

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.

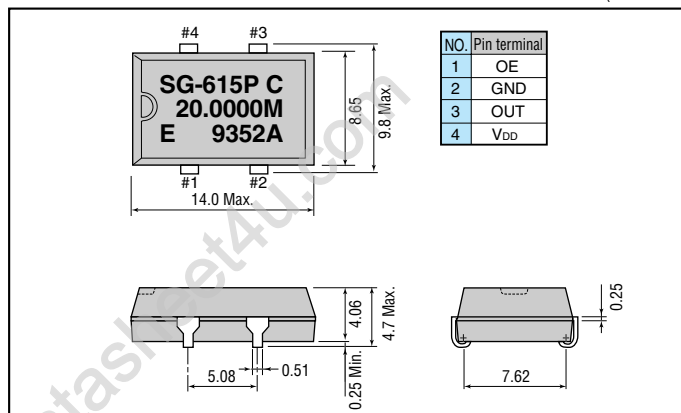
Specifications (characteristics)

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 μ 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 $I_{IH} = 1$ μ A Max.(OE= V_{DD}) $I_{IL} = 100$ μ A Min.(OE=GND) $I_{IL} = 500$ μ A Min.(OE=GND) PTJ
	TTL	N	10 TTL Max.	5 TTL Max.	—	
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.	OE=GND	
Output rise time	C-MOS level	t_{TLH}	8 ns Max.	—	7 ns Max.	C-MOS load: 20 % \rightarrow 80 % V_{DD}
	TTL level			5 ns Max.	—	TTL load: 0.4 V \rightarrow 2.4 V
Output fall time	C-MOS level	t_{THL}	8 ns Max.	—	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 ² 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.

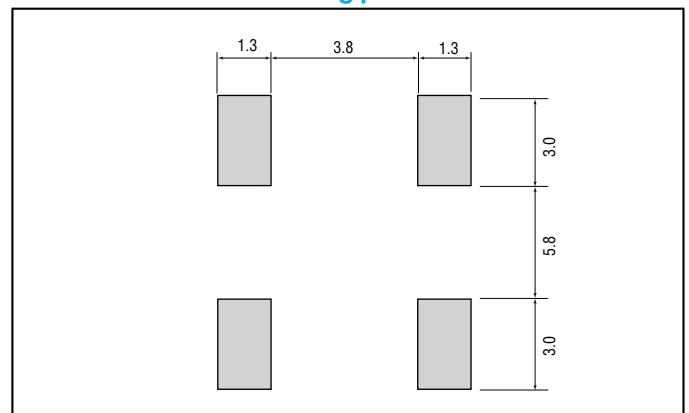
External dimensions

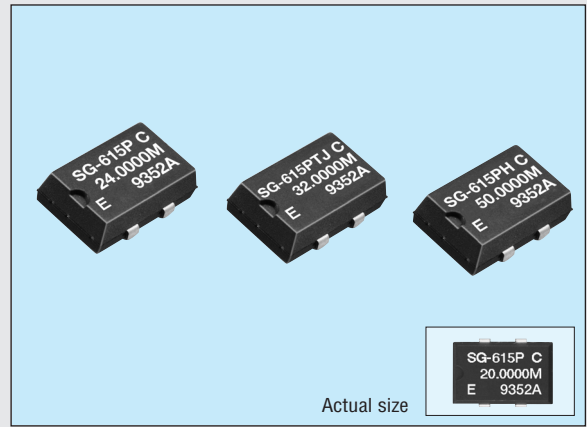
(Unit: mm)



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 μ 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 ² 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)		26		135
	Frequency stability:C (-20 to +70 °C)		26		135
	Frequency stability:M (-40 to +85 °C)		26		135