



Multi output SAW Oscillator (MOSO)  
OUTPUT : LV-PECL



Product Number  
X1M000411xxxx00

# MG7050EAN

## 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 700 MHz
- Supply voltage : 2.5 V / 3.3 V
- External dimensions : 7.0 × 5.0 × 1.6 mm
- Output : LV-PECL (2 or 4 outputs)

## Application

GbE, Fiber Channel, SAS, PCI express  
Server, Storage, Router/Switch, Networking, OTN



## Specifications (characteristics)

Item	Symbol	Specifications	Conditions / Remarks	
Output frequency range	fo	100 MHz to 700 MHz	Please contact us about available frequencies.	
		100MHz, 106.25MHz, 125MHz, 150MHz, 156.25MHz, 200MHz, 212.5MHz, 250MHz, 300MHz, 312.5MHz	Standard frequency	
Supply voltage	V <sub>cc</sub>	D: 2.5 V ± 0.125 V      C: 3.3 V ± 0.33 V	V <sub>cc</sub> , V <sub>cc1</sub> and V <sub>cc2</sub> need same voltage	
Storage temperature	T <sub>stg</sub>	-55 °C to +125 °C	Store as bare product after packing	
Operating temperature	T <sub>use</sub>	A: 0 °C to +70 °C,    B: -20 °C to +70 °C D: -5 °C to +85 °C		
Frequency tolerance *1	f <sub>tol</sub>	J: ±50 × 10 <sup>-6</sup> , L: ±100 × 10 <sup>-6</sup>		
Current consumption	I <sub>cc</sub>	75 mA Typ., 94 mA Max.      80 mA Typ., 102 mA Max.	2-outputs	
		125 mA Typ., 170 mA Max.    130 mA Typ., 184 mA Max.	4-outputs	
Disable current	I <sub>dis</sub>	7 mA Typ., 18 mA Max.      8 mA Typ., 20 mA Max.	OE=GND	
Symmetry	SYM	45 % to 55 %	At outputs crossing point	
Output voltage	V <sub>OH</sub>	V <sub>cc</sub> -1.025 V to V <sub>cc</sub> -0.88 V	DC characteristics	
	V <sub>OL</sub>	V <sub>cc</sub> -1.81 V to V <sub>cc</sub> -1.62 V		
Output load condition	L <sub>ECL</sub>	50 Ω	Termination to V <sub>cc</sub> -2.0 V	
Input voltage	V <sub>IH</sub>	70 % V <sub>cc</sub> Min.	OE and FSEL terminals	
	V <sub>IL</sub>	30 % V <sub>cc</sub> Max.		
Rise time / Fall time	tr / tf	200 ps Typ., 400 ps Max.	Between 20 % and 80 % of (V <sub>OH</sub> -V <sub>OL</sub> )	
Start-up time	t <sub>str</sub>	5 ms Typ., 10 ms Max.	Time at minimum supply voltage to be 0 s	
Phase Jitter	t <sub>PJ</sub>	0.17 ps Typ.	0.14 ps Typ.	Offset frequency: 12 kHz to 20 MHz
		0.16 ps Typ.	0.13 ps Typ.	
		0.15 ps Typ.	0.12 ps Typ.	
		0.13 ps Typ.	0.11 ps Typ.	
		0.11 ps Typ.	0.10 ps Typ.	
		0.05 ps Typ.	0.05 ps Typ.	
		0.3 ps Max.		
Skew	t <sub>skew</sub>	20 ps Typ., 50 ps Max.	FSEL=H	
Aging	f <sub>age</sub>	N: ±10 × 10 <sup>-9</sup> /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 E AN 156.250000MHz    ④ ⑤ ⑥ ⑦ ⑧ ⑨      (⑦⑧⑨:JDA, JBA are not available)  
(Standard form)      ①      ②      ③

- ① Model  
② Output (E: LV-PECL)  
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

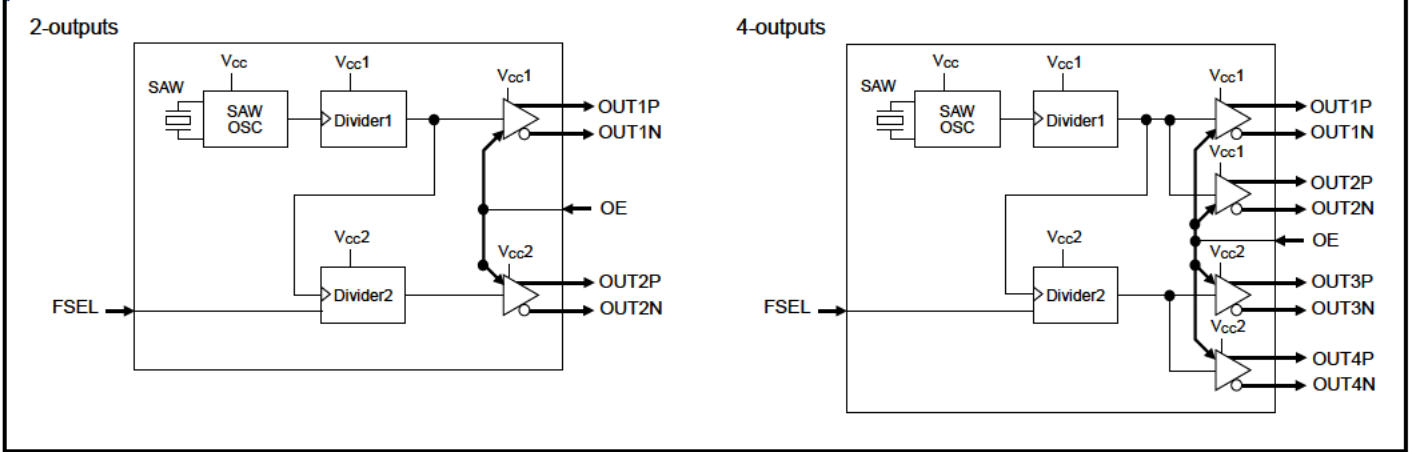
⑥ Supply voltage	
C	3.3 V Typ.
D	2.5 V Typ.

⑦ Frequency tolerance	
J	±50 × 10 <sup>-6</sup>
L	±100 × 10 <sup>-6</sup>

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



FSEL function

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

External dimensions

(Unit :mm)

Footprint (Recommended) (Unit :mm)

Pin	Connections	
	2-outputs	4-outputs
1	V <sub>cc1</sub>	
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	V <sub>cc2</sub>	
13	V <sub>cc</sub>	
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<sub>cc</sub>, V<sub>cc1</sub>, V<sub>cc2</sub> - 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.

ISO 14000 is an international standard for environmental management that was established by the International Standards Organization in 1996 against the background of growing concern regarding global warming, destruction of the ozone layer, and global deforestation.

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IATF 16949 is the international standard that added the sector-specific supplemental requirements for automotive industry based on ISO9001.

### ► Explanation of the mark that are using it for the catalog

	► 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.)
	► Designed for automotive applications such as Car Multimedia, Body Electronics, Remote Keyless Entry etc.
	► Designed for automotive applications related to driving safety (Engine Control Unit, Air Bag, ESC etc ).

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