

4.5Ω Dual Bilateral SPST Analog Switch

FEATURES

- **Bandwidth:** 300MHz
- **High Speed,** Typically 30ns
- **Supply Range:** +1.8V to +5.5V
- **Low ON-State Resistance:**4.5Ω(TYP)
- **Rail-to-Rail Operation**
- **TTL/CMOS Compatible**
- **Extended Industrial Temperature Range:** -40°C to +125°C
- **PACKAGES:** SOIC-8(SOP-8), MSOP-8

APPLICATIONS

- **Wireless Devices**
- **Audio and Video Signal Routing**
- **Portable Computing**
- **Wearable Devices**
- **Signal Gating, Chopping, Modulation or Demodulation (Modem)**
- **Cell Phones**

DESCRIPTION

The RS2266 is a bidirectional 2-channel single-pole single-throw (SPST) analog switch, which is designed to operate from 1.8V to 5.5V.

The RS2266 device can handle both analog and digital signals. It features bandwidth(300MHz) and low on-resistance (4.5Ω TYP).

Each switch section has its own enable-input control (SEL). A high-level voltage applied to SEL turns on the associated switch section.

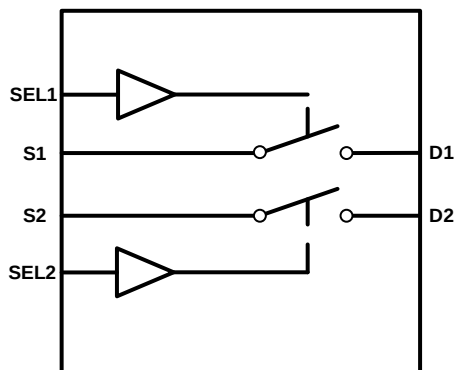
Applications include signal gating, chopping, modulation or demodulation (modem), and signal multiplexing for analog-to-digital and digital-to-analog conversion systems.

Device Information ⁽¹⁾

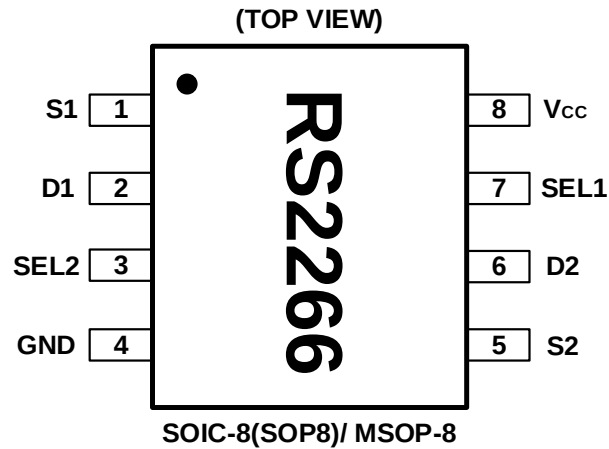
PART NUMBER	PACKAGE	BODY SIZE(NOM)
RS2266	SOIC-8	4.90mm×3.90mm
	MSOP-8	3.00mm×3.00mm

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

Functional Diagrams of RS2266



PIN CONFIGURATIONS



PIN DESCRIPTION

NAME	PIN	I/O	DESCRIPTION
S1	1	I/O	Bidirectional signal to be switched
D1	2	I/O	Bidirectional signal to be switched
SEL2	3	I	Controls the switch (L = OFF, H = ON)
GND	4	-	Ground
S2	5	I/O	Bidirectional signal to be switched
D2	6	I/O	Bidirectional signal to be switched
SEL1	7	I	Controls the switch (L = OFF, H = ON)
V _{cc}	8	-	Power Supply

FUNCTION TABLE

SELECT INPUTS	SWITCH STATUS
SEL1/SEL2	
High	All Switches ON
Low	All Switches OFF

NOTE: Input and output pins are identical and interchangeable. Any may be considered an input or output; signals pass equally well in both directions.

SPECIFICATIONS

Absolute Maximum Ratings

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

SYMBOL	PARAMETER		MIN	MAX	UNIT
V_{CC}	Supply Voltage ⁽²⁾		-0.3	6.0	V
V_{IN}	Input Voltage ⁽²⁾⁽³⁾		-0.3	6.0	
V_O	Switch I/O Voltage ⁽²⁾⁽³⁾⁽⁴⁾		-0.3	$V_{CC}+0.3$	
I_{IK}	Control input clamp current	$V_I < 0$		-50	mA
$I_{I/OK}$	I/O port diode current	$V_{I/O} < 0$ or $V_{I/O} > V_{CC}$		-50	
I_T	On-state switch Current	$V_{IO}=0$ to V_{CC}	-50	50	
Continuous current through V_{CC} or GND			-100	100	°C
T_J	Junction Temperature			150	
T_{stg}	Storage temperature		-65	150	

(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) All voltages are with respect to ground, unless otherwise specified.

(3) The input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.

(4) This value is limited to 5.5 V maximum.

ESD Ratings

			VALUE	UNIT
$V_{(ESD)}$	Electrostatic discharge	Human-body model (HBM)	±2000	V
		Machine Model (MM)	300	V

Recommended Operating Conditions

Over operating free-air temperature range (unless otherwise noted) ⁽³⁾

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

Thermal Information

THERMAL METRIC		RS2266		UNIT
		8PINS		
		SOIC-8	MSOP-8	
R _{ΘJA}	Junction-to-ambient thermal resistance	116	165	°C/W
R _{ΘJC(top)}	Junction-to-case(top) thermal resistance	60	53	°C/W
R _{ΘJB}	Junction-to-board thermal resistance	56	87	°C/W
Ψ _{JT}	Junction-to-top characterization parameter	12.8	4.9	°C/W
Ψ _{JB}	Junction-to-board characterization parameter	98.3	85	°C/W
R _{ΘJC(bot)}	Junction-to-case(bottom) thermal resistance	N/A	NA	°C/W

PACKAGE/ORDERING INFORMATION

PRODUCT	ORDERING NUMBER	TEMPERATURE RANGE	PACKAGE LEAD	PACKAGE MARKING	PACKAGE OPTION
RS2266	RS2266XK	-40°C ~+125°C	SOIC-8(SOP8)	RS2266	Tape and Reel,2500
	RS2266XM	-40°C ~+125°C	MSOP-8	RS2266	Tape and Reel,3000

ELECTRICAL CHARACTERISTICS

$V_{CC} = 5.0\text{ V or }3.3\text{ V}$, FULL = $-40^{\circ}\text{C to }+125^{\circ}\text{C}$, Typical values are at $T_A = +25^{\circ}\text{C}$. (unless otherwise noted)

PARAMETER	SYMBOL	CONDITIONS	VDD	T_A	MIN	TYP	MAX	UNITS
ANALOG SWITCH								
Analog Signal Range	V_S, V_D			FULL	0		V_{CC}	V
On-Resistance	R_{ON}	$V_S = V_{CC}/2$, $I_{SD} = -10\text{mA}$, Switch ON, See Figure 1	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}	$V_S = V_{CC}/2$, $I_{SD} = -10\text{mA}$, Switch ON, See Figure 1	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	$R_{FLAT(ON)}$	$0 \leq (V_S) \leq V_{CC}/2$, $I_{SD} = -10\text{mA}$, Switch ON, See Figure 1	5V	+25°C		2	3	Ω
				FULL			3.3	Ω
			3.3V	+25°C		3	4	Ω
				FULL			4.3	Ω
Source, Drain OFF Leakage Current	$I_{D(OFF)}, I_{S(OFF)}$	$V_D = 0.3\text{V}$, $V_{CC}/2$, $V_S = V_{CC}/2$, 0.3V See Figure 2	1.8 to 5.5V	FULL			1	μA
Channel ON Leakage Current	$I_{D(ON)}, I_{S(ON)}$	$V_D = 0.3\text{V}$, Open $V_S = \text{Open}$, 0.3V See Figure 3	1.8 to 5.5V	FULL			1	μA
DIGITAL CONTROL INPUTS ⁽¹⁾								
Input High Voltage	V_{IH}		5V	FULL	1.5			V
			3.3V	FULL	1.3			V
Input Low Voltage	V_{IL}		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

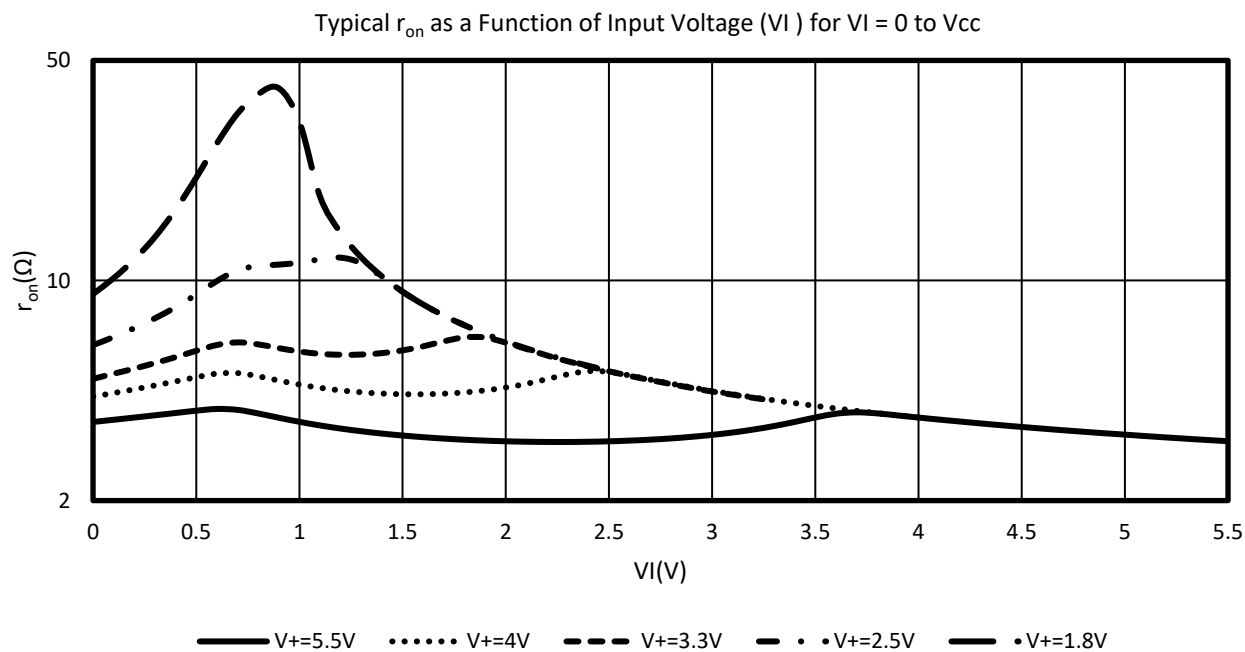
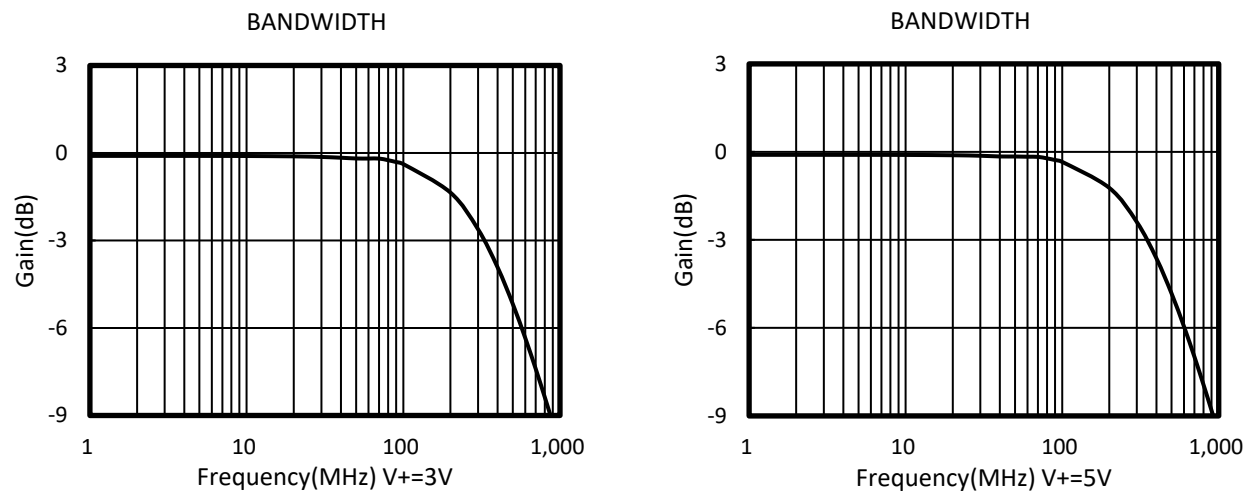
(1) All unused digital inputs of the device must be held at V_{IO} or GND to ensure proper device operation.

ELECTRICAL CHARACTERISTICS (continued)

$V_{CC} = 5.0\text{ V}$ or 3.3 V , FULL = -40°C to $+125^{\circ}\text{C}$, Typical values are at $T_A = +25^{\circ}\text{C}$ (unless otherwise noted)

PARAMETER	SYMBOL	CONDITIONS	V+	TEMP	MIN	TYP	MAX	UNITS
DYNAMIC CHARACTERISTICS								
Turn-On Time	t_{ON}	$V_S = V_{CC}$, $R_L = 300\Omega$, $C_L = 35\text{pF}$, See Figure 4	5V	$+25^{\circ}\text{C}$		30		ns
			3.3V			40		
Turn-Off Time	t_{OFF}	$V_S = V_{CC}$, $R_L = 300\Omega$, $C_L = 35\text{pF}$, See Figure 4	5V	$+25^{\circ}\text{C}$		25		ns
			3.3V			30		
Break-Before-Make Time Delay	t_{BBM}	$V_S = 3\text{V}$, $R_L = 300\Omega$, $C_L = 35\text{pF}$, See Figure 5	5V	$+25^{\circ}\text{C}$		5		ns
			3.3V			8		
-3dB Bandwidth	BW	Switch ON, $R_L = 50\Omega$, See Figure 6	5V	$+25^{\circ}\text{C}$		300		MHz
Off Isolation	O_{ISO}	$R_L = 50\Omega$, Switch OFF, See Figure 7	$f = 10\text{MHz}$	$+25^{\circ}\text{C}$		-52		dB
			$f = 1\text{MHz}$	$+25^{\circ}\text{C}$		-71		dB
Source, Drain OFF Capacitance	$C_{S(OFF)}$, $C_{D(OFF)}$	$V_S = V_{CC}/2$ or GND, Switch OFF		$+25^{\circ}\text{C}$		5		pF
Source, Drain ON Capacitance	$C_{S(ON)}$, $C_{D(ON)}$	$V_S = V_{CC}/2$ or GND, Switch ON		$+25^{\circ}\text{C}$		15		pF
POWER REQUIREMENTS								
Power Supply Range	V_{CC}			FULL	1.8		5.5	V
Power Supply Current	I_{CC}	$V_{IN} = \text{GND}$ or V_{CC}	5.5V	FULL			1	μA

TYPICAL CHARACTERISTICS



Parameter Measurement Information

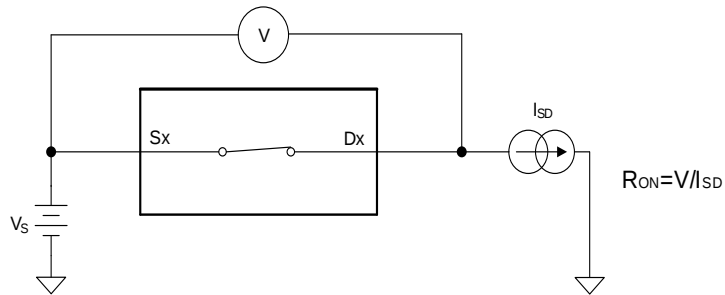


Figure 1. ON-State Resistance (R_{ON})

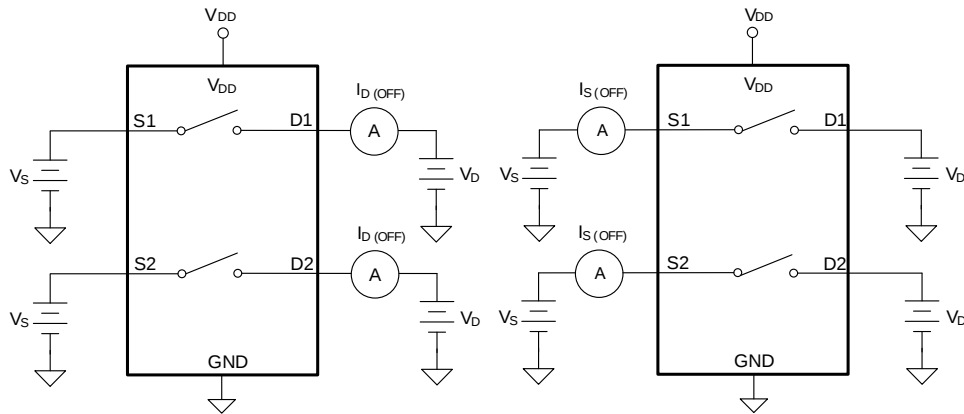


Figure 2. OFF-State Leakage Current ($I_{D(OFF)}$, $I_{S(OFF)}$)

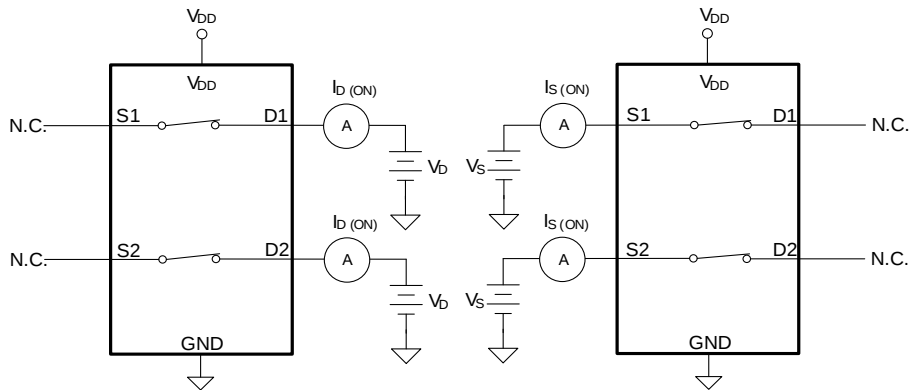


Figure 3. ON-State Leakage Current ($I_{D(ON)}$, $I_{S(ON)}$)

Parameter Measurement Information(continued)

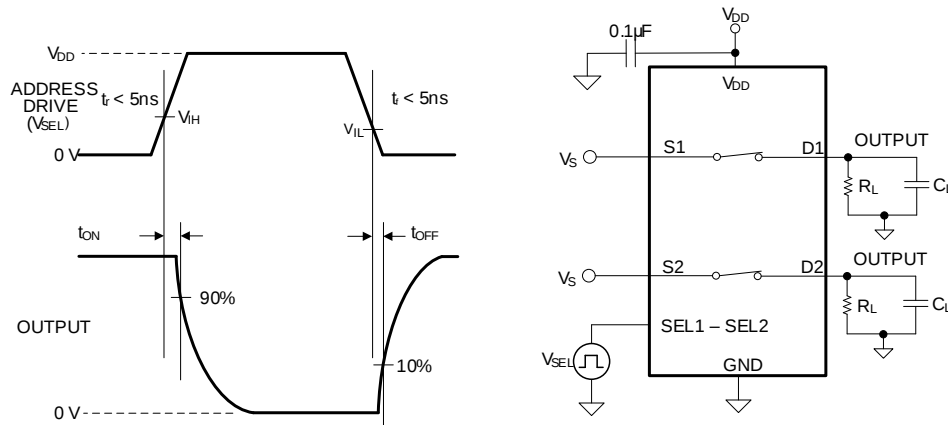


Figure 4. Turn-On (t_{ON}) and Turn-Off Time (t_{OFF})

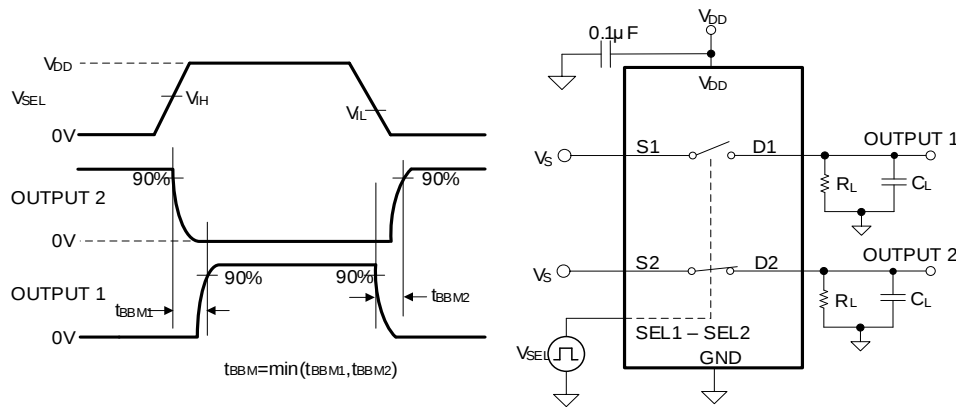


Figure 5. Break-Before-Make Time (t_{BBM})

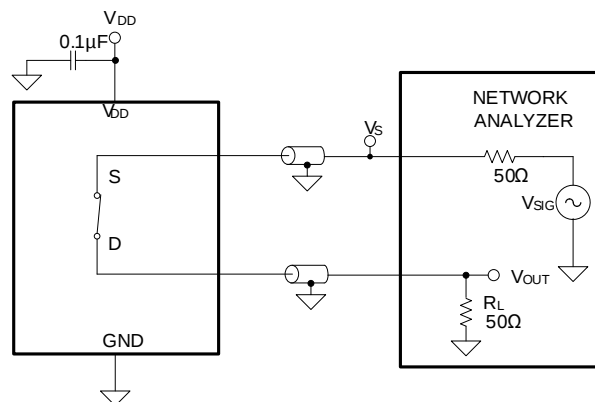


Figure 6. Bandwidth (BW)

Parameter Measurement Information(continued)

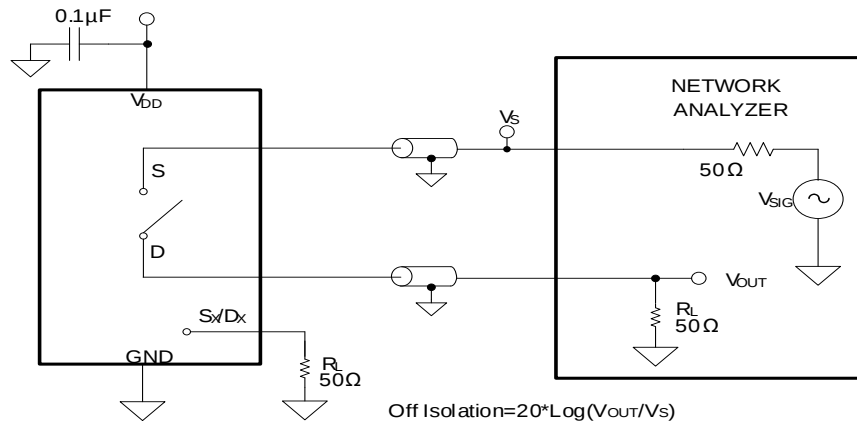


Figure 7. Off Isolation (O_{Iso})

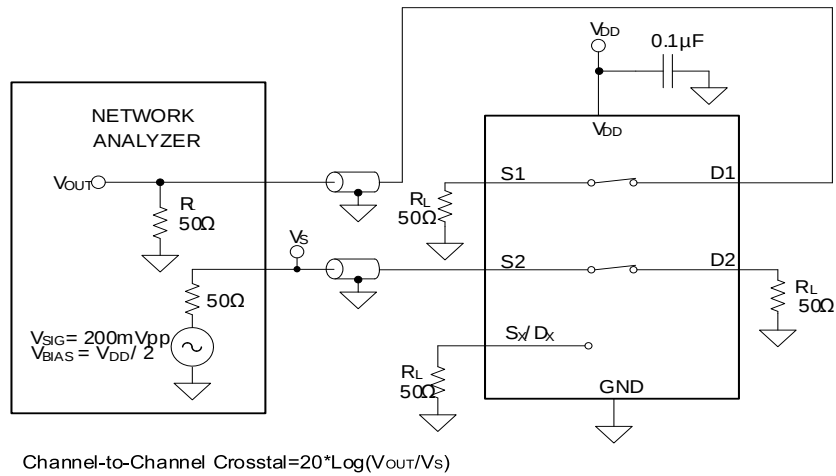


Figure 8. Crosstalk (X_{TALK})

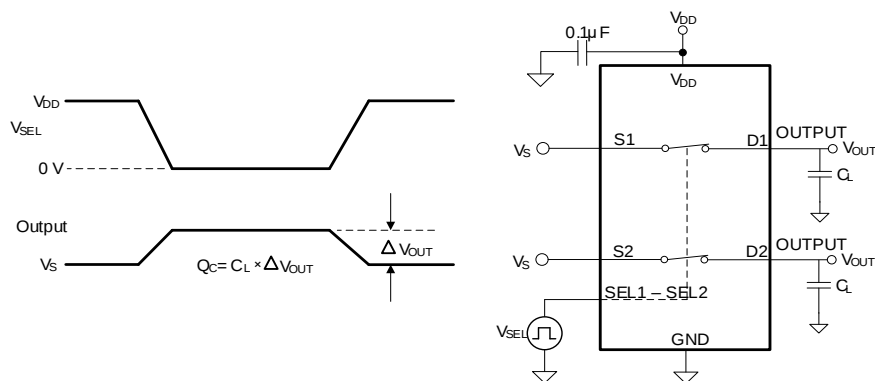


Figure 9. Charge Injection (Q_c)

TYPICAL APPLICATION

The RS2266 can be used in any situation where a Dual SPST switch would be used and a solid-state, voltage-controlled version is preferred. The RS2266 allows on/off control of analog and digital signals with a digital control signal. All input signals should remain between 0V and V_{CC} for optimal operation.

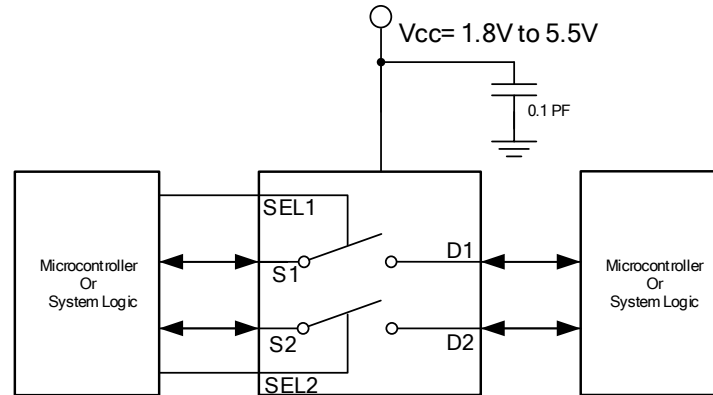
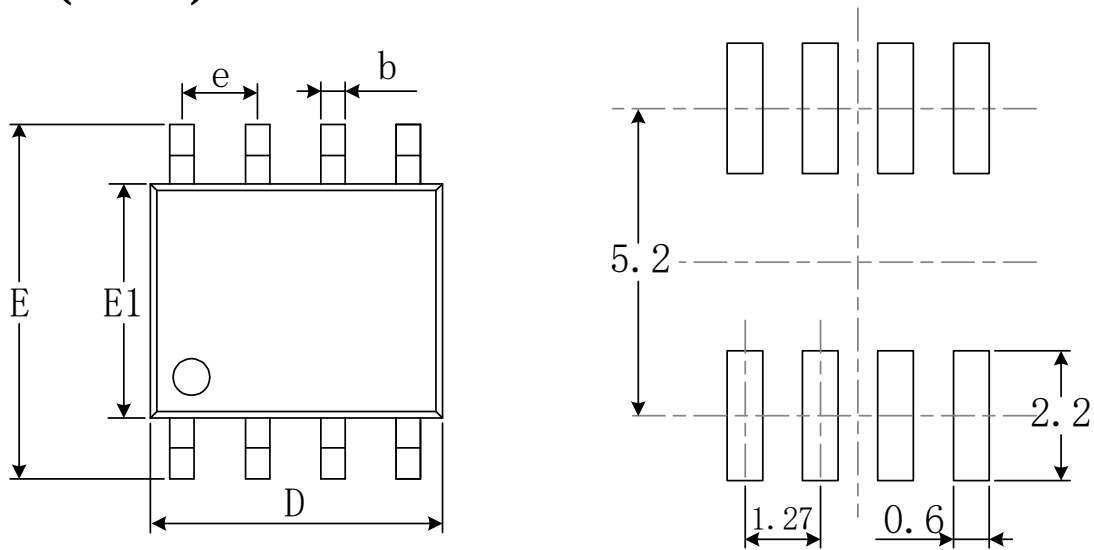
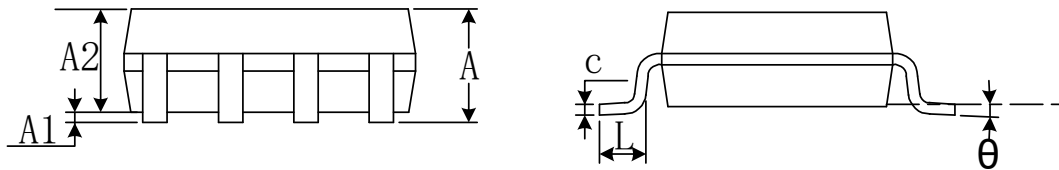


Figure 10. Typical Application Schematic

PACKAGE OUTLINE DIMENSIONS SOIC-8(SOP8)

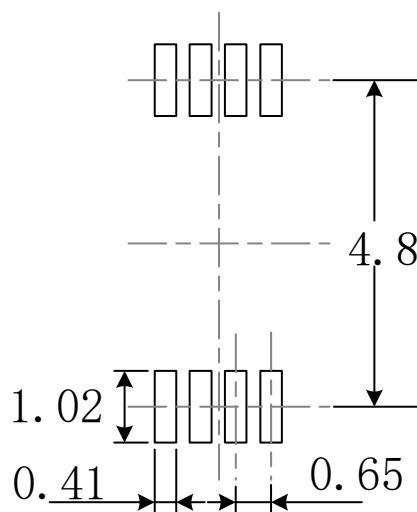
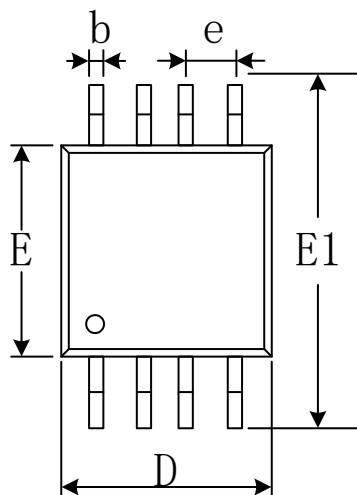


RECOMMENDED LAND PATTERN (Unit: mm)

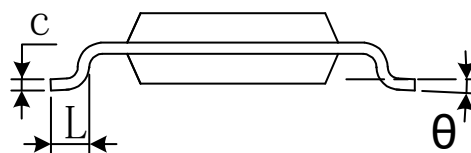
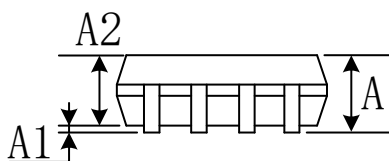


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270(BSC)		0.050(BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

MSOP-8



RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
e	0.650(BSC)		0.026(BSC)	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°