

SOJ HIGH-FREQUENCY CRYSTAL OSCILLATOR

SG-615 / 531 / 51 series

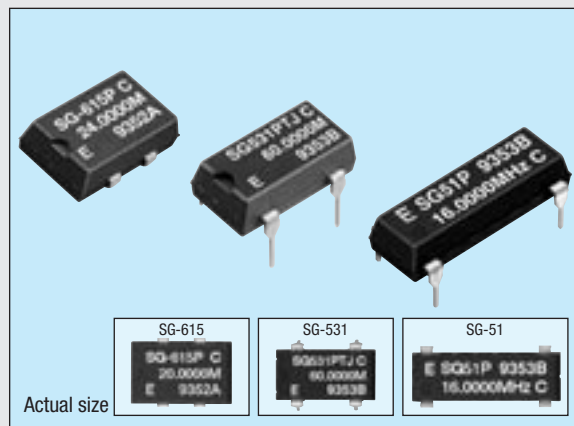
Product number (please refer to page 2)

Q33615xxxxxxxx00

Q32531xxxxxxxx00

Q32510xxxxxxxx00

- High-density mounting-type SMD.
- Cylindrical AT crystal unit built-in, thus assuring high reliability.
- Low current consumption by output enable function (OE) or standby function (ST).
- Pin compatible with full-size metal can. (SG-51 series)
- Pin compatible with half-size metal can. (SG-531 series)
- Available for lead (Pb)-free soldering.



Specifications (characteristics)

Item		Symbol	Specifications						Remarks	
			SG-615P	SG-531P	SG-51P	SG-615PTJ	SG-531PTJ	SG-51PTJ		SG-615PH
Output frequency range		f _o	1.0250 MHz to 26.0000 MHz			26.0001 MHz to 66.6667 MHz			Refer to Operating condition and Frequency range	
Power source voltage	Max. supply voltage	V _{DD} -GND	-0.3 V to +7.0 V				-0.5 V to +7.0 V			
	Operating voltage	V _{DD}				5.0 V±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 Operating condition and Frequency range
Frequency stability		Δf/f _o	B: ±50 x 10 ⁻⁶ C: ±100 x 10 ⁻⁶						Refer to Operating condition and Frequency range	
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: 1/2 V _{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 μA (P,PTJ) / -4 mA (PH)		
	V _{OL}			0.4 V Max.				I _{OL} = 16 mA (P) / 8 mA (PTJ) / 4 mA (PH)		
Output load condition (fan out)	CL	50 pF Max.		—		50 pF Max.				
	N	10 TTL Max.		5 TTL Max.		—		C _L ≤ 15 pF		
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 _{DD})		
	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 time	t _r	8 ns Max.		—		7 ns Max.		CMOS load: 20 % → 80 % V _{DD}		
				5 ns Max.		—		TTL load: 0.4 V → 2.4 V		
Output fall time	t _f	8 ns Max.		—		7 ns Max.		CMOS load: 80 % → 20 % V _{DD}		
				5 ns Max.		—		TTL load: 2.4 V → 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					±5 x 10 ⁻⁶ / year Max.			T _a = +25 °C, V _{DD} = 5 V, first year
Shock resistance		S.R.					±20 x 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.

Operating condition and frequency range

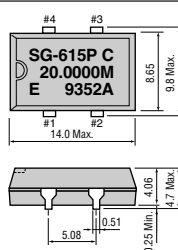
Operating Voltage	Frequency stability(Operating temperature)	1 MHz	50 MHz	100 MHz	150 MHz
5 V±0.5 V	B: ±50 x 10 ⁻⁶ (-20 °C to +70 °C)	1.025 26 55 135 SG-615/531/51P SG-615/531/51PTJ/PH SG-615/531PTW/STW/PHW/SHW	1.025 26 66.6667 135 SG-615/531/51P SG-615/531/51PTJ/PH SG-615/531PTW/STW/PHW/SHW		
	C: ±100 x 10 ⁻⁶ (-20 °C to +70 °C)				
3.3 V±0.3 V	B: ±50 x 10 ⁻⁶ C: ±100 x 10 ⁻⁶ M: ±100 x 10 ⁻⁶ (-40 °C to +85 °C)	1.5 26 66.6667 135 SG-615/531PCG/SCG SG-615PCN SG-615/531PCW/SCW			

External dimensions

(Unit: mm)

Recommended soldering pattern (Unit: mm)

SG-615 series

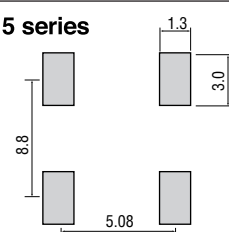


NO.	Pin terminal
1	OE or ST
2	GND
3	OUT
4	V _{DD}

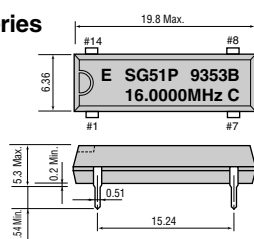
Note.
OE Pin (P, PTJ, PH, PTW, PHW, PCW, PCN)
OE pin - "H" or "open": Specified frequency output.
OE pin - "L": Output is high impedance.

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

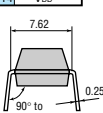
SG-615 series



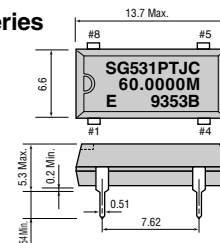
SG-51 series



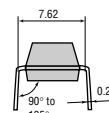
NO.	Pin terminal
1	OE
7	GND
8	OUT
14	V _{DD}



SG-531 series



NO.	Pin terminal
1	OE or ST
4	GND
5	OUT
8	V _{DD}



■ Specifications (characteristics)

Item	Symbol	Specifications			Remarks
		SG-615PCG SG-531PCG	SG-615SCG SG-531SCG	SG-615PCN	
Nominal frequency range	f ₀	1.5000 MHz to 26.0000 MHz		26.0001 MHz to 66.6667 MHz	Refer to Operating condition and Frequency range
Power source voltage	Max. supply voltage	V _{DD} -GND		-0.5 V to +7.0 V	
	Operating voltage	V _{DD}		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	Stored as bare product after unpacking
	Operating temperature	T _{OPR}		-40 °C to +85 °C	Refer to Operating condition and Frequency range
Frequency stability	Δf/f ₀	B : ±50 x 10 ⁻⁶ C : ±100 x 10 ⁻⁶			-20 °C to +70 °C
		M : ±100 x 10 ⁻⁶			-40 °C to +85 °C
Current consumption	I _{OP}	12 mA Max.		30 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 μA 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.		2.2 V Min.	I _{OH} = -8 mA
	V _{OL}	0.4 V Max.		0.4 V Max.	I _{OL} = 8 mA
Output load condition	CL	25 pF		15 pF	
	V _{IH}	0.7 V _{DD} Min.		0.7 V _{DD} Min.	OE, ST
Output enable / disable input voltage	V _{IL}	0.2 V _{DD} Max.		0.3 V _{DD} Max.	OE, ST
Output rise time	t _r	4.0 ns Max.		7 ns Max.	20 % → 80 % V _{DD} , CL ≤ Max.
Output fall time	t _f	4.0 ns Max.		7 ns Max.	80 % → 20 % V _{DD} , CL ≤ Max.
Oscillation start up time	t _{OSC}	12 ms Max.		10 ms Max.	Time at minimum operating voltage to be 0 s
Aging	fa	±5 x 10 ⁻⁶ / year Max.			Ta = +25 °C, V _{DD} = 3.3 V First year
Shock resistance	S.R.	±20 x 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

■ Specifications (characteristics)

Item	Symbol	Specifications			Remarks
		SG-615PTW / STW SG-531PTW / STW	SG-615PHW / SHW SG531PHW / SHW	SG-615PCW / SCW SG-531PCW / SCW	
Nominal frequency range	f ₀	55.0001 MHz to 135.0000 MHz		26.0001 MHz to 135.0000 MHz	Refer to Operating condition and Frequency range
Power source voltage	Max. supply voltage	V _{DD} -GND		-0.5 V to +7.0 V	
	Operating voltage	V _{DD}		5.0 V ± 0.5 V	3.3 V ± 0.3 V
Temperature range	Storage temperature	T _{STG}		-55 °C to +100 °C	Stored as bare product after unpacking
	Operating temperature	T _{OPR}		-20 °C to +70 °C	Refer to Operating condition and Frequency range
Frequency stability	Δf/f ₀	B : ±50 x 10 ⁻⁶ C : ±100 x 10 ⁻⁶			-20 °C to +70 °C
		—			-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 (P*W)
Standby current	I _{ST}	50 μA 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 ₀ ≤ 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 ₀ ≤ 66.6667 MHz
Output voltage	V _{OH}	—	—	—	CMOS load : 50% V _{DD} , CL = 25 pF, f ₀ ≤ 40.0 MHz
		—	—	—	
		—	—	—	
		—	—	—	
Output load condition	CL	15 pF	—	—	f ₀ ≤ 135 MHz
		5 TTL + 15 pF	—	—	f ₀ ≤ 90 MHz
		25 pF	—	—	f ₀ ≤ 66.6667 MHz
		—	15 pF	15 pF	f ₀ ≤ 135 MHz
Output enable / disable input voltage	V _{IH}	—	—	—	f ₀ ≤ 125 MHz
		—	—	—	f ₀ ≤ 66.6667MHz
		—	—	—	f ₀ ≤ 40.0 MHz
		—	—	—	
Output rise time	t _r	2.0 ns Max.	—	—	OE, ST
		4.0 ns Max.	—	—	OE, ST
		—	3.0 ns Max.	—	TTL load: 0.8 V → 2.0 V, CL = Max.
		—	—	—	TTL load: 0.4 V → 2.4 V, CL = Max.
Output fall time	t _f	—	—	—	CMOS load: 80 % → 20 % V _{DD} , CL = 25 pF
		—	—	—	CMOS load: 80 % → 20 % V _{DD} , CL = 15 pF
		—	—	—	CMOS load: 80 % → 20 % V _{DD} , CL = Max.
		—	—	—	
Oscillation start up time	t _{OSC}	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
		—	—	—	CMOS load: 80 % → 20 % V _{DD} , CL = 15 pF
Aging	fa	—	—	—	CMOS load: 80 % → 20 % V _{DD} , CL = Max.
		—	—	—	
		—	—	—	
		—	—	—	
Oscillation start up time	t _{OSC}	10 ms Max.			Time at minimum operating voltage to be 0 s
Aging	fa	±5 x 10 ⁻⁶ / year Max.			Ta = +25 °C, V _{DD} = 5.0 V / 3.3 V, First year
Shock resistance	S.R.	±20 x 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