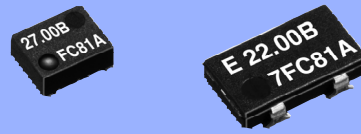


**CRYSTAL OSCILLATOR
SPXO**

SG - 350 / 550 series

- Frequency range : 1 MHz to 48 MHz
- Supply voltage : 1.8 V Typ. / 2.5 V Typ. / 3.3 V Typ.
- Current consumption : SEF 1.8 V No load condition 48 MHz
1.5 mA Typ.
- Function : Standby(\overline{ST})
- Thickness : 1.2 mm Max.
- Lead(Pb)-free : Lead free completely



Actual size

SG-350	SG-550
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Specifications (characteristics)

Item	Symbol	Specifications				Remarks
		SEF	SDF	SCF	SCG	
Output frequency range	f_o	2 MHz to 48 MHz			1 MHz to 48 MHz	
Supply voltage	V_{cc}	1.8 V Typ. 1.6 V to 2.2 V	2.5 V Typ. 2.2 V to 3.0 V	3.3 V Typ. 2.7 V to 3.6 V		
Temperature range	Storage temperature	-40 °C to +125 °C				Stored as bare product after unpacking
	Operating temperature	-40 °C to +85 °C				
Frequency tolerance	$F_{tol}(osc)$	B: $\pm 50 \times 10^{-6}$, C: $\pm 100 \times 10^{-6}$			—	-20 °C to +70 °C
		M: $\pm 100 \times 10^{-6}$			—	-40 °C to +85 °C
		—			S: $\pm 25 \times 10^{-6}$	-20 °C to +70 °C
L: $\pm 50 \times 10^{-6}$			—	-40 °C to +85 °C		
Current consumption	I_{cc}	1.5 mA Max.	1.5 mA Max.	1.5 mA Max.	—	No load condition, 2 MHz <math>f_o \leq 4 MHz
		1.5 mA Max.	1.5 mA Max.	2.0 mA Max.	—	No load condition, 4 MHz <math>f_o \leq 8 MHz
		1.5 mA Max.	2.0 mA Max.	2.5 mA Max.	—	No load condition, 8 MHz <math>f_o \leq 16 MHz
		2.0 mA Max.	2.0 mA Max.	2.5 mA Max.	—	No load condition, 16 MHz <math>f_o \leq 25 MHz
		2.0 mA Max.	2.5 mA Max.	3.5 mA Max.	—	No load condition, 25 MHz <math>f_o \leq 33 MHz
		3.0 mA Max.	3.5 mA Max.	4.5 mA Max.	—	No load condition, 33 MHz <math>f_o \leq 48 MHz
Stand-by current	I_{std}	0.7 μ A Max.	1.5 μ A Max.	2.0 μ A Max.	12 mA Max.	No load condition, Max.frequency output. $\overline{ST} = GND$
Symmetry	SYM	45 % to 55 %	45 % to 55 %		45 % to 55 %	50 % V_{cc} level $L_{CMOS} \leq 15$ pF
		40 % to 60 %	40 % to 60 %		40 % to 60 %	
High output voltage	V_{OH}	90 % V_{cc} Min.			$V_{cc} - 0.4$ V Min.	$I_{OH} = -3$ mA(SEF, SDF, SCF), -8 mA(SCG)
Low output voltage	V_{OL}	10 % V_{cc} Max.			0.4 V Max.	$I_{OL} = 3$ mA(SEF, SDF, SCF), 8 mA(SCG)
Output load condition(CMOS)	L CMOS	15 pF Max.				
Output enable / disable input voltage	V_{IH}	80 % V_{cc} Min.			70 % V_{cc} Min.	\overline{ST} terminal
	V_{IL}	20 % V_{cc} Max.				
Output rise and fall time	t_r / t_f	4 ns Max.				20 % V_{cc} to 80 % V_{cc} level, $L_{CMOS} = 15$ pF
Oscillation start up time	t_{osc}	SG-350:2 ms Max. / SG-550:10 ms Max.			12 ms Max.	$t=0$ at 90 % V_{cc}
Frequency aging	F_{aging}	$\pm 5 \times 10^{-6}$ / year Max.			$\pm 10 \times 10^{-6}$ Max. 10 years	+25 °C, First year, $V_{cc} = 1.8$ V, 2.5 V, 3.3 V

External dimensions

(Unit:mm)

● SG-350

Pin map

Pin	Connection
1	\overline{ST}
2	GND
3	OUT
4	V_{cc}

*1 The terminal of #1 pin may look the same as #2 to #4 pin.
Note:
 \overline{ST} pin = HIGH or "open" : Specified frequency output.
 \overline{ST} pin = LOW : Output is low level (weak pull - down), oscillation stops.(SCG) / HI-z(SEF,SDF,SCF)

● SG-550

Pin map

Pin	Connection
1	\overline{ST}
2	GND
3	OUT
4	V_{cc}

Metal may be exposed on the top or bottom of this product.
This will not affect any quality, reliability or electrical spec.

Footprint (Recommended)

(Unit:mm)

● SG-350

● SG-550

End to End EPSON TOYOCOM

The development of our ubiquitous network society has caused a diversification of applications and has increased the demand for high-level quartz devices in terms of quality, quantity, and function.

The Quartz Device Operations Division of SEIKO EPSON CORPORATION (EPSON) and TOYO COMMUNICATION EQUIPMENT CO., LTD. (TOYOCOM) were integrated on October 1, 2005 to establish a new company, EPSON TOYOCOM CORPORATION, to meet these market and customer demands.

Each company contributes its own strength; EPSON holds a strong presence in consumer products and TOYOCOM is strong in industrial products. The consolidation of these two companies in a new company that provides advanced expertise with a wide range of products for terminals and infrastructure to our

customers.

Quartz devices have become crucial in the network environment where products are increasingly intended for broadband, ubiquitous applications and where various types of terminals can transfer information almost immediately via LAN and WAN on a global scale. EPSON TOYOCOM CORPORATION addresses every single aspect within a network environment. The new corporation offers "end-to-end" solutions to problems arising with products for consumer use, such as core network systems and automotive systems.

PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING INTERNATIONAL STANDARD

At EPSON TOYOCOM, 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.

In May 2001, all of our major manufacturing and non-manufacturing sites, in Japan and overseas, completed the acquisition of ISO 14001 certification. In the future, new group companies will be expected to acquire the certification around the third year of operations.

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.

WORKING FOR HIGH QUALITY

EPSON TOYOCOM quickly began working to acquire company-wide ISO 9000 series certification, and has acquired ISO 9001 or ISO 9002 certification with all targeted products manufactured in Japanese and overseas plants.

The Quartz Device Operations Division (In Japan, EPM and SZE) have acquired QS-9000 certification, which are of higher Level. Also QS-9000 and TS 16949 certification, which is of higher level, has been acquired.

QS-9000 is an enhanced standard for quality assurance systems formulated by leading U.S. automobile manufacturers based on the international ISO 9000 series.

ISO/TS 16949 is a global standard based on QS-9000, a severe standard corresponding to the requirements from automobile industry.

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/ traffic control equipment / and others requiring equivalent reliability.
- In this new crystal master for EPSON TOYOCOM, product code and marking will still remain as previously identified prior to the merger. Due to the on going strategy of gradual unification of part numbers, please review product code and marking as they will change during the course of the coming months.
We apologize for the inconvenience, but we will eventually have a unified part numbering system for Epson Toyocom which will be user friendly.