SHOULDER

SAW Resonator SMD

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.

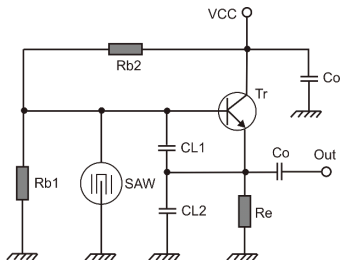
ELECTRICAL SPECIFICATION

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_{DC}		10V
AC Voltage V_{PP}		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/°C²
Frequency Aging (at 25°C)		±10ppM/year
DC Insulation Resistance between any two pins		1.0MOhms minimum
RF Equivalent RLC Model	Motional Resistance (R_M)	26 Ohms Maximum
	Motional Indutance (L_M)	86µH typical
	Motional Capacitance (R_M)	1.5pF typical
Pin 1 to Pin 2 Static Capacitance (Co)		2.3pF Maximum
Transducer Static Capacitance (Cp)		1.9pF typical

Remark

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

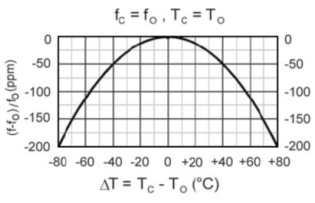
Typical Local Oscillator Application



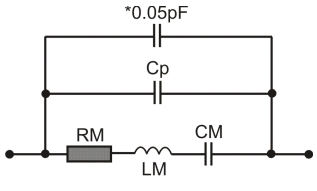
Rb1 = Rb2 = 2k Ohms
Re = 160 Ohms
CL1 = 10pF
CL2 = 8pF
Co = 2pF
Tr = transistor shall be a high frequency type, FT a few GHz or more.

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

Temperature Characteristics



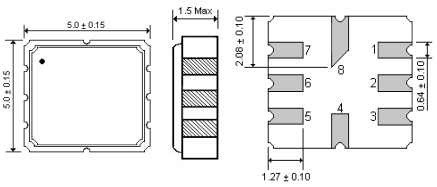
Equivalent LC Model



Co=Cp + 0.05pF
*case Parasitics

MECHANICAL DIMENSIONS (all in mm)

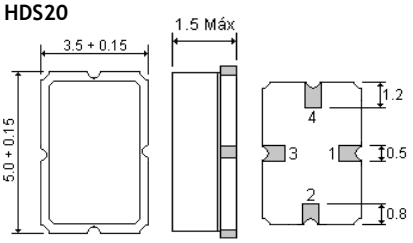
HDS3



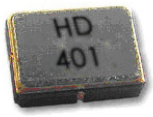
Pin	Connection
1	NC
2	Input
3	NC
4	Ground(case)
5	NC
6	Output
7	NC
8	Ground(case)



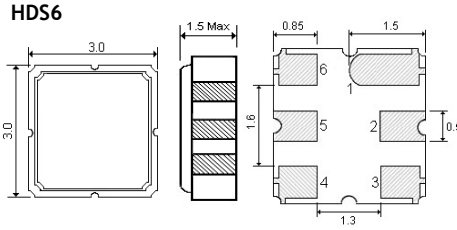
HDS20



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



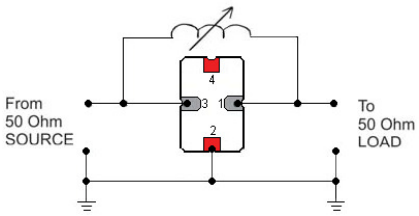
HDS6



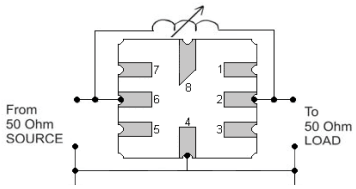
Pin	Connection
1	NC
2	Input
3	NC
4	NC
5	Output
6	NC



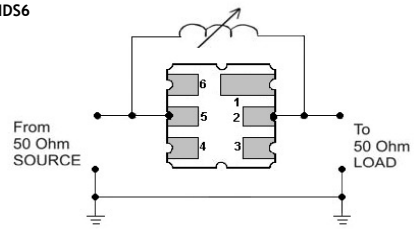
Electrical Test HDS20



Electrical Test HDS3



Electrical Test HDS6



PART NUMBERING SYSTEM (Example)

HDS3-433.92-75-S-XX

- Package: HDS3/HDS20/HDS6
- Center Frequency in MHz: See table 1
- Frequency Tolerance in kHz: See table 1
- Options (can be blank): S= Standard; X= Additional Specifications; T= Tape and Reel
- Operating Temperature Range*: S=Standard

* Operating Temperature Range: -20°C to +80°C (Standard)
* Specific Operating Temperature Range under request

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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

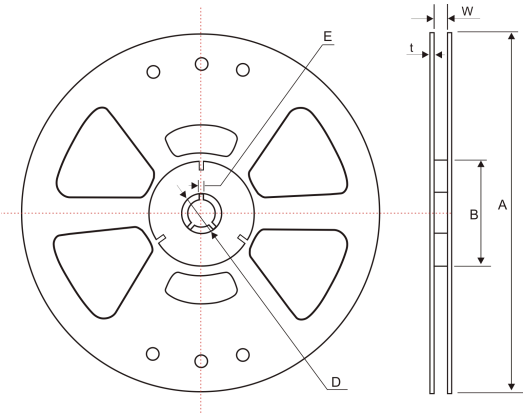
Table 1 (cont.)

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

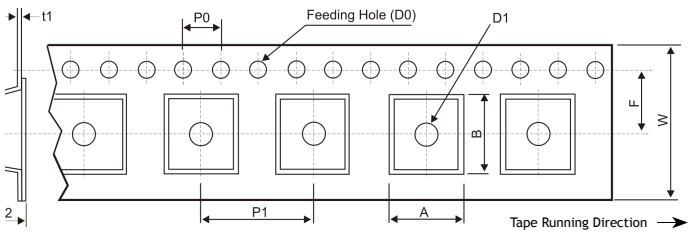
Reeling Quantity
1000pcs / reel



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

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