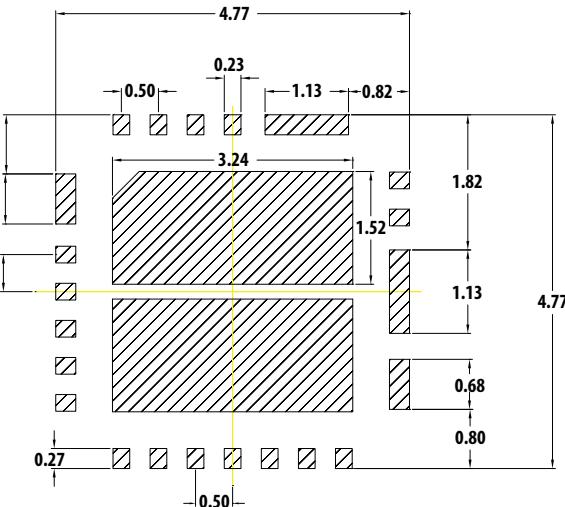
**Figure 28. Ic Versus Vc at Vdd=VddBias=5.5V**
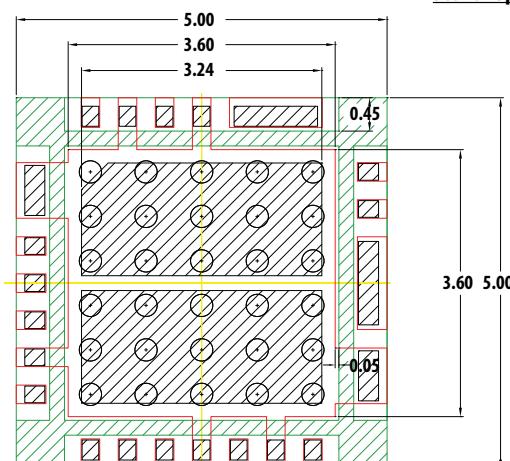
PCB Land Pattern and Stencil Outline

Land Pattern

Pin1

5.00
3.60
0.45
0.75
0.60
0.25
0.40
0.30
1.25
3.70
0.05
0.50 (pitch)
0.25

Soldermask Opening

Stencil Opening

4.77
0.50
0.23
1.13
0.82
0.80
0.68
3.24
1.82
1.52
0.50
1.13
4.77
0.27
0.68
0.80
0.50

Soldermask

Top Metal

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

5.00
3.60
3.24
0.45
3.60 5.00
0.05

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
43003
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
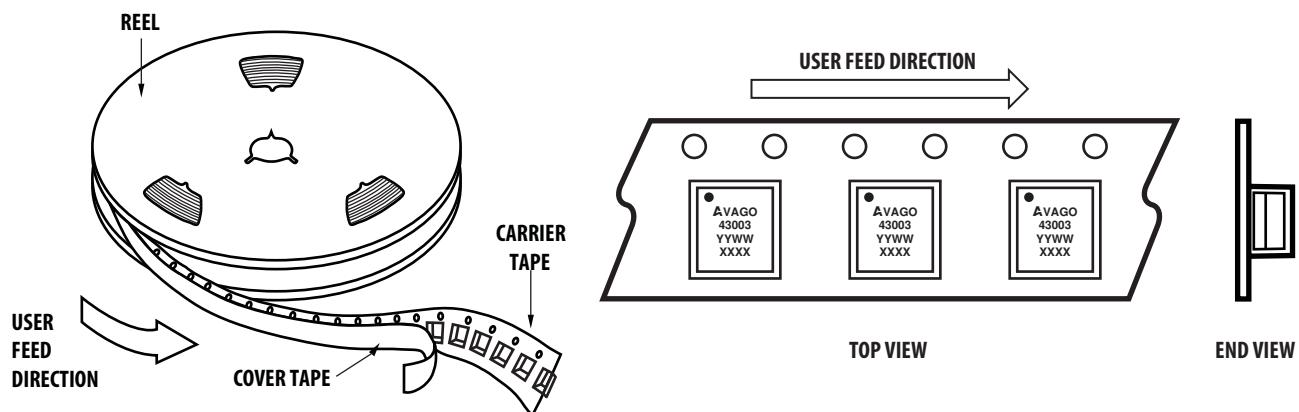
Note
1. All dimensions are in millimeters.
2. Dimensions are inclusive of plating.
3. Dimensions are exclusive of mold flash and metal burr.
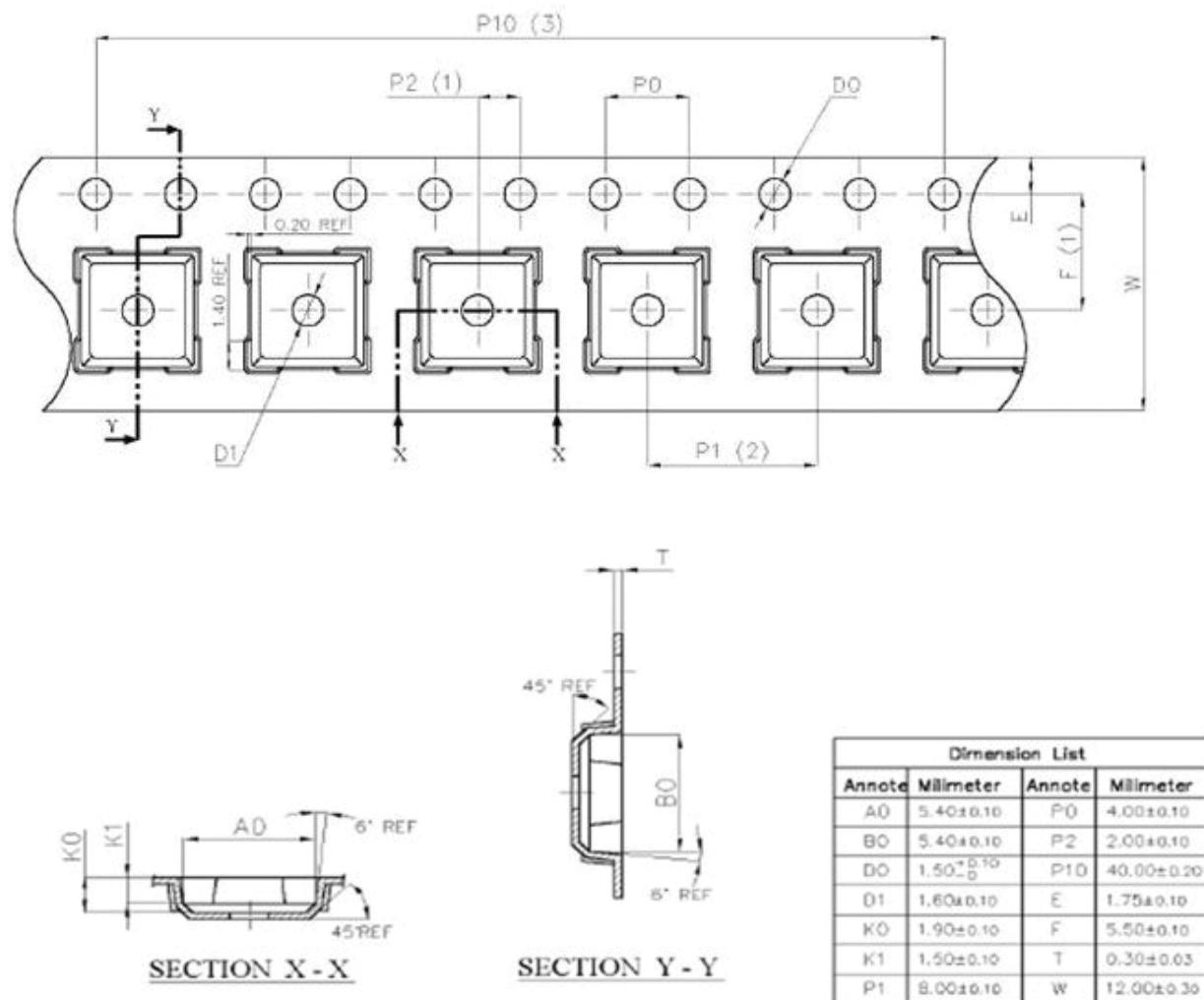
## Part Number Ordering Information

Part Number	Qty	Container
MGA-43003-BLKG	100	Antistatic Bag
MGA-43003-TR1G	1000	7" Reel

Device Orientation

REEL

USER FEED DIRECTION

CARRIER TAPE

USER FEED DIRECTION

COVER TAPE

TOP VIEW

END VIEW

AVAGO
43003
YYWW
XXXX

Tape Dimensions

P10 (3)

P2 (1)

P0

D0

0.20 REF

1.40 REF

D1

P1 (2)

E

F (1)

W

Y

X X

T

45° REF

B0

6° REF

K0

K1

A0

6° REF

45 REF

SECTION X - X

SECTION Y - Y

Dimension List			
Annote	Milimeter	Annote	Milimeter
A0	5.40±0.10	P0	4.00±0.10
B0	5.40±0.10	P2	2.00±0.10
D0	$1.50^{+0.10}_{-0}$	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.

Avago
TECHNOLOGIES