

## CMOS-CCD 1/2H Delay Line for NTSC

**Description**

The CXL5002M/P are general-purpose CMOS-CCD delay line ICs that provide 1/2H delay time for NTSC.

**Features**

- Low power consumption 70mW (Typ.)
- Small size package (8-pin SOP, DIP)
- Low differential gain DG = 3% (Typ.)
- Input signal amplitude 180 IRE (= 1.28Vp-p, Max.)
- Low input clock amplitude operation 150mVp-p (Min.)
- Built-in peripheral circuits (clock driver, timing generator, autobias, and output circuits)

**Functions**

- 340-bit CCD register
- Clock drivers
- Autobias circuit
- Sync tip clamp circuit
- Sample and hold circuit

**Structure**

CMOS-CCD

**Absolute Maximum Ratings** (Ta = 25°C)

- |                               |                  |             |    |
|-------------------------------|------------------|-------------|----|
| • Supply voltage              | V <sub>DD</sub>  | 11          | V  |
| • Supply voltage              | V <sub>CL</sub>  | 6           | V  |
| • Operating temperature       | T <sub>opr</sub> | -10 to +60  | °C |
| • Storage temperature         | T <sub>stg</sub> | -55 to +150 | °C |
| • Allowable power dissipation | P <sub>D</sub>   |             |    |
|                               | CXL5002M         | 350         | mW |
|                               | CXL5002P         | 480         | mW |

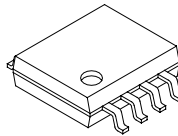
**Recommended Operating Conditions**

- |                |                 |        |   |
|----------------|-----------------|--------|---|
| Supply voltage | V <sub>DD</sub> | 9 ± 5% | V |
|                | V <sub>CL</sub> | 5 ± 5% | V |

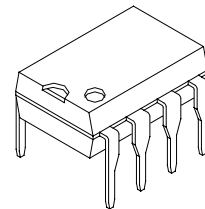
**Recommended Clock Conditions**

- |                         |                 |  |
|-------------------------|-----------------|--|
| • Input clock amplitude | V <sub>CK</sub> | 150mVp-p to 1.0Vp-p<br>(250mVp-p typ.) |
| • Clock frequency       | f <sub>CK</sub> | 10.7MHz                                |

CXL5002M  
8 pin SOP (Plastic)

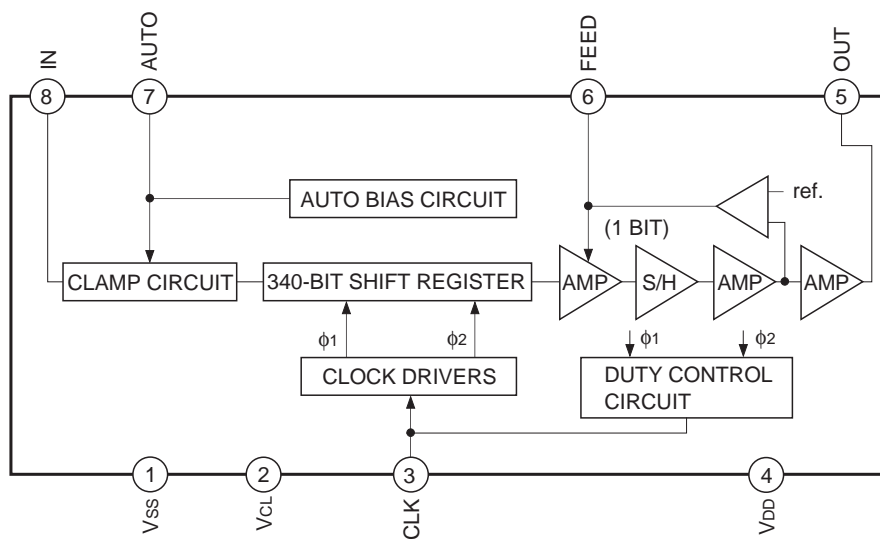


CXL5002P  
8 pin DIP (Plastic)



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**Blook Diagram**



**Pin Description**

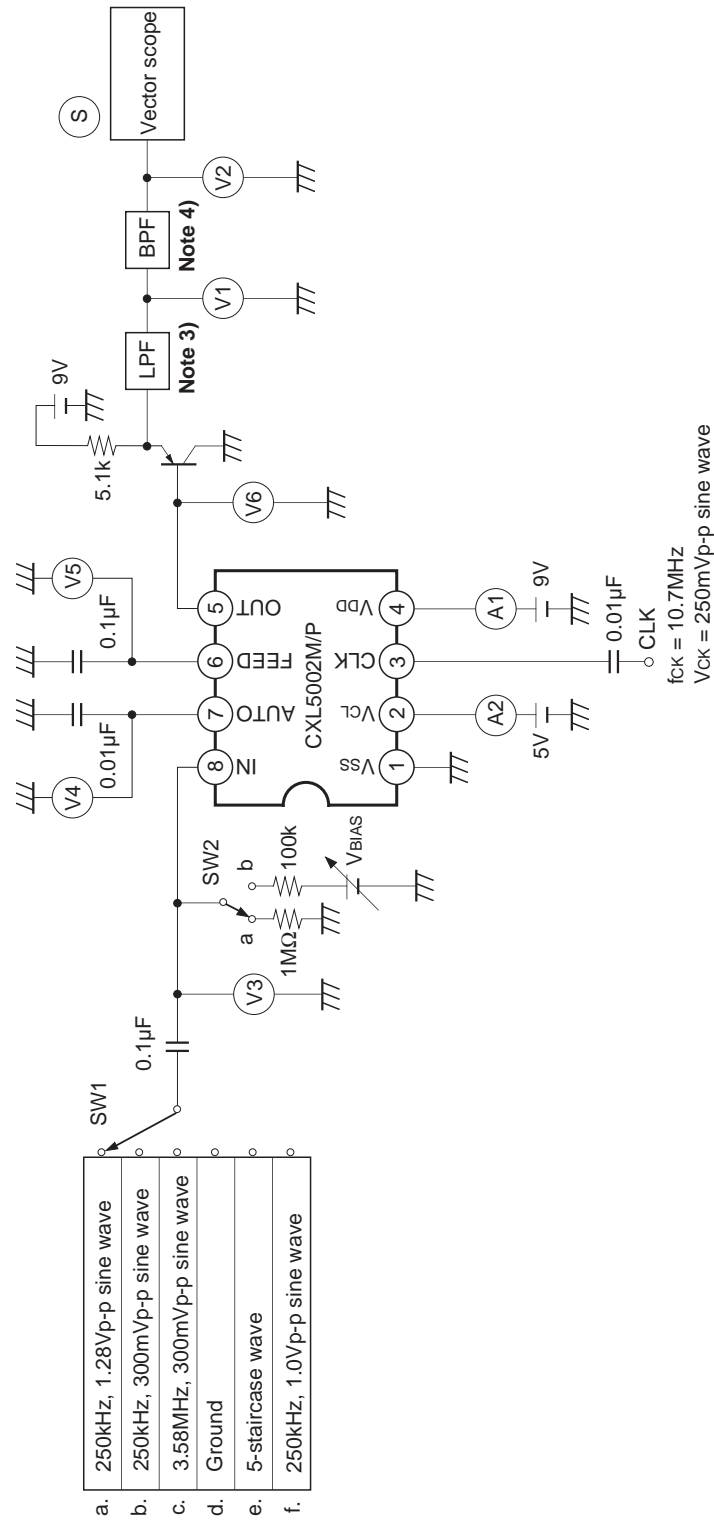
Pin No.	Symbol	Description	Impedance [ $\Omega$ ]	Pin No.	Symbol	Description	Impedance [ $\Omega$ ]
1	V <sub>SS</sub>	GND		5	OUT	Signal output	600 to 1k
2	V <sub>CL</sub>	5V power supply		6	FEED	Feedback DC output	> 100k
3	CLK	Clock input	> 100k	7	AUTO	Autobias DC output	10k
4	V <sub>DD</sub>	9V power supply		8	IN	Signal input	> 100k

## Electrical Characteristics

( $T_a = 25^\circ\text{C}$ ,  $V_{DD} = 9.0\text{V}$ ,  $V_{CL} = 5.0\text{V}$ ,  $f_{CK} = 10.7\text{MHz}$ ,  $V_{CK} = 250\text{mVp-p}$  sine wave,  
See "Electrical characteristics test circuit")

Item	Symbol	Measuring condition	SW conditions		Measuring point	Min.	Typ.	Max.	Unit
			1	2					
Supply current	I <sub>DD</sub>	250kHz, 1.28Vp-p, sine wave input	a	a	A1	—	4	5	mA
	I <sub>CL</sub>				A2	—	7	9	mA
Insertion gain	IG	250kHz, 1.28Vp-p, sine wave input IG = 20 log (Output voltage [Vp-p] / 1.28 [Vp-p])	a	a	V1	-3	0	3	dB
Frequency response	fG	Dissipation at 3.5MHz in relation to 250kHz fG = 20 log (V <sub>3.5MHz</sub> / V <sub>250kHz</sub> ) ( <b>Note 1</b> )	b, c	b	V1	-3.0	-2.1	—	dB
Differential gain	DG	5-staircase wave input Y = 140 IRE (= 1.0Vp-p) Measure S point with vector scope ( <b>Note 2</b> )	e	a	S	—	3	5	%
Differential phase	DP					—	3	5	deg
Allowable input amplitude	V <sub>IN-AC</sub>		—	—	—	—	—	1.28	Vp-p
Noise	S/N	S: Input = 250kHz, 1.0Vp-p output (Vp-p)	f	a	V2	55	60	—	dB
		N: Input = DC ground output (mVrms)	d	a	V2				
Output DC voltage	V <sub>IN-AC</sub>		d	a	V3	3.5	5.0	6.5	V
	V <sub>AUTO-DC</sub>				V4	3.5	5.0	6.5	V
	V <sub>FEED-DC</sub>	250kHz, 1.28Vp-p, sine wave input	a	a	V5	1.3	2.3	3.3	V
	V <sub>OUT-DC</sub>				V6	1.7	2.7	3.7	V

Electrical Characteristics Test Circuit

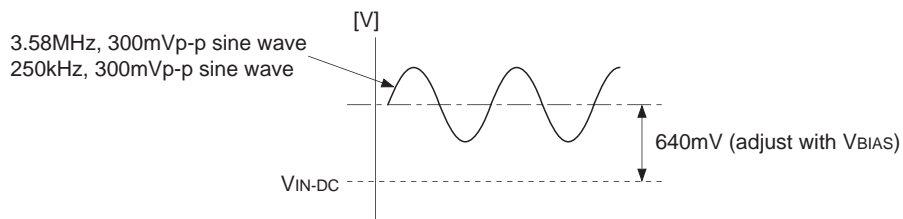


**Note 1) Frequency response measuring condition**

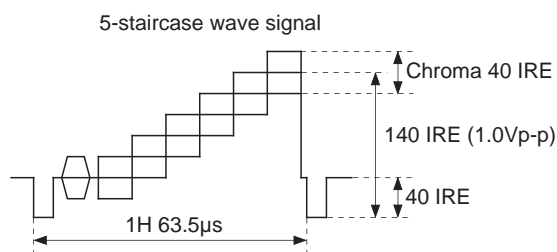
$V_{3.58\text{MHz}}$  (Output signal voltage [Vp-p] at 3.58MHz input)

$V_{250\text{kHz}}$  (Output signal voltage [Vp-p] at 250kHz input)

Set Pin 8 (IN) voltage [V] =  $V_{\text{IN-DC}} + 640\text{mV}$ .

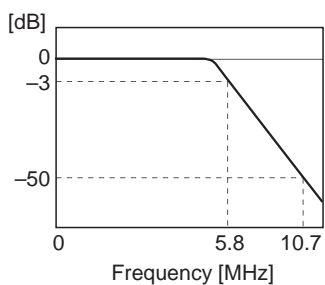


**Note 2) Differential gain and differential phase measuring condition**

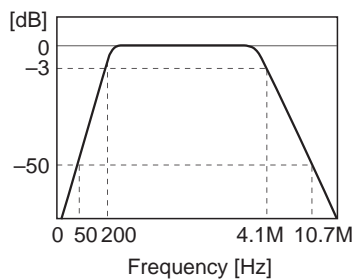


DG and DP are measured at output S point by vector scope.

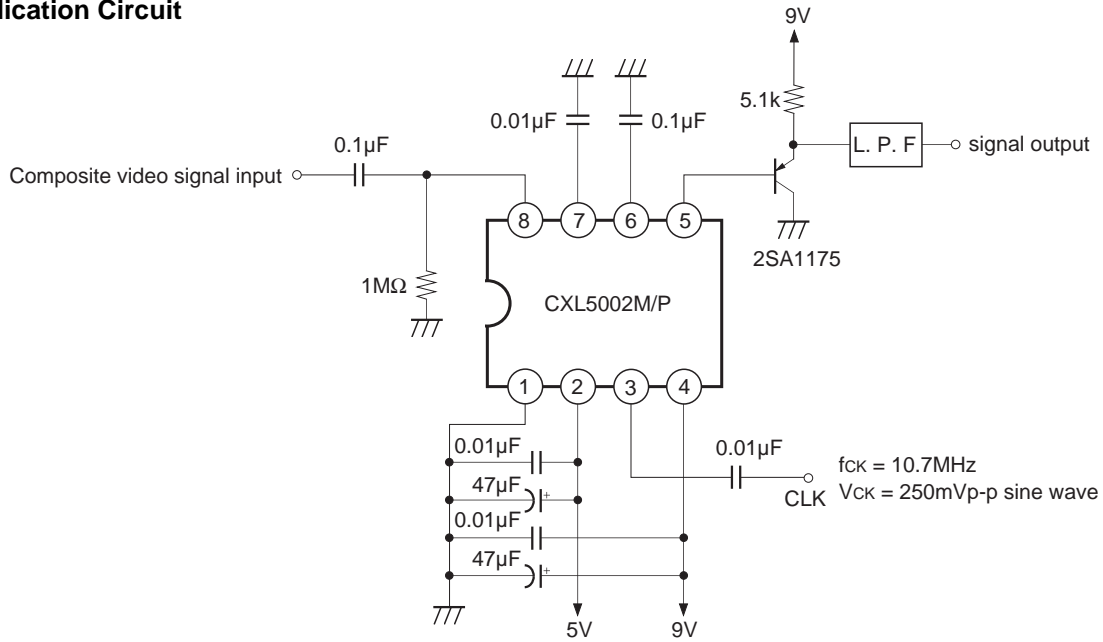
**Note 3) LPF frequency response**



**Note 4) BPF frequency response**



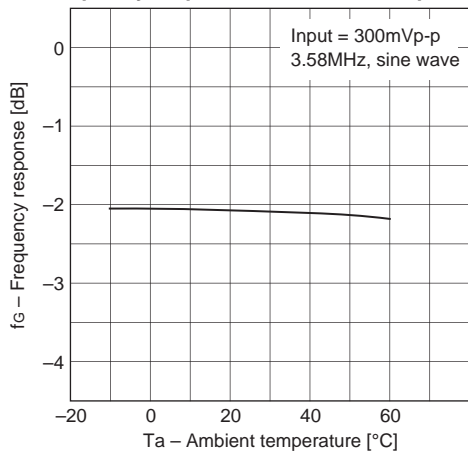
Application Circuit



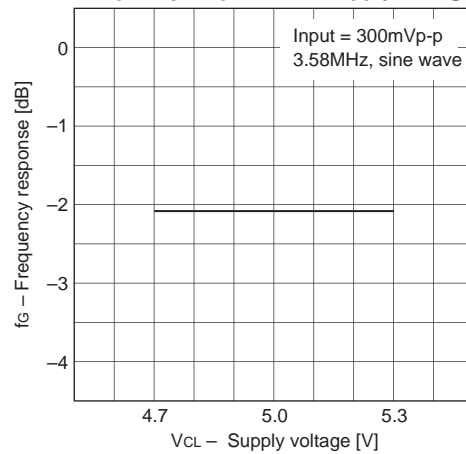
Application circuits shown are typical examples illustrating the operation of the devices. Sony cannot assume responsibility for any problems arising out of the use of these circuits or for any infringement of third party patent and other right due to same.

Example of Representative Characteristics

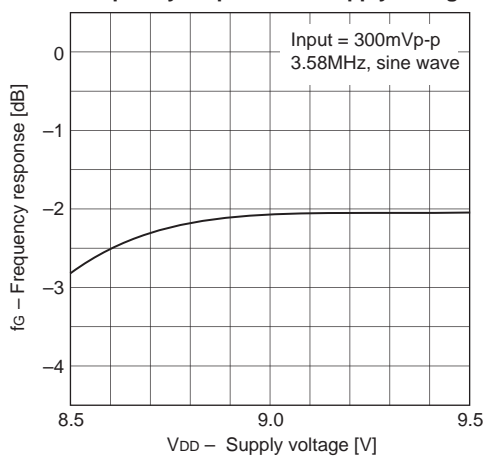
Frequency response vs. Ambient temperature



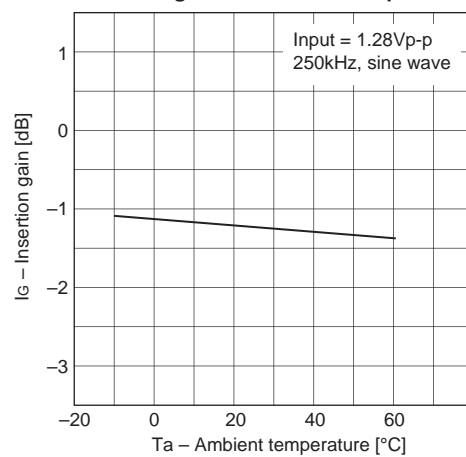
Frequency response vs. Supply voltage

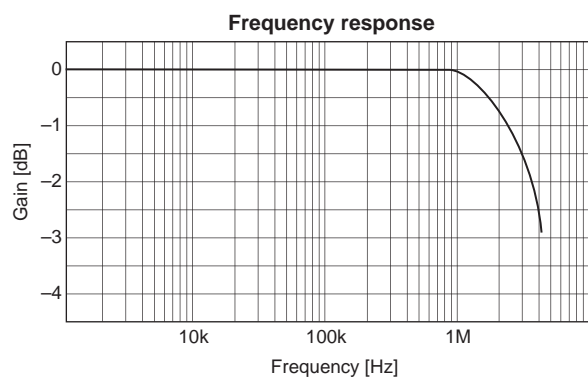
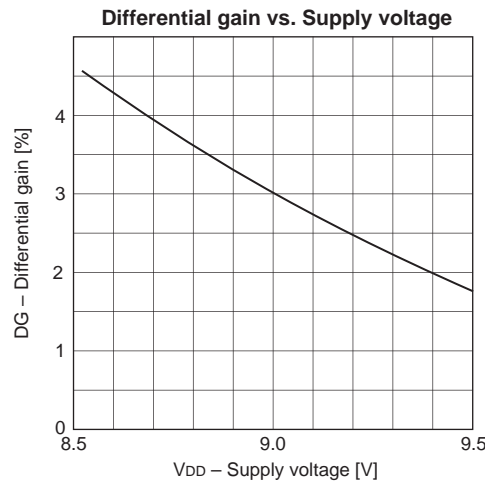
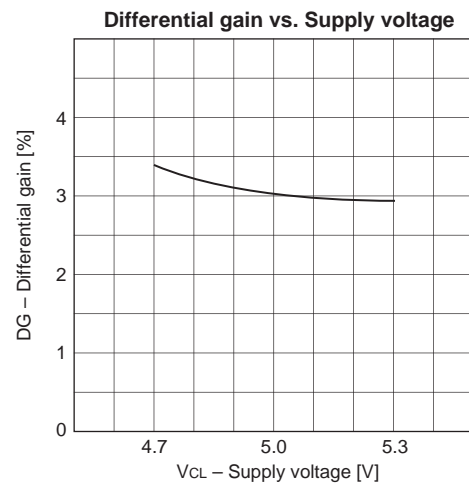
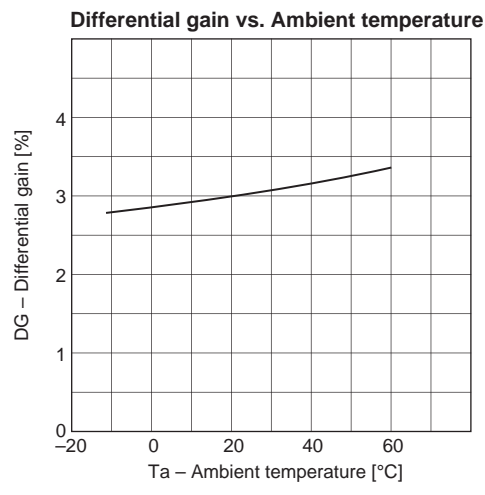
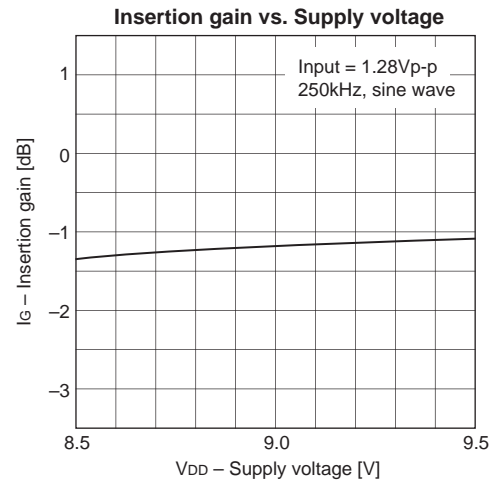
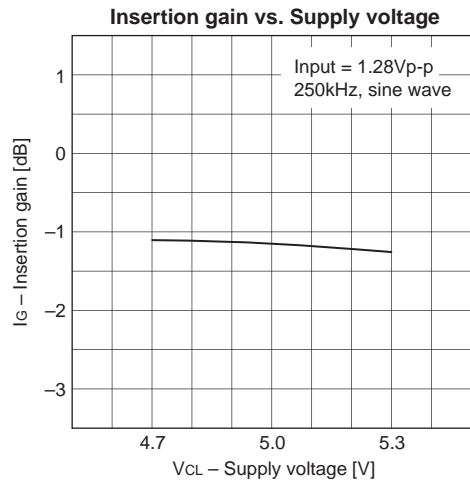


Frequency response vs. Supply voltage



Insertion gain vs. Ambient temperature



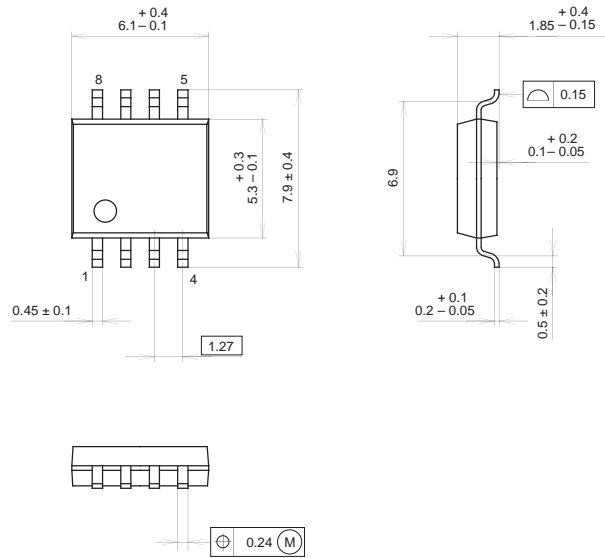


Package Outline

Unit: mm

CXL5002M

8PIN SOP (PLASTIC)



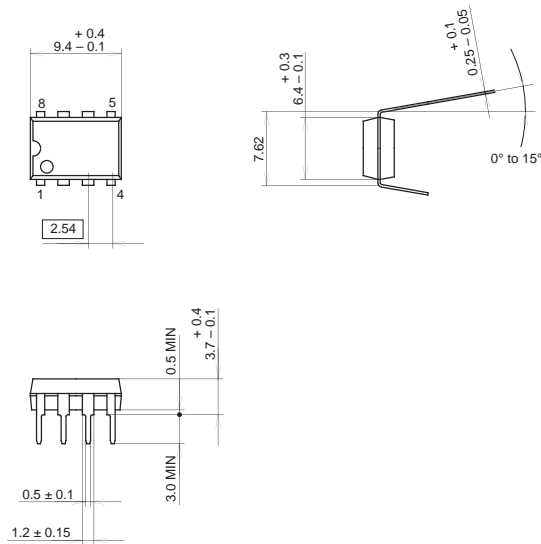
PACKAGE STRUCTURE

SONY CODE	SOP-8P-L01
EIAJ CODE	SOP008-P-0300
JEDEC CODE	—

PACKAGE MATERIAL	EPOXY RESIN
LEAD TREATMENT	SOLDER PLATING
LEAD MATERIAL	42/COPPER ALLOY
PACKAGE MASS	0.1g

CXL5002P

8PIN DIP (PLASTIC)



PACKAGE STRUCTURE

SONY CODE	DIP-8P-01
EIAJ CODE	DIP008-P-0300
JEDEC CODE	—

PACKAGE MATERIAL	EPOXY RESIN
LEAD TREATMENT	SOLDER PLATING
LEAD MATERIAL	COPPER ALLOY
PACKAGE MASS	0.5g