

Product name SG-210STF 20.000000 MHz L

Product Number / Ordering code X1G0041710029xx

Please refer to the 8.Packing information about xx (last 2 digits)

Output waveform CMOS

Pb free / Complies with EU RoHS directive

Reference weight Typ. 12 mg

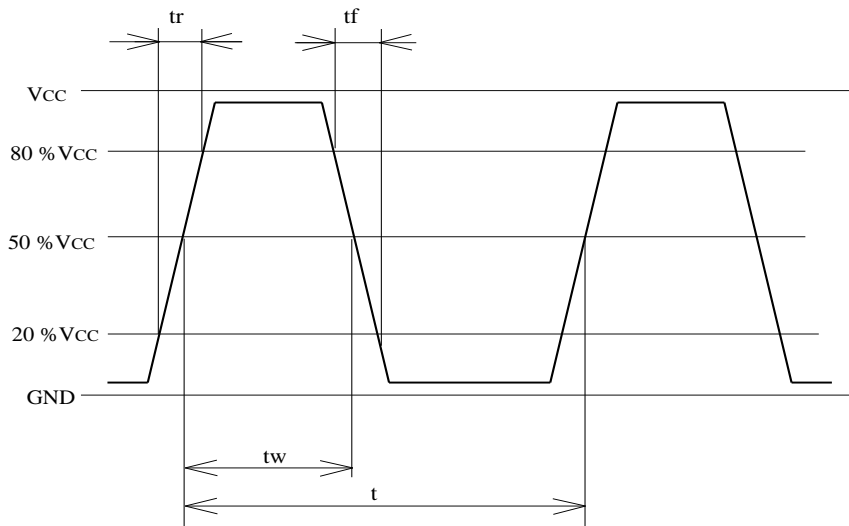
**1.Absolute maximum ratings**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Remarks
Maximum supply voltage	V <sub>cc</sub> -GND	-0.3	-	+4	V	-
Storage temperature	T <sub>stg</sub>	-40	-	+125	°C	Storage as single product
Input voltage	V <sub>in</sub>	-0.3	-	V <sub>cc</sub> +0.3	V	ST terminal

**2.Specifications(characteristics)**

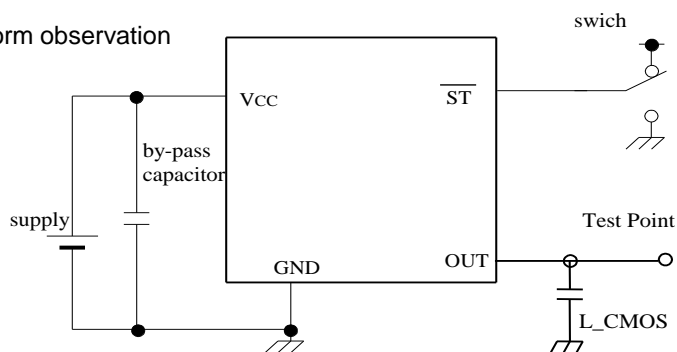
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Remarks
Output frequency	f <sub>0</sub>		20.000000		MHz	
Supply voltage	V <sub>cc</sub>	1.6	-	3.6	V	-
Operating temperature	T <sub>use</sub>	-40	-	+85	°C	-
Frequency tolerance	f <sub>tol</sub>	-50	-	50	x10 <sup>-6</sup>	T <sub>use</sub>
Current consumption	I <sub>cc</sub>	-	-	1.8	mA	No load condition V <sub>cc</sub> = 3.6V
Stand-by current	I <sub>std</sub>	-	-	2.7	μA	V <sub>cc</sub> = 3.6V, ST = GND
Symmetry	SYM	45	-	55	%	50% V <sub>cc</sub> Level L <sub>CMOS</sub> =<15pF
Output voltage	V <sub>OH</sub>	V <sub>cc</sub> -0.4	-	-		-
	V <sub>OL</sub>	-	-	0.4		-
Output load condition	L <sub>CMOS</sub>	-	-	15	pF	CMOS Load
Input voltage	V <sub>IH</sub>	0.8V <sub>cc</sub>	-	-		ST terminal
	V <sub>IL</sub>	-	-	0.2V <sub>cc</sub>		ST terminal
Rise time	t <sub>r</sub>	-	-	3.5	ns	V <sub>cc</sub> 1.8V±10% : 0.2V <sub>cc</sub> to 0.8V <sub>cc</sub> Level, L <sub>CMOS</sub> =15pF
Fall time	t <sub>f</sub>	-	-	3.5	ns	V <sub>cc</sub> 1.8V±10% : 0.2V <sub>cc</sub> to 0.8V <sub>cc</sub> Level, L <sub>CMOS</sub> =15pF
Start-up time	t <sub>str</sub>	-	-	3	ms	t = 0 at 0.9V <sub>cc</sub>
Jitter	t <sub>DJ</sub>	-	0	-	ps	Deterministic Jitter V <sub>cc</sub> =3.3V
	t <sub>RJ</sub>	-	2.4	-	ps	Random Jitter V <sub>cc</sub> =3.3V
	t <sub>RMS</sub>	-	2.3	-	ps	δ(RMS of total distribution) V <sub>cc</sub> =3.3V
	t <sub>p-p</sub>	-	20	-	ps	Peak to Peak V <sub>cc</sub> =3.3V
	t <sub>acc</sub>	-	2.5	-	ps	Accumulated Jitter(δ) n=2 to 50000 cycles
Phase jitter	t <sub>PJ</sub>	-	0.5	-	ps	Off set Frequency: 12kHz to 20MHz, V <sub>cc</sub> =3.3V
Phase noise	L(f)	-	-	-	dBc/Hz	-
		-	-96	-	dBc/Hz	Off set 10Hz V <sub>cc</sub> =3.3V
		-	-125	-	dBc/Hz	Off set 100Hz V <sub>cc</sub> =3.3V
		-	-146	-	dBc/Hz	Off set 1kHz V <sub>cc</sub> =3.3V
		-	-155	-	dBc/Hz	Off set 10kHz V <sub>cc</sub> =3.3V
		-	-158	-	dBc/Hz	Off set 100kHz V <sub>cc</sub> =3.3V
		-	-159	-	dBc/Hz	Off set 1MHz V <sub>cc</sub> =3.3V
Frequency aging	f <sub>age</sub>	-3	-	3	x10 <sup>-6</sup>	@+25°C first year
		-	-	-		-

### 3. Timing chart

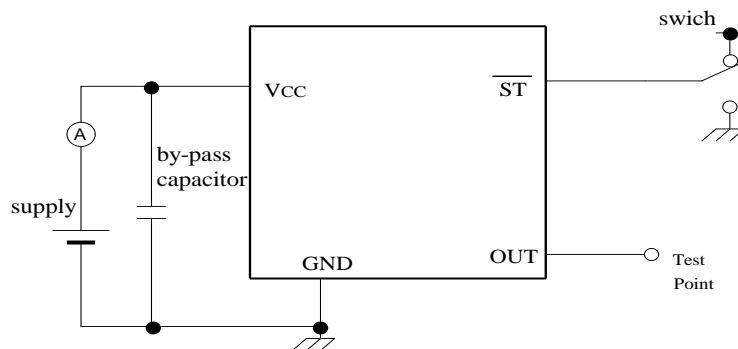


### 4. Test circuit

#### 1) Waveform observation



#### 2) Current consumption



\*Current consumption under the disable function should be = GND.

#### 3) Condition

##### (1) Oscilloscope

- Band width should be minimum 5 times higher (wider) than measurement frequency.
- Probe earth should be placed closely from test point and lead length should be as short as possible

\* Recommendable to use miniature socket. (Don't use earth lead.)

##### (2) L\_CMOS also includes probe capacitance.

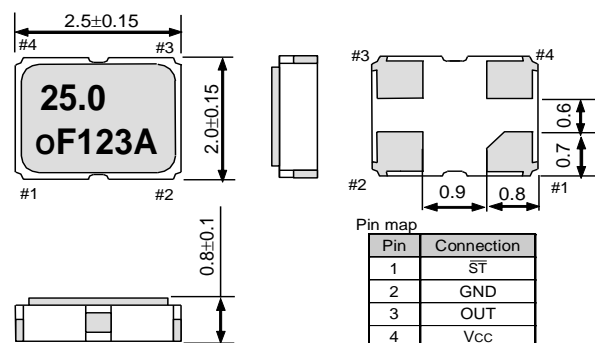
(3) By-pass capacitor (0.01  $\mu$ F to 0.1  $\mu$ F) is placed closely between VCC and GND.

(4) Use the current meter whose internal impedance value is small.

##### (5) Power supply

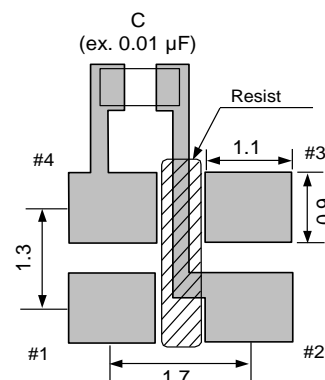
- Start up time (0 %VCC to 90 %VCC) of power source should be more than 150  $\mu$ s.
- Impedance of power supply should be as lowest as possible.

5.External dimensions (Unit: mm)	
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Note.  
 $\overline{\text{ST}}$  pin = HIGH or "open" : Specified frequency output.  
 $\overline{\text{ST}}$  pin = LOW : Output is high impedance, oscillation stops.

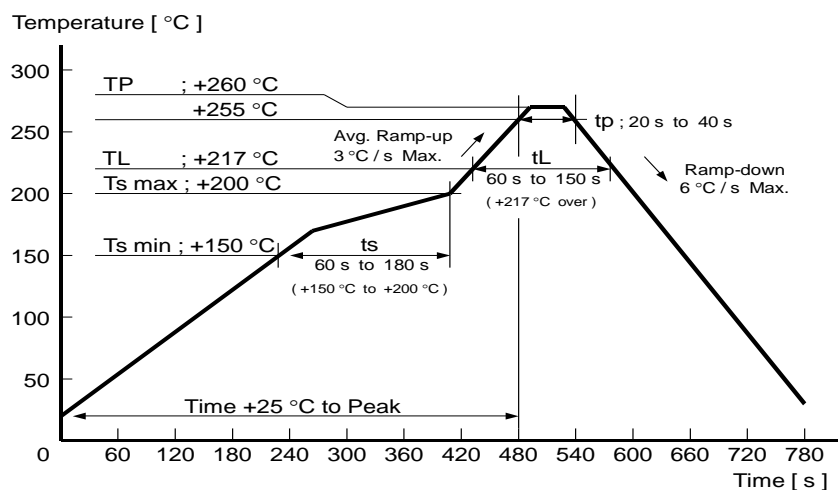
6.Footprint(Recommended)	(Unit: mm)
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To maintain stable operation, provide a 0.01uF to 0.1uF by-pass capacitor at a location as near as possible to the power source terminal of the crystal product (between Vcc - GND).

## 7.Reflow profile

Reflow condition (Follow of JEDEC STD-020D.01)



## 8.Packing information

[ 1 ]	Product number last 2 digits code(xx)	description
01	01	01
02	02	02
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The recommended code is "00"

X1G0041710029xx

Code	Condition	Code	Condition
01	Any Q'ty vinyl bag(Tape cut)	14	1000pcs / Reel
11	Any Q'ty / Reel	15	2000pcs / Reel
12	250pcs / Reel	00	3000pcs / Reel

[ 2 ] Taping specification

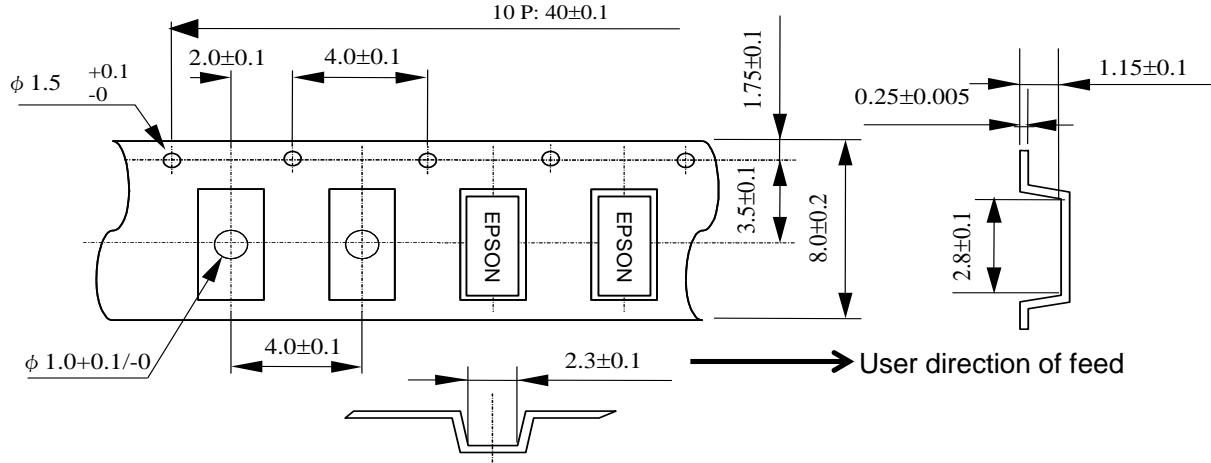
Subject to EIA-481 & IEC-60286

(1) Tape dimensions

Material of the Carrier Tape : PS

Material of the Top Tape : PET+PE

Unit: mm

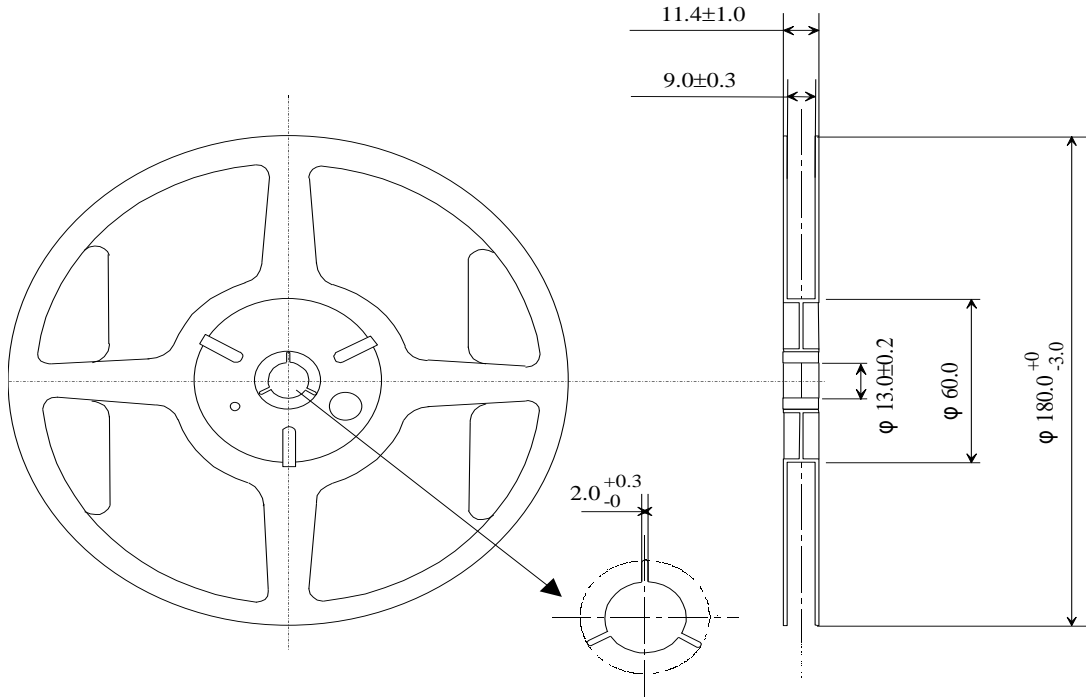


(2) Reel dimensions

Center material : PS

Material of the Reel : PS

Unit: mm



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