# Dual SPDT Analog Switch with Chip Scale Packaging

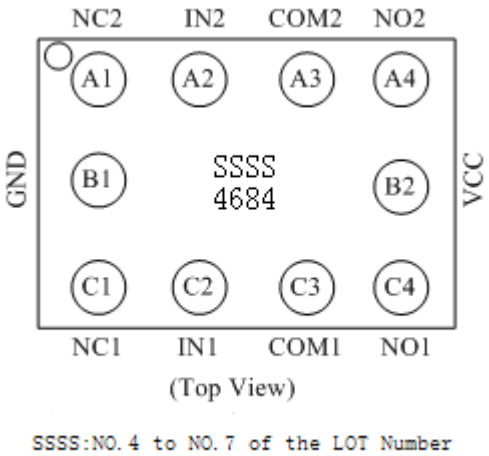
## Features

- Wide Power Supply Range:1.65V to 5.5V
- Low On-Resistance:
  $R_{ON(NC)}$ = 0.4Ω (VCC=2.7V)
  $R_{ON(NO)}$ = 0.5Ω (VCC=2.7V)
- Low On-Resistance Flatness:
  $R_{ONF(NC)}$ = 0.15Ω max (VCC=2.7V)
  $R_{ONF(NO)}$ = 0.25Ω max (VCC=2.7V)
- Rail-to-Rail Signal Range
- High Off-Isolation: -60dB (f=100 kHz)
- Crosstalk Rejection: -67dB
- Low Total Harmonic Distortion: 0.05%
- Lead(Pb) Free CSP-10 Packaging

## Applications

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

## Pin Configuration




(Top View)

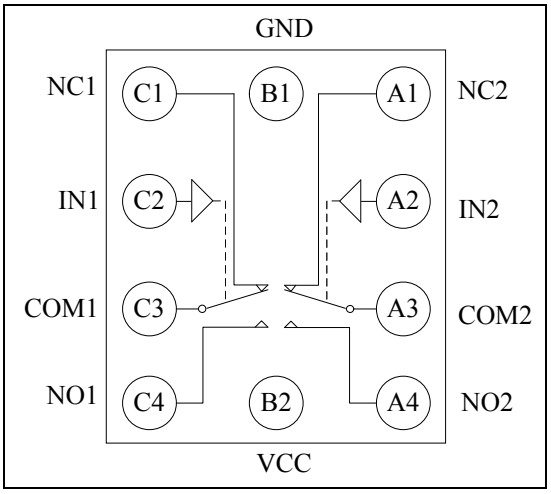
SSSS:NO.4 to NO.7 of the LOT Number

## Description

The BL4684 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 to5.5V. It 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.

## Block Diagram




## Function Table

| $IN_X$ | Function |
|---|---|
| 0 | $NC_X$ Connected to $COM_X$ |
| 1 | $NO_X$ Connected to $COM_X$ |

## Pin Description

| Pin Name | Type | Description |
|---|---|---|
| VCC | PWR | Power Supply |
| GND | Ground | Ground |
| COMx | Input/Output | Data Port |
| NCx | Input/Output | Data Port |
| NOx | Input/Output | Data Port |
| $IN_X$ | Input | Logic Control Signal |

** X = 1or 2

## ABSOLUTE MAXIMUM RATINGS

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

**Notes:**

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

(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.

(3) Control input($V_{INX}$) 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 @ +3V Supply

| Parameter | Symbol | Conditions | Guaranteed Limit | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ.(1) | Max. | |
| **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 ; $V_{NO}$= 0 to $V_{CC}$ | | 0.5 | 0.6 | Ω |
| NC On-Resistance Flatness(2) | $R_{FLAT(NC)}$ | $V_{CC}$ = 2.7V; $I_{COM}$ =100mA ; $V_{NC}$ = 0 to $V_{CC}$ | | | 0.15 | Ω |
| NO On-Resistance Flatness(2) | $R_{FLAT(NO)}$ | $V_{CC}$ = 2.7V; $I_{COM}$ =100mA ; $V_{NO}$ = 0 to $V_{CC}$ | | | 0.25 | Ω |
| On-Resistance Match Between Channels(3) | $\triangle R_{ON}$ | $V_{CC}$ = 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 |

**Note:**

(1) Typical characteristics are at +3V supply and +25°C

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

(3) $\triangle R_{ON}= R_{ON(MAX)} - R_{ON(MIN)}$, between NC1 and NC2 or between NO1 and NO2.

## DYNAMIC CHARACTERISTICS

| Parameter | Symbol | Conditions | Guaranteed Limit | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. (1) | Max. | |
| **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 | $f_{3dB}$ | Figure8 | | 27 | | MHz |
| Charge Injection | Q | $V_{GEN}$ = 0V; $R_{GEN}$ = 0Ω; $C_L$ = 1nF; Figure3 | | 30 | | pC |
| Off Isolation(2) | $V_{Iso}$ | f = 100kHz; $R_L$ = 50Ω; $C_L$ = 5pF; $V_{COM}$ = 1 $V_{RMS}$; Figure4 | | -60 | | dB |
| Crosstalk (3) | $V_{CT}$ | 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 | | 5.5 | V |
| Maximum Quiescent Supply Current | $I_{cc}$ | $V_{CC}$ = 5.5V; $V_{IN}$ = $V_{CC}$ or 0 | | | 200 | nA |

**Note:**

(1) Typical characteristics are at +3V supply and 25°C

(2) Off Channel Isolation = $20\log_{10}[(V_{NO\backslash NC})/V_{COM}]$

(3) Between any two switches

## TEST SETUP CIRCUITS

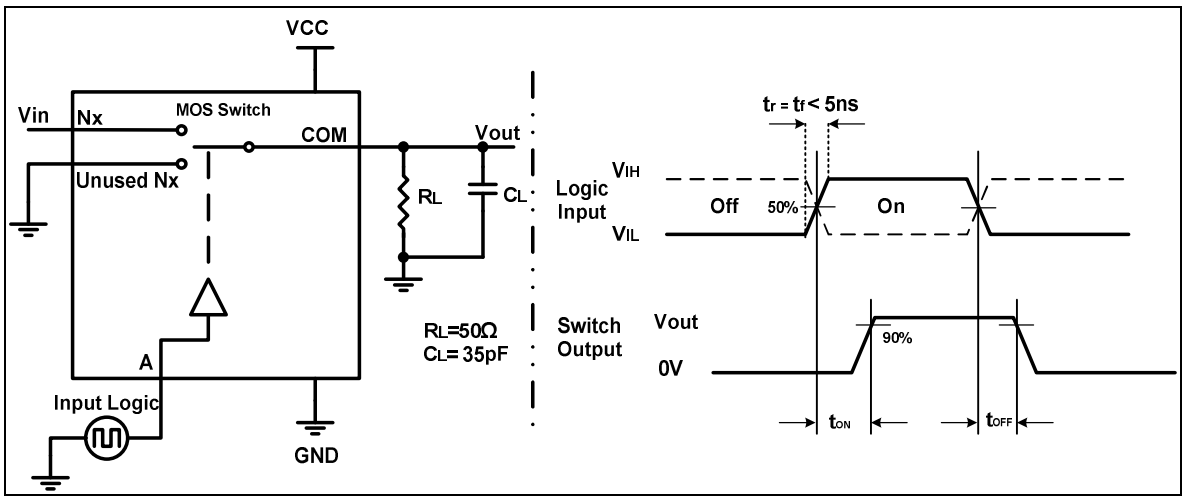



**Figure1. AC Test Circuit & Waveforms**

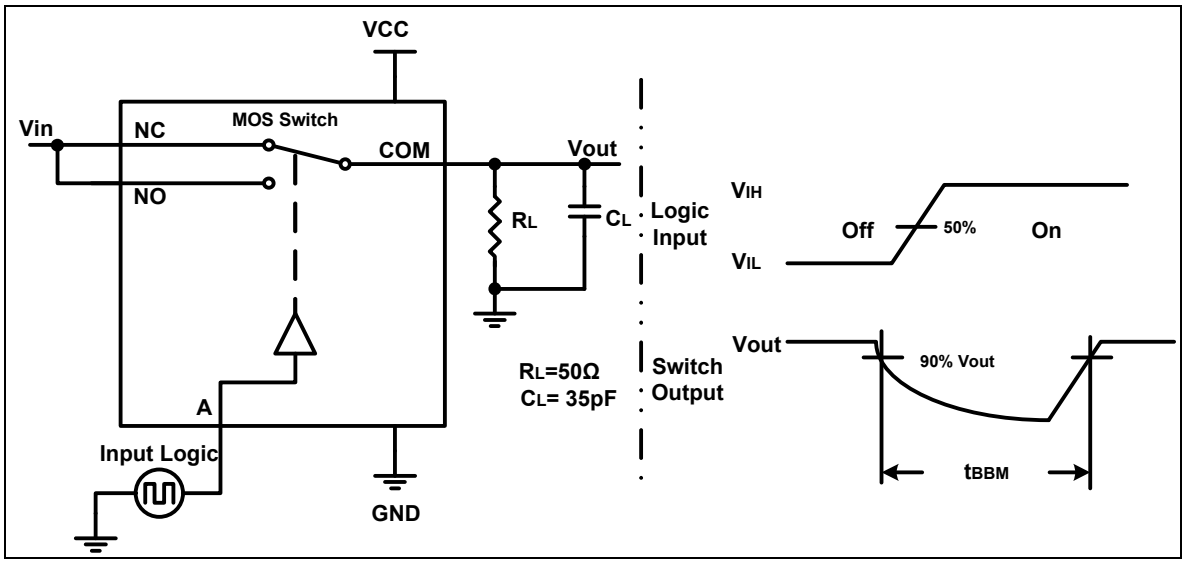



**Figure2. Break-Before-Make Time ($t_{BBM}$)**

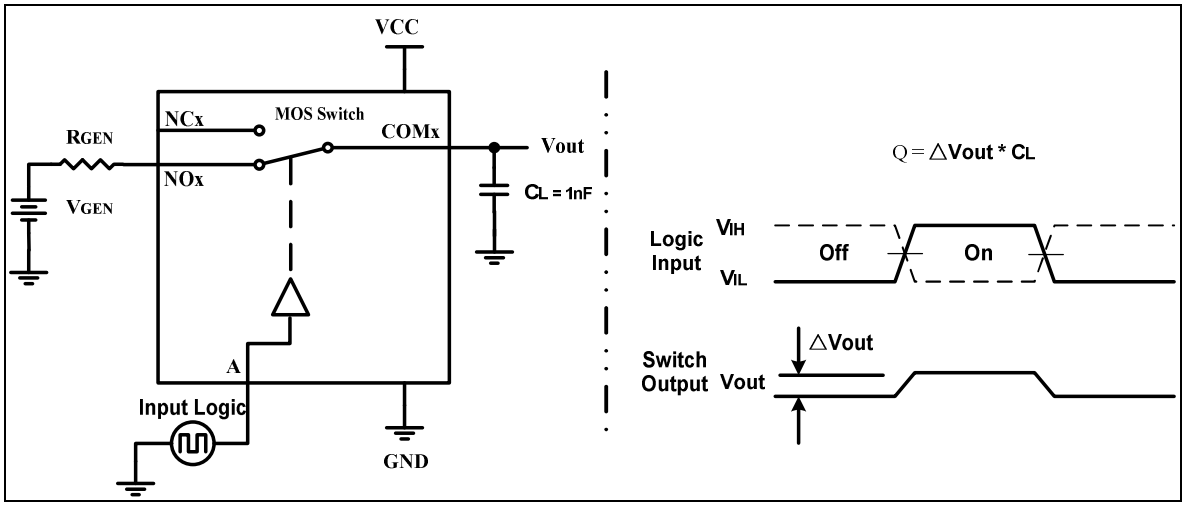



**Figure3. Charge Injection (Q)**

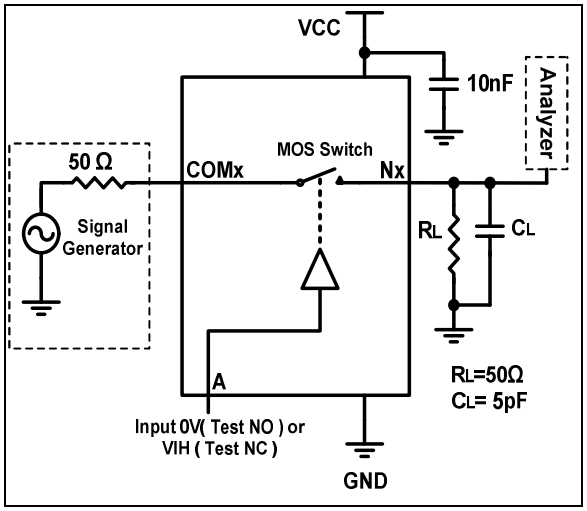



Figure4. Off Isolation ($V_{ISO}$)

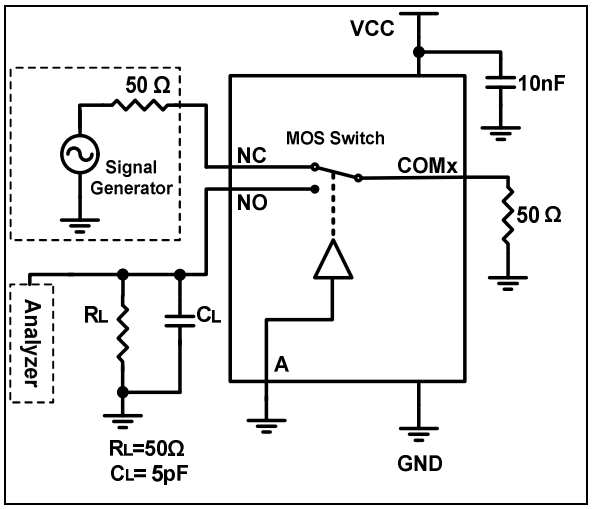



Figure5. Cross Talk ($V_{CT}$)

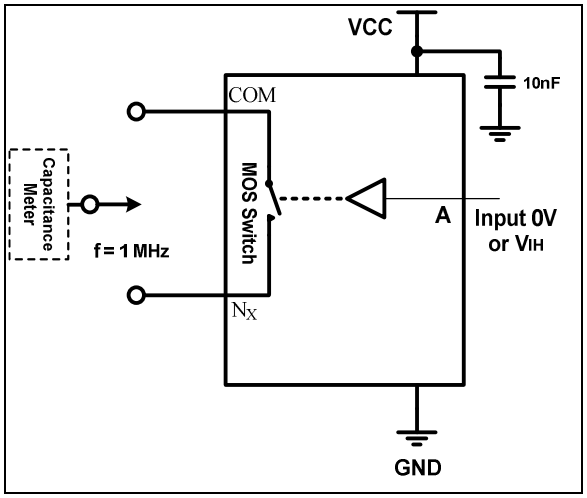



Figure6. Channel Off Capacitance($C_{OFF(NX)}$)

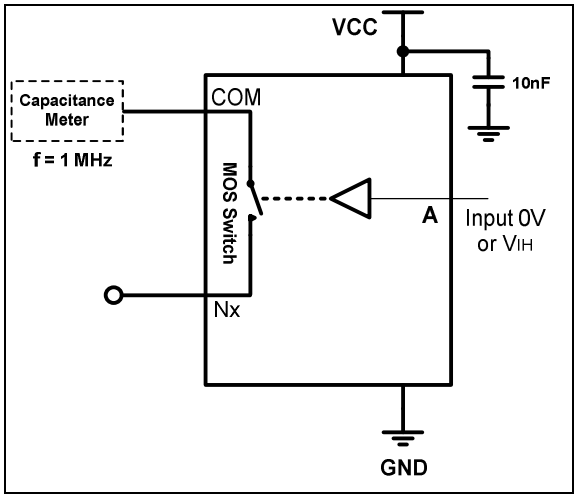



Figure7. Channel On Capacitance($C_{ON(NX)}$)

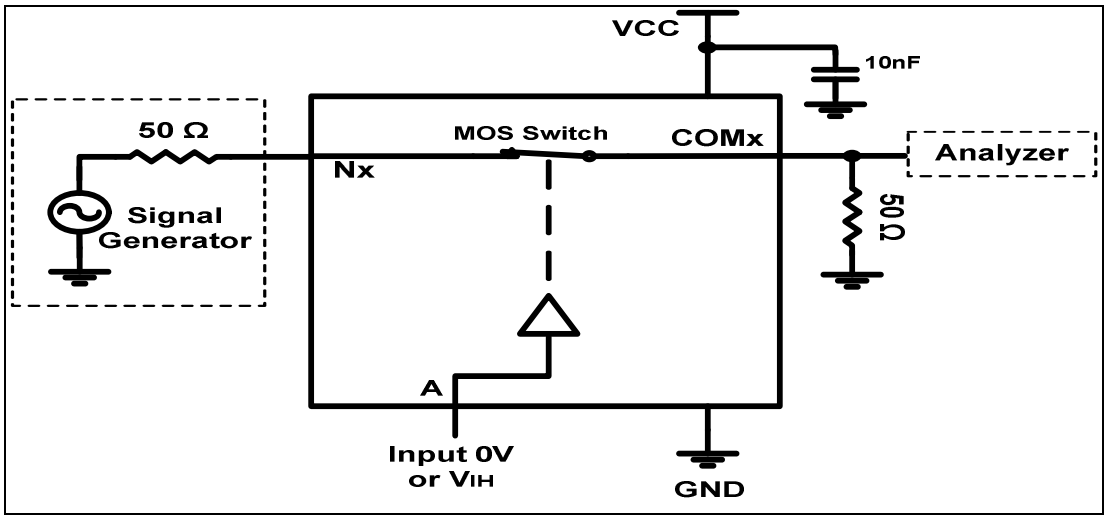
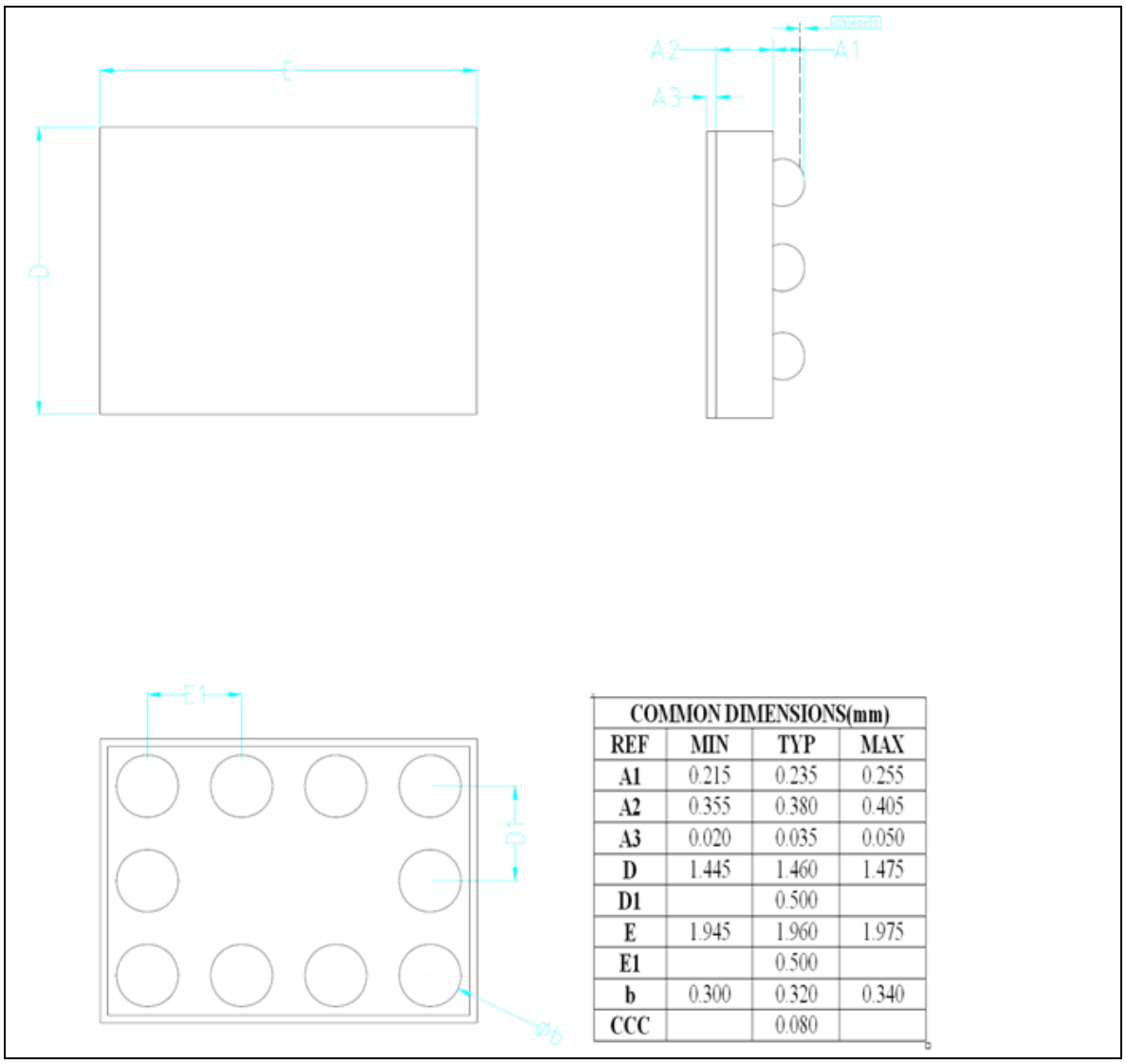



Figure8. -3dB Bandwidth ($f_{3dB}$)

## PACKAGE OUTLINE DIMENSIONS (CSP-10)




| COMMON DIMENSIONS(mm) | | | |
|---|---|---|---|
| REF | MIN | TYP | MAX |
| A1 | 0.215 | 0.235 | 0.255 |
| A2 | 0.355 | 0.380 | 0.405 |
| A3 | 0.020 | 0.035 | 0.050 |
| D | 1.445 | 1.460 | 1.475 |
| D1 | | 0.500 | |
| E | 1.945 | 1.960 | 1.975 |
| E1 | | 0.500 | |
| b | 0.300 | 0.320 | 0.340 |
| CCC | | 0.080 | |

# X-ON Electronics

Largest Supplier of Electrical and Electronic Components

***Click to view similar products for*** Analogue Switch ICs ***category:***

***Click to view products by*** Belling ***manufacturer:***

Other Similar products are found below :

FSA3051TMX NLVAS4599DTT1G MAX4992EVB+T MAX4684ETB+T BCM6522IPBG BCM65300IFSBG MAX14764ETA+T TMUX1113RSVR TMUX1112RSVR ADG1436TRUZ-EP BL4684C PE423422A PE42359SCAA PE42540F RS550YUCM12 ADGS1414DBCCZ ADG658YRUZ-REEL7 RS2117YUTQK10 RS2118YUTQK10 RS2227XUTQK10 SP2526A-1EN-L/TR FSA4157P6X BA7603F-E2 MAX4702EUE+ MAX4617CUE+ MAX4599EUT+T MAX4066ESD+ MAX4052ACSE+ MAX396CAI+ MAX391CPE+ MAX4730EXT+T MAX314CPE+ MAX4051AEEE+ BU4066BCFV-E2 MAX313CPE+ BU4S66G2-TR TS3A4751PWR NCN1154MUTAG DG444DY-E3 NLAS4157DFT2G NLAS4599DFT2G NLAS7242MUTBG NLASB3157DFT2G NLAST4599DFT2G NLAST4599DTT1G DG403DY-T1-E3 MAX4714EXTT MAX392CPE BGSX22G2A10E6327XTSA1 ADG1611BRUZ-REEL7