



## DESCRIPTION

The A4711 is a Single Wide-Bandwidth, fast single-pole double-throw (SPDT) CMOS switch featuring an On-Resistance of 2.7 ohm at  $V_{CC}=5.0V$  and wide power supply range from 1.8V to 5.5V. It can be used as an analog switch or as a low-delay bus switch.

The 300MHz high bandwidth performance supports the high frequency application.

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

The A4711 is available in SC70-6 package.

## ORDERING INFORMATION

Package Type	Part Number	
SC70-6	C6	A4711C6R
		A4711C6VR
Note	R: Tape & Reel V:Halogen free Package	
AiT provides all RoHS products Suffix "V" means Halogen free Package		

## FEATURES

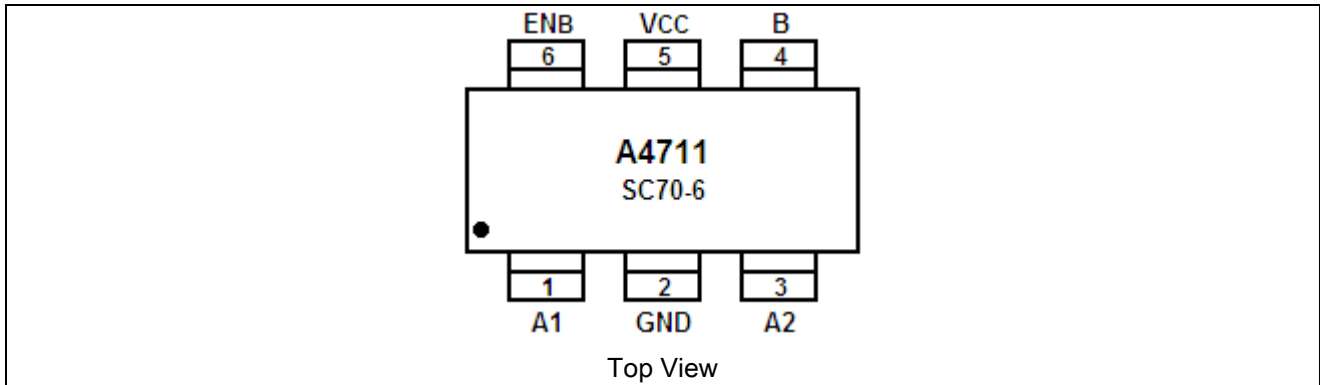
- Wide Power Supply Range: 1.8V to 5.5V
- High Bandwidth: 300MHz
- High Off-Isolation:
  - 84dB at 1MHz
  - 51dB at 10MHz
- On-Resistance: 2.7Ω(TYP) at 5.0V
- Fast Switching Time
  - $T_{ON} = 12.0ns$ ;  $T_{OFF} = 5.0ns$
- TTL/CMOS Compatible
- Break-Before-Make Switching
- Rail-to-Rail Signal Range
- Operation Temperature Range:-40°C to 85°C
- Available in SC70-6 Package

## APPLICATION

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



## PIN DESCRIPTION



Pin #	Pin Name	Function
1	A1	Data Port
2	GND	Ground
3	A2	Data Port
4	B	Data Port
5	Vcc	Power Supply
6	ENB	Logic Control Signal

## FUNCTION TABLE

ENB	Function
1	A1 Connected to B
0	A2 Connected to B



## ABSOLUTE MAXIMUM RATINGS

V <sub>CC</sub> , DC Supply Voltage	-0.3V ~ 6.0V
V <sub>A1</sub> / V <sub>A2</sub> / V <sub>B</sub> , DC Switch Voltage	-0.3V ~ V <sub>SUP</sub> + 0.3 (V)
V <sub>ENB</sub> , DC Input Voltage <sup>NOTE2</sup>	-0.3V ~ V <sub>SUP</sub> + 0.3 (V)
I <sub>(A1/A2/B)</sub> , Continuous Current	±200mA
I <sub>PEAK(A1/A2/B)</sub> , Peak Current <sup>NOTE1</sup>	±300mA
T <sub>A</sub> , Operating Temperature Range	-40°C~ +85°C

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.

NOTE1: Pulsed at 1ms, 50% duty circle

NOTE2: Control input (V<sub>ENB</sub>) must be held HIGH or LOW, and mustn't be floated.

## RECOMMENDED OPERATING CONDITIONS

DC Supply Voltage (V <sub>CC</sub> )	1.8V to 5.5V
Switch Input Voltage (V <sub>S</sub> )	0V to V <sub>CC</sub>
Control Input Voltage (V <sub>ENB</sub> )	0V to V <sub>CC</sub>
Operation Temperature (T <sub>A</sub> )	-40°C to +85°C



## ELECTRICAL CHARACTERISTICS<sup>NOTE3</sup>

### DC ELECTRICAL CHARACTERISTICS @ +2.7V Supply

Parameter	Symbol	Conditions	Min.	Typ. <sup>(3)</sup>	Max.	Unit
Analog Signal Range	$V_{A1}/V_{A2}/V_B$		0	-	$V_{CC}$	V
A1 On-Resistance	$R_{ON(A1)}$	$V_{CC} = 2.7V$ ; $I_B = -10mA$ ; $V_{A1} = 1.5V$	-	5.5	-	Ω
A2 On-Resistance	$R_{ON(A2)}$	$V_{CC} = 2.7V$ ; $I_B = -10mA$ ; $V_{A2} = 1.5V$	-	5.5	-	Ω
A1 On-Resistance Flatness <sup>NOTE4</sup>	$R_{FLAT(A1)}$	$V_{CC} = 2.7V$ ; $I_B = -10mA$ ; $V_{A1} = 1.5V$	-	2.3	-	Ω
A2 On-Resistance Flatness <sup>NOTE4</sup>	$R_{FLAT(A2)}$	$V_{CC} = 2.7V$ ; $I_B = -10mA$ ; $V_{A2} = 1.5V$	-	2.3	-	Ω
On-Resistance Match Between Channels <sup>NOTE5</sup>	$\Delta R_{ON}$	$V_{CC} = 2.7V$ ; $I_B = -10mA$ ; $V_{A2}/V_{A1} = 1.5$	-	0.15	1	Ω
A1 or A2 Off Leakage Current	$I_{OFF(A1)}$ or $I_{OFF(A2)}$	$V_{CC} = 3.6V$ ; $V_{A1}$ or $V_{A2} = 3V$ , 0.3V; $V_B = 0.3V, 3V$	-	0.01	1	μA
B On Leakage Current	$I_{ON(B)}$	$V_{CC} = 3.6V$ ; $V_{A1}$ or $V_{A2} = 3.3V$ , 0.3V; $V_B = 0.3V, 3.3V$ or floating	-	0.01	1	μA
Input Voltage High	$V_{IH}$	Minimum High Level Input Voltage	1	-	-	V
Input Voltage Low	$V_{IL}$	Maximum Low Level Input Voltage	-	-	0.5	V
Input Leakage Current	$I_{ENB}$	$V_{ENB} = 0$ or $V_{CC}$	-	0.01	1	μA

### DYNAMIC CHARACTERISTICS @ +2.7V Supply

Parameter	Symbol	Conditions	Min.	Typ. <sup>(3)</sup>	Max.	Unit	
<b>AC ELECTRICAL CHARACTERISTICS</b>							
Turn-On Time	$T_{ON}$	$V_{CC} = 2.7V$ ; $V_{A1}$ or $V_{A2} = 1.5V$ , $R_L = 300\Omega$ ; $C_L = 35pF$ , $V_{IH} = 1.5V$ , $V_{IL} = 0V$	-	17.0	-	ns	
Turn-Off Time	$T_{OFF}$	$V_{CC} = 2.7V$ ; $V_{A1}$ or $V_{A2} = 1.5V$ , $R_L = 300\Omega$ ; $C_L = 35pF$ , $V_{IH} = 1.5V$ , $V_{IL} = 0V$	-	9.0	-	ns	
Break-Before-Make Time	$T_{BBM}$	$V_{CC} = 2.7V$ ; $V_{A1}$ or $V_{A2} = 1.5V$ , $R_L = 300\Omega$ ; $C_L = 35pF$	-	15.0	-	ns	
NC OFF Capacitance	$C_{OFF(A1)}$	$f = 1MHz$	-	5.5	-	pF	
NO OFF Capacitance	$C_{OFF(A2)}$	$f = 1MHz$	-	5.5	-	pF	
NC ON Capacitance	$C_{ON(A1)}$	$f = 1MHz$	-	15.5	-	pF	
NO ON Capacitance	$C_{ON(A2)}$	$f = 1MHz$	-	15.5	-	pF	
<b>ADDITIONAL APPLICATION CHARACTERISTICS</b>							
3dB Bandwidth	$f_{3dB}$	Signal = 0dBm, $R_L = 50\Omega$ , $C_L = 5pF$	-	300	-	MHz	
Off Isolation <sup>NOTE6</sup>	$V_{ISO}$	$R_L = 50\Omega$ , $C_L = 5pF$ , Signal = 0dBm	$f = 1MHz$	-	-84	-	dB
			$f = 10MHz$	-	-51	-	dB
Power Supply Range	$V_{CC}$		1.8	-	5.5	V	



DC ELECTRICAL CHARACTERISTICS @ +5.0V Supply

Parameter	Symbol	Conditions	Min	Typ. <sup>(3)</sup>	Max	Unit
Analog Signal Range	$V_{A1}/V_{A2}/V_B$		0		$V_{CC}$	V
A <sub>1</sub> On-Resistance	$R_{ON(A1)}$	$V_{CC} = 5.0V; I_B = -10mA; V_{A1} = 3.5V$	-	2.7	-	Ω
A <sub>2</sub> On-Resistance	$R_{ON(A2)}$	$V_{CC} = 5.0V; I_B = -10mA; V_{A2} = 3.5V$	-	2.7	-	Ω
A <sub>1</sub> On-Resistance Flatness <sup>NOTE4</sup>	$R_{FLAT(A1)}$	$V_{CC} = 5.0V; I_B = -10mA; V_{A1} = 3.5V$	-	0.8	-	Ω
A <sub>2</sub> On-Resistance Flatness <sup>NOTE4</sup>	$R_{FLAT(A2)}$	$V_{CC} = 5.0V; I_B = -10mA; V_{A2} = 3.5V$	-	0.8	-	Ω
On-Resistance Match Between Channels <sup>NOTE5</sup>	$\Delta R_{ON}$	$V_{CC} = 5.0V; I_B = -10mA; V_{A2}/V_{A1} = 3.5$	-	0.15	-	Ω
A <sub>1</sub> or A <sub>2</sub> Off Leakage Current	$I_{OFF(A1)}$ or $I_{OFF(A2)}$	$V_{CC} = 5.5V; V_{NO}$ or $V_{NC} = 4.5V, 1.0V; V_{COM} = 1.0V, 4.5V$	-	0.01	1	μA
B On Leakage Current	$I_{ON(B)}$	$V_{CC} = 5.5V; V_{A1}$ or $V_{A2} = 4.5V, 1.0V; V_B = 1.0V, 4.5V$ or floating	-	0.01	1	μA
Input Voltage High	$V_{IH}$	Minimum High Level Input Voltage	1	-	-	V
Input Voltage Low	$V_{IL}$	Maximum Low Level Input Voltage	-	-	0.5	V
Input Leakage Current	$I_{ENB}$	$V_{ENB} = 0$ or $V_{CC}$	-	0.01	1	μA

DAYNAMIC CHARACTERISTICS @ +5.0V Supply

Parameter	Symbol	Conditions	Min	Typ. <sup>(3)</sup>	Max	Unit	
Turn-On Time	$T_{ON}$	$V_{CC} = 5.0V; V_{A1}$ or $V_{A2} = 3.0V, R_L = 300\Omega; C_L = 35pF, V_{IH} = 1.5V, V_{IL} = 0V$	-	12.0	-	ns	
Turn-Off Time	$T_{OFF}$	$V_{CC} = 5.0V; V_{A1}$ or $V_{A2} = 3.5V, R_L = 300\Omega; C_L = 35pF, V_{IH} = 1.5V, V_{IL} = 0V$	-	5.0	-	ns	
Break-Before-Make Time	$T_{BBM}$	$V_{CC} = 5.0V; V_{A1}$ or $V_{A2} = 3.5V, R_L = 300\Omega; C_L = 35pF$	-	8.5	-	ns	
NC OFF Capacitance	$C_{OFF(A1)}$	$f = 1MHz$	-	5.5	-	pF	
NO OFF Capacitance	$C_{OFF(A2)}$	$f = 1MHz$	-	5.5	-	pF	
NC ON Capacitance	$C_{ON(A1)}$	$f = 1MHz$	-	15.5	-	pF	
NO ON Capacitance	$C_{ON(A2)}$	$f = 1MHz$	-	15.5	-	pF	
3dB Bandwidth	$f_{3dB}$	Signal = 0dBm, $R_L = 50\Omega, C_L = 5pF$	-	300	-	MHz	
Off Isolation <sup>NOTE6</sup>	$V_{ISO}$	$R_L = 50\Omega, C_L = 5pF, \text{Signal} = 0dBm$	$f = 1MHz$	-	-84	-	dB
			$f = 10MHz$	-	-51	-	dB
Power Supply Range	$V_{CC}$		1.8	-	5.5	V	

NOTE3: Typical characteristics are at +3V supply and +25°C

NOTE4: Flatness is defined as the difference between the maximum and minimum value of on resistance as measured over the specified analog signal ranges.

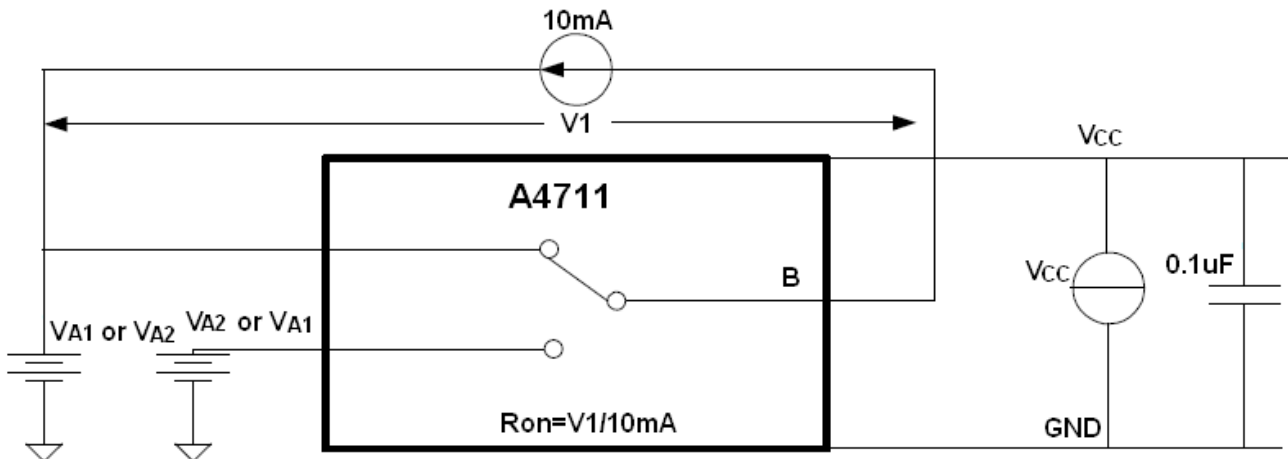
NOTE5:  $\Delta R_{ON} = R_{ON(MAX)} - R_{ON(MIN)}$ , between A<sub>1</sub> and A<sub>2</sub>.

NOTE6: Off Channel Isolation =  $20\log_{10}[(V_{A1/A2})/V_B]$

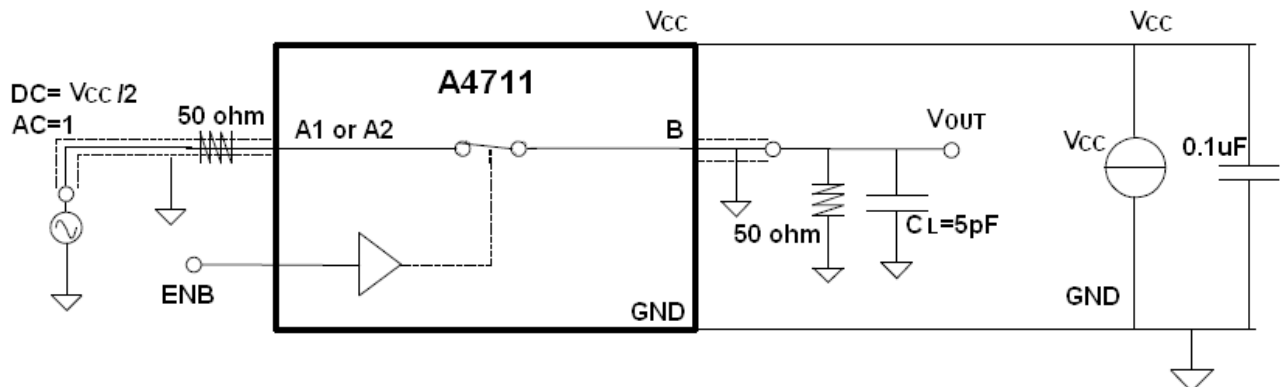


## TEST CIRCUIT

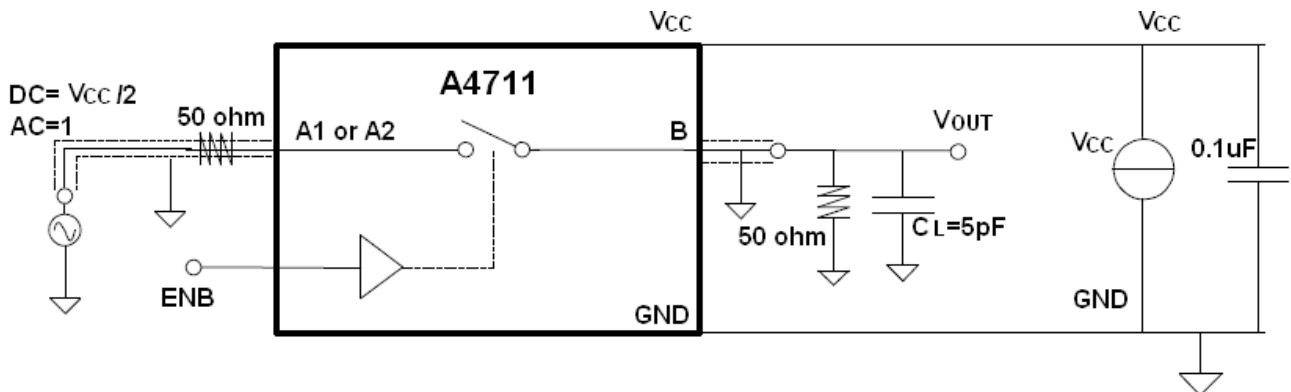
### 1. Test Circuit for On Resistor



### 2. Test Circuit for Bandwidth

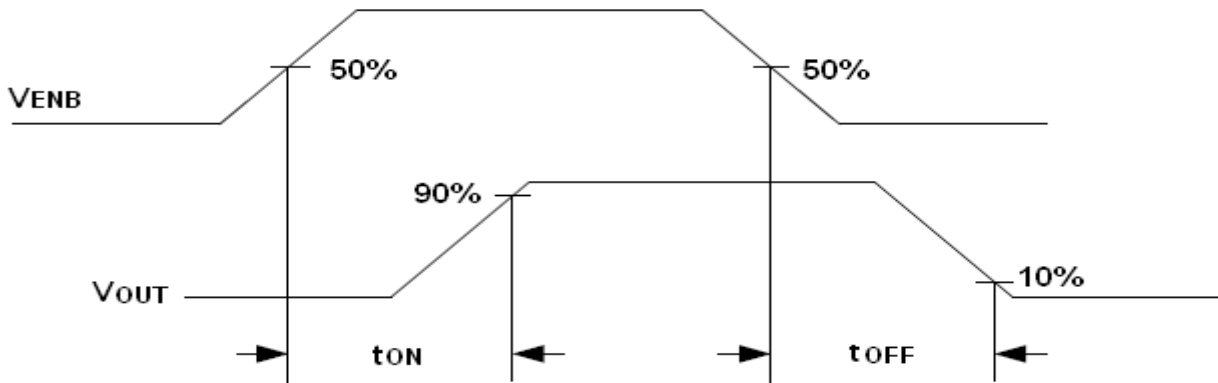
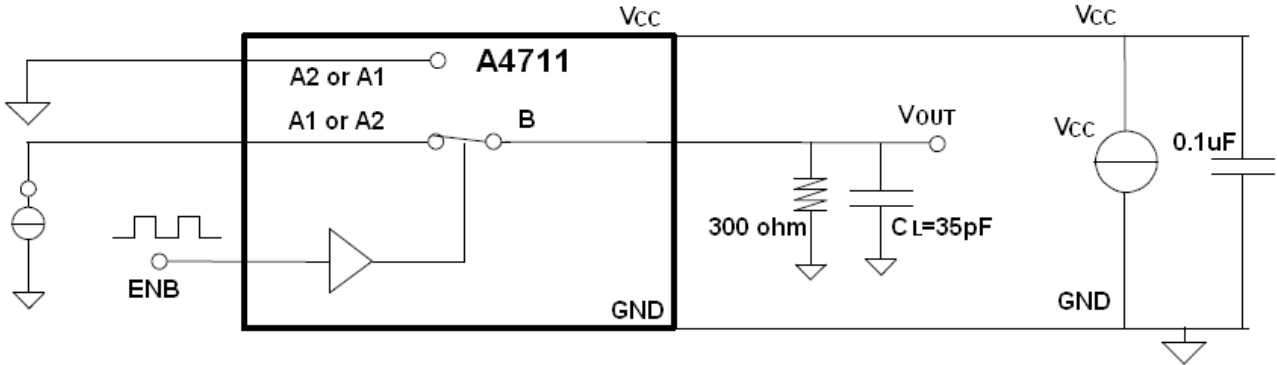


### 3. Test Circuit for Off Isolation

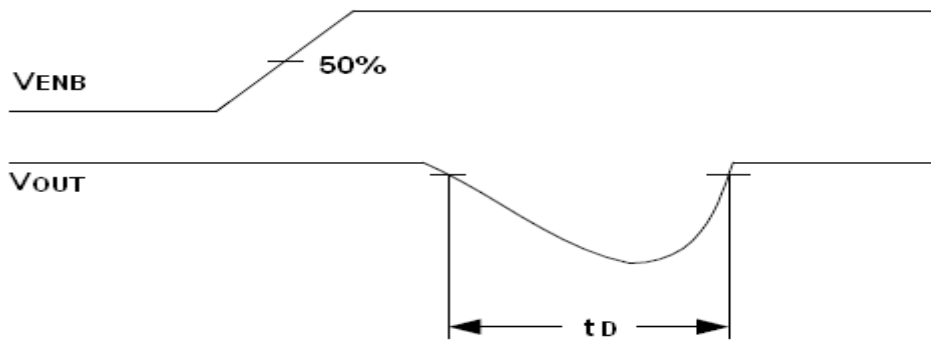
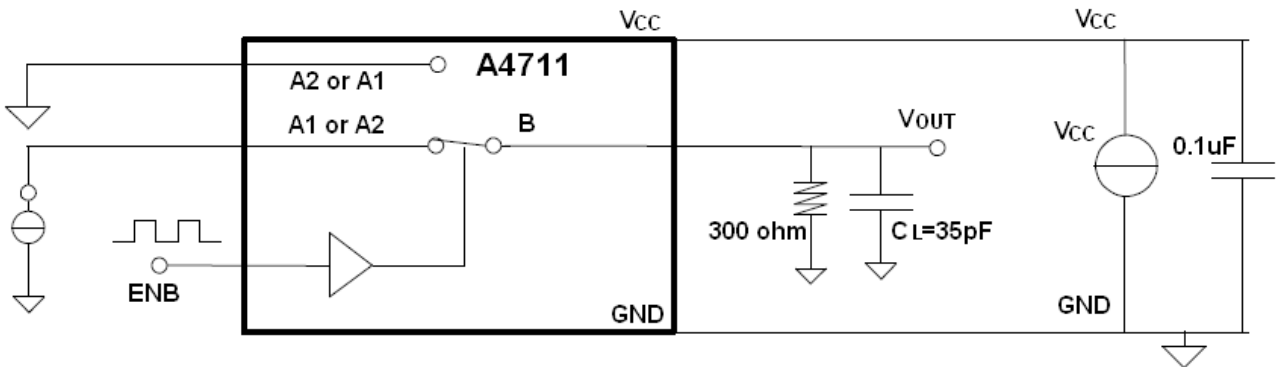




4. Test Circuit for Switch Times

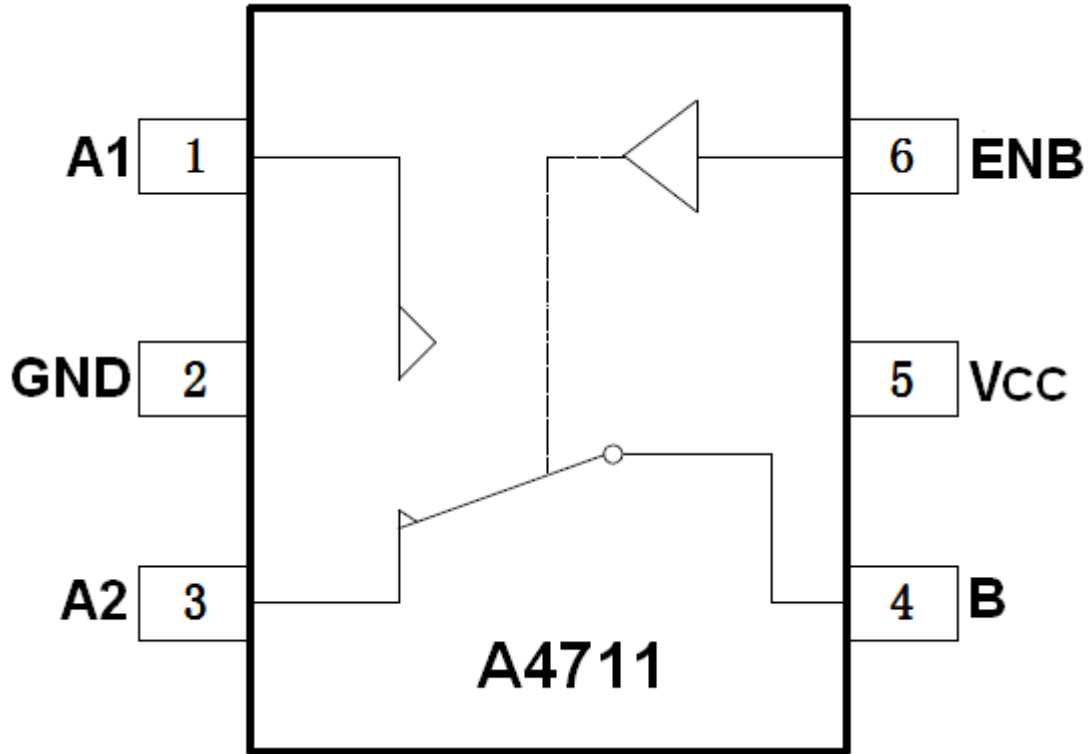


5. Test Circuit for Break-Before-Make Time Delay,  $t_D$





**BLOCK DIAGRAM**

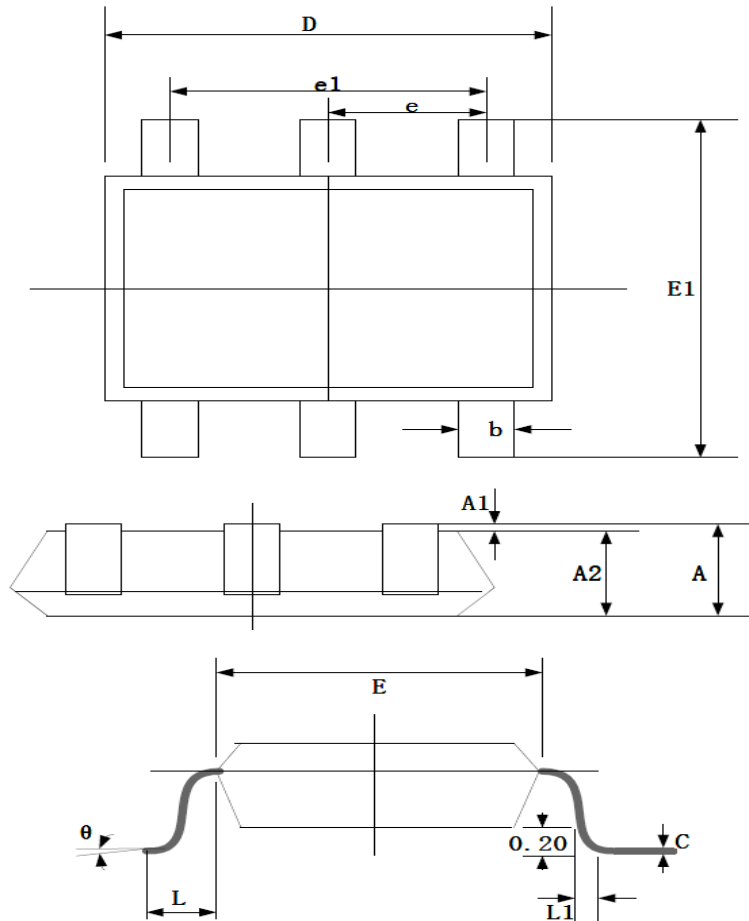






**PACKAGE INFORMATION**

Dimension in SC70-6 Package (Unit: mm)



Symbol	Min	Max
A	0.900	1.100
A1	0.000	0.100
A2	0.900	1.000
b	0.150	0.350
c	0.080	0.150
D	2.000	2.200
E	1.150	1.350
E1	2.150	2.450
e	0.065 TYP	
e1	1.200	1.400
L	0.525 REF	
L1	0.260	0.460
$\theta$	0°	8°



## IMPORTANT NOTICE

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