

Product name VG-4513CA-148.500000-GGCT

Product code / Ordering code X1G0041411012xx

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

Output waveform LV-PECL

Pb free / Complies with EU RoHS directive

Reference weight Typ.162mg

**1.Absolute maximum ratings**

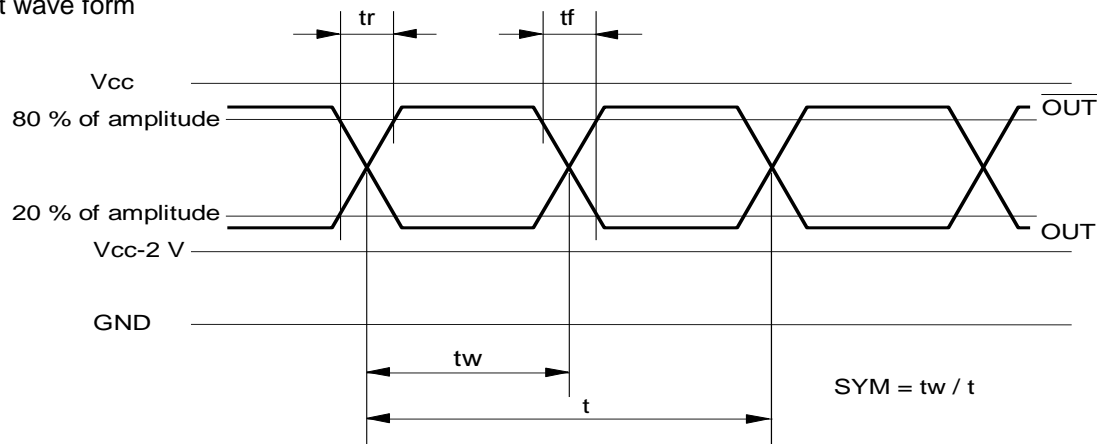
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Remarks
Maximum supply voltage	V <sub>cc-GND</sub>	-0.5	-	+5	V	-
Storage temperature	T <sub>stg</sub>	-55	-	+125	°C	-
Input voltage	V <sub>in</sub>	-0.5	-	V <sub>cc</sub> +0.5	V	V <sub>c</sub> pin

**2.Specifications(characteristics)**

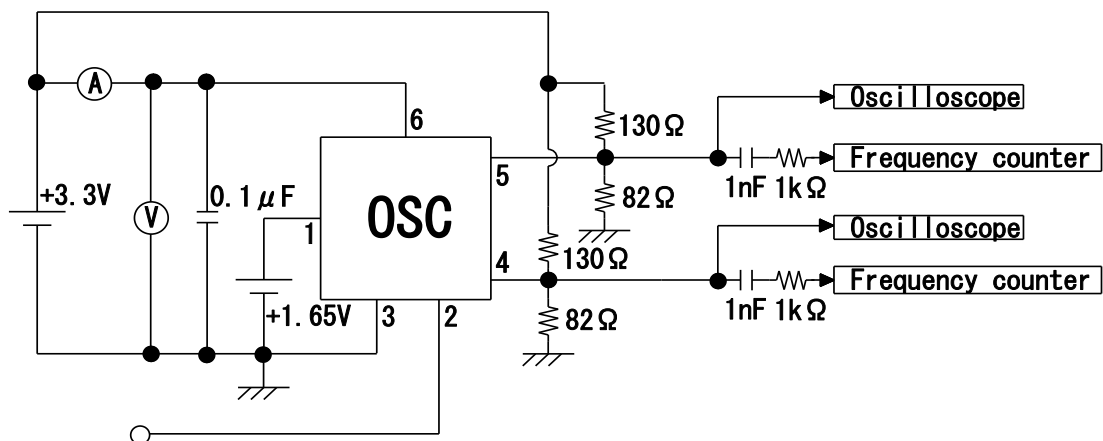
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Remarks
Output frequency	f <sub>0</sub>		148.5000		MHz	
Supply voltage	V <sub>cc</sub>	3.135	3.3	3.465	V	-
Control voltage	V <sub>c</sub>	0	1.65	3.3	V	V <sub>c</sub> =1.65V+/-1.65V
Operating temperature	T <sub>use</sub>	-40	-	+85	°C	-
Frequency tolerance	f <sub>tol</sub>	-50	-	+50	x10 <sup>-6</sup>	includes 20 years aging
Current consumption	I <sub>cc</sub>	-	-	65	mA	L <sub>ECL</sub> = 50Ω
Disable current	I <sub>dis</sub>	-	-	-	mA	-
Frequency control range	f <sub>cont</sub>	-	-	-	x10 <sup>-6</sup>	-
Absolute pull range	APR	+/-50	+/-70	-	x10 <sup>-6</sup>	-
Modulation characteristics	BW	10	60	-	kHz	+/-3 dB
Input resistance	R <sub>in</sub>	100	-	-	kΩ	DC Level
Frequency change polarity	-					Positive polarity
Symmetry	SYM	45	-	55	%	V <sub>cc</sub> -1.3V, V <sub>c</sub> =1/2V <sub>cc</sub>
Output voltage	V <sub>OH</sub>	V <sub>cc</sub> -1.1	-	-	V	-
	V <sub>OL</sub>	-	-	V <sub>cc</sub> -1.5	V	-
Output load condition	ECL	-	50	-	Ω	Outputs terminated to V <sub>cc</sub> -2.0V
Input voltage	V <sub>IH</sub>	70%V <sub>cc</sub>	-	-	V	OE pin
	V <sub>IL</sub>	-	-	30%V <sub>cc</sub>	V	OE pin
Rise time	t <sub>r</sub>	-	-	0.5	ns	20 % to 80 % of amplitude
Fall time	t <sub>f</sub>	-	-	0.5	ns	20 % to 80 % of amplitude
Start-up time	t <sub>str</sub>	-	-	10	ms	-
Jitter	t <sub>DJ</sub>	-	0.1	-	ps	Deterministic Jitter
	T <sub>RJ</sub>	-	2.5	-	ps	Random Jitter
	t <sub>RMS</sub>	-	2.5	-	ps	δ(RMS of total distribution)
	t <sub>p-p</sub>	-	25	-	ps	Peak to Peak
	t <sub>acc</sub>	-	4	-	ps	Accumulated Jitter(δ) n=2 to 50000 cycles
Phase jitter	t <sub>PJ</sub>	-	0.25	-	ps	Offset Frequency: 12kHz to 20MHz
Frequency aging	f <sub>aging</sub>	-	-	-	x10 <sup>-6</sup>	Included in frequency tolerance

### 3. Timing chart

Output wave form



### 4. Test circuit



#### [Pin Connections]

1. Frequency Control Voltage
2. E/D Control
3. Common and case
4. OUT1 (Positive)
5. OUT2 (Negative)
6. Supply Voltage

#### 3) Condition

##### (1) Oscilloscope

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

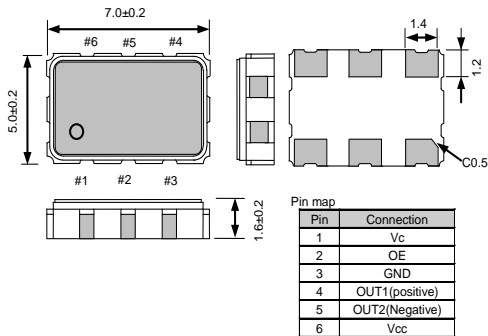
##### (2) By-pass capacitor (approx. 0.01mF~0.1 mF) should be placed closely between Vcc and GND.

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

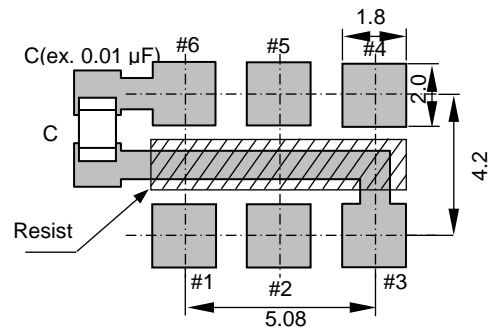
##### (4) Power supply

- Start up time(0 V→90 %Vcc)of power source should be more than 150us.
- Impedance of power supply should be as low as possible.

### 5.External dimensions (Unit: mm)



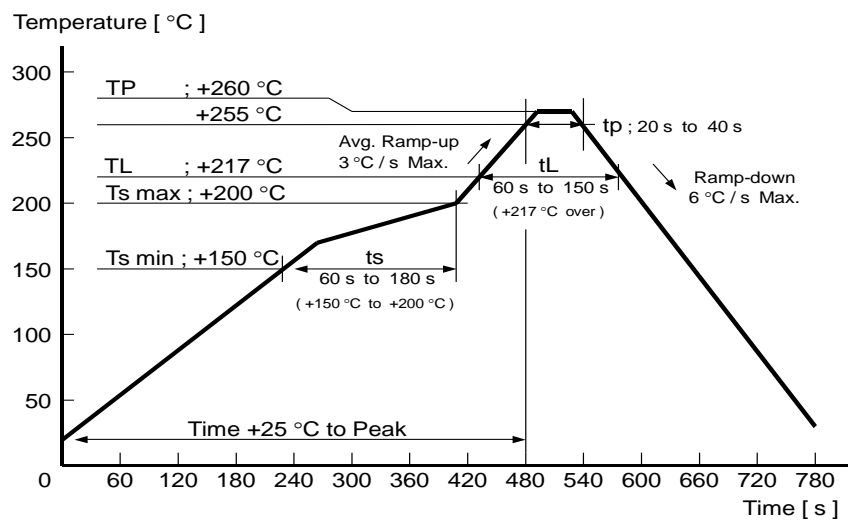
<b>6.Footprint(Recommended)</b>	<b>(Unit: mm)</b>
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To maintain stable operation, provide a 0.01uF to 0.1uF by-pass capacitor at a location as near as possible to the power source terminal of the crystal product (between Vcc - GND).

## 7.Reflow profile

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



## 8.Packing information

[ 1 ]Product number last 2 digits code(xx) description

The recommended code is "00"

X1G0041411012xx

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

## [ 2 ] Taping specification

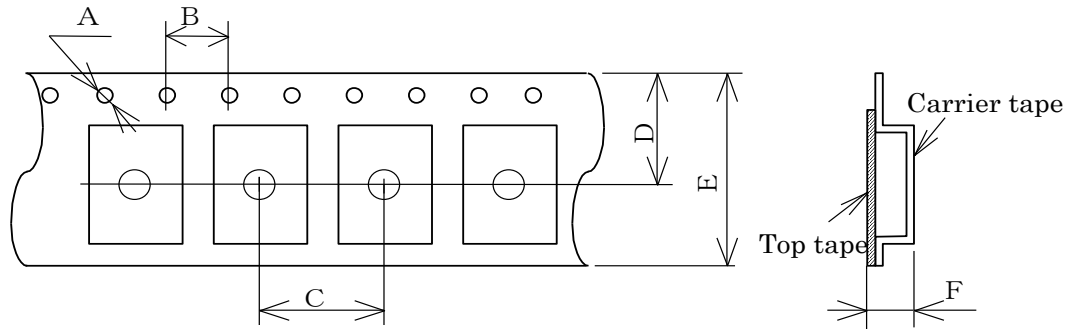
Subject to EIA-481 &amp; IEC-60286

## (1) Tape dimensions

Material of the Carrier Tape : PS

Material of the Top Tape : PET+PE

Unit: mm

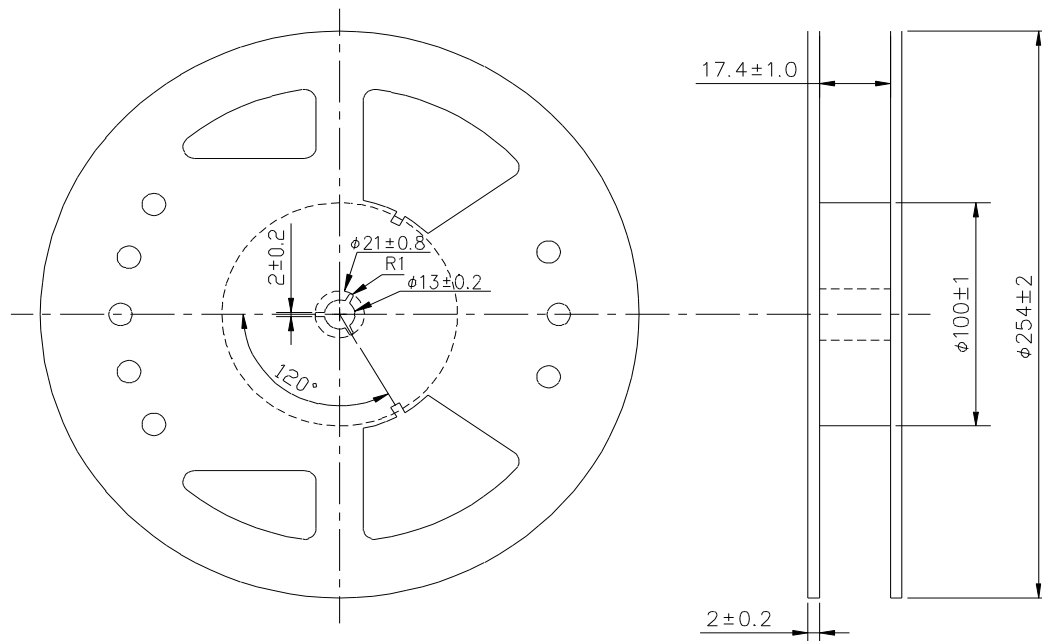


Symbol	A	B	C	D	E	F
Value	$\Phi 1.5$	4	8	9.25	16	2.3

## (2) Reel dimensions

Center material : PS

Material of the Reel : PS



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