

SOJ HIGH-FREQUENCY CRYSTAL OSCILLATOR

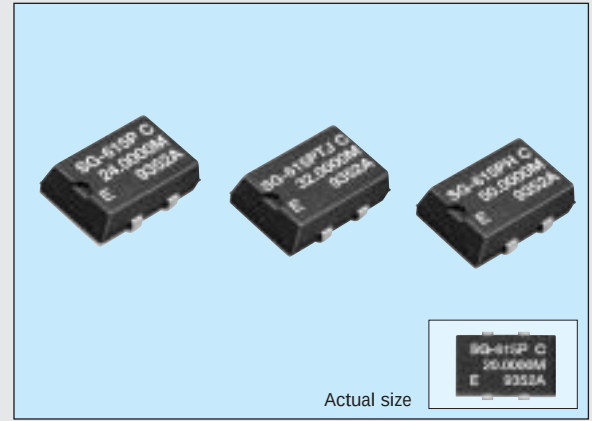
SG-615 series

Product number (Please refer to P1)

Q33615xxxxxx00

- 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.
- Low current consumption by output enable function(OE) or standby function(ST).

勝特力材料 886-3-5753170
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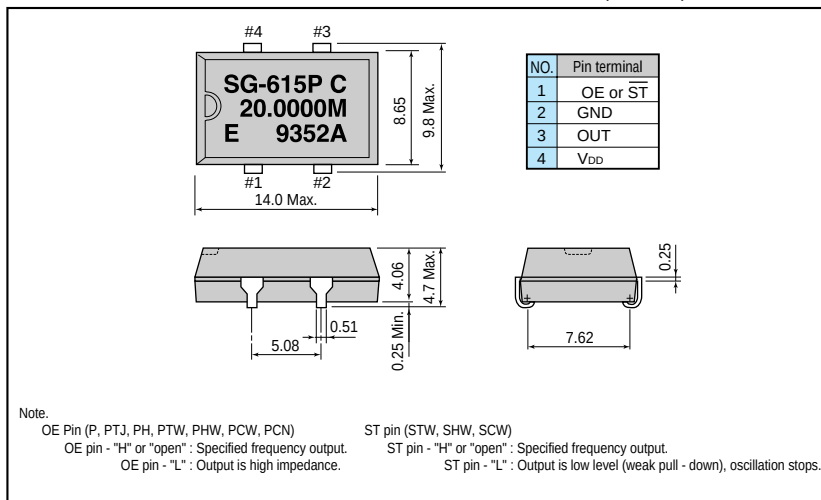
Specifications (characteristics)

Item	Symbol	Specifications			Remarks
		SG-615P	SG-615PTJ	SG-615PH	
Output frequency range	f_0	1.0250 MHz to 26.0000 MHz	26.0001 MHz to 66.6667 MHz		Refer to page 31. "Frequency range"
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
	Operating temperature	T_{OPR}	-20 °C to +70 °C (-40 °C to +85 °C)		Refer to page 31. "Frequency range"
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
Output disable current	I_{OE}	12 mA Max.	28 mA Max.	20 mA Max.	OE=GND
Duty	t_w/t	40 % to 60 %	—	40 % to 60 %	CMOS load: $1/2V_{DD}$
		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.	$I_{OH} = -400 \mu A$ (P,PTJ) / -4 mA (PH)
	V_{OL}	—	0.4 V Max.	—	$I_{OL} = 16$ mA (P) / 8mA (PTJ) / 4 mA (PH)
Output load condition (fan out)	C_L	50 pF Max.	—	50 pF Max.	
	N	10 TTL Max.	5 TTL Max.	—	$C_L \leq 15$ pF
Output enable/disable input voltage	V_{IH}	2.0 V Min.	3.5 V Min.	2.0 V Min.	$I_{IH} = 1 \mu A$ Max. (OE= V_{DD})
	V_{IL}	0.8 V Max.	1.5 V Max.	0.8 V Max.	$I_{IL} = -100 \mu A$ Min. (OE=GND), PTJ: $I_{IL} = -500 \mu A$ Min. (OE=GND)
Output rise time	t_{TLH}	8 ns Max.	—	7 ns Max.	CMOS load: 20 % $\rightarrow$ 80 % V_{DD}
		—	5 ns Max.	—	TTL load: 0.4 V $\rightarrow$ 2.4 V
Output fall time	t_{THL}	8 ns Max.	—	7 ns Max.	CMOS load: 80 % $\rightarrow$ 20 % V_{DD}
		—	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	fa	—	$\pm 5 \times 10^{-6}$ /year Max.		Ta = +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

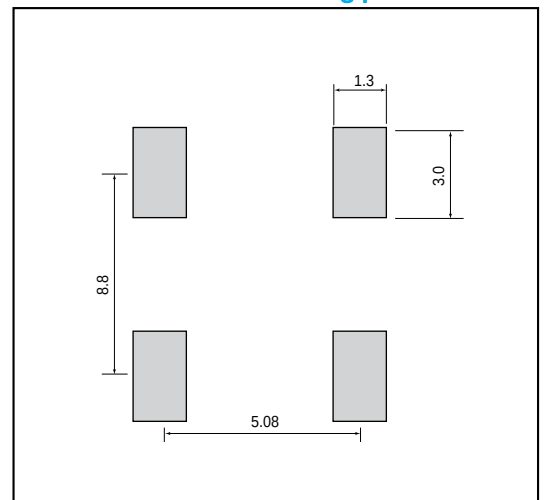
Note: • Unless otherwise stated, characteristics (specifications) shown in the above table are based on the rated operating temperature and voltage condition.
 • External by-pass capacitor is recommended.

External dimensions

(Unit: mm)



Recommended soldering pattern (Unit: mm)



■ Specifications (characteristics)

Item	Symbol	Specifications			Remarks
		SG-615PCG	SG-615SCG	SG-615PCN	
Output frequency range	f _o	1.5000 MHz to 26.0000 MHz			Refer to page 31. "Frequency range"
Power source voltage	Max. supply voltage	V _{DD} -GND			
	Operating voltage	V _{DD}			
Temperature range	Storage temperature	T _{STG}			Stored as bare product after unpacking
	Operating temperature	T _{OPR}			Refer to page 31. "Frequency range"
Frequency stability	$\Delta f/f_o$	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}	12 mA Max.			No load condition
Output disable current	I _{OE}	10 mA Max.	—	15 mA Max.	OE=GND (PCG/PCN)
Standby current	I _{ST}	—	50 μ A Max.	—	ST=GND (SCG)
Duty	tw/t	45 % to 55 %			50 % V _{DD} , CL = Max.
Output voltage	V _{OH}	V _{DD} -0.4 V Min.			I _{OH} = -8 mA
Output load condition (fan out)	V _{OL}	0.4 V Max.			I _{OL} = 8 mA
	CL	25 pF			
Output enable	V _{IH}	70 % V _{DD} Min.			OE, ST
disable input voltage	V _{IL}	20 % V _{DD} Max.			OE, ST
Output rise time	t _{TLH}	4.0 ns Max.			20 % to 80 % V _{DD} , CL $\leq$ Max.
Output fall time	t _{THL}	4.0 ns Max.			80 % to 20 % V _{DD} CL $\leq$ Max.
Oscillation start up time	t _{OSC}	12 ms Max.			Time at minimum operating voltage to be 0 s
Aging	fa	$\pm 5 \times 10^{-6}$ / year Max.			Ta=+25 °C, V _{DD} =3.3 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 1/2 sine wave in 3 directions

■ Specifications (characteristics)

Item	Symbol	Specifications			Remarks
		SG-615PTW/STW	SG-615PHW/SHW	SG-615PCW/SCW	
Output frequency range	f _o	55.0001 MHz to 135.0000 MHz			Refer to page 31. "Frequency range"
Power source voltage	Max. supply voltage	V _{DD} -GND			
	Operating voltage	V _{DD}			
Temperature range	Storage temperature	T _{STG}			Stored as bare product after unpacking
	Operating temperature	T _{OPR}			Refer to page 31. "Frequency range"
Frequency stability	$\Delta f/f_o$	B : $\pm 50 \times 10^{-6}$ C : $\pm 100 \times 10^{-6}$			-20 °C to +70 °C
		—			-40 °C to +80 °C
Current consumption	I _{OP}	45 mA Max.			No load condition
Output disable current	I _{OE}	30 mA Max.			OE=GND(P*W)
Standby current	I _{ST}	50 μ A Max.			ST=GND(S*W)
Duty	tw/t	40 % to 60 %	—	—	TTL load : 1.4 V, CL = Max.
		45 % to 55 %	—	—	TTL load : 1.4 V, 5TTL + 15 pF, f _o $\leq$ 66.6667 MHz
		—	40 % to 60 %	40 % to 60 %	CMOS load : 50% V _{DD} , CL = Max.
		—	45 % to 55 %	—	CMOS load : 50% V _{DD} , CL = 25 pF, f _o $\leq$ 66.6667 MHz
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)	CL	15 pF	—	—	f _o $\leq$ 135 MHz
		5 TTL + 15 pF	—	—	f _o $\leq$ 90 MHz
		25 pF	—	—	f _o $\leq$ 66.6667 MHz
		—	15 pF	15 pF	f _o $\leq$ 135 MHz
		—	25 pF	—	f _o $\leq$ 125 MHz
		—	50 pF	—	f _o $\leq$ 66.6667MHz
Output enable disable input voltage	V _{IH}	2.0 V Min.			OE, ST
	V _{IL}	0.8 V Max.			OE, ST
Output rise time	t _{TLH}	2.0 ns Max.	—	—	TTL load: 0.8 V→2.0 V, CL = Max.
		4.0 ns Max.	—	—	TTL load: 0.4 V→2.4 V, CL = Max.
		—	3.0 ns Max.	—	CMOS load: 20 %→80 % V _{DD} , CL = 25 pF
		—	—	3.0 ns Max.	CMOS load: 20 %→80 % V _{DD} , CL = 15 pF
Output fall time	t _{THL}	—	4.0ns Max.	4.0ns Max.	CMOS load: 20 %→80 % V _{DD} , CL= Max.
		2.0 ns Max.	—	—	TTL load: 2.0 V→0.8 V, CL = Max.
		4.0 ns Max.	—	—	TTL load: 2.4 V→0.4 V, CL = Max.
		—	3.0 ns Max.	—	CMOS load: 80 %→20 % V _{DD} , CL = 25 pF
Oscillation start up time	t _{OSC}	—	—	—	CMOS load: 80 %→20 % V _{DD} , CL = 15 pF
		—	4.0ns Max.	4.0ns Max.	CMOS load: 80 %→20 % V _{DD} , CL= Max.
Aging	fa	10 ms Max.			Time at minimum operating voltage to be 0 s
Shock resistance	S.R.	$\pm 5 \times 10^{-6}$ /year Max.			Ta=+25 °C, V _{DD} =5.0 V / 3.3 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 1/2 sine wave in 3 directions

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