

**SONY****CXB1116Q/Q-Y****4-bit Ripple Counter with Enable and Reset***T-45-19-05***Description**

The CXB1116Q is an ECL ultra high speed monolithic Binary Ripple Counter with divide-by-2/4/8/16 outputs.

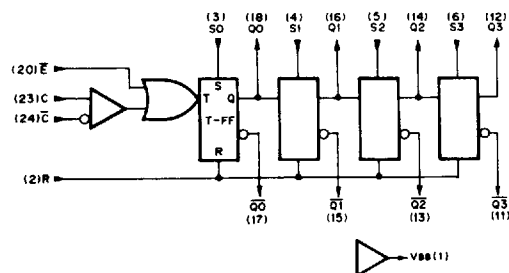
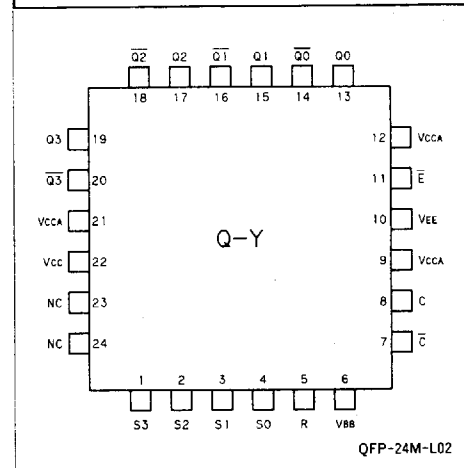
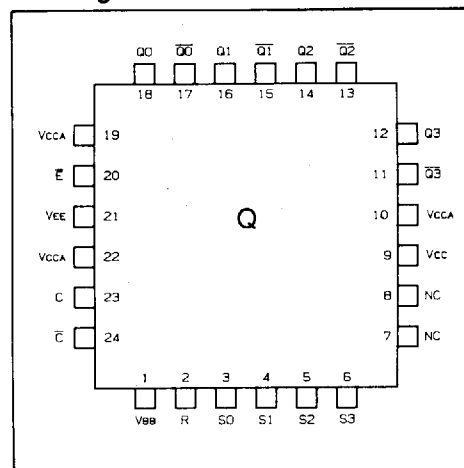
This IC features differential clock input at pins C and  $\bar{C}$ . Built-in reference voltage  $V_{BB}$  is provided to facilitate the use of single clock input. Enable input ( $\bar{E}$ ) controls clock inputs. Common direct Reset input (R) resets the counter while separate Set inputs ( $S_n$ ) set each stage of the counter.

**Features**

- Typical clock rate up to 3.0GHz
- Differential Clock input (positive edge trigger)
- Internal pull down resistors on input pins to maintain logic LOW level with the pins left open
- ECL 100K compatible I/O levels

**Pin Names**

|                  |                            |
|------------------|----------------------------|
| C, $\bar{C}$     | Clock inputs               |
| $Q_n, \bar{Q}_n$ | Data outputs               |
| $S_n$            | Direct set inputs          |
| R                | Common direct Reset input  |
| $\bar{E}$        | Clock enable (active LOW)  |
| $V_{BB}$         | Reference voltage output   |
| VCC              | Circuit ground             |
| $V_{CCA}$        | Circuit ground for outputs |
| $V_{EE}$         | Negative power supply      |

**Logic Symbol****Pin Assignment**

QFP-24M-L02



SONY®

CXB1116Q/QY

T-45-19-05

## DC Characteristics

 $V_{EE} = -4.5V \pm 0.3V$ ,  $V_{CC} = V_{CCA} = GND$ ,  $V_{TT} = -2.0V$ ,  $T_c = 0^\circ C$  to  $+85^\circ C$ 

| Item                 | Symbol   | Test Condition | Min. | Typ. | Max. | Unit |
|----------------------|----------|----------------|------|------|------|------|
| Power supply current | $I_{EE}$ |                | -213 | -155 | -108 | mA   |

Note: Other DC characteristics; See pages 3-3 and 3-4.

## AC Characteristics

 $V_{EE} = -4.5V \pm 0.3V$ ,  $V_{CC} = V_{CCA} = GND$ ,  $V_{TT} = -2.0V$ ,  $T_c = 0^\circ C$  to  $+85^\circ C$ ,  $R_T = 50\Omega$  to  $V_{TT}$ 

| Item                   | Symbol           | Input              | Output         | Test Condition | Min. | Typ. | Max. | Unit |
|------------------------|------------------|--------------------|----------------|----------------|------|------|------|------|
| Propagation delay time | T <sub>PLH</sub> | C, $\bar{E}$       | Q <sub>0</sub> |                | 540  | 730  | 940  | ps   |
|                        | T <sub>PHL</sub> |                    |                |                | 540  | 730  | 940  |      |
|                        | T <sub>PLH</sub> |                    | Q <sub>1</sub> |                | 670  | 900  | 1150 |      |
|                        | T <sub>PHL</sub> |                    |                |                | 680  | 910  | 1160 |      |
|                        | T <sub>PLH</sub> |                    | Q <sub>2</sub> |                | 810  | 1090 | 1390 |      |
|                        | T <sub>PHL</sub> |                    |                |                | 830  | 1110 | 1410 |      |
|                        | T <sub>PLH</sub> |                    | Q <sub>3</sub> |                | 930  | 1240 | 1580 |      |
|                        | T <sub>PHL</sub> |                    |                |                | 940  | 1260 | 1600 |      |
|                        | T <sub>PLH</sub> | S <sub>n</sub>     | Q <sub>n</sub> |                | 570  | 760  | 970  |      |
|                        | T <sub>PHL</sub> | R                  |                |                | 670  | 900  | 1150 |      |
| Release time           | T <sub>R</sub>   | S <sub>0</sub> , C | Q <sub>0</sub> | 160            |      |      |      |      |
|                        |                  | S <sub>1</sub> , C | Q <sub>1</sub> | −30            |      |      |      |      |
|                        |                  | S <sub>2</sub> , C | Q <sub>2</sub> | −230           |      |      |      |      |
|                        |                  | S <sub>3</sub> , C | Q <sub>3</sub> | −390           |      |      |      |      |
|                        |                  | R, C               | Q <sub>0</sub> | 430            |      |      |      |      |
|                        |                  | $\bar{E}$ , C      |                | −10            |      |      |      |      |
| Min. Pulse width       | T <sub>PW</sub>  | S <sub>n</sub>     | Q <sub>n</sub> | 330            |      |      |      |      |
|                        |                  | R                  |                | 330            |      |      |      |      |
| Max. Clock Frequency   | f <sub>MAX</sub> | C                  |                | 20% to 80%     | 2.4  | 3.0  |      | GHz  |
| Rise time              | T <sub>TLH</sub> |                    |                |                |      | 200  | 250  | ps   |
| Fall time              | T <sub>THL</sub> |                    |                |                | 160  | 200  |      |      |

Note: AC test circuit; See pages 4-3, 4-4 and 4-5.

## Package Data

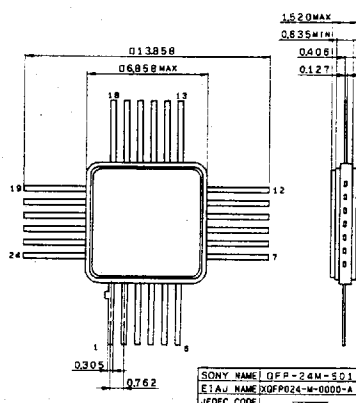
T-90-20

## Package Outline

Unit: mm

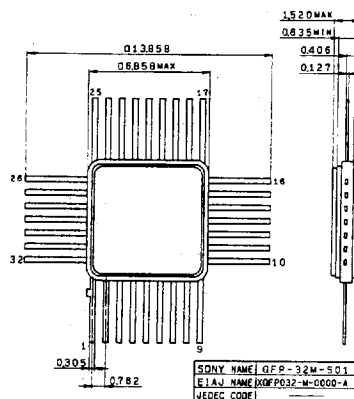
## 24pin QFP (QFP-24M-S01)

24pin QFP (Metal) 0.3g



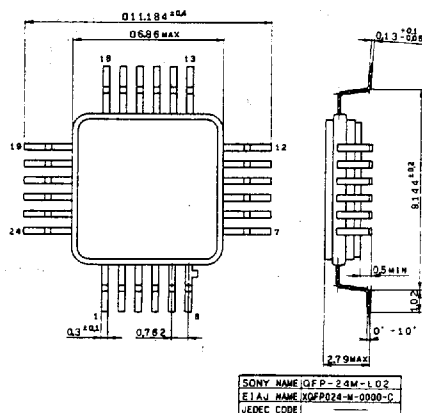
## 32pin QFP (QFP-32M-S01)

32pin QFP (Metal) 0.2g



## 24pin QFP (QFP-24M-L02)

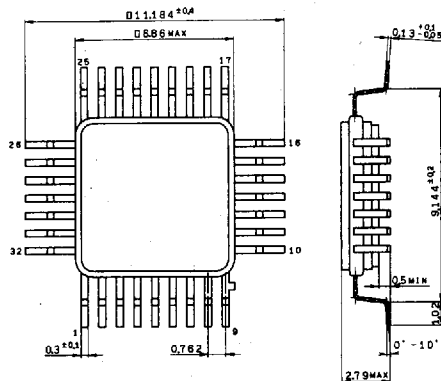
24pin QFP (Metal) 0.3g



T-90-20

32pin QFP (QFP-32M-L02)

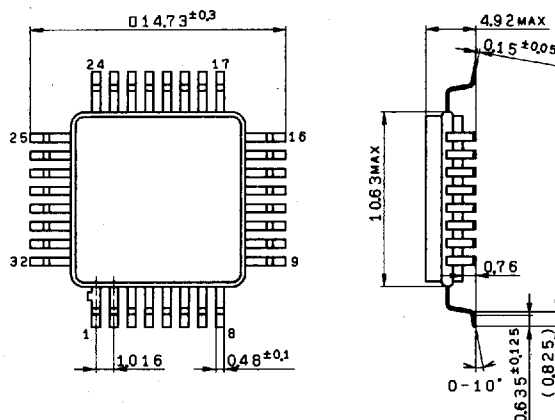
32pin QFP (Metal) 0.2g



|            |                  |
|------------|------------------|
| SONY NAME  | QFP-32M-L02      |
| EIAJ NAME  | XQFP032-M-0000-C |
| JEDEC CODE |                  |

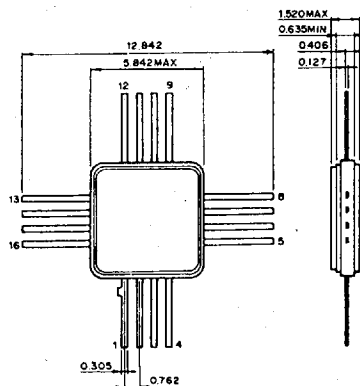
32pin QFP (QFP-32C-L01)

32pin QFP (Ceramic)



|            |                  |
|------------|------------------|
| SONY NAME  | QFP-32C-L01      |
| EIAJ NAME  | XQFP032-G-0000-A |
| JEDEC CODE |                  |

16pin QFP



**Package Data**

| Package Data                   | Page |
|--------------------------------|------|
| 1. 16 pin QFP                  | 6-3  |
| 2. 24 pin QFP                  | 6-3  |
| 3. 32 pin QFP                  | 6-3  |
| 4. 24 pin QFP with formed lead | 6-4  |
| 5. 32 pin QFP with formed lead | 6-4  |

## Package Data

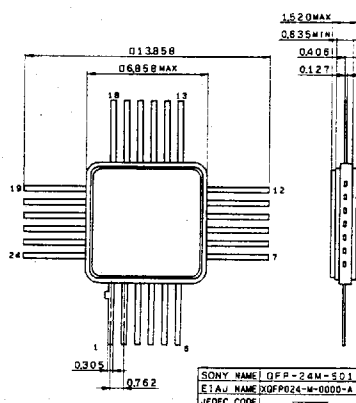
T-90-20

## Package Outline

Unit: mm

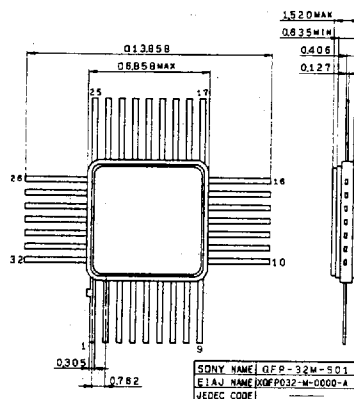
## 24pin QFP (QFP-24M-S01)

24pin QFP (Metal) 0.3g



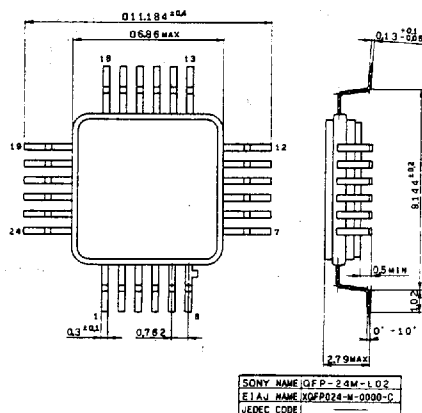
## 32pin QFP (QFP-32M-S01)

32pin QFP (Metal) 0.2g



## 24pin QFP (QFP-24M-L02)

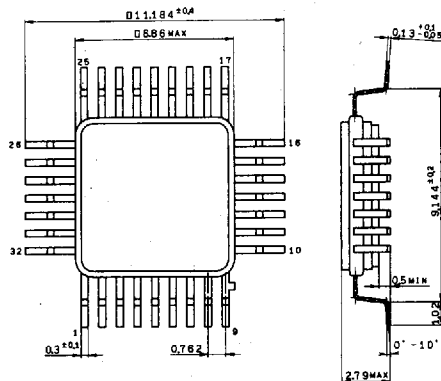
24pin QFP (Metal) 0.3g



T-90-20

32pin QFP (QFP-32M-L02)

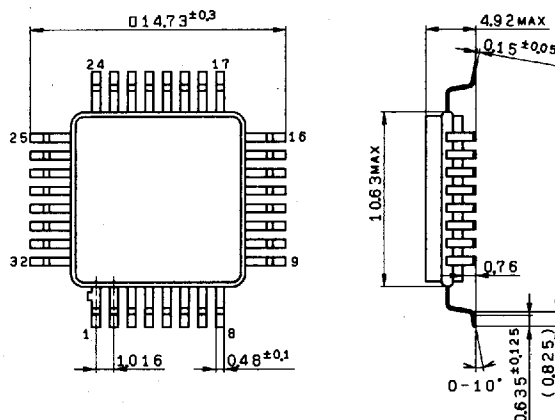
32pin QFP (Metal) 0.2g



|            |                  |
|------------|------------------|
| SONY NAME  | QFP-32M-L02      |
| EIAJ NAME  | XQFP032-M-0000-C |
| JEDEC CODE |                  |

32pin QFP (QFP-32C-L01)

32pin QFP (Ceramic)



|            |                  |
|------------|------------------|
| SONY NAME  | QFP-32C-L01      |
| EIAJ NAME  | XQFP032-G-0000-A |
| JEDEC CODE |                  |

16pin QFP

