Wide-Bandwidth 4-Channel SPST Analog Switch

1 FEATURES

- **Wide Bandwidth: 300MHz**
- **Single Supply Operation +1.8V to +5.5V**
- **Low ON Resistance, 4.5Ω(TYP)**
- **High Speed: Typical 30ns**
- **Rail-to-Rail Operation**
- **TTL/CMOS Compatible**
- **Operating Temperature Range: -40°C to +125°C**
- **Packages: SSOP16, TSSOP14**

2 APPLICATIONS

- **Game Consoles**
- **Audio and Video Switching**
- **Wired Networking**
- **Personal Video Recorders**
- **Supports Defense, Aerospace and Medical Applications**
- **Desktop Video Editors**
- **Hard Disk Recorders**

3 DESCRIPTION

The RS2268 is a CMOS analog IC configured as a quad, bidirectional, single-pole/single-throw (SPST) switches. This CMOS device can operate from 1.8 V to 5.5 V.

The RS2268 device can handle both analog and digital signals. It features high-bandwidth (300MHz) and low on-resistance (4.5Ω TYP). Each switch is disabled when the associated output-enable (IN) input is low.

The RS2268 is available in Green SSOP16, TSSOP14 packages. It operates over an ambient temperature range of -40°C to +125°C.

Device Information (1)

PART NUMBER	PACKAGE	BODY SIZE (NOM)
RS2268	TSSOP14	5.00mm×4.40mm
	SSOP16	4.90mm×3.90mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.

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4 REVISION HISTORY

Note: Page numbers for previous revisions may different from page numbers in the current version.

Version	Change Date	Change Item
A.0	2022/03/10	Initial version completed
A.1	2022/06/20	Official version completed
A.1.1	2024/03/08	Modify packaging naming
A.2	2024/05/08	1. Add MSL on Page 4@RevA.1.1 2. Add Package thermal impedance on Page 7@RevA.1.1 3. Update PACKAGE note

5 PACKAGE/ORDERING INFORMATION (1)

PRODUCT	ORDERING NUMBER	TEMPERATURE RANGE	PACKAGE LEAD	PACKAGE MARKING (2)	MSL (3)	PACKAGE OPTION
RS2268	RS2268XSS16	-40°C~+125°C	SSOP16	RS2268	MSL3	Tape and Reel, 4000
	RS2268XQ	-40°C~+125°C	TSSOP14	RS2268	MSL3	Tape and Reel, 4000

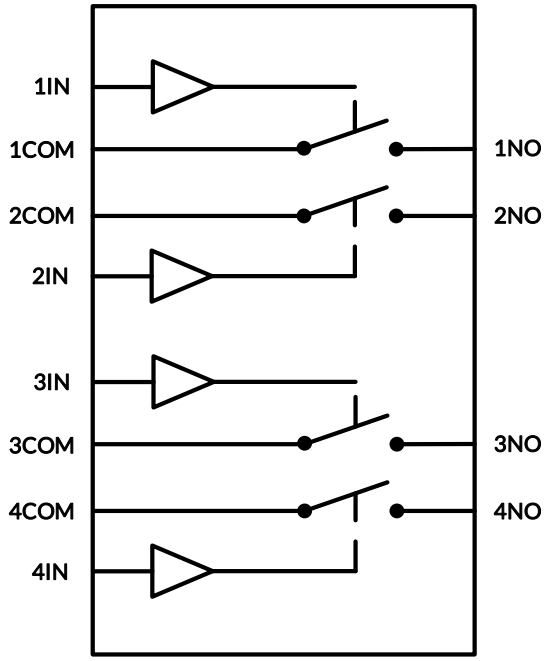
NOTE:

(1) This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the right-hand navigation.

(2) There may be additional marking, which relates to the lot trace code information (data code and vendor code), the logo or the environmental category on the device.

(3) MSL, The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications.

6 PIN CONFIGURATION AND FUNCTION

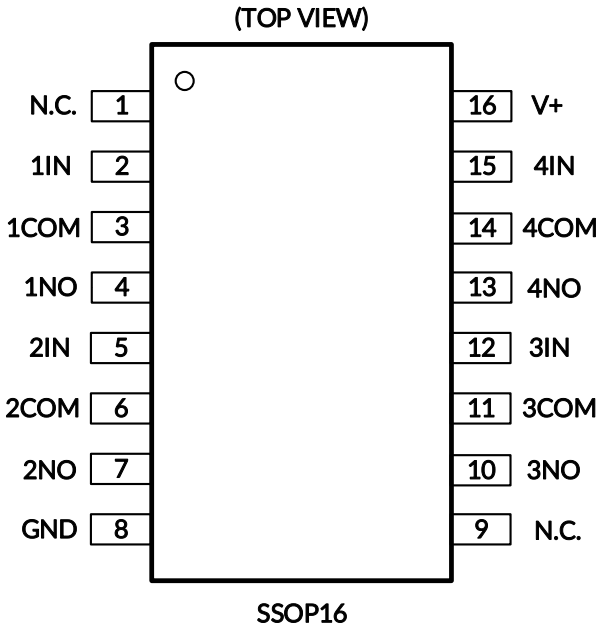


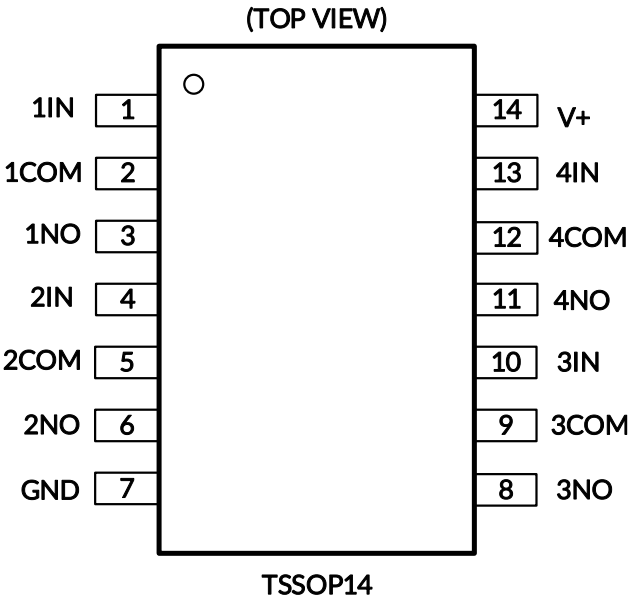
FUNCTION TABLE

INPUTS	FUNCTION
IN	
L	Disconnect
H	COM Port = NO Port

NOTE: Input and output pins are identical and inter-changeable. Either may be considered an input or output; signals pass equally well in either direction.

7 PIN CONFIGURATIONS





NOTE: N.C.= No internet connection

PIN DESCRIPTION

NAME	PIN		FUNCTION
	SSOP16	TSSOP14	
N.C.	1	/	No internet connection
1IN	2	1	Channel 1 Switch-Enable Input.
1COM	3	2	Channel 1, input or output
1NO	4	3	Channel 1, input or output
2IN	5	4	Channel 2 Switch-Enable Input.
2COM	6	5	Channel 2, input or output
2NO	7	6	Channel 2, input or output
GND	8	7	Ground.
N.C.	9	/	No internet connection
3NO	10	8	Channel 3, input or output
3COM	11	9	Channel 3, input or output
3IN	12	10	Channel 3 Switch-Enable Input.
4NO	13	11	Channel 4, input or output
4COM	14	12	Channel 4, input or output
4IN	15	13	Channel 4 Switch-Enable Input.
V+	16	14	Power Supply.

8 SPECIFICATIONS

8.1 Absolute Maximum Ratings

Over operating free-air temperature range (unless otherwise noted) (1)

SYMBOL	PARAMETER		MIN	MAX	UNIT
V+	Supply Voltage		-0.3	6	V
V_{IN}	Input Voltage (All inputs)		-0.3	6	
	Continuous Current		-300	+300	mA
I_{PEAK}	Peak Current		-500	+500	mA
θ_{JA}	Package thermal impedance (2)	SSOP16		110	°C/W
		TSSOP14		90	
T_J	Junction temperature (3)		-40	150	°C
T_{stg}	Storage temperature		-65	+150	°C

(1) Stresses above these ratings may cause permanent damage. Exposure to absolute maximum conditions for extended periods may degrade device reliability. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those specified is not implied.
(2) The package thermal impedance is calculated in accordance with JESD-51.
(3) The maximum power dissipation is a function of $T_{J(MAX)}$, $R_{\theta JA}$, and T_A. The maximum allowable power dissipation at any ambient temperature is PD = ($T_{J(MAX)}$ - T_A) / $R_{\theta JA}$. All numbers apply for packages soldered directly onto a PCB.

8.2 ESD Ratings

The following ESD information is provided for handling of ESD-sensitive devices in an ESD protected area only.

			VALUE	UNIT
$V_{(ESD)}$	Electrostatic discharge	Human-Body Model (HBM)	±1000	V
		Machine Model (MM)	±100	V

ESD SENSITIVITY CAUTION

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

8.3 Recommended Operating Conditions

Over operating free-air temperature range (unless otherwise noted)

SYMBOL	PARAMETER	MIN	MAX	UNIT
V+	Supply Voltage	1.8	5.5	V
T_A	Operating temperature	-40	+125	°C

8.4 Electrical Characteristics

V+= +1.8V to +5.5 V, FULL= -40°C to +125°C, Typical values are at T_A = +25°C. (unless otherwise noted)

PARAMETER	SYMBOL	CONDITIONS	V+	T_A	MIN(2)	TYP(3)	MAX(2)	UNIT
DC CHARACTERISTICS								
Analog Signal Range	V_{NO}, V_{COM}			FULL	0		V+	V
On-Resistance	R_{ON}	0 ≤ V_{NO} ≤V+/2, I_{COM} = -10mA, Switch ON, See Figure 4	5V	+25°C		4.5	8	Ω
				FULL			8.5	Ω
			3.3V	+25°C		7	10	Ω
				FULL			10.5	Ω
On-Resistance Match Between Channels	ΔR_{ON}	0 ≤ V_{NO} ≤V+/2, I_{COM} = -10mA, Switch ON, See Figure 4	5V	+25°C		0.15	0.3	Ω
				FULL			0.4	Ω
			3.3V	+25°C		0.15	0.3	Ω
				FULL			0.4	Ω
On-Resistance Flatness	$R_{FLAT(ON)}$	0 ≤ V_{NO} ≤V+/2, I_{COM} = -10mA, Switch ON, See Figure 4	5V	+25°C		2	3	Ω
				FULL			3.3	Ω
			3.3V	+25°C		3	4	Ω
				FULL			4.3	Ω
Leakage Current Off State	$I_{Leak(OFF)}$	V_{NO} = 0.3V, V+/2, V_{COM}= V+/2, 0.3V See Figure 5	1.8~5.5V	FULL			1	μA
Leakage Current On State	$I_{Leak(ON)}$	V_{NO} = 0.3V, Open, V_{COM} = Open, 0.3V See Figure 6	1.8~5.5V	FULL			1	μA
DIGITAL CONTROL INPUTS (1)								
High-Level Control Input Voltage	V_{INH}		5V	FULL	1.5			V
			3.3V	FULL	1.3			V
Low-Level Control Input Voltage	V_{INL}		5V	FULL			0.6	V
			3.3V	FULL			0.5	V
Input Leakage Current	I_{IN}	V_{IN} = V_{IO} or 0	1.8~5.5V	FULL			1	μA

(1) All unused digital inputs of the device must be held at V_{IO} or GND to ensure proper device operation.
(2) Limits are 100% production tested at 25°C. Limits over the operating temperature range are ensured through correlations using statistical quality control (SQC) method.
(3) Typical values represent the most likely parametric norm as determined at the time of characterization. Actual typical values may vary over time and will also depend on the application and configuration.

Electrical Characteristics

V+ = +1.8V to +5.5 V, FULL= -40°C to +125°C, Typical values are at T_A = +25°C. (unless otherwise noted)

PARAMETER	SYMBOL	CONDITIONS		V+	T_A	MIN	TYP	MAX	UNITS
DYNAMIC CHARACTERISTICS									
Turn-On Time	t_{ON}	V_{COM} = V+, R_L = 300Ω, C_L = 35pF, See Figure 8		5V	+25°C		30		ns
				3.3V			40		
Turn-Off Time	t_{OFF}	V_{COM} = V+, R_L = 300Ω, C_L = 35pF, See Figure 8		5V	+25°C		25		ns
				3.3V			30		
Off Isolation	O_{ISO}	R_L = 50Ω, Switch OFF, See Figure 10	f =10MHz		+25°C		-52		dB
			f =1MHz		+25°C		-71		dB
-3dB Bandwidth	BW	Switch ON, R_L=50Ω, See Figure 9			+25°C		300		MHz
OFF Capacitance	C_{OFF}	V_{NO} =V+/2 or GND, Switch OFF See Figure 7			+25°C		5		pF
ON Capacitance	C_{ON}	V_{NO} =V+/2 or GND, Switch ON See Figure 7			+25°C		15		pF
POWER REQUIREMENTS									
Power Supply Range	V+				FULL	1.8		5.5	V
Power Supply Current	I+	V_{IN} = GND or V+		5.5V	FULL			4	μA

8.6 Typical Characteristics

NOTE: The graphs and tables provided following this note are a statistical summary based on a limited number of samples and are provided for informational purposes only.

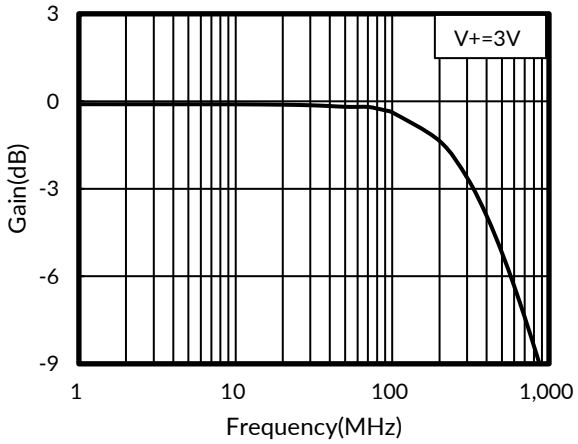


Figure 1. Bandwidth vs Frequency

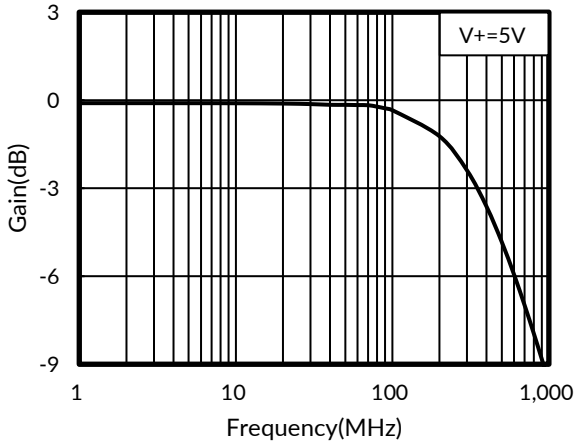


Figure 2. Bandwidth vs Frequency

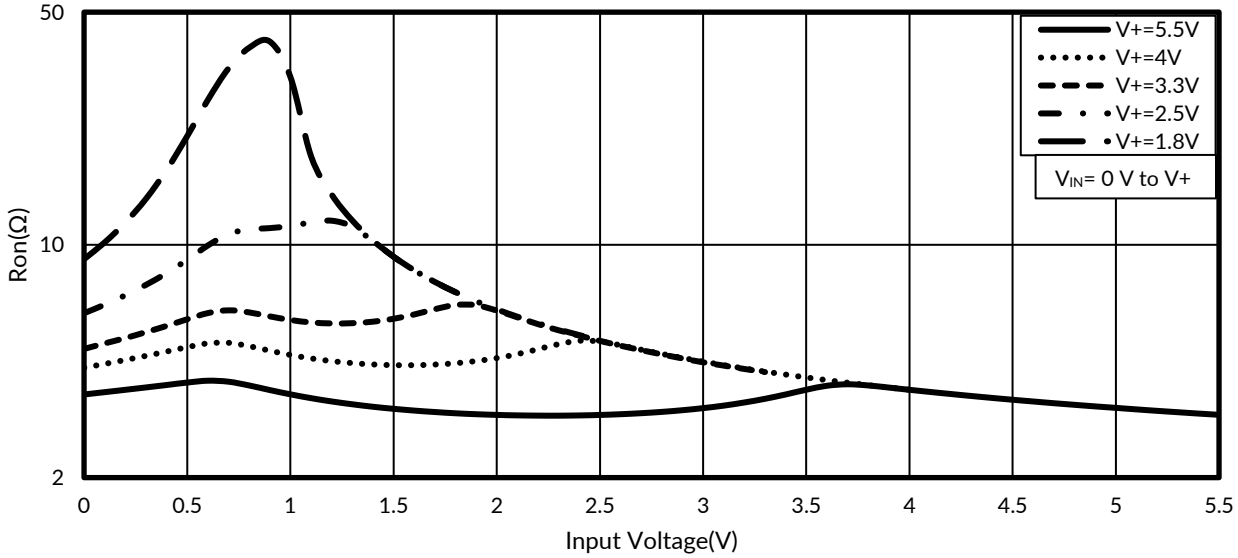


Figure 3. Typical Ron as a Function of Input Voltage

9 PARAMETER MEASUREMENT INFORMATION

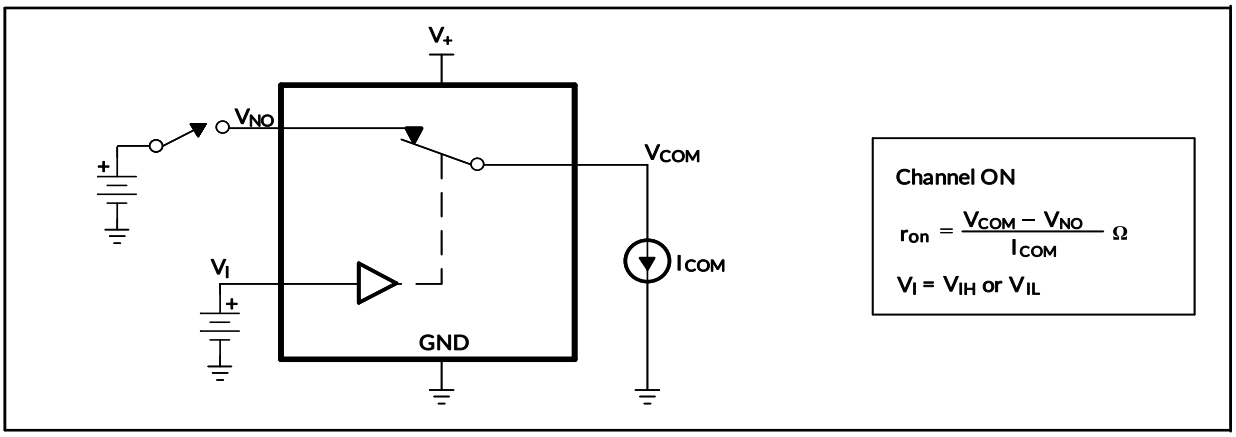


Figure 4. ON-State Resistance

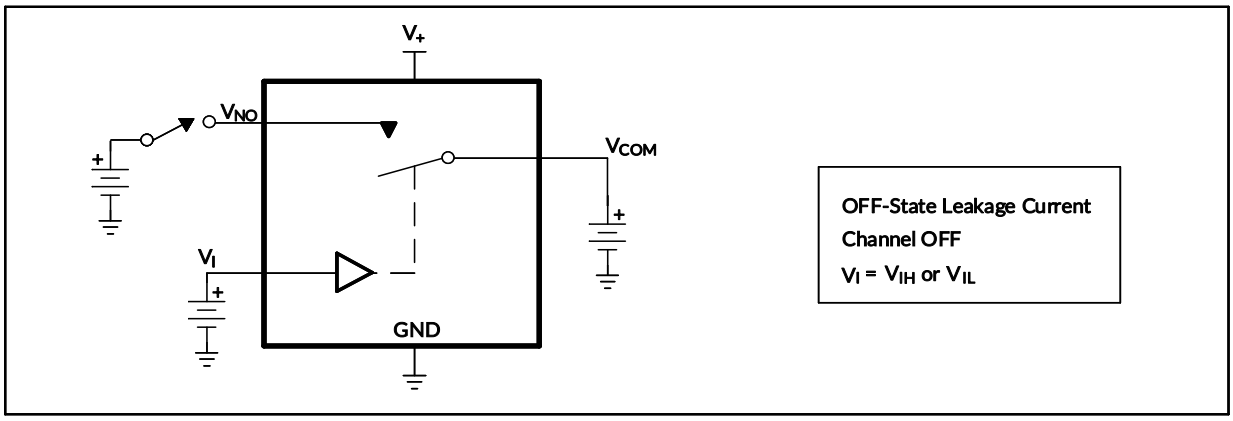


Figure 5. OFF-State Leakage Current

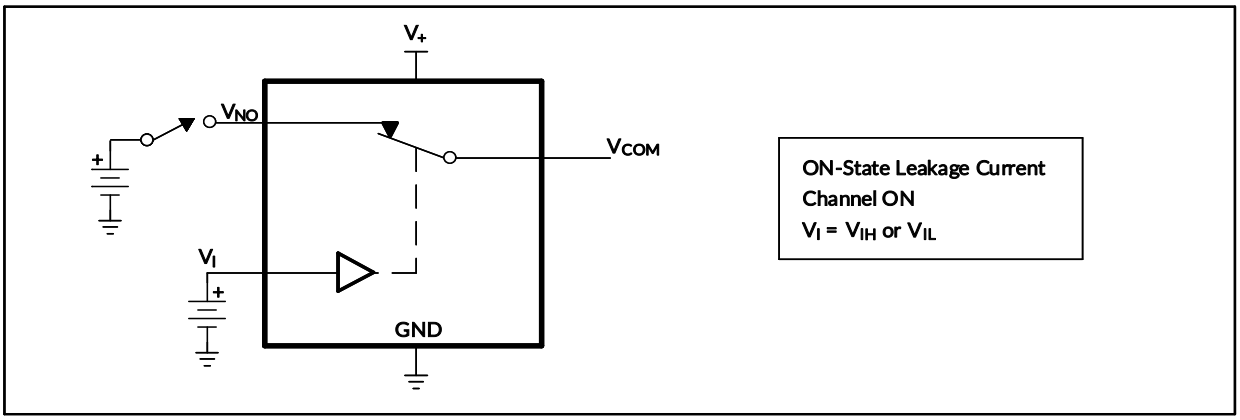


Figure 6. ON-State Leakage Current

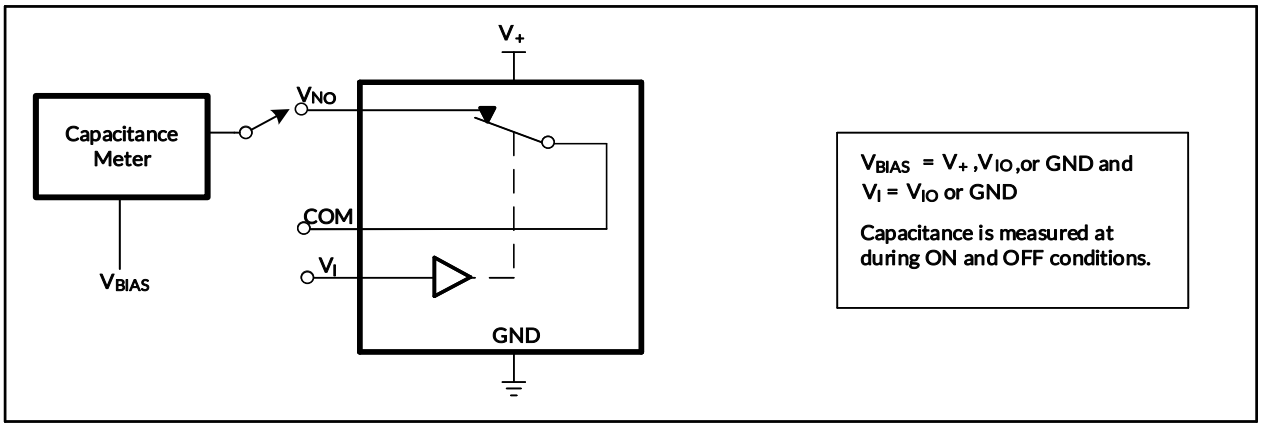
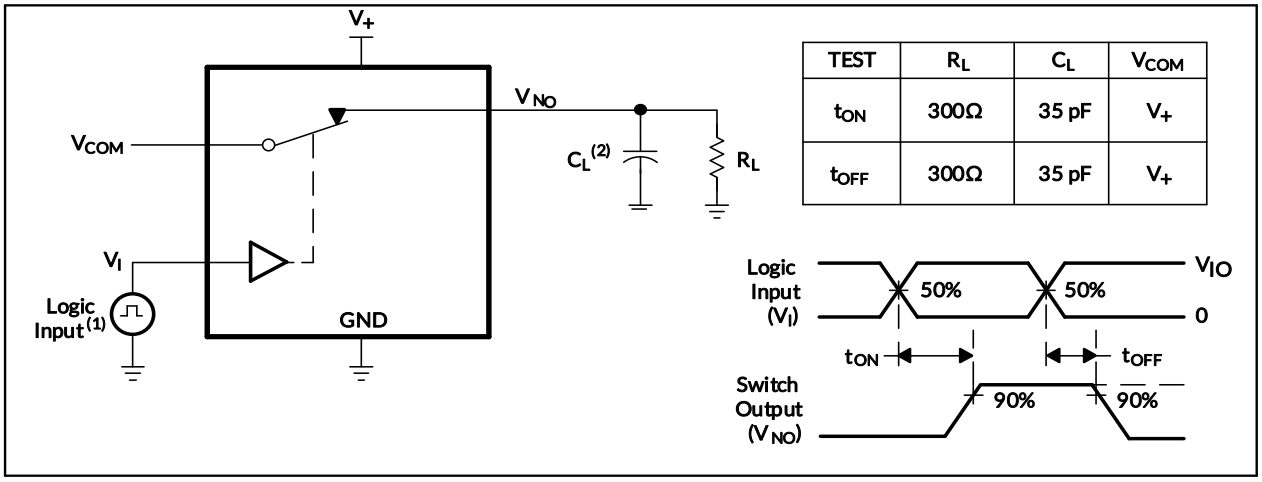


Figure 7. Capacitance C_{IN} or C_{OFF}



TEST	R_L	C_L	V_{COM}
t_{ON}	300Ω	35 pF	V_+
t_{OFF}	300Ω	35 pF	V_+

Figure 8. Turn-On (t_{ON}) and Turn-Off Time (t_{OFF})

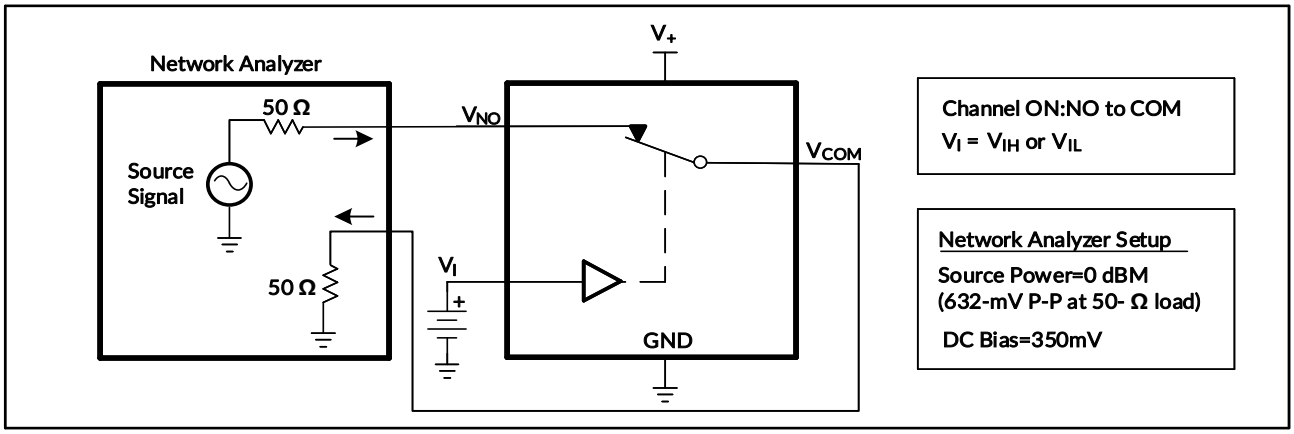


Figure 9. Bandwidth (BW)

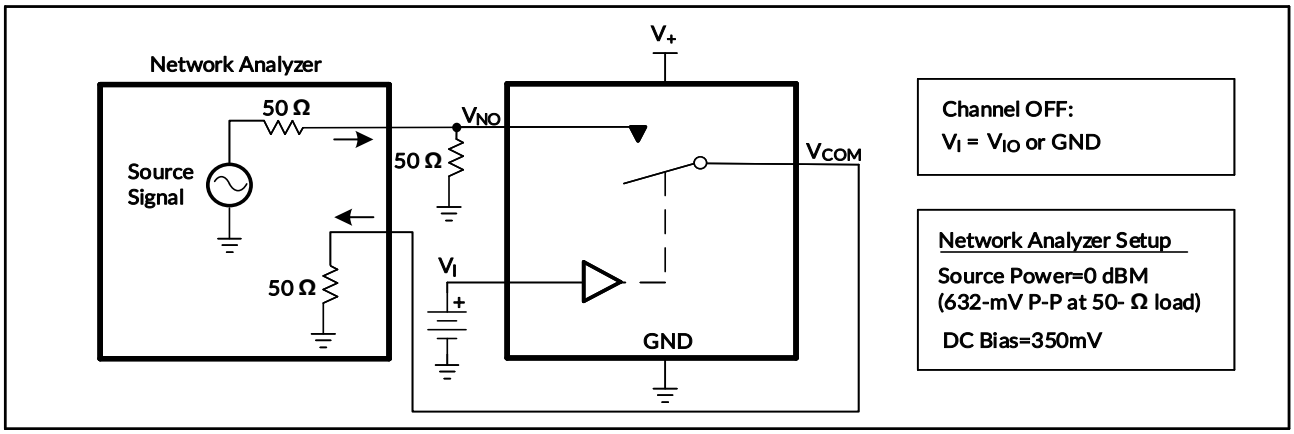
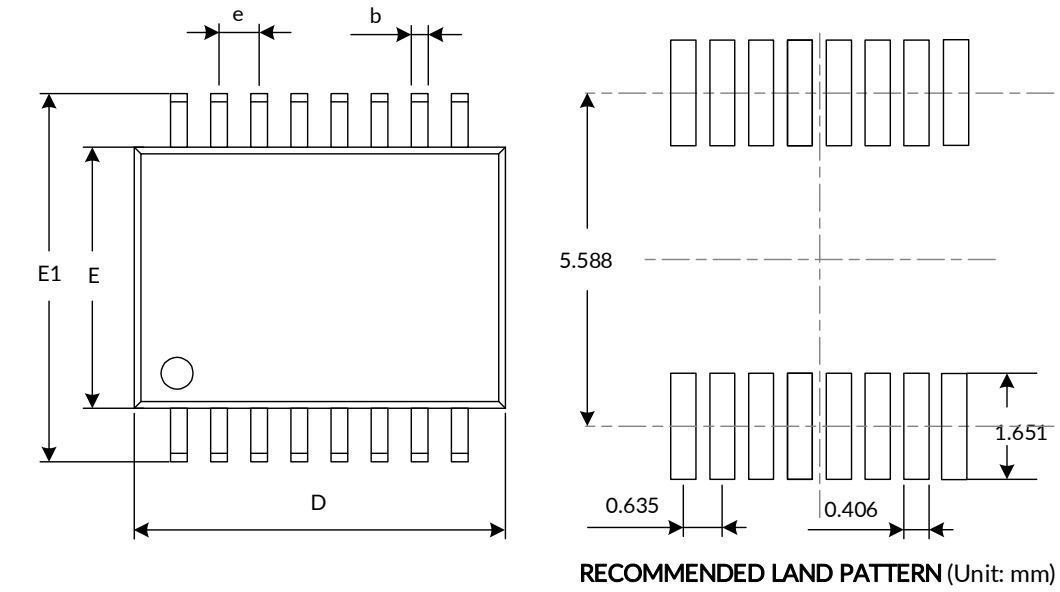


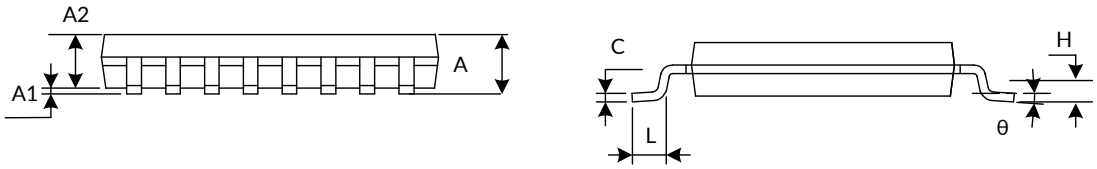
Figure 10. OFF Isolation (O_{ISO})

10 PACKAGE OUTLINE DIMENSIONS

SSOP16 (3)



RECOMMENDED LAND PATTERN (Unit: mm)

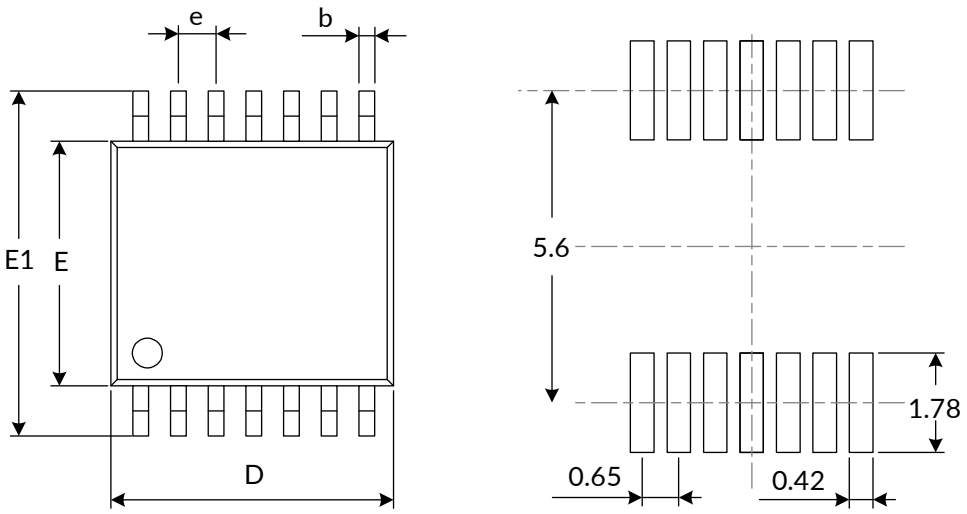


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A (1)	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.200	0.300	0.008	0.012
c	0.170	0.250	0.007	0.010
D (1)	4.700	5.100	0.185	0.200
E (1)	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	0.635(BSC) (2)		0.025(BSC) (2)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

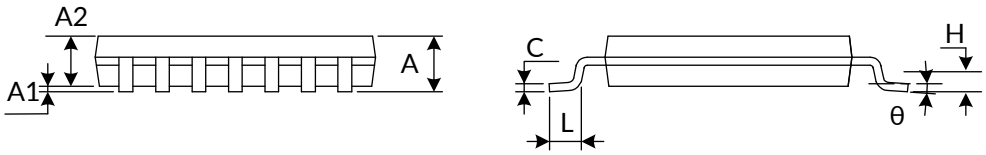
NOTE:

1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. BSC (Basic Spacing between Centers), "Basic" spacing is nominal.
3. This drawing is subject to change without notice.

TSSOP14 (3)



RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A (1)		1.200		0.047
A1	0.050	0.150	0.002	0.006
A2	0.800	1.050	0.031	0.041
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
D (1)	4.860	5.100	0.191	0.201
E (1)	4.300	4.500	0.169	0.177
E1	6.200	6.600	0.244	0.260
e	0.650(BSC) (2)		0.026(BSC) (2)	
L	0.500	0.700	0.020	0.028
H	0.250 TYP		0.010 TYP	
θ	1°	7°	1°	7°

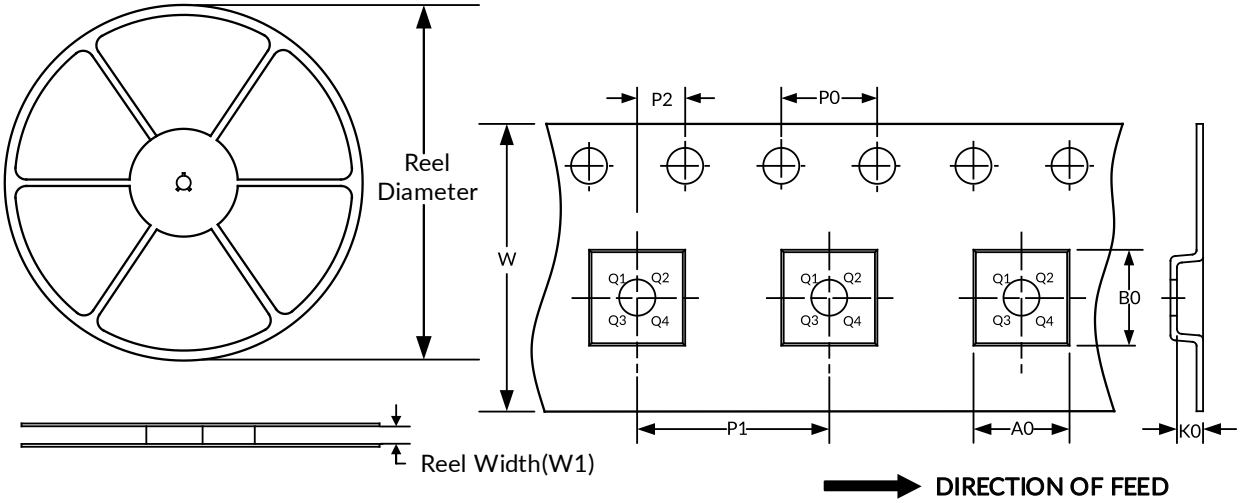
NOTE:

1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. BSC (Basic Spacing between Centers), "Basic" spacing is nominal.
3. This drawing is subject to change without notice.

11 TAPE AND REEL INFORMATION

REEL DIMENSIONS

TAPE DIMENSION



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
TSSOP14	13"	12.4	6.95	5.60	1.20	4.0	8.0	2.0	12.0	Q1
SSOP16	13"	12.4	8.30	6.70	2.10	4.0	8.0	2.0	12.0	Q1

NOTE:
1. All dimensions are nominal.
2. Plastic or metal protrusions of 0.15mm maximum per side are not included.

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