

Features

- Low On-resistance, Ron of 6Ω
- Supply Range (2.5V ~ 5.5V)
- Differential 2:1 or 1:2 Switch/Multiplexer
- Up to DC 30V Overvoltage Protection (OvP) on C0+/- Ports
- IEC 64000-4-5 Surge Protection w/o External TVS onto C0+/-Ports: +30V
- System Side Clamp Voltage Pulse Less than 9V, Duration Less than 200nS
- Powered Off Protection When VCC = 0 V
- Insertion loss:-1dB@200MHz, -2dB@650MHz, -3dB@1GHZ
- Small Packaging: QFN2015-10L

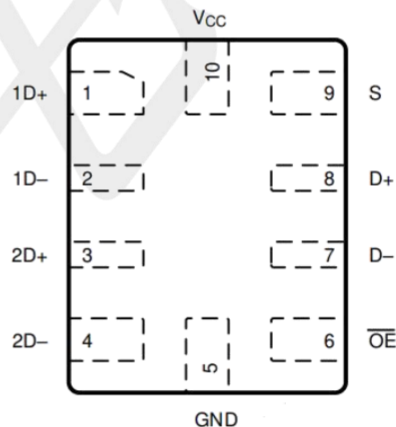
Applications

- Mobile Phones, Tablets and Notebooks
- USB Type-C Mic/Gnd Switch
- Audio, Video, UART, USB2.0 Signal and Supply Routing
- Telecom Signal Switching
- Sample and Hold Systems
- Signal Gating, Multiplexer /Demultiplexer

General Description

The a high-bandwidth switch specially designed for the switching of high-speed USB 2.0 signals in handset and consumer applications, such as cell phones, digital cameras, and notebooks with hubs or controllers with limited USB I/Os. The wide bandwidth (1.1 GHz) of this switch allows signals to pass with minimum edge and phase distortion. The device multiplexes differential outputs from a USB host device to one of two corresponding outputs. The switch is bidirectional and offers little or no attenuation of the high-speed signals at the outputs. It is designed for low bit-to-bit skew and high channel-to-channel noise isolation, and is compatible with various standards, such as high-speed USB 2.0 (480 Mbps).

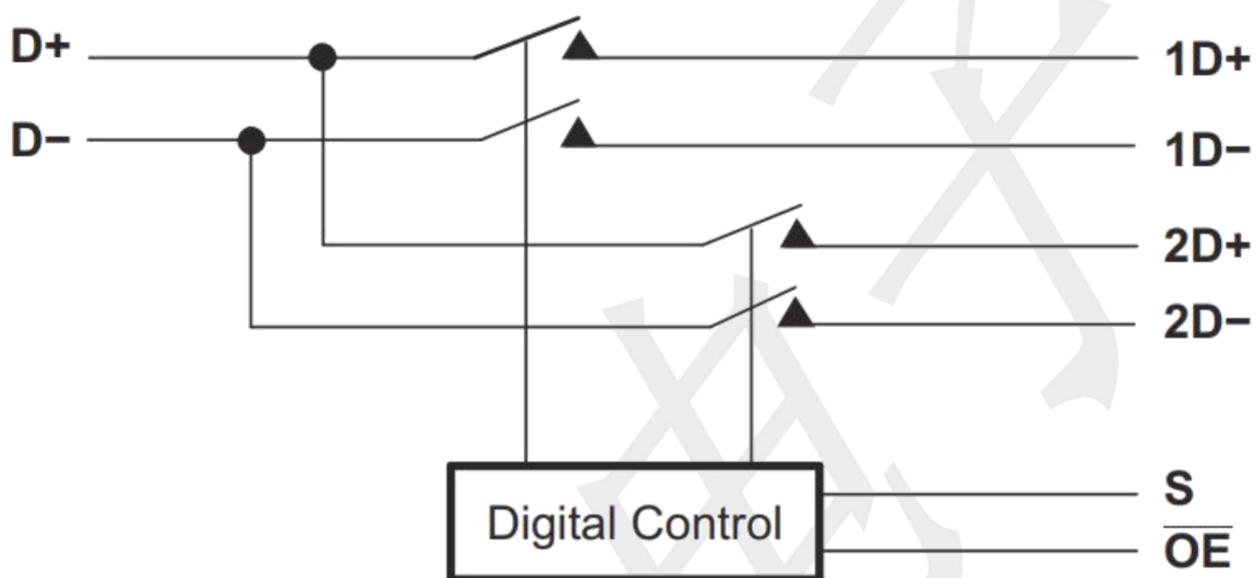
PIN CONFIGURATIONS (Top View)



PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	1D+	I/O for USB data path 1
2	1D-	I/O for USB data path 1
3	2D+	I/O for USB data path 2
4	2D-	I/O for USB data path 2
5	GND	Ground
6	$\overline{OE}$	Active LOW, Output enable
7	D-	Common USB port
8	D+	Common USB port
9	S	Select input
10	VCC	Supply voltage

BLOCK DIAGRAM



Function Table

S	OE	FUNCTION
X	H	Disconnect
L	L	D = 1D
H	L	D = 2D

Absolute Maximum Ratings (Unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V _{CC}	-0.3 ~ +6.5	V
Input Voltage	V _{IN}	-0.3 ~ +6.5	V
VI/O Switch I/O Voltage Range	VI/O	-0.3 ~ +6.5	V
I _{IK} Control Input Clamp Current (V _{IN} < 0)	I _{IK}	-50	mA
I _{I/OK} I/O Port Clamp Current (V _{I/O} < 0)	I _{I/OK}	-50	mA
I _{I/O} ON-state Switch Current	I _{I/O}	±120	mA
Continuous Current through	V _{CC} or GND	±100	mA
Storage Temperature Range	T _{STG}	-55 ~ +150	°C
Operating Junction Temperature	T _J	150	°C
Lead Temperature (Soldering, 10 seconds)	T _L	260	°C
Power Dissipation	P _D	250	mW

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

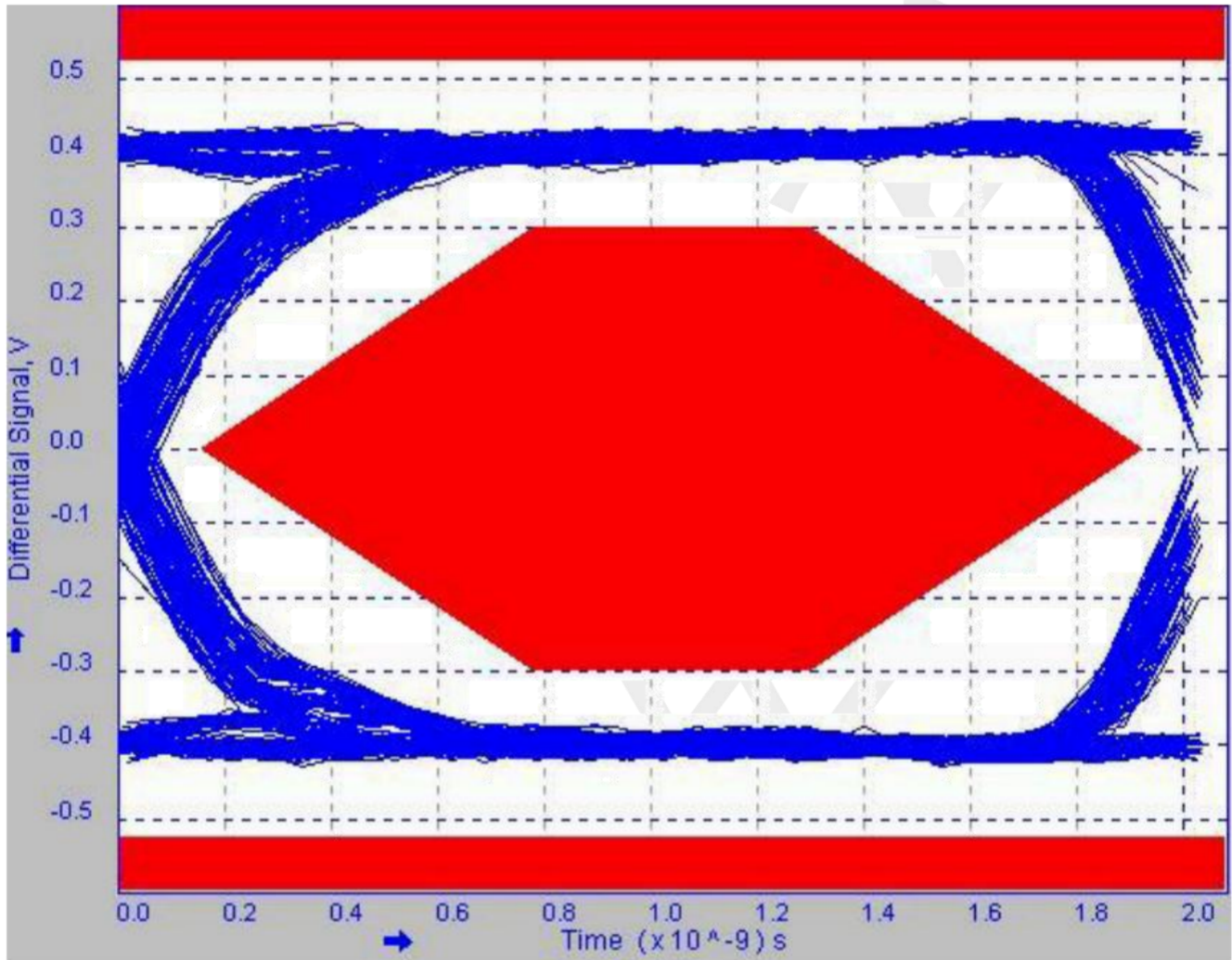
Recommend operating ratings(Unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage Operating	V _{CC}	2.5 ~ 5.5	V
Control Input Voltage	V _{IN}	-0.3 ~ 5.5	V
Input Signal Voltage	VI/O	-0.3 ~ 5.5	V
Operating Temperature	T _A	-40 ~ +85	°C
Junction to Ambient	R _{θJA}	360	°C/W

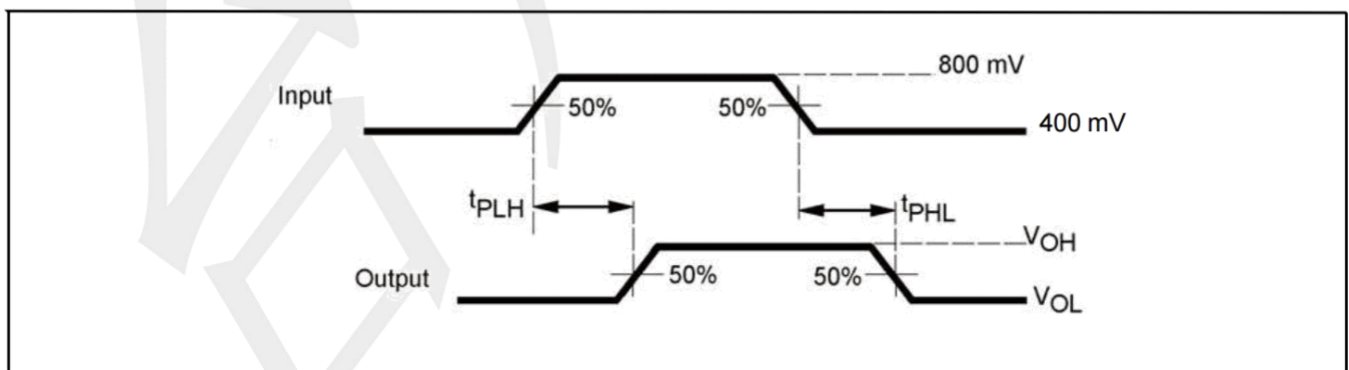
Electrical Characteristics (TA = 25°C, VDD = 3.3V, unless otherwise specified)

PARAMETER	SYMBOL	TEST Conditions	MIN	TYP	MAX	UNIT
POWER SUPPLY						
Supply Voltage Range	VCC		2.5	3.3	5.5	V
Supply Current	Icc	$\overline{OE} = 1$ disconnection	--	5	13	uA
		$\overline{OE} = 0$ connection	--	33	60	uA
SEL/ EN DIGITALINPUT CONTOL						
High-Level Input Voltage	V _{IH}		1.6	--	5.5	V
Low-Level Input Voltage	V _{IL}		-0.1	--	0.5	V
Internal pull-down resistor	RPD		--	2	--	MΩ
SWITCH ON RESISTANCE AND OFF LEAKAGE						
On-Resistance	R _{ON}	V _{IS} = 0V~0.4V I _{out} =8mA	--	6	11	Ω
On-Resistance Flatness	R _{FLAT}	V _{IS} = 0V~0.4V I _{out} =8mA	--	0.3	0.5	Ω
On-Resistance Matching Between Channels	Δ R _{ON}	V _{IS} = 0V~0.4V I _{out} =8mA	--	0.1	0.2	Ω
OFF Leakage Current	I _{LEAK}	V _{C0} +/-=10V,V _{L1} +/-=V _{D2} +/-=0V	--	31	50	uA
SWITCH DYNAMICS						
On Capacitance	C _{ON}	V _{co} +/-= 0.2V,f= 1MHz	--	4	--	PF
Off Capacitance	C _{OFF}	V _{co} +/-= 0.2V,f= 1MHz	--	3	--	PF
Off Isolation	Off	f=250MHz,R _T =50Ω,CL=0pF	--	-38	--	dB
Crosstalk Channel-to-Channel	X _{TALK}	f=250MHz,R _T =50Ω,CL=0pF	--	-41	--	dB
-3dB Bandwidth	BW	R _T =500,CL=0pF Signal Power 0dBm	1.0	1.1	--	GHz
Break-Before-Make	BBM	V _{L1} +/-=V _{D2} +/-=0.4V,R _L =50Ω	--	1.5	--	uS
Turn-on Time	t _{OFF}	V _{co} +/-= 0.4V, R _L =50Ω $\overline{OE}$ switches from High to Low	--	20	--	uS
Turn-off Time	t _{OFF}	V _{co} +/-= 0.4V, R _L =50Ω $\overline{OE}$ switches from Low to High	--	1.2	--	uS
Propagation Delay	t _{pD}	V _{co} +/-= 0.4V, R _L =50Ω	--	200	--	PS
OVER VOLTAGE PROTECTION						
OVP Lockout Threshold	V _{ovP}	V _{co} +/- Rising Edge	4.6	4.9	5.2	V
OVP Hysteresis	V _{HYS}	V _{co} +/- Falling Edge	--	200	--	mV
Clamp Voltage on L1+/- and D2+/-	V _{CLAMP}	10V shorts to C0+/- with R _L =1KΩ @ L1+/- and D2+/-	--	6.5	8	V
OVP Response Time	t _{FP}	10V shorts to C0+/- with R _L =1KΩ @ L1+/- and D2+/-	--	200	300	nS
OVP Recovery Time	t _{FPR}	V _{co} +/- jumps from 6v to 1v step	30	45	60	uS

Typical Characteristics (Ta=25°C, VCC=3.3V, unless otherwise noted)

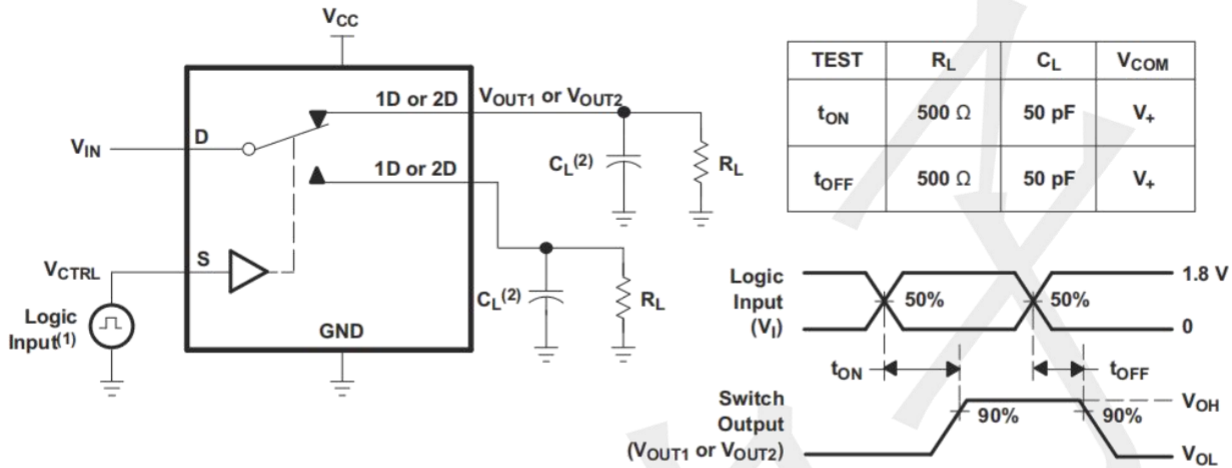


Test Result: High-speed, Up-stream, Near-end Eye



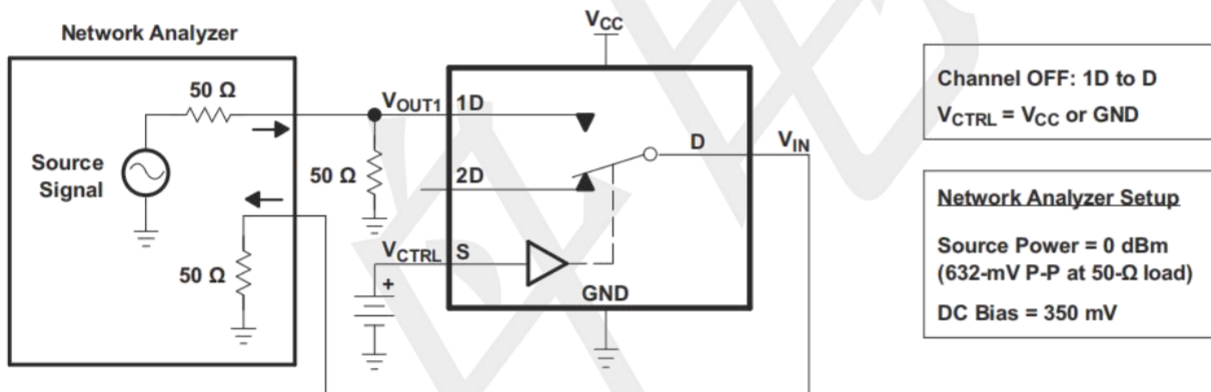
Propagation Delay

Parameter Measurement Information

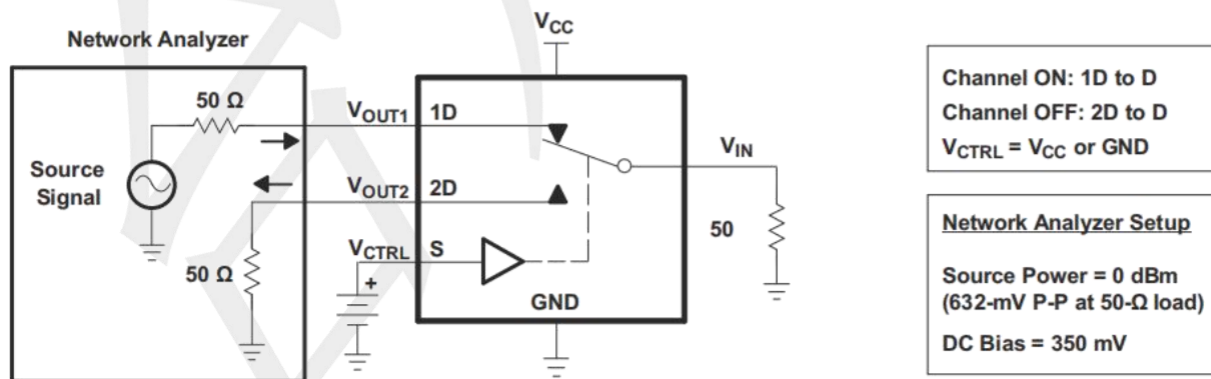


- (1) All input pulses are supplied by generators having the following characteristics: PRR $\leq$ 10 MHz, $Z_O = 50 \Omega$, $t_r < 5$ ns, $t_f < 5$ ns.
(2) C_L includes probe and jig capacitance.

Turnon (t_{ON}) and Turnoff Time (t_{OFF})

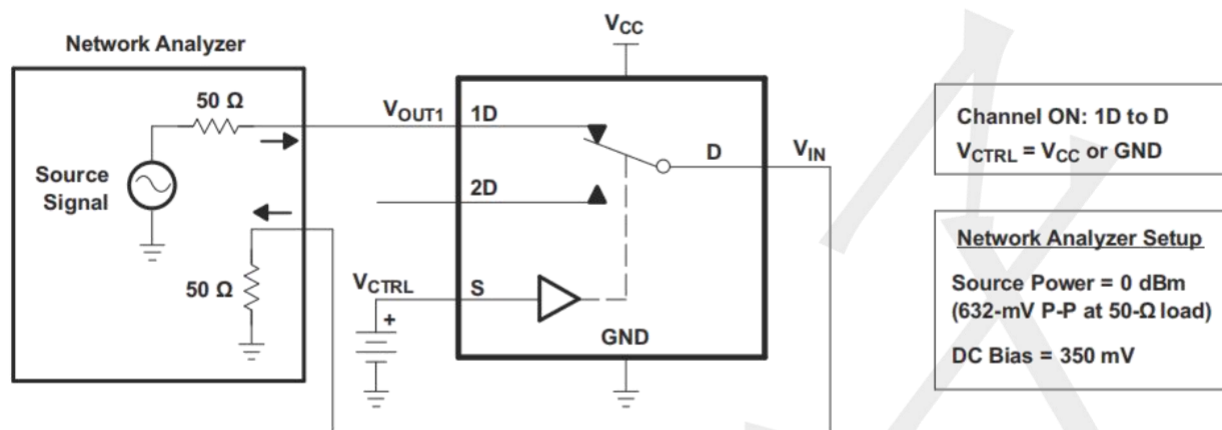


OFF Isolation (O_{ISO})

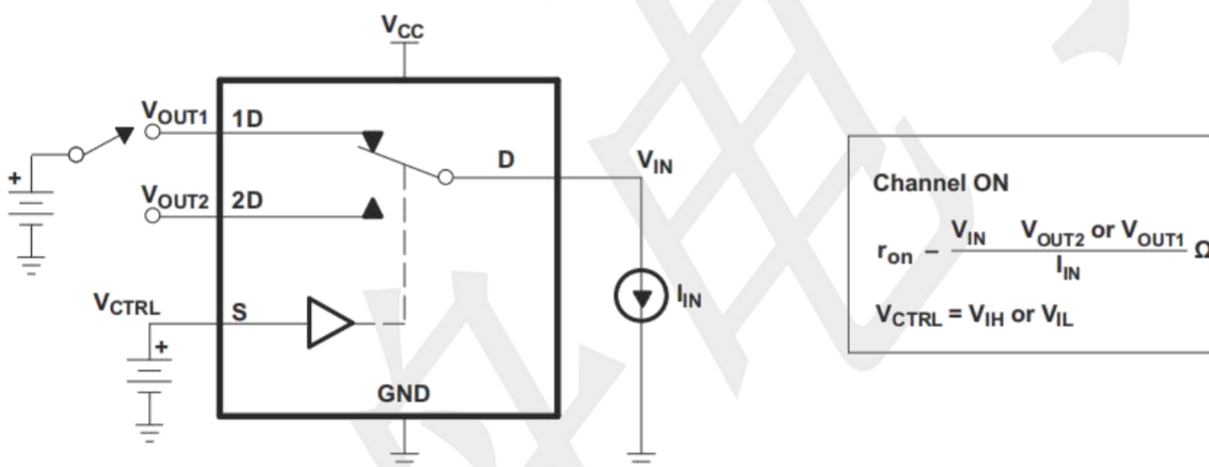


Crosstalk (X_{TALK})

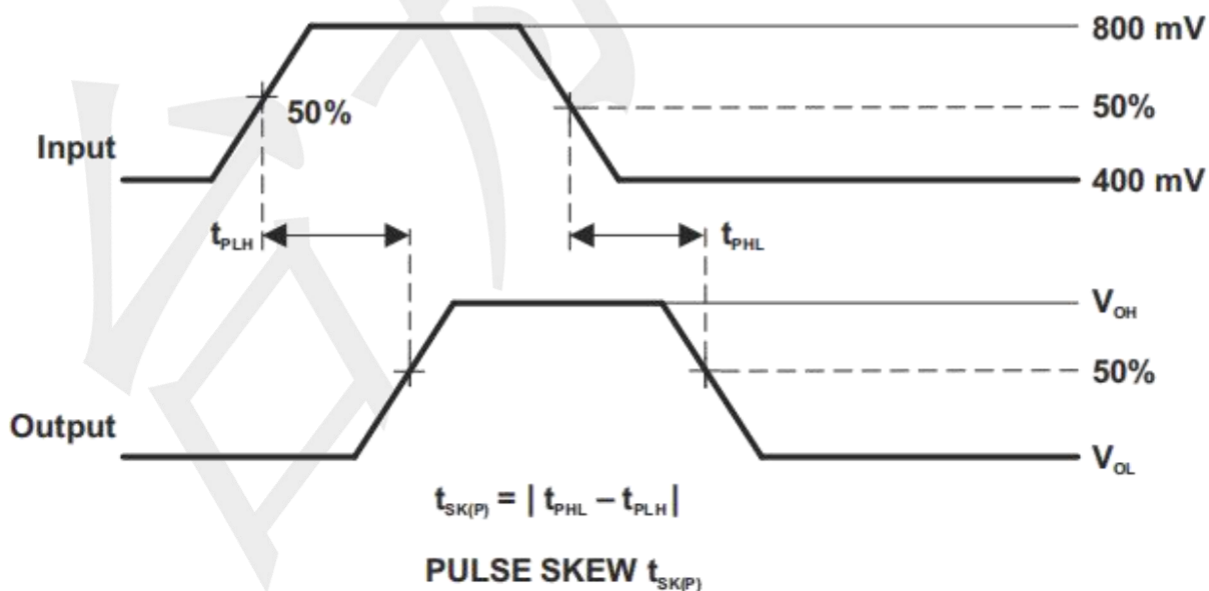
Parameter Measurement Information



Bandwidth (BW)

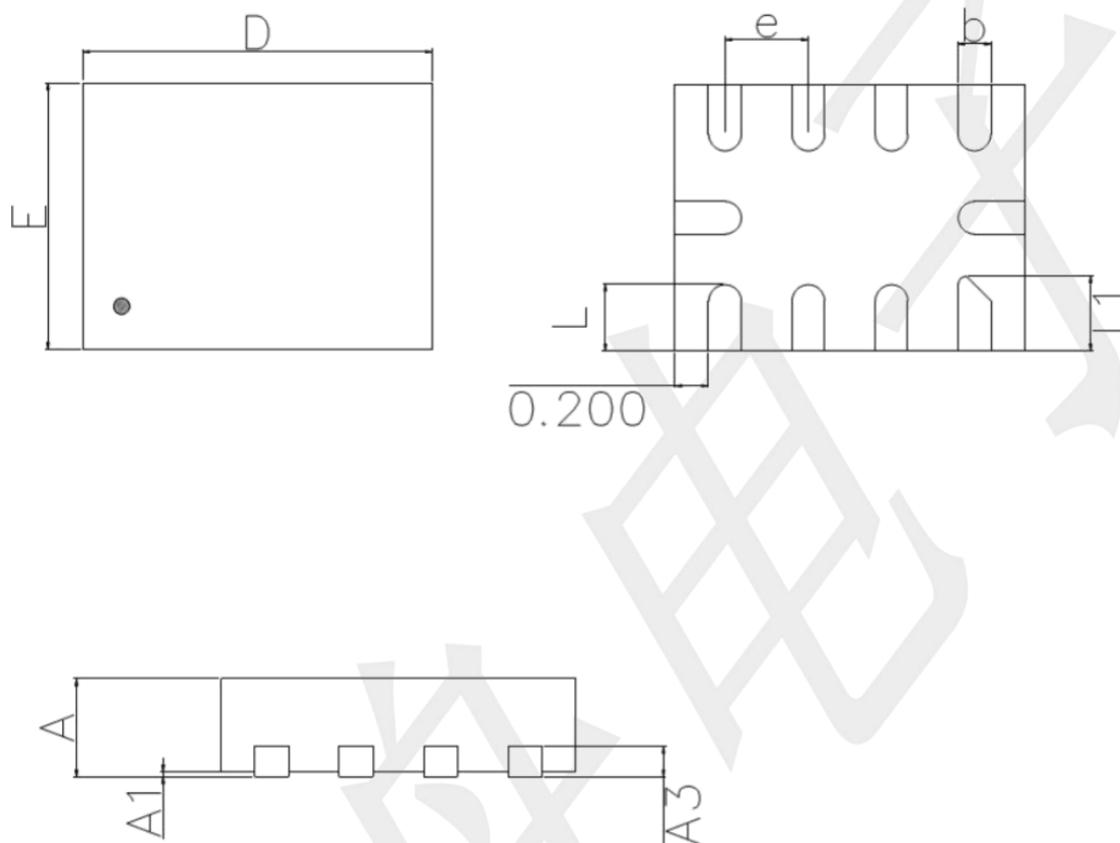


ON-State Resistance (r_{on})



Package information

QFN2015-10L (Unit: mm)



Symbol	Dimension in Millimeters		
	Min.	Typ.	Max.
A	0.500	0.550	0.600
A1	0.000		0.050
A3	0.150 Ref.		
D	1.950	2.000	2.050
E	1.450	1.500	1.550
b	0.150	0.200	0.250
e	0.500 (BSC)		
L	0.300	0.350	0.400
L1	0.350	0.400	0.450