

**500MHz Rail-to-Rail Amplifiers**

The 5962-0721301QXC, 5962-0721302QXC and 5962-0721303QYC are fully DLA SMD compliant parts and the SMD data sheets are available on the Defense Logistics Agency Land and Maritime (DLA) website (<http://www.landandmaritime.dla.mil/Downloads/MilSpec/Smd/07213.pdf>). The 5962-0721301QXC is electrically equivalent to the EL8202, the 5962-0721302QXC is electrically equivalent to the EL8203, and the 5962-0721303QYC is electrically equivalent to the EL8403. Reference equivalent “EL” data sheet for additional information. These parts are dual and quad rail-to-rail amplifiers with a -3dB bandwidth of 500MHz and slew rate of 600V/μs.

Running off a low supply current of 13.5mA per channel, the 5962-0721301QXC, 5962-0721302QXC, and 5962-0721303QYC also feature inputs that go to 0.15V below the V<sub>S-</sub> rail. The 5962-0721301QXC and 5962-0721302QXC are dual channel amplifiers. The 5962-0721303QYC is a quad channel amplifier.

The 5962-0721301QXC includes a fast-acting disable/power-down circuit with a 25ns disable and a 200ns enable, the 5962-0721301QXC is ideal for multiplexing applications.

**Features**

- 500MHz -3dB bandwidth
- 600V/μs slew rate
- Supplies from 3V to 5.5V
- Rail-to-rail output
- Input to 0.15V below V<sub>S-</sub>
- Fast 25ns disable (5962-0721301QXC only)

**Applications**

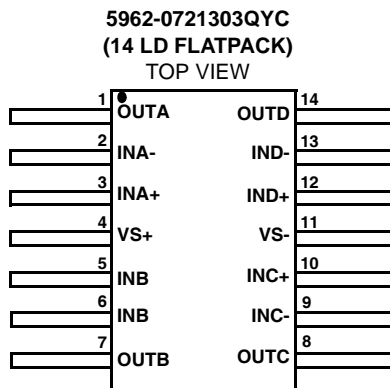
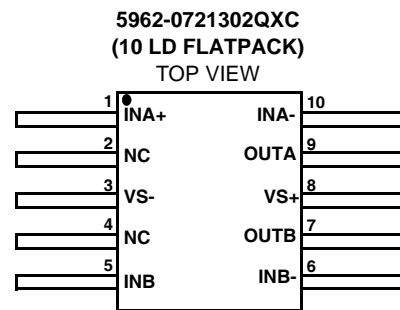
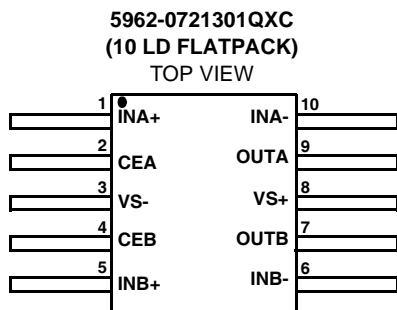
- Video amplifiers
- Portable/hand-held products
- Communications devices

**Ordering Information**

PART NUMBER	PART MARKING	PACKAGE	PKG. DWG. #
5962-0721301QXC	07213 01QXC	10 Ld Flat Pack	K10.A
5962-0721302QXC	07213 02QXC	10 Ld Flat Pack	K10.A
5962-0721303QYC	07213 03QYC	14 Ld Flat Pack	K14.A

NOTE: These Intersil Pb-free Hermetic packaged products employ 100% Au plate - e4 termination finish, which is RoHS compliant and compatible with both SnPb and Pb-free soldering operations.

**Pinouts**



**Absolute Maximum Ratings** ( $T_A = +25^\circ\text{C}$ )

Supply Voltage from $V_{S+}$ to $V_{S-}$ .....	5.5V
Input Voltage .....	$V_{S+} + 0.3\text{V}$ to $V_{S-} - 0.3\text{V}$
Differential Input Voltage .....	.2V
Continuous Output Current .....	20mA/Op Amp

**Thermal Information**

Power Dissipation .....	74.3mW/Op Amp
Storage Temperature .....	$-65^\circ\text{C}$ to $+150^\circ\text{C}$
Ambient Operating Temperature .....	$-55^\circ\text{C}$ to $+125^\circ\text{C}$
Operating Junction Temperature .....	$+150^\circ\text{C}$

CAUTION: Do not operate at or near the maximum ratings listed for extended periods of time. Exposure to such conditions may adversely impact product reliability and result in failures not covered by warranty.

IMPORTANT NOTE: All parameters having Min/Max specifications are guaranteed. Typ values are for information purposes only. Unless otherwise noted, all tests are at the specified temperature and are pulsed tests, therefore:  $T_J = T_C = T_A$

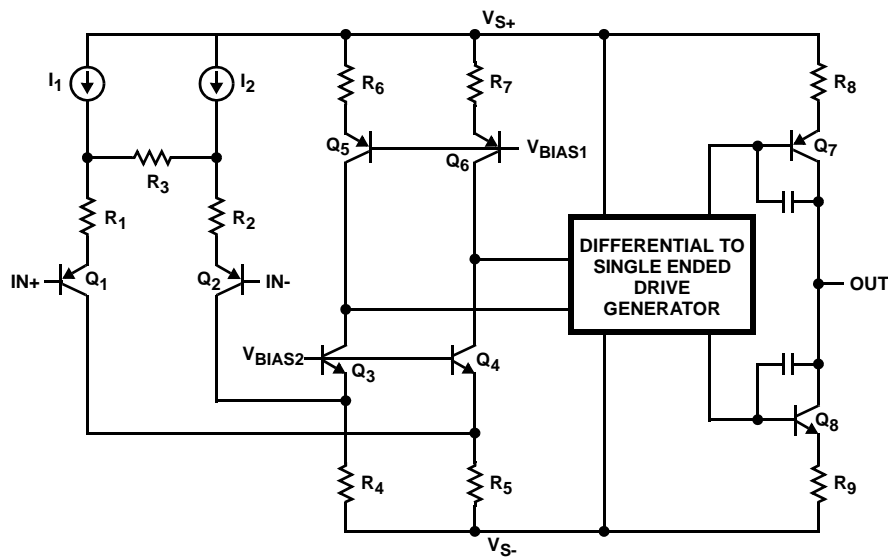
**Electrical Specifications**  $V_{S+} = 5\text{V}$ ,  $V_{S-} = \text{GND}$ ,  $T_A = +25^\circ\text{C}$ ,  $V_{CM} = 2.5\text{V}$ ,  $R_L$  to 2.5V,  $A_V = 1$ , Unless Otherwise Specified.

PARAMETER	DESCRIPTION	CONDITIONS	MIN	TYP	MAX	UNIT
<b>INPUT CHARACTERISTICS</b>						
$R_{IN}$	Input Resistance	Common Mode		3.5		$\text{M}\Omega$
$C_{IN}$	Input Capacitance			0.5		pF
<b>OUTPUT CHARACTERISTICS</b>						
$R_{OUT}$	Output Resistance	$A_V = +1$		30		$\text{m}\Omega$
$I_{OUT}$	Linear Output Current			65		mA
<b>ENABLE (5962-0721301QXC ONLY)</b>						
$t_{EN}$	Enable Time			200		ns
$t_{DS}$	Disable Time			25		ns
$V_{IH-ENB}$	$\overline{\text{ENABLE}}$ Pin Voltage for Power-up			0.8		V
$V_{IL-ENB}$	$\overline{\text{ENABLE}}$ Pin Voltage for Shut-down			2		V
<b>AC PERFORMANCE</b>						
BW	-3dB Bandwidth	$A_V = +1$ , $R_F = 0\Omega$ , $C_L = 2.5\text{pF}$		500		MHz
		$A_V = -1$ , $R_F = 1\text{k}\Omega$ , $C_L = 2.5\text{pF}$		140		MHz
		$A_V = +2$ , $R_F = 1\text{k}\Omega$ , $C_L = 2.5\text{pF}$		165		MHz
		$A_V = +10$ , $R_F = 1\text{k}\Omega$ , $C_L = 2.5\text{pF}$		18		MHz
BW	$\pm 0.1\text{dB}$ Bandwidth	$A_V = +1$ , $R_F = 0\Omega$ , $C_L = 2.5\text{pF}$		35		MHz
Peak	Peaking	$A_V = +1$ , $R_L = 1\text{k}\Omega$ , $C_L = 2.5\text{pF}$		2		dB
GBWP	Gain Bandwidth Product			200		MHz
PM	Phase Margin	$R_L = 1\text{k}\Omega$ , $C_L = 2.5\text{pF}$		55		$^\circ$
SR	Slew Rate	$A_V = 2$ , $R_L = 100\Omega$ , $V_{OUT} = 0.5\text{V}$ to $4.5\text{V}$		600		$\text{V}/\mu\text{s}$
$t_R$	Rise Time	$2.5V_{STEP}$ , 20% to 80%		4		ns
$t_F$	Fall Time	$2.5V_{STEP}$ , 20% to 80%		2		ns
OS	Overshoot	200mV step		10		%
$t_{PD}$	Propagation Delay	200mV step		1		ns
$t_S$	0.1% Settling Time	200mV step		15		ns
dG	Differential Gain	$A_V = +2$ , $R_F = 1\text{k}\Omega$ , $R_L = 150\Omega$		0.01		%
dP	Differential Phase	$A_V = +2$ , $R_F = 1\text{k}\Omega$ , $R_L = 150\Omega$		0.01		$^\circ$
$e_N$	Input Noise Voltage	$f = 10\text{kHz}$		12		$\text{nV}/\sqrt{\text{Hz}}$
$i_{N+}$	Positive Input Noise Current	$f = 10\text{kHz}$		1.7		$\text{pA}/\sqrt{\text{Hz}}$
$i_{N-}$	Negative Input Noise Current	$f = 10\text{kHz}$		1.3		$\text{pA}/\sqrt{\text{Hz}}$
$e_S$	Channel Separation	$f = 100\text{kHz}$		95		dB

### Pin Descriptions

5962-0721301QXC (10 LD FLATPACK)	5962-0721302QXC (10 LD FLATPACK)	5962-0721303QYC (14 LD FLATPACK)	NAME	FUNCTION
1, 5	1, 5	3, 5, 10, 12	IN+	Non-inverting input for each channel
2, 4			$\overline{CE}$	Enable and disable input for each channel
3	3	11	VS-	Negative power supply
6, 10	6, 10	2, 6, 9, 13	IN-	Inverting input for each channel
7, 9	7, 9	1, 7, 8, 14	OUT	Amplifier output for each channel
8	8	4	VS+	Positive power supply
	2, 4		NC	Not Connected

### Simplified Schematic Diagram

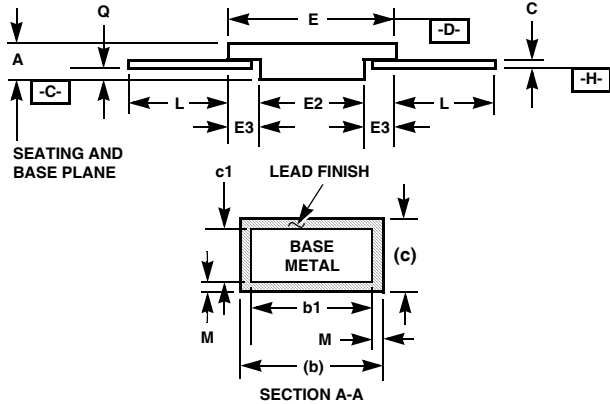
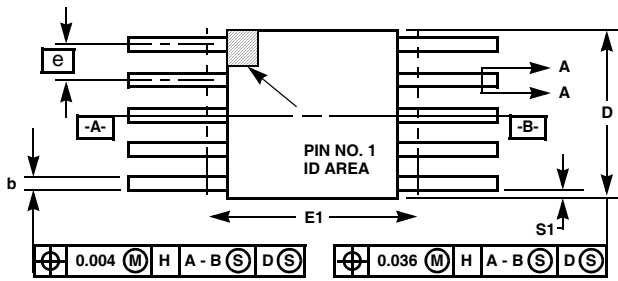


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**Ceramic Metal Seal Flatpack Packages (Flatpack)**



**K10.A MIL-STD-1835 CDFP3-F10 (F-4A, CONFIGURATION B)  
10 LEAD CERAMIC METAL SEAL FLATPACK PACKAGE**

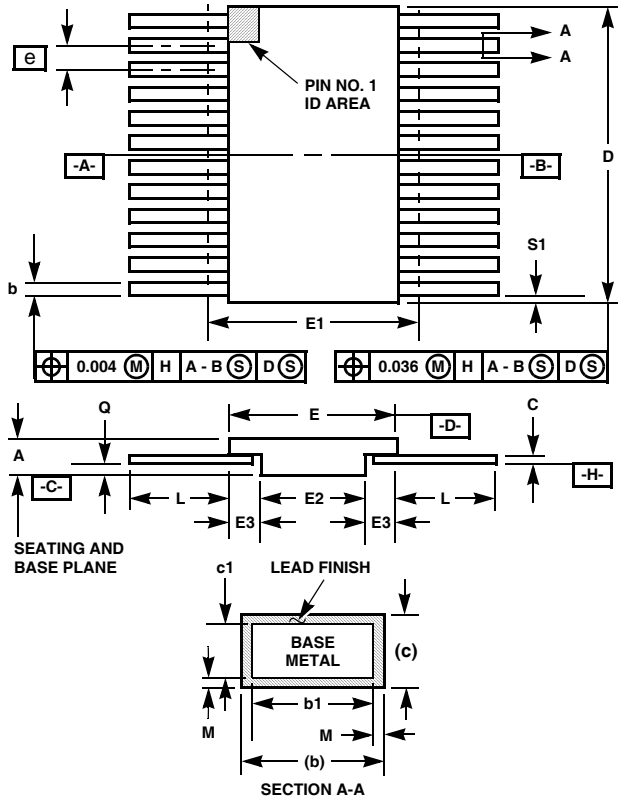
SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.045	0.115	1.14	2.92	-
b	0.015	0.022	0.38	0.56	-
b1	0.015	0.019	0.38	0.48	-
c	0.004	0.009	0.10	0.23	-
c1	0.004	0.006	0.10	0.15	-
D	-	0.290	-	7.37	3
E	0.240	0.260	6.10	6.60	-
E1	-	0.280	-	7.11	3
E2	0.125	-	3.18	-	-
E3	0.030	-	0.76	-	7
e	0.050 BSC		1.27 BSC		-
k	0.008	0.015	0.20	0.38	2
L	0.250	0.370	6.35	9.40	-
Q	0.026	0.045	0.66	1.14	8
S1	0.005	-	0.13	-	6
M	-	0.0015	-	0.04	-
N	10		10		-

Rev. 0 3/07

**NOTES:**

1. Index area: A notch or a pin one identification mark shall be located adjacent to pin one and shall be located within the shaded area shown. The manufacturer's identification shall not be used as a pin one identification mark. Alternately, a tab (dimension k) may be used to identify pin one.
2. If a pin one identification mark is used in addition to a tab, the limits of dimension k do not apply.
3. This dimension allows for off-center lid, meniscus, and glass overrun.
4. Dimensions b1 and c1 apply to lead base metal only. Dimension M applies to lead plating and finish thickness. The maximum limits of lead dimensions b and c or M shall be measured at the centroid of the finished lead surfaces, when solder dip or tin plate lead finish is applied.
5. N is the maximum number of terminal positions.
6. Measure dimension S1 at all four corners.
7. For bottom-brazed lead packages, no organic or polymeric materials shall be molded to the bottom of the package to cover the leads.
8. Dimension Q shall be measured at the point of exit (beyond the meniscus) of the lead from the body. Dimension Q minimum shall be reduced by 0.0015 inch (0.038mm) maximum when solder dip lead finish is applied.
9. Dimensioning and tolerancing per ANSI Y14.5M - 1982.
10. Controlling dimension: INCH.

14 Id FLATPACK Package Outline Drawing



K14.A MIL-STD-1835 CDFP3-F14 (F-2A, CONFIGURATION B)  
14 LEAD CERAMIC METAL SEAL FLATPACK PACKAGE

SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.045	0.115	1.14	2.92	-
b	0.015	0.022	0.38	0.56	-
b1	0.015	0.019	0.38	0.48	-
c	0.004	0.009	0.10	0.23	-
c1	0.004	0.006	0.10	0.15	-
D	-	0.390	-	9.91	3
E	0.235	0.260	5.97	6.60	-
E1	-	0.290	-	7.11	3
E2	0.125	-	3.18	-	-
E3	0.030	-	0.76	-	7
e	0.050 BSC		1.27 BSC		-
k	0.008	0.015	0.20	0.38	2
L	0.270	0.370	6.86	9.40	-
Q	0.026	0.045	0.66	1.14	8
S1	0.005	-	0.13	-	6
M	-	0.0015	-	0.04	-
N	14		14		-

Rev. 0 5/18/94

NOTES:

1. Index area: A notch or a pin one identification mark shall be located adjacent to pin one and shall be located within the shaded area shown. The manufacturer's identification shall not be used as a pin one identification mark. Alternately, a tab (dimension k) may be used to identify pin one.
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