Multi output OSC MG7050EAN

SEIKO EPSON CORPORATION

Product name MG7050EAN 156.250000MHz 2ACJAN

Product Number / Ordering code X1M0004110011xx

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	Vcc-GND	-0.5	-	4	V	
Storage temperature	T_stg	-55	-	125	ºC	Storage as single product
Input voltage	Vin	-0.5	-	Vcc+0.5	V	ST or OE terminal

2.Specifications(characteristics)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Remarks
Output frequency	f0		156.2500		MHz	2 output
Supply voltage	Vcc	2.97	3.3	3.63	V	
Operating temperature	T_use	0	-	70	ºC	
Frequency tolerance	f_tol	-50	-	50	$x10^{-6}$	T_use
Current consumption	Icc	-	80	102	mA	L_ECL=50Ω
Stand-by current	I_std	-	-	-	mA	-
Disable current	I_dis	-	8	20.0	mA	OE=GND
Symmetry	SYM	45	-	55	%	At output crossing point
Output voltage(LV-PECL)	V_{OH}	Vcc-1.025	-	Vcc-0.88	V	DC characteristics
	V_{OL}	Vcc-1.81	-	Vcc-1.62	V	
Output load condition(ECL)	L_ECL	-	50	-	Ω	Terminated to Vcc-2.0V
Input voltage	V_{IH}	70%Vcc	-	-		OE ans FAEL terminal
	V_{IL}	-	-	30%Vcc		
Rise time	t_r	-	200	400	ps	Between 20% and 80% of (VOH-VOL)
Fall time	tf	-	200	400	ps	Between 20% and 80% of (V_{OH}-V_{OL})
Start-up time	t_str	-	5	10	ms	Time at minimum supply voltage to be 0s
Jitter	t_{DJ}	-	-	N/A	ps	Deterministic Jitter
	T_{RJ}	-	-	N/A	ps	Random Jitter
	t_{RMS}	-	-	N/A	ps	σ(RMS of total distribution)
	t_{p-p}	-	-	N/A	ps	Peak to Peak
	t_{acc}	-	-	N/A	ps	Accumulated jitter
Phase jitter	t_{PJ}	-	0.12	0.3	ps	Offset frequency 12 kHz to 20 MHz
Phase noise	L(f)	-	-	-	dBc/Hz	Offset:1 Hz
		-	-47.2	-	dBc/Hz	Offset:10 Hz
		-	-77.1	-	dBc/Hz	Offset:100 Hz
		-	-106.2	-	dBc/Hz	Offset:1 kHz
		-	-141.5	-	dBc/Hz	Offset:10 kHz
		-	-151.2	-	dBc/Hz	Offset:100 kHz
		-	-153.7	-	dBc/Hz	Offset:1 MHz
Skew	t_skew	-	-	50	ps	FSEL = H
Frequency aging	f_age	-10	-	10	$x10^{-6}$/Year	@+25ºC 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 µF to 0.1 µF) places closely between Vcc and GND.

(3) By-pass capacitor 2 (approx. 10 µF) places closely between power supply terminals on the board.

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

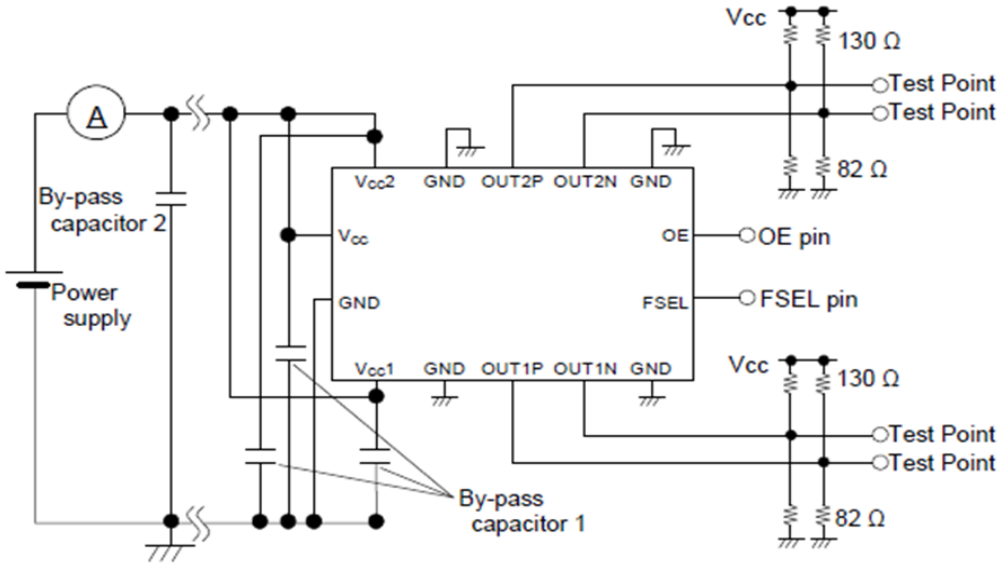
(5) Power supply

• Start up time (0 V→90 %Vcc) of power source should be more than 150 µs and slew rate should be less than 19.8 mV/µs.

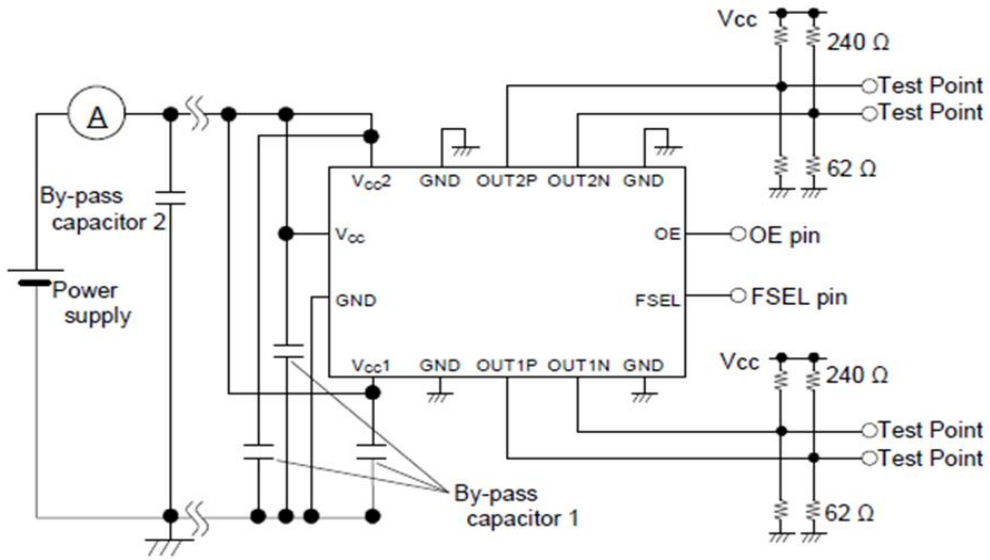
• Impedance of power supply should be as low as possible.

2) 2 outputs type

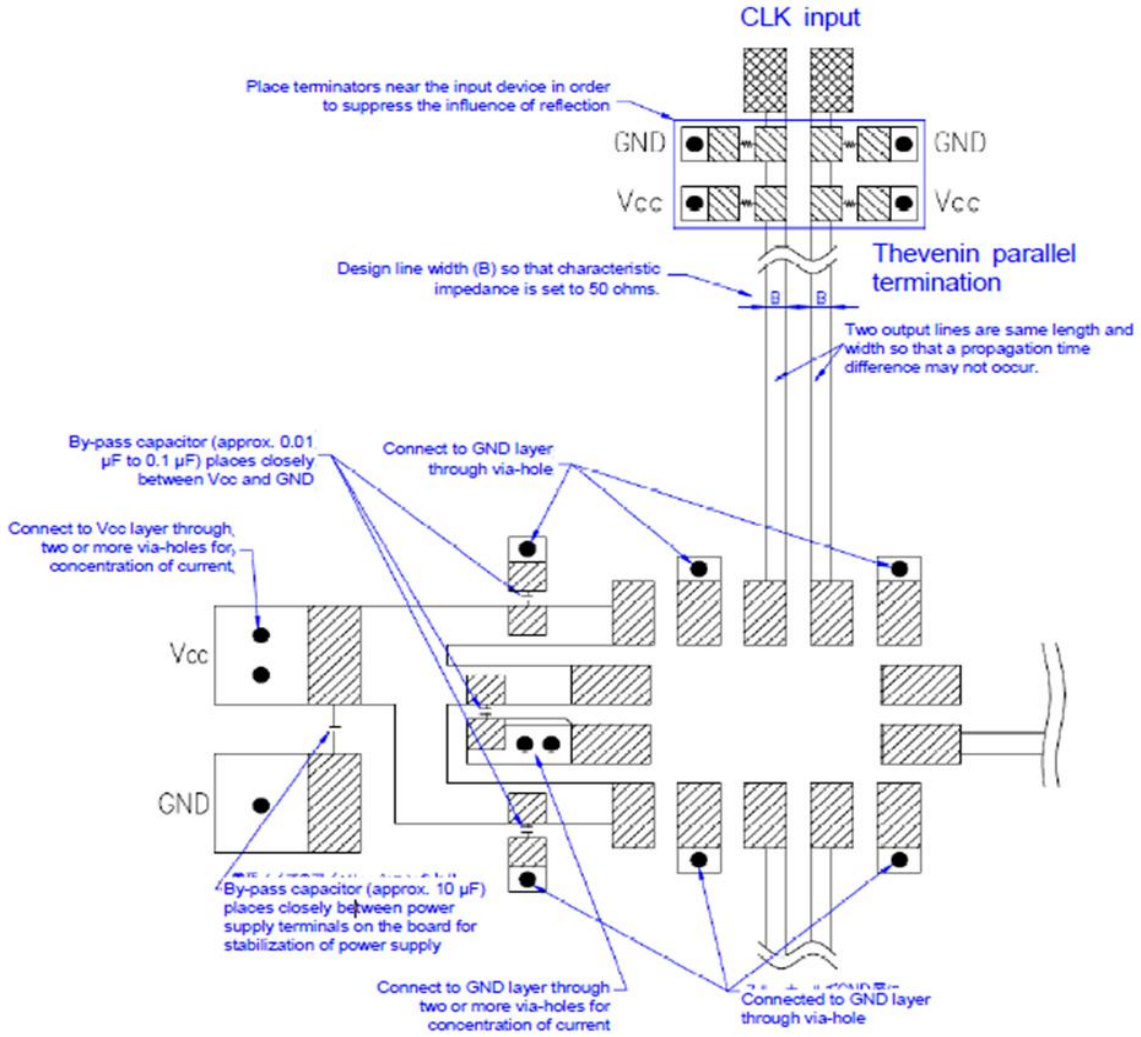
(1)To observe waveform and current Vcc = 3.3V



(2)To observe waveform and current Vcc = 2.5V

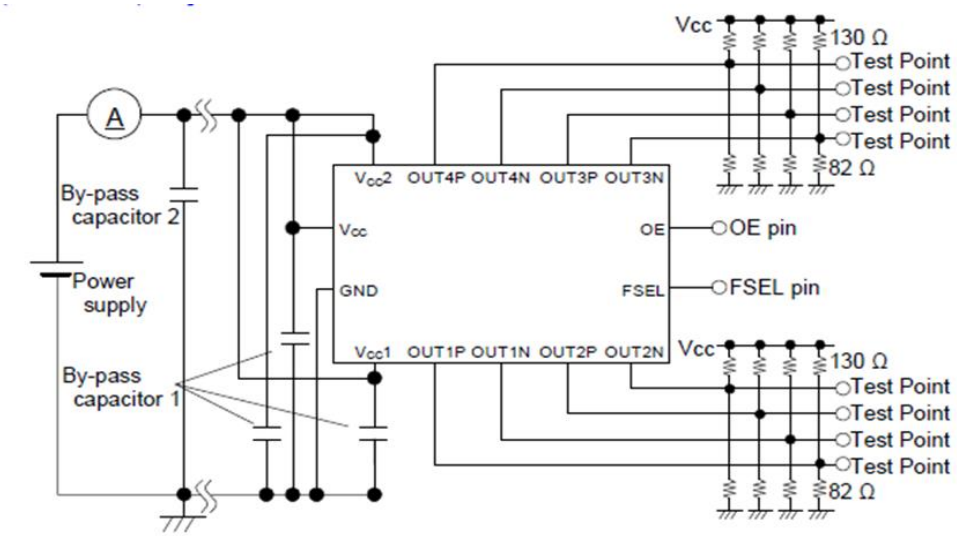


(3)PCB layout (multilayers, with Vcc and GND layer inside)

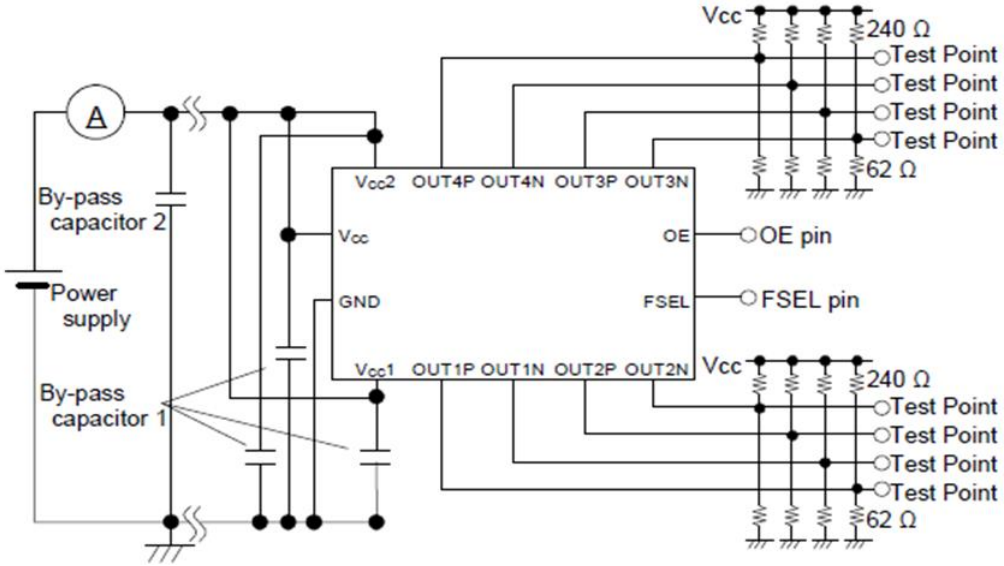


3) 4 outputs type

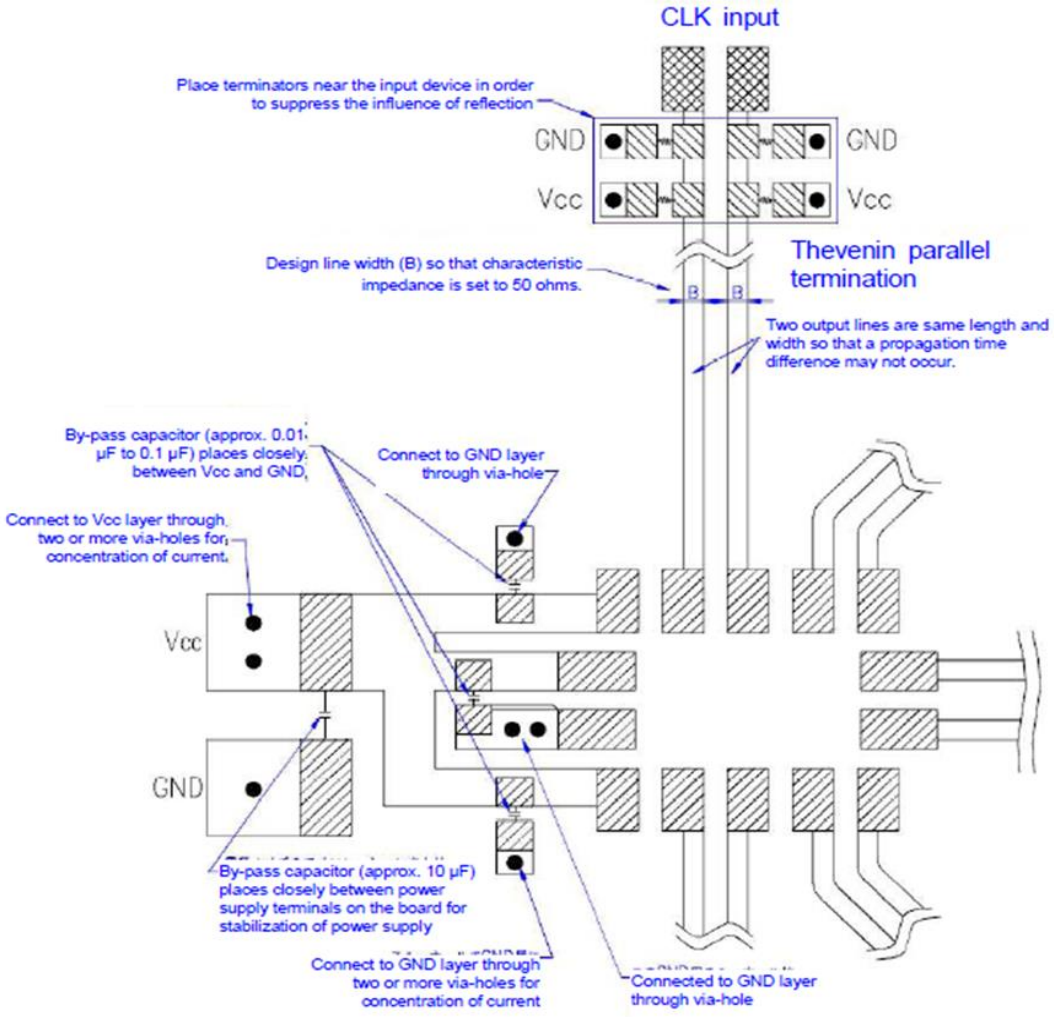
(1)To observe waveform and current Vcc = 3.3V



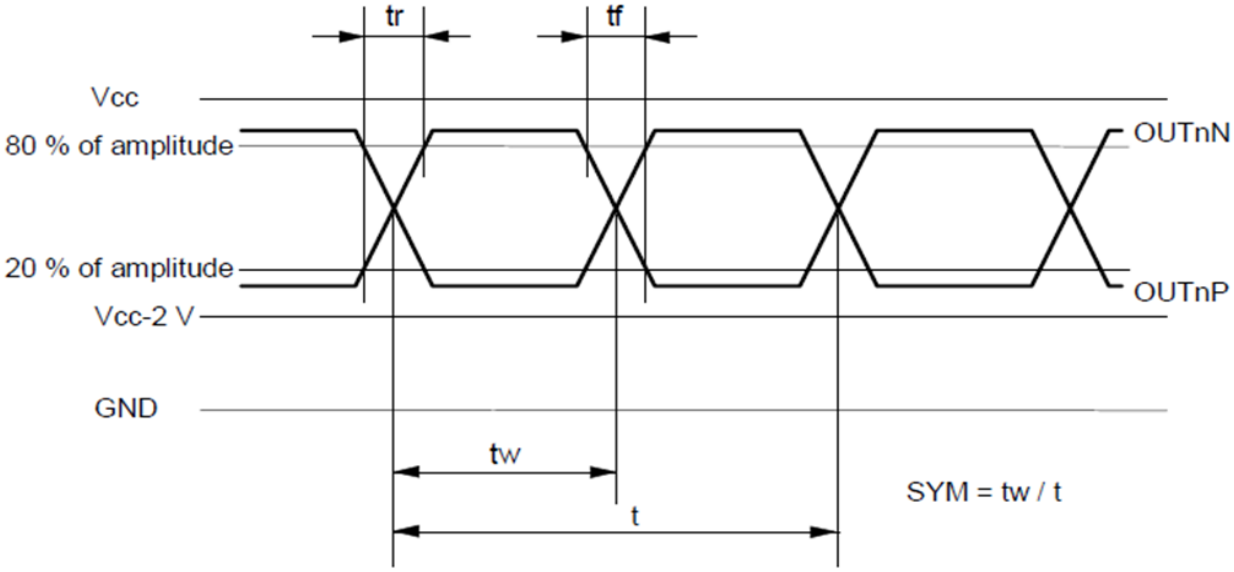
(2)To observe waveform and current Vcc = 2.5V



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

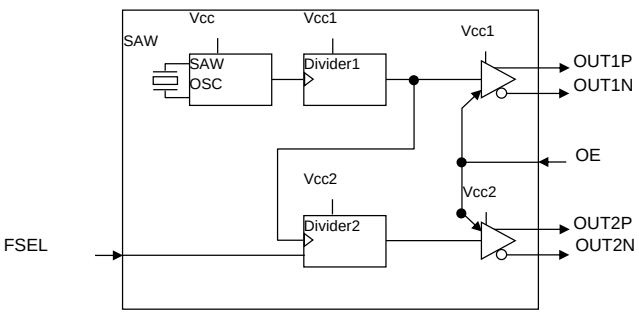


4.Timing chart

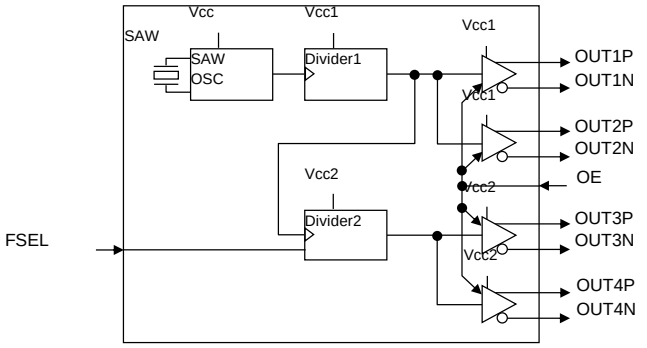


5.Block diagram

2 outputs



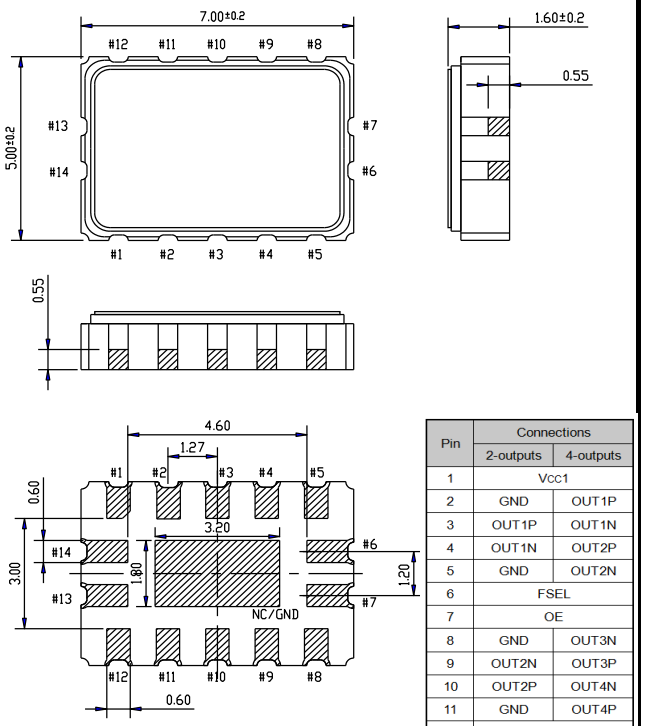
4 outputs



6. FSEL function

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

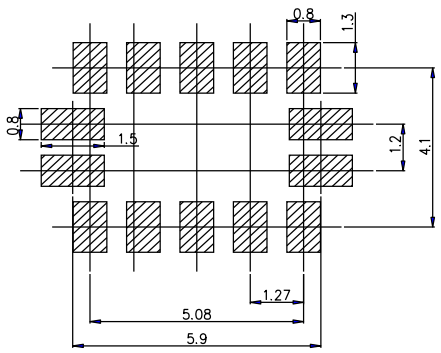
7.External dimensions (Unit: mm)



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

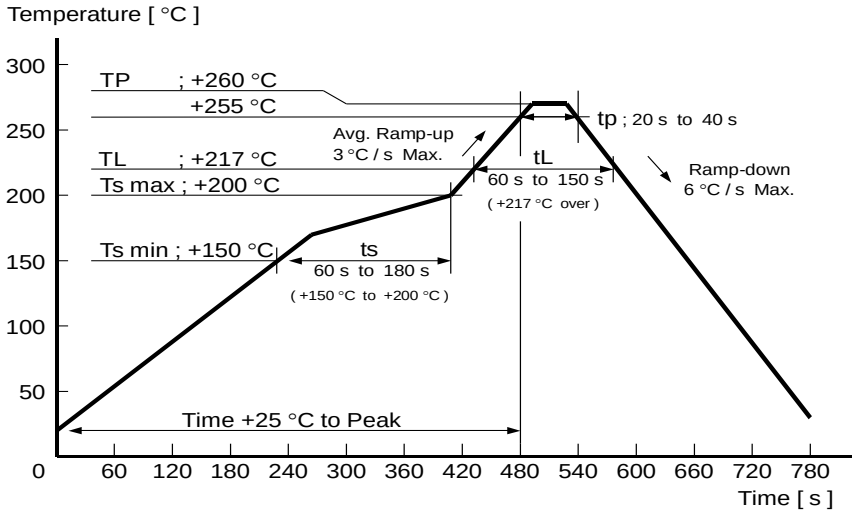
8.Footprint(Recommended) (Unit: mm)



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_{CC}, $V_{CC}1$, $V_{CC}2$ - 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"

X1M0004110011xx

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

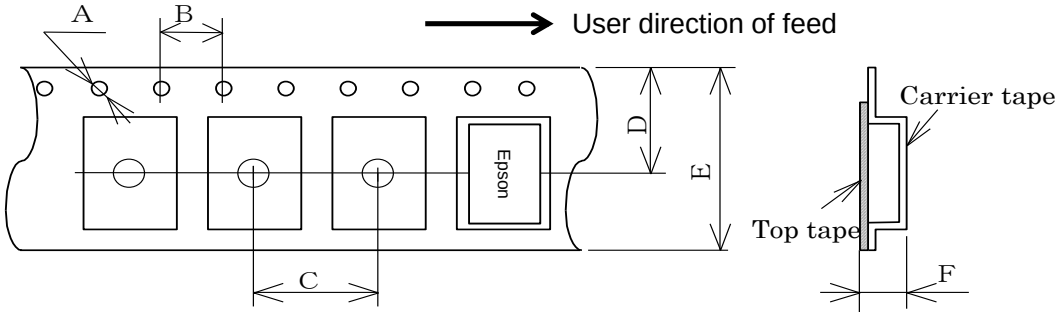
Subject to EIA-481 & IEC-60286

(1) Tape dimensions

Material of the Carrier Tape : PS

Material of the Top Tape : PET+PE

Unit: mm

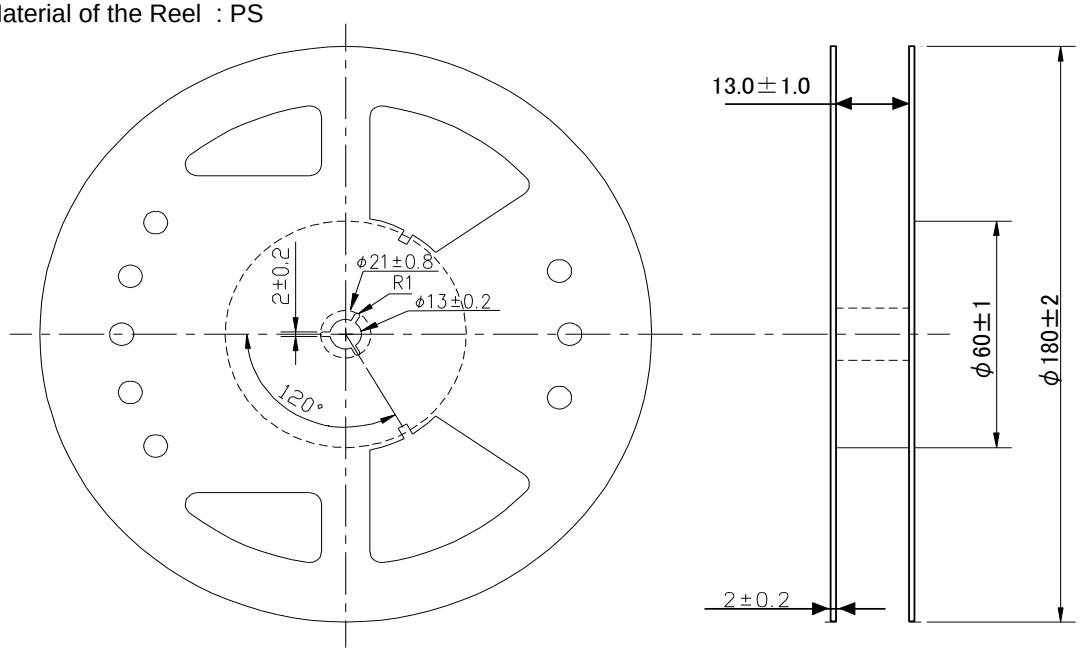


Symbol	A	B	C	D	E	F
Value	Φ1.5	4	8	9.25	16	2.3

(2) Reel dimensions

Center material : PS

Material of the Reel : PS



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