Elektronische Bauelemente

SPW8103S

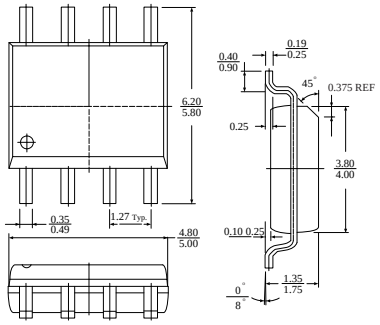
Dual OP-AMP and 2.5V±0.7% Voltage Reference

RoHS Compliant Product

Description

The SPW8103S consists of 2 low-offset voltage amplifiers and a high-accuracy 2.5V voltage reference in SOP-8 package. The SPW8103S provides a low cost and space saving solution for the application such as power supply and switching adapters. The SPW8103S is available in a SOP-8 package. It can operate over the ambient temperature range from -40℃ to 105℃.

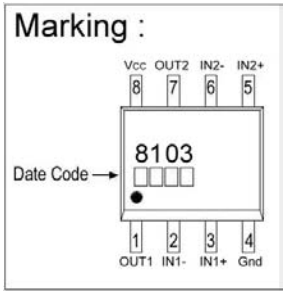
SOP-8



Dimensions in millimeters

Features

* Max. 27V Voltage Rating
* V_{REF} Sinking Current Capability : 1mA to 100 mA
* Low Input Offset Voltage
* Precision ±0.7% Voltage Reference



Appliactions

* Adapter
* Switching Power Supply
* Portable Device

Typical Circuit

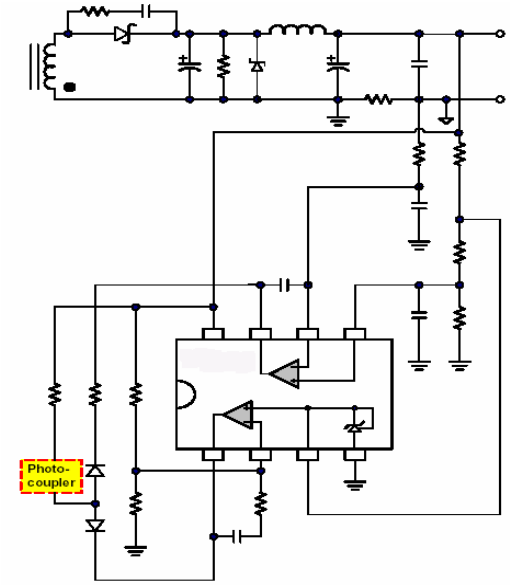
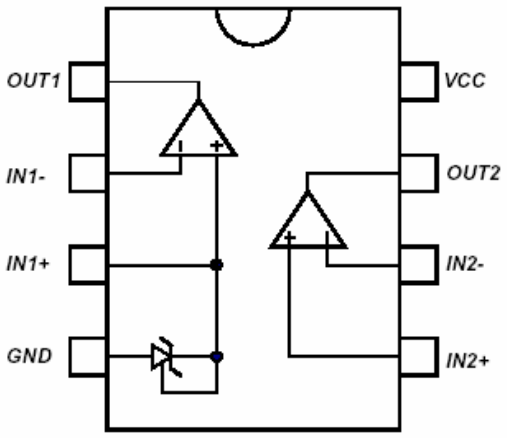


Fig 1. CC/CV Control for Switching Adapters

Block Diagram



Pin Descriptions

Pin	Name	Function
1	OUT1	Output of Op-amp 1
2	IN1-	Negative terminal of Op-amp 1
3	IN1+	Positive terminal of Op-amp 1, connected to internal reference voltage
4	GND	Ground
5	IN2+	Positive terminal of Op-amp 2
6	IN2-	Negative terminal of Op-amp 2
7	OUT2	Output of Op-amp 2
8	VCC	Supply voltage

Absolute Maximum Ratings

Parameter	Ratings	Unit
Supply Voltage V_{CC}	27	V
Differential Input Voltage(IN1+ to IN1-, IN2+ to IN2-)	27	V
Input Voltage	-0.3 ~ V_{CC}+0.3V	V
Maximum Junction Temperature	150	℃
Operating Ambient Temperature Range	-40 ~ + 105	℃
Storage Temperature Range	-65 ~ + 150	℃
Lead Temperature (PB Free, 10sec)	260	℃
Junction-to-Ambient Thermal Resistance	160	℃/W
ESD Level (Human Body Model)	2k	V

Caution:
Stresses beyond the ratings in "Absolute maximum ratings" may cause permanent damage to the device. This is a stress only rating and operation of device at these or any other conditions above those indicated in the operational sections of this specification is not limited.

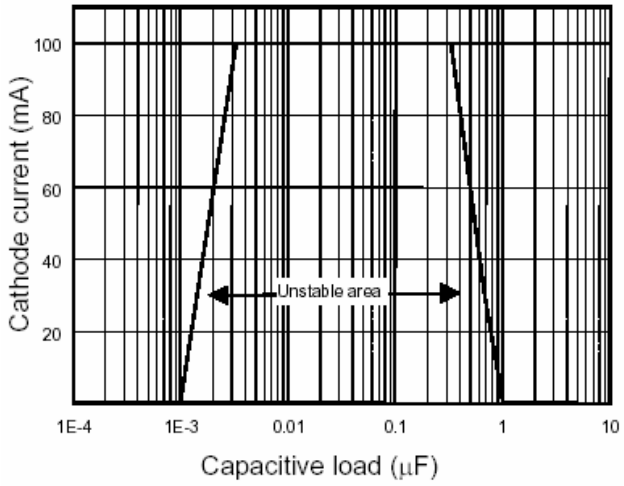
Electrical Characteristics

Parameter	Test Conditions	Min	Typ	Max	Unit
Total Supply Current (No Load)	V_{CC}=5V, -40℃~105℃	-	0.7	1.2	mA
	V_{CC}=27V, -40℃~105℃	-	-	2	

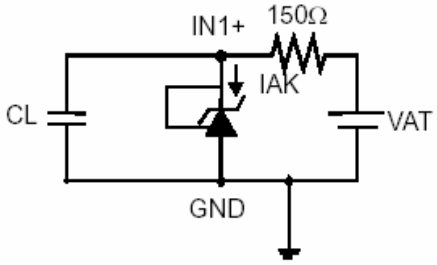
(V_{CC}=+5V, T_A=+25℃ unless otherwise stated)

Parameter	Test Conditions	Min	Typ	Max	Unit
OP-Amp1 & OP-Amp2					
Input Offset Voltage (Common mode Voltage=0V)	25℃	-	1	4	mV
	-40℃~105℃	-	-	5	
Input Offset Voltage Drift		-	7	-	μV/℃
Input Bias Current (OP1)	25℃	-	20	-	nA
Input Bias Current (OP2)	25℃	-	20	150	nA
	-40℃~105℃	-	-	200	
Output Source Current	V_{CC}=15V, V_O=2V Differential Input Voltage=1V	20	40	-	mA
Output Sink Current	V_{CC}=15V, V_O=2V Differential Input Voltage=-1V	10	-	-	mA
	V_{CC}=15V, V_O=0.2V Differential Input Voltage=-1V	12	50	-	μA
Output Short Current	V_{CC}=15V	-	40	60	mA
Output Voltage – High Level	V_{CC}=27V, R_L=2kΩ, 25℃	23	24	-	V
	V_{CC}=27V, R_L=2kΩ, -40℃~105℃	23	-	-	
	V_{CC}=27V, R_L=10kΩ, 25℃	24	-	-	
	V_{CC}=27V, R_L=10kΩ, -40℃~105℃	24	25	-	
Output Voltage – Low Level	R_L=10kΩ, 25℃	-	5	20	mV
	R_L=10kΩ, -40℃~105℃	-	-	20	
Large Signal Voltage Gain (OP1)	Common mode Voltage=0V V_{CC}=15V, R_L=2kΩ V_O=1.4V~11.4V, -40℃~105℃	-	100	-	V/mV
Large Signal Voltage Gain (OP2)	V_{CC}=15V, R_L=2kΩ, V_O=1.4V~11.4V, 25℃	50	100	-	V/mV
	V_{CC}=15V, R_L=2kΩ, V_O=1.4V~11.4V, -40℃~105℃	25	-	-	
Slew Rate at Unity Gail	V_{IN}=0.5V~2V, V_{CC}=15V R_L=2kΩ, C_L=100pF, Unity Gain	0.2	0.4	-	V/μS
Supply Voltage Rejection Ratio	Common mode Voltage=0V, V_{CC}=5~27V	65	100	-	dB
Gain Bandwidth Product	V_{CC}=27V, R_L=2kΩ, C_L=100pF, f=100kHz, V_{IN}=10mV	0.5	0.9	-	MHz
Total Harmonic Distortion	V_{CC}=27V, R_L=2kΩ, C_L=100pF V_O=2V_{PP}, f=1kHz, A_V=20dB	-	0.02	-	%

OP-Amp2					
Input Offset Current	25℃	-	2	75	nA
	-40℃~105℃	-	-	150	
Input Common Mode Voltage Range	V_{CC}=27V, 25℃	0	-	V_{CC}-1.5	V
	V_{CC}=27V, -40℃~105℃	0	-	V_{CC}-2	
Common Mode Rejection Ratio	25℃	70	85	-	dB
	-40℃~105℃	60	-	-	
Equivalent Input Noise Voltage	f=1kHz, R_S=100Ω,V_{CC}=27V	-	50	-	$nV/\sqrt{Hz}$
Reference Voltage					
Cathode Current		1	-	100	mA
Reference Voltage (I_K=10mA)	25℃	2.482	2.500	2.518	V
	-40℃~105℃	2.465	2.500	2.535	
Reference Input Voltage Deviation Over Temperature Range(I_K=10mA)	-40℃~105℃	-	7	30	mV
Minimum Cathode Current for Regulator		-	0.5	1	mA
Dynamic Impedance	△I_K=1~100mA, f<1kHz	-	0.2	0.5	Ω



Stability behavior with capacitor loads



Test Circuit

Application Information—CC/CV Control for Switching Adapters