

SOJ HIGH-FREQUENCY CRYSTAL OSCILLATOR

# SG-615 series

- High-density mounting-type SMD.
- A general-purpose SMD with heat-resisting cylindrical AT-cut crystal unit and allowing almost the same soldering temperature as SMD IC.
- Cylindrical AT crystal unit builtin, thus assuring high reliability.
- Provided with output enable function.
- Low current consumption.

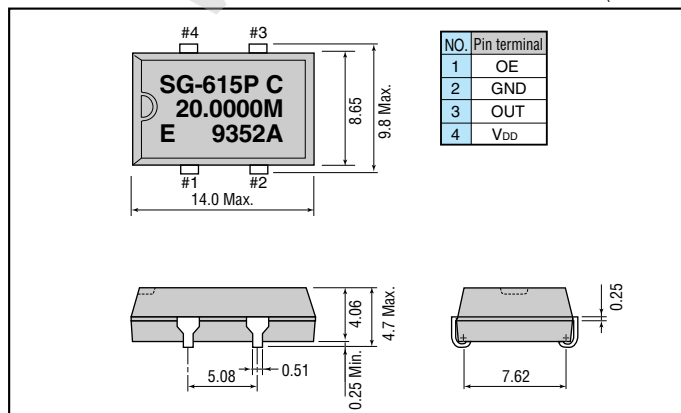
## Specifications (characteristics)

Item	Symbol	SG-615P	SG-615PTJ	SG-615PH	Remarks	
		Specifications				
Output frequency range	$f_0$	1.0250 MHz to 26.0000 MHz	26.0001 MHz to 66.6667 MHz			
Power source voltage	Max. supply voltage	$V_{DD-GND}$	-0.3 V to +7.0 V			
	Operating voltage	$V_{DD}$	5.0 V $\pm$ 0.5 V			
Temperature range	Storage temperature	$T_{STG}$	-55 °C to +125 °C		Stored as bare product after unpacking 55 MHz Max.(-40 °C to +85 °C)	
	Operating temperature	$T_{OPR}$	-20 °C to 70 °C (-40 °C to 85 °C)			
Soldering condition	$T_{SOL}$	Twice at under 260 °C within 10 s or under 230 °C within 3 min.				
Frequency stability	$\Delta f/f_0$	B: $\pm 50 \times 10^{-6}$ C: $\pm 100 \times 10^{-6}$		B type is possible up to 55 MHz		
Current consumption	$I_{OP}$	23 mA Max.	35 mA Max.		No load condition	
Duty	C-MOS level	$t_w/t$	40 % to 60 %	—	40 % to 60 %	C-MOS load: 1/2 $V_{DD}$
	TTL level		45 % to 55 %		—	TTL load: 1.4 V
Output voltage	$V_{OH}$	$V_{DD}$ -0.4 V Min.	2.4 V Min.	$V_{DD}$ -0.4 V Min.		
	( $I_{OH}$ )	-400 $\mu$ A		-4 mA		
	$V_{OL}$	0.4 V Max.				
	( $I_{OL}$ )	16 mA	8 mA	4 mA		
Output load condition (fan out)	C-MOS	$C_L$	50 pF Max.	—	50 pF Max.	$C_L \leq 15$ pF
	TTL	N	10 TTL Max.	5 TTL Max.	—	$I_{IH} = 1$ $\mu$ A Max.(OE= $V_{DD}$ ) $I_{IL} = 100$ $\mu$ A Min.(OE=GND) $I_{IL} = 500$ $\mu$ A Min.(OE=GND) PTJ OE=GND
Output enable/disable input voltage	$V_{IH}$	2.0 V Min.	3.5 V Min.	2.0 V Min.		
	$V_{IL}$	0.8 V Max.	1.5 V Max.	0.8 V Max.		
Output disable current	$I_{OE}$	12 mA Max.	28 mA Max.	20 mA Max.		
Output rise time	C-MOS level	$t_{TLH}$	—		7 ns Max.	C-MOS load: 20 % $\rightarrow$ 80 % $V_{DD}$
	TTL level		8 ns Max.		5 ns Max.	TTL load: 0.4 V $\rightarrow$ 2.4 V
Output fall time	C-MOS level	$t_{THL}$	—		7 ns Max.	C-MOS load: 80 % $\rightarrow$ 20 % $V_{DD}$
	TTL level		5 ns Max.		—	TTL load: 2.4 V $\rightarrow$ 0.4 V
Oscillation start up time	$t_{OSC}$	4 ms Max.	10 ms Max.		Time at 4.5 V to be 0 s	
Aging	$f_a$	$\pm 5 \times 10^{-6}$ /year Max.			$T_a = +25$ °C, $V_{DD} = 5$ V, first year	
Shock resistance	S.R.	$\pm 20 \times 10^6$ Max.			Three drops on a hard board from 750 mm or excitation test with 29400 m/s <sup>2</sup> x 0.3 ms x 1/2sine wave in 3 directions	

Note: • Unless otherwise stated, characteristics (specifications) shown in the above table are based on the rated operating temperature and voltage condition.  
• External by-pass capacitor is recommended.

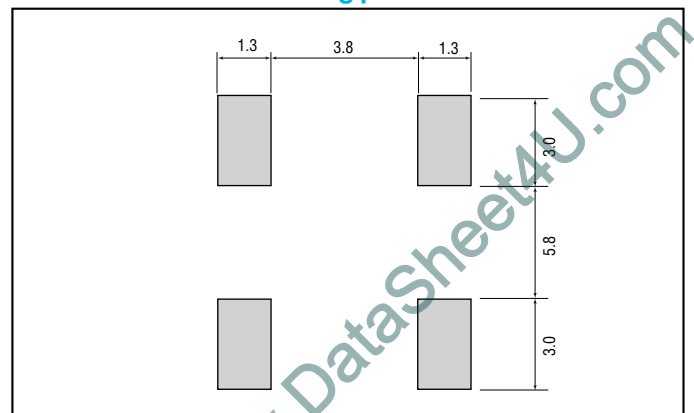
## External dimensions

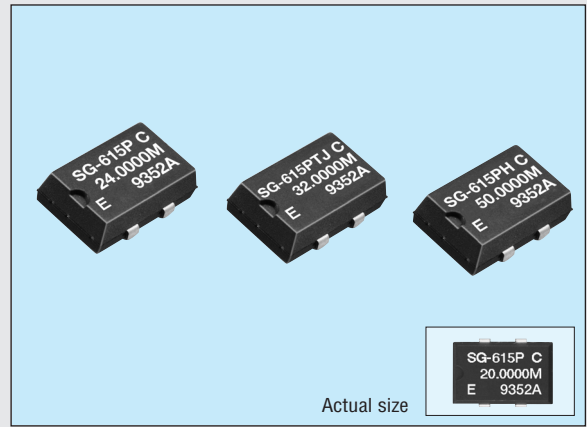
(Unit: mm)



## Recommended soldering pattern

(Unit: mm)





## Specifications (characteristics)

Item	Symbol	SG-615PTW/STW	SG-615PHW/SHW	SG-615PCW/SCW	Remarks
		Specifications			
Output frequency range	$f_0$	55.0001 MHz to 135.0000 MHz		26.0001 MHz to 135.0000 MHz	
Power source voltage	Max. supply voltage	$V_{DD-GND}$ -0.5 V to +7.0 V			
	Operating voltage	$V_{DD}$ 5.0 V $\pm$ 0.5 V		3.3 V $\pm$ 0.3 V	
Temperature range	Storage temperature	$T_{STG}$ -55 °C to +125 °C			
	Operating temperature	$T_{OPR}$ -20 °C to +70 °C		-40 °C to +85 °C	
Soldering condition (lead part)	$T_{SOL}$	Twice at under 260 °C within 10 s or under 230 °C within 3 min.			
Frequency stability	$\Delta f/f_0$	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	$I_{OP}$	45 mA Max.		28 mA Max.	No load condition
Output disable current	$I_{OE}$	30 mA Max.		16 mA Max.	OE=GND
Output disable current	$I_{ST}$	50 $\mu$ A Max.			ST=GND
Duty	C-MOS level	—		40 % to 60 %	C-MOS load: 1/2 $V_{DD}$
	TTL level	40 % to 60 %		—	TTL load: 1.4 V
Output voltage	$V_{OH}$	$V_{DD}$ -0.4 V Min.			$I_{OH}$ = -16 mA (*TW/HW)/-8 mA(*CW)
	$V_{OL}$	0.4 V Max.			$I_{OL}$ = -16 mA (*TW/HW)/8 mA(*CW)
Output load condition (fan out)	$C_L$	15 pF Max.			
Output enable/disable input voltage	$V_{IH}$	2.0 V Min.		0.7 $V_{DD}$ Min.	OE,ST
	$V_{IL}$	0.8 V Max.		0.2 $V_{DD}$ Min.	OE,ST
Output rise time	C-MOS level	—		4 ns Max.	C-MOS load: 20 % $\rightarrow$ 80 % $V_{DD}$
	TTL level	4 ns Max.		—	TTL load: 0.4 V $\rightarrow$ 2.4 V
Output fall time	C-MOS level	—		4 ns Max.	C-MOS load: 80 % $\rightarrow$ 20 % $V_{DD}$
	TTL level	4 ns Max.		—	TTL load: 2.4 V $\rightarrow$ 0.4 V
Oscillation start up time	$t_{OSC}$	10 ms Max.			Time at 4.5 V to be 0 s
Aging	$f_a$	$\pm 5 \times 10^{-6}$ /year Max.			$T_a$ =+25 °C, $V_{DD}$ =5 V
Shock resistance	S.R.	$\pm 20 \times 10^{-6}$ Max.			Three drops on a hard board from 750 mm or excitation test with 29400 m/s <sup>2</sup> x 0.3 ms x 1/2 sine wave in 3 directions

## Operating condition and Frequency band

Operating condition		1 MHz	50 MHz	100 MHz	150 MHz
5 V $\pm$ 0.5 V	Frequency stability:B (-20 to +70 °C)	1.025	26	55	135
	Frequency stability:C (-20 to +70 °C)	1.025	26	66.667	135
3.3 V $\pm$ 0.3 V	Frequency stability:B (-20 to +70 °C)	SG-615P			SG-615PTW/STW/PHW/SHW
	Frequency stability:C (-20 to +70 °C)	SG-615P			SG-615PTW/STW/PHW/SHW
	Frequency stability:M (-40 to +85 °C)	SG-615P			SG-615PCW/SCW