DESCRIPTION

The A4712 is a Dual Wide-Bandwidth, fast single-pole double-throw (SPDT) CMOS switch featuring an On-Resistance of 0.4 ohm at V_{DD}=2.7V and wide power supply range from 1.65V to 5.5V.

The A4712 can be used as an analog switch or as a low-delay bus switch.

Break-before-make function for both parts eliminates signal disruption during switching from preventing both switches being enabled simultaneously.

The A4712 is available in CSP10 Package.

FEATURES

- Wide Power Supply Range:1.65V to 5.5V
- Low On-Resistance:
  $R_{ON(NC)}$ = 0.4Ω(V_{CC}=2.7V)
  $R_{ON(NO)}$ = 0.5Ω(V_{CC}=2.7V)
- Low On-Resistance Flatness:
  $RO_{NF(NC)}$ = 0.15Ω max (V_{CC}=2.7V)
  $RO_{NF(NO)}$ = 0.25Ω max (V_{CC}=2.7V)
- Rail-to-Rail Signal Range
- High Off-Isolation: -60dB (f=100 kHz)
- Crosstalk Rejection: -67dB
- Low Total Harmonic Distortion: 0.05%
- Available in CSP10 Package

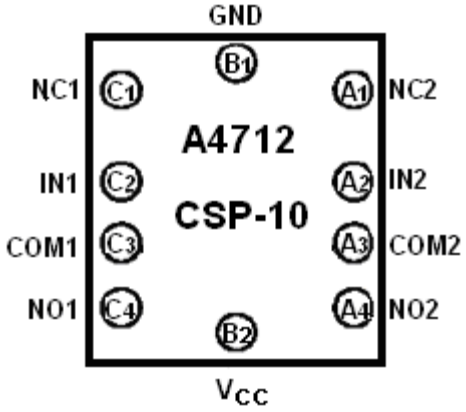
ORDERING INFORMATION

Package Type	Part Number	
CSP10	G10	A4712G10R
		A4712G10VR
Note	V: Green Package R: Tape & Reel	
AiT provides all Pb free products Suffix " V " means Green Package		

APPLICATION

- Wireless Handsets
- MP3 Players
- Portable Electronic Devices
- Relay Replacement
- PDAs
- Audio & Video Signal Routing
- PCMCIA Cards
- Computer Peripherals
- Modems

PIN DESCRIPTION



Pin #	Symbol	Type	Function
A1	NC_2	Input/Output	Data Port
A2	IN_2	Input	Logic Control Signal
A3	COM_2	Input/Output	Data Port
A4	NO_2	Input/Output	Data Port
C1	NC_1	Input/Output	Data Port
C2	IN_1	Input	Logic Control Signal
C3	COM_1	Input/Output	Data Port
C4	NO_1	Input/Output	Data Port
B1	GND	Ground	Ground
B2	V_{CC}	Power	Power Supply

FUNCTION TABLE

IN_X	Function
0	NC_X Connected to COM_X
1	NO_X Connected to COM_X

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Units
DC Supply Voltage	V_{CC}	-0.5	7	V
DC Switch Voltage	V_{NCX}/ V_{NOX}/ V_{COMX} NOTE	-0.5	V_{SUP} + 0.3	V
DC Input Voltage(2)	V_{INX} NOTE	-0.5	7	V
Continuous Current	$I_{(NCX/NOX/COMX}$ NOTE)	-500	+500	mA
Peak Current(1)	$I_{PEAK(NCX/NOX/COMX}$ NOTE)	-650	+650	mA
Storage Temperature Range	T_{STG}	-65	150	℃

NOTE: X = 1 or 2

Stress beyond above listed “Absolute Maximum Ratings” may lead permanent damage to the device.

These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Notes:

(1) Pulsed at 1ms, 50% duty circle

(2) Control input (VINX) must be held HIGH or LOW, and mustn’t be floated.

RECOMMENDED OPERATING CONDITIONS

DC Supply Voltage, V_{CC}	1.65V to 5.5V
Switch Input Voltage, V_S	0V to V_{CC}
Control Input Voltage, V_{IN}	0V to V_{CC}
Operation Temperature, TA	-40℃ to +85℃
Input Rise and Fall Time, tf/tr	0ns/V to 5ns/V
Bump Temperature, Soldering:	
Infared, 15s	+220℃
Vapor Phase, 60s	+215℃

DC ELECTRICAL CHARACTERISTICS

Test Condition: V_{CC} = 3.0V, T_A = 25℃, unless otherwise specified.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Analog Switch						
Analog Signal Range	$V_{NOX}/V_{NCX}/V_{COMX}$		0		V_{CC}	V
NC On-Resistance	$R_{ON(NC)}$	V_{CC} = 2.7V; I_{COM} =100mA ; V_{NC} = 0 to V_{CC}		0.4	0.5	Ω
NO On-Resistance	$R_{ON(NO)}$	V_{CC} = 2.7V; I_{COM} =100mA ; VNO= 0 to V_{CC}		0.5	0.6	Ω
NC On-Resistance Flatness(1)	$R_{FLAT(NC)}$	V_{CC} = 2.7V; I_{COM} =100mA ; V_{NC} = 0 to V_{CC}			0.15	Ω
NO On-Resistance Flatness(1)	$R_{FLAT(NO)}$	V_{CC} = 2.7V; I_{COM} =100mA ; V_{NO} = 0 to V_{CC}			0.25	Ω
On-Resistance Match Between Channels(2)	$\triangle R_{ON}$	V_{CC} = 2.7V; I_{COM} =100mA ; V_{NC}/V_{NO}=1.5		0.01	0.06	Ω
NC or NO Off Leakage Current	$I_{OFF(NC)}$ or $I_{OFF(NO)}$	V_{CC} = 3.3V; V_{NO} or V_{NC} = 3V, 0.3V; V_{COM} = 0.3V, 3 V	-80		+80	nA
COM On Leakage Current	$I_{ON(COM)}$	V_{CC} = 3.3V; V_{NO} or V_{NC} = 3V, 0.3V; V_{COM} = 0.3V, 3 V or floating	-160		160	nA
Digital I/O						
Input Voltage High	V_{IH}	Minimum High Level Input Voltage	1.3			V
Input Voltage Low	V_{IL}	Maximum Low Level Input Voltage			0.6	V
Input Hysteresis	I_H	V_{CC} = 3.3V		200		mV
Input Leakage Current	I_{IN}	V_{IN} = 0 or Vcc	-1		1	uA

(1) Flatness is defined as the difference between the maximum and minimum value of on resistance as measured over the specified analog signal ranges.

(2) △RON= RON(MAX) - RON(MIN), between NC1 and NC2 or between NO1 and NO2.

DYNAMIC CHARACTERISTICS

Test Condition: V_{CC} = 3.0V, T_A = 25℃, unless otherwise specified.

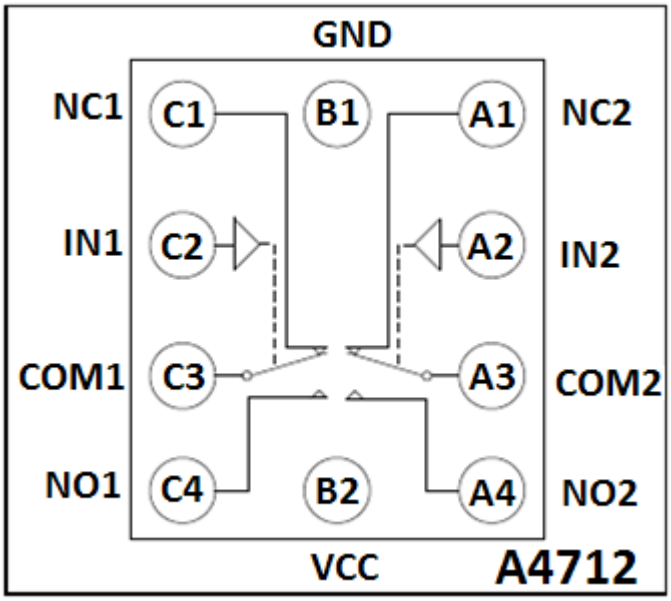
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
AC ELECTRICAL CHARACTERISTICS						
Turn-On Time	t_{ON}	V_{CC} = 2.7V; V_{NO} or V_{NC} = 1.5V, R_L =50Ω; C_L = 35pF, Figure1		25	60	ns
Turn-Off Time	t_{OFF}	V_{CC} = 2.7V; V_{NO} or V_{NC} = 1.5V, R_L =50Ω; C_L = 35pF, Figure1		8	20	ns
Break-Before-Make Time	t_{BBM}	V_{CC} = 2.7V; V_{NO} or V_{NC} = 1.5V, R_L =50Ω; C_L = 35pF, Figure2		22		ns
NC OFF Capacitance	$C_{OFF(NC)}$	f = 1MHz, Figure6		84		pF
NO OFF Capacitance	$C_{OFF(NO)}$	f = 1MHz, Figure6		66		pF
NC ON Capacitance	$C_{ON(NC)}$	f = 1MHz, Figure7		245		pF
NO ON Capacitance	$C_{ON(NO)}$	f = 1MHz, Figure7		235		pF
ADDITIONAL APPLICATION CHARACTERISTICS						
3dB Bandwidth	$f3_{dB}$	Figure8		27		MHz
Charge Injection	Q	V_{GEN} = 0V; R_{GEN} = 0Ω; C_L = 1nF; Figure3		30		pC
Off Isolation(1)	V_{ISO}	f = 100kHz; R_L = 50Ω; C_L = 5pF; V_{COM}= 1 V_{RMS}; Figure4		-60		dB
Crosstalk(2)	V_{CT}	f = 100kHz; R_L = 50Ω; C_L = 5pF; V_{COM}= 1 V_{RMS}; Figure5		-67		dB
Total Harmonic Distortion	THD	V_{CC} = 3.3V; R_L = 32Ω; V_{IN} =2V_{P-P};		0.06		%
Supply						
Power Supply Range	V_{CC}		1.65			V
Maximum Quiescent Supply Current	I_{CC}	VCC = 5.5V; VIN = VCC or 0				nA

Note:

(1) Off Channel Isolation = 20 log10 [($V_{NO\backslash NC}$)/V_{COM}]

(2) Between any two switches

Block Diagram



TEST SETUP CIRCUITS

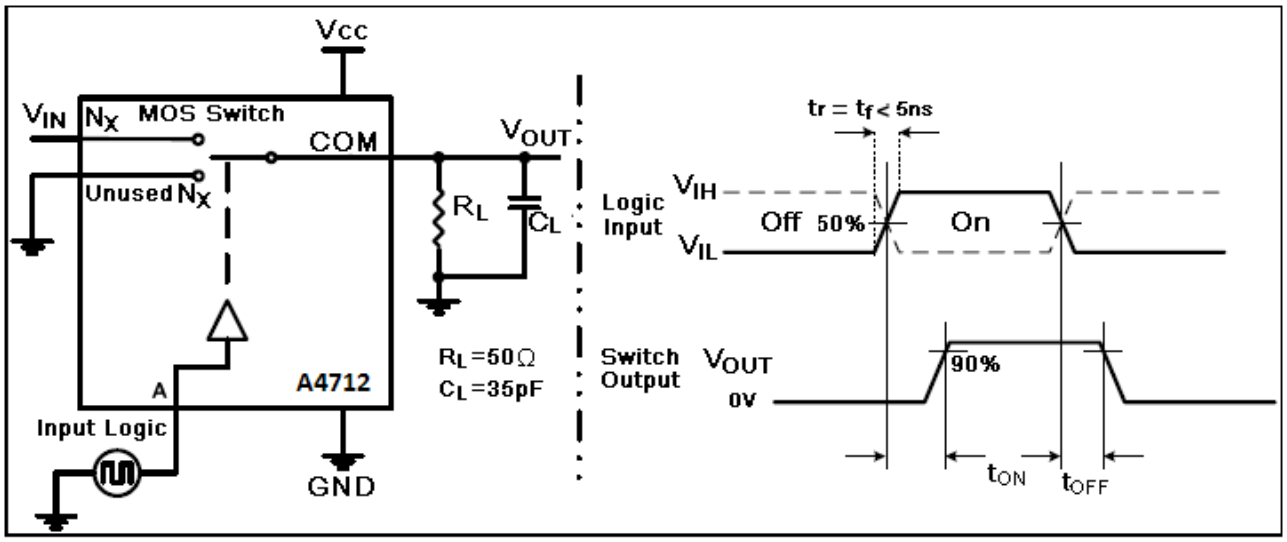


Figure1. AC Test Circuit & Waveforms

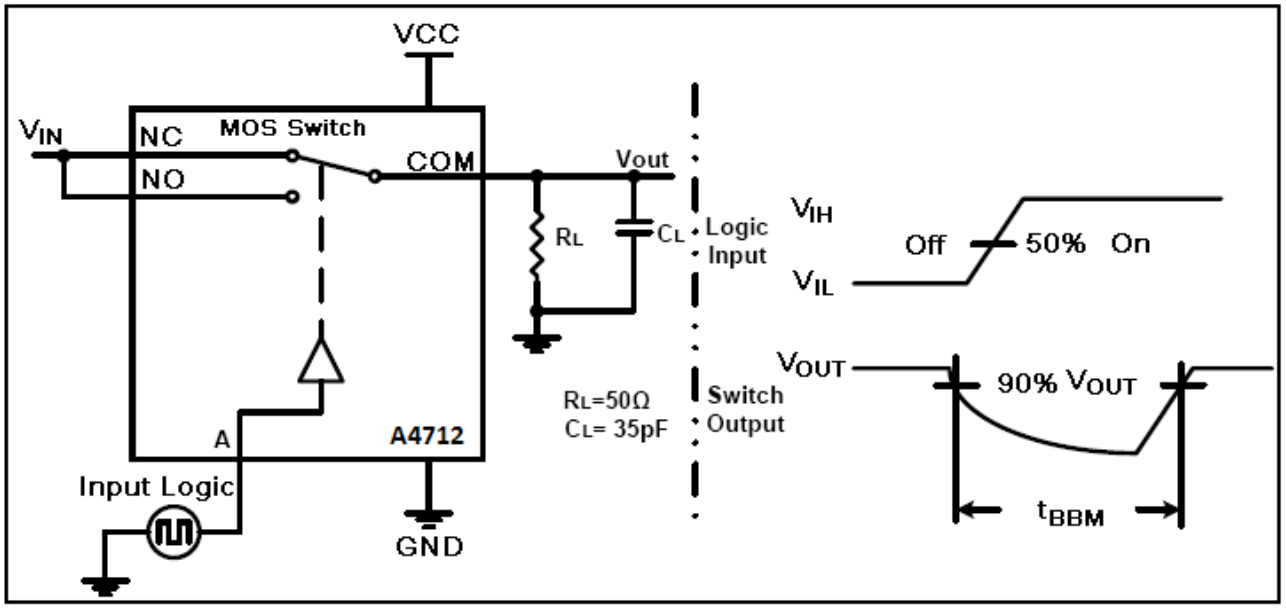


Figure2. Break-Before-Make Time (t_{BBM})

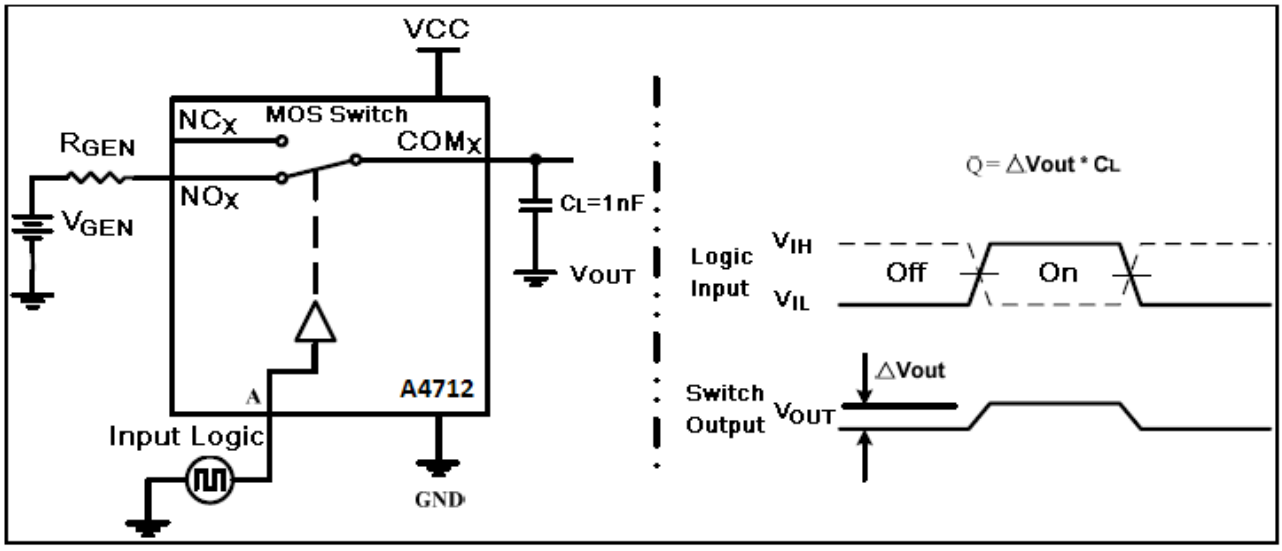


Figure3. Charge Injection (Q)

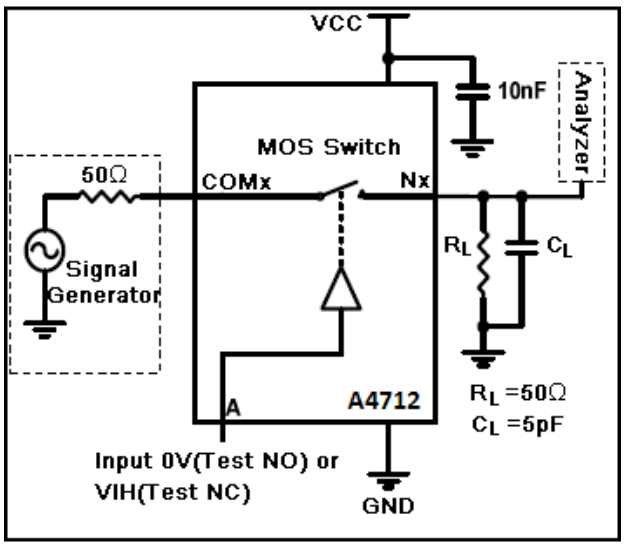


Figure4. Off Isolation (V_{ISO})

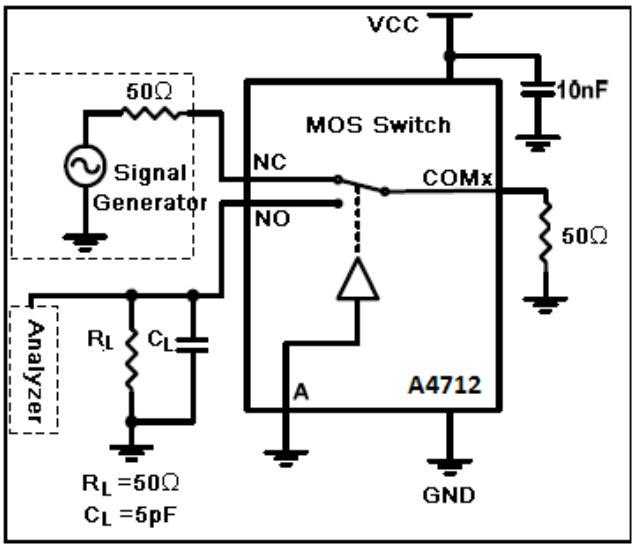


Figure5. Cross Talk (V_{CT})

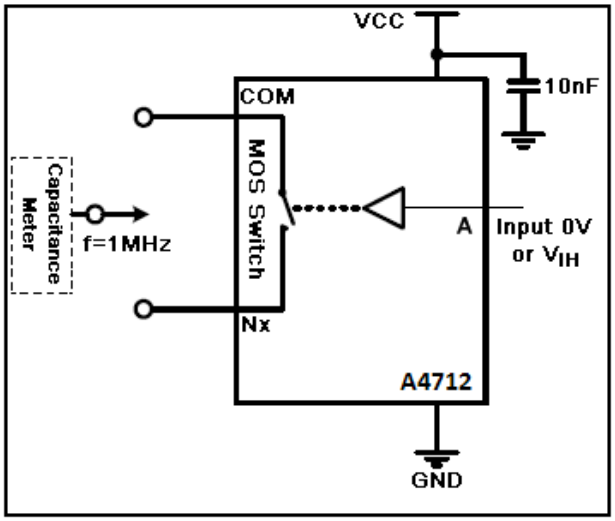


Figure6. Channel Off Capacitance($C_{OFF(NX)}$)

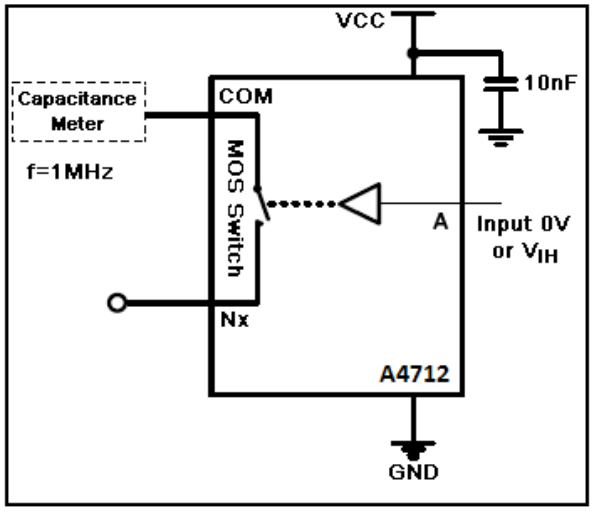


Figure7. Channel On Capacitance($C_{ON(NX)}$)

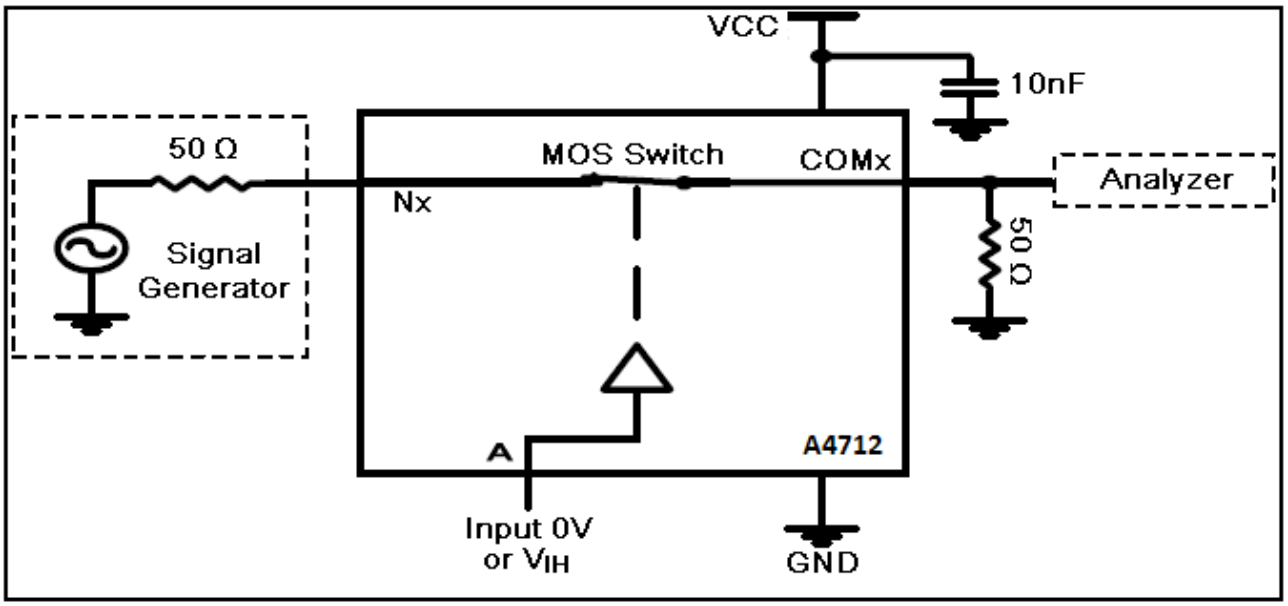
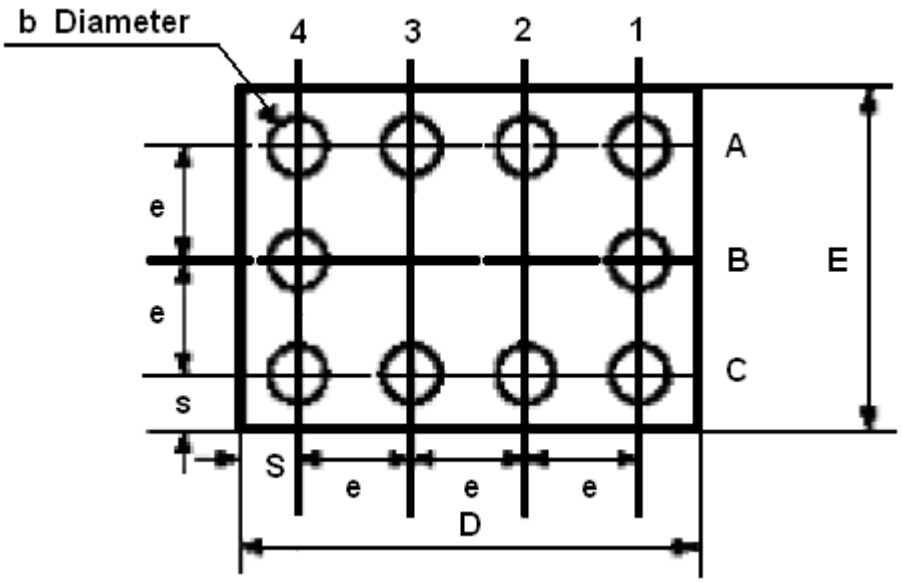


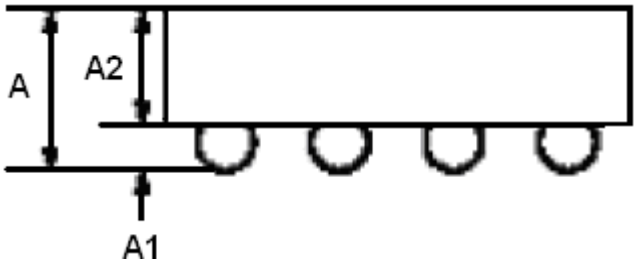
Figure8. -3dB Bandwidth (f_{3dB})

PACKAGE INFORMATION

Dimension in CSP10 Package (Unit: mm)



Bottom View



Symbol	Min	Nominal	Max
A	0.590	0.650	0.710
A1	0.215	0.235	0.255
A2	0.375	0.415	0.455
b	0.300	0.320	0.340
D	2.005	2.020	2.035
E	1.445	1.460	1.475
e	0.5 Basic		
s	0.220	0.230	0.240
S	0.250	0.260	0.270

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