



Multi output SAW Oscillator (MOSO)
OUTPUT : HCSL



Product Number
X1M000431xxxx00

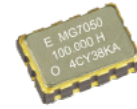
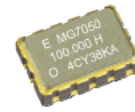
MG7050HAN

Feature

- Ultra Low jitter : 0.3 ps Max.
- 2 or 4 outputs and it is able to reduce fan-out buffers
- Frequency range : 100 MHz to 200 MHz
- Supply voltage : 2.5 V / 3.3 V
- External dimensions : 7.0 × 5.0 × 1.6 mm
- Output : HCSL (2 or 4 outputs)
- Output impedance select by ZSEL

Application

GbE, Fiber Channel, SAS, PCI express



Specifications (characteristics)

Item	Symbol	Specifications	Conditions / Remarks
Output frequency range	fo	100 MHz to 200 MHz	Please contact us about available frequencies.
		100 MHz, 125 MHz, 156.25 MHz, 200 MHz	Standard frequency
Supply voltage	V _{CC}	D: 2.5 V ± 0.125 V C: 3.3 V ± 0.33 V	V _{CC} , V _{CC1} and V _{CC2} need same voltage
Storage temperature	T _{stg}	-55 °C to +125 °C	Store as bare product after packing
Operating temperature	T _{use}	A: 0 °C to +70 °C, B: -20 °C to +70 °C D: -5 °C to +85 °C	
Frequency tolerance *1	f _{tol}	J: ±50 × 10 ⁻⁶ , L: ±100 × 10 ⁻⁶	
Current consumption	I _{CC}	55 mA Typ., 84 mA Max. 60 mA Typ., 90 mA Max.	2-outputs
		95 mA Typ., 128 mA Max. 100 mA Typ., 136 mA Max.	4-outputs
Disable current	I _{dis}	11 mA Typ., 23 mA Max. 12 mA Typ., 25 mA Max.	2-outputs
		15 mA Typ., 28 mA Max. 16 mA Typ., 30 mA Max.	4-outputs
Symmetry	SYM	45 % to 55 %	At outputs crossing point
Output voltage	V _{OH}	0.66 V to 0.85 V	DC characteristics
	V _{OL}	-0.15 V to 0.15 V	
Output load condition	L _{HCSL}	50 Ω or 42.2 Ω, with C _L =2 pF, R _S =33 Ω or 27 Ω	
Input voltage	V _{IH}	70 % V _{CC} Min.	OE and ZSEL terminals
	V _{IL}	30 % V _{CC} Max.	
Rise / Fall skew rate	R _r / R _f	1 V/ns to 4 V/ns	Between -0.15 V and 0.15 V of differential output.
Start-up time	t _{str}	5 ms Typ., 10 ms Max.	Time at minimum supply voltage to be 0 s
Phase Jitter	t _{PJ}	0.19 ps Typ. 0.16 ps Typ.	fo=100 MHz
		0.18 ps Typ. 0.15 ps Typ.	fo=125 MHz
		0.16 ps Typ. 0.13 ps Typ.	fo=156.25 MHz
		0.14 ps Typ. 0.12 ps Typ.	fo=200 MHz
		0.3 ps Max.	
Skew	t _{skew}	20 ps Typ., 50 ps Max.	ZSEL=H
Aging	f _{age}	N: ±10 × 10 ⁻⁶ /year Max.	First year
		A: Included in Frequency tolerance *2	10 years

*1 Frequency tolerance includes initial frequency tolerance, temperature variation, supply voltage change and reflow drift.

*2 "A" is not acceptable when Frequency tolerance is "J" and Operating temperature is "B" or "D".

Product Name MG7050 H AN 156.250000MHz 4 A C J A N (⑦⑧⑨:JDA, JBA are not available)
(Standard form) ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

- ① Model
② Output (H: HCSL)
③ Frequency
④ Number of outputs (2: 2-outputs, 4: 4-outputs)
⑤ "A": Fixed
⑥ Supply voltage
⑦ Frequency tolerance
⑧ Operating temperature
⑨ Frequency aging

⑥ Supply voltage	
C	3.3 V Typ.
D	2.5 V Typ.

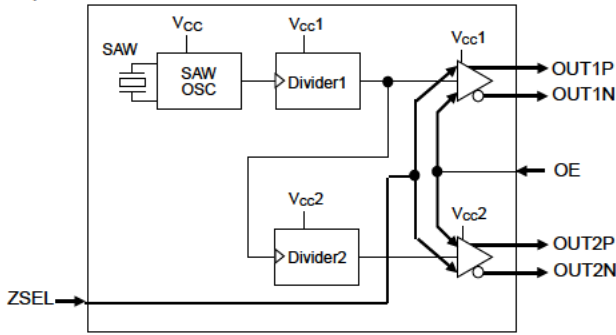
⑦ Frequency tolerance	
J	±50 × 10 ⁻⁶
L	±100 × 10 ⁻⁶

⑧ Operating temp.	
A	0 °C to +70 °C
B	-20 °C to +70 °C
D	-5 °C to +85 °C

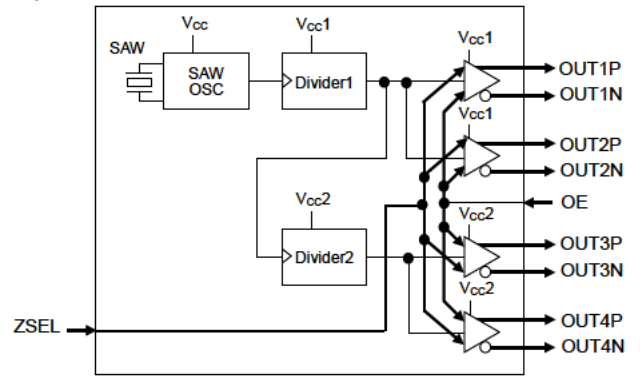
⑨ Frequency aging	
A	Frequency tolerance include aging
N	Frequency tolerance exclude aging

Block diagram

2-outputs



4-outputs



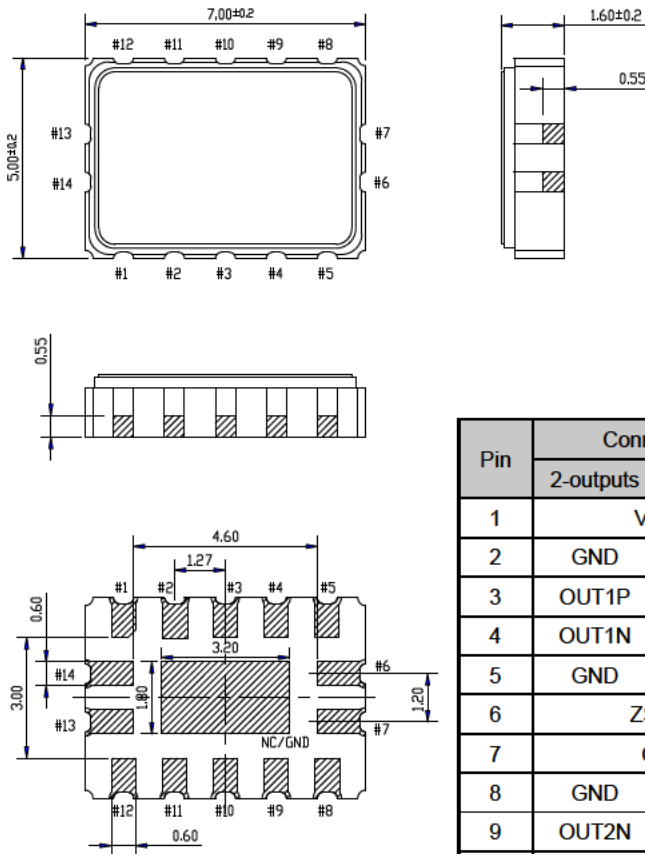
ZSEL function

		Output line Differential Zo	HCSL load L_HCSL	Shunt resistor Rs
ZSEL	H	100 Ω	50 Ω	33 Ω
	L	85 Ω	42.2 Ω	27 Ω

External dimensions

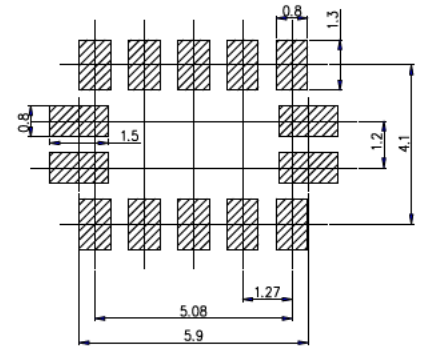
(Unit :mm)

Footprint (Recommended) (Unit :mm)



Pin	Connection	
	2-outputs	4-outputs
1	V _{cc1}	
2	GND	OUT1P
3	OUT1P	OUT1N
4	OUT1N	OUT2P
5	GND	OUT2N
6	ZSEL	
7	OE	
8	GND	OUT3N
9	OUT2N	OUT3P
10	OUT2P	OUT4N
11	GND	OUT4P
12	V _{cc2}	
13	V _{cc}	
14	GND	

OE pin = "H" : Specified frequency output.
 OE pin = "L" : Output is high impedance
 #14 is connected to the cover.



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_{cc1}, V_{cc2} - GND).

PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

At Seiko Epson, all environmental initiatives operate under the Plan-Do-Check-Action (PDCA) cycle designed to achieve continuous improvements. The environmental management system (EMS) operates under the ISO 14001 environmental management standard.

All of our major manufacturing and non-manufacturing sites, in Japan and overseas, completed the acquisition of ISO 14001 certification.

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	► Pb free.
	► Complies with EU RoHS directive. *About the products without the Pb-free mark. Contains Pb in products exempted by EU RoHS directive. (Contains Pb in sealing glass, high melting temperature type solder or other.)
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