

多模式电荷泵压电发声驱动器

特点

- 支持电压范围从 1.3 V 到 5.5V
- 18V_{PP} 输出（3V 供电）
- 集成升压转换器可产生高达 16.5V 的电压输出
- 输入信号可以从 20Hz 到 10kHz
- 关机模式下无电压差分输出
- 低电流消耗
- 自动待机和唤醒控制
- 短路保护电流约 100mA
- OTP 功能

应用

- 医疗保健系统
- 家庭应用

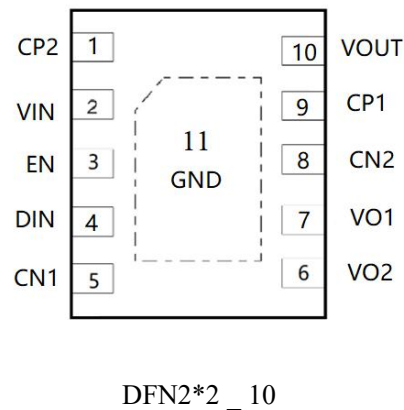
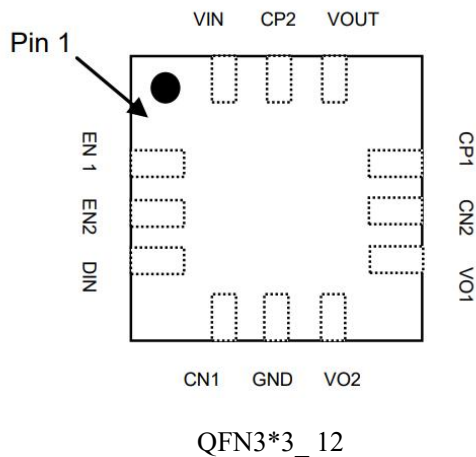
- 手表
- 手持 GPS 设备
- PDA
- 安全装置
- 报警钟表

描述

● SD110 是一款带多模式电荷泵的开关驱动器，用于压电发声器。它可以从 3V 电源驱动高达 18V_{pp} 的输出。为了调整压电发声器的音量，电荷泵可以在 1x 2x 或 3x 模式下工作。由于 SD110 具有自动关机功能，因此适用于电池应用。

● SD110 内置自动关机和唤醒功能，保证更长的电池寿命。SD110 具有热关机和输出短路保护电路。

封装 (QFN12 AND DFN10)

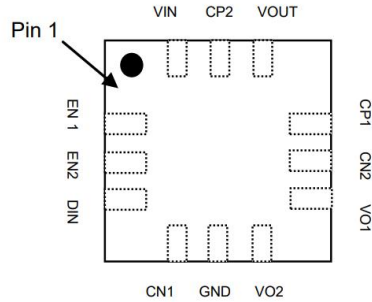


包装信息

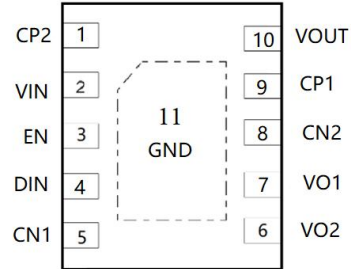
元件名称	封装类型	包装数量	工作温度(°C)	丝印
SD110	QFN12	5000	-40~85	SD110 XXX
SD110	DFN10	3000	-40~85	SD110 XXX

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封装及管脚名称



QFN3*3_12



DFN2*2_10

管脚功能

(1)G = 地, I = 输入, O = 输出, P = 电源

Pin Number		Pin Name	Type	Function
DFN2*2_10	QFN3*3_12			
3	1	EN1	I	倍压选择端 1
	2	EN2	I	倍压选择端 2
4	3	DIN	I	信号输入端
5	4	CN1	I	升压电容 1 负端
	5	GND	P	接地端
6	6	VO2	O	输出端 2
7	7	VO1	O	输出端 1
8	8	CN2	I	升压电容 2 负端
9	9	CP1	I	升压电容 1 正端
12		NC	—	空
10	10	VOUT	O	电荷泵输出端
1	11	CP2	I	升压电容 2 正端
2	12	VIN	P	输入电源端
11		EPAD	—	接地端

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最大极限参数 ^(注1)

(@ T_A = +25°C, 除非特别说明.)

类型	特性	参考值	单位
VIN	输入电压	-0.3 to 6.0	V
VOUT	输出电压	-0.3 to 16.5	V
VEN	EN 电压	-0.3 to V _{IN} +0.3	V
TA	工作自由空间温度范围	-40 to +85	°C
T _J	工作结温范围	-40 to +150	°C
TSTG	储存温度范围	-65 to +150	°C
ESD Rating	HBM 人体模式	±3	kV

注 1: 超过上述表中规定的极限参数会导致器件永久性损坏。而工作在以上极限条件下可能会影响器件的可靠性。.

推荐操作条件

(@ T_A = +25°C, 除非特别说明.)

类型	特性	条件	最小	最大	单位
VIN	输入电压	1x Mode 2x Mode, 3x Mode	1.3	5.5	V

热特性

参数	类型	封装	最大限值	单位
热阻 (结对环境)	θ _{JA}	DFN2*2_10	68	°C/W
热阻 (结到外壳)	θ _{JC}	DFN2*2_10	25	°C/W
热阻 (结对环境)	θ _{JA}	QFN12L	35	°C/W
热阻 (结到外壳)	θ _{JC}	QFN12L	14	°C/W

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电特性

(@T_A = +25°C, V_{IN} = 3.0V, C_{PIEZO} = 30nF, f_{DIN} = 3 kHz, 除非特别说明.)

参数	类型	条件	最小	典型	最大	单位
输出电压		1x Mode	1.2	—	3	V
	VOUT2	2x Mode	5.2	—	6	V
	VOUT3	3x Mode (Note 2)	7.2	—	9	V
工作电流 1	IDD11	1x Mode, C _{PIEZO} = 没有负载	—	105	—	μA
	IDD12	2x Mode, C _{PIEZO} = 没有负载	—	249	—	μA
	IDD13	3x Mode, C _{PIEZO} = 没有负载	—	354	—	μA
工作电流 2	IDD21	1x Mode, 单端应用	—	0.38	—	mA
	IDD22	2x Mode, 单端应用	—	1.33	—	mA
	IDD23	3x Mode, 单端应用	—	2.8	—	mA
工作电流 3	IDD31	1x Mode, 差分应用	—	1.1	—	mA
	IDD32	2x Mode, 差分应用	—	4.46	—	mA
	IDD33	3x Mode, 差分应用	—	9.83	—	mA
关机电流	ISD	DIN = 0V	—	—	1	μA
输入频率	f _{IN}	矩形脉冲	—	3	—	kHz
晶振频率	f _{OSC}	—	—	200	—	kHz
VOUT 开始延时时间	t _{ON1}	1x Mode, 从 DIN 信号高到 90%Vout 稳态	—	95	—	μs
	t _{ON2}	2x Mode, 从 DIN 信号高到 90%Vout 稳态	—	310	—	μs
	t _{ON3}	3 x Mode, 从 DIN 信号高到 90%Vout 稳态	—	390	—	μs
关机延时时间	t _{OFF}	DIN = H- > L	—	42	—	ms
输出短路电流	ISC	—	—	40	—	mA
控制端电压 H	VIH	EN, DIN 管脚	0.8*VIN	—	VIN	V
控制端电压 L	VIL	EN, DIN 管脚	0	—	0.2*VIN	V
控制端电流 1	IIH1	DIN = 3V	—	1.7	—	μA
控制端电流 2	IIH2	VEN1 = X, DIN = 3V	—	1.7	—	μA
控制端电流 t 3	IIH3	VEN = X, DIN = 0V	—	—	1	μA

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电荷泵模式设置

QFN3*3_12 模式设置

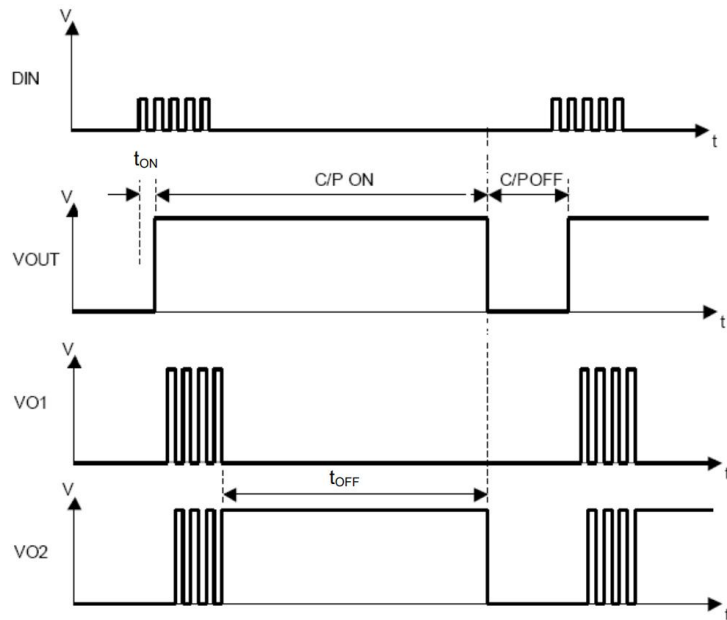
DIN	EN1	EN2	MODE
0	--	--	Shutdown Mode
1	0	1	1x Mode
1	1	0	2x Mode
1	1	1	3x Mode

DFN2*2_10 模式设置

DIN	EN	模式
0	--	待机模式
1	0	2x 模式
1	1	3x 模式

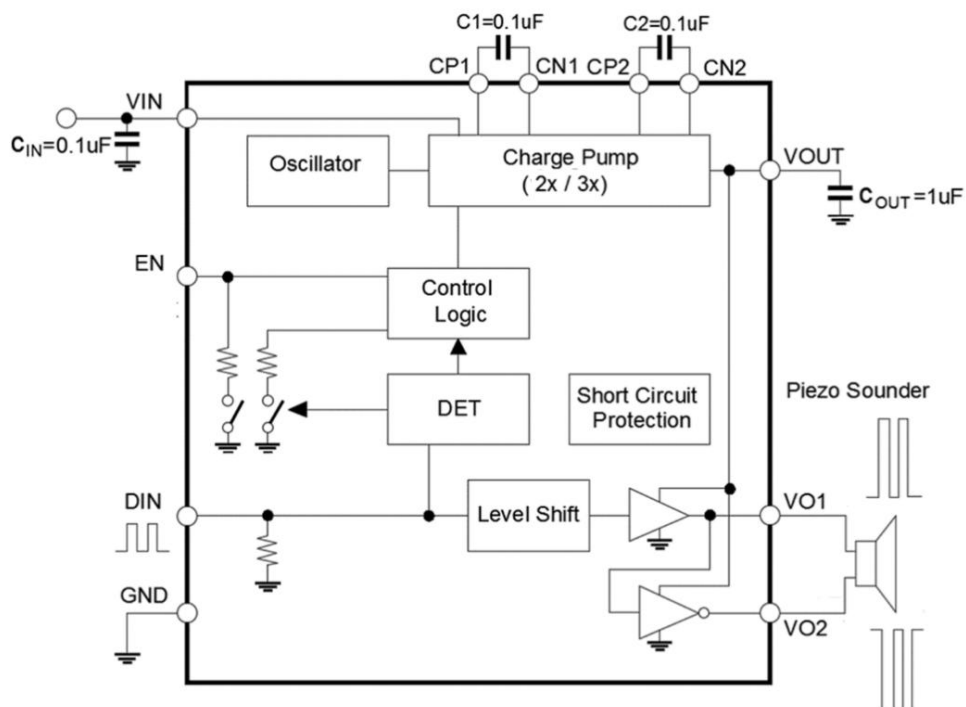
注意事项：SD110 是通过 DIN 开启和关断输出，DIN 给波形时 EN 不可给方波或低电平。

时序图

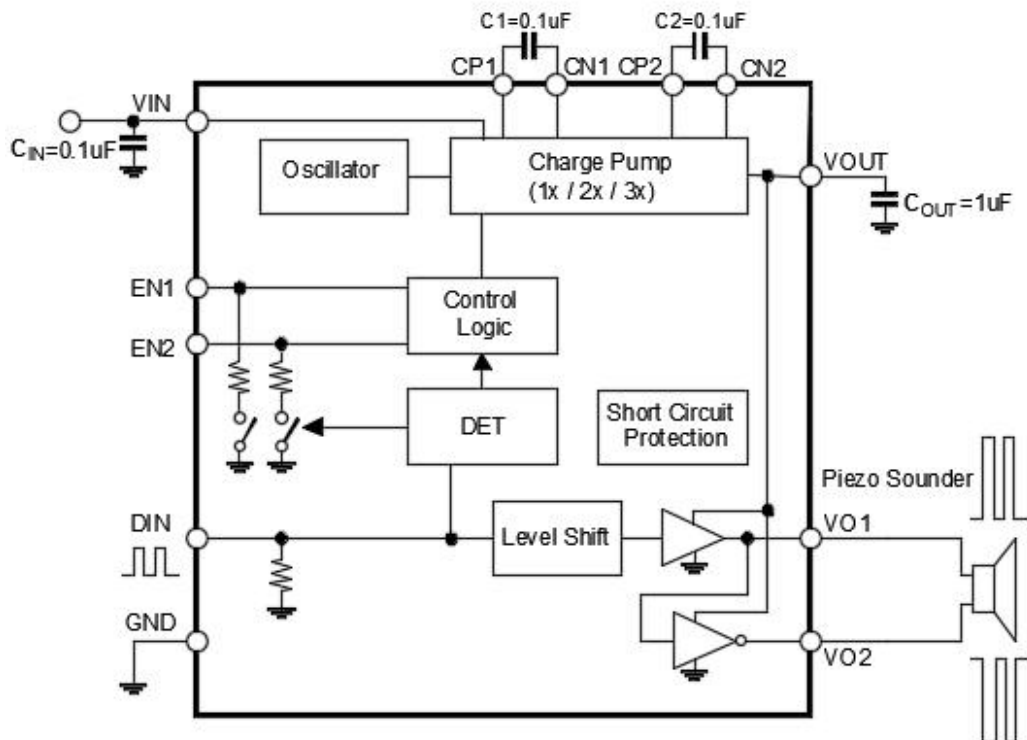


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典型应用电路



DFN2*2_10 Application

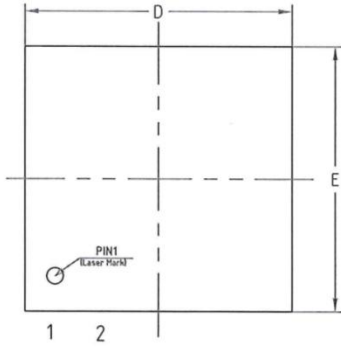


QFN3*3_12 Application

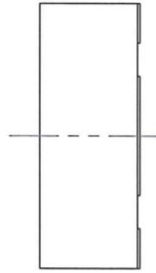
多模式电荷泵压电发声器驱动器

封装信息(DFN2*2_10)

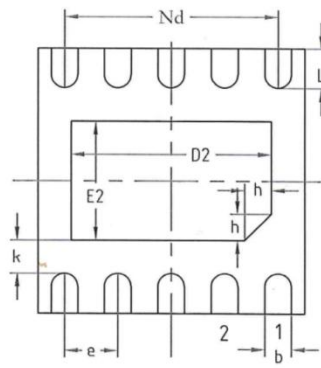
TOP VIEW
正视图



SIDE VIEW
侧视图

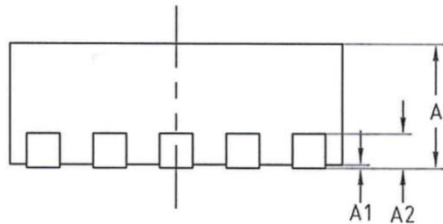


BOTTOM VIEW
背视图



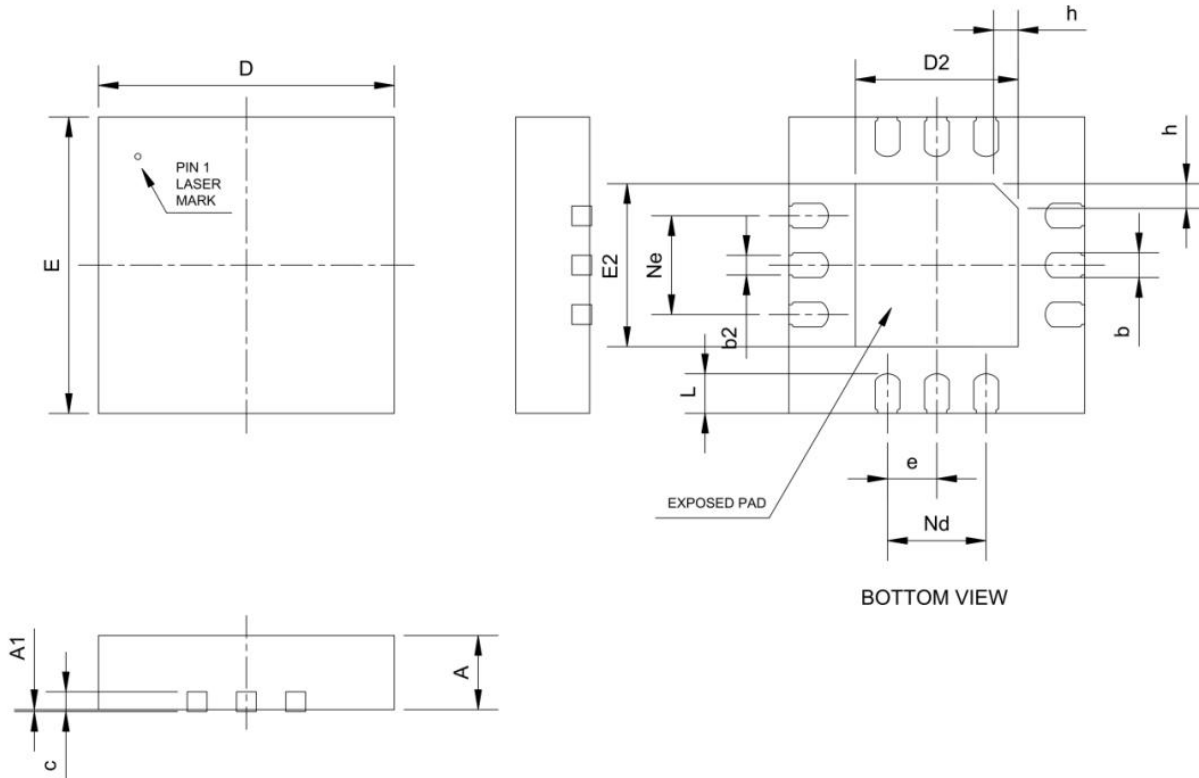
机械尺寸/mm			
字符 SYMBOL	最小值 MIN	典型值 NOMINAL	最大值 MAX
A	0.70	0.75	0.80
A1	-	0.02	0.05
A2	0.203 REF		
b	0.15	0.20	0.25
D	1.90	2.00	2.10
D2	1.45	1.50	1.55
E	1.90	2.00	2.10
E2	0.85	0.90	0.95
e	0.40 BSC		
K	0.20	0.25	0.30
L	0.25	0.30	0.35
h	0.15	0.20	0.25
Nd	1.60 BSC		

SIDE VIEW
侧视图



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PACKAGE INFORMATION(QFN3*3_12)



Symbol	Min	Nom	Max	Unit
PACKAGE DIMENSIONS				
A	0.70	0.75	0.80	mm
A1	---	0.02	0.05	mm
b	0.20	0.25	0.30	mm
b2	0.15	0.20	0.25	mm
c	0.18	0.20	0.25	mm
D	2.90	3.00	3.10	mm
D2 (Exposed.pad)	1.55	1.65	1.75	mm
e	0.50 BSC			mm
Ne	1.00 BSC			mm
Nd	1.00 BSC			mm
E	2.90	3.00	3.10	mm
E2 (Exposed.pad)	1.55	1.65	1.75	mm
L	0.35	0.40	0.45	mm
h	0.20	0.25	0.30	mm

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Data	Version	Changes
17-Mar-2024	Ver1.0	初始版本
01- Apr -2026	Ver1.1	增加 QFN12 封装