

DATA SHEET



SUNPLUS

SPY0030A

Audio Driver

AUG. 03, 2004

Version 1.0

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AUDIO DRIVER

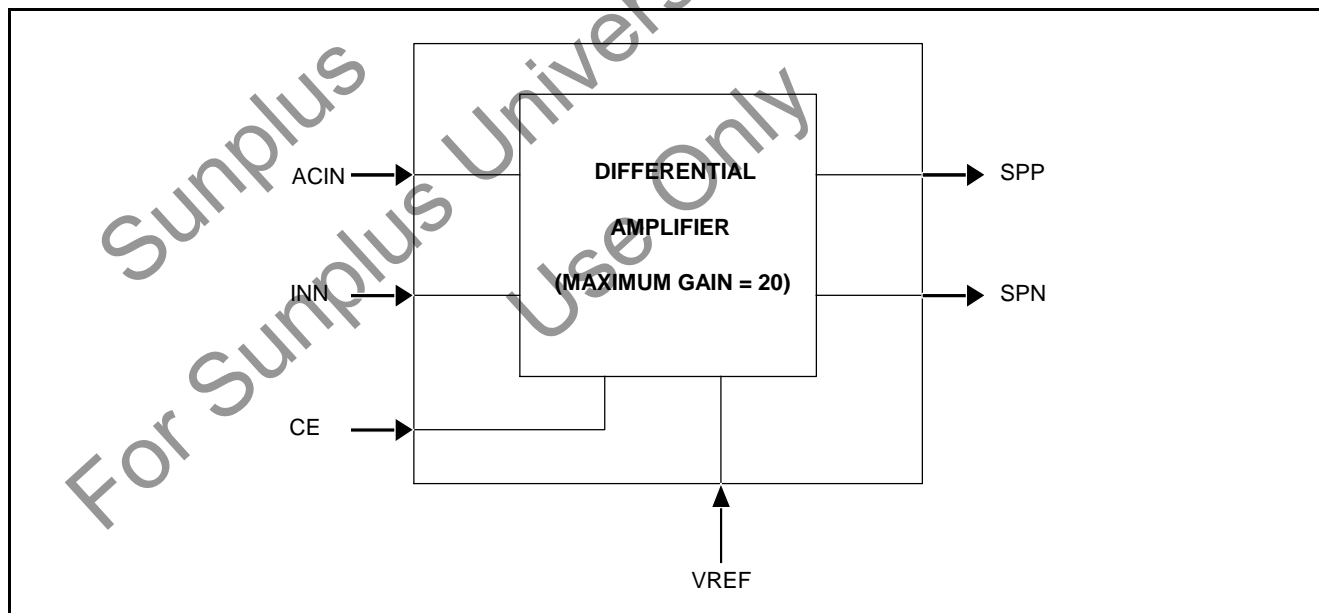
1. GENERAL DESCRIPTION

The SPY0030A is an audio driver whose gain can be adjusted by external resistor. (Maximum gain is 20) Normally, it is applied for SPC series, SPF series, SPL series and other SUNPLUS products. The SPY0030A is easily to be used in various applications and products.

2. FEATURES

- Wide operation range: 2.4V ~ 6.8V
- Dual-end output mode
- Low distortion: THD+N = 0.55% (Typ.)
(For $V_{DD} = 5.0V$, $R_L = 8.0\Omega$ & $P_{out} = 500mW$)
- High output power: $P_{OUT} = 825mW$
(For $V_{DD} = 5.0V$, THD+N = 10%, $f = 1.0KHz$ & $R_L = 8.0\Omega$)
- Low standby current: 1.0 μA

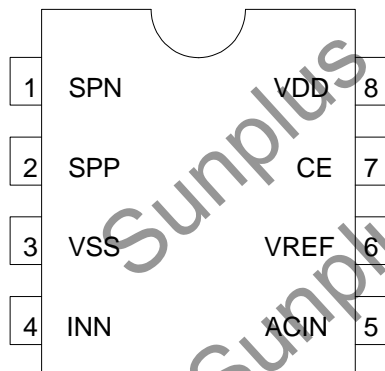
3. BLOCK DIAGRAM



4. SIGNAL DESCRIPTIONS

Mnemonic	PIN No.	Type	Description	Electrical Characteristics
VDD	8	I	Power VDD	2.4V - 6.8V
VSS	3	I	Power VSS	
SPP	2	O	Audio output positive	
SPN	1	O	Audio output negative	
ACIN	5	I	Signal input positive	
INN	4	I	Signal input negative	
CE	7	I	Chip enable	
VREF	6	O	Reference voltage	VDD/2

4.1. PIN Assignment



5. ELECTRICAL SPECIFICATIONS

5.1. Absolute Maximum Ratings

Characteristics	Symbol	Ratings
DC Supply Voltage	V_+	< 7.0V
Input Voltage Range	V_{IN}	-0.5V to $V_+ + 0.5V$
Operating Temperature	T_A	0°C to +60°C
Storage Temperature	T_{STO}	-50°C to +150°C

Note: Stresses beyond those given in the Absolute Maximum Rating table may cause operational errors or damage to the device. For normal operational conditions see AC/DC Electrical Characteristics.

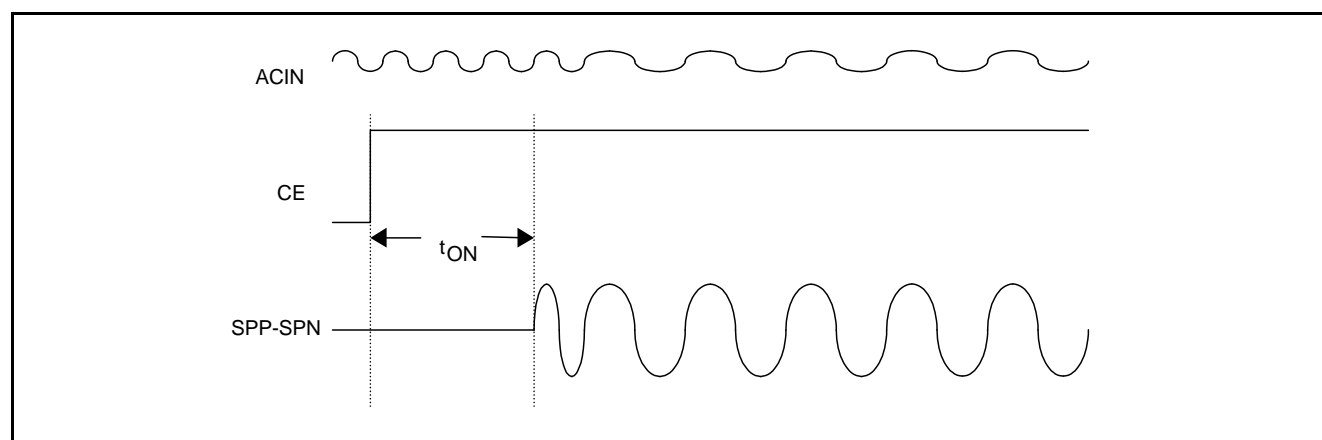
5.2. DC Characteristics ($T_A = 25^\circ\text{C}$)

Characteristics	Symbol	Limit			Unit	Test Condition
		Min.	Typ.	Max.		
Operating Voltage	VDD	2.4	-	6.8	V	For 2- or 3-battery application
Standby Current	I_{STBY}	-	-	1.0	μA	CE low
Reference Voltage	V_{VREF}	-	VDD/2	-	V	CE high, the voltage of VREF (PIN 6)
Total Harmonic Distortion + Noise	THD+N	-	0.55	1.0	%	VDD = 5.0V, $R_L = 8.0\Omega$, $P_{OUT} = 500\text{mW}$
Input resistor (CE)	R_{CE}	-	20	-	$K\Omega$	$V_{IH} = VDD$, Pull-low
Input current (CE)	I_{CE}	200	-	-	μA	$V_{IH} = 2.3V$ at VDD = 5.0V
Operating Current	I_{CC}	-	3.0	6.0	mA	CE high, no load & ACIN floating
Output power (See Note 1)	P_{OUT}	500	675	-	mW	VDD = 5.0V, THD+N = 1%, $f = 1.0\text{KHz}$ & $R_L = 8.0\Omega$
		-	825	-	mW	VDD = 5.0V, THD+N = 10%, $f = 1.0\text{KHz}$ & $R_L = 8.0\Omega$
Enable time (See Note 2)	T_{ON}	-	15	-	ms	VDD = 5.0V
		-	30	-	ms	VDD = 3.0V

Note1: Output power = $(V_{O(PEAK)})^2/2R_L$; $V_{O(PEAK)} = (V_{I(PEAK)}) \cdot \text{GAIN}$;

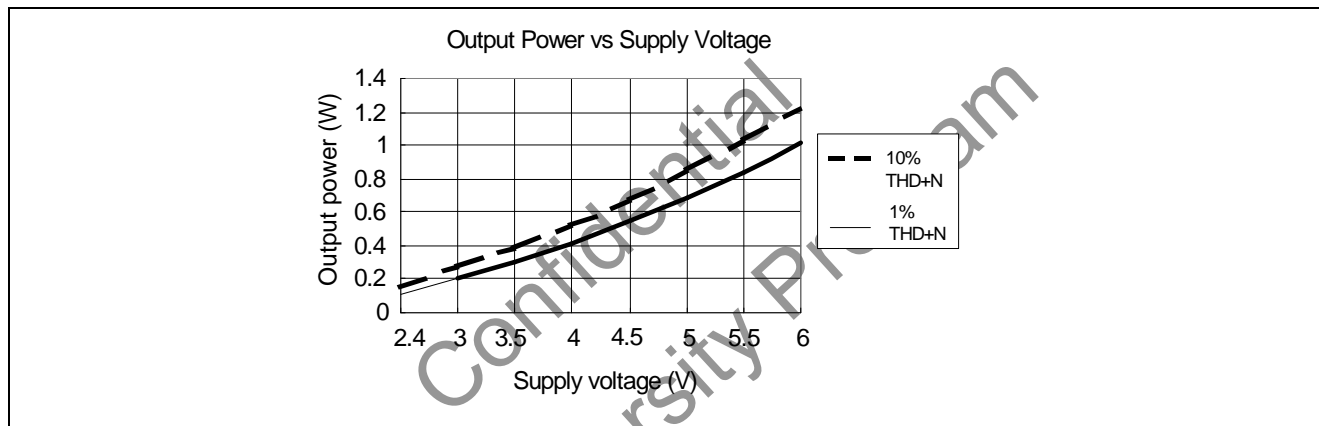
So we can get the input range from output power, output loading and audio driver's gain.

Note2: t_{ON} is the time from CE high (chip enable) to SPP or SPN output.

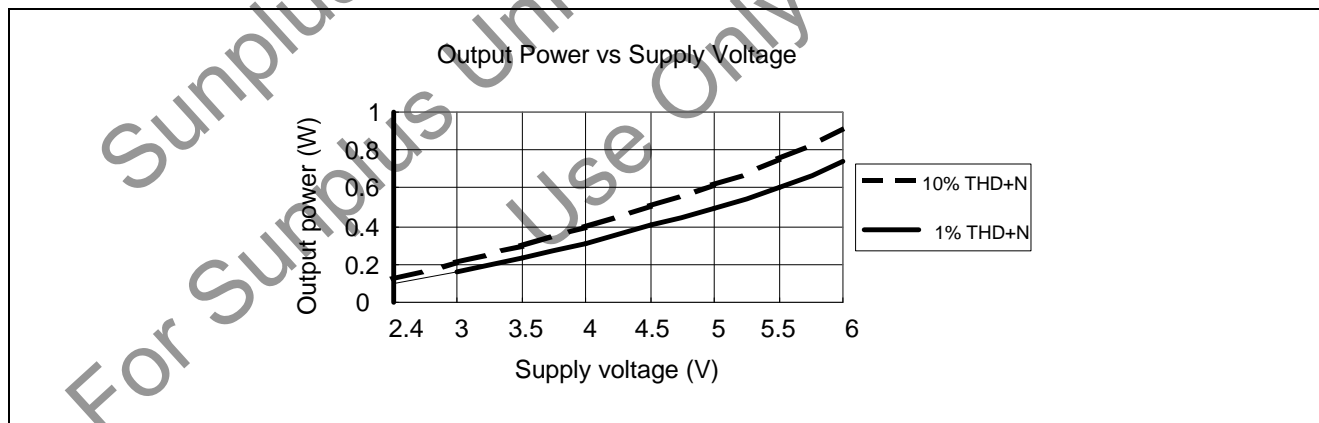


5.3. Typical Performance Characteristics

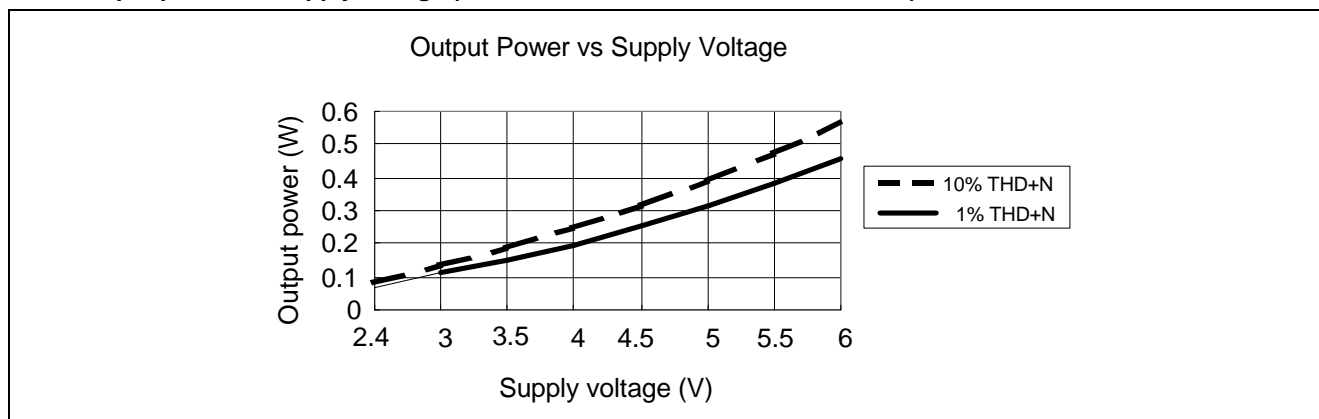
5.3.1. Output power vs. supply voltage ($f_{IN} = 1.0\text{KHz}$, $R_L = 8.0\Omega$, $20\text{Hz} < \text{BW} < 22\text{KHz}$)

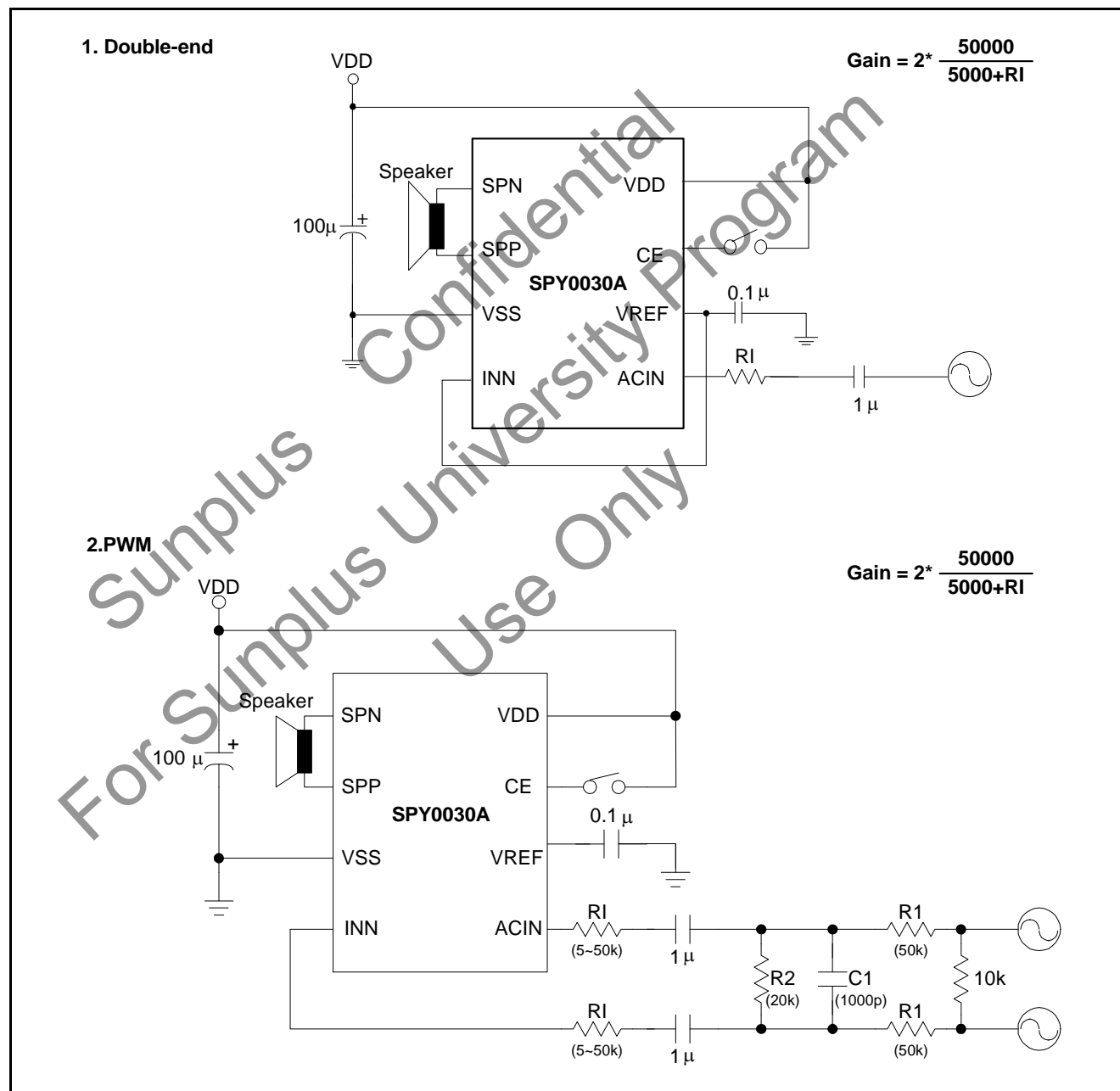


5.3.2. Output power vs. supply voltage ($f_{IN} = 1.0\text{KHz}$, $R_L = 16\Omega$, $20\text{Hz} < \text{BW} < 22\text{KHz}$)



5.3.3. Output power vs. supply voltage ($f_{IN} = 1.0\text{KHz}$, $R_L = 32\Omega$, $20\text{Hz} < \text{BW} < 22\text{KHz}$)



6. APPLICATION CIRCUIT


7. PACKAGE/PAD LOCATIONS

7.1. PAD Assignment and Locations

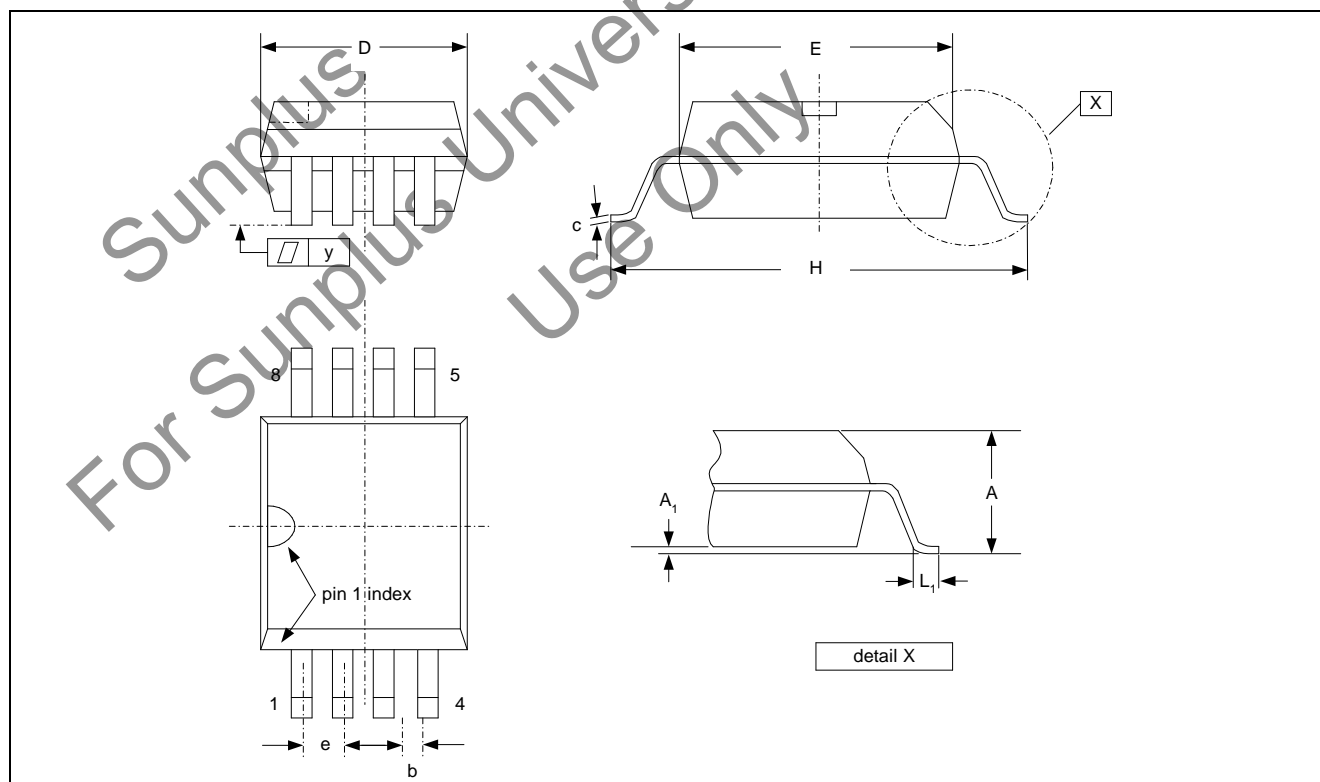
Please contact Sunplus sales representatives for more information.

7.2. Ordering Information

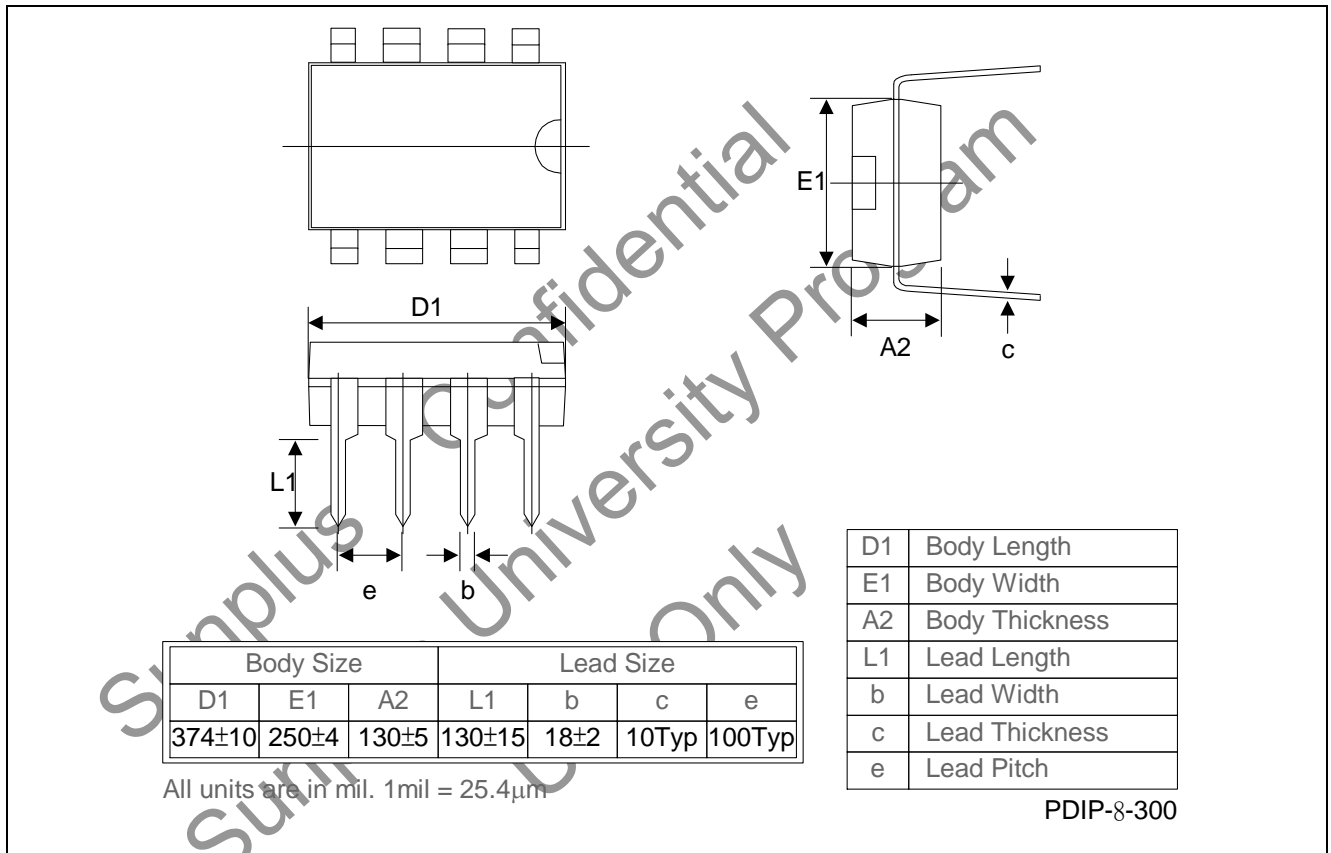
Product Number	Package Type
SPY0030A - C	Chip form
SPY0030A - PS01	Package form - SOP8 (150mil)
SPY0030A - PD01	Package form - PDIP 8 (300mil)

7.3. Package Information

7.3.1. SOP 8



Symbol	Dimension in inch		
	Min.	Typ.	Max.
A	0.053	-	0.069
A ₁	0.004	-	0.010
b	-	0.016	-
D	0.189	-	0.196
E	0.150	-	0.157
e	-	0.050	-
H	0.228	-	0.244
L ₁	0.016	-	0.050
y	-	-	0.004

7.3.2. PDIP 8


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9. REVISION HISTORY

Date	Revision #	Description	Page
AUG. 03, 2004	1.0	1. Remove " <u>Preliminary</u> " 2. Correct SOP 8 package unit: from mm to inch 3. Remove pad assignment and locations	8
FEB. 20, 2003	0.3	1. Update " <u>5.2 DC Characteristics ($T_A = 25^{\circ}\text{C}$)</u> " 2. Update " <u>6. APPLICATION CIRCUIT</u> " 3. Update Operating voltage: 2.4V - 6.0V -> 2.4V - 6.8V	4 6 3, 4
OCT. 02, 2002	0.2	1. VDD Power: 5.5V to 6.0V 2. Add " <u>5.3 Typical Performance Characteristics</u> " 3. Modify " <u>7.3 Ordering Information</u> " 4. Add " <u>7.5 Package Information</u> "	5 7 9 - 10
JUN. 26, 2001	0.1	Original	11