Dual OP-Amp and Voltage Reference

General Description

The LD8103 consists of 2 low-offset voltage amplifiers and a high-accuracy 2.5V voltage reference in a SOP-8 package. The LD8103 provides a low cost and space saving solution for the applications such as power supplies and switching adaptors.

The LD8103 is available in a SOP-8 package. It can operate over the ambient temperature range between -40°C and 105°C.

Features

- Precision ±0.7% voltage reference
- VREF sinking current capability: 0.5mA to 100mA
- Low input offset voltage (<0.5mV typ.)
- Max. 27V voltage rating
- SOP-8 package

Applications

- Switching Power Supply
- Adaptor
- Portable Device

Typical Application

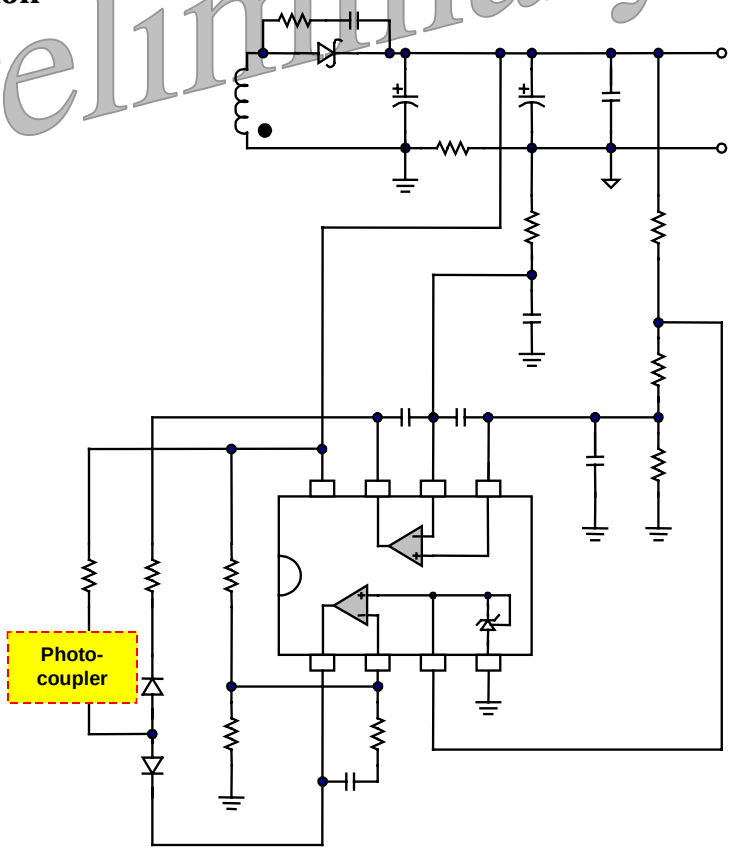
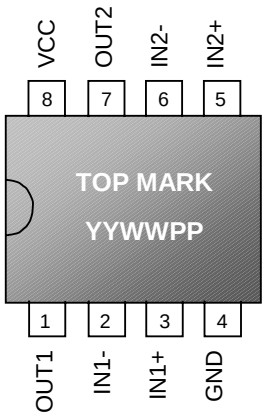


Fig. 1 Adaptor CC/CV Control

Pin Configuration

SOP-8 (TOP VIEW)



YY: Year code
WW: week code
PP: production code

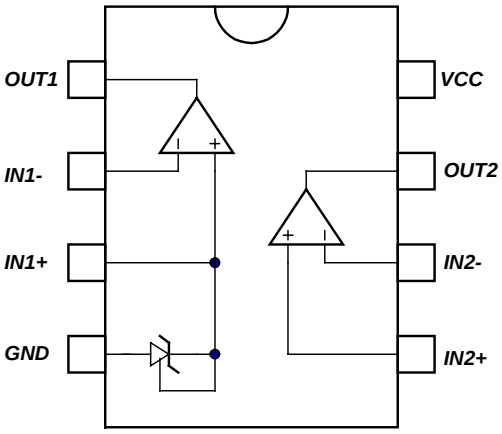
Ordering Information

Part number	Temperature range	Package	TOP MARK	Shipping
LD8103 CS	-40~105 (°C)	SOP-8	LD8103CS	2500 /tape & reel
LD8103 PS		SOP-8 (PB Free)	LD8103PS	2500 /tape & reel

Pin Descriptions

PIN	NAME	FUNCTION
1	OUT1	Output of OP-amp 1
2	IN1-	Positive terminal of OP-amp 1
3	IN1+	Negative terminal of OP-amp 1, also 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

Block Diagram



Absolute Maximum Ratings

Supply Voltage Vcc	27V
Supply Current (Vcc=5V, over all operating temperature range)	1.2mA
Supply Current (Vcc=27V, over all operating temperature range)	2mA
Differential Input Voltage (IN1+ to IN1-, IN2+ to IN2-)	27V
Input Voltage	-0.3V to Vcc+0.3V
Operating Temperature Range	-40°C to 105°C
Maximum Junction Temperature	150°C
Storage Temperature Range	-65°C to 150°C
Lead Temperature (Soldering, 10 sec.)	260°C
Junction-to-Ambient Thermal Resistance	175°C/W
ESD	TBD

Caution:

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

Electrical Characteristics

(T_A = +25°C unless otherwise stated)

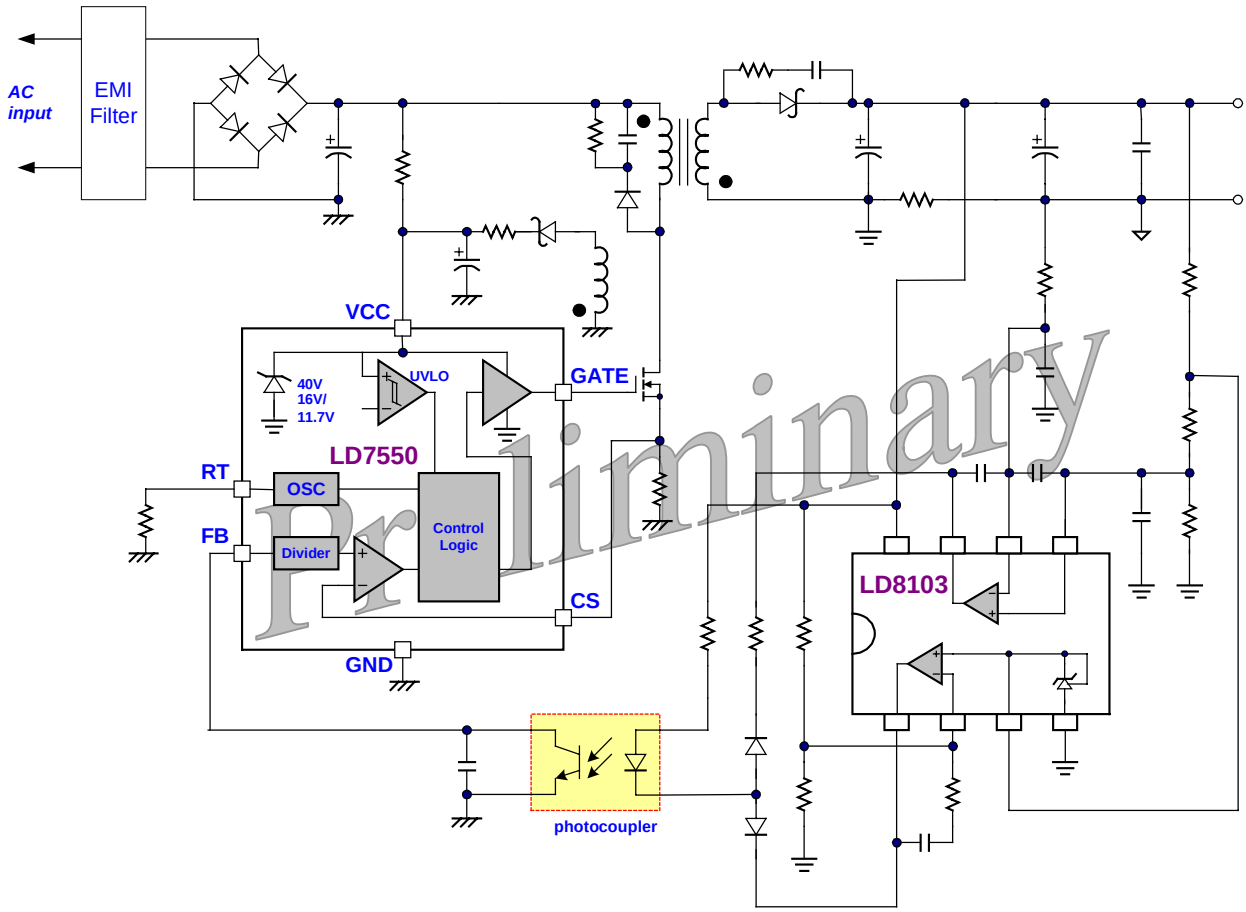
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
OP-Amp1 & OP-Amp2					
Input Offset voltage (Common mode Voltage =0V)	25°C		1	4	mV
	-40°C~105°C			5	mV
Input Offset Voltage Drift			7		μV/°C
Input Bias Current (OP1)	25°C		20		nA
Input Bias Current (OP2)	25°C		20	150	nA
	-40°C~105°C			200	nA
Output Source Current	V_{CC}=15V, V_O=2V Differential Input Voltage = 1V	20	40		mA
Output Sink Current	V_{CC}=15V, Vo=2V Differential Input Voltage = -1V	10	20		mA
	V_{CC}=15V, Vo=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=2K, 25°C	26	27		V
	V_{CC}=27V,R_L=2K, -40°C~105°C	26			V
	V_{CC}=27V,R_L=10K, 25°C	27			V
	V_{CC}=27V,R_L=10K, -40°C~105°C	27	28		V
Output Voltage --- Low Level	R_L=10K, -40°C~105°C		5	20	mV
				20	mV
Large Signal Voltage Gain (OP1)	Common-mode Voltage=0V V_{CC}=15V, R_L=2K		100		V/mV
Large Signal Voltage Gain (OP2)	V_{CC}=15V, R_L=2K, Vo=1.4V~11.4V, 25°C	50	100		V/mV
	V_{CC}=15V, R_L=2K, Vo=1.4V~11.4V, -40°C~105°C	25			V/mV
Slew Rate at Unity Gain	V_{IN}=0.5V~2V, V_{CC}=15V R_L=2K, 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=2K, C_L=100pF F=100KHz, V_{IN}=10mV	0.5	0.9		MHz
Total Harmonic Distortion	V_{CC}=27V, R_L=2K, C_L=100pF V_O=2Vpp, f=1KHz, A_V=20dB		0.02		%

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
OP-Amp2					
Input Bias Current	25°C		2	75	nA
	-40°C~105°C			150	nA
Input Common Mode Voltage	V_{CC}=27V, 25°C	0		Vcc-1.5	V
	V_{CC}=27V, -40°C~105°C	0		Vcc-2	V
Common Mode Rejection Ratio	25°C	70	85		dB
	-40°C~105°C	60			DB
Equivalent Input Noise Voltage	F=1KHz, Rs=100Ω, V_{CC}=27V		50		$nV/\sqrt{Hz}$
Reference Voltage					
Cathode Current		0.5		100	mA
Reference Voltage (I_K=10mA)	25°C	2.482	2.5	2.518	V
	-40°C~105°C	2.465	2.5	2.535	V
Reference Voltage Deviation over Temperature Range (I_K=10mA)	-40°C~105°C		7	30	mV
Minimum Cathode Current for Regulation				0.5	mA
Dynamic Impedance	ΔI_K =1~100mA, f<1KHz		0.2	0.5	Ω

Note: All the other characteristics should be compatible with TSM103W.

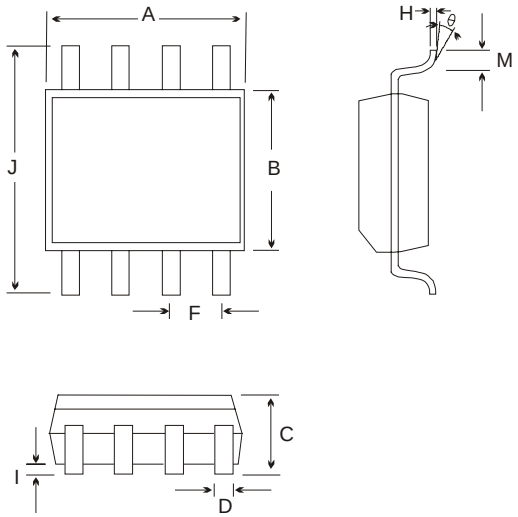
Typical Performance Characteristics

Application Information



Package Information

SOP-8



Symbols	Dimensions in Millimeters		Dimensions in Inch	
	MIN	MAX	MIN	MAX
A	4.801	5.004	0.189	0.197
B	3.810	3.988	0.150	0.157
C	1.346	1.753	0.053	0.069
D	0.330	0.508	0.013	0.020
F	1.194	1.346	0.047	0.053
H	0.178	0.229	0.007	0.009
I	0.102	0.254	0.004	0.010
J	5.791	5.690	0.228	0.224
M	0.406	1.270	0.016	0.050
θ	0	8°	0	8°

Important Notice

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