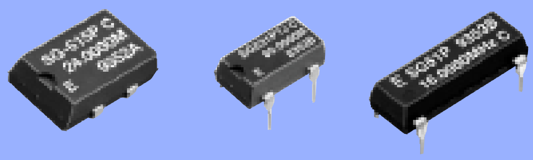
CRYSTAL OSCILLATOR
SPXO

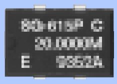
SG-615 series
SG-531 / SG-51 series

- Frequency range : 1.025 MHz to 135 MHz
- Supply voltage : 3.3 V / 5.0 V
- Function : Output enable(OE) Standby($\overline{ST}$)
- Pin compatible with full-size metal can. (SG-51 series)
- Pin compatible with half-size metal can. (SG-531 series)

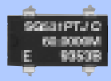


Actual size

SG-615



SG-531



SG-51

Specifications (characteristics)

Item		Symbol	Specifications: SG-615P / SG-531P / SG-51P	Specifications: SG-615PTJ / SG-531PTJ / SG-51PTJ	Specifications: SG-615PH / SG-531PH / SG-51PH	Remarks
Output frequency range		f_0	1.025 MHz to 26 MHz	26.001 MHz to 66.667 MHz		.
Supply voltage		V_{CC}	5.0 V ±0.5 V			
Temperature range	Storage temperature	T_stg	-55 °C to +125 °C			Store as bare product after unpacking
	Operating temperature	T_use	-20 °C to +70 °C			
Frequency tolerance		f_tol(osc)	B: $\pm 50 \times 10^{-6}$, C: $\pm 100 \times 10^{-6}$			-20 °C to +70 °C ∗1
Current consumption		I_{CC}	23 mA Max.	35 mA Max.		No load condition
Output disable current		I_dis	12 mA Max.	28 mA Max.	20 mA Max.	OE=GND
Symmetry		SYM	40 % to 60 %	—	40 % to 60 %	CMOS load:50 % V_{CC} level
			40 % to 60 %	45 % to 55 %	—	TTL load: 1.4 V level
High output voltage		V_{OH}	V_{CC}-0.4 V Min.	2.4 V Min.	V_{CC}-0.4 V Min.	I_{OH}=-400 µA(P,PTJ)/-4 mA(PH)
Low output voltage		V_{OL}	0.4 V Max.			I_{OL}=16 mA(P)/ 8 mA(PTJ)/ 4 mA(PH)
Output load condition (TTL)		L_TTL	10 TTL Max.	5 TTL Max.	—	L_CMOS ≤ 15 pF
Output load condition (CMOS)		L_CMOS	50 pF Max.	—	50 pF Max.	
Output enable / disable input voltage		V_{IH}	2.0 V Min.	3.5 V Min.	2.0 V Min.	I_{IH}= 1 µA Max. (OE=V_{CC})
		V_{IL}	0.8 V Max.	1.5 V Max.	0.8 V Max.	I_{IL}= -100 µA Min. (OE=GND), PTJ:I_{IL}= -500 µA Min.(OE=GND)
Output rise and fall time		t_r / t_f	8 ns Max.	—	7 ns Max.	CMOS load:20 % V_{CC} to 80 % V_{CC} level
			8 ns Max.	5 ns Max.	—	TTL load:0.4 V to 2.4 V level
Oscillation start up time		t_{OSC}	4 ms Max.	10 ms Max.		Time at minimum supply voltage to be 0 s
Frequency aging		f_aging	$\pm 5 \times 10^{-6}$ / year Max.			+25 °C, V_{CC}=5.0 V, First year

∗1 "B" tolerance will be available up to 55 MHz.

Specifications (characteristics)

Item		Symbol	Specifications: SG-615PCG / SG-531PCG	Specifications: SG-615SCG / SG-531SCG	Specifications: SG-615PCN	Remarks
Output frequency range		f_0	1.500 MHz to 26.000 MHz		26.001 MHz to 66.667 MHz	
Supply voltage		V_{CC}	2.7 V to 3.6 V		3.0 V to 3.6 V	
Temperature range	Storage temperature	T_stg	-55 °C to +125 °C			Store as bare product after unpacking
	Operating temperature	T_use	-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
Current consumption		I_{CC}	12 mA Max.		20 mA Max.	No load condition
Output disable current		I_dis	10 mA Max.	—	10 mA Max.	OE=GND (PCG,PCN)
Stand-by current		I_std	—	50 µA Max.	—	$\overline{ST}$ =GND (SCG)
Symmetry		SYM	45 % to 55 %			50 % V_{CC} level, L_CMOS=Max.
High output voltage		V_{OH}	V_{CC}-0.4 V Min.		V_{CC}-0.4 V Min.	I_{OH}=-8 mA
Low output voltage		V_{OL}	0.4 V Max.		0.4 V Max.	I_{OL}= 8 mA
Output load condition		L_CMOS	25 pF Max.		15 pF Max.	
Output enable / disable input voltage		V_{IH}	70 % V_{CC} Min.		70 % V_{CC} Min.	OE Terminal , $\overline{ST}$ Terminal
		V_{IL}	20 % V_{CC} Max.		30 % 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 ≤ Max.
Oscillation start up time		t_{OSC}	12 ms Max.		10 ms Max.	t=0 at 90% V_{CC}
Frequency aging		f_aging	$\pm 5 \times 10^{-6}$ / year Max.			+25 °C, V_{CC}=3.3 V, First year

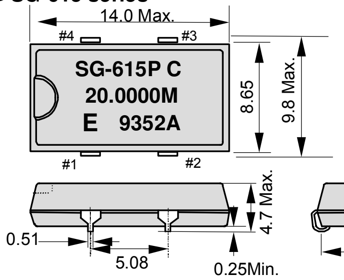
Specifications (characteristics)

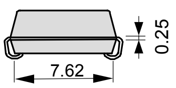
Item		Symbol	SG-615PTW / STW SG-531PTW / STW	SG-615PHW / SHW SG-531PHW / SHW	SG-615PCW / SCW SG-531PCW / SCW	Remarks
Output frequency range		f_0	55.001 MHz to 135.000 MHz		26.001 MHz to 135.000 MHz	
Supply voltage		V_{CC}	5.0 V ±0.5 V		3.3 V ±0.3 V	
Temperature range	Storage temperature	T_stg	-55 °C to +125 °C			Store as bare product after unpacking
	Operating temperature	T_use	-20 °C to +70 °C		-40 °C to +85 °C	
Frequency tolerance		f_tol(osc)	B: ±50 × 10^{-6} , C: ±100 × 10^{-6}			-20 °C to +70 °C *1
			—		M: ±100 × 10^{-6}	-40 °C to +85 °C
Current consumption		I_{CC}	45 mA Max.		28 mA Max.	No load condition(Max. frequency range)
Output disable current		I_dis	30 mA Max.		16 mA Max.	OE=GND (PTW,PHW,PCW)
Stand-by current		I_std	50 µA Max.			$\overline{ST}$ =GND (STW,SHW,SCW)
Symmetry		SYM	—	40 % to 60 %		50 % V_{CC} level, L_CMOS=Max.
			40 % to 60 %	—		1.4 V level ,L_CMOS=Max.
High output voltage		V_{OH}	V_{CC}-0.4 V Min.			I_{OH}=-16 mA(PTW,STW,PHW,SHW),-8 mA(PCW,SCW)
Low output voltage		V_{OL}	0.4 V Max.			I_{OL}= 16 mA(PTW,STW,PHW,SHW), 8 mA(PCW,SCW)
Output load condition (TTL)		L_TTL	5 TTL Max.	—	—	$f_0 \leq$ 90 MHz , Max.supply voltage
Output load condition (CMOS)		L_CMOS	15 pF Max.			Max.frequency , Max.supply voltage
Output enable / disable input voltage		V_{IH}	2.0 V Min.		70 % V_{CC} Min.	OE Terminal , $\overline{ST}$ Terminal
		V_{IL}	0.8 V Max.		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 ≤ Max.
			4 ns Max.	—	—	0.4 V to 2.4 V level
Oscillation start up time		t_{OSC}	10 ms Max..			Time at minimum supply voltage to be 0 s
Frequency aging		f_aging	±5 × 10^{-6} / year Max.			+25 °C, V_{CC}=5.0 V / 3.3 V, First year

*1 “C” tolerance : f_0 ≥66.667 MHz(PTW,STW,PHW,SHW)

External dimensions (Unit:mm)

● SG-615 series

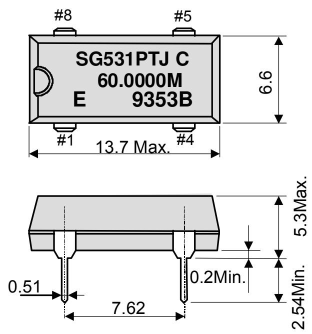




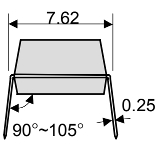
Pin map

Pin	Connection
1	OE or $\overline{ST}$
2	GND
3	OUT
4	V_{CC}

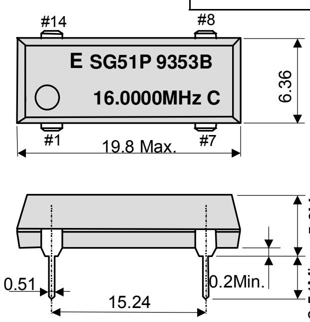
● SG-531 series



No.	Pin terminal
1	OE or $\overline{ST}$
4	GND
5	OUT
8	V_{CC}

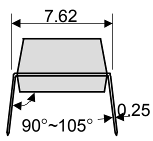


● SG-51 series



Pin map

Pin	Connection
1	OE or $\overline{ST}$
7	GND
8	OUT
14	V_{CC}

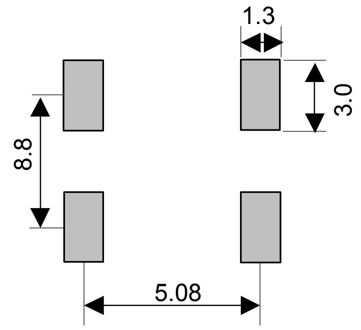


Note.
OE pin (P,PTJ,PH,PTW,PHW,PCW,PCN,PCG)
OE pin = "H" or "open" : Specified frequency output.
OE pin = "L" : Output is high impedance.

$\overline{ST}$ pin (STW, SHW, SCW,SCG)
$\overline{ST}$ pin = "H" or "open" : Specified frequency output.
$\overline{ST}$ pin = "L" : Output is low level
(weak pull - down),oscillation stops.

Footprint (Recommended) (Unit:mm)

● SG-615 series



“Quartz + MEMS” EPSON TOYOCOM

In order to meet customer needs in a rapidly advancing digital, broadband and ubiquitous society, we are committed to offering products that are one step ahead of the market and a rank above the rest in quality. To achieve our goals, we follow a “3D (three device) strategy” designed to drive both horizontal and vertical growth. We will to grow our three device categories of “Timing Devices”, ”Sensing Devices” and “Optical Devices”, and expand vertical growth through a combination of products from these categories.

A Quartz MEMS is any high added value quartz device that exploits the characteristics of quartz crystal material but that is produced using MEMS (micro-electro-mechanical system) processing technology.

Market needs are advancing faster than previously imagined toward smaller, more stable crystal products, but we will stay ahead of the curve by rolling out products that exceed market speed and quality requirements. We want to further accelerate the 3D strategy by QMEMS.

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 “Digital Convergence” solutions to problems arising with products for consumer use, such as, core network systems and automotive systems.

PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

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.
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

In order provide high quality and reliable products and services than meet customer needs,
Epson Toyocom made early efforts towards obtaining ISO9000 series certification and has acquired ISO9001 for all business establishments in Japan and abroad. We have also acquired ISO/TS 16949 certification that is requested strongly by major automotive manufacturers as standard.

> 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 the automobile industry.