

		REVISIONS																																	
		LTR	DESCRIPTION								DATE				APPROVED																				
																																			
Prepared in accordance with ASME Y14.24																			Vendor item drawing																
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PMIC N/A				PREPARED BY RICK OFFICER								DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990 http://www.landandmaritime.dla.mil/																							
Original date of drawing YY-MM-DD 16-07-25				CHECKED BY RAJESH PITHADIA								TITLE MICROCIRCUIT, LINEAR, 105 MHz LOW POWER, LOW NOISE, RAIL TO RAIL AMPLIFIER, MONOLITHIC SILICON																							
				APPROVED BY CHARLES F. SAFFLE																															
				SIZE A		CODE IDENT. NO. 16236						DWG NO. V62/16621																							
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1. SCOPE

1.1 Scope. This drawing documents the general requirements of a high performance 105 MHz low power, low noise, rail to rail amplifier microcircuit, with an operating temperature range of -55°C to +125°C.

1.2 Vendor Item Drawing Administrative Control Number. The manufacturer's PIN is the item of identification. The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation:

<u>V62/16621</u> Drawing number	-	<u>01</u> Device type (See 1.2.1)	<u>X</u> Case outline (See 1.2.2)	<u>E</u> Lead finish (See 1.2.3)
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1.2.1 Device type(s).

<u>Device type</u>	<u>Generic</u>	<u>Circuit function</u>
01	ADA4805-2	105 MHz low power, low noise rail to rail amplifier

1.2.2 Case outline(s). The case outline(s) are as specified herein.

<u>Outline letter</u>	<u>Number of pins</u>	<u>JEDEC PUB 95</u>	<u>Package style</u>
X	8	MO-187-AA	Small outline package

1.2.3 Lead finishes. The lead finishes are as specified below or other lead finishes as provided by the device manufacturer:

<u>Finish designator</u>	<u>Material</u>
A	Hot solder dip
B	Tin-lead plate
C	Gold plate
D	Palladium
E	Gold flash palladium
Z	Other

1.3 Absolute maximum ratings. 1/

Supply voltage (V _S)	11 V
Power dissipation (P _D)	See figure 3
Common mode input voltage	-V _S - 0.7 V to +V _S + 0.7 V
Differential input voltage	±1 V
Storage temperature range (T _{STG})	-65°C to +125°C
Lead temperature (soldering, 10 seconds)	300°C
Junction temperature (T _J)	150°C
Thermal resistance, junction to ambient (θ _{JA})	123.8°C/W
Thermal resistance, junction to board (θ _{JB})	136.8°C/W
Thermal resistance, junction to case (θ _{JC})	68.52°C/W

1/ Stresses beyond those listed under "absolute maximum rating" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

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1.4 Recommended operating conditions. 2/

Supply voltage range (Vs) -5 V to +5 V
Operating free-air temperature range (TA) -55°C to +125°C

2. APPLICABLE DOCUMENTS

JEDEC Solid State Technology Association

JEDEC PUB 95 – Registered and Standard Outlines for Semiconductor Devices

(Copies of these documents are available online at <http://www.jedec.org> or from JEDEC – Solid State Technology Association, 3103 North 10th Street, Suite 240–S, Arlington, VA 22201-2107).

3. REQUIREMENTS

3.1 Marking. Parts shall be permanently and legibly marked with the manufacturer's part number as shown in 6.3 herein and as follows:

- A. Manufacturer's name, CAGE code, or logo
- B. Pin 1 identifier
- C. ESDS identification (optional)

3.2 Unit container. The unit container shall be marked with the manufacturer's part number and with items A and C (if applicable) above.

3.3 Electrical characteristics. The maximum and recommended operating conditions and electrical performance characteristics are as specified in 1.3, 1.4, and table I herein.

3.4 Design, construction, and physical dimension. The design, construction, and physical dimensions are as specified herein.

3.5 Diagrams.

3.5.1 Case outline. The case outline shall be as shown in 1.2.2 and figure 1.

3.5.2 Terminal connections. The terminal connections shall be as shown in figure 2.

3.5.3 Maximum power dissipation versus temperature for a four layer board. The maximum power dissipation versus temperature for a four layer board graph shall be as shown in figure 3.

2/ Use of this product beyond the manufacturers design rules or stated parameters is done at the user's risk. The manufacturer and/or distributor maintain no responsibility or liability for product used beyond the stated limits.

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TABLE I. Electrical performance characteristics. 1/

Test	Symbol	Conditions <u>2/</u> VS = ±5 V, unless otherwise specified	Temperature, TA	Device type	Limits		Unit
					Min	Max	
Dynamic performance							
-3 dB bandwidth		G = +1, VOUT = 0.02 VPP	+25°C	01	120 typical	MHz	
		G = +1, VOUT = 2 VPP			40 typical		
Bandwidth for 0.1 dB flatness		G = +1, VOUT = 0.02 VPP	+25°C	01	18 typical	MHz	
Slew rate	SR	G = +1, VOUT = 2 V step	+25°C	01	190 typical	V/μs	
		G = +2, VOUT = 4 V step			250 typical		
Settling time to 0.1%	ts	G = +1, VOUT = 2 V step	+25°C	01	35 typical	ns	
		G = +2, VOUT = 4 V step			78 typical		
Noise/distortion performance							
Second harmonic distortion	HD2	fC = 20 kHz, VOUT = 2 VPP	+25°C	01	-114 typical	dBc	
		fC = 100 kHz, VOUT = 2 VPP			-102 typical		
		fC = 20 kHz, VOUT = 4 VPP, G = +1			-109 typical		
		fC = 100 kHz, VOUT = 4 VPP, G = +1			-93 typical		
		fC = 20 kHz, VOUT = 4 VPP, G = +2			-113 typical		
		fC = 100 kHz, VOUT = 4 VPP, G = +2			-96 typical		
Third harmonic distortion <u>3/</u>	HD3	fC = 20 kHz, VOUT = 2 VPP	+25°C	01	-140 typical	dBc	
		fC = 100 kHz, VOUT = 2 VPP			-128 typical		
		fC = 20 kHz, VOUT = 4 VPP, G = +1			-143 typical		
		fC = 100 kHz, VOUT = 4 VPP, G = +1			-130 typical		
		fC = 20 kHz, VOUT = 4 VPP, G = +2			-142 typical		
		fC = 100 kHz, VOUT = 4 VPP, G = +2			-130 typical		

See footnotes at end of table.

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TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions <u>2/</u> VS = ±5 V, unless otherwise specified	Temperature, TA	Device type	Limits		Unit
					Min	Max	
Noise/distortion performance – continued.							
Input voltage noise		f = 100 kHz	+25°C	01	5.2 typical		nV/ √Hz
Input voltage noise		1/f corner frequency	+25°C	01	8 typical		Hz
0.1 Hz to 10 Hz voltage noise			+25°C	01	44 typical		nVrms
Input current noise		f = 100 kHz	+25°C	01	0.7 typical		pA/ √Hz
DC performance							
Input offset voltage			+25°C	01		125	μV
					13 typical		
Input offset voltage <u>4/</u> drift			-55°C to +125°C	01		2.7	μV/°C
					0.4 typical		
Input bias current			+25°C	01		800	nA
					550 typical		
Input offset current			+25°C	01		25	nA
					2.1 typical		
Open loop gain		VOUT = -4.0 V to +4.0 V	+25°C	01	107		dB
					111 typical		
Input characteristics							
Input resistance, common mode			+25°C	01	50 typical		MΩ
Input resistance, differential mode			+25°C	01	260 typical		kΩ

See footnotes at end of table.

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TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions <u>2/</u> VS = ±5 V, unless otherwise specified	Temperature, TA	Device type	Limits		Unit
					Min	Max	
Input characteristics – continued.							
Input capacitance			+25°C	01	1 typical		pF
Input common mode voltage range			+25°C	01	-5.1	+4	V
Common mode rejection ratio		VIN, CM = -4.0 V to +4.0 V	+25°C	01	103		dB
					130 typical		
Output characteristics							
Rising edge output overdrive recovery time		VIN = +6 V to -6 V, G = +2	+25°C	01	95 typical		ns
Falling edge output overdrive recovery time		VIN = +6 V to -6 V, G = +2	+25°C	01	100 typical		ns
Output voltage swing		RL = 2 kΩ	+25°C	01	-4.98	+4.98	V
Short circuit current, sinking			+25°C	01	85 typical		mA
Short circuit current, sourcing			+25°C	01	73 typical		mA
Linear output current		< 1% total harmonic distortion (THD) at 100 kHz, VOUT = 2 VPP	+25°C	01	±58 typical		mA
Capacitive load drive		30% overshoot	+25°C	01	15 typical		pF
Power supply							
Operating range			+25°C	01	2.7	10	V
Quiescent current per amplifier			+25°C	01		625	μA
					570 typical		
Positive power supply rejection ratio		+VS = 3 V to 5 V, -VS = -5 V	+25°C	01	100		dB
					119 typical		
Negative power supply rejection ratio		+VS = +5 V, -VS = -3 V to -5 V	+25°C	01	100		dB
					122 typical		

See footnotes at end of table.

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TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions <u>5/</u> VS = 5 V, unless otherwise specified	Temperature, TA	Device type	Limits		Unit
					Min	Max	
Dynamic performance							
-3 dB bandwidth		G = +1, VOUT = 0.02 VPP	+25°C	01	105 typical	MHz	
		G = +1, VOUT = 2 VPP			35 typical		
Bandwidth for 0.1 dB flatness		G = +1, VOUT = 0.02 VPP	+25°C	01	20 typical	MHz	
Slew rate	SR	G = +1, VOUT = 2 V step	+25°C	01	160 typical	V/μs	
		G = +2, VOUT = 4 V step			220 typical		
Settling time to 0.1%	ts	G = +1, VOUT = 2 V step	+25°C	01	35 typical	ns	
		G = +2, VOUT = 4 V step			82 typical		
Noise/distortion performance							
Second harmonic distortion	HD2	fC = 20 kHz, VOUT = 2 VPP	+25°C	01	-114 typical	dBc	
		fC = 100 kHz, VOUT = 2 VPP			-102 typical		
		fC = 20 kHz, VOUT = 4 VPP, G = +2			-107 typical		
		fC = 100 kHz, VOUT = 4 VPP, G = +2			-90 typical		
Third harmonic distortion <u>3/</u>	HD3	fC = 20 kHz, VOUT = 2 VPP	+25°C	01	-135 typical	dBc	
		fC = 100 kHz, VOUT = 2 VPP			-126 typical		
		fC = 20 kHz, VOUT = 4 VPP, G = +2			-143 typical		
		fC = 100 kHz, VOUT = 4 VPP, G = +2			-130 typical		

See footnotes at end of table.

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TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions <u>5/</u> VS = 5 V, unless otherwise specified	Temperature, TA	Device type	Limits		Unit
					Min	Max	
Noise/distortion performance – continued.							
Input voltage noise		f = 100 kHz	+25°C	01	5.9 typical		nV/ √Hz
Input voltage noise		1/f corner frequency	+25°C	01	8 typical		Hz
0.1 Hz to 10 Hz voltage noise			+25°C	01	54 typical		nVrms
Input current noise		f = 100 kHz	+25°C	01	0.6 typical		pA/ √Hz
DC performance							
Input offset voltage			+25°C	01		125	μV
					9 typical		
Input offset voltage <u>4/</u> drift			-55°C to +125°C	01		2.7	μV/°C
					0.4 typical		
Input bias current			+25°C	01		720	nA
					470 typical		
Input offset current			+25°C	01	0.4 typical		nA
Open loop gain		VOUT = 1.25 V to 3.75 V	+25°C	01	105		dB
					109 typical		
Input characteristics							
Input resistance, common mode			+25°C	01	50 typical		MΩ
Input resistance, differential mode			+25°C	01	260 typical		kΩ

See footnotes at end of table.

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TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions <u>5/</u> VS = 5 V, unless otherwise specified	Temperature, TA	Device type	Limits		Unit
					Min	Max	
Input characteristics – continued.							
Input capacitance			+25°C	01	1 typical		pF
Input common mode voltage range			+25°C	01	-0.1	+4	V
Common mode rejection ratio		VIN, CM = 1.25 V to 3.75 V	+25°C	01	103		dB
					133 typical		
Output characteristics							
Rising edge output overdrive recovery time		VIN = -1 V to +6 V, G = +2	+25°C	01	130 typical		ns
Falling edge output overdrive recovery time		VIN = -1 V to +6 V, G = +2	+25°C	01	145 typical		ns
Output voltage swing		RL = 2 kΩ	+25°C	01	0.02	4.98	V
Short circuit current, sinking			+25°C	01	73 typical		mA
Short circuit current, sourcing			+25°C	01	63 typical		mA
Linear output current		< 1% total harmonic distortion (THD) at 100 kHz, VOUT = 2 VPP	+25°C	01	±47 typical		mA
Capacitive load drive		30% overshoot	+25°C	01	15 typical		pF
Power supply							
Operating range			+25°C	01	2.7	10	V
Quiescent current per amplifier			+25°C	01		520	μA
					500 typical		
Positive power supply rejection ratio		+VS = 1.5 V to 3.5 V, -VS = -2.5 V	+25°C	01	100		dB
					120 typical		
Negative power supply rejection ratio		+VS = +2.5 V, -VS = -1.5 V to -3.5 V	+25°C	01	100		dB
					126 typical		

See footnotes at end of table.

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TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions <u>5/</u> VS = 3 V, unless otherwise specified	Temperature, TA	Device type	Limits		Unit
					Min	Max	
Dynamic performance							
-3 dB bandwidth		G = +1, VOUT = 0.02 VPP	+25°C	01	95 typical	MHz	
		G = +1, VOUT = 1 VPP, +VS = 2 V, -VS = -1 V			30 typical		
Bandwidth for 0.1 dB flatness		G = +1, VOUT = 0.02 VPP	+25°C	01	35 typical	MHz	
Slew rate	SR	G = +1, VOUT = 1 V step, +VS = 2 V, -VS = -1 V	+25°C	01	85 typical	V/μs	
Settling time to 0.1%	ts	G = +1, VOUT = 1 V step	+25°C	01	41 typical	ns	
Noise/distortion performance							
Second harmonic distortion	HD2	fC = 20 kHz, VOUT = 1 VPP, +VS = 2 V, -VS = -1 V	+25°C	01	-123 typical	dBc	
		fC = 100 kHz, VOUT = 1 VPP, +VS = 2 V, -VS = -1 V			-107 typical		
Third harmonic distortion <u>3/</u>	HD3	fC = 20 kHz, VOUT = 1 VPP, +VS = 2 V, -VS = -1 V	+25°C	01	-143 typical	dBc	
		fC = 100 kHz, VOUT = 1 VPP, +VS = 2 V, -VS = -1 V			-133 typical		
Input voltage noise		f = 100 kHz	+25°C	01	6.3 typical	nV/ √Hz	
Input voltage noise		1/f corner frequency	+25°C	01	8 typical	Hz	
0.1 Hz to 10 Hz voltage noise			+25°C	01	55 typical	nVrms	
Input current noise		f = 100 kHz	+25°C	01	0.8 typical	pA/ √Hz	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions <u>5/</u> VS = 3 V, unless otherwise specified	Temperature, TA	Device type	Limits		Unit
					Min	Max	
DC performance							
Input offset voltage			+25°C	01		125	μV
					7 typical		
Input offset voltage <u>4/</u> drift			-55°C to +125°C	01	2.7		μV/°C
					0.4 typical		
Input bias current			+25°C	01		690	nA
					440 typical		
Input offset current			+25°C	01	0.5 typical		nA
Open loop gain		VOUT = 1.1 V to 1.9 V	+25°C	01	100		dB
					107 typical		
Input characteristics							
Input resistance, common mode			+25°C	01	50 typical		MΩ
Input resistance, differential mode			+25°C	01	260 typical		kΩ
Input capacitance			+25°C	01	1 typical		pF
Input common mode voltage range			+25°C	01	-0.1	+2	V
Common mode rejection ratio		VIN, CM = 0.5 V to 2 V	+25°C	01	89		dB
					117 typical		

See footnotes at end of table.

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TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions <u>5/</u> VS = 3 V, unless otherwise specified	Temperature, TA	Device type	Limits		Unit
					Min	Max	
Output characteristics							
Rising edge output overdrive recovery time		VIN = -1 V to +4 V, G = +2	+25°C	01	135 typical		ns
Falling edge output overdrive recovery time		VIN = -1 V to +4 V, G = +2	+25°C	01	175 typical		ns
Output voltage swing		RL = 2 kΩ	+25°C	01	0.02	2.98	V
Short circuit current, sinking			+25°C	01	65 typical		mA
Short circuit current, sourcing			+25°C	01	47 typical		mA
Linear output current		< 1% total harmonic distortion (THD) at 100 kHz, VOUT = 1 VPP	+25°C	01	±40 typical		mA
Capacitive load drive		30% overshoot	+25°C	01	15 typical		pF
Power supply							
Operating range			+25°C	01	2.7	10	V
Quiescent current per amplifier			+25°C	01		495	μA
					470 typical		
Positive power supply rejection ratio		+VS = 1.5 V to 3.5 V, -VS = -1.5 V	+25°C	01	96		dB
					119 typical		
Negative power supply rejection ratio		+VS = +1.5 V, -VS = -1.5 V to -3.5 V	+25°C	01	96		dB
					125 typical		

1/ Testing and other quality control techniques are used to the extent deemed necessary to assure product performance over the specified temperature range. Product may not necessarily be tested across the full temperature range and all parameters may not necessarily be tested. In the absence of specific parametric testing, product performance is assured by characterization and/or design.

2/ Unless otherwise specified, RF = 0 Ω for G = +1; otherwise RF = 1 kΩ, RL = 2 kΩ to ground. All specification are per amplifier.

3/ fc is the fundamental frequency.

4/ Guaranteed, but not tested.

5/ Unless otherwise specified, RF = 0 Ω for G = +1; otherwise RF = 1 kΩ, RL = 2 kΩ to midsupply. All specification are per amplifier.

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Case X

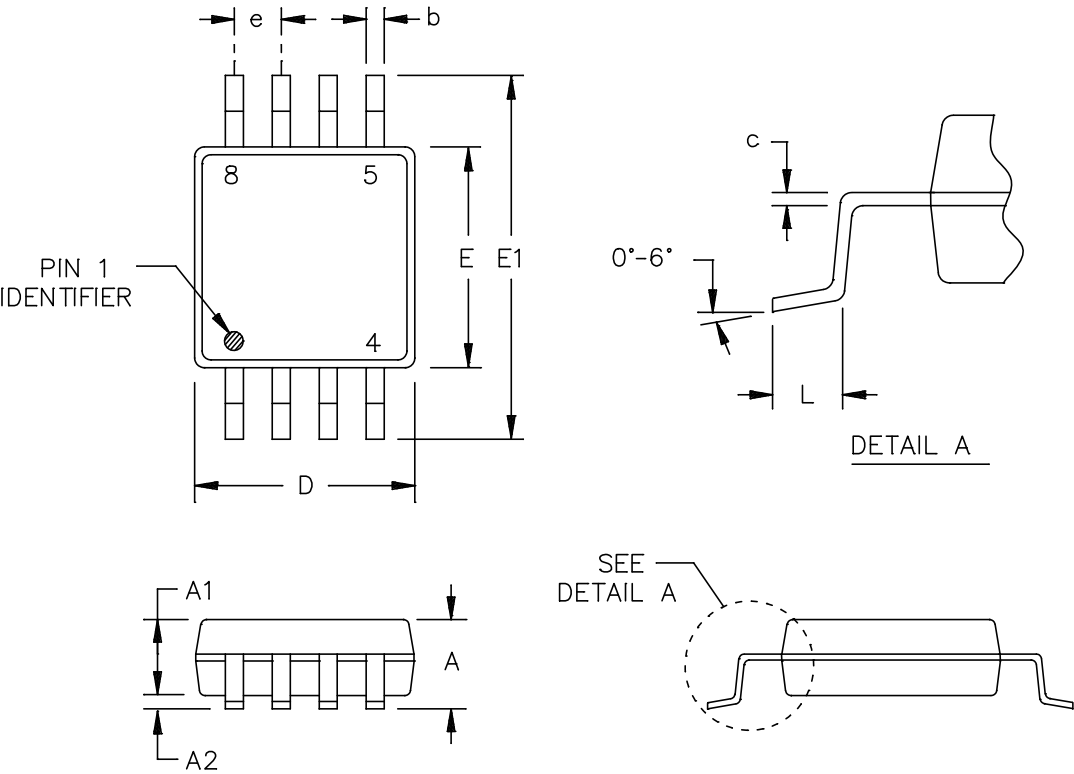


FIGURE 1. Case outline.

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Case X – continued.

Symbol	Dimensions					
	Inches			Millimeters		
	Minimum	Medium	Maximum	Minimum	Medium	Maximum
A	---	---	.043	---	---	1.10
A1	.029	.033	.037	0.75	0.85	0.95
A2	.001	.003 coplanarity	.005	0.05	0.10 coplanarity	0.15
b	.010	---	.015	0.25	---	0.40
c	.003	---	.009	0.09	---	0.23
D	.110	.118	.125	2.80	3.00	3.20
E	.110	.118	.125	2.80	3.00	3.20
E1	.183	.192	.202	4.65	4.90	5.15
e	0.026 BSC			0.65 BSC		
L	.015	.021	.031	0.40	0.55	0.80

NOTES:

1. Controlling dimensions are millimeter, inch dimensions are given for reference only.
2. Falls with JEDEC MO-187-AA.

FIGURE 1. Case outline - Continued.

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Device type	01	
Case outline	X	
Terminal number	Terminal symbol	Description
1	VOUT1	Output 1.
2	-IN1	Inverting input 1.
3	+IN1	Noninverting input 1.
4	-VS	Negative supply.
5	+IN2	Noninverting input 2.
6	-IN2	Inverting input 2.
7	VOUT2	Output 2.
8	+VS	Positive supply.

FIGURE 2. Terminal connections.

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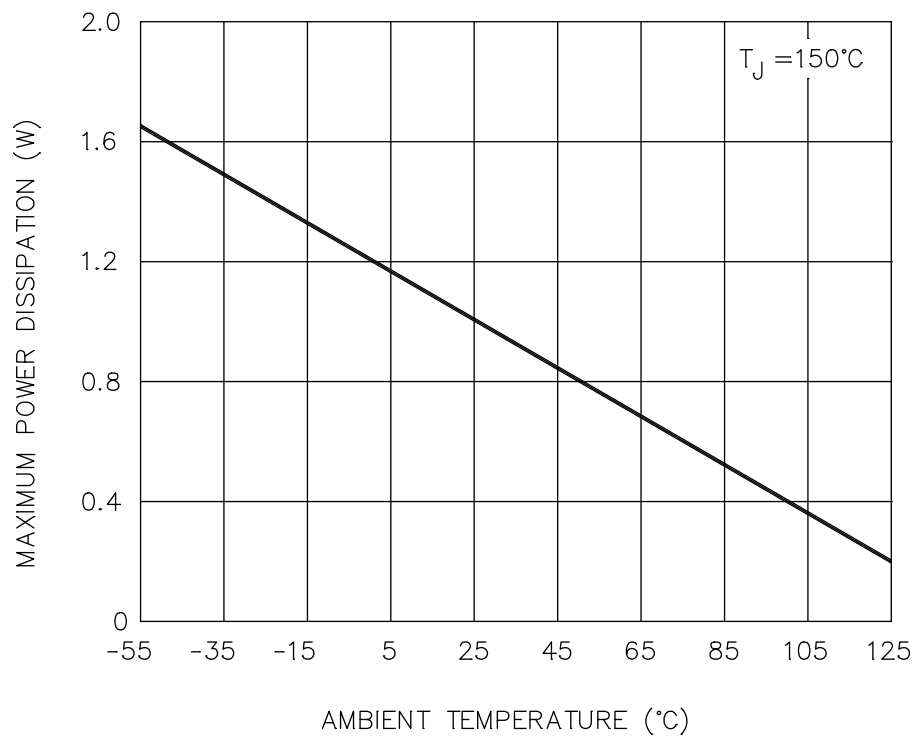


FIGURE 3. Maximum power dissipation versus temperature for a four layer board.

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4. VERIFICATION

4.1 Product assurance requirements. The manufacturer is responsible for performing all inspection and test requirements as indicated in their internal documentation. Such procedures should include proper handling of electrostatic sensitive devices, classification, packaging, and labeling of moisture sensitive devices, as applicable.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Preservation, packaging, labeling, and marking shall be in accordance with the manufacturer's standard commercial practices for electrostatic discharge sensitive devices.

6. NOTES

6.1 ESDS. Devices are electrostatic discharge sensitive and are classified as ESDS class 1 minimum.

6.2 Configuration control. The data contained herein is based on the salient characteristics of the device manufacturer's data book. The device manufacturer reserves the right to make changes without notice. This drawing will be modified as changes are provided.

6.3 Suggested source(s) of supply. Identification of the suggested source(s) of supply herein is not to be construed as a guarantee of present or continued availability as a source of supply for the item. DLA Land and Maritime maintains an online database of all current sources of supply at <http://www.landandmaritime.dla.mil/Programs/Smcr/>.

Vendor item drawing administrative control number <u>1/</u>	Device manufacturer CAGE code	Mode of transportation and quantity	Vendor part number
V62/16621-01XE	24355	Tube, 50 units	ADA4805-2TRMZ-EP
V62/16621-01XE	24355	Reel, 1000 units	ADA4805-2TRMZ-EPR7

1/ The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation.

CAGE code

24355

Source of supply

Analog Devices
Route 1 Industrial Park
P.O. Box 9106
Norwood, MA 02062
Point of contact: Raheen Business Park
Limerick, Ireland

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