WAS4761Q

Dual SPST Analog Switch with Negative Swing Audio Capability and 12V Tolerance

Http//:www.sh-willsemi.com

Descriptions

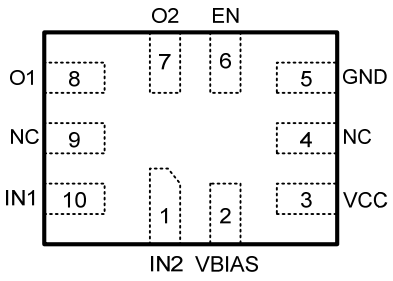
The WAS4761Q is a high performance, dual Single Pole Single Throw (SPST) analog switch with negative swing audio capability that features low Ron of 1Ω (typical) at 3.6V VCC. The WAS4761Q operates over a wide VCC range of 3.3V to 4.5V and is designed for high voltage isolation. The EN input is 1.8V logic level compatible.

WAS4761Q is also featured with smart circuitry to minimize VCC leakage current even when the control voltage is lower than VCC supply voltage. This feature suits mobile handset applications by allowing direct interface with baseband processor general-purpose IO with minimal battery consumption. In other word, there is no need of additional device to shift control level to be the same as that of VCC in real application.

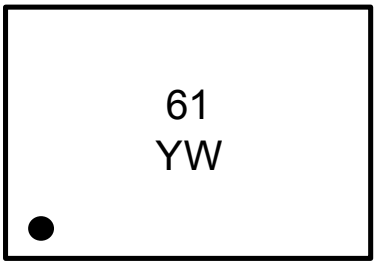
As EN is logic high, INx connects to Ox, very flatten Ron from INx to Ox minimizes little distortion as analog signals pass through; As EN is logic low, INx disconnects to Ox and Ox is withstanding high voltage up to 12V with very limit couplings back to INx.

The WAS4761Q is available in QFN1418-10L package. Standard product is Pb-Free and halogen-Free.

QFN1418-10L



Pin configuration (Top view)



61 = Device code
Y = Year Code (A~Z)
W = Week Code (A~Z)

Marking

Features

- Supply voltage : 3.3 ~ 4.5V
- O1/O2 pin voltage range : 12V DC
- Ultra high OFF isolation : -130dB @ 1KHz
- Low ON resistance : 1Ω @ 3.6V
- Crosstalk rejection : -130dB @ 1KHz
- THD for 0.707Vrms @ R_L=32Ω : - 95 dB
- Signal-to-Noise Ratio : 120dBV
- -3dB Bandwidth : 50MHz
- HBM JEDEC: JESD22-A114
  - IO to GND : ±8KV
  - Power to GND : ±5KV

Order information

Device	Package	Shipping
WAS4761Q-10/TR	QFN1418-10L	3000/Reel&Tape

Applications

- Cell phones and PDA
- Audio and Video Signal Routing

Pin descriptions

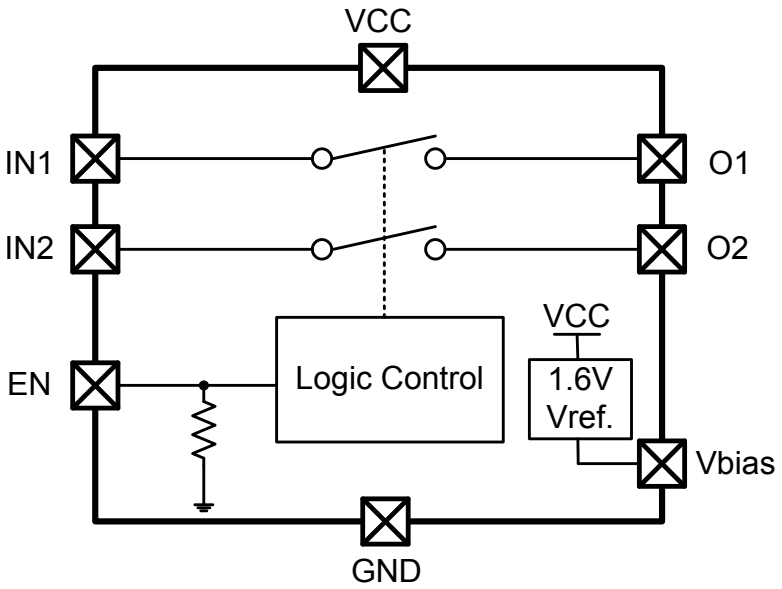
Pin No.	Symbol	Type	Descriptions
1,10	IN2,IN1	Input	Signal Input
5	GND	Ground	Ground
7,8	O2,O1	Output	Signal Output
2	VBIAS	Output	Bias Voltage Output
3	VCC	VDD	Positive Power Supply
4,9	NC	-	No connection
6	EN	Input	Logic Control

True Table

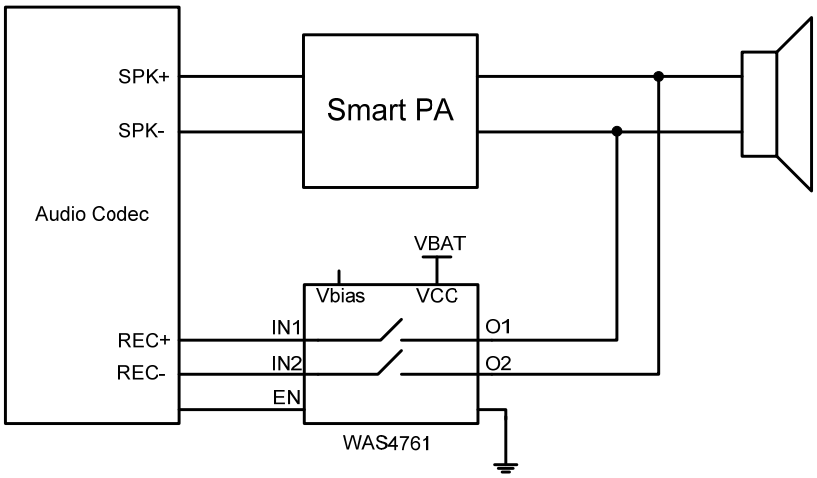
Logic Input (EN)	Function
1	IN_X Connected to O_X
0	IN_X Disconnected to O_X

Note: $_X$=1 or 2

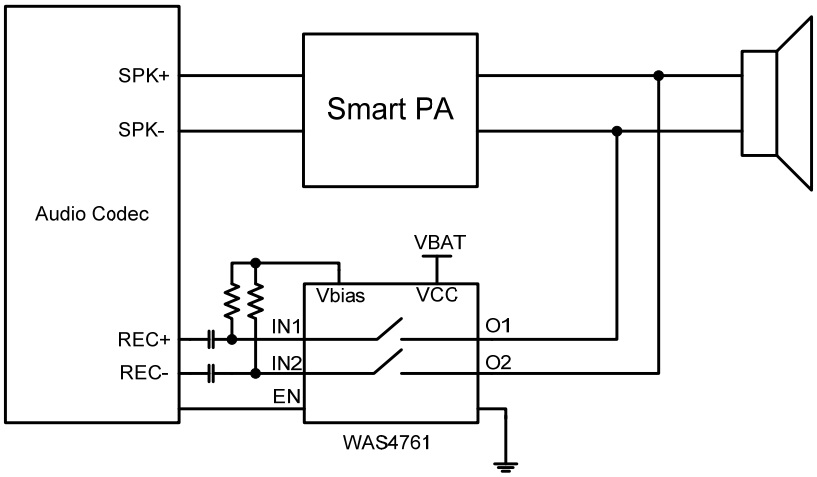
Functional Block Diagram



Typical Applications



2 in 1 Speaker applications with smart PA and none cap-less receiver output



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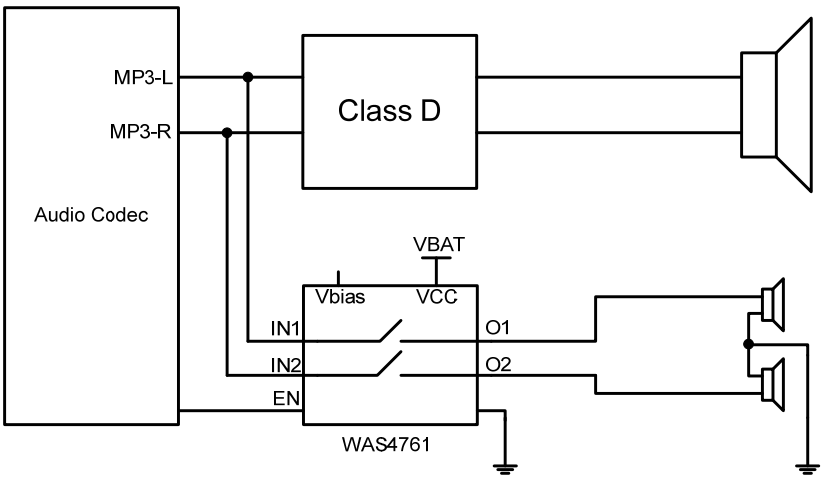


Speaker and headphone with common audio source applications

Absolute Maximum Ratings (1)

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	-0.3 ~ 6.5	V
Signal Output Pin Voltage	V_{OX}	0.7-VCC ~ 12	V
Signal Input Pin Voltage	V_{INX}	0.7-VCC ~ VCC	V
Logic Control Pin Voltage	V_{EN}	-0.3 ~ 6.5	V
Continuous Current	Iout	±200	mA
Peak Current (pulsed at 1ms 50% duty cycle)	Iout	±400	mA
Storage Temperature Range	T_{STG}	-55 ~ 150	°C
Junction Temperature	T_J	150	°C
Lead Temperature (Soldering, 10 seconds)	T_L	260	°C
Power Dissipation	P_D	250	mW

Recommend operating ratings (3)

Parameter	Symbol	Value	Unit
Operating Supply Voltage	V_{CC}	3.3 ~ 4.5	V
Logic Control Voltage	V_{EN}	0.0 ~ V_{CC}	V
Input Signal Voltage	V_{INX}	-3 ~ +3	V
Operating Temperature	T_A	-40 ~ 85	°C
Input Raise and Fall Time(Control Input V_{CC}=2.3~3.6V)	t_r,t_f	0 ~ 10	ns/V
Thermal Resistance	$R_{\theta JA}$	350	°C/W

Note:

1. “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied.
2. The input and output negative voltage ratings may be exceeded if the input and output diode current ratings are observed.
3. Control input must be held high or Low, it must not float.

DC Electronics Characteristics (Ta=25°C, VCC=3.6V, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input logic high level	V_{IH}	VCC: 3.3 ~ 4.5	1.6			V
Input logic low level	V_{IL}	VCC: 3.3 ~ 4.5			0.6	V
Output voltage of bias	Vbias	VCC: 3.3~4.5		1.6		V
Supply quiescent current	I_{CC}	EN=0		15		uA
		EN=VCC		200		uA
EN pull down resistor	R_{PD}			100		KΩ
Off state switch leakage current	I_{OFF}	EN=0			±1.0	uA
On-Resistance	R_{ON}	V_{IS}= -3~+3, I_{OUT}=100mA,		1		Ω
On-Resistance Matching Between Channels	ΔR_{ON}	V_{IS}= -3~+3, I_{OUT}=100mA,		0.02		Ω
On-Resistance Flatness	$R_{FLAT(ON)}$	V_{IS}=-3~+3, I_{OUT}=100mA,		0.01		Ω

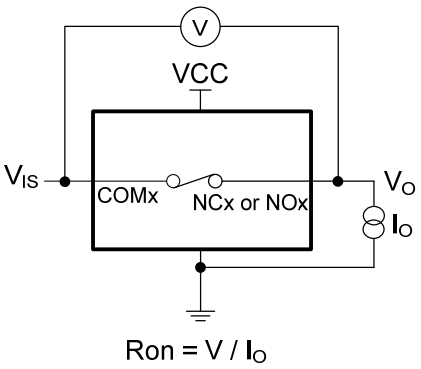
AC Electronics Characteristics (Ta=25°C, VCC=3.6V, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-On Time	T_{ON}	V_{IS}=1V, R_L=32Ω		200		us
Turn-Off Time	T_{OFF}	V_{IS}=1V, R_L=32Ω		100		ns
-3dB Bandwidth	BW	R_L=50Ω, C_L=0pF		50		MHz
Off isolation	OIRR	F=1K~10KHz, R_L=50Ω		-130		dB
Channel-to-channel Crosstalk	Xtalk	F=1K~10KHz, R_L=50Ω		-130		dB
Total Harmonic Distortion	THD	F=20Hz to 20KHz V_{IS}=0.707Vrms @R_L=32Ω		-95		dB
		F=20Hz to 20KHz V_{IS}=2Vrms @R_L=20kΩ		-105		dB
Signal-to-Noise Ratio	SNR	F=20Hz to 20KHz, A-weighted filter, Inputs grounded		120		dBV

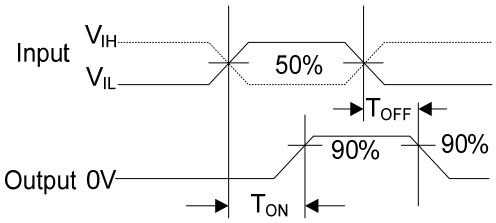
Capacitance (Ta=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off capacitance	C_{OFF}	F=100KHz, VCC=3.3		50		pF
On capacitance	C_{ON}	F=100KHz, VCC=3.3		50		pF

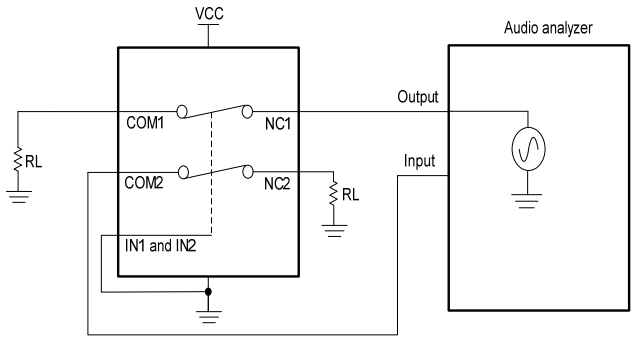
Test Circuits



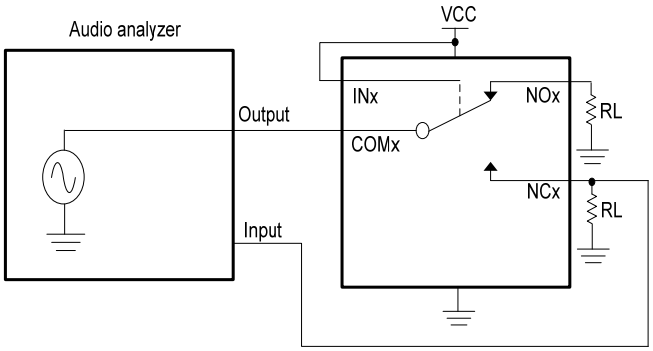
ON-Resistance (R_{ON})



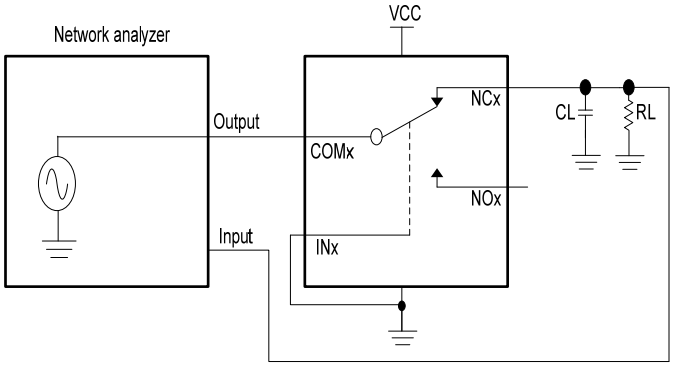
ON/OFF Time Waveforms (T_{ON} / T_{OFF})



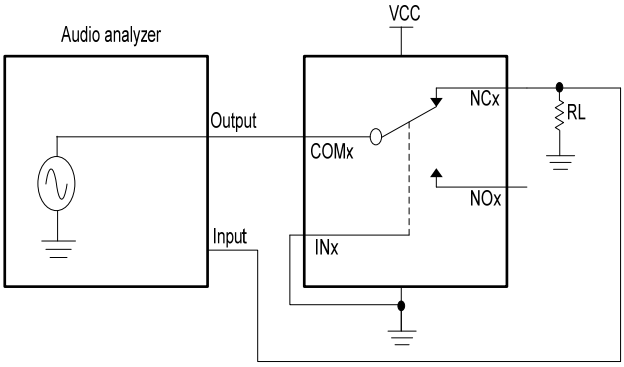
Crosstalk (Xtalk)



Off isolation (OIRR)



Bandwidth (BW)



THD+N

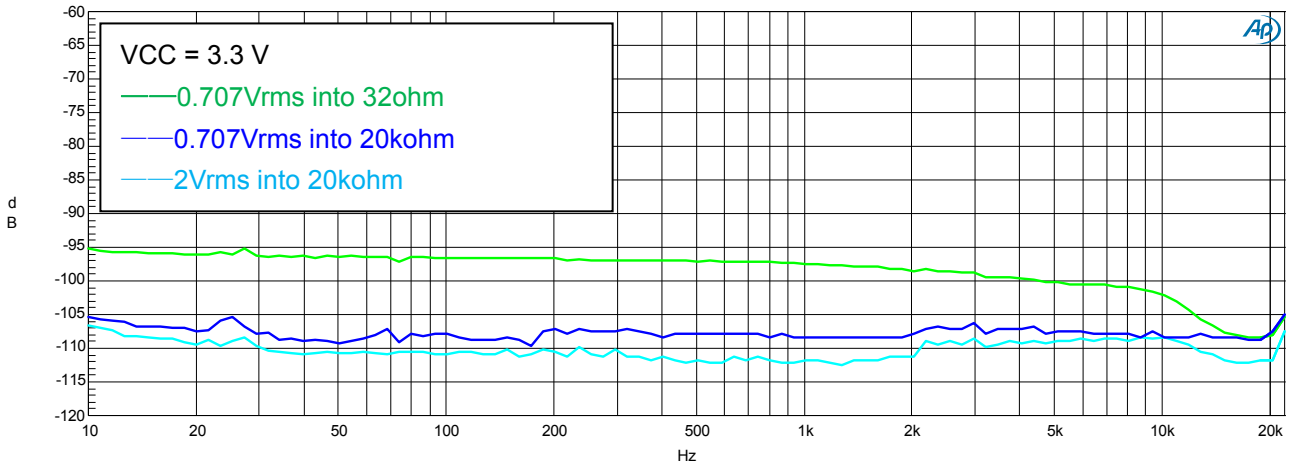


Figure 1. THD+N vs. FREQUENCY

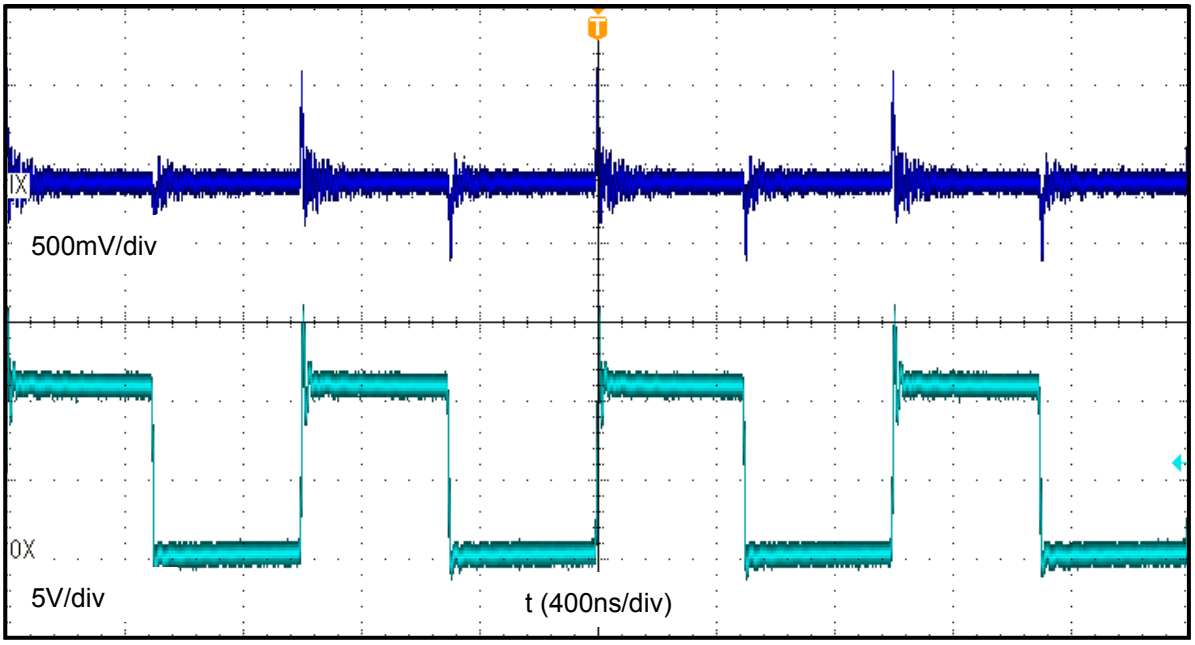


Figure 2. High Voltage Isolation

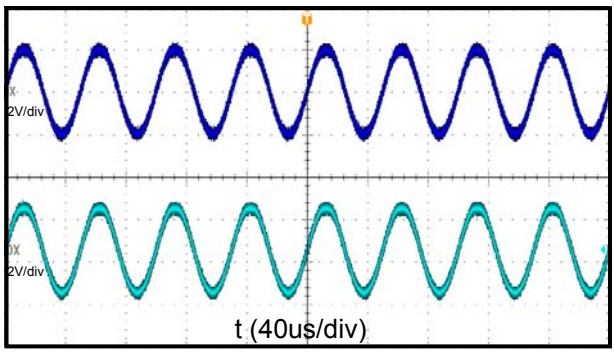


Figure 3. 2 in 1 Speaker applications
with smart PA and none cap-less receiver output

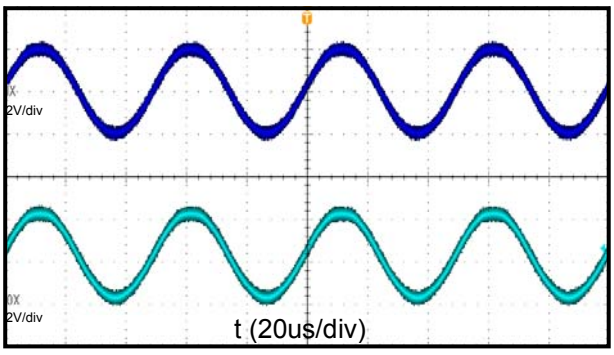
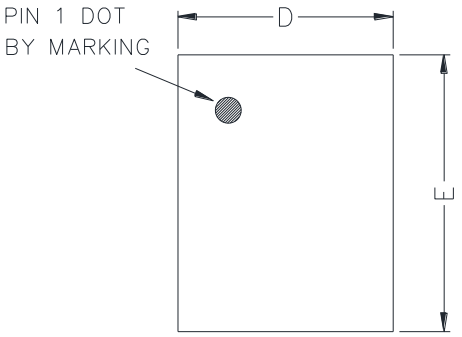


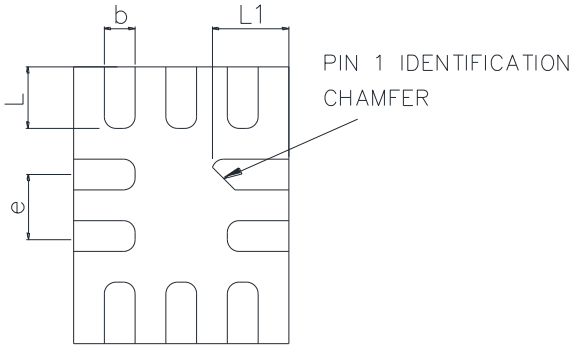
Figure 4. 2 in 1 Speaker applications
with smart PA and cap-less receiver output

PACKAGE OUTLINE DIMENSIONS

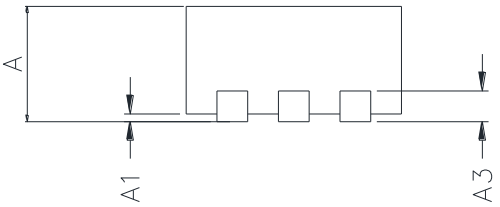
QFN1418-10L



TOP VIEW



BOTTOM VIEW

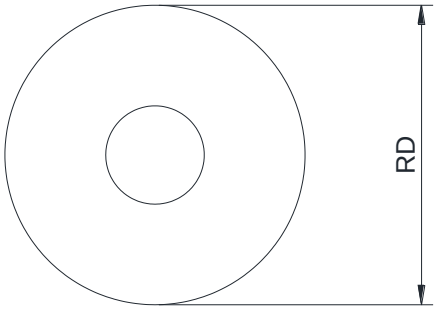


SIDE VIEW

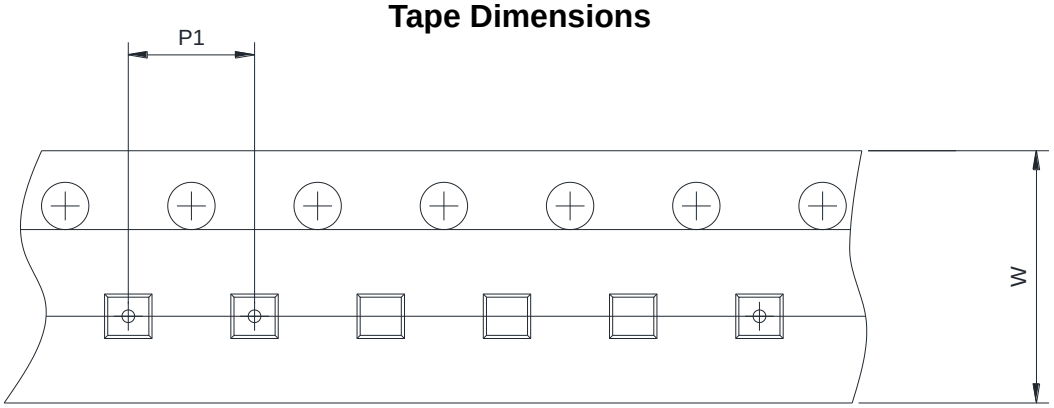
Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.50	0.55	0.60
A1	0.00	-	0.05
A3	0.15 Ref.		
D	1.35	1.40	1.45
E	1.75	1.80	1.85
b	0.15	0.20	0.25
L	0.30	0.40	0.50
L1	0.40	0.50	0.60
e	0.40 BSC		

TAPE AND REEL INFORMATION

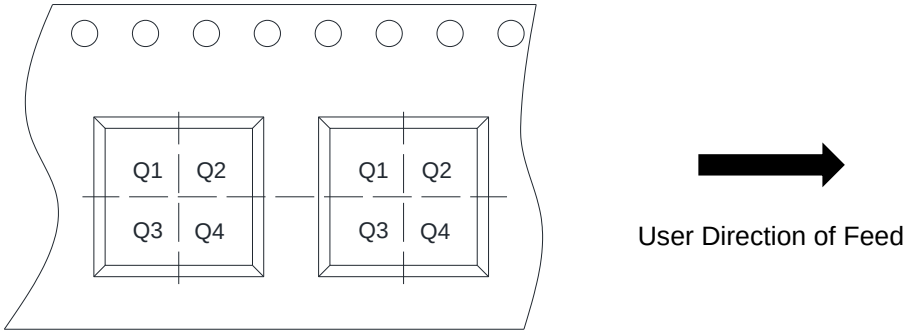
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



RD	Reel Dimension	☑ 7inch ☐ 13inch
W	Overall width of the carrier tape	☑ 8mm ☐ 12mm
P1	Pitch between successive cavity centers	☐ 2mm ☑ 4mm ☐ 8mm
Pin1	Pin1 Quadrant	☑ Q1 ☐ Q2 ☐ Q3 ☐ Q4