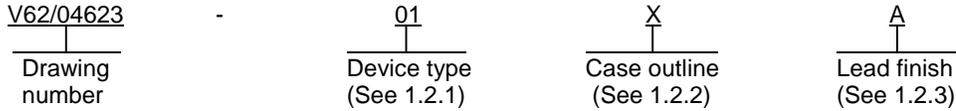


1. SCOPE

1.1 Scope. This drawing documents the general requirements of a high performance dual wideband video operational amplifier microcircuit, with an operating temperature range of -40°C to +85°C.

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



1.2.1 Device type(s).

<u>Device type</u>	<u>Generic</u>	<u>Circuit function</u>
01	LMH6715EP	Dual wideband video operational amplifier

1.2.2 Case outline(s). The case outlines shall be as specified herein.

<u>Outline letter</u>	<u>Number of pins</u>	<u>JEDEC PUB 95</u>	<u>Package style</u>
X	8	MS-102-AA	Small plastic outline

1.2.3 Lead finishes. The lead finishes shall be as specified below or other lead finishes as provided by the device manufacture:

<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

DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 16236	DWG NO. V62/04623
		REV	PAGE 2

1.3 Absolute maximum ratings. 1/

Supply voltage (V _{CC})	±6.75 V
Output voltage (I _{OUT})	70 mA 2/
Common mode input voltage	±V _{CC}
Differential input voltage	2.2 V
Power dissipation (P _D)	3/
Maximum junction temperature (T _J)	+150°C
ESD tolerance: 4/	
Human body model	2000 V
Machine model	150 V
Lead temperature (soldering, 10 seconds)	+300°C
Storage temperature range (T _{STG})	-65°C to +150°C
Thermal resistance, junction-to-case (θ _{JC}):	
X package	65°C/W
Thermal resistance, junction-to-ambient (θ _{JA}):	
X package	145°C/W

1.4 Recommended operating conditions. 5/

Nominal operating range	±5 V to ±6 V
Operating temperature range (T _A)	-40°C to +85°C

-
- 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.
- 2/ The maximum output current (I_{OUT}) is determined by device power dissipation limitations.
- 3/ The maximum power dissipation is a function of T_{J(MAX)}, θ_{JA} and T_A. The maximum allowable power dissipation at any ambient temperature is P_D = (T_{J(MAX)} - T_A) / θ_{JA}. For example, P_D = (150°C – 85°C) / 145°C/W = 448 mW. If this dissipation is exceeded, the die temperature will rise above 150°C and the device will go into thermal shutdown.
- 4/ Human body model, 1.5 kΩ in series with 100 pF. Machine model, 0 Ω in series with 200 pF.
- 5/ 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.

DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 16236	DWG NO. V62/04623
		REV	PAGE 3

2. APPLICABLE DOCUMENTS

JEDEC PUB 95 – Registered and Standard Outlines for Semiconductor Devices

(Applications for copies should be addressed to the Electronic Industry Alliance, 2500 Wilson Boulevard, Arlington, VA 22201-3834 or at <http://www.jedec.org>)

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.

DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 16236	DWG NO. V62/04623
		REV	PAGE 4

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions <u>1/</u> unless otherwise specified	Temperature, T _A	Device type	Limits		Unit
					Min	Max	
Frequency domain response section							
Small signal bandwidth	SSBW	V _{OUT} < 0.5 V _{PP} , R _F = 300 Ω, -3 dB bandwidth	+25°C	01	280		MHz
					400 typical		
Large signal bandwidth	LSBW	V _{OUT} < 4.0 V _{PP} , R _F = 300 Ω, -3 dB bandwidth	+25°C	01	170 typical		MHz
Gain flatness peaking	GFP	V _{OUT} < 0.5 V _{PP} , R _F = 300 Ω, DC to 100 MHz	+25°C	01	0.1 typical		dB
Gain flatness rolloff	GFR	V _{OUT} < 0.5 V _{PP} , R _F = 300 Ω, DC to 100 MHz	+25°C	01	0.1 typical		dB
Linear phase deviation	LPD	R _F = 300 Ω, DC to 100 MHz	+25°C	01	0.25 typical		deg
Differential gain	DG	R _L = 150 Ω, 4.43 MHz	+25°C	01	0.02 typical		%
Differential phase	DP	R _L = 150 Ω, 4.43 MHz	+25°C	01	0.02 typical		deg
Time domain response section							
Rise and fall time	Tr	0.5 V step	+25°C	01	1.4 typical		ns
		4 V step			3 typical		
Settling time to 0.05%	Ts	2 V step	+25°C	01	12 typical		ns
Overshoot	OS	0.5 V step	+25°C	01	1 typical		%
Slew rate	SR	2 V step	+25°C	01	1300 typical		V/μs
Distortion and noise response section							
2 nd harmonic distortion	HD2	2 V _{PP} , 20 MHz	+25°C	01	-60 typical		dBc
3 rd harmonic distortion	HD3	2 V _{PP} , 20 MHz	+25°C	01	-75 typical		dBc
Equivalent input noise non-inverting voltage	V _N	> 1 MHz	+25°C	01	3.4 typical		nV / √Hz
Equivalent input noise inverting current	I _N	> 1 MHz	+25°C	01	10.0 typical		pA / √Hz
Equivalent input noise non-inverting current	I _{NN}	> 1 MHz	+25°C	01	1.4 typical		pA / √Hz

See footnote at end of table.

DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 16236	DWG NO. V62/04623
		REV	PAGE 5

TABLE I. Electrical performance characteristics – continued.

Test	Symbol	Conditions <u>1/</u> unless otherwise specified	Temperature, T _A	Device type	Limits		Unit
					Min	Max	
Distortion and noise response section – continued.							
Noise floor	SNF	> 1 MHz	+25°C	01	-153 typical		dB _{1Hz}
Crosstalk	XTLKA	Input referred 10 MHz	+25°C	01	-70 typical		dB
Static , DC performance section							
Input offset voltage	V _{IO}		+25°C	01		±6	mV
			-40°C to +85°C		±2 typical		
						±8	
Average drift	DV _{IO}		+25°C	01	±30 typical		µV/°C
Input bias current	I _{BN}	Non-inverting	+25°C	01		±12	µA
			-40°C to +85°C		±5 typical		
						±20	
Average drift	DI _{BN}		+25°C	01	±30 typical		nA/°C
Input bias current	I _{BI}	Inverting	+25°C	01		±21	µA
			-40°C to +85°C		±6 typical		
						±35	
Average drift	DI _{BI}		+25°C	01	±20 typical		nA/°C
Power supply rejection ratio	PSRR	DC	+25°C	01	46		dB
			-40°C to +85°C		60 typical		
					44		
Common mode rejection ration	CMRR	DC	+25°C	01	50		dB
			-40°C to +85°C		56 typical		
					47		
Supply current per amplifier	I _{CC}	R _L = ∞	+25°C	01	4.7	7.6	mA
			-40°C to +85°C		5.8 typical		
					4.1	8.1	

See footnotes at end of table.

DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 16236	DWG NO. V62/04623
		REV	PAGE 6

TABLE I. Electrical performance characteristics – continued.

Test	Symbol	Conditions <u>1/</u> unless otherwise specified	Temperature, T_A	Device type	Limits		Unit
					Min	Max	
Miscellaneous performance section							
Input resistance	R_{IN}	Non-inverting	+25°C	01	1000 typical		k Ω
Input capacitance	C_{IN}	Non-inverting	+25°C	01	1.0 typical		pF
Output resistance	R_{OUT}	Closed loop	+25°C	01	0.6 typical		Ω
Output voltage range	V_O	$R_L = \infty$	+25°C	01	±4.0 typical		V
	V_{OL}	$R_L = 100 \Omega$	+25°C		±3.5		
			-40°C to +85°C		±3.9 typical		
					±3.4		
Input voltage range	CMIR	Common mode	+25°C	01	±2.2 typical		V
Output current	I_{OUT}		+25°C	01	70 typical		mA

1/ Unless otherwise specified, $V_{CC} = \pm 5$ V, gain (A_V) = +2, feedback resistance (R_F) = 500 Ω , and load resistance (R_L) = 100 Ω .

DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 16236	DWG NO. V62/04623
		REV	PAGE 7

Case X

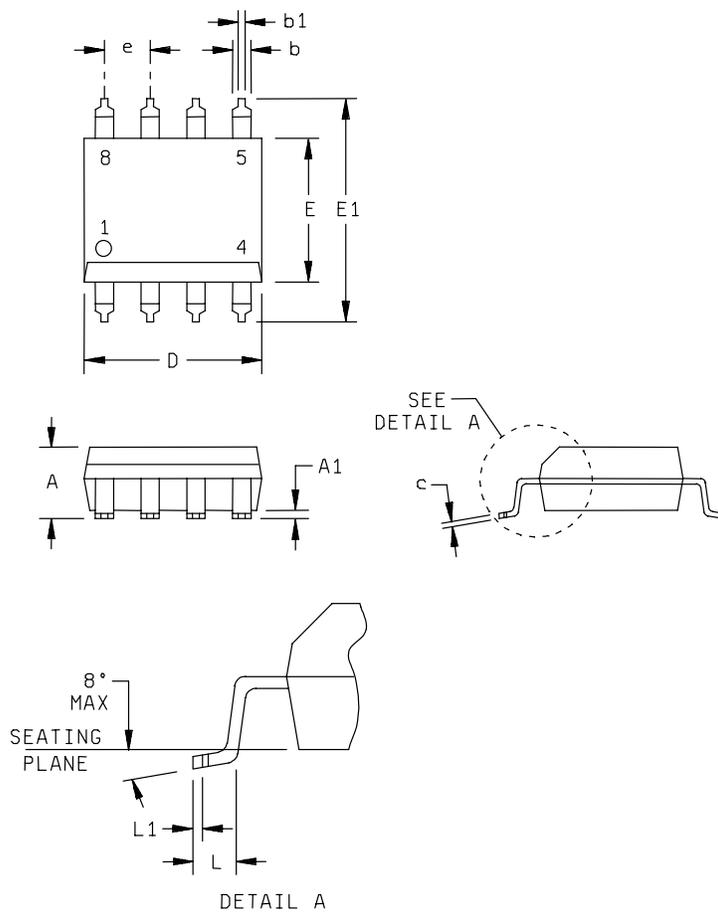


FIGURE 1. Case outlines.

<p>DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO</p>	<p>SIZE A</p>	<p>CODE IDENT NO. 16236</p>	<p>DWG NO. V62/04623</p>
		<p>REV</p>	<p>PAGE 8</p>

Case X

Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.053	0.069	1.346	1.753
A1	0.004	0.010	0.102	0.254
b	0.014	0.020	0.356	0.508
b1	0.008	---	0.203	---
c	0.008	0.010	0.203	0.254
D	0.189	0.197	4.800	5.004
e	0.050	---	1.270	---
E	0.150	0.157	3.810	3.988
E1	0.228	0.244	5.791	6.198
L	0.016	0.050	0.406	1.270
L1	---	0.010	---	0.254
n	8 leads		8 leads	

NOTES:

1. Controlling dimensions are inch, millimeter dimensions () are given for reference only.
2. Falls with JEDEC MO-012-AA.

FIGURE 1. Case outline – continued.

DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 16236	DWG NO. V62/04623
		REV	PAGE 9

Device type	01
Case outline	X
Terminal number	Terminal symbol
1	V _{OUT} 1
2	V _{INV} 1
3	V _{NON-INV} 1
4	-V _{CC}
5	V _{NON-INV} 2
6	V _{INV} 2
7	V _{OUT} 2
8	+V _{CC}

FIGURE 2. Terminal connections.

DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 16236	DWG NO. V62/04623
		REV	PAGE 10

4.0 QUALITY ASSURANCE PROVISIONS

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.

5.0 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.

6.0 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.

Vendor item drawing administrative control number <u>1/</u>	Device manufacturer CAGE code	Tape and reel <u>2/</u>	Package number	Vendor part number <u>3/</u>
V62/04623-01XA	27014	---	M08A	LMH6715MAEP
	<u>2/</u>	LMH6715MAXEP	M08A	LMH6715MAXEP

- 1/ The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation.
- 2/ Check with the manufacturer for availability of vendor part number LM6715MAXEP.
- 3/ For additional ordering and product information, please visit the Enhanced Plastic web site at www.national.com/mil.

CAGE code

27014

Source of supply

National Semiconductor
 2900 Semiconductor Drive
 P.O. Box 58090
 Santa Clara, CA 95052-8090

DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 16236	DWG NO. V62/04623
		REV	PAGE 11