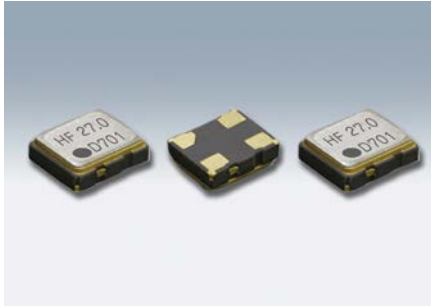


SMD Low Phase Noise Crystal Oscillators

DSO221SHF



Actual size

Features

- Supply Voltage: 1.8V/2.5V/2.8V/3.0V/3.3V/5.0V
- Low phase noise: $f_{out} \pm 1\text{kHz}$ -145 dBc/Hz(Typ.)
 $f_{out} \pm 100\text{kHz}$ -158 dBc/Hz(Typ.)
- Low profile: 0.8mm
- 3-state function
- AEC-Q100/AEC-Q200 compliant

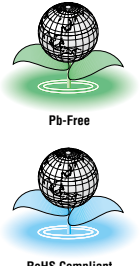
Applications

- WiLAN, WiMAX, Bluetooth
- DVC, HDTV, Blu-ray
- PC, gaming equipment, audio equipment
- Camera module
- Automotive multimedia device

[Function Code]

DSO221SHF

Y	A
Y : 5.0V	A : $\pm 100 \times 10^{-6}$
A : 3.3V	B : $\pm 50 \times 10^{-6}$
M : 3.0V	C : $\pm 30 \times 10^{-6}$
B : 2.8V	D : $\pm 25 \times 10^{-6}$
C : 2.5V	E : $\pm 20 \times 10^{-6}$
D : 1.8V	



Standard Specification

When requesting the product, please select the model and function code of your request.

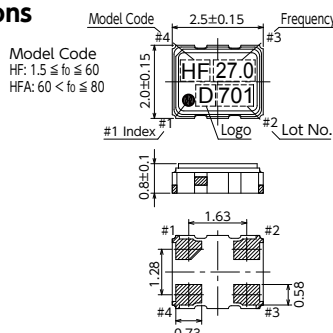
Item	Function Code		Output Frequency Range (MHz)	Legend	Spec.				Condition		
	Supply Voltage	Frequency tolerance			min.	typ.	max.	Unit			
Supply Voltage	Y	*	1.5≤f ₀ ≤[48] 80 []→Supply Voltage : Y	V _{cc}	+4.5	+5.0	+5.5	V			
	A				+3.0	+3.3	+3.6				
	M				+2.7	+3.0	+3.3				
	B				+2.6	+2.8	+3.0				
	C				+2.25	+2.5	+2.75				
	D				+1.6	+1.8	+2.0				
Frequency Tolerance (Includes frequency tolerance at room temperature.)	*	A		f _{tol}	-100	—	+100	×10 ⁻⁶	-40 to +85℃	-10 to +70℃ (Standard Operating Temperature Range)	
		B			-50	—	+50				
		C			-30	—	+30		-20 to +70℃		
		D			-25	—	+25				
		E			-20	—	+20		-10 to +70℃		
Current Consumption	Y	*	1.5≤f ₀ ≤48	I _{cc}	—	—	8.0	mA	No Load		
	A·M		1.5≤f ₀ ≤60		—	—	4.0				
	B		60<f ₀ ≤80		—	—	9.1				
			1.5≤f ₀ ≤60		—	—	3.6				
	C		60<f ₀ ≤80		—	—	8.1				
	D		1.5≤f ₀ ≤60		—	—	3.4				
Stand-by Current (#1 pin "L" Level)	*	*	*	I _{std}	—	—	10	μA			
	Y·A	*	1.5≤f ₀ ≤48	L _{CMOS}	—	—	30	pF			
Load Condition	A·M·B·C·D	*	1.5≤f ₀ ≤80		—	—	15				
Symmetry	*	*	*	SYM	45	50	55	%	at 50% V _{cc}		
0 Level Output Voltage	*	*	*	V _{OL}	—	—	V _{cc} ×0.1	V			
1 Level Output Voltage	*	*	*	V _{OH}	V _{cc} ×0.9	—	—				
Rise and Fall Time	Y·A	*	1.5≤f ₀ ≤48	tr,rf	—	—	10(8)	ns	10 to 90% V _{cc} Level (20 to 80% V _{cc} Level)	L _{CMOS} =30pF	
	Y·A·M·B·C		1.5≤f ₀ ≤[48] 60		—	—	5(4)				
	D		[]→Supply Voltage : Y		—	—	6(5)			10 to 90% V _{cc} Level	L _{CMOS} =15pF
	A·M·B·C·D		60<f ₀ ≤80		—	—	6				
OE Pin 0 Level Input Voltage	*	*	*	V _{IL}	—	—	V _{cc} ×0.2	V			
OE Pin 1 Level Input Voltage	*	*	*	V _{IH}	V _{cc} ×0.8	—	—				
Output Disable Time	*	*	*	tPLZ	—	—	150	ns			
Output Enable Time	*	*	1.5≤f ₀ ≤[48] 60	tPZL	—	—	1	ms			
	[]→Supply Voltage : Y		60<f ₀ ≤80				3				
Phase Noise	A·M·B·C·D	*	1.5≤f ₀ ≤[48] 60	—	—	-145	—	dBc/Hz	Offset 1kHz		
	Y·A·M·B·C		[]→Supply Voltage : Y		—	-140	—				
	D		60<f ₀ ≤80		—	-135	—				
	A·M·B·C·D		1.5≤f ₀ ≤[48] 60		—	-158	—		Offset 100kHz		
	Y·A·M·B·C		[]→Supply Voltage : Y		—	-152	—				
	D		60<f ₀ ≤80		—	-156	—				
Period Jitter (1)	*	*	*	tRMS	—	2.4	—	ps	σ		
Total Jitter (1)	*	*	*	tp-p	—	23	—	ps	Peak to peak		
Phase Jitter	*	*	40≤f ₀ ≤60	tTJ	—	34	—	ps	tDJ+n×tRJ n=14.1(BER=1×10 ⁻¹⁴) (2)		
			10≤f ₀ <40								fo offset:12kHz to 20MHz
Packing Unit (3)					3000pcs./reel (φ 180)						
									fo offset:12kHz to 5MHz		

- (1) Measured WAVECREST DTS-2075
(2) tDJ : Deterministic jitter tRJ : Random jitter
(3) Moisture prevention packing is unnecessary.
Moisture Sensitivity Level : Level 1 (IPC/JEDEC J-STD-033)

Consult our sales representative for other specifications.

[mm]

Dimensions



Pin Connections	
Pin No.	Connection
#1	OE(Output Enable)
#2	GND
#3	Output
#4	Vcc

Function	
#1 Input	#3 Output condition
H	Oscillation out
Open	Oscillation out
L	High Z

Recommended Land Pattern

<Top View>

