

Helping Customers Innovate, Improve & Grow



### Features

- Reflow Process Compatible
- Surface Mount package
- AT-CUT and SC\_CUT Crystal Options
- Low Profile Compact Package

### Applications

- Base stations
- Test equipment
- Synthesizers
- Military communication equipment
- Digital Switching

## Performance Specifications

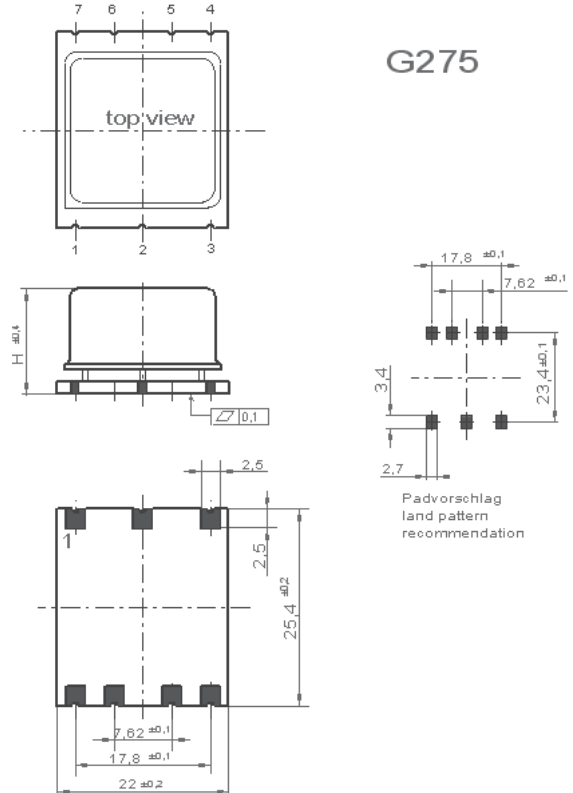
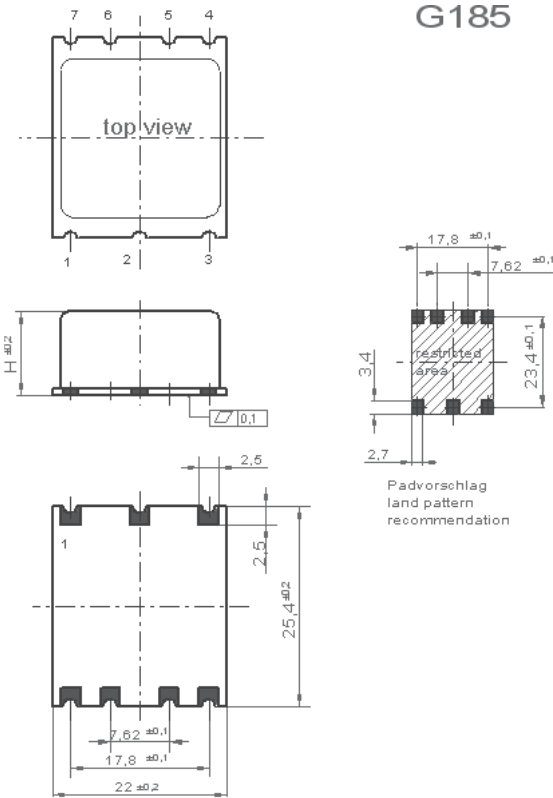
Frequency Stabilities <sup>1</sup> (AT-Cut Crystal-10 to 160 MHz -)						
Parameter	Min	Typical	Max	Units	Condition	Options <sup>5</sup>
vs. operating temperature range (referenced to +25°C)	-100		+100	ppb	-20 to +70°C	
	-200		+200	ppb	-20 to +70°C	
	-250		+250	ppb	-40 to +85°C	
Initial tolerance	-0.5		+0.5	ppm	at time of shipment, nominal EFC V <sub>s</sub> ±5% static Load ±5% static after 30 days of operation ≤ 60 MHz after 30 days of operation ≥ 60 MHz after 30 days of operation	
vs. supply voltage change	-10		+10	ppb		
vs. load change	-10		+10	ppb		
vs. aging / day	-5		+5	ppb		
vs. aging / year	-300		+300	ppb		
vs. aging / year	-500		+500	ppb		
Warm-up time			5	minutes	to ±100ppb of final frequency (1 hour reading) @ +25°C	
Frequency Stabilities <sup>1</sup> (SC-Cut Crystal-Option - 10 to 100 MHz)						
vs. operating temperature range (referenced to +25°C)	-5		+5	ppb	0 to 50 °C	
	-10		+10	ppb	-5 to +70°C	
	-10		+10	ppb	-20 to +70°C	
	-20		+20	ppb	-40 to +85°C	
Initial tolerance	-0.2		+0.2	ppm	at time of shipment, nominal EFC V <sub>s</sub> ±5% static Load ±5% static after 30 days of operation after 30 days of operation after 30 days of operation after 30 days of operation	
vs. supply voltage change	-5		+5	ppb		
vs. load change	-5		+5	ppb		
vs. aging / day	-1		+1	ppb		
vs. aging / year	-100		+100	ppb		
vs. aging / year (following years)	-80		+80	ppb		
vs. aging / year (5MHz; OX- 221)	-15		+15	ppb		
Warm-up time			5	minutes	to ±100ppb of final frequency (1 hour reading) @ +25°C	

## Performance Specifications

Supply Voltage (Vs)						
Parameter	Min	Typical	Max	Units	Condition	
Supply voltage (standard)	3.135	3.3	3.465	VDC		
	4.75	5.0	5.25	VDC		
Power consumption			2.5	Watts	during warm-up	
			1.0	Watts	steady state @ +25°C	
RF Output						
Signal [standard]	HCMOS					
Load		15		pF		
Signal Level (Vol)			0.4	VDC	with Vs=3.3V and 15pF Load	
Signal Level (Vol)			0.5		with Vs=5.0V & 12V and 15pF Load	
Signal Level (Voh)	2.4			VDC	with Vs=3.3V and 15pF Load	
Signal Level (Voh)	3.5				with Vs=5.0V & 12V and 15pF Load	
Duty Cycle	45		55	%	@ (Voh-Vol)/2	
Signal	Sine Wave					
Load		50		Ω		
Output Power @3,3V	2	5	8	dBm	50 Ω load	
Putput Power @ 5.0V	5	8	11	dBm	50 Ω load	
Harmonics			-30	dBm	50 Ω load	
Frequency Tuning (EFC)						
Tuning Range	Fixed OCXO; No adjust				Option <sup>5</sup>	
Tuning Range	±3.0		±8	ppm		with AT cut crystal
	±0.8		±2.4	ppm		with SC cut crystal
Linearity	10%					
Tuning Slope	Positive					
Control Voltage Range	0.0	1.4	2.8	VDC	with Vs=3.3V	
	0.0	2.0	4.0		with Vs=5.0V	
Reference Voltage Output (Vref)						
Reference Voltage	2.75	2.8	2.85	VDC	with Vs = 3.3 VDC	
	3.92	4.0	4.08	VDC	with Vs = 5.0 VDC	
Additional Parameters						
Phase Noise <sup>3</sup>			-75	dBc/Hz	1 Hz	@ 30.72MHz with SC Cut
			-110	dBc/Hz	10 Hz	
			-135	dBc/Hz	100 Hz	
			-150	dBc/Hz	1 kHz	
			-150	dBc/Hz	10 kHz	
Phase Noise <sup>3</sup>			-75	dBc/Hz	1 Hz	@ 110MHz with AT Cut
			-105	dBc/Hz	10 Hz	
			-130	dBc/Hz	100 Hz	
			-140	dBc/Hz	1 kHz	
			-150	dBc/Hz	10 kHz	
Weight			10	g		
Processing & Packing	Handling & Processing Note					

Absolute Maximum Ratings					
supply voltage (Vs)			6.5	V	with Vs=3.3 & 5.0VDC
Output Load			50	pF	
Operable Temperature Range	-55		+85	°C	
Storage Temperature Range	-55		+125	°C	

## Outline Drawing / Enclosure



Dimensions in mm

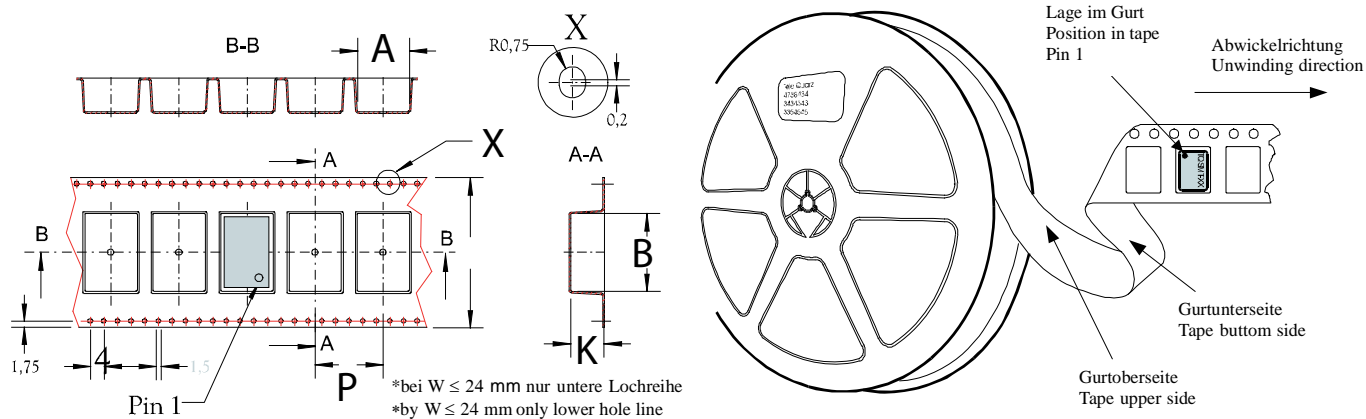
OX-220	
Height "H"	Pin Length "L"
7.8	N.A
12.1	N.A
15.0	N.A
11.3	N/A
8.5	N.A

OX-221	
Height "H"	Pin Length "L"
13,2	N.A
11.4	N/A

Pin Connections	
1	Electronic Frequency Control Input (EFC)
2	Reference Voltage output
3	Supply Voltage Input (Vs)
4	RF Output
5	Oven Alarm
6	N.C or Option (must remain un connected)
7	Ground (Case)

Pin Connections	
1	RF Output
2	Oven Alarm
3	Ground (Case)
4	Reference Voltage Output
5	Electronic Frequency Control Input (EFC)
6	Enable
7	Supply Voltage Input (VS)

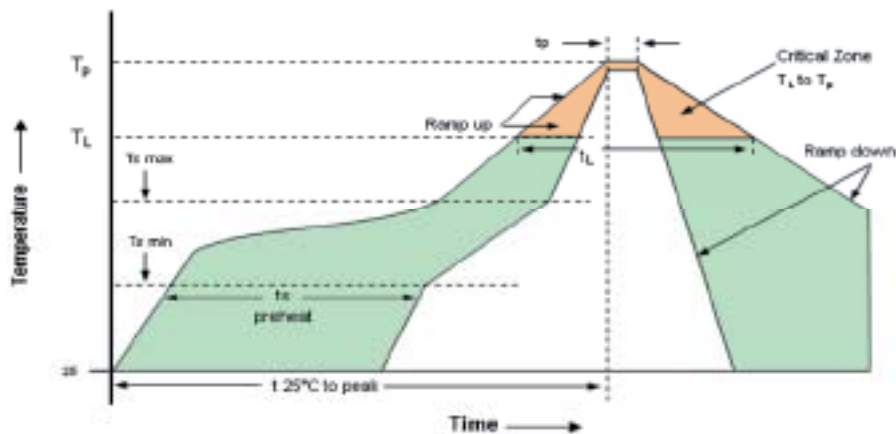
# Standard Shipping Method (OX-220 / OX -221)



Enclosure Type	Tape Width W (mm)	Quantity per meter	Quantity per reel	Dimension P
OX-220 (7.8mm)	44	37.5	280	32
OX-220 (12.1mm)	44	37.5	175	28
OX-220 (15mm)	44	37.5	120	28
OX-221 (13.2mm)	44	37.5	120	28

## Recommended Reflow Profile

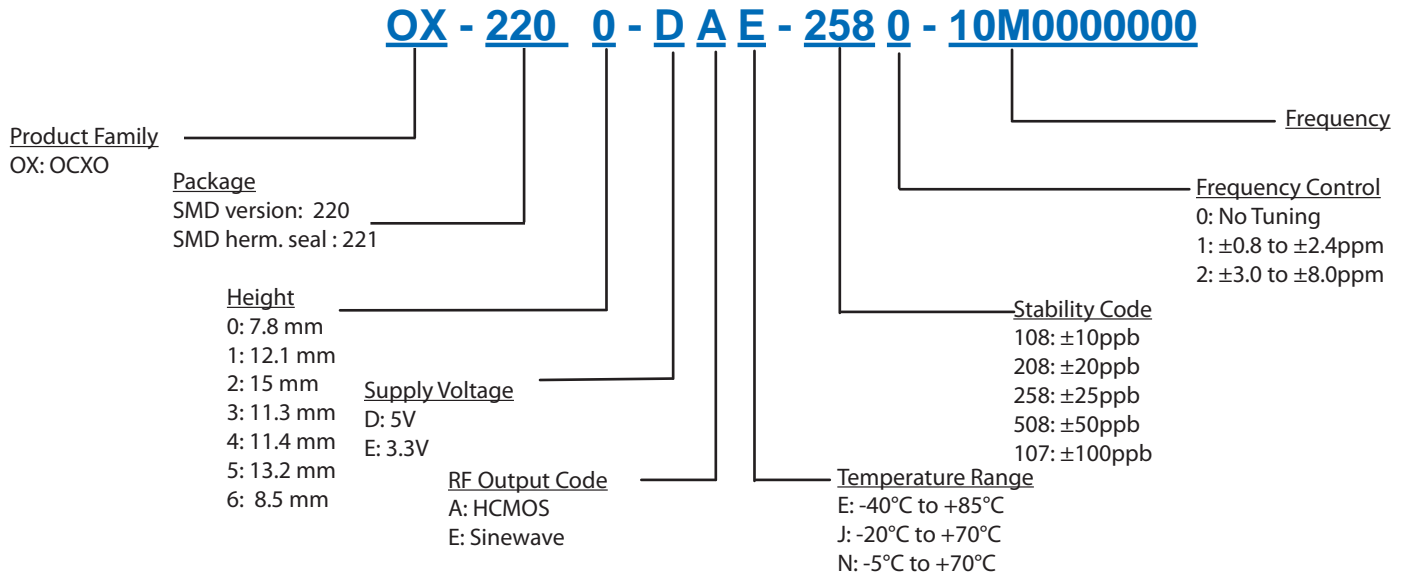
### Solderprofile:



Profile Feature	Pb-Free Assembly/ Sn-Pb Assembly	Profile Feature	Pb-Free Assembly/ Sn-Pb Assembly
Average ramp-up rate ( $T_L$ to $T_p$ )	3°C/second max.	Time 25°C to Peak Temperature	8 minutes max.
Preheat -Temperature Min $T_{Smin}$ -Temperature Min $T_{Smax}$ -Time (min to max) $t_s$	150°C 200°C 60-180 seconds	Time maintained above -Temperature ( $T_L$ ) -Time ( $t_L$ )	217°C 60-150 seconds
$T_{Smax}$ to $T_L$ -Ramp-up Rate	3°C/second max		
Time maintained above -Temperature ( $T_L$ ) -Time ( $t_L$ )	217°C 60-150 seconds	Time within 5°C of actual Peak Temperature ( $t_p$ )	20-40 seconds
Peak Temperature ( $T_p$ )	max 260°C	Ramp-down Rate	6°C/ second max

**Note:** All temperatures refer to topside of the package, measured on the package body surface.

## Ordering Information



**Notes:**

1. Contact factory for improved stabilities or additional product options. Not all options and codes are available at all frequencies.
2. Unless other stated all values are valid after warm-up time and refer to typical conditions for supply voltage, frequency control voltage, load, temperature (25°C).
3. Phase noise degrades with increasing output frequency.
4. Subject to technical modification.
5. Contact factory for availability.

## For Additional Information, Please Contact

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