

SOJ HIGH-FREQUENCY CRYSTAL OSCILLATOR

SG-615 / 531 / 51 series

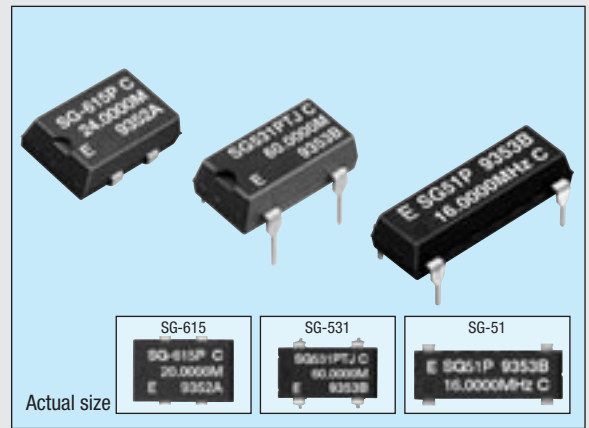
Product number (please refer to page 2)

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. • Available for lead (Pb)-free terminal.



Specifications (characteristics)

Item	Symbol	Specifications			Remarks
		SG-615P SG-531P SG-51P	SG-615PTJ SG-531PTJ SG-51PTJ	SG-615PH SG-531PH SG-51PH	
Output frequency range	f _o	1.0250 MHz to 26.0000 MHz	26.0001 MHz to 66.6667 MHz	66.6667 MHz to 135.0000 MHz	Refer to Operating condition and Frequency range
Power source voltage	Max. supply voltage	-0.3 V to +7.0 V			-0.5 V to +7.0 V
	Operating voltage	5.0 V±0.5 V			
Temperature range	Storage temperature	-55 °C to +125 °C			Stored as bare product after unpacking
	Operating temperature	-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	tw/ t	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.	-		C _L ≤ 15 pF
	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.	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.	-		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.	-		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	66.6667	135
	C: ±100 x 10 ⁻⁶ (-20 °C to +70 °C)	1.025 26 66.6667 135	SG-615/531/51P SG-615/531/51PTJ/PH SG-615/531PTW/STW/PHW/SHW	66.6667	135
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	66.6667	135

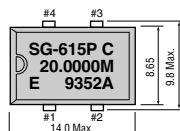
External dimensions

(Unit: mm)

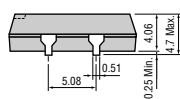
Recommended soldering pattern

(Unit: mm)

SG-615 series



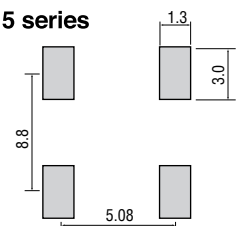
NO.	Pin terminal
1	OE or ST
2	GND
3	OUT
4	V _{DD}



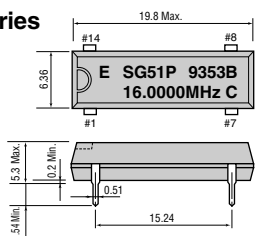
Note.
OE Pin (P, PTJ, PH, PTW, PHW, PCW, PCN)
OE pin - "H" or "open": Specified frequency output.
OE pin - "L": Output is high impedance.

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.

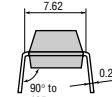
SG-615 series



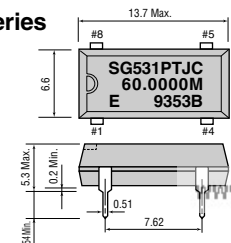
SG-51 series



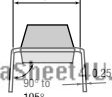
NO.	Pin terminal
1	OE
7	GND
8	OUT
14	V _{DD}



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	fo	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	VDD-GND		-0.5 V to +7.0 V	
	Operating voltage	VDD		2.7 V to 3.6 V	3.0 V to 3.6 V
Temperature range	Storage temperature	TSTG		-55 °C to +125 °C	Stored as bare product after unpacking
	Operating temperature	TOPR		-40 °C to +85 °C	Refer to Operating condition and Frequency range
Frequency stability	Δf/fo	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	IOP	12 mA Max.		30 mA Max.	No load condition
Output disable current	IOE	10 mA Max.	–	15 mA Max.	OE = GND (PCG / PCN)
Standby current	IST	–	50 μA Max.	–	ST = GND (SCG)
Duty	tw/ t	–		45 % to 55 %	50 % VDD, CL = Max.
Output voltage	VOH	VDD -0.4 V Min.		2.2 V Min.	IOH = -8 mA
	VOL	0.4 V Max.		0.4 V Max.	IOL = 8 mA
Output load condition	CL	25 pF		15 pF	
	VIH	0.7 VDD Min.		0.7 VDD Min.	OE, ST
Output enable / disable input voltage	VIL	0.2 VDD Max.		0.3 VDD Max.	OE, ST
	tr	4.0 ns Max.		7 ns Max.	20 % → 80 % VDD, CL ≤ Max.
Output fall time	tf	4.0 ns Max.		7 ns Max.	80 % → 20 % VDD, CL ≤ Max.
Oscillation start up time	tosc	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, VDD = 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	fo	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	VDD-GND		-0.5 V to +7.0 V	
	Operating voltage	VDD		5.0 V ± 0.5 V	3.3 V ± 0.3 V
Temperature range	Storage temperature	TSTG		-55 °C to +100 °C	Stored as bare product after unpacking
	Operating temperature	TOPR		-20 °C to +70 °C	Refer to Operating condition and Frequency range
Frequency stability	Δf/fo	B : ±50 x 10 ⁻⁶ C : ±100 x 10 ⁻⁶			-20 °C to +70 °C
		–			M : ±100 x 10 ⁻⁶
Current consumption	IOP	45 mA Max.		28 mA Max.	No load condition
Output disable current	IOE	30 mA Max.		16 mA Max.	OE = GND (P*W)
Standby current	IST	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, fo ≤ 66.6667 MHz
		–	40 % to 60 %	40 % to 60 %	CMOS load : 50% VDD, CL = Max.
		–	45 % to 55 %	–	CMOS load : 50% VDD, CL = 25 pF, fo ≤ 66.6667 MHz
Output voltage	VOH	VDD -0.4 V Min.		–	IOH = -16 mA (*TW / *HW) / -8 mA (*CW)
		0.4 V Max.		–	IOH = -16 mA (*TW / *HW) / 8 mA (*CW)
		–		–	–
		–		–	–
Output load condition	CL	15 pF	–	–	fo ≤ 135 MHz
		5 TTL + 15 pF	–	–	fo ≤ 90 MHz
		25 pF	–	–	fo ≤ 66.6667 MHz
		–	15 pF	15 pF	fo ≤ 135 MHz
Output enable / disable input voltage	VIL	2.0 V Min.		0.7 VDD Min.	OE, ST
		0.8 V Max.		0.2 VDD Max.	OE, ST
		–		–	–
		–		–	–
Output rise time	tr	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: 80 % → 20 % VDD, CL = 25 pF
		–	–	3.0 ns Max.	CMOS load: 80 % → 20 % VDD, CL = 15 pF
Output fall time	tf	2.0 ns Max.	–	–	CMOS load: 80 % → 20 % VDD, CL = Max.
		4.0 ns Max.	–	–	–
		–	3.0 ns Max.	–	TTL load: 2.0 V → 0.8 V, CL = Max.
		–	–	–	TTL load: 2.4 V → 0.4 V, CL = Max.
Output load condition	CL	–	15 pF	15 pF	CMOS load: 80 % → 20 % VDD, CL = 25 pF
		–	25 pF	–	CMOS load: 80 % → 20 % VDD, CL = 15 pF
		–	50 pF	–	CMOS load: 80 % → 20 % VDD, CL = Max.
		–	–	30 pF	–
Oscillation start up time	tosc	10 ms Max.		–	Time at minimum operating voltage to be 0 s
Aging	fa	±5 x 10 ⁻⁶ / year Max.		–	Ta = +25 °C, VDD = 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