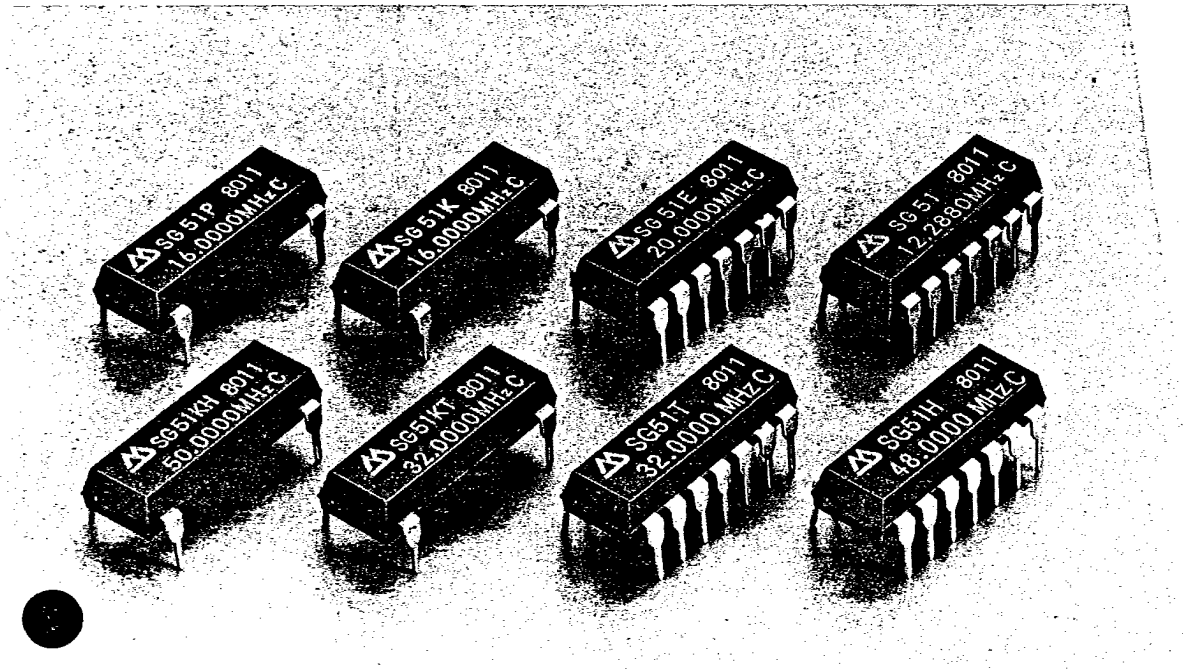
CMOS CRYSTAL OSCILLATOR
SG-51 Series



- 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)

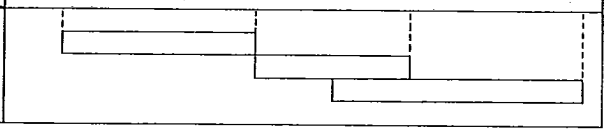
EPSON AMERICA, INC.

■SPECIFICATION (CHARACTERISTICS)

Item		Symbol	SG-51/51K/51E/51P	
			Specification	Remarks
Output Frequency Range		F_O	1.5000MHz~25.0000MHz	
Input Voltage	Operating Voltage	V_{DD}	5.0±0.5V	
	Maximum Supply Voltage	V_{DD}-V_{SS}	−0.3~+7.0V	
Temperature Range	Operating Temperature	T_{OPR}	−10~+70℃	
	Storage Temperature	T_{STG}	−55~+125℃	
Soldering Condition	Lead	T_{SOL}	Temperature 260℃ MAX. For 10sec MAX.	Molding part 150℃ MAX.
Frequency Stability		$\triangle F_O$	C: ±100ppm	
Aging		fag	±20ppm/year Max. ±3ppm/year TYP.	25℃ V_{DD}=5.0V The first year
Input Current		I_{OP}	10mA(12MHz) TYP. 23mA MAX.	Without load
Duty		T_W/T	40~60%	1.4V or 1/2 V_{DD} level
Output Voltage		V_{OH}	V_{DD}−0.4V MIN.	I_{OH}=−400mA
		V_{OL}	0.4V MAX.	I_{OL}=16mA
Input Voltage (SG-51E,51P)		V_{IH}	2.0V MIN.	I_{IH}=1μA (V_{IH}=V_{DD})
		V_{IL}	0.8V MAX.	I_{IL}=−100μA (V_{IL}=GND)
Output Rise Time		t_{TLH}	8 nsec MAX. 5 nsec TYP.	C-MOS Load:20% V_{DD}↔80%V_{DD} TTL Load:0.4V↔2.4V Refer to the timing chart
Output Fall Time		t_{THL}	8 nsec MAX. 5 nsec TYP.	
Oscillation Time		tosc	10 msec MAX. 0.3 msec TYP.(12MHz MIN.)	t of rise time 4.5V should be 0 more than 150μsec. at V_{DD}=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 4.0000MHz 6.0000MHz 8.0000MHz 9.8304MHz 12.0000MHz 16.0000MHz 19.6608MHz 24.0000MHz	3.0720MHz 4.9152MHz 6.1440MHz 9.2160MHz 10.0000MHz 12.2880MHz 18.4320MHz 20.0000MHz
SG-51T 51KT	30.0000MHz 33.3333MHz	32.0000MHz 36.0000MHz
SG-51H 51KH	30.0000MHz 33.3333MHz 40.0000MHz 50.0000MHz	32.0000MHz 36.0000MHz 48.0000MHz

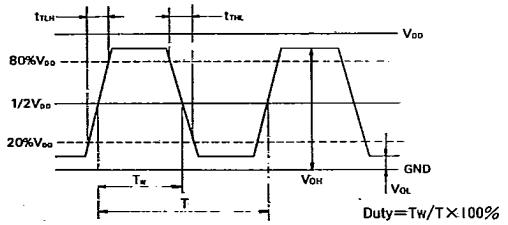
■FUNCTION LIST

Model	Terminal		Load Condition		Output Control Function	
	DIP14PIN	DIP 4PIN	C-MOS	TTL-IO	OE Function	$\overline{ST}$ Function
SG-51	○		○	○		
SG-51K		○	○	○		
SG-51E	○		○	○	○	○
SG-51P		○	○	○	○	
SG-51T	○			○		
SG-51H	○		○			
SG-51KT		○		○		
SG-51KH		○	○			

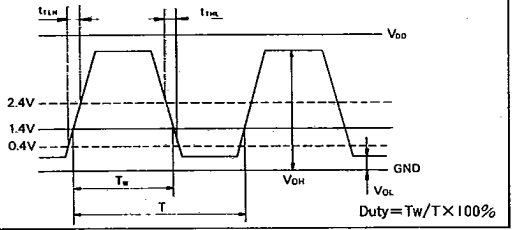
SG-51T/51KT		SG-51H/51KH	
Specification	Remarks	Specification	Remarks
25.0000MHz~36.0000MHz		30.0000MHz~54.9999MHz	
5.0±0.5V		5.0±0.5V	
−0.3~+7.0V		−0.3~+7.0℃	
−10~+70℃		−10~+70℃	
−55~+100℃		−55~+100℃	
Temperature 260℃ MAX. For 10sec MAX.	Molding part 150℃ MAX.	Temperature 260℃ MAX. For 10sec MAX.	Molding part 150℃ MAX.
C: ±100ppm		C: ±100ppm	
±20ppm/year MAX. ±3ppm/year TYP.	25℃, V_{DD}=5.0V The first year	±20ppm/year MAX. ±3ppm/year TYP.	25℃, V_{DD}=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_{DD} level
V_{DD}−0.4V MIN.	I_{OH}=−400μA	V_{DD}−0.37V MIN.	I_{OH}=−4mA
0.4V MAX.	I_{OL}=16mA	0.37V MAX.	I_{OL}=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_{DD}↔80%V_{DD} 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_{DD}=0~4.5V	10msec. MAX. 3msec TYP.	t of rise time 4.5V should be 0 more than 1msec. at V_{DD}=0~4.5V

■OUTPUT WAVEFORM

● C-MOS LOAD (CL=50pF MAX)



● TTL LOAD (RL=390Ω)



■OUTPUT ENABLE & STAND-BY

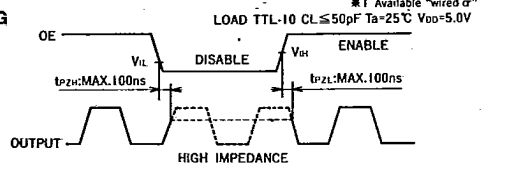
● TRI-STATE OUTPUT ENABLE/DISABLE (SG-51E,51P)

OE terminal	Output conditions
High or open	Clock output :Enable
Low	Output:High impedance :Disable ※1

※1 Available "wired or"

● TIMING

LOAD TTL-10 CL≦50pF Ta=25℃ V_{DD}=5.0V



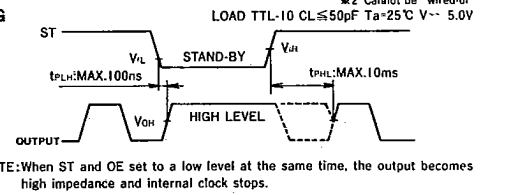
● STAND-BY FUNCTION (SG-51E)

ST terminal	Output conditions
High or open	Clock output
Low	Output:High level(Internal clock stop) ※2

※2 Cannot be "wired-or"

● TIMING

LOAD TTL-10 CL≦50pF Ta=25℃ V~ 5.0V



NOTE: When ST and OE set to a low level at the same time, the output becomes high impedance and internal clock stops.

SG-51 Series

■RELIABILITY TEST

2H-24HS later than test

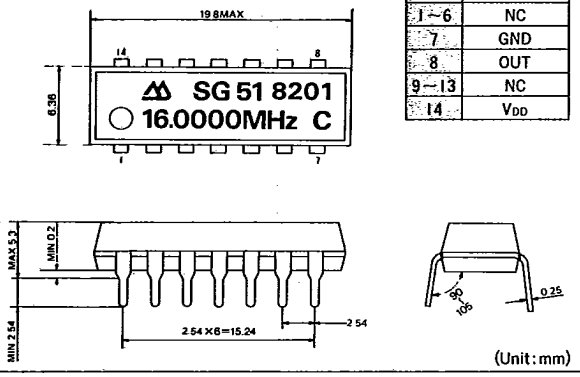
Test Items	Conditions	Standard	Conform to test way
Continuous operating	70℃ ×5V×1000H	±20ppm *1	JIS C-7022 B-1
High Temperature and Humidity bias	85℃ ×85% ×5V×1000H	±20ppm *1, *2	JIS C-7022 B-5
Temperature Cycle	−55℃↔125℃ ×no input voltage 100 cycle, Leave it 30 min, by each temperature	——— *1	JIS C-7022 A-4
Steam Pressurization (P. C. T.)	121℃ ×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℃ ±10℃	±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

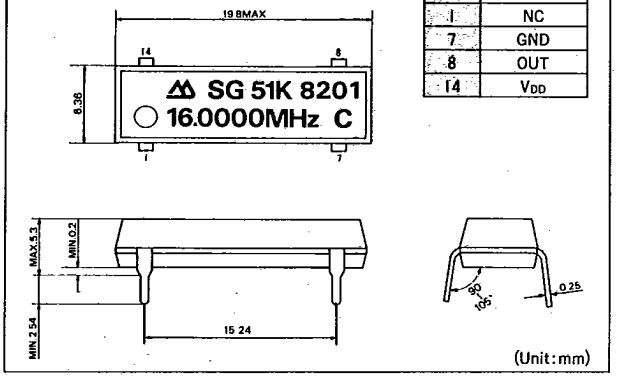
● SG-51, 51T, 51H



No.	PINOUT
1~6	NC
7	GND
8	OUT
9~13	NC
14	V_{DD}

(Unit:mm)

● SG-51K, 51KT, 51KH

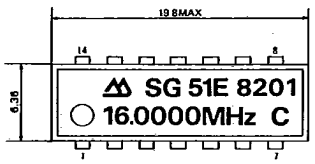


No.	PINOUT
1	NC
7	GND
8	OUT
14	V_{DD}

(Unit:mm)

※Indicating content give an example.

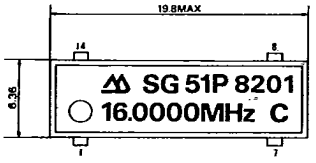
● SG-51E



No.	PINOUT
1, 5	OE
2~4	NC
6	$\overline{ST}$
7	GND
8	OUT
9~13	NC
14	V_{DD}

(Unit:mm)

● SG-51P



No.	PINOUT
1	OE
7	GND
8	OUT
14	V_{DD}

(Unit:mm)

■NOTES

- C-MOS IC is assembled.
  Should be careful to the static electricity.
- Please put over 0.1μF capacitor in between V_{DD} and V_{SS} in order to keep a stabillity 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:
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The Component Sales Department

● All specifications of this device are subject to change without notice.

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