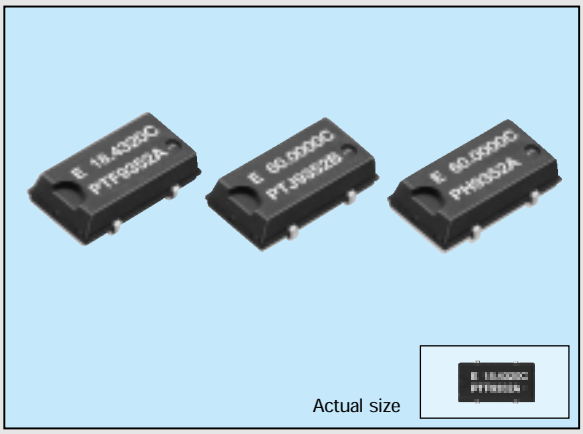
SMALL SOJ HIGH-FREQUENCY CRYSTAL OSCILLATOR

SG-636 series

Products number

Q33636xxxxxxx00

- A small SMD that enables high-density mounting.
- A general-purpose device with builtin heat-resisting cylindrical AT-cut crystal and allowing almost the same temperature condition for soldering as SMD IC.
- Low current consumption by output enable function(OE) or standby function(ST).



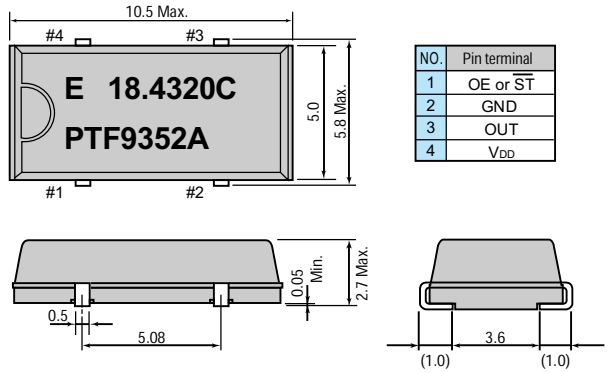
Specifications (characteristics)

Item		Symbol	SG-636PTF	SG-636PH	SG-636SCE/PCE	SG-636PDE	Remarks
			Specifications				
Output frequency range		f_0	2.21675 MHz to 41.0000 MHz	41.0001 MHz to 70.0000 MHz	2.21675 MHz to 41.0000 MHz		
Power source voltage	Max. supply voltage	V_{DD}-GND	-0.5 V to +7.0 V		-0.5 V to +7.0 V		
	Operating voltage	V_{DD}	5.0 V ±0.5 V		3.3 V ±0.3 V	2.5 V ±0.25 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				
Frequency stability		$\Delta f/f_0$	C: ±100 x 10^{-6}				
Current consumption		Iop	17 mA Max.	35 mA Max.	9 mA Max.	5 mA Max.	No load condition
Output disable current		I_{OE}	10 mA Max.	20 mA Max.	5 mA Max.	3 mA Max.	OE=GND, ST=GND 2 µA Max.(SCE)
Duty	C-MOS level	t_W/t	40 % to 60 %		45 % to 55 %		C-MOS load: 1/2 V_{DD} level
	TTL level		45 % to 55 %		—		TTL load: 1.4 V level
Output Joltage V_{OH}		V_{OL}	V_{DD} -0.4 V Min.				I_{OH} =-8 mA (PTF) /-4 mA (PH / SCE PCE / PDE)
		V_{OL}	0.4 V Max.				I_{OL} =16 mA (PTF) /4 mA (PH / SCE PCE / PDE)
Output load condition (fan out)	C-MOS	C_L	50 pF Max.	20 pF Max.(≤ 55 MHz) 15 pF Max.(> 55 MHz)	30 pF Max.	15 pF Max.	
	TTL	N	10 TTL Max.	5 LSTTL Max.	—		C_L≤15 pF
Output enable/disable input voltage		V_{IH}	2.0 V Min.		0.8 V_{DD} Min.		OE,ST
		V_{IL}	0.8 V Max.		0.2 V_{DD} Max.		
Output rise time	C-MOS level	t_{TLH}	7 ns Max.		5 ns Max.		C-MOS load: 20 %→80 % V_{DD}
	TTL level		5 ns Max.		—		TTL load: 0.4 V→2.4 V
Output fall time	C-MOS level	t_{THL}	7 ns Max.		5 ns Max.		C-MOS load: 80 %→20 % V_{DD}
	TTL level		5 ns Max.		—		TTL load: 2.4 V→0.4 V
Oscillation start up time		tosc	4 ms Max.	10 ms Max.	4 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 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/s² x 0.3 ms x 1/2 sine 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 required.
• Metal may be exposed on the top or bottom of this product. This won't affect any quality, reliability or electrical spec.

External dimensions

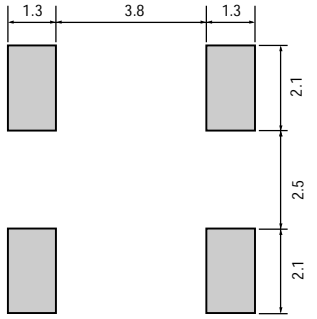
(Unit: mm)



NO.	Pin terminal
1	OE or $\overline{ST}$
2	GND
3	OUT
4	V_{DD}

Recommended soldering pattern

(Unit: mm)



Specifications (characteristics)

Item		Symbol	SG-636PTW/STW	SG-636PHW/SHW	SG-636PCW/SCW	Remarks
			Specifications			
Output frequency range		f_0	32.0001 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±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			
Frequency stability		$\Delta f/f_0$	B: ±50 x 10^{-6} C: ±100 x 10^{-6}			
Current consumption		Iop	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.			$\overline{ST}$=GND(S*W)
Duty	C-MOS level	tw/t	—	40 % to 60 %		C-MOS load: 1/2V_{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,$\overline{ST}$
		V_{IL}	0.8 V Max.		0.2 V_{DD} Max.	OE,$\overline{ST}$
Output rise time	C-MOS level	t_{TLH}	—	4 ns Max.	4 ns Max.	C-MOS load: 20 %→80 % V_{DD}
	TTL level		4 ns Max.	—	—	TTL load: 0.4 V→2.4 V
Output fall time	C-MOS level	t_{THL}	—	4 ns Max.	4 ns Max.	C-MOS load: 80 %→20 % V_{DD}
	TTL level		4 ns Max.	—	—	TTL load: 2.4 V→0.4 V
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 V
Shock resistance		S.R.	±20 x 10^{-6} Max.			Three drops on a hard board from 750 mm or excitation test with 29400 m/s² 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±0.5 V	Frequency stability:B (-20 to +70 °C)	32			135
		SG-636PTW/STW/PHW/SHW			
	Frequency stability:C (-20 to +70 °C)	2.21675	41	70	135
		SG-636PTF	SG-636PH	SG-636PTW/STW/PHW/SHW	
3.3 V±0.3 V	Frequency stability:B (-20 to +70 °C)	32			135
		SG-636PCW/SCW			
	Frequency stability:C (-20 to +70 °C)	2.21675	41		135
		SG-636PCE/SCE	SG-636PCW/SCW		
2.5 V±0.25 V	Frequency stability:C (-20 to +70 °C)	2.21675	41		
		SG-636PDE			