



# AS4305N

## 1.25 V Secondary V/I Amplifier

### DESCRIPTION

The AS4305N is a low cost error amplifier for a constant voltage/constant current loop. The voltage loop is referred to a 1.25 V reference, the current loop to a 200mV threshold.

The AS4305N voltage reference is a 1.25V bandgap trimmed to 1.0% accuracy and temperature compensated to 50ppm/°C over a wide -10 to 105°C junction temperature range. The current loop reduces the 1.25 V reference by 40mV per mV change at the current sense input, once the 200mV threshold has been surpassed.

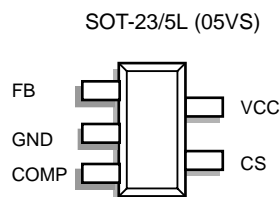
The AS4305N has been optimized to provide high gain and 1 MHz bandwidth under low voltage operation, as well as providing 5 mA of current to drive an optocoupler.

The AS4305N is available in SOT23-5 package.

### Features

- precision internal voltage reference
- constant voltage and constant current control in one package
- extended commercial temperature range
- eliminates separate control amplifier
- 50 ppm/°C typical temperature deviation
- low voltage operation to 3V
- 5 mA current sink
- available in SOT-23 package

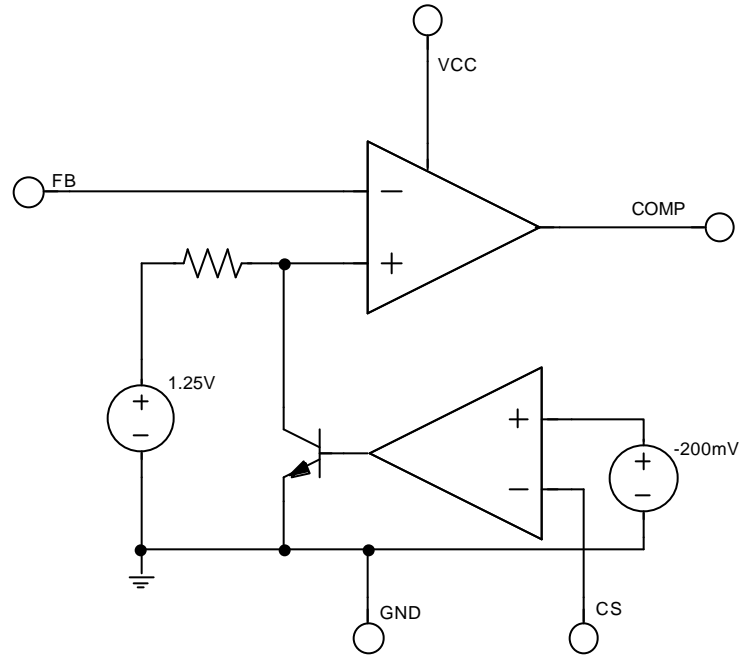
### PINOUTS - top view



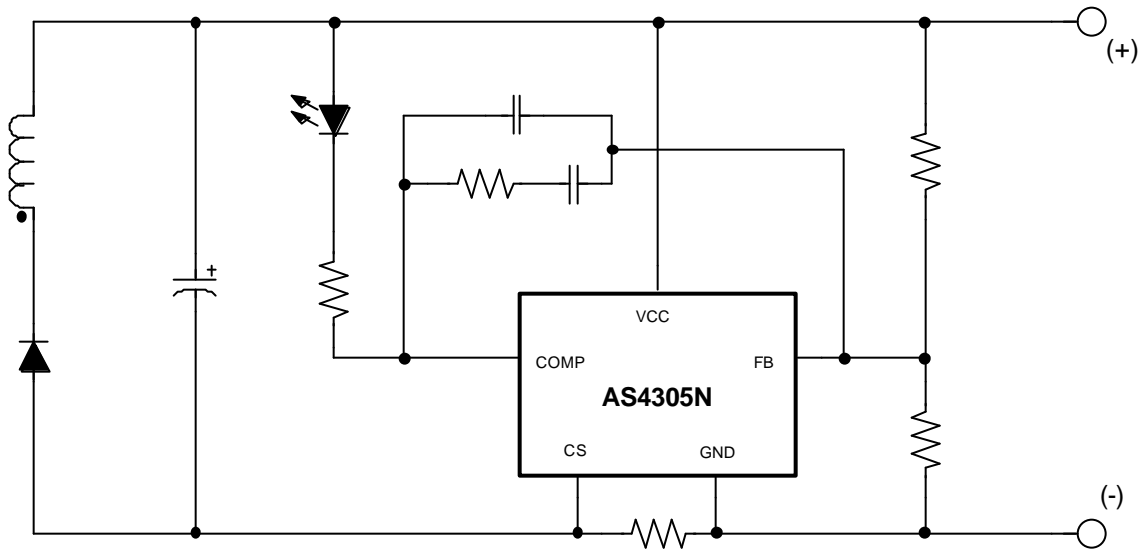
### ORDERING INFORMATION

Description	Operating Junction Temp	Part No.
SOT23-5	-10 to 105° C	AS4305-5VSN2

**FUNCTIONAL BLOCK DIAGRAM**



**TYPICAL APPLICATION**



**ABSOLUTE MAXIMUM RATINGS**

Parameter	Symbol	Rating	Unit
Supply Voltage	VCC	18	V
Output Voltage	COMP	18	V
Operating Output Current	I <sub>COMP</sub>	50	mA
Input Current	I <sub>FB</sub> , I <sub>CS</sub>	±2	mA
Input Voltage	VCS	±0.5	V
Continuous Power Dissipation at 25 °C SOT23-5	PD	200	mW
Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature	T <sub>STG</sub>	-60 to 150	°C
Lead Temperature (soldering, 10 seconds)	T <sub>L</sub>	300	°C

**PIN DESCRIPTION**

Pin Name	Description
<b>Vcc</b>	Positive DC supply for the IC. The chip needs at least 3V Vdc to start operating.
<b>FB</b>	The inverting input of the voltage error amplifier. The non-inverting input is trimmed to a 1.25 V +/-1% bandgap reference. This section controls the voltage loop to attain constant voltage mode.
<b>COMP</b>	The output of the chip can drive a 5 mA optocoupler or other feedback devices.
<b>CS</b>	The inverting input of the current error amplifier. The non-inverting input is referred to a -200mV threshold. This section controls the current loop to attain constant current mode by altering the voltage reference input to the voltage error amplifier.
<b>GND</b>	Circuit common ground

**ELECTRICAL CHARACTERISTICS**

Electrical characteristics are guaranteed over the full junction temperature range  $-10 < T_J < 105 \text{ }^\circ\text{C}$ .  
Ambient temperature must be derated based upon power dissipation and package thermal characteristics. Unless otherwise stated, test conditions are:

$V_{CC} = 5\text{V}$ ,  $V_{CS} = 0\text{V}$ ,  $V_{COMP} = V_{FB}$ ,  $I_{COMP} = 1\text{mA}$

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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**Reference**

Reference Voltage	$V_{REF}$	@ $T_a = 25^\circ\text{C}$ $\pm 1\%$	1.238	1.250	1.263	V
Line Regulation	$\Delta V_{REF}$	$V_{CC} = 3\text{V to } 15$		10	15	mV
Load Regulation	$\Delta V_{REF}$	$I_{COMP} = 1 \text{ mA to } 5 \text{ mA}$		3	6	mV
Temperature Deviation	$\Delta V_{REF}$	$-10 < T_J < 105^\circ\text{C}$		6	9	mV
Reference Input Current	$I_{FB}$			0.2	1	$\mu\text{A}$

**Amplifier**

Amplifier open loop Gain	$A_V$			60		dB
Unity gain frequency	$F_1$			1		MHz
Output saturation Voltage	$V_{COMP}$	$I_{COMP} = 10 \text{ mA}$		375	500	mV
Output saturation Current	$I_{COMP}$	$V_{COMP} = 340 \text{ mV}$		5	15	mA
Output Leakage Current	$I_{Leak}$	$V_{COMP} = 18\text{V}$ , $V_{FB} = 0\text{V}$ ,		250	500	nA

**ELECTRICAL CHARACTERISTICS**

Electrical characteristics are guaranteed over the full junction temperature range  $-10 < T_J < 105$  °C. Ambient temperature must be derated based upon power dissipation and package thermal characteristics. Unless otherwise stated, test conditions are:

$V_{CC} = 5V$ ,  $V_{CS} = 0V$ ,  $V_{COMP} = V_{FB}$ ,  $I_{COMP} = 1mA$

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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**Current Sense**

Threshold Voltage	$V_{CS}$	@ $T_a = 25^\circ C$ Class A Green Class B Red Class C Yellow	-195		-198	mV
			-198		-201	mV
			-201		-205	mV
		<b>Variation over temp</b>				2
Bias Current	$I_{CS}$	$V_{CS} = -200$ mV		-100		$\mu A$
		$V_{CS} = -250$ mV		-300		$\mu A$
Gain	$\Delta V_{FB}$	per mV change in CS @ $T_a = 25^\circ C$ $-10 < T_J < 105$ °C		40		mV
			35	40	45	mV

**Supply**

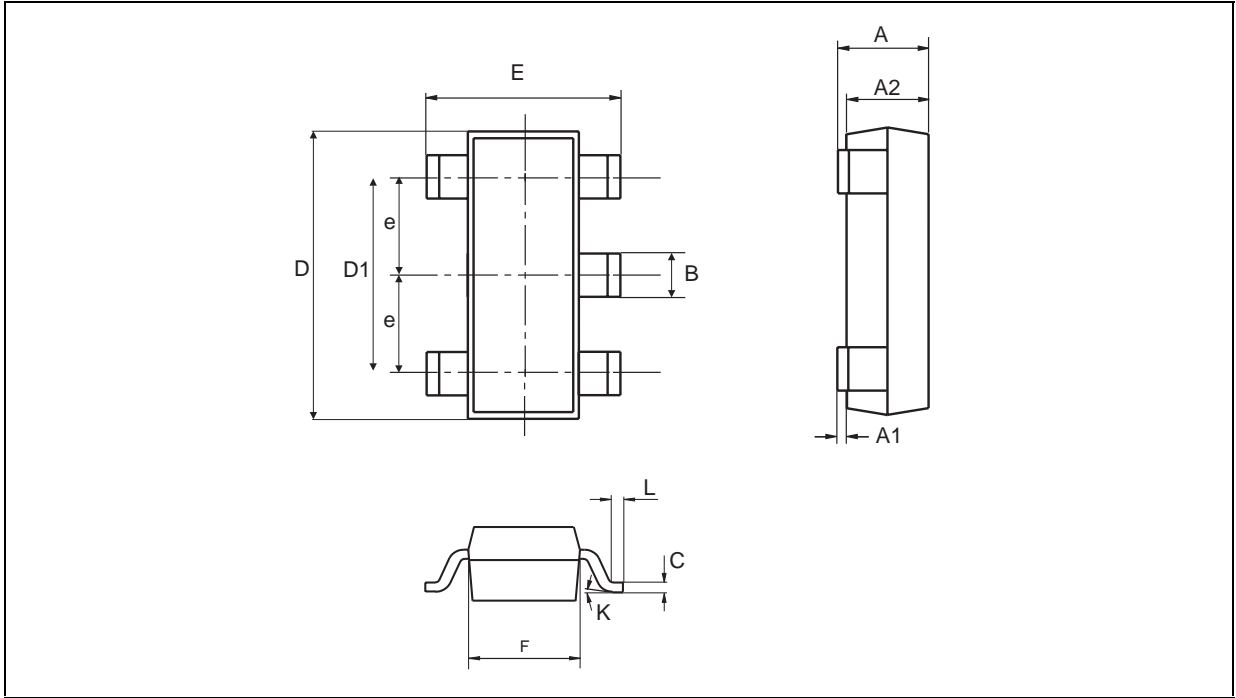
Supply Current	$I_{CC}$	$V_{CC} = 15$ V		0.8	2	mA
		$V_{CC} = 5$ V		0.6	1.0	mA
Supply Voltage	$V_{CC}$		3		15	V

**Typical Thermal Characteristics**

Package	$T_{JA}$	$T_{JC}$	Typical Derating
SOT23-3	130°C/W	°C/W	mW/°C

**PACKAGE OUTLINE DRAWING**

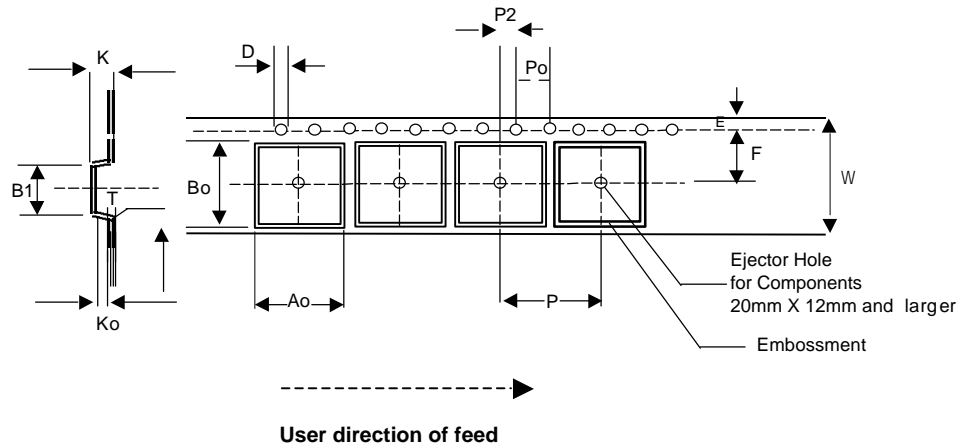
5 PINS - PLASTIC PACKAGE SOT23-5



Dim.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.90	1.20	1.45	0.035	0.047	0.057
A1	0		0.15			0.006
A2	0.90	1.05	1.30	0.035	0.041	0.051
B	0.35	0.40	0.50	0.014	0.016	0.020
C	0.09	0.15	0.20	0.004	0.006	0.008
D	2.80	2.90	3.00	0.110	0.114	0.118
D1		1.90			0.075	
e		0.95			0.037	
E	2.60	2.80	3.00	0.102	0.110	0.0118
F	1.50	1.60	1.75	0.059	0.063	0.069
L	0.10	0.5	0.60	0.004	0.014	0.024
K	0d		10d	0d		10d

**PACKAGE MECHANICAL DRAWING**

Surface Mountable Tape & Reel Specifications in mm ( inch )  
( SOT-23 )

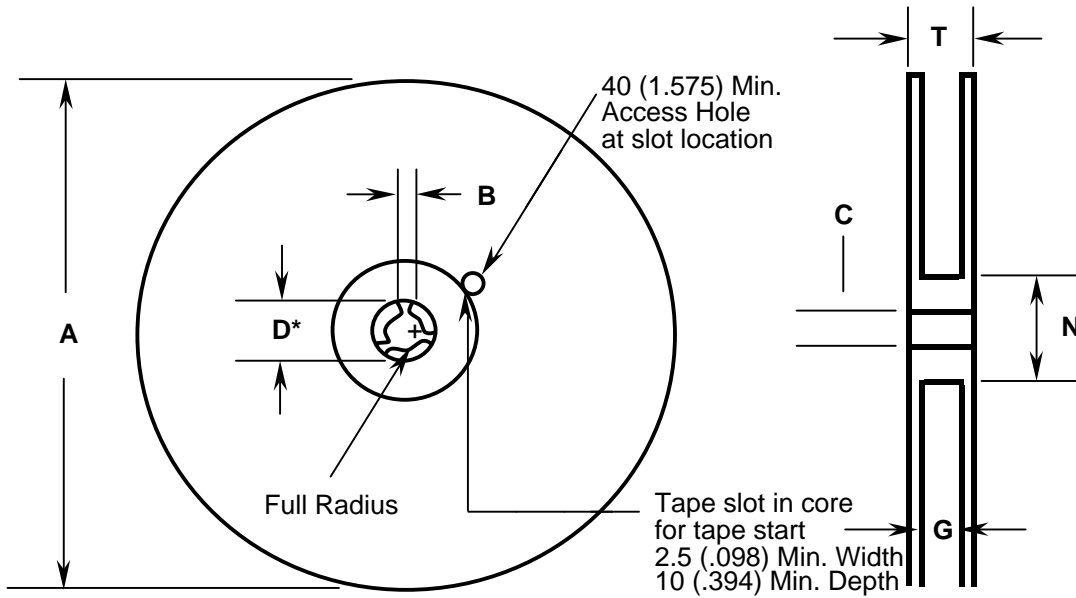


Tape Size (W)	D	E	P0	T (Max)	A0, B0, K0	T1 (Max)	Constant Dimensions
8, 12, 16, 24mm	1.55±0.05 (.061±.002)	1.75±0.10 (.069±.004)	4.0±0.10 (.157±.004)	0.400 (.016)	See Note	0.100 (.004)	

Tape Size (W)	B1 Max.	D1 Min.	F	K Max.	P2
8 mm	4.2 (.165)	1.0 (.039)	3.5±0.05 (.138±.002)	2.4 (.094)	2.0±.05

Per Package Requirement						
Components		Tape Width (W) mm	Cavity Pitch (P) mm	Devices per Reel		
				7" Reel	13" Reel	14" Reel
SOT-23	5L	8	4	3000	-	-

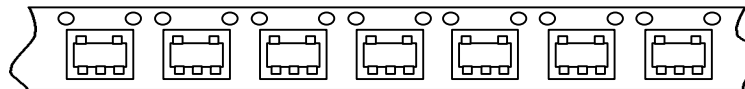
**Note:** Ao Bo Ko are determined by component size. The clearance between the component and the cavity must be within 0.05 [.002] min. to 0.50 [.020] max. for 8mm tape, 0.05 [.002] min to 0.65 [.026] max for 12mm tape.



REEL DIMENSIONS							
	A Max.	B Min.	C	D* Min.	N Min.	G	T Max.
8mm	330 (12.992)	1.5 (.059)	13.0±0.20 (.152±.008)	20.2 (.795)	50 (1.973)	8.4±1.5 0.0 (.331±.059) 0.0	14.4 (.567)

MECHANICAL POLARIZATION

SOT 23-5L DEVICE



User direction of feed ----->

**Notes**