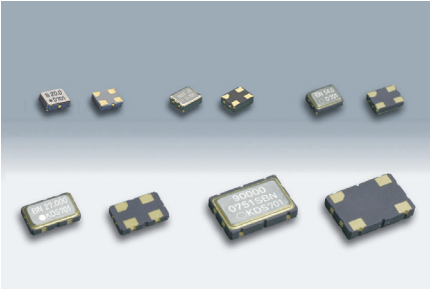


# SMD Crystal Oscillators

## DSO211AB/DSO221SBM/DSO321SBM/DSO531SBM/DSO751SBM



Actual size DSO211AB □ DSO221SBM □ DSO321SBM □  
DSO531SBM □ DSO751SBM □

### Features

- Low current consumption
- 3-state function
- General purpose +5.0V HCMOS oscillator
- DSO\*\*\*SBN/SVN: Optimized characteristic for single gate drive/lower loading conditions

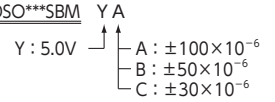


### Applications

- PC, visual and FA equipment applications

[Function Code]

DSO211AB, DSO\*\*\*SBM



[Type]	Model	Size
	DSO211AB	2016 size
	DSO221SBM	2520 size
	DSO321SBM	3225 size
	DSO531SBM	5032 size
	DSO751SBM	7349 size

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

### Standard Specification

Item	Legend	Function Code		DSO211AB/DSO221SBM			DSO321, 531, 751 SBM			Unit	Condition			
		Supply Voltage	Frequency tolerance	Output Frequency Range (MHz)	min.	typ.	max.	Output Frequency Range (MHz)	min.		Typ.	max.		
Supply Voltage	V <sub>CC</sub>	*	*	3.25 ≤ f <sub>0</sub> ≤ 52	+4.5	+5.0	+5.5	0.7 ≤ f <sub>0</sub> ≤ 90	+4.5	+5.0	+5.5	V		
Frequency Tolerance (Includes frequency tolerance at room temperature.)	f <sub>tol</sub>	*	A	3.25 ≤ f <sub>0</sub> ≤ 52	-100	-	+100	0.7 ≤ f <sub>0</sub> ≤ 90	-100	-	+100	X10 <sup>-6</sup>	-40 to +85°C	-10 to +70°C (Standard Operating Temperature Range)
			B	3.25 ≤ f <sub>0</sub> ≤ 52	-50	-	+50	0.7 ≤ f <sub>0</sub> ≤ 90	-50	-	+50		-20 to +70°C	
			C	3.25 ≤ f <sub>0</sub> ≤ 52	-30	-	+30	0.7 ≤ f <sub>0</sub> ≤ 54	-30	-	+30			
Current Consumption	I <sub>CC</sub>	*	*	3.25 ≤ f <sub>0</sub> ≤ 52	-	-	8.0	0.7 ≤ f <sub>0</sub> < 32	-	-	4.0	mA	No Load	
								32 ≤ f <sub>0</sub> < 54	-	-	6.0			
								54 ≤ f <sub>0</sub> < 90	-	-	8.0			
Stand-by Current (#1 pin "L" Level)	I <sub>std</sub>	*	*	*	-	-	50	*	-	-	50	μA		
Load Condition	L <sub>CMOS</sub>	*	*	*	-	-	30	*	-	-	30	pF		
Symmetry	SYM	*	*	f <sub>0</sub> < 26	45	50	55	f <sub>0</sub> < 26	45	50	55	%	50% V <sub>CC</sub> Level	
				f <sub>0</sub> ≥ 26	40	50	60	f <sub>0</sub> ≥ 26	40	50	60			
0 Level Output Voltage	V <sub>OL</sub>	*	*	*	-	-	V <sub>CC</sub> × 0.1	*	-	-	V <sub>CC</sub> × 0.1	V		
1 Level Output Voltage	V <sub>OH</sub>	*	*	*	V <sub>CC</sub> × 0.9	-	-	*	V <sub>CC</sub> × 0.9	-	-	V		
Rise and Fall Time	tr, tf	*	*	3.25 ≤ f <sub>0</sub> ≤ 52	-	-	10	0.7 ≤ f <sub>0</sub> ≤ 54	-	-	7 (6)	ns	L <sub>CMOS</sub> : 30pF 10 to 90% V <sub>CC</sub> Level (20 to 80% V <sub>CC</sub> Level)	
								54 < f <sub>0</sub> ≤ 90	-	-	5 (4)			
OE Pin 0 Level Input Voltage	V <sub>IL</sub>	*	*	*	-	-	V <sub>CC</sub> × 0.2	*	-	-	V <sub>CC</sub> × 0.2	V		
OE Pin 1 Level Input Voltage	V <sub>IH</sub>	*	*	*	V <sub>CC</sub> × 0.8	-	-	*	V <sub>CC</sub> × 0.8	-	-	V		
Output Disable Time	t <sub>PLZ</sub>	*	*	*	-	-	150	*	-	-	150	ns		
Output Enable Time	t <sub>PZL</sub>	*	*	*	-	-	5	*	-	-	1	ms		
Period Jitter (1)	t <sub>RMS</sub> tp-p	*	*	*	-	2.5	-	*	-	2.5	-	ps	σ Peak to peak	
				*	-	20	-	*	-	20	-			
Total Jitter (1)	t <sub>TJL</sub>	*	*	*	-	35	-	*	-	35	-	ps	t <sub>DJ</sub> + n × t <sub>RJ</sub> n=14.1 (BER=1 × 10 <sup>-12</sup> ) (2)	
Phase Jitter	tpj	*	*	40 ≤ f <sub>0</sub> ≤ 52	-	-	1	40 ≤ f <sub>0</sub> ≤ 90	-	-	1	ps	fo offset: 1.2kHz to 20MHz fo offset: 1.2kHz to 5MHz	
				10 ≤ f <sub>0</sub> < 40	-	-	1	10 ≤ f <sub>0</sub> < 40	-	-	1			
Packing Unit (3)	DSO211AB: 3000pcs./reel (φ 180), DSO221SBM, DSO321SBM: 2000pcs./reel (φ 180), DSO531SBM: 1000pcs./reel (φ 180), DSO751SBM: 1000pcs./reel (φ 254)													

- (1) Measured WAVECREST DTS-2075
- (2) t<sub>DJ</sub> : Deterministic jitter t<sub>RJ</sub> : 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.

### Dimensions [mm]

DSO211AB	DSO221SBM	DSO321SBM	DSO531SBM	DSO751SBM
<p>Model Code #4 #3 Frequency #1 Index #1 Logo #2 Lot No.</p> <p>2.0 ± 0.12 1.6 ± 0.12 0.72 ± 0.08 1.25 0.95 0.55 0.45</p> <p>Recommended Land Pattern (Top View) Pin Connections: #1 OE/Output Enable, #2 GND, #3 Output, #4 V<sub>CC</sub> Function: #1 Input #3 Output condition: H Oscillation out, Open Oscillation out, L High Z</p>	<p>Model Code #4 #3 Frequency #1 Index #1 Logo #2 Lot No.</p> <p>2.5 ± 0.15 2.0 ± 0.15 0.815 ± 0.08 1.58 1.23 0.68 0.53</p> <p>Recommended Land Pattern (Top View) Pin Connections: #1 OE/Output Enable, #2 GND, #3 Output, #4 V<sub>CC</sub> Function: #1 Input #3 Output condition: H Oscillation out, Open Oscillation out, L High Z</p>	<p>Model Code #4 #3 Frequency #1 Index #1 Logo #2 Lot No.</p> <p>3.2 ± 0.15 2.6 ± 0.15 1.1 ± 0.1 2.1 1.65 0.9 0.45</p> <p>Recommended Land Pattern (Top View) Pin Connections: #1 OE/Output Enable, #2 GND, #3 Output, #4 V<sub>CC</sub> Function: #1 Input #3 Output condition: H Oscillation out, Open Oscillation out, L High Z</p>	<p>Model Code #4 #3 Frequency #1 Index #1 Logo #2 Lot No.</p> <p>5.0 ± 0.2 3.2 ± 0.2 1.15 2.54 2.10 1.2 0.9</p> <p>Recommended Land Pattern (Top View) Pin Connections: #1 OE/Output Enable, #2 GND, #3 Output, #4 V<sub>CC</sub> Function: #1 Input #3 Output condition: H Oscillation out, Open Oscillation out, L High Z</p>	<p>Model Code #4 #3 Frequency (9kHz) #1 Index #1 Logo #2 Lot No.</p> <p>7.3 ± 0.2 4.9 ± 0.2 1.5 ± 0.2 5.08 3.65 1.4 0.8</p> <p>Recommended Land Pattern (Top View) Pin Connections: #1 OE/Output Enable, #2 GND, #3 Output, #4 V<sub>CC</sub> Function: #1 Input #3 Output condition: H Oscillation out, Open Oscillation out, L High Z</p>