

0.6Ω Quad SPST Analog Switch 4-Channel 1:1 Multiplexer – Demultiplexer

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**

DESCRIPTION

The RS2259 is a bidirectional 4-channel single-pole single -throw (SPST) analog switch, which is designed to operate from 1.8V to 5.5V.

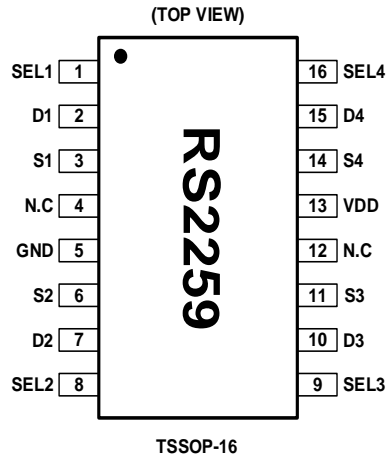
The RS2259 device can handle both analog and digital signals. It features bandwidth(30MHz) and low on-resistance (0.6Ω TYP).

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

APPLICATIONS

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

PIN CONFIGURATIONS



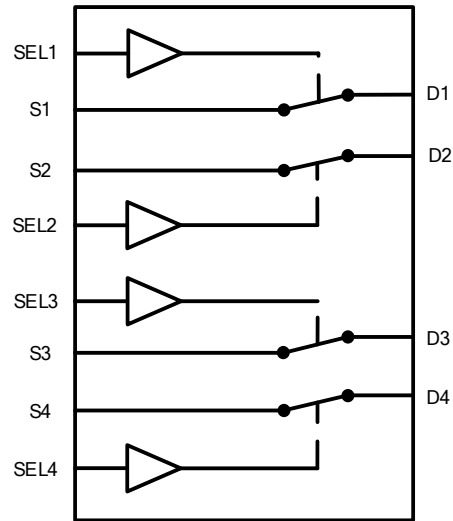
FUNCTION TABLE

SELx	STATE
0	All Channels ON
1	All Channels OFF

PIN DESCRIPTION

NAME	PIN	FUNCTION
VDD	13	Power Supply
GND	5	Ground
SEL1~SEL4	1,8,9,16	Logic Control Pin
D1~D4	2,7,10,15	Drain pin. Can be an input or output.
S1~S4	3,6,11,14	Source pin. Can be an input or output
N.C	4,12	No internet connection

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS (1)

V+, IN to GND.....	-0.3V to 6.0V
Analog, Digital Voltage Range (2)	- 0.3 to (V+) + 0.3V
Source or drain Continuous Current	±500mA
Source or drain Peak Current.....	±800mA
Storage Temperature	-65°C to +150°C
Operating Temperature	-40°C to +125°C
Junction Temperature.....	150°C
Package Thermal Resistance @ TA = +25°C	
TSSOP-16.....	110°C/W
Lead Temperature (Soldering, 10s)	260°C
ESD Susceptibility	
HBM	1000V
MM	100V



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.

- (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) Input terminals are diode-clamped to the power-supply rails. Input signals that can swing more than 0.3V beyond the supply rails should be current-limited to 10mA or less.

PACKAGE/ORDERING INFORMATION

PRODUCT	ORDERING NUMBER	TEMPERATURE RANGE	PACKAGE LEAD	PACKAGE MARKING	PACKAGE OPTION
RS2259	RS2259XTSS16	-40°C ~125°C	TSSOP-16	RS2259	Tape and Reel,3000

ELECTRICAL CHARACTERISTICS
 $V_+ = 5.0\text{ V}$, $T_A = -40^\circ\text{C}$ to 125°C (unless otherwise noted)

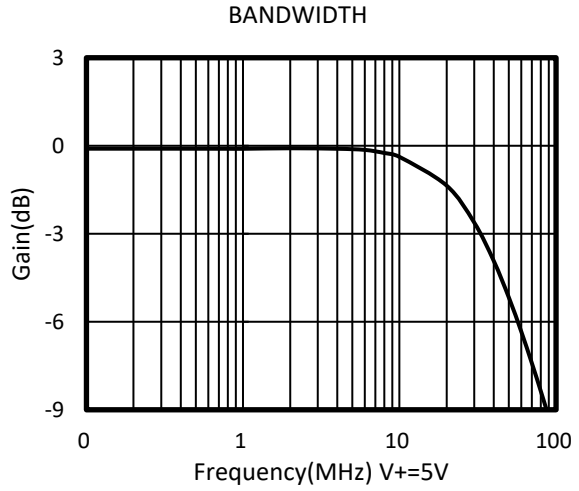
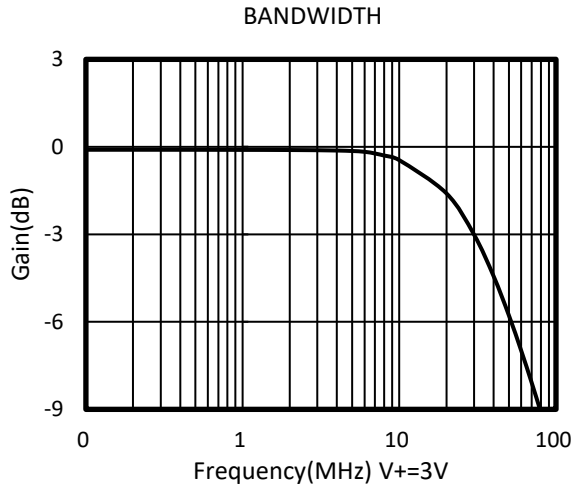
PARAMETER	SYMBOL	CONDITIONS	VDD	T _A	MIN	TYP	MAX	UNITS
ANALOG SWITCH								
Analog Signal Range	V_S, V_D			FULL	0		V_{DD}	V
On-Resistance	R_{ON}	$V_S = V_+/2$, $I_{SD} = -10\text{mA}$, Switch ON, See Figure 1	5V	+25°C		0.6	1.0	Ω
				FULL			1.2	Ω
			3.3V	+25°C		1.0	1.5	Ω
				FULL			1.7	Ω
On-Resistance Match Between Channels	ΔR_{ON}	$V_S = V_+/2$, $I_{SD} = -10\text{mA}$, Switch ON, See Figure 1	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	$R_{FLAT(ON)}$	$0 \leq (V_S) \leq V_+/2$, $I_{SD} = -10\text{mA}$, Switch ON, See Figure 1	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
Source, Drain OFF Leakage Current	$I_{D(OFF)}, I_{S(OFF)}$	$V_D = 0.3\text{V}$, $V_+/2$ $V_S = V_+/2$, 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.

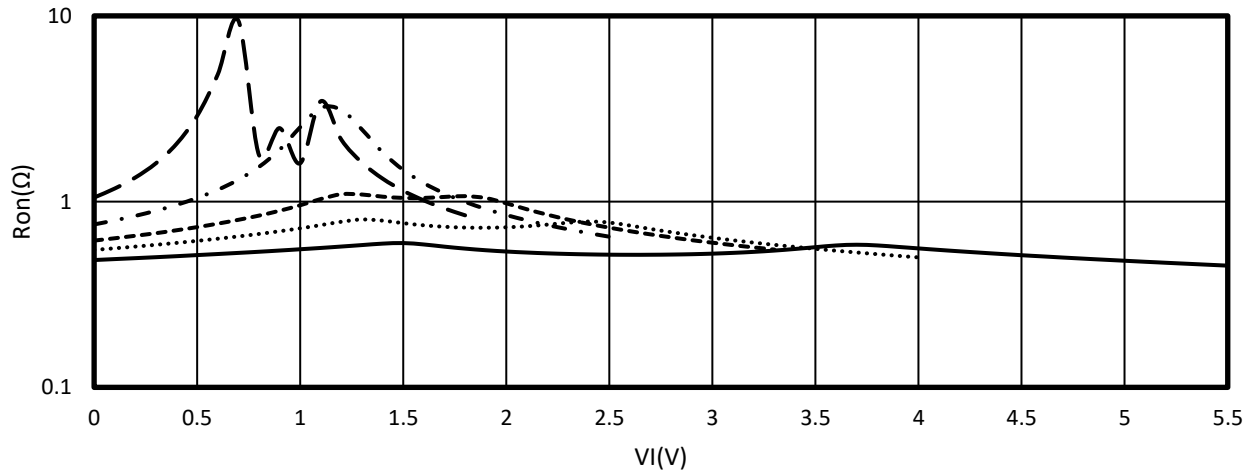
ELECTRICAL CHARACTERISTICS (continued)
 $V_+ = 5.0\text{ V}$, TEMP= -40°C to 125°C (unless otherwise noted)

PARAMETER	SYMBOL	CONDITIONS	V+	TEMP	MIN	TYP	MAX	UNITS
DYNAMIC CHARACTERISTICS								
Turn-On Time	t_{ON}	$V_S = V_+$, $R_L = 300\Omega$, $C_L = 35\text{pF}$, See Figure 4	5V	+25°C		50		ns
			3.3V			50		
Turn-Off Time	t_{OFF}	$V_S = V_+$, $R_L = 300\Omega$, $C_L = 35\text{pF}$, See Figure 4	5V	+25°C		15		ns
			3.3V			17		
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°C		10		ns
			3.3V			11		
Off Isolation	O_{ISO}	$R_L = 50\Omega$, Switch OFF, See Figure 7	f = 10MHz	+25°C		-68		dB
			f = 1MHz	+25°C		-86		dB
-3dB Bandwidth	BW	Switch ON, $R_L = 50\Omega$ See Figure 6		+25°C		30		MHz
Source, Drain OFF Capacitance	$C_{S(OFF)}$, $C_{D(OFF)}$	$V_S = V_+/2$ or GND, Switch OFF		+25°C		80		pF
Source, Drain ON Capacitance	$C_{S(ON)}$, $C_{D(ON)}$	$V_S = V_+/2$ or GND, Switch ON		+25°C		350		pF
POWER REQUIREMENTS								
Power Supply Range	V_{DD}			FULL	1.8		5.5	V
Power Supply Current	I_{DD}	$V_{IN} = \text{GND}$ or V_{DD}	5.5V	FULL			1	μA

TYPICAL CHARACTERISTICS



Typical ron as a Function of Input Voltage (VI) for VI = 0 to V+



— V+=5.5V V+=4V - - - - V+=3.3V - · - · V+=2.5V — — V+=1.8V

Parameter Measurement Information

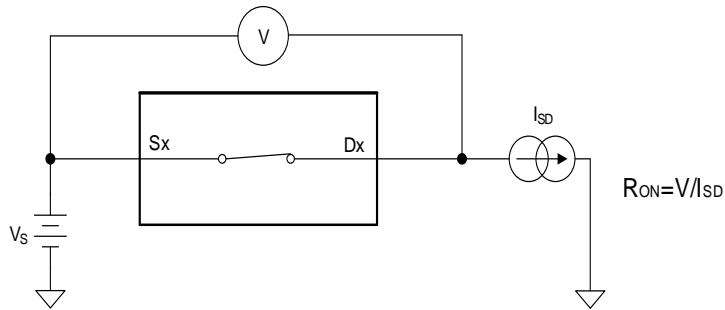


Figure 1.ON-State Resistance (R_{ON})

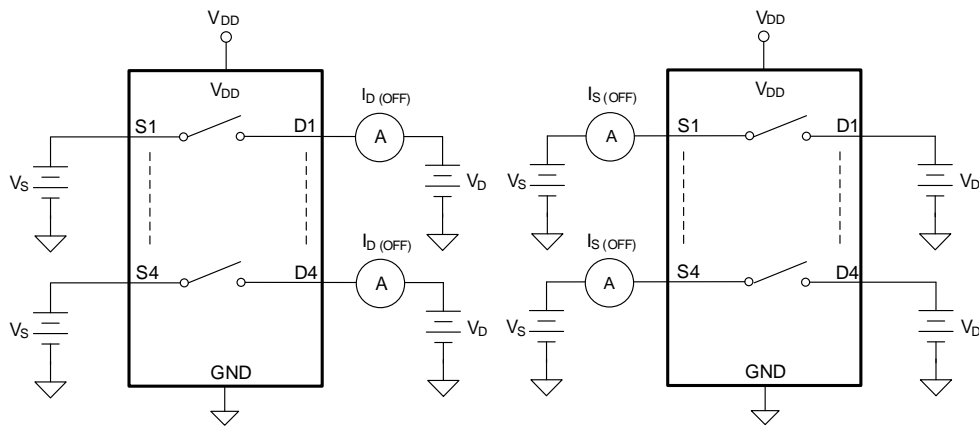


Figure 2.OFF-State Leakage Current ($I_{D(OFF)}$, $I_{S(OFF)}$)

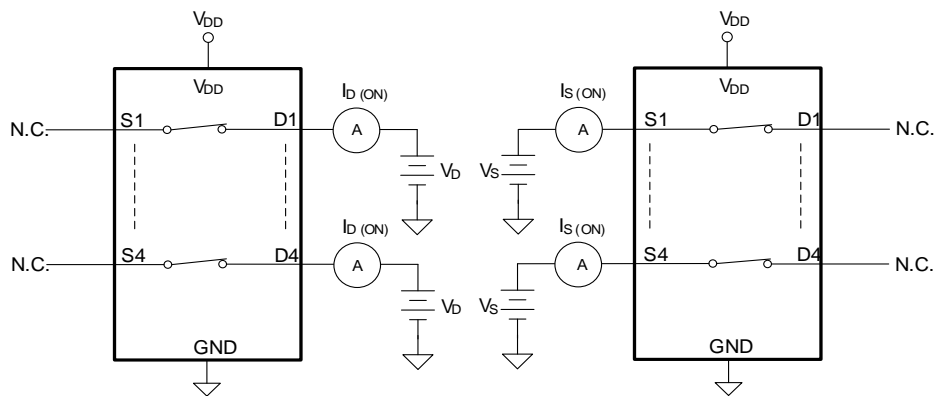


Figure 3.ON-State Leakage Current ($I_{D(ON)}$, $I_{S(ON)}$)

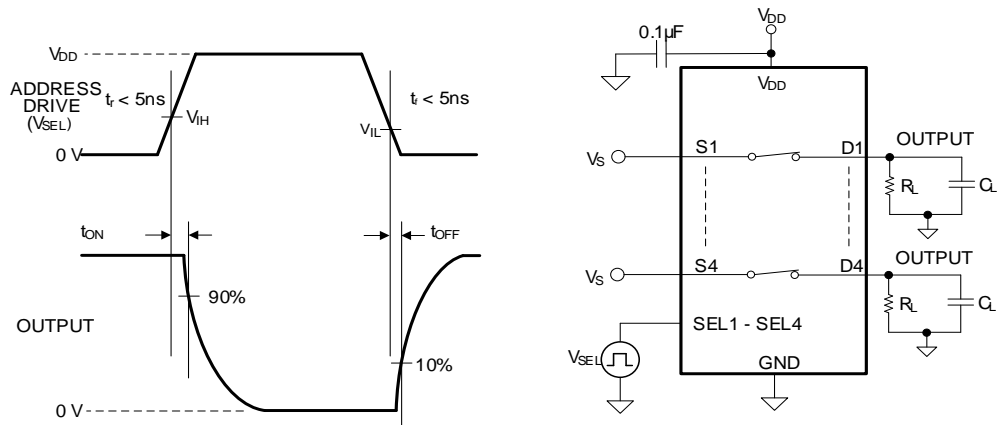


Figure 4. Turn-On (t_{ON}) and Turn-Off Time (t_{OFF})

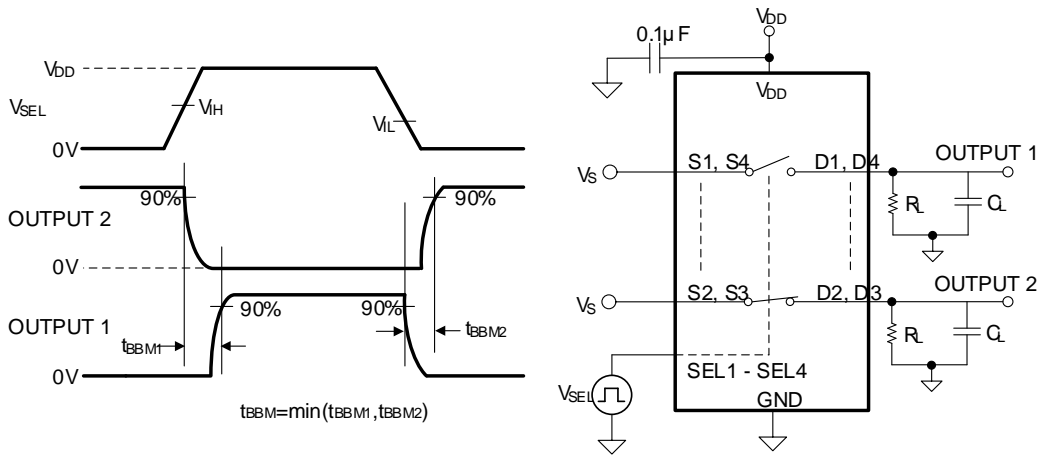


Figure 5. Break-Before-Make Time (t_{BBM})

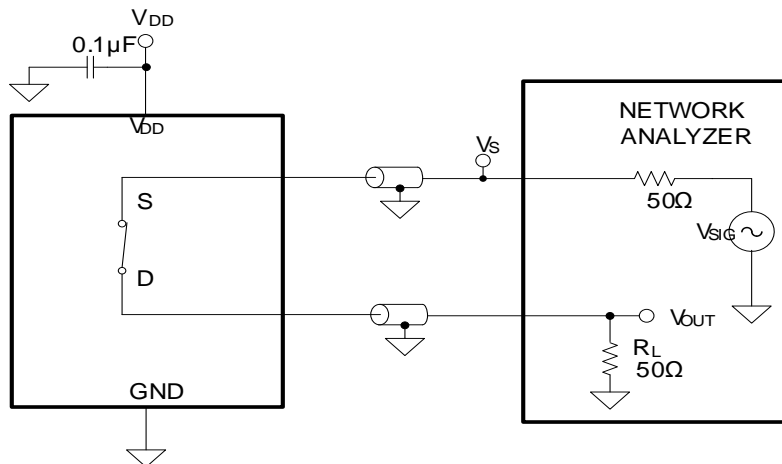


Figure 6. Bandwidth (BW)

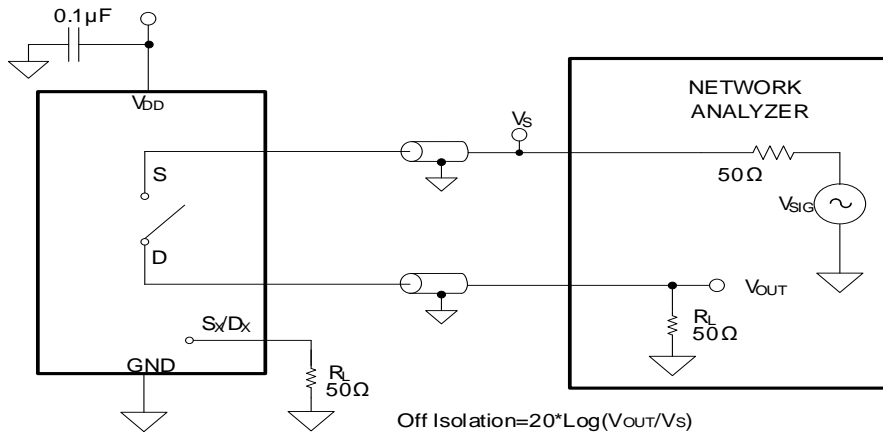


Figure 7. OFF Isolation (O_{iso})

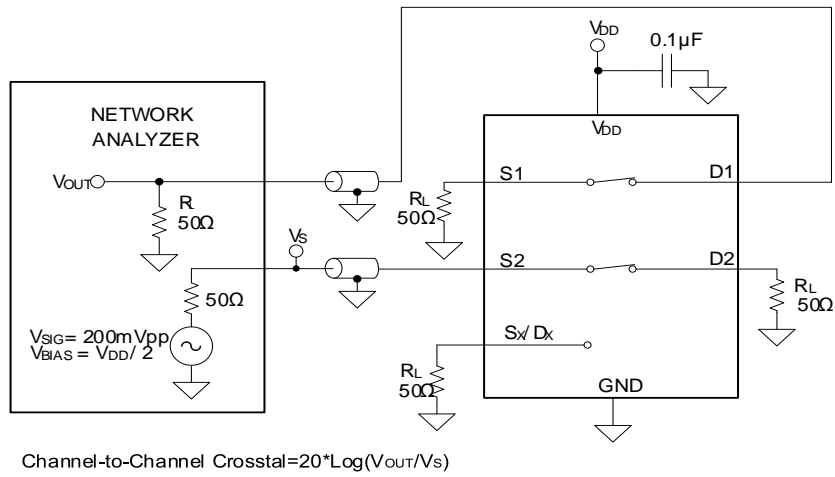


Figure 8. Crosstalk (X_{TALK})

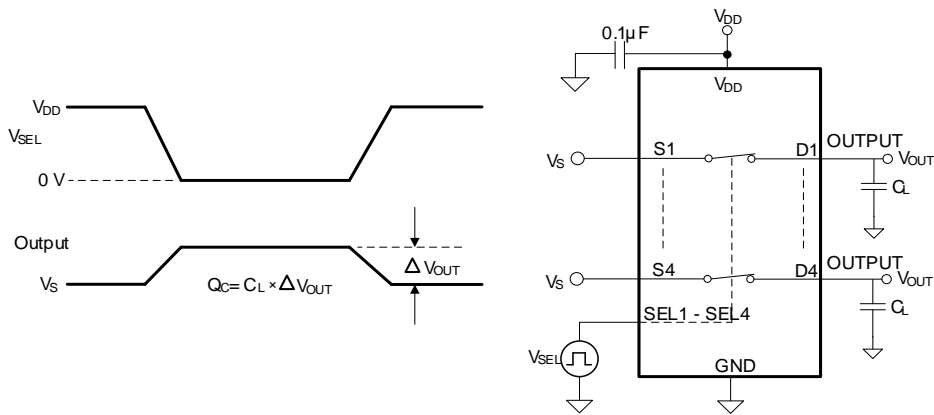
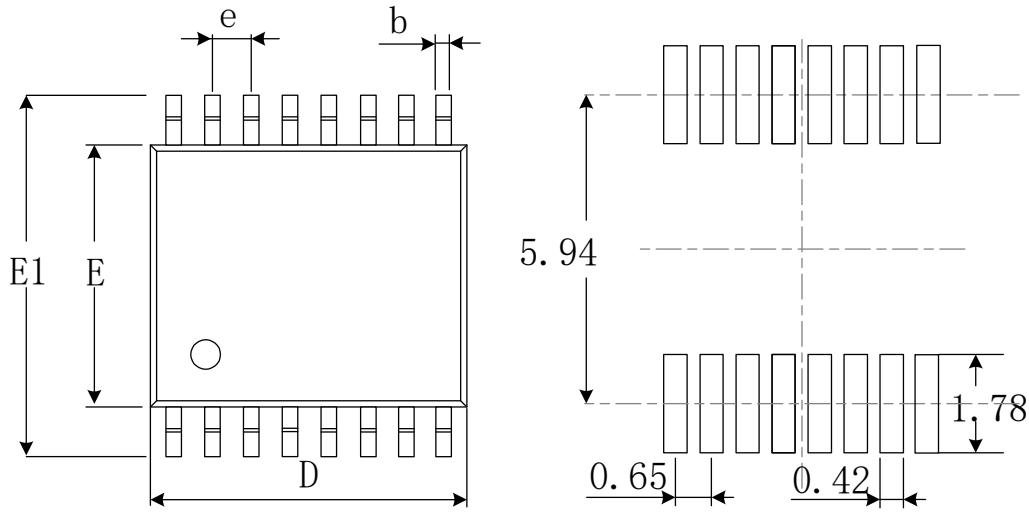
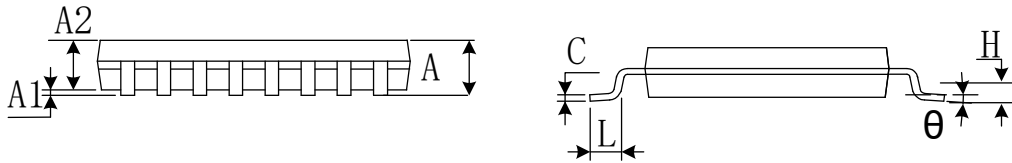


Figure 9. Charge Injection (Q_c)

PACKAGE OUTLINE DIMENSIONS

TSSOP-16


RECOMMENDED LAND PATTERN (Unit: mm)


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A		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	4.860	5.100	0.191	0.201
E	4.300	4.500	0.169	0.177
E1	6.200	6.600	0.244	0.260
e	0.650(BSC)		0.026(BSC)	
L	0.500	0.700	0.02	0.028
H	0.25TYP		0.01TYP	
θ	1°	7°	1°	7°