

EPSON

**CRYSTAL OSCILLATOR
SG-8000 Series**

NEW PRODUCT

**CRYSTAL
QUARTZ DEVICE**

NEW PRODUCT

**CRYSTAL
QUARTZ DEVICE**

1997

SEIKO EPSON CORP.

SEIKO19*

Short Lead Time Crystal Oscillator EPSON's solution is SG-8000 to just in time (JIT)

Lead Time will be 1/3 compare to the previous, and 2 weeks lead times (ex. J)



What we have to do after receiving P/O is only to write the data to generic oscillator, it needs very short time. Our PLL & P-ROM technology makes it possible.



All our sells offices can program to meet customer's request for the immediate samples.



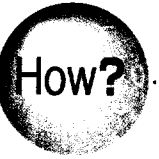
Professional operator is assigned for this job.



The data required from customers such as frequency, output level, and operating voltage.



Immediate response after receiving a inquiry.



Specific P-ROM writer and generic oscillators are provided at sales office and factory in advance.

How can we do?

Need immediate sample.

UNEXPECTED SITUATION LIKE ;
ex.
• New project must start urgently.
• Sudden production ramp up.

Yes, We shall do!

Don't hesitate contact EPSON.

Yes, We can provide.
When, how many pieces do you need?

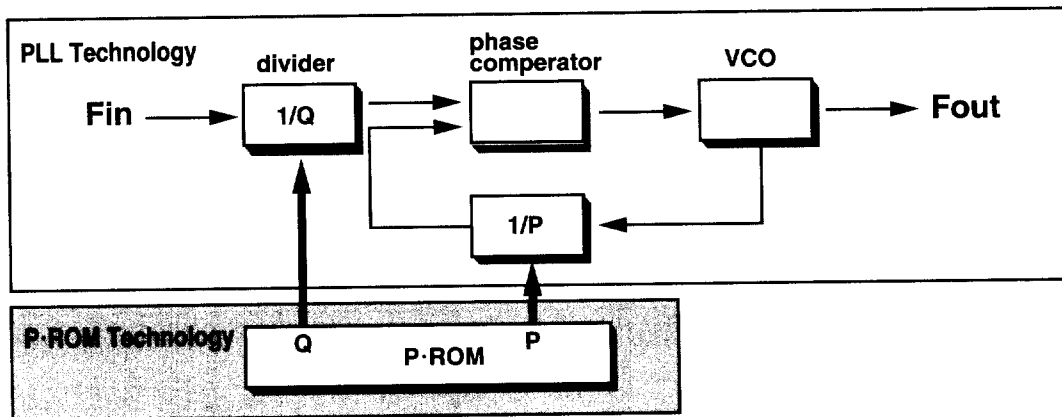
OH!

How fast!
Great!!

Within 2 Weeks
(min. 1 day)

I SG-8000 is a most latest programmable oscillator.

1. Can program the frequency



$F_{in}/Q = F_{out}/P$
 i.e,
 $F_{out} = P/Q \times F_{in}$ ← If variable P or Q value are programmed in to the P-ROM, variable F_{out} can be generated.

2. Can program the output level (i, e, C-MOS level or TTL level)

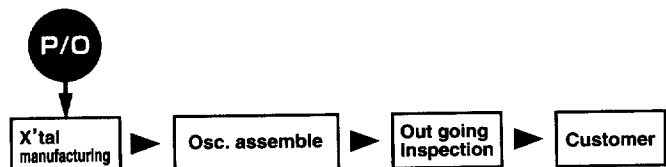
3. Can program the operating voltage (i, e, 5 volt or 3.3 volt)

● Valuable packages are available (JA or JC is available now, Dip type coming soon)

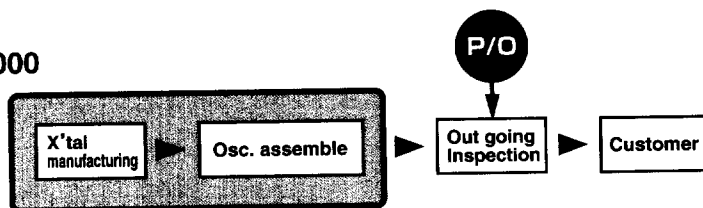
II EPSON can deliver SG-8000 when you need, what frequency you need with short lead time.

Flow chart from the receiving P/O to export.

■ Previous



■ SG-8000



III SG-8000 consist of fundamental X'tal and custom IC including a PLL and P-ROM circuit.

Programmable Clock Oscillator

SG - 8001JA (PH, PT, PC)

- Using PLL technology and P-ROM programmability for quick-turn custom version.
- Reflowable and high density mounting type SMD package compatible with SG-615.
- Operable 3.3V or 5.0V and out put frequencies from 2.5 MHz to 100 MHz at 5V (up to 80 MHz at 3.3V).
- Output enable function allow more low current consumption.

Specifications

1. Absolute Maximum Ratings

| Item | Symbol | PH type | PT type | PC type | Remarks |
|------------------------|--------|---|---------|---------|---------|
| Storage Temperature | TSTG | - 55 to 125°C | | | |
| Maximum supply voltage | VDD | - 0.5 to 7.0V | | | |
| Maximum input voltage | VIN | - 0.5 to VDD+0.5V | | | |
| Soldering condition | TSOL | Twice at under 260°C within 10sec. or under 230°C within 3min. | | | |

2. Operating Conditions

| Item | Symbol | PH type | PT type | PC type | Remarks |
|-----------------------|--------|--------------|-----------|-------------|---------------|
| Operating Temperature | TOPR | - 10 to 70°C | | | |
| Operating voltage | VDD | 4.5 to 5.5V | | 3.0 to 3.6V | |
| Input voltage | VIN | GND to VDD | | | |
| Output load condition | CL | 30 pF | --- | --- | 2.5 to 40MHz |
| | | 15 pF | --- | --- | 2.5 to 100MHz |
| | | --- | 2TTL+15pF | --- | 2.5 to 100MHz |
| | | --- | --- | 15pF | 2.5 to 80MHz |

3. Frequency Characteristics

| Item | Symbol | PH type | PT type | PC type | Remarks |
|-------------------------|--------------------|---------------|---------|--------------|-------------|
| Output frequency range* | f _o | 2.5 to 100MHz | | 2.5 to 80MHz | |
| Frequency stability | f / f _o | +/- 100 ppm | | | -10 to 70°C |
| Aging | f _a | +/- 5ppm max. | | | |

*Note :

Please contact to EPSON about Standard frequency.

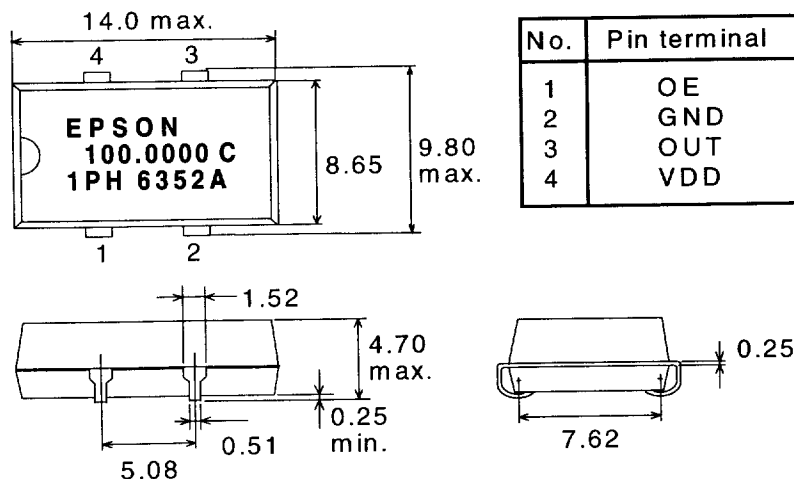
4. Characteristics

| Item | Symbol | PH type | PT type | PC type | Remarks |
|---------------------------|-----------------|-----------------|----------------------|----------------------|-----------------------------------|
| Current consumption | IOP | 45 mA max. | | 23 mA max. | |
| Disable current | IOE | 30 mA max. | | 16 mA max. | |
| OE input voltage | V _{IH} | 2.0 V min. | | 70%V _{DD} | |
| | V _{IL} | 0.8 V max. | | 20%V _{DD} | |
| OE input current | I _{IH} | 2.0 μA max. | | 2.0 μA max. | OE= V _{DD} |
| | I _{IL} | 16.0 μA max. | | 7.0 μA max. | OE=GND |
| Duty | Tw/T | 40 to 60% | --- | --- | 50%V _{DD} |
| | | --- | 45 to 55% | --- | 1.4V, 2TTL (up to 80M) |
| Output voltage | C-MOS | V _{OH} | V _{DD} -0.4 | --- | 1.4V, 2TTL (80 to 100M) |
| | | V _{OL} | 0.4V | --- | 50%V _{DD} (up to 66.67M) |
| | TTL | V _{OH} | --- | V _{DD} -0.4 | 50%V _{DD} (66.67 to 80M) |
| | | V _{OL} | --- | 0.4V | |
| Output rise time | C-MOS | tr | 3.5 nS | --- | 20% to 80%V _{DD} CL=15pF |
| | | | 7.0 nS | --- | 20% to 80%V _{DD} CL=30pF |
| Output fall time | C-MOS | tf | 2.5 nS | --- | 0.4V to 2.4V 2TTL+15pF |
| | | | 5.0 nS | --- | 0.4V to 2.4V 30pF |
| Oscillation start up time | tOSC | --- | 2.0 nS | --- | 0.4V to 2.4V 2TTL+15pF |
| | | --- | 4.0 nS | --- | 0.4V to 2.4V 30pF |
| Oscillation start up time | tOSC | 10 mSec. max. | | | |

**Note :

Output wave form is not compatible with C-MOS level and TTL level.
Programmable wave form only for C-MOS level or TTL level.

5. External Dimensions (Unit : mm)



Programmable Clock Oscillator

SG - 8001JC (PH, PT, PC)

- Using PLL technology and P-ROM programmability for quick-turn custom version.
- Reflowable and high density mounting type SMD package compatible with SG-636.
- Operable 3.3V or 5.0V and out put frequencies from 2.5 MHz to 80 MHz.
- Output enable function allow more low current consumption.

Specifications

1. Absolute Maximum Ratings

| Item | Symbol | PH type | PT type | PC type | Remarks |
|------------------------|--------|---|---------|---------|---------|
| Storage Temperature | TSTG | - 55 to 100°C | | | |
| Maximum supply voltage | VDD | - 0.5 to 7.0V | | | |
| Maximum input voltage | VIN | - 0.5 to VDD+0.5V | | | |
| Soldering condition | TSOL | Twice at under 260°C within 10sec. or under 230°C within 3min. | | | |

2. Operating Conditions

| Item | Symbol | PH type | PT type | PC type | Remarks |
|-----------------------|--------|--------------|-----------|-------------|--------------|
| Operating Temperature | TOPR | - 10 to 70°C | | | |
| Operating voltage | VDD | 4.5 to 5.5V | | 3.0 to 3.6V | |
| Input voltage | VIN | GND to VDD | | | |
| Output load condition | CL | 30 pF | --- | --- | 2.5 to 40MHz |
| | | 15 pF | --- | --- | 2.5 to 80MHz |
| | | --- | 2TTL+15pF | --- | 2.5 to 80MHz |
| | | --- | --- | 15pF | 2.5 to 80MHz |

3. Frequency Characteristics

| Item | Symbol | PH type | PT type | PC type | Remarks |
|-------------------------|------------------|---------------|---------|---------|-------------|
| Output frequency range* | F ₀ | 2.5 to 80MHz | | | |
| Frequency stability | F/F ₀ | +/- 100 ppm | | | -10 to 70°C |
| Aging | fa | +/- 5ppm max. | | | |

*Note :

Please contact to EPSON about Standard Frequency.

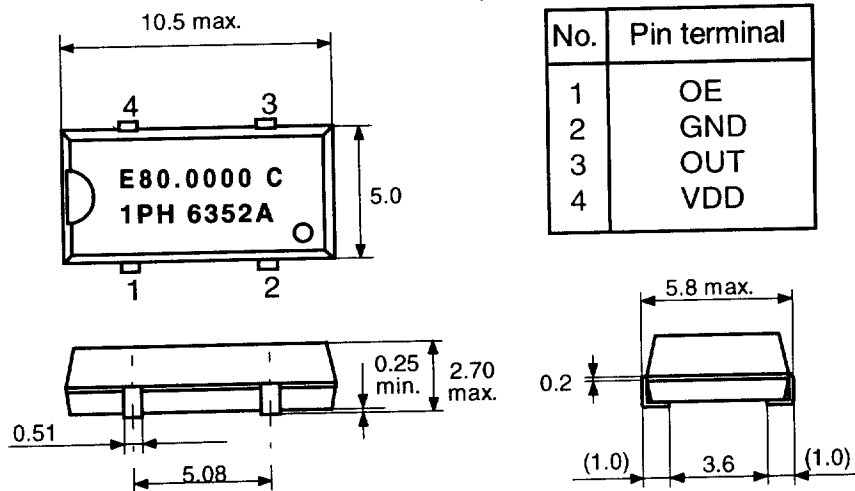
4. Characteristics

| Item | Symbol | PH type | PT type | PC type | Remarks | |
|---------------------------|-----------------|-----------------|----------------------|----------------------|------------------------------------|-----------------------------------|
| Current consumption | IOP | 40 mA max. | | 23 mA max. | | |
| Disable current | IOE | 27 mA max. | | 16 mA max. | | |
| OE input voltage | V _{IH} | 2.0 V min. | | 70%V _{DD} | | |
| | V _{IL} | 0.8 V max. | | 20%V _{DD} | | |
| OE input current | I _{IH} | 2.0 μA max. | | 2.0 μA max. | OE= V _{DD} | |
| | I _{IL} | 16.0 μA max. | | 7.0 μA max. | OE=GND | |
| Duty | Tw/T | 40 to 60% | --- | --- | 50%V _{DD} | |
| | | --- | 45 to 55% | --- | 1.4V, 2TTL+15pF | |
| | | --- | --- | 40 to 60% | 50%V _{DD} (up to 66.67M) | |
| | | --- | --- | 35 to 55% | 50%V _{DD} (66.67 to 80M) | |
| Output voltage | C-MOS | V _{OH} | V _{DD} -0.4 | --- | V _{DD} -0.4 | |
| | | V _{OL} | 0.4V | --- | 0.4V | |
| | TTL | V _{OH} | --- | V _{DD} -0.4 | --- | |
| | | V _{OL} | --- | 0.4V | --- | |
| Output rise time | C-MOS | tr | 3.5 nS | --- | 3.5 nS | 20% to 80%V _{DD} CL=15pF |
| | | | 7.0 nS | --- | --- | 20% to 80%V _{DD} CL=30pF |
| | TTL | --- | 2.5 nS | --- | 0.4V to 2.4V 2TTL+15pF | |
| | | --- | 5.0 nS | --- | 0.4V to 2.4V 30pF | |
| Output fall time | C-MOS | tf | 2.5 nS | --- | 2.5 nS | 20% to 80%V _{DD} CL=15pF |
| | | | 5.0 nS | --- | --- | 20% to 80%V _{DD} CL=30pF |
| | TTL | --- | 2.0 nS | --- | 0.4V to 2.4V 2TTL+15pF | |
| | | --- | 4.0 nS | --- | 0.4V to 2.4V 30pF | |
| Oscillation start up time | tOSC | 10 mSec. max. | | | | |

**Note :

Output wave form is not compatible with C-MOS level and TTL level.
 Programmable wave form only for C-MOS level or TTL level.

5. External Dimensions (Unit : mm)



SG-8001JA vs SG-615

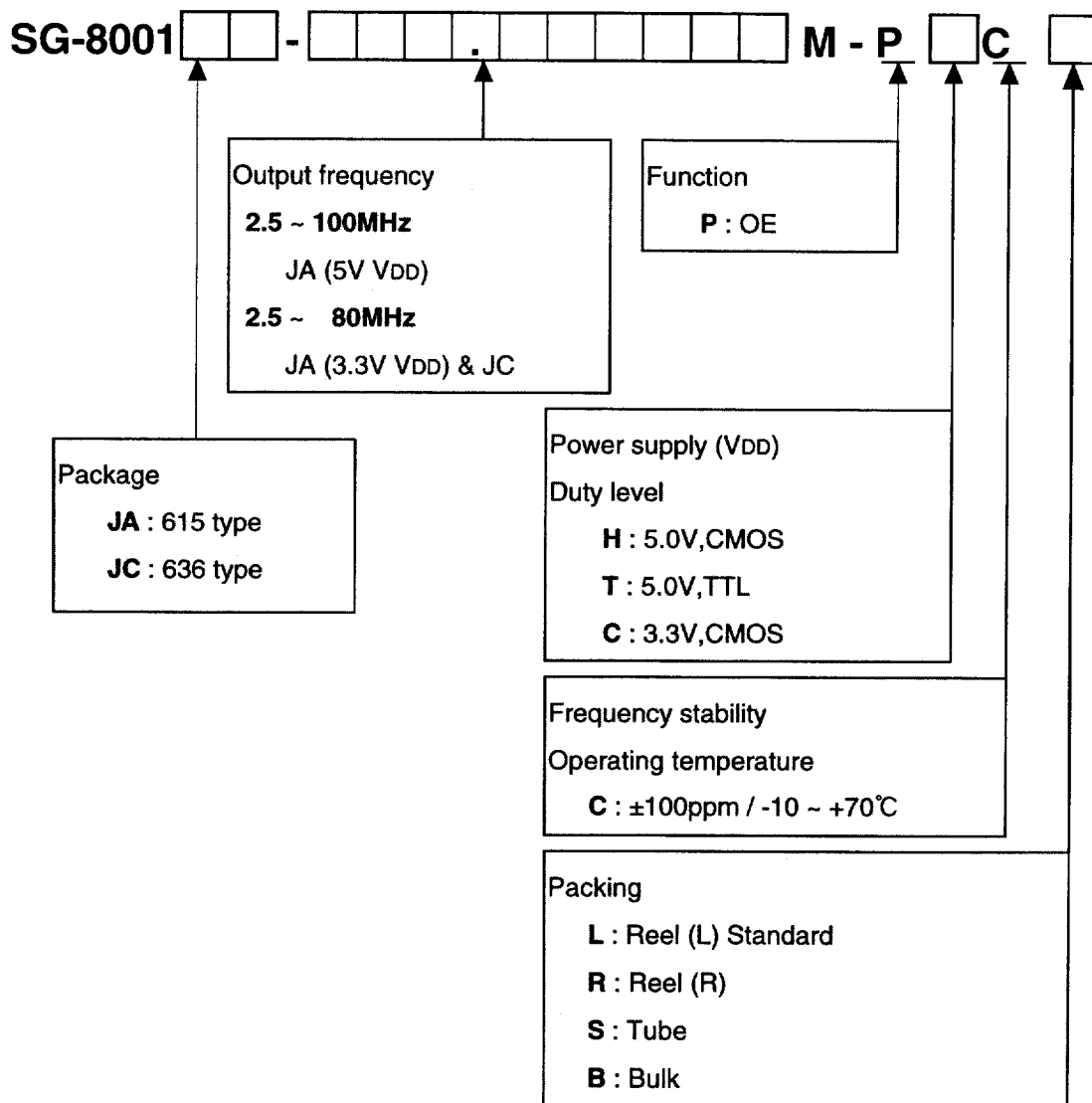
| | SG-8001JA PH | SG-8001JA PT | SG-8001JA PC | SG-615P | SG-615PTJ | SG-615PH | SG-615PCV |
|------------------------|---|---|--|--|-------------------|----------------|-----------------|
| Output Frequency Range | 2.5 ~ 100.0MHz | | 2.5 ~ 80.0MHz | 1.025 ~ 26.0MHz | 26.0 ~ 66.6667MHz | | 40.0 ~ 125.0MHz |
| Maximum Supply Voltage | - 0.5 ~ + 7.0V | | | - 0.3 ~ + 7.0V | | - 0.5 ~ + 7.0V | |
| Storage Temperature | - 55 ~ + 125°C | | | | | | |
| Soldering Temperature | 260°C x 10sec x 2 times or 230°C x within 3 minute | | | | | | |
| Operating Voltage | 4.5 ~ 5.5 V | | 3.0 ~ 3.6V | 4.5 ~ 5.5 V | | | |
| Operating Temperature | -10 ~ +70°C | | | | | | |
| Frequency Stability | C: ± 100 ppm | | | B: ± 50 ppm C: ± 100 ppm | | | C: ± 100 ppm |
| Current Consumption | 45 mA | | 23 mA | 23 mA | 35 mA | | 50 mA |
| Output Disable Current | 30 mA | | 16 mA | 12 mA | 28 mA | 20 mA | 27 mA |
| DUTY | 40% ~ 60% | 45% ~ 55% (up to 80M) 40% ~ 60% (80 to 100M) | 40% ~ 60% (up to 66.7M) 35% ~ 55% (66.7 to 80M) | 40% ~ 60% (C-MOS) 45% ~ 55% (TTL) | 45% ~ 55% | 40% ~ 60% | 35% ~ 60% |
| Output Voltage(Voh) | VDD-0.4 V | | | VDD-0.4 V | 2.4 V | VDD-0.4 V | VDD-0.5 V |
| Output Voltage(Vol) | 0.4 V | | | | | | |
| Output Load Condition | 15 pF | 2 TTL | 15 pF | 50 pF 10TTL | 5 TTL | 50 pF | 25 pF |
| Input Voltage (High) | 2.0 V | | 70%VDD | 2.0 V | 3.5 V | 2.0 V | 70%VDD |
| Input Voltage (Low) | 0.8 V | | 20%VDD | 0.8 V | 1.5 V | 0.8 V | 20%VDD |
| Output Rise Time | 3.5 nSec | 2.5 nSec | 3.5 nSec | 8.0 nSec | 5.0 nSec | 7.0 nSec | 4.0 nSec |
| Output Fall Time | 2.5 nSec | 2.0 nSec | 2.5 nSec | 8.0 nSec | 5.0 nSec | 7.0 nSec | 4.0 nSec |
| Oscillation Start Time | 10 mSec | | | 4 mSec | 10 mSec | | |
| Aging | ± 5 ppm | | | | | | |

SG-8001JC vs SG-636

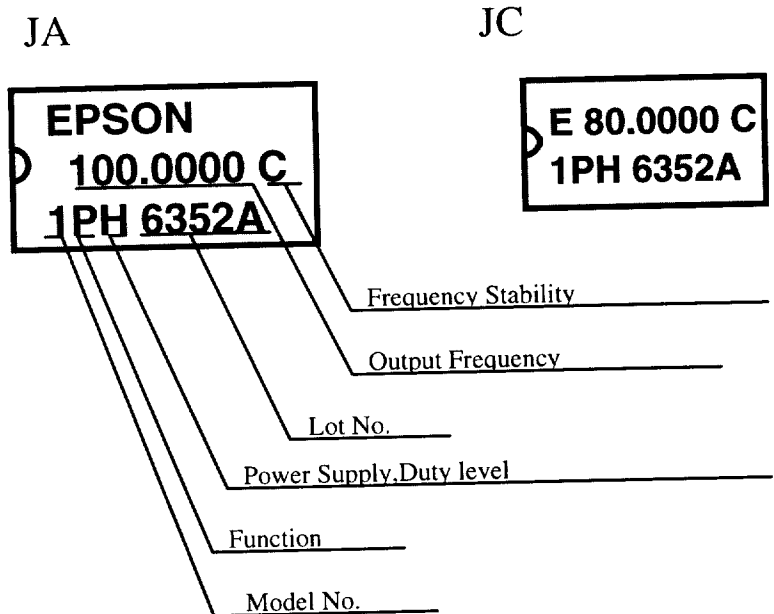
| | SG-8001JC PH | SG-8001JC PT | SG-8001JC PC | SG-636PTF | SG-636PTJ | SG-636PH | SG-636PCV |
|------------------------|---|-----------------|--|--|----------------|----------------|----------------|
| Output Frequency Range | 2.5 ~ 80.0MHz | | | 2.2167 ~ 41.0MHz | 41.0 ~ 70.0MHz | | 40.0 ~ 80.0MHz |
| Maximum Supply Voltage | - 0.5 ~ + 7.0V | | | - 0.3 ~ + 7.0V | - 0.5 ~ + 7.0V | - 0.3 ~ + 7.0V | - 0.5 ~ + 7.0V |
| Storage Temperature | - 55 ~ + 100°C | | | | | | |
| Soldering Temperature | 260°C x 10sec x 2 times or 230°C x within 3 minute | | | | | | |
| Operating Voltage | 4.5 ~ 5.5 V | | 3.0 ~ 3.6V | 4.5 ~ 5.5 V | | | 2.7 ~ 5.5 V |
| Operating Temperature | -10 ~ +70°C | | | | | | |
| Frequency Stability | C: ± 100 ppm | | | | | | |
| Current Consumption | 40 mA | | 23 mA | 17 mA | 35 mA | | 35 mA |
| Output Disable Current | 27 mA | | 16 mA | 10 mA | 28 mA | 20 mA | 25 mA |
| DUTY | 40% ~ 60% | 45% ~ 55% | 40% ~ 60% (up to 66.7M) 35% ~ 55% (66.7 to 80M) | 40% ~ 60% (C-MOS) 45% ~ 55% (TTL) | 45% ~ 55% | 40% ~ 60% | 40% ~ 60% |
| Output Voltage(Voh) | VDD-0.4 V | | | VDD-0.4 V | 2.4 V | VDD-0.4 V | VDD-0.5 V |
| Output Voltage(Vol) | 0.4 V | | | | | | |
| Output Load Condition | 15 pF | 2 TTL | 15 pF | 50 pF 10TTL | 5 TTL | 15 pF | 25 pF |
| Input Voltage (High) | 2.0 V | | 70%VDD | 2.0 V | 3.5 V | 2.0 V | 70%VDD |
| Input Voltage (Low) | 0.8 V | | 20%VDD | 0.8 V | 1.5 V | 0.8 V | 20%VDD |
| Output Rise Time | 3.5 nSec | 2.5 nSec | 3.5 nSec | 7.0 nSec | 5.0 nSec | 5.0 nSec | 4.0 nSec |
| Output Fall Time | 2.5 nSec | 2.0 nSec | 2.5 nSec | 7.0 nSec | 5.0 nSec | 5.0 nSec | 4.0 nSec |
| Oscillation Start Time | 10 mSec | | | 4 mSec | 10 mSec | | |
| Aging | ± 5 ppm | | | | | | |

SG-8001 SAMPLE ORDERING FORMAT

Please specify the following items when ordering sample.



Marking



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EPSON

1997 New Product Catalog

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