

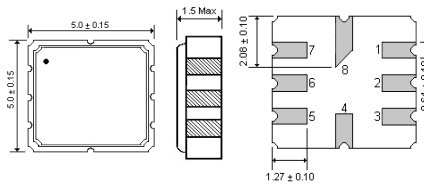


**DESCRIPTION**

The 1-port SAW Resonator is designed to be the frequency control element in transmitters and receiver local oscillators, allowing reduced receiver bandwidths, which results in improved sensitivity and immunity to interference. The SAW Resonators SMD are typically required in applications such as wireless point of sale terminals, computer peripherals and personal and home security.

**MECHANICAL DIMENSIONS (all in mm)**

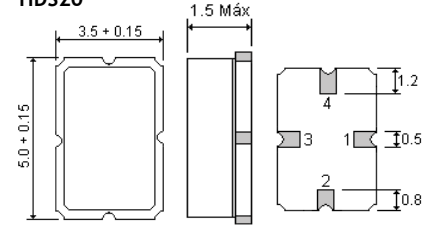
**HDS3**



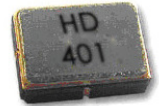
Pin	Connection
1	NC
2	Input
3	NC
4	Ground(case)
5	NC
6	Output
7	NC
8	Ground(case)



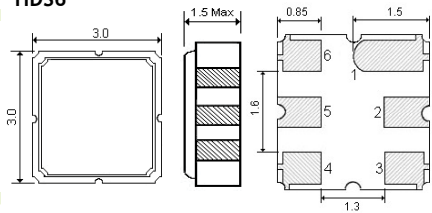
**HDS20**



Pin	Connection
1	Input
2	Case Ground
3	Output
4	Case Ground



**HDS6**



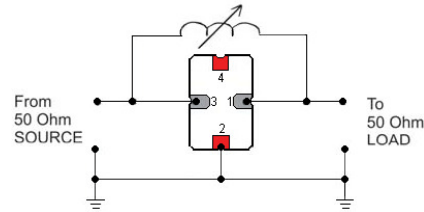
Pin	Connection
1	NC
2	Input
3	NC
4	NC
5	Output
6	NC



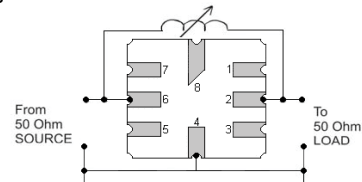
**ELECTRICAL SPECIFICATION**

Center Frequency (Fc)	See Table 1
Frequency Tolerance (at 25° C)	See Table 1
Operating Temperature Range	-20° C to +85° C
Storage Temperature Range	-45° C to +85° C
DC Voltage V <sub>DC</sub>	10V
AC Voltage V <sub>PP</sub>	10V 50Hz/60Hz
RF Power Dissipation	0dBm
Insertion Loss	See table 1
Quality Factor Unload Q	12.800 typical
50 Ohms Load Q	2.000 typical
Temperature Stability	Turnover Temperature (To) 50° C Maximum
	Turnover Frequency (fo) fo±1.3 typical
	Freq. Temp. Coefficient (FTC) 0.032ppM/° C <sup>2</sup>
Frequency Aging (at 25° C)	±10ppM/year
DC Insulation Resistance between any two pins	1.0MOhms minimum
	Motional Resistance (R <sub>m</sub> ) 26 Ohms Maximum
RF Equivalent RLC Model	Motional Inductance (L <sub>m</sub> ) 86µH typical
	Motional Capacitance (R <sub>m</sub> ) 1.5pF typical
Pin 1 to Pin 2 Static Capacitance (Co)	2.3pF Maximum
Transducer Static Capacitance (Cp)	1.9pF typical

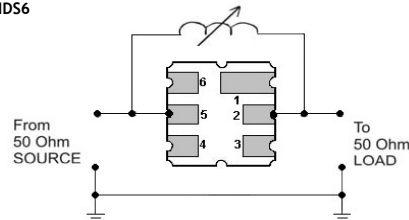
**Electrical Test HDS20**



**Electrical Test HDS3**



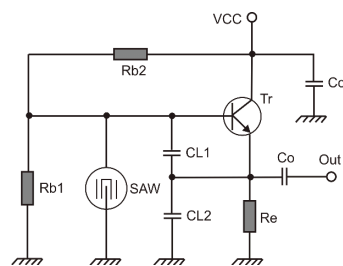
**Electrical Test HDS6**



**Remark**

- Static Voltage:** Static voltage between signal load/ground may cause deterioration/destruction of the component. Please avoid static voltage.
- Ultrasonic cleaning:** Ultrasonic vibration may cause deterioration/destruction of the component. Please avoid ultrasonic cleaning.
- Soldering:** Only leads of component may be soldered. Please avoid soldering another part of component.

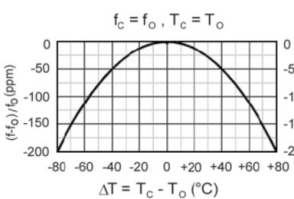
**Typical Local Oscillator Application**



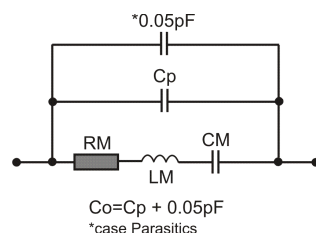
Rb1 = Rb2 = 2k Ohms  
 Re = 160 Ohms  
 CL1 = 10pF  
 CL2 = 8pF  
 Co = 2pF  
 Tr = transistor shall be a high frequency type, FT a few GHz or more.

SMT type transistor, resistor and capacitor are recommended for application more than 100MHz due to the inductance of the lead terminals.

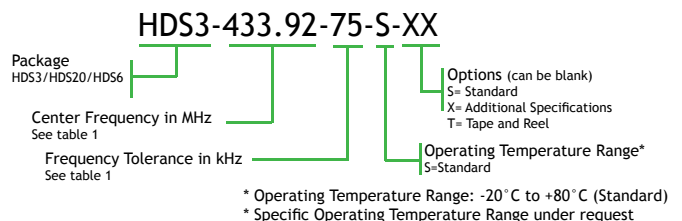
**Temperature Characteristics**



**Equivalent LC Model**



**PART NUMBERING SYSTEM (Example)**



**ELECTRICAL SPECIFICATION**

**1. Moisture**

Keep the device at 40°C and 95% rh for 96 minutes. Then release the device into the room conditions for 1 to 2 hours prior to the measurement. It shall meet all the initial electrical characteristics. ( Applied in MS2 6X4, MS3 5X5, 3X3)

**2. Temperature cycling**

Subject the device to a low temperature of -40°C for 30 minutes. Following by a high temperature of +25°C for 5 minutes and a higher temperature of +85°C for 30 minutes. Then release the device into the room conditions for 1 to 2 hours prior to the measurement. It shall meet all the initial electrical characteristics. ( Applied in MS2 6X4, MS3 5X5, 3X3)

**3. Resistance to solder heat**

- HDS20** Submerge the device terminals into the solder bath at 240°C ±5°C for 10 ±1 sec. Then release the device into the room conditions for 4 hours. It shall meet all the initial electrical characteristics.
- HDS3** Dip the device terminals no closer than 1.5mm into the solder bath at 270°C ±10°C for 10 ±1 sec. Then release the device into the room conditions for 1 to 2 hours. It shall meet all the initial electrical characteristics.
- HDS6** Submerge the device terminals into the solder bath at 260°C ±5°C for 10 ±1 sec. Then release the device into the room conditions for 4 hours. It shall meet all the initial electrical characteristics.

**4. Mechanical shock**

- HDS20** Drop the device randomly onto the concrete floor from the height of 1m 3 times. The device shall fulfill the initial electrical characteristics.
- HDS3** Drop the device randomly onto the concrete floor from the height of 30cm 3 times. The device shall fulfill the initial electrical characteristics.
- HDS6** Drop the device randomly onto the concrete floor from the height of 1m 3 times. The device shall fulfill the initial electrical characteristics.

**5. Vibration**

- HDS20** Subject the device to the vibration for 2 hour each in x, y and z axes with the amplitude of 1.5mm at 10 to 55 Hz. The device shall fulfill the initial electrical characteristics.
- HDS3** Subject the device to the vibration for 1 hour each in x, y and z axes with the amplitude of 1.5mm at 10 to 55 Hz. The device shall fulfill the initial electrical characteristics.
- HDS6** Subject the device to the vibration for 2 hour each in x, y and z axes with the amplitude of 1.5mm at 10 to 55 Hz. The device shall fulfill the initial electrical characteristics.

**Table 1**

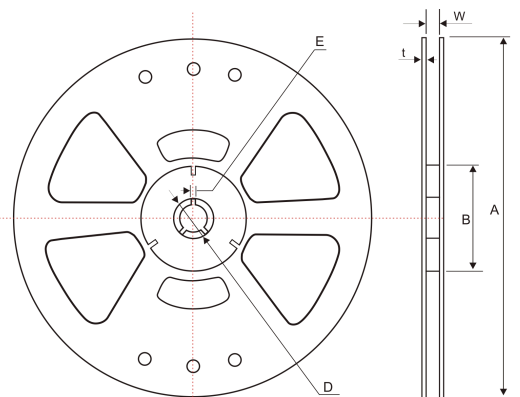
Center Frequency (MHz)	Frequency Tolerance (KHz)	Insertion Loss (dB)	Package
293.97	± 100	2.5	HDS3 / HDS20 / HDS6
303.825	± 100	2.5	HDS3 / HDS20 / HDS6
303.875	± 100	2.5	HDS3 / HDS20 / HDS6
304.300	± 100	2.5	HDS3 / HDS20 / HDS6
305.000	± 100	2.5	HDS3 / HDS20 / HDS6
307.500	± 100	2.5	HDS3 / HDS20 / HDS6
308.500	± 100	2.5	HDS3 / HDS20 / HDS6
310.000	± 100	2.5	HDS3 / HDS20 / HDS6
311.063	± 100	2.5	HDS3 / HDS20 / HDS6
314.500	± 100	2.5	HDS3 / HDS20 / HDS6
315.000	± 100	2.5	HDS3 / HDS20 / HDS6
316.800	± 100	2.5	HDS3 / HDS20 / HDS6
318.000	± 100	2.5	HDS3 / HDS20 / HDS6
320.000	± 100	2.5	HDS3 / HDS20 / HDS6
325.000	± 100	2.5	HDS3 / HDS20 / HDS6
330.000	± 100	2.5	HDS3 / HDS20 / HDS6
335.000	± 100	2.5	HDS3 / HDS20 / HDS6
340.000	± 100	2.5	HDS3 / HDS20 / HDS6
345.000	± 100	2.5	HDS3 / HDS20 / HDS6
360.000	± 100	2.5	HDS3 / HDS20 / HDS6
372.500	± 100	2.5	HDS3 / HDS20 / HDS6
382.840	± 75	2.5	HDS3 / HDS20 / HDS6
383.160	± 75	2.5	HDS3 / HDS20 / HDS6

**Table 1 (cont.)**

Center Frequency (MHz)	Frequency Tolerance (KHz)	Insertion Loss (dB)	Package
390.000	± 75	2.5	HDS3 / HDS20 / HDS6
395.000	± 75	2.5	HDS3 / HDS20 / HDS6
403.050	± 75	2.5	HDS3 / HDS20 / HDS6
403.550	± 75	2.5	HDS3 / HDS20 / HDS6
407.300	± 75	2.5	HDS3 / HDS20 / HDS6
418.000	± 75	2.5	HDS3 / HDS20 / HDS6
422.000	± 75	2.5	HDS3 / HDS20 / HDS6
423.220	± 75	2.5	HDS3 / HDS20 / HDS6
426.062	± 75	2.5	HDS3 / HDS20 / HDS6
433.420	± 75	2.5	HDS3 / HDS20 / HDS6
433.920	± 75	2.5	HDS3 / HDS20 / HDS6
435.700	± 100	2.5	HDS3 / HDS20 / HDS6
447.625	± 100	2.5	HDS3 / HDS20 / HDS6
456.800	± 100	2.5	HDS3 / HDS20 / HDS6
457.500	± 100	2.5	HDS3 / HDS20 / HDS6
462.500	± 100	2.5	HDS3 / HDS20 / HDS6
479.500	± 150	2.5	HDS3 / HDS20 / HDS6
857.650	± 250	2.5	HDS3 / HDS20 / HDS6
868.000	± 250	2.5	HDS3 / HDS20 / HDS6
868.350	± 250	2.5	HDS3 / HDS20 / HDS6
868.950	± 250	2.5	HDS3 / HDS20 / HDS6
915.000	± 250	2.5	HDS3 / HDS20 / HDS6

**TAPE SPECIFICATIONS (all in mm)**  
Carrier Tape Dimensions

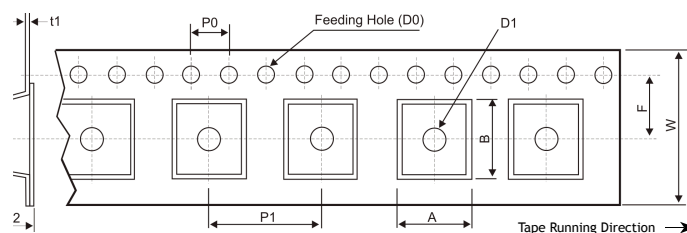
Reeling Quantity  
1000pcs / reel



Type	A	B	D	E	W	t
HDS3	Ø178±1.0	60±0.5	Ø13.5	2±0.5	13.5±0.3	3.0 max
HDS20	Ø178±1.0	60±0.5	Ø13.5	2±0.5	13.5±0.3	3.0 max
HDS6	Ø178±1.0	60±0.5	Ø13.5	2±0.5	13.5±0.3	3.0 max

**TAPE SPECIFICATIONS (all in mm) - Carrier Tape Dimensions**

Reeling Quantity  
1000pcs / reel



Type	W	F	P0	P1	D0	D1	t1	t2	A	B
HDS3	12.0±0.3	5.5±0.05	4.0±0.1	8.0±0.1	Ø1.5±0.1	Ø1.0±0.25	0.3±0.03	2.0±0.1	5.5±0.1	5.5±0.1
HDS20	12.0±0.3	5.5±0.05	4.0±0.1	8.0±0.1	Ø1.5±0.1	Ø1.0±0.25	0.3±0.03	2.0±0.1	4.1±0.1	5.5±0.1
HDS6	8.0±0.3	3.5±0.05	4.0±0.1	4.0±0.1	Ø1.0±0.25	Ø1.0±0.25	0.3±0.03	2.0±0.1	3.5±0.1	3.5±0.1