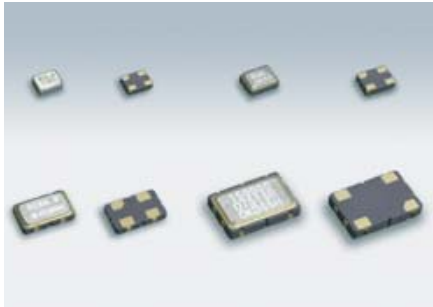


# SMD Crystal Oscillators

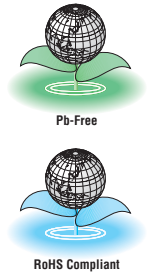
## DSO221SR/DSO321SR/DSO531SR/DSO751SR



Actual size DSO221SR DSO321SR   
DSO531SR DSO751SR

### ■ Features

- Low current consumption: 8mA max (167MHz, 3.3V)
- Low voltage operation: 1.8V/2.5V/2.8V/3.3V
- Offers Narrow deviation:  $\pm 20 \times 10^{-6}$  /  $\pm 30 \times 10^{-6}$  /  $\pm 50 \times 10^{-6}$  /  $\pm 100 \times 10^{-6}$
- Available up to 167MHz by using AT cut fundamental resonator. Low jitter provides for high performance.
- Low profile: 0.815mm(DSO221SR),  
1.1mm(DSO321SR/DSO531SR),  
1.5mm(DSO751SR)



[Type]

DSO751SR	7349 size
DSO531SR	5032 size
DSO321SR	3225 size
DSO221SR	2520 size

[Function Code]

DSO***SR	A C
A: 3.3V	A: $\pm 100 \times 10^{-6}$
B: 2.8V	B: $\pm 50 \times 10^{-6}$
C: 2.5V	C: $\pm 30 \times 10^{-6}$
D: 1.8V	D: $\pm 25 \times 10^{-6}$
	E: $\pm 20 \times 10^{-6}$

### ■ 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.			Unit	Condition	
	Supply Voltage	Frequency tolerance			min.	Typ.	max.			
Supply Voltage	A	*	$0.2 \leq f_o \leq 167$	V <sub>cc</sub>	+3.0	+3.3	+3.6	v		
	B	*	$0.2 \leq f_o \leq 157$		+2.6	+2.8	+3.0			
	C	*	$0.2 \leq f_o \leq 157$		+2.25	+2.5	+2.75			
	D	*	$0.2 \leq f_o \leq 80$		+1.6	+1.8	+2.0			
Frequency Tolerance (Includes frequency tolerance at room temperature.)	*	A	$0.2 \leq f_o \leq 167$	f <sub>tol</sub>	-100	-	+100	x10 <sup>-6</sup>	-40~+85°C	-10~+70°C (Standard Operating Temperature Range)
	*	B	$0.2 \leq f_o \leq 125$		-50	-	+50			
	*	C	$0.2 \leq f_o \leq 80$		-30	-	+30			
	*	D	$0.2 \leq f_o \leq 80$		-25	-	+25			
	*	E	$0.2 \leq f_o \leq 50$		-20	-	+20			
Current Consumption	A	*	$0.2 \leq f_o < 32$	I <sub>cc</sub>	-	-	1.8	mA	No Load	
			$32 \leq f_o < 54$		-	-	2.5			
			$54 \leq f_o < 80$		-	-	5.0			
			$80 \leq f_o < 125$		-	-	6.0			
			$125 \leq f_o \leq 160$		-	-	8.0			
	B	*	$0.2 \leq f_o < 32$		-	-	1.8			
			$32 \leq f_o < 54$		-	-	2.5			
			$54 \leq f_o < 125$		-	-	5.0			
			$125 \leq f_o \leq 157$		-	-	7.0			
	C	*	$0.2 \leq f_o < 32$		-	-	1.5			
			$32 \leq f_o < 54$		-	-	2.0			
			$54 \leq f_o < 125$		-	-	4.0			
			$125 \leq f_o \leq 157$		-	-	6.0			
	D	*	$0.2 \leq f_o < 32$		-	-	1.0			
			$32 \leq f_o < 54$		-	-	1.4			
			$54 \leq f_o \leq 80$		-	-	3.0			
Stand-by Current(#1 pin "L" Level)	*	*	*	I <sub>std</sub>	-	-	10	μA		
Load Condition	*	*	*	L <sub>CMOS</sub>	-	-	15	pF		
	A	*	$0.2 \leq f_o \leq 80$		-	-	30			
Symmetry	*	*	$f_o < 50$	SYM	45	50	55	%	50% V <sub>cc</sub> Level	
	*	*	$f_o \geq 50$		40	50	60			
0 Level Output Voltage	*	*	*	V <sub>OL</sub>	-	-	V <sub>cc</sub> × 0.1	v		
1 Level Output Voltage	*	*	*	V <sub>OH</sub>	V <sub>cc</sub> × 0.9	-	-			
Rise and Fall Time	A,B,C	*	$0.2 \leq f_o \leq 54$	tr, tf	-	-	5(4)	ns	L <sub>CMOS</sub> : 15pF 10~90% V <sub>cc</sub> Level (20~80% V <sub>cc</sub> Level)	
	D	*	$0.2 \leq f_o \leq 54$		-	-	7(6)			
	*	*	$54 < f_o < 100$		-	-	4(3)			
	*	*	$100 \leq f_o \leq 167$		-	-	3(2.5)			
	A	*	$0.2 \leq f_o \leq 54$		-	-	10			
	A	*	$54 < f_o \leq 80$		-	-	6			
OE Pin 0 Level Input Voltage	*	*	*	V <sub>IL</sub>	-	-	V <sub>cc</sub> × 0.2	v		
OE Pin 1 Level Input Voltage	*	*	*	V <sub>IH</sub>	V <sub>cc</sub> × 0.8	-	-			
Output Disable Time	*	*	*	t <sub>PLZ</sub>	-	-	150	ns		
Output Enable Time	*	*	*	t <sub>PZL</sub>	-	-	1	ms		
Period Jitter (1)	*	*	*	t <sub>RMS</sub>	-	2.2	-	ps	σ	
	*	*	*	t <sub>p-p</sub>	-	20	-		Peak to peak	
Total Jitter (1)	*	*	*	t <sub>TL</sub>	-	31	-	ps	t <sub>DJ</sub> +n*t <sub>RJ</sub> n=14.1(BER=1*10 <sup>-12</sup> ) (2)	
Phase Jitter	*	*	$40 \leq f_o \leq 160$	tpj	-	-	1	ps	fo offset: 12kHz~20MHz	
			$10 \leq f_o < 40$		fo offset: 12kHz~5MHz					
Packing Unit	DSO221SR, DSO321SR: 2000pcs./reel (φ 180) , DSO531SR: 1000pcs./reel (φ 180) , DSO751SR: 1000pcs./reel (φ 254)									

(1) Measured WAVECREST DTS-2075

(2) t<sub>DJ</sub>: Deterministic jitter t<sub>RJ</sub>: Random jitter

Consult our sales representative for other specifications.

# SMD Crystal Oscillators

## DS0221SR/DS0321SR/DS0531SR/DS0751SR

### Applications

- PC, PDA, and peripherals, gaming equipment
- DSC, DVD, Blu-ray Disk, TV, HDTV, DVC, HDD
- WiMAX
- Mobile phones: camera module
- Telecommunications: GbEthernet, ISDN

### Dimensions[mm]

<p><b>DS0221SR</b> Model code: R</p> <p>Pin Connections</p> <table border="1"> <thead> <tr> <th>Pin No.</th> <th>Connection</th> </tr> </thead> <tbody> <tr> <td>#1</td> <td>OE(Output Enable)</td> </tr> <tr> <td>#2</td> <td>GND</td> </tr> <tr> <td>#3</td> <td>Output</td> </tr> <tr> <td>#4</td> <td>V<sub>cc</sub></td> </tr> </tbody> </table> <p>Function</p> <table border="1"> <thead> <tr> <th>#1 input</th> <th>#3 output condition</th> </tr> </thead> <tbody> <tr> <td>H</td> <td>Oscillation out</td> </tr> <tr> <td>Open</td> <td>Oscillation out</td> </tr> <tr> <td>L</td> <td>High Z</td> </tr> </tbody> </table> <p><b>Recommended Land Pattern (Top View)</b></p>	Pin No.	Connection	#1	OE(Output Enable)	#2	GND	#3	Output	#4	V <sub>cc</sub>	#1 input	#3 output condition	H	Oscillation out	Open	Oscillation out	L	High Z	<p><b>DS0321SR</b> Model code: R</p> <p>Pin Connections</p> <table border="1"> <thead> <tr> <th>Pin No.</th> <th>Connection</th> </tr> </thead> <tbody> <tr> <td>#1</td> <td>OE(Output Enable)</td> </tr> <tr> <td>#2</td> <td>GND</td> </tr> <tr> <td>#3</td> <td>Output</td> </tr> <tr> <td>#4</td> <td>V<sub>cc</sub></td> </tr> </tbody> </table> <p>Function</p> <table border="1"> <thead> <tr> <th>#1 input</th> <th>#3 output condition</th> </tr> </thead> <tbody> <tr> <td>H</td> <td>Oscillation out</td> </tr> <tr> <td>Open</td> <td>Oscillation out</td> </tr> <tr> <td>L</td> <td>High Z</td> </tr> </tbody> </table> <p><b>Recommended Land Pattern (Top View)</b></p>	Pin No.	Connection	#1	OE(Output Enable)	#2	GND	#3	Output	#4	V <sub>cc</sub>	#1 input	#3 output condition	H	Oscillation out	Open	Oscillation out	L	High Z
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