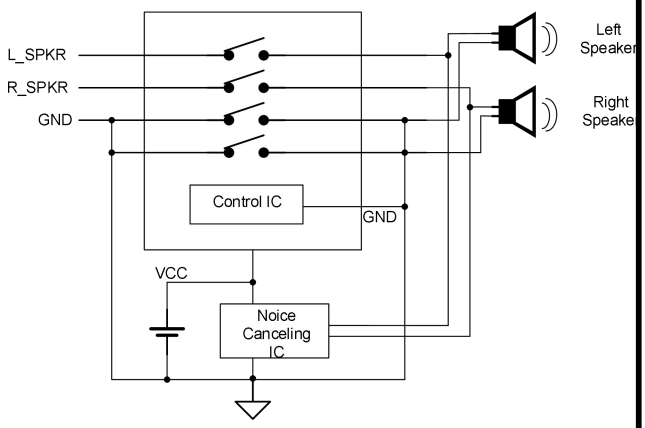
GSW550
4PST Depletion Mode Isolation Switch

1 Features	2 Application
- 4PST (NC) - Depletion Mode MOSFETS - V_{CC}(OFF): +1.6V to +3.0V - I_{SWPEAK}: 500mA - R_{ON}: 0.6Ω (TYP) - $R_{ON\ Flat}$: 0.01 Ω Typical - THD+N: 0.002% Typical - Industrial TemperatureRange: -40°C to +85°C	- MP3 Portable Media Players - Cellular Phones,Smart Phones

3 Description	Circuit Diagram
The GSW550 is a high-performance four-pole single throw (4PST) normally closed Depletion-Mode isolation switch. The Depletion Mode technology allows the device to conduct signals when there is no V_{CC} availableand to isolate the signals when V_{CC} is present. The GSW550 operates on a wide V_{CC} range for design flexibility. Additionally, select pins allow the internal oscillator frequency to be adjusted between 500 kHz and 750 kHz in 75 kHz steps when V_{CC} is present. Thisfeature is used to shift the electromagnetic interference(EMI) signature to meet customer specifications.	

4 Revision History

Revision	Date	Note
Rev. A1. 0	2023. 06. 09	Original Version
Rev. A1. 1	2024. 01. 09	Updated Package Qty
Rev. A1. 2	2024. 11. 06	1.Added Tape and Reel Information 2.Update 7.2 Conditions

The latest datasheet version should be checked on the GTIC official website, as the company does not actively inform customers about updates to the datasheet.

5 Device Summary, Pin and Packages

Table 5-1. Device Summary(1)

Serial Name	Part Name	Package	Body Size (Nom)	Marking(2)	MSL(3)	Package Qty
GSW550	GSW550WLG	WLCSP-12	1.17mm×1.57mm×0.582mm	GSW550 XXXXX	3	Tape and Reel,3000
	GSW550QE	QFN3×3-16L	3.00mm×3.00mm×0.75mm	GSW550 XXXXX	3	Tape and Reel,3000

(1) For all available packages, please contact product sales.

(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.

(4) "XXXXX" in Marking will be appeared as the batch code.

5 Device Summary, Pin and Packages(Continued)

Top View

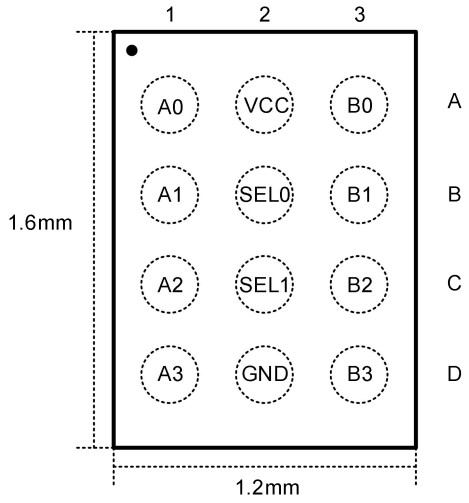


Fig.5-1.GSW550: WLG (WLCSP-12L) Package

Table 5-2 Pin Description

No.	Pin#	Name	Type	Description
1	A1	A0	I/O	A-Port
2	B1	A1	I/O	A-Port
3	C1	A2	I/O	A-Port
4	D1	A3	I/O	A-Port
5	A2	V_{CC}	P	Supply Volatege
6	B2	SEL0	I	Oscillator Frequency Control (see Table 5-4). Used to shift the electromagnetic interference (EMI) signature to meet the customer specifications
7	C2	SEL1	I	
8	D2	GND	G	Ground
9	A3	B0	I/O	B-Port
10	B3	B1	I/O	B-Port
11	C3	B2	I/O	B-Port
12	D3	B3	I/O	B-Port

5 Device Summary, Pin and Packages(Continued)

Top View

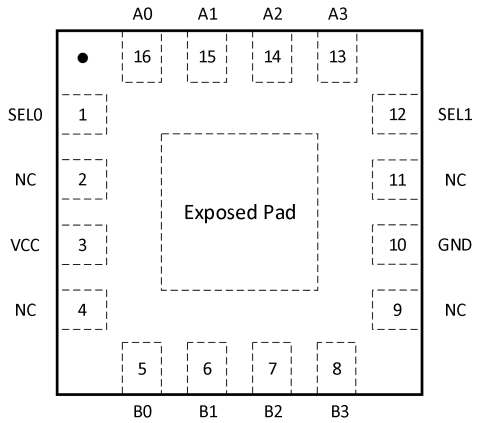


Fig.5-3.GSW550: QE (QFN3×3-16L) Package

Table 5-4 Pin Description

No.	Name	Type	Description
1	SEL0	I	Oscillator Frequency Control (see Table 5-4). Used to shift the electromagnetic interference (EMI) signature to meet the customer specifications
12	SEL1	I	
2	NC	-	No Connect
3	V_{CC}	P	Supply Volatege
4	NC	-	No Connect
5	B0	I/O	B-Port
6	B1	I/O	B-Port
7	B2	I/O	B-Port
8	B3	I/O	B-Port
9	NC	-	No Connect
10	GND	G	Ground
11	NC	-	No Connect
13	A3	I/O	A-Port
14	A2	I/O	A-Port
15	A1	I/O	A-Port
16	A0	I/O	A-Port
--	Exposed Pad	G	Ground or Float

5 Device Summary, Pin and Packages(Continued)

Table 5-3 Truth Table

V_{CC}	Function
0V~0.2V	Conduction: B0~B3=A0~A3
1.6V~3.0V	Isolation: B0~B3≠A0~A3

Table 5-4 Oscillator Frequency Step Logic

SEL1	SEL0	Frequency(TYP)
Low	Low	500kHz
Low	High	575kHz
High	Low	650kHz
High	High	725kHz

6 Voltage, Temperature, ESD and Thermal Ratings

6.1 Absolute Maximum Ratings

Parameters		Min.	Max.	Unit
V_{CC}	Supply/Control Voltage	0	4.6	V
V_{IN}	Input Voltage (Select Pins)	0	V_{CC}	
V_{SW}(ON)	DC Switch I/O Voltage (Switch Conducting)	-5	+5	
V_{SW}(OFF)	DC Switch I/O Voltage (Switch Isolated)	-1.8	+3.0	
I_{IK}	DC Input Diode Current	-50		mA
I_{SW}	Switch I/O Current		350	
I_{SWPEAK}	Peak Switch Current		500	
T_A	Absolute Maximum Operating Temperature	-40	+85	°C
T_{STG}	Storage Temperature	-65	+150	°C

(1) Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
(2) The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.
(3) When a switch is isolated (OFF), VSW value must be < V_{CC};

6.2 ESD Ratings

ESD			Value	Unit
V(ESD)	Electrostatic Discharge	Human-Body Model (HBM)	5K	V
		Charged-Device Model (CDM)	2K	V

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

6.3 Recommended Operating Conditions

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

Symbol	Parameter		Min	Max	Unit
V_{CC}(ON)	Supply Voltage with Switch Conducting		0	0.2	V
V_{CC}(OFF)	Supply Voltage with Switch Isolated		1.6	3.0	V
V_{SW}(ON)	DC Switch I/O Voltage (Switch Conducting)	V_{CC}=0 V	-2.0	2.0	V
V_{SW}(OFF)	DC Switch I/O Voltage (Switch Isolated)	V_{CC}=1.6 V to 3.0 V	-1.5	+1.5	V

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

7 Electrical Specifications

7.1 DC Electrical Characteristics

Typical values are at T_A=+25°C. (unless otherwise noted)

Symbol	Parameter	Conditions	V_{CC}	Min	Typ	Max	Units
I_{ON}	Switch-to-GND Leakage Current (Switch Conducting)	An=-1.4 V to 1.4 V Bn=Float	0	0	0.3	1.5	μA
I_{OFF}	Switch-to-GND Leakage Current (Switch Isolated)	An=0.4 V to 1.4 V, Bn=Float	3	0	0.5	2	μA
R_{ON}	Switch On Resistance	I_{SW}=±24 mA V_{SW}=-1.4 V to +1.4 V	0		0.8		Ω
$R_{FLAT(ON)}$	On Resistance Flatness	I_{SW}=±24 mA, V_{SW}=-1.4 V to +1.4 V	0		0.01		Ω
I_{CC}	Quiescent Supply Current	SEL0=SEL1 = V_{CC}	3	0	45	70	μA
V_{IH}	Input Voltage High (Select Pins)		3	0.8V_{CC}			V
V_{IL}	Input Voltage Low (Select Pins)		3			0.2V_{CC}	V
I_{IN}	Input Leakage Current (Select Pins)		3	0		±1	μA

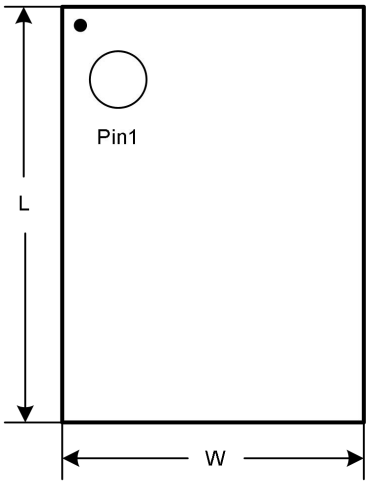
7.2 Switch And AC Characteristics

Typical values are at T_A=+25°C. (unless otherwise noted)

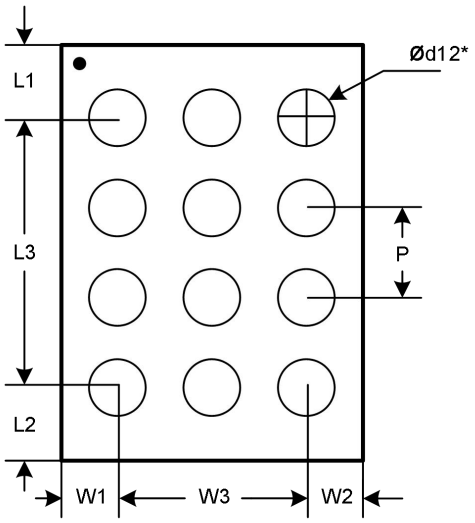
Symbol	Parameter	Conditions	V_{CC}	Typ	Units
t_{ON}	Turn-On Time	R_L=32 Ω, C_L=10 pF, V_{SW}=1.4 V	1.6	120	ns
t_{OFF}	Turn-Off Time	R_L=32 Ω, C_L=10 pF, V_{SW}=1.4 V	1.6	160	ns
BW	-3 dB Bandwidth	R_L=50 Ω, C_L=0 pF	0	<100	MHz
O_{IRR}	Off-Isolation	R_L=32 Ω, f=20 kHz, V_{SW}=0.35 VRMS	1.6	-90	dB
X_{TALK}	Crosstalk	R_L=32 Ω, f=20 kHz, V_{SW}=1 VRMS	0	-85	dB
THD+N	Total Harmonic Distortion + Noise	R_L=32 Ω, f=20 Hz to 20 kHz, V_{SW}=1 VRMS	0	0.002	%
C_{ON}	On Capacitance	V_{CC}=0 V, f=1 MHz, 400 mVPP	0	10	pF
C_{OFF}	Off Capacitance	V_{CC}=1.6 V, f=1 MHz, 400 mVPP	1.6	10	pF

8 Package Outline Dimension

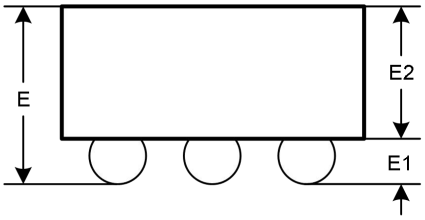
WLCSP-12



Top View
Mark Side



Bottom View
Mark Side

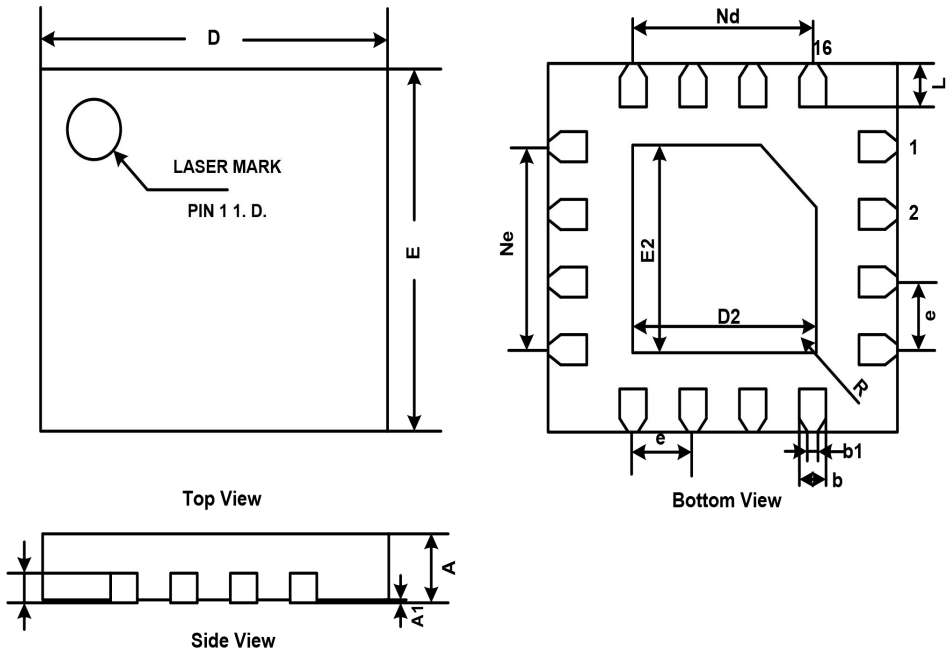


Side View

Symbol	Dimensions in Millimeters			Dimensions in Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
E	0.542	0.582	0.622	0.021	0.023	0.024
E1	0.177	0.202	0.227	0.007	0.008	0.009
E2	0.355	0.380	0.405	0.014	0.015	0.016
L	1.540	1.570	1.600	0.061	0.062	0.063
L3	1.200BSC			0.047BSC		
W	1.140	1.170	1.200	0.045	0.046	0.047
W3	0.800			0.031		
d	0.243	0.268	0.293	0.010	0.011	0.012
p	0.40			0.016BSC		
W1	0.185REF			0.007REF		
W2	0.185REF			0.007REF		
L	0.185REF			0.007REF		
L2	0.185REF			0.007REF		

8 Package Outline Dimension(Continued)

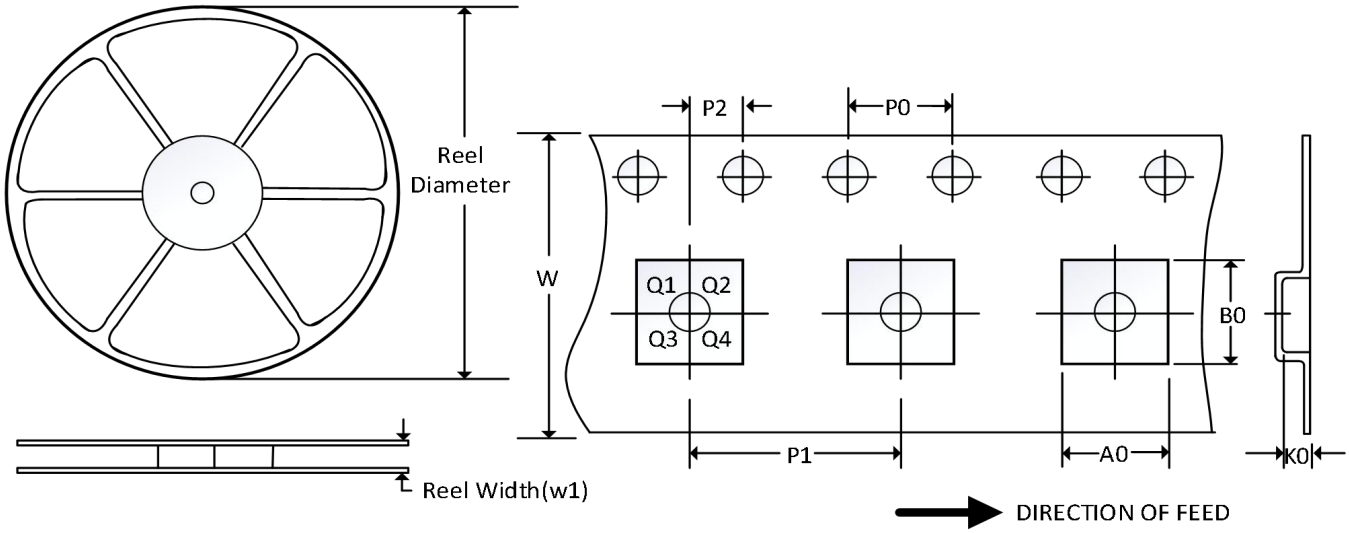
QFN3×3-16L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Min
A	0.700	0.800	0.028	0.032
A1	0.000	0.050	0.000	0.002
b	0.200	0.300	0.008	0.012
b1	0.230REF		0.009REF	
c	0.203REF		0.008REF	
D	2.900	3.100	0.116	0.124
D2	1.600	1.700	0.064	0.068
e	0.500BSC		0.020BSC	
Nd	1.500BSC		0.060BSC	
Ne	1.500BSC		0.060BSC	
E	2.900	3.100	0.116	0.124
E2	1.600	1.700	0.064	0.068
L	0.350	0.450	0.014	0.018
h	0.250	0.350	0.010	0.014
K	0.225	0.325	0.009	0.013
R	0.075REF		0.003REF	

9 Type And Reel Information

Reel Dimensions **Reel Dimensions**



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	1.30	4.0	8.0	2.0	12.0	Q1
WLCSP1.6X1.2-12	7''	8.3	1.35	1.75	0.70	4.0	4.0	2.0	8.0	Q1

NOTE:
1. All dimensions are nominal.
2. Plastic or metal protrusions of 0.15mm maximum per side are not included.