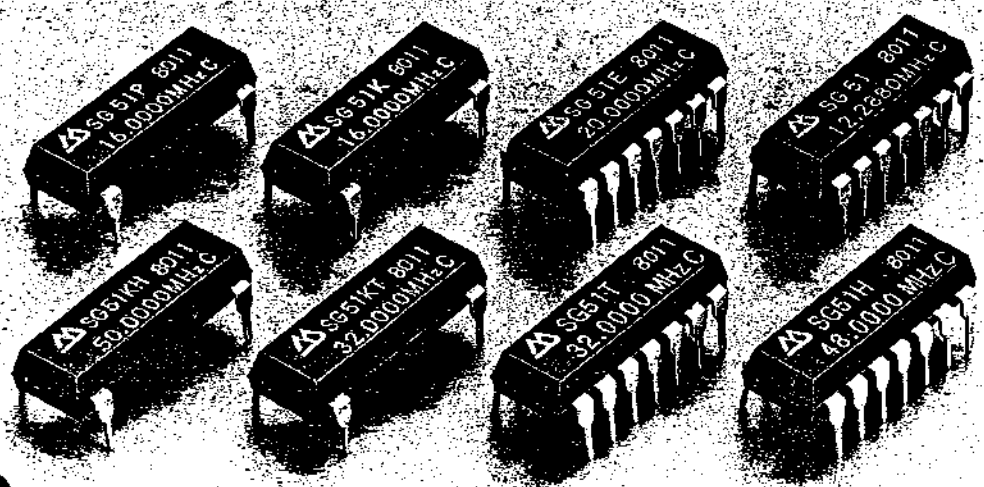


# CMOS CRYSTAL OSCILLATOR SG-51 Series



- SG-51      ● SG-51T
- SG-51K    ● SG-51H
- SG-51E    ● SG-51KT
- SG-51P    ● SG-51KH

- High reliability by cylinder type AT Crystal
  - Automatic mountable
- Lower current consumption by C-MOS IC
  - TTL-10 output load by using C-MOS IC
    - DIP 14 PIN plastic package
  - Output enable with standby function
- DIP4PIN plastic package compatible with metal package oscillator (SG-31 series)

EPSON AMERICA, INC.

**SPECIFICATION (CHARACTERISTICS)**

Item	Symbol	SG-51/51K/51E/51P	
		Specification	Remarks
Output Frequency Range	F <sub>0</sub>	1.5000MHz~25.0000MHz	
Input Voltage	Operating Voltage V <sub>DD</sub>	5.0±0.5V	
	Maximum Supply Voltage V <sub>DD-VSS</sub>	-0.3~+7.0V	
Temperature Range	Operating Temperature T <sub>OPR</sub>	-10~+70°C	
	Storage Temperature T <sub>STG</sub>	-55~+125°C	
Soldering Condition	Lead T <sub>SOL</sub>	Temperature 260°C MAX. For 10sec MAX.	Molding part 150°C MAX.
Frequency Stability	ΔF <sub>0</sub>	C: ±100ppm	
Aging	f <sub>ag</sub>	±20ppm/year Max. ±3ppm/year TYP.	25°C V <sub>DD</sub> =5.0V The first year
Input Current	I <sub>OP</sub>	10mA(12MHz) TYP. 23mA MAX.	Without load
Duty	T <sub>w</sub> /T	40~60%	1.4V or 1/2 V <sub>DD</sub> level
Output Voltage	V <sub>OH</sub>	V <sub>DD</sub> -0.4V MIN.	I <sub>OH</sub> =-400mA
	V <sub>OL</sub>	0.4V MAX.	I <sub>OL</sub> =16mA
Input Voltage (SG-51E,51P)	V <sub>IH</sub>	2.0V MIN.	I <sub>IH</sub> =1μA (V <sub>IH</sub> =V <sub>DD</sub> )
	V <sub>IL</sub>	0.8V MAX.	I <sub>IL</sub> =-100μA (V <sub>IL</sub> =GND)
Output Rise Time	t <sub>RLH</sub>	8 nsec MAX. 5 nsec TYP.	C-MOS Load:20% V <sub>DD</sub> ↔80%V <sub>DD</sub> TTL Load:0.4V↔2.4V Refer to the timing chart
Output Fall Time	t <sub>rHL</sub>	8 nsec MAX. 5 nsec TYP.	
Oscillation Time	t <sub>osc</sub>	10 msec MAX. 0.3 msec TYP.(12MHz MIN.)	t of rise time 4.5V should be 0 more than 150μsec. at V <sub>DD</sub> =0~4.5V

NOTES: Characteristics is standard by above-mentioned operating temperature and input voltage without any notes.

**FREQUENCY LIST**

Model	Frequency	2.5MHz	25MHz	30MHz	36MHz	54.999MHz
SG-51,51K,51E,51P						
SG-51T,SG-51KT						
SG-51H,SG-51KH						

**OUTPUT FREQUENCIES(TYPICAL)**

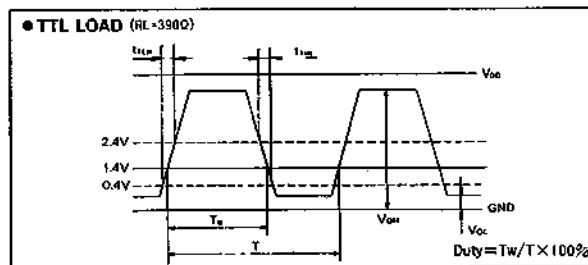
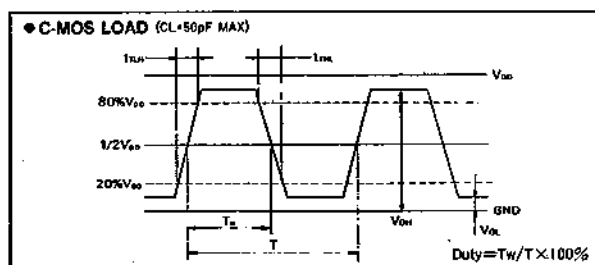
Model	Output Frequencies	
SG-51 51K 51E 51P	2.4576MHz	3.0720MHz
	4.0000MHz	4.9152MHz
	6.0000MHz	6.1440MHz
	8.0000MHz	9.2160MHz
	9.8304MHz	10.0000MHz
	12.0000MHz	12.2880MHz
	16.0000MHz	18.4320MHz
	19.6608MHz	20.0000MHz
	24.0000MHz	
	SG-51T 51KT	30.0000MHz
33.3333MHz		36.0000MHz
SG-51H 51KH	30.0000MHz	32.0000MHz
	33.3333MHz	36.0000MHz
	40.0000MHz	48.0000MHz
	50.0000MHz	

**FUNCTION LIST**

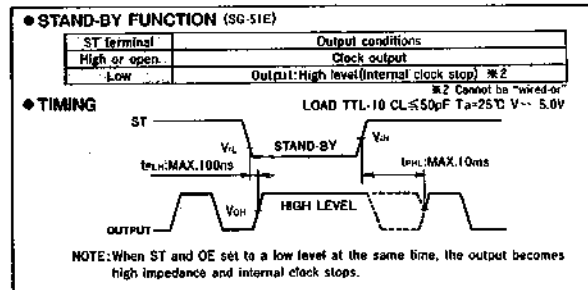
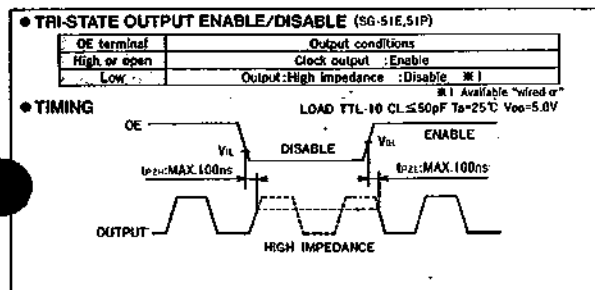
Model	Terminal		Load Condition		Output Control Function	
	DIP 14PIN	DIP 4PIN	C-MOS	TTL-10	OE Function	ST Function
SG-51	○		○	○		
SG-51K		○	○	○		
SG-51E	○		○	○		○
SG-51P		○	○	○	○	
SG-51T	○			○		
SG-51H	○		○			
SG-51KT		○		○		
SG-51KH		○	○			

SG-51J/51KT		SG-51H/51KH	
Specification	Remarks	Specification	Remarks
25.0000MHz~36.0000MHz		30.0000MHz~54.9999MHz	
5.0±0.5V		5.0±0.5V	
-0.3~+7.0V		-0.3~+7.0°C	
-10~+70°C		-10~+70°C	
-55~+100°C		-55~+100°C	
Temperature 260°C MAX. For 10sec MAX.	Molding part 150°C MAX.	Temperature 260°C MAX. For 10sec MAX.	Molding part 150°C MAX.
C: ±100ppm		C: ±100ppm	
±20ppm/year MAX. ±3ppm/year TYP.	25°C, V <sub>DD</sub> =5.0V The first year	±20ppm/year MAX. ±3ppm/year TYP.	25°C, V <sub>DD</sub> =5.0V The first year
35mA MAX. 25mA(32MHz)TYP.	Without load	32mA MAX. 20mA(54MHz)TYP.	Without load
40~60%	1.4V level	40~60%	1/2 V <sub>DD</sub> level
V <sub>DD</sub> -0.4V MIN.	I <sub>OH</sub> =-400μA	V <sub>DD</sub> -0.37V MIN.	I <sub>OH</sub> =-4mA
0.4V MAX.	I <sub>OL</sub> =16mA	0.37V MAX.	I <sub>OL</sub> =4mA
10nsec MAX. 5nsec TYP.	TTL load:0.4V→2.4V Refer to the timing chart	7nsec MAX. 3.5nsec TYP.	C-MOS load: 20%V <sub>DD</sub> ↔80%V <sub>DD</sub> Refer to the timing chart
8nsec MAX. 3nsec TYP.		7nsec MAX. 3.5nsec. TYP.	
10msec. MAX. 5msec TYP.	t of rise time 4.5V should be 0 more than 1msec. at V <sub>DD</sub> =0~4.5V	10msec. MAX. 3msec TYP.	t of rise time 4.5V should be 0 more than 1msec. at V <sub>DD</sub> =0~4.5V

OUTPUT WAVEFORM



OUTPUT ENABLE & STAND-BY



**RELIABILITY TEST**

2H-24HS later than test

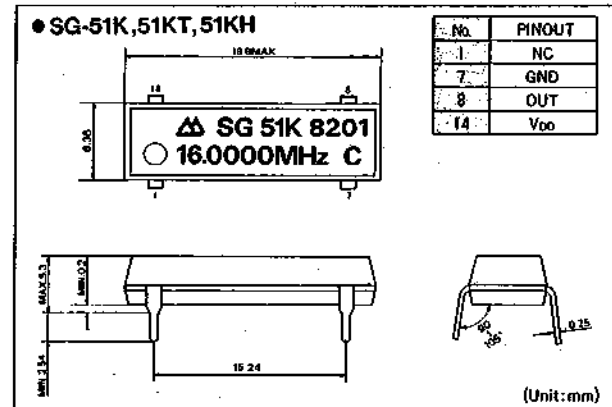
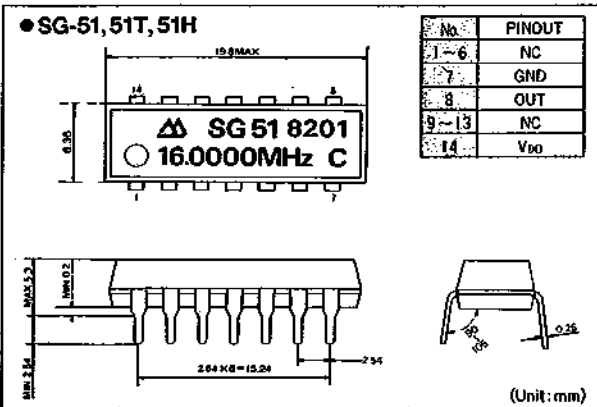
Test Items	Conditions	Standard	Conform to test way
Continuous operating	70°C × 5V × 1000H	± 20ppm *1	JIS C-7022 B-1
High Temperature and Humidity bias	85°C × 85% × 5V × 1000H	± 20ppm *1, *2	JIS C-7022 B-5
Temperature Cycle	-55°C ↔ 125°C × no input voltage 100 cycle, Leave it 30 min, by each temperature	*1	JIS C-7022 A-4
Steam Pressurization (P.C.T.)	121°C × 2 atoms (96%) × 5V × 96H	*1	EIAJ-SD-121 18
Oscillation	10-500Hz 15mmp-p or 10G 10Hz → 500Hz → 10Hz 15min./cycle Logarithm 6H (3 direction 2H each)	± 10ppm *1	JIS C-7022 A-10
Shock Resistance	Dropping 3 times from a height of 750mm on to a hard wooden plate. (Approx. 5000G)	± 20ppm *1	JIS C-7022 A-8
Solder heat resistance	To dipping it for 10 second above 1mm from the lead terminal in the solder bath with 260°C ± 10°C	± 10ppm *1	JIS C-7022 A-1

**NOTES:**

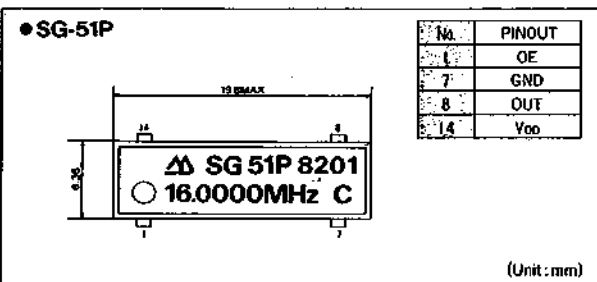
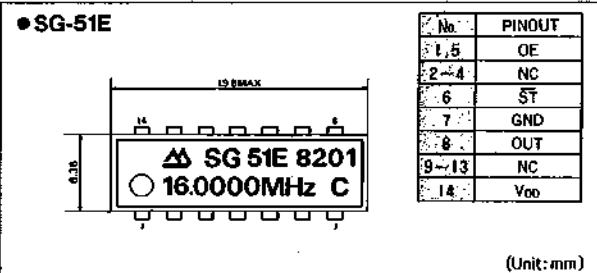
This test is enforced at our company. Each item is individual test.

\* The above-mentioned standard makes a maximum value for the frequency variation.  
 1. Should be satisfied with the electrical character after reliability test.  
 2. Should be operated at testing atmosphere.

**Dimensions**



\*Indicating content give an example.



**NOTES**

- C-MOS IC is assembled.  
Should be careful to the static electricity.
- Please put over 0.1μF capacitor in between V<sub>DD</sub> and V<sub>SS</sub> in order to keep a stability movement.
- Please put over 1ms of rise time for capacitor.
- Ultrasonic clean or insertor are available to use.  
Please check the condition of the use.
- Quartz crystal is assembled.  
Please don't put the excessive shock,  
We'd like to recommend an ordinary temperature and humidity conditions to keep the accuracy.
- The same care should be exercised as IC.

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To order in America and Canada, contact:  
**EPSON AMERICA, INC.**  
 The Component Sales Department

● All specifications of this device are subject to change without notice. February 1988. Printed in Japan.