

Product name MG7050EAN 100.000000MHz 4ADJDN

Product Number / Ordering code X1M0004110021xx

Please refer to the 10.Packing information about xx (last 2 digits)

Output waveform LV-PECL

Pb free / Complies with EU RoHS directive

Reference weight Typ. 163 mg

**1.Absolute maximum ratings**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Remarks
Maximum supply voltage	V <sub>cc-GND</sub>	-0.5	-	4	V	
Storage temperature	T <sub>stg</sub>	-55	-	125	°C	Storage as single product
Input voltage	V <sub>in</sub>	-0.5	-	V <sub>cc</sub> +0.5	V	ST or OE terminal

**2.Specifications(characteristics)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Remarks
Output frequency	f <sub>0</sub>		100.0000		MHz	4 output
Supply voltage	V <sub>cc</sub>	2.375	2.5	2.625	V	
Operating temperature	T <sub>use</sub>	-5	-	85	°C	
Frequency tolerance	f <sub>tol</sub>	-50	-	50	x10 <sup>-6</sup>	T <sub>use</sub>
Current consumption	I <sub>cc</sub>	-	125	170	mA	L <sub>ECL</sub> =50Ω
Stand-by current	I <sub>std</sub>	-	-	-	mA	-
Disable current	I <sub>dis</sub>	-	7	18.0	mA	OE=GND
Symmetry	SYM	45	-	55	%	At output crossing point
Output voltage(LV-PECL)	V <sub>OH</sub>	V <sub>cc</sub> -1.025	-	V <sub>cc</sub> -0.88	V	DC characteristics
	V <sub>OL</sub>	V <sub>cc</sub> -1.81	-	V <sub>cc</sub> -1.62	V	
Output load condition(ECL)	L <sub>ECL</sub>	-	50	-	Ω	Terminated to V <sub>cc</sub> -2.0V
Input voltage	V <sub>IH</sub>	70%V <sub>cc</sub>	-	-		OE ans FAEL terminal
	V <sub>IL</sub>	-	-	30%V <sub>cc</sub>		
Rise time	t <sub>r</sub>	-	200	400	ps	Between 20% and 80% of (V <sub>OH</sub> -V <sub>OL</sub> )
Fall time	t <sub>f</sub>	-	200	400	ps	Between 20% and 80% of (V <sub>OH</sub> -V <sub>OL</sub> )
Start-up time	t <sub>str</sub>	-	5	10	ms	Time at minimum supply voltage to be 0s
Jitter	t <sub>DJ</sub>	-	-	N/A	ps	Deterministic Jitter
	T <sub>RJ</sub>	-	-	N/A	ps	Random Jitter
	t <sub>RMS</sub>	-	-	N/A	ps	σ(RMS of total distribution)
	t <sub>p-p</sub>	-	-	N/A	ps	Peak to Peak
	t <sub>acc</sub>	-	-	N/A	ps	Accumulated jitter
Phase jitter	t <sub>pJ</sub>	-	0.17	0.3	ps	Offset frequency 12 kHz to 20 MHz
Phase noise	L(f)	-	-	-	dBc/Hz	Offset:1 Hz
		-	-57.2	-	dBc/Hz	Offset:10 Hz
		-	-88.1	-	dBc/Hz	Offset:100 Hz
		-	-118.2	-	dBc/Hz	Offset:1 kHz
		-	-145.4	-	dBc/Hz	Offset:10 kHz
		-	-152.5	-	dBc/Hz	Offset:100 kHz
		-	-154.7	-	dBc/Hz	Offset:1 MHz
Skew	t <sub>skew</sub>	-	-	50	ps	FSEL = H
Frequency aging	f <sub>age</sub>	-10	-	10	x10 <sup>-6</sup> /Year	@+25°C first year
		-	-	-		-

### 3. Test circuit

#### 1) Measurement condition

##### (1) Oscilloscope

- Bandwidth should be 5 times higher than DUT's output frequency (4 GHz).
- Probe ground should be placed closely from test point and lead length should be as short as possible.

##### (2) By-pass capacitor 1 (approx. 0.01 $\mu\text{F}$ to 0.1 $\mu\text{F}$ ) places closely between $V_{\text{cc}}$ and GND.

##### (3) By-pass capacitor 2 (approx. 10 $\mu\text{F}$ ) places closely between power supply terminals on the board.

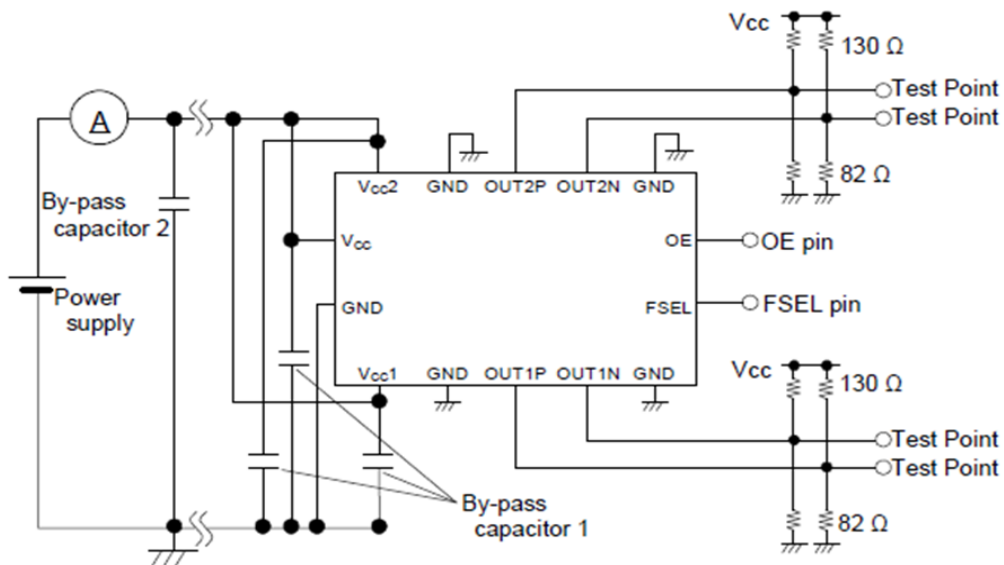
##### (4) Use the current meter whose internal impedance value is small.

##### (5) Power supply

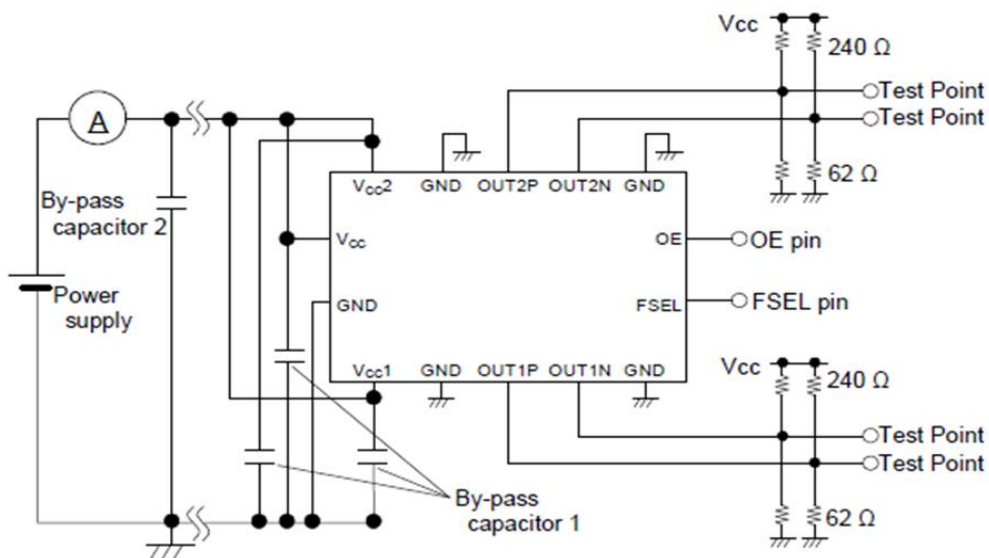
- Start up time (0 V  $\rightarrow$  90 %  $V_{\text{cc}}$ ) of power source should be more than 150  $\mu\text{s}$  and slew rate should be less than 19.8 mV/ $\mu\text{s}$ .
- Impedance of power supply should be as low as possible.

#### 2) 2 outputs type

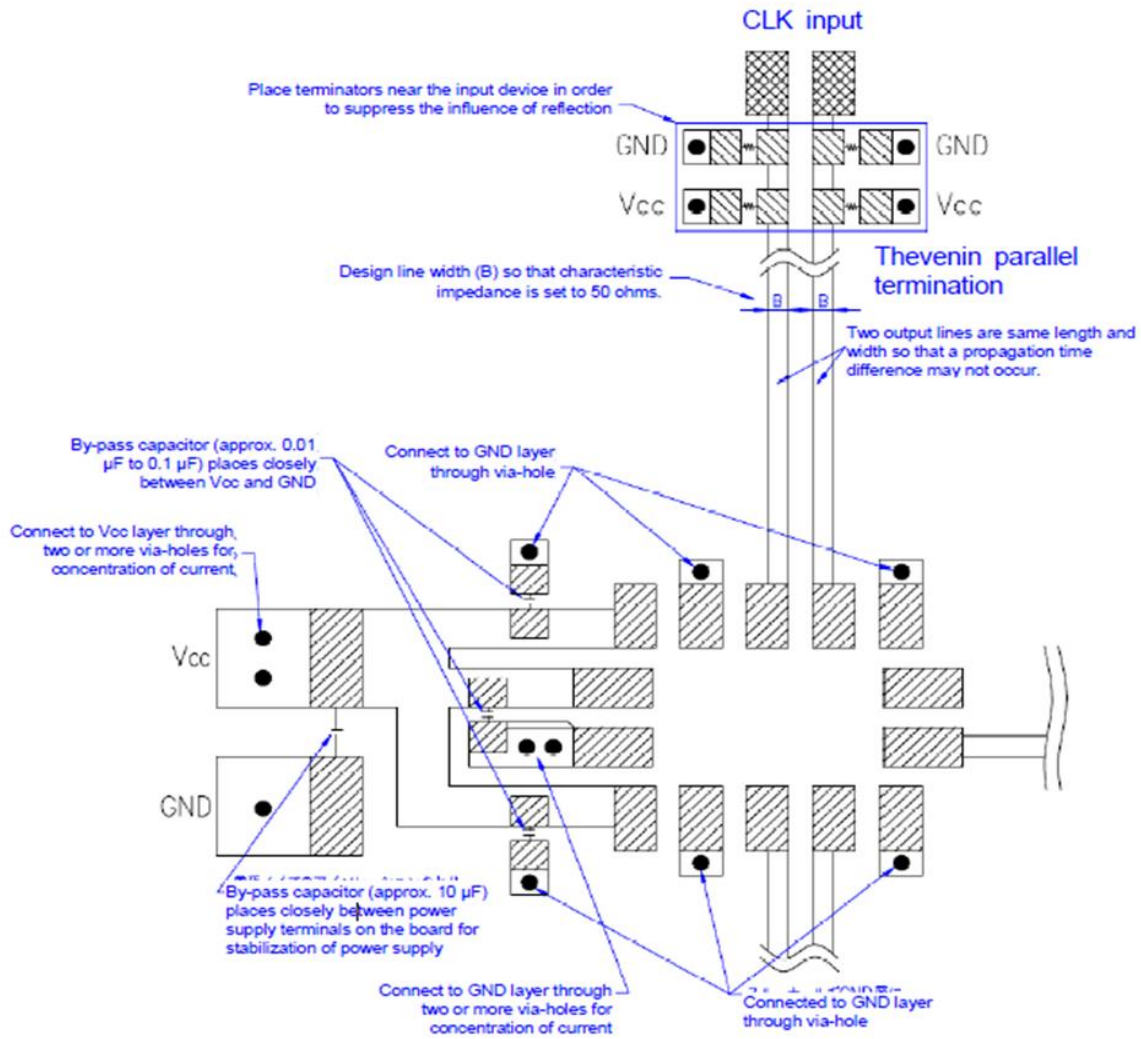
##### (1) To observe waveform and current $V_{\text{cc}} = 3.3\text{V}$



##### (2) To observe waveform and current $V_{\text{cc}} = 2.5\text{V}$

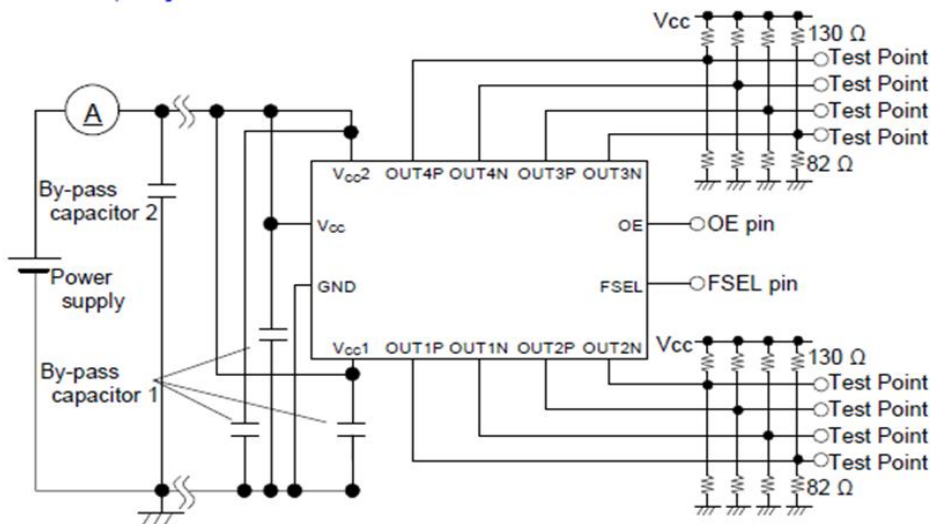


(3)PCB layout (multilayers, with Vcc and GND layer inside)

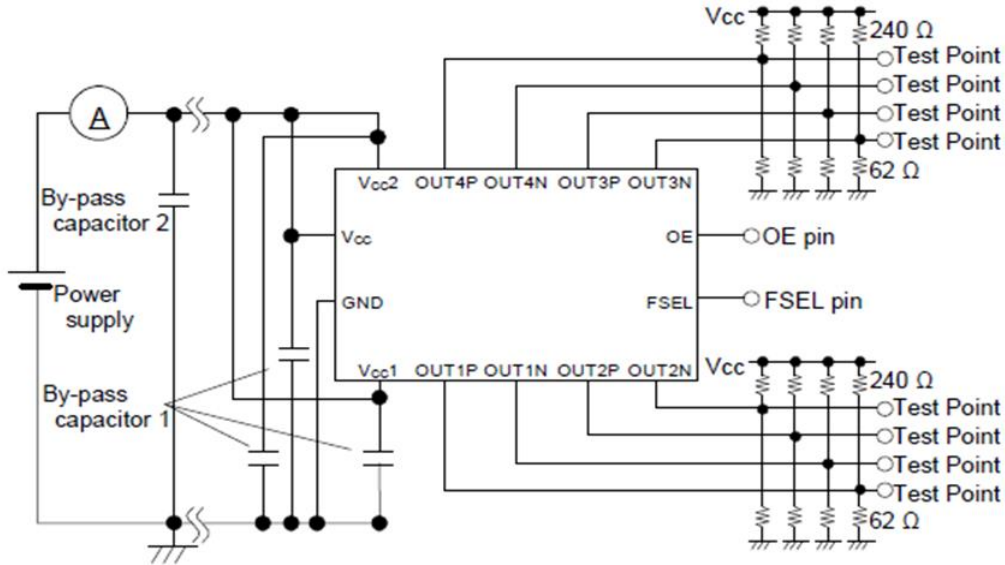


3) 4 outputs type

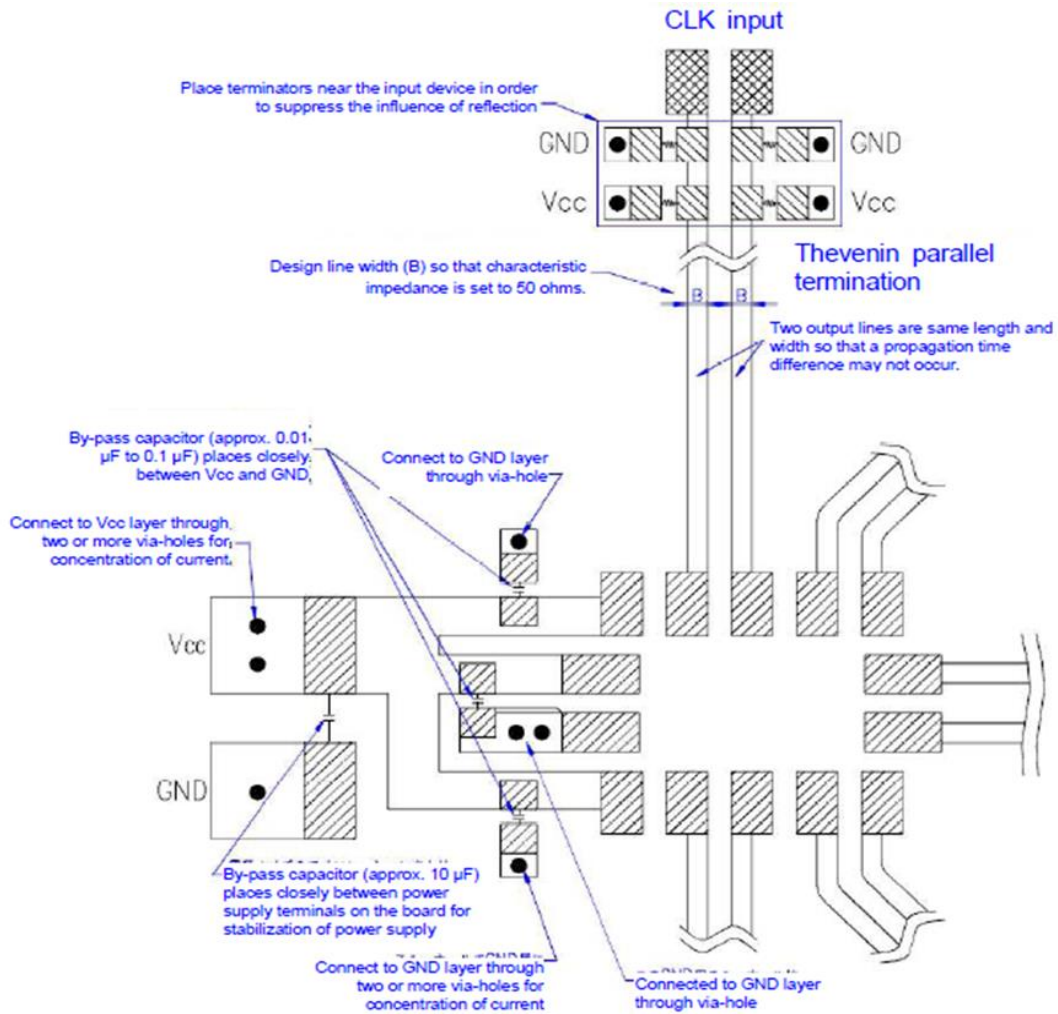
(1)To observe waveform and current Vcc = 3.3V



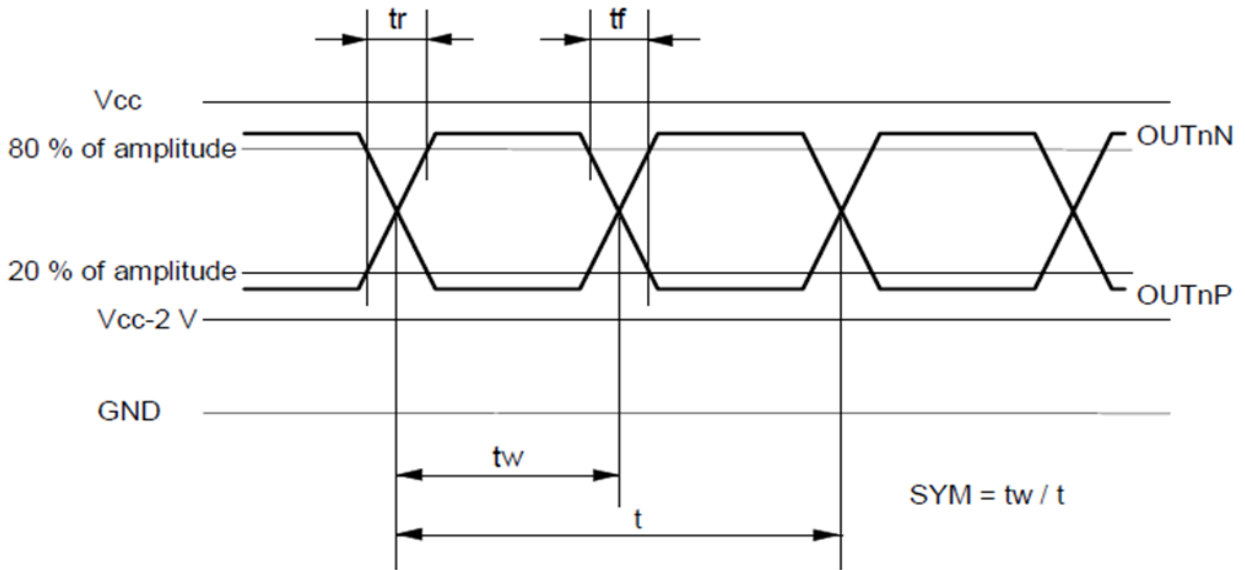
(2) To observe waveform and current  $V_{cc} = 2.5V$



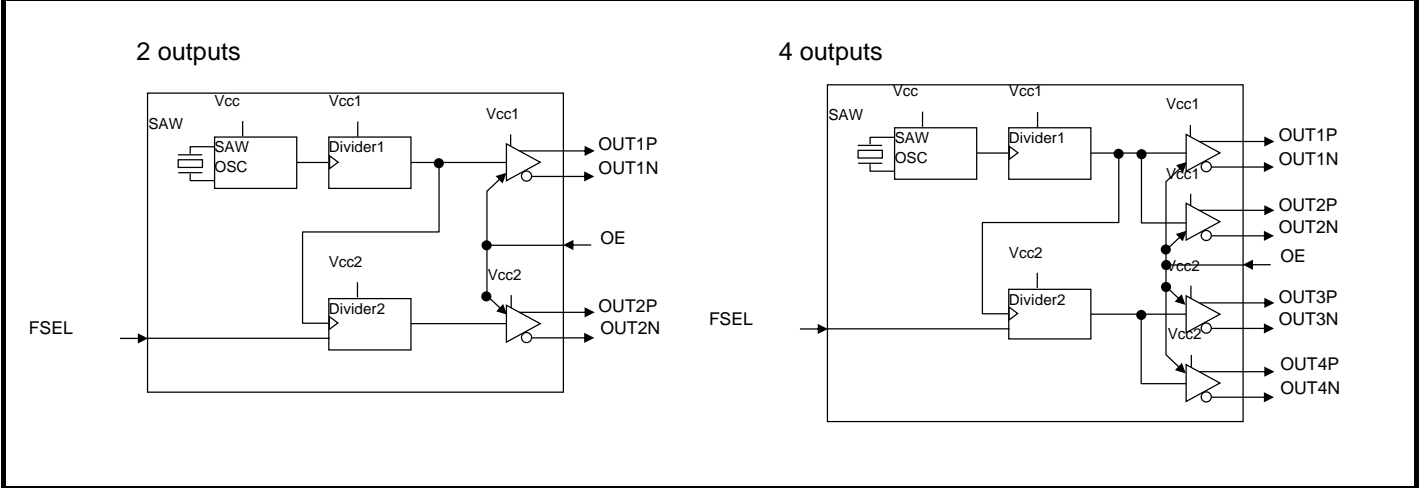
(3) PCB layout (multilayers, with  $V_{cc}$  and GND layer inside)



4. Timing chart



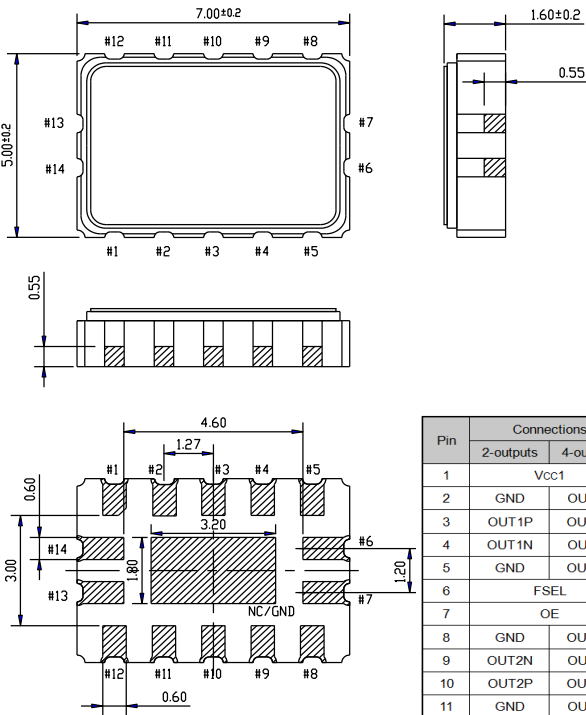
5. Block diagram



6. FSEL function

	2-outputs	OUT1	OUT2
	4-outputs	OUT1 / OUT2	OUT3 / OUT4
FSEL	H	$f_o$	$f_o$
	L	$f_o$	$f_o/2$

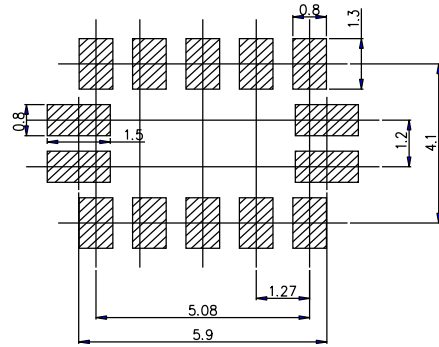
**7.External dimensions (Unit: mm)**



Pin	Connections	
	2-outputs	4-outputs
1	Vcc1	
2	GND	OUT1P
3	OUT1P	OUT1N
4	OUT1N	OUT2P
5	GND	OUT2N
6	FSEL	
7	OE	
8	GND	OUT3N
9	OUT2N	OUT3P
10	OUT2P	OUT4N
11	GND	OUT4P
12	Vcc2	
13	Vcc	
14	GND	

OE pin = "H" : Specified frequency output.  
 OE pin = "L" : Output is high impedance

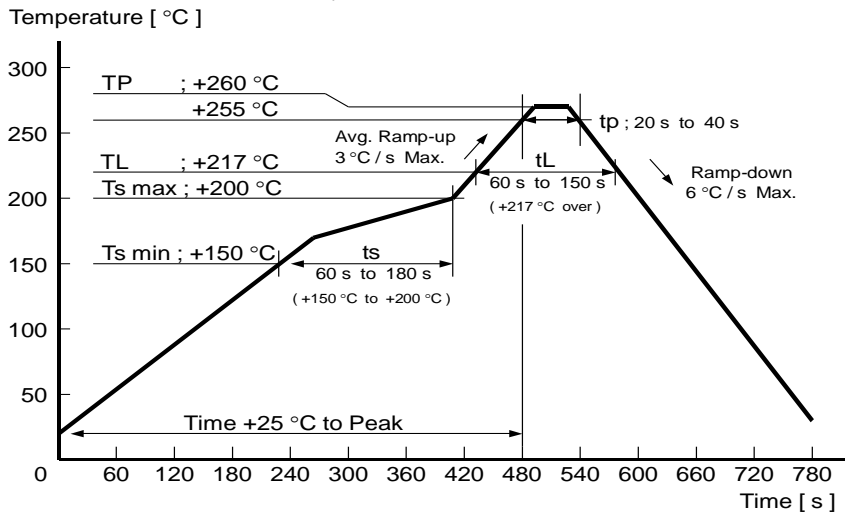
**8.Footprint(Recommended) (Unit: mm)**



To maintain stable operation, provide a 0.01 μF to 0.1 μF by-pass capacitor at a location as near as possible to the power source terminal of the crystal product (between V<sub>CC</sub>, V<sub>CC</sub>1, V<sub>CC</sub>2 - GND).

**9.Reflow profile**

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



**10.Packing information**

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

X1M0004110021xx

Code	Condition	Code	Condition
01	Any Q'ty vinyl bag(Tape cut)	13	500pcs / Reel
11	Any Q'ty / Reel	00	1000pcs / Reel
12	250pcs / Reel		

[ 2 ] Taping specification

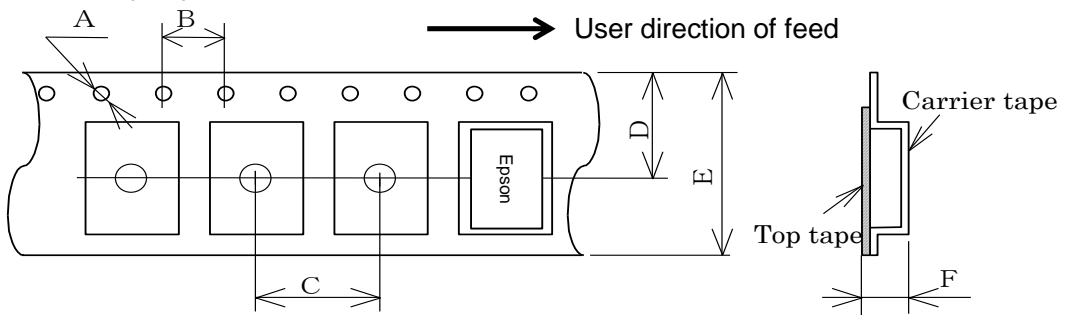
Subject to EIA-481 & IEC-60286

(1) Tape dimensions

Material of the Carrier Tape : PS

Material of the Top Tape : PET+PE

Unit: mm

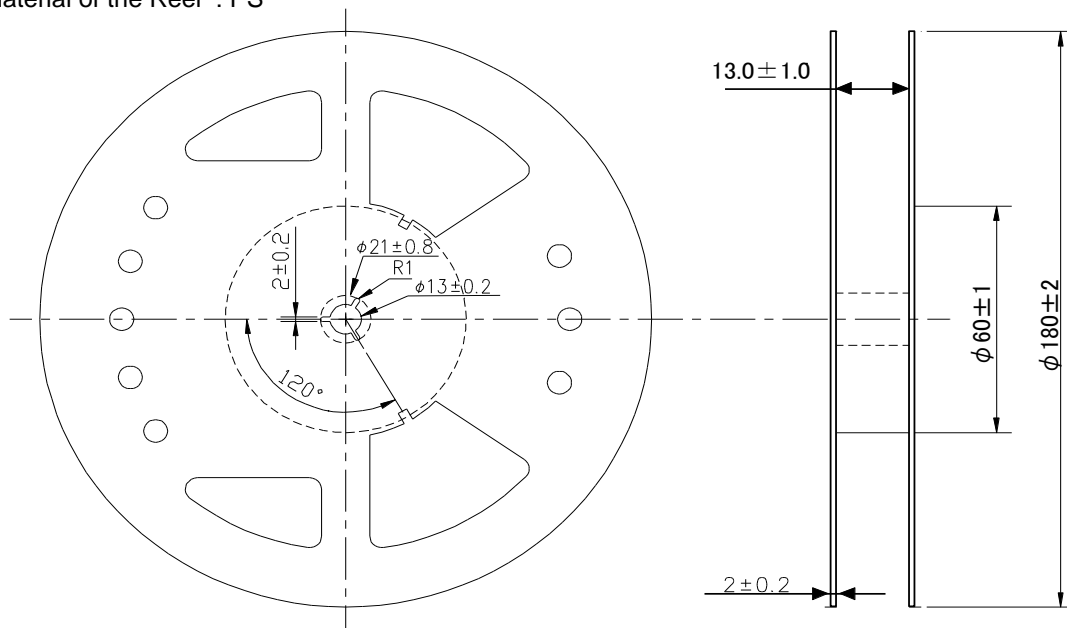


Symbol	A	B	C	D	E	F
Value	Φ1.5	4	8	9.25	16	2.3

(2) Reel dimensions

Center material : PS

Material of the Reel : PS



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