0.6Ω Quad SPDT Analog Switch 4-Channel 2:1 Multiplexer – Demultiplexer With Two Controls

1 FEATURES

- **Bandwidth: 30MHz**
- **High Speed, Typically 50ns**
- **Supply Range: +1.8V to +5.5V**
- **Low ON-State Resistance, 0.6Ω(TYP)**
- **Break-Before-Make Switching**
- **Rail-to-Rail Operation**
- **TTL/CMOS Compatible**
- **Extended Industrial Temperature Range: -40°C to +125°C**
- **ESD Protection Exceeds JESD 22**
  - **2000-V Human-Body Model (A114)**
  - **300-V Machine Model (A115)**
  - **1000-V Charged-Device Model (JS-002)**

2 APPLICATIONS

- **Video Switching**
- **Relay Replacements**
- **USB Switching**
- **Battery-Operated Equipment**
- **Cell Phones**

3 DESCRIPTIONS

The RES44159 is a bidirectional 4-channel single-pole double-throw (SPDT) analog switch with two control inputs, which is designed to operate from 1.8V to 5.5V. This device is also known as a 2 channels double-pole double-throw (DPDT) configuration.

The RES44159 device can handle both analog and digital signals. It features bandwidth(30MHz) and low on-resistance (0.6Ω TYP).

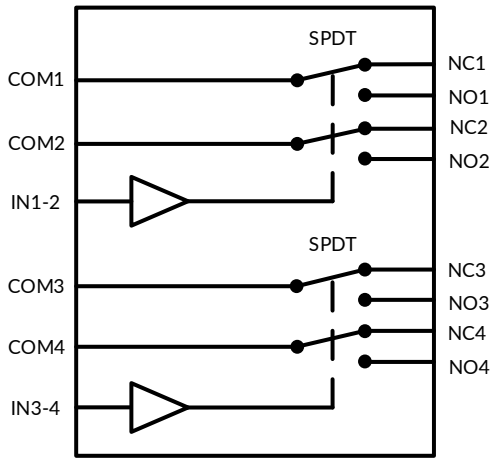
Applications include signal gating, chopping, modulation or demodulation (modem), and signal multiplexing for analog-to-digital and digital-to-analog conversion systems.

Device Information (1)

PART NUMBER	PACKAGE	BODY SIZE (NOM)
RES44159IDR	QFN3X3-16	3.00mm×3.00mm

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

4 Block Diagram



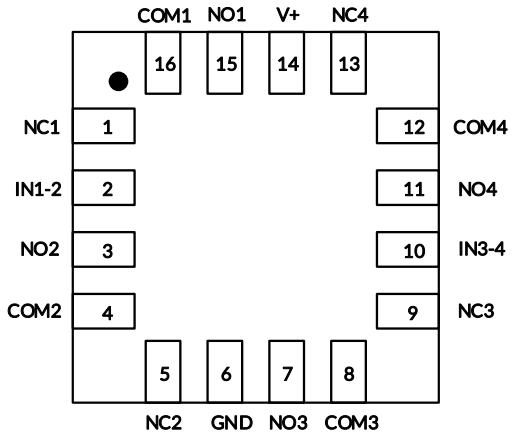
6 PACKAGE/ORDERING INFORMATION (1)

PRODUCT	ORDERING NUMBER	TEMPERATURE RANGE	PACKAGE LEAD	PACKAGE MARKING (2)	MSL (3)	PACKAGE OPTION
RES44159	RES44159IDR	-40°C ~125°C	QFN3X3-16	RES44159IDR	MSL3	Tape and Reel, 5000

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.

7 PIN CONFIGURATIONS

RS44159IDR



QFN3X3-16

7.1 PIN DESCRIPTION

NAME	PIN	FUNCTION
V+	14	Power Supply
GND	6	Ground
IN1-2	2	Digital Control Pin
IN3-4	10	Digital Control Pin
COMx	16,4,8,12	Common Terminal
NOx	15,3,7,11	Normally-Open Terminal
NCx	1,5,9,13	Normally-Closed Terminal

7.2 FUNCTION TABLE

IN1-2	NO1 and NO2	NC1 and NC2
0	OFF	ON
1	ON	OFF

IN3-4	NO3 and NO4	NC3 and NC4
0	OFF	ON
1	ON	OFF

8.4 ELECTRICAL CHARACTERISTICS

V+ = 5.0 V, T_A= -40°C to 125°C (unless otherwise noted)

PARAMETER	SYMBOL	CONDITIONS	V_+	T_A	MIN(2)	TYP(3)	MAX(2)	UNIT
ANALOG SWITCH								
Analog Signal Range	V_{NO}, V_{NC}, V_{COM}			FULL	0		V+	V
On-Resistance	R_{ON}	V_{NO} or V_{NC} = V+/2, I_{COM} = -10mA, Switch ON, See Figure 4	5V	+25°C		0.6	1.0	Ω
				FULL			1.2	Ω
			3.3V	+25°C		1.0	1.5	Ω
				FULL			1.7	Ω
On-Resistance Match Between Channels	ΔR_{ON}	V_{NO} or V_{NC} = V+/2, I_{COM} = -10mA, Switch ON, See Figure 4	5V	+25°C		0.04	0.1	Ω
				FULL			0.12	Ω
			3.3V	+25°C		0.04	0.1	Ω
				FULL			0.12	Ω
On-Resistance Flatness	$R_{FLAT(ON)}$	0 ≤ (V_{NO} or V_{NC}) ≤V+/2, I_{COM} = -10mA, Switch ON, See Figure 4	5V	+25°C		0.18	0.3	Ω
				FULL			0.4	Ω
			3.3V	+25°C		0.54	0.7	Ω
				FULL			0.8	Ω
NC, NO OFF Leakage Current	$I_{NC(OFF)}$, $I_{NO(OFF)}$	V_{NO} or V_{NC} = 0.3V, V+/2 V_{COM} = V+/2, 0.3V See Figure 5	1.8 to 5.5V	FULL			1	µA
NC,NO,COM ON Leakage Current	$I_{NC(ON)}$, $I_{NO(ON)}$, $I_{COM(ON)}$	V_{NO} or V_{NC} = 0.3V, Open V_{COM} = Open, 0.3V See Figure 6	1.8 to 5.5V	FULL			1	µA
DIGITAL CONTROL INPUTS (1)								
Input High Voltage	V_{INH}		5V	FULL	1.5			V
			3.3V	FULL	1.3			V
Input Low 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 to 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.

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V+ = 5.0 V, T_A= -40°C to 125°C (unless otherwise noted)

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				FULL			0.12	Ω
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On-Resistance Flatness	$R_{FLAT(ON)}$	0 ≤ (V_{NO} or V_{NC}) ≤V+/2, I_{COM} = -10mA, Switch ON, See Figure 4	5V	+25°C		0.18	0.3	Ω
				FULL			0.4	Ω
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NC,NO,COM ON Leakage Current	$I_{NC(ON)}$, $I_{NO(ON)}$, $I_{COM(ON)}$	V_{NO} or V_{NC} = 0.3V, Open V_{COM} = Open, 0.3V See Figure 6	1.8 to 5.5V	FULL			1	µA
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			3.3V	FULL	1.3			V
Input Low 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 to 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.

Parameter Measurement Information (continued)

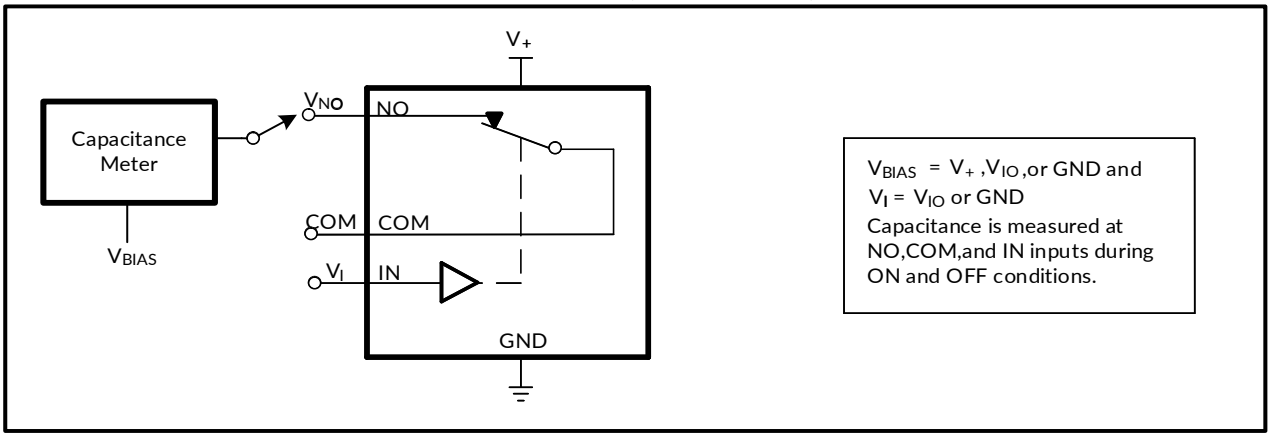


Figure 7. Capacitance (C_I, $C_{COM(OFF)}$, $C_{COM(ON)}$, $C_{NO(OFF)}$, $C_{NO(ON)}$)

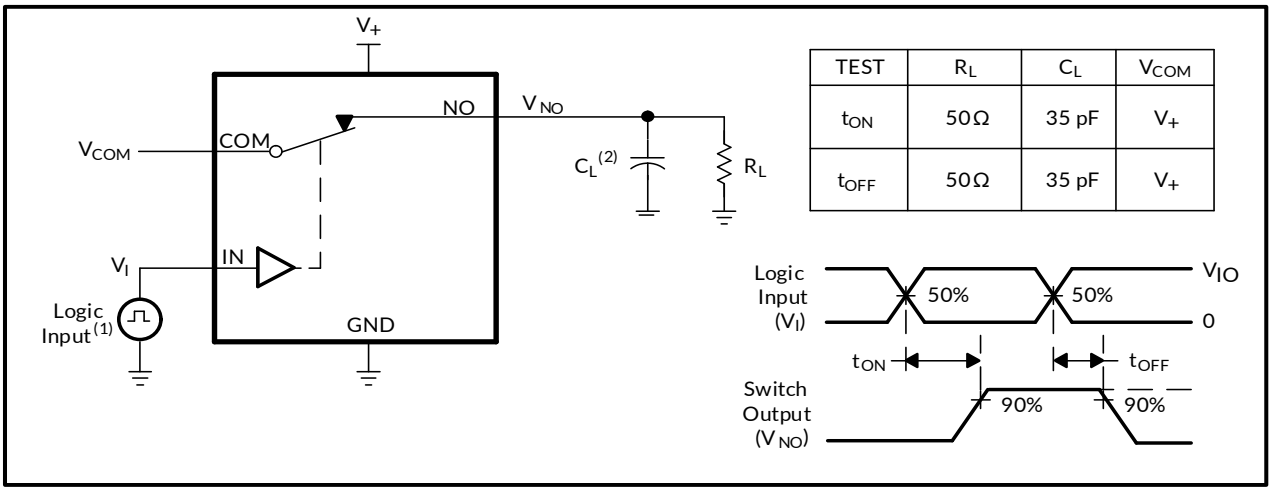


Figure 8. Turn-On (t_{ON}) and Turn-Off Time (t_{OFF})

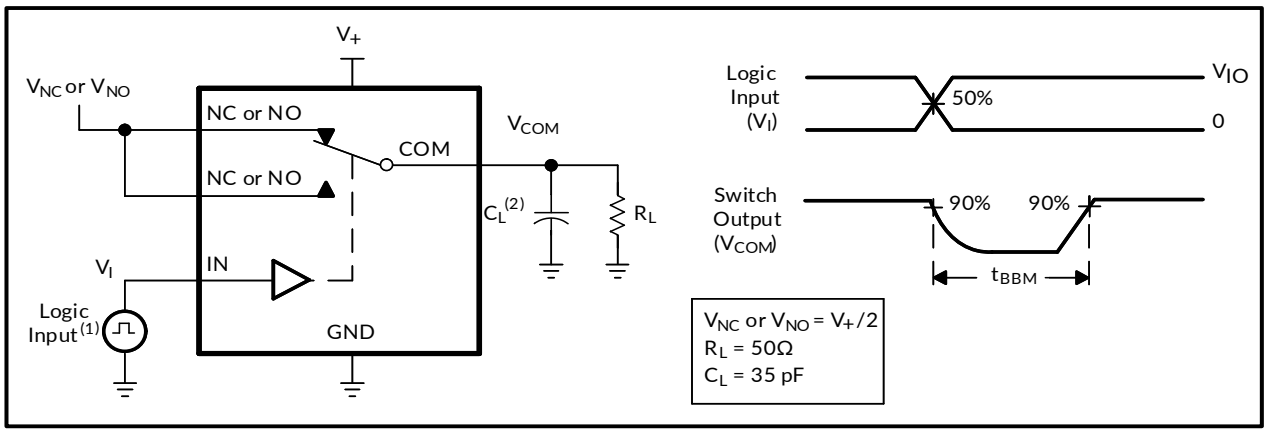
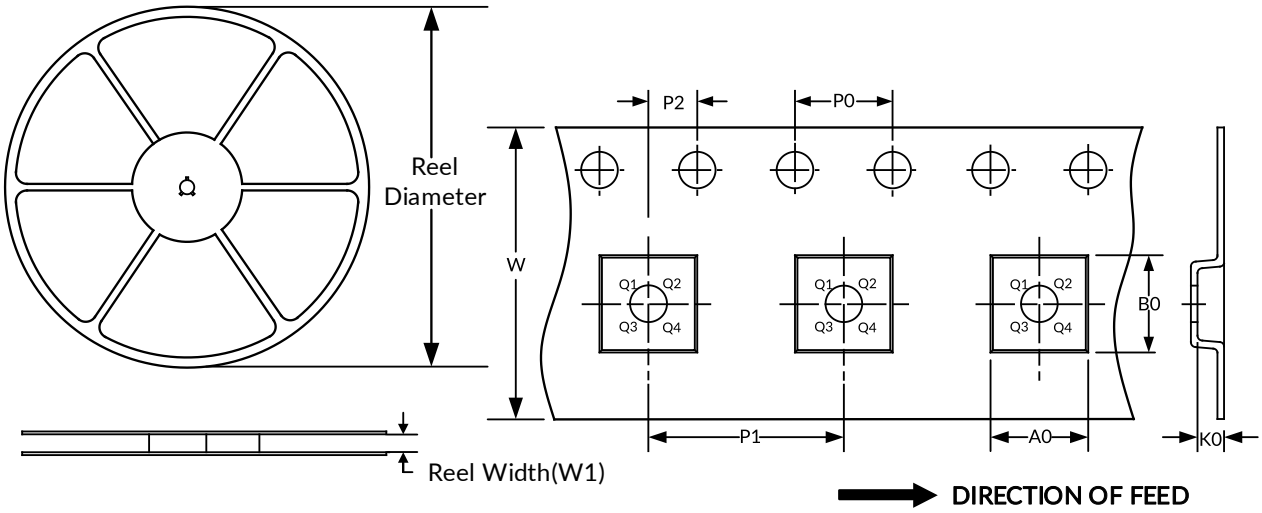


Figure 9. Break-Before-Make Time (t_{BBM})

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
QFN3X3-16	13"	12.4	3.35	3.35	1.13	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.