IP1531

TRIPLE OUTPUT VOLTAGE LDO REGULATOR

DESCRIPTION

The IP1531 is a triple output voltage LDO regulator which can provide up to 500mA of output current.
The IP1531 consists of 1fixed 3.3V and 2adjustable regulators.



14SOPH-8L

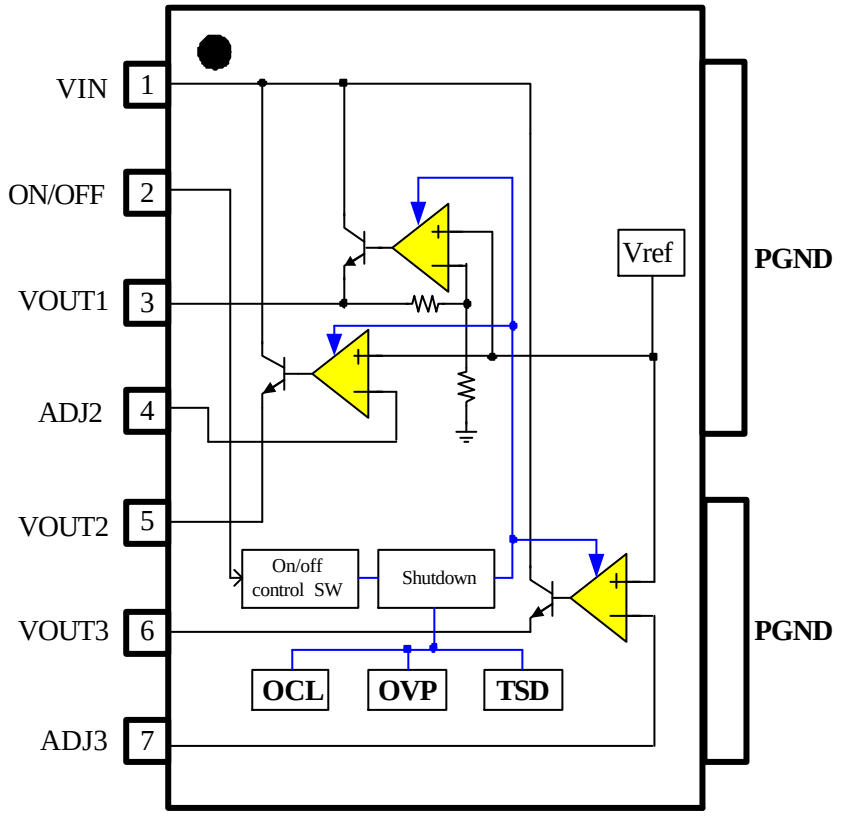
FEATURES

- 1-Fixed 3.3V LDO regulator with internal NPN TR.
- 2-Adjustable LDO regulators with internal NPN TR.
- Built-in TSD circuit.
- Built-in current limit circuit.
- Built-in over voltage protection circuit.
- Output trimmed to +/-3% Tolerance

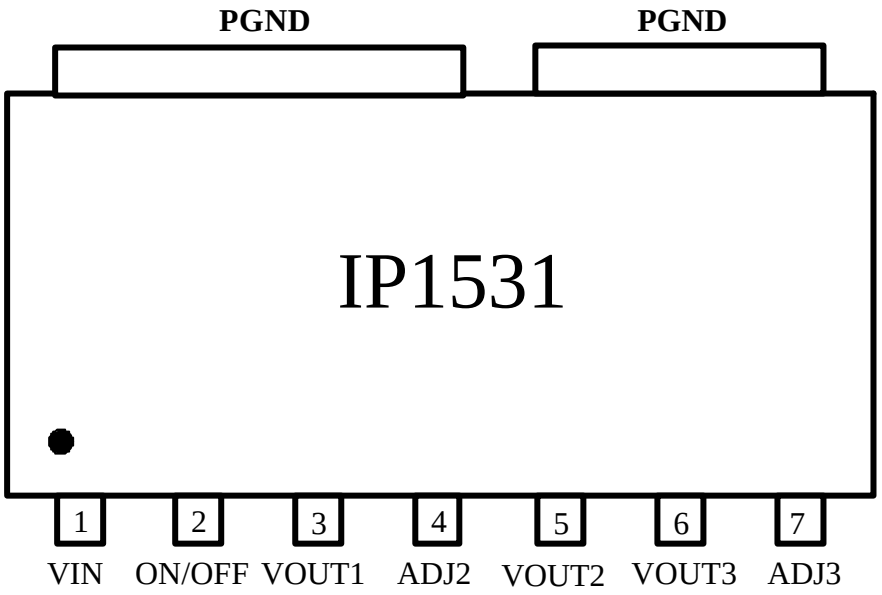
ORDERING INFORMATION

Device	Package	Operating Temp
IP1531	14SOPH-8L	-35°C ~ +85°C

BLOCK DIAGRAM



PIN CONNECTIONS



PIN DESCRIPTIONS

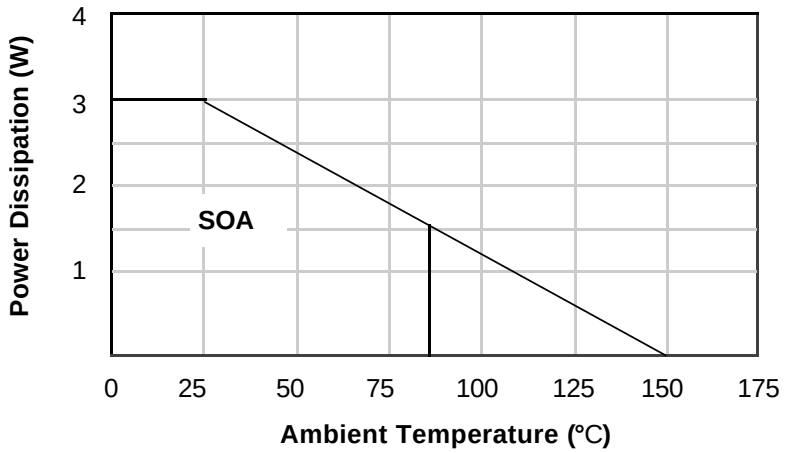
NO	SYMBOL	I/O	DESCRIPTION
1	VIN	I	Input Supply Voltage
2	ON/OFF	I	ON/OFF control
3	VOUT1	O	Regulator 1 Output (3.3V fixed)
4	ADJ2	I	Regulator 2 Adjustable Pin
5	VOUT2	O	Regulator 2 Output (Adjustable)
6	VOUT3	O	Regulator 3 Output (Adjustable)
7	ADJ3	I	Regulator 3 Adjustable Pin
8	PGND	-	Power Ground

ABSOLUTE MAXIMUM RATINGS(TA=25°C)

CHARACTERISTICS	SYMBOL	VALUE	UNIT
Maximum supply voltage	Vccmax	10	V
Input voltage	Vinmax	10	V
Power dissipation	Pd	3.0*	W
Operating temperature	Topr	-35 ~ +85	°C
Storage temperature	Tstr	-55 ~ +150	°C

Note>
1. When mounted on 100mm X 100mm X 1mm PCB (Phenolic resin material).
2. Power dissipation reduces 24mW/°C for using above Ta=25°C
3. Do not exceed Pd and SOA.

POWER DISSIPATION CURVE



RECOMMENDED OPERATING CONDITIONS

CHARACTERISTICS	SYMBOL	VALUE	UNIT
Input voltage	VIN	4.5 ~ 6.0	V

ELECTRICAL CHARACTERISTICS

(Vin= 5V, Co=10uF, Ta = 25°C, unless otherwise specified.)

Characteristics	Symbol	Condition	Min.	Typ.	Max.	Units
Quiescent current	Icc	Vcc=5V, No-Load	-	7	12	mA
OVP Detecting Voltage	Vovp	Vcc=Variable	6.5	-	-	V
Reference voltage	Vref	-	1.212	1.25	1.288	V
LDO REGULATOR 1 (3.3V FIXED TYPE)						
Output Voltage	Vout1	Io=10mA	3.2	3.3	3.4	V
Line Regulation	dVline1	Vin=4.5~6V, Io=10mA	-	0.01	0.2	%
Load Regulation	dVload 1	Ta=25°C Vin=5V, 10mA < Io < 500mA	-	0.4	0.8	%
Dropout voltage	Vdrop1	Io=500mA	-	1.1	1.3	V
Ripple rejection	RR1	F=120Hz, Co=10uF Tantalum Vin-Vout=2V, Io=250mA	60	70	-	dB
Current limit *Note	Ilimit1	-	500	-	-	mA
Temperature stability	Temp1	-	-	0.5	-	%
LDO REGULATOR 2 (ADJUSTABLE TYPE)						
Output Voltage	Vout2	Io=10mA	Vref	-	Vin-1.5V	V
Line Regulation	dVline2	Vin=4.5~6V, Io=10mA	-	0.01	0.4	%
Load Regulation	dVload2	Ta=25°C Vin=5V, 10mA < Io < 400mA	-	0.4	0.8	%
Dropout voltage	Vdrop2	Io=400mA	-	1.1	1.3	V
Ripple rejection	RR2	F=120Hz, Co=10uF Tantalum Vin-Vout=2V, Io=200mA	60	70	-	dB
Current limit *Note	Ilimit2	Vin-Vout=3.0V	400	-	-	mA
Adjust pin current	Iadj 2	-	-	0.1	-	uA
Minimum load current	Ilmin2	-	10	-	-	mA
Temperature stability	Temp2	-	-	0.5	-	%

ELECTRICAL CHARACTERISTICS

(Vin= 5V, Co=10uF, Ta = 25°C, unless otherwise specified.)

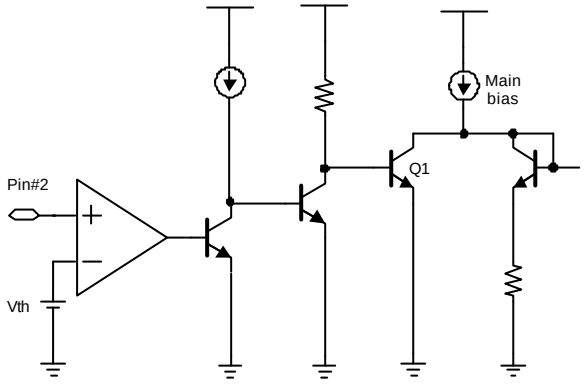
Parameter	Symbol	Condition	Min.	Typ.	Max.	Units
LDO REGULATOR 3 (ADJUSTABLE TYPE)						
Output Voltage	Vout3	Io=10mA	Vref	-	Vin-1.5V	V
Line Regulation	dVline3	Vin=4.5~6V,Io=10mA	-	0.01	0.4	%
Load Regulation	dVload3	Ta=25°C Vin=5V, 10mA < Io < 400mA	-	0.4	0.8	%
Dropout voltage	Vdrop3	Io=400mA	-	1.1	1.3	V
Ripple rejection	RR3	F=120Hz, Co=10uF Tantalum Vin-Vout=2V, Io=200mA	60	70	-	dB
Current limit *Note	Ilimit3	Vin-Vout=3.0V	400	-	-	mA
Adjust pin current	Iadj 3	-	-	0.1	-	uA
Minimum load current	Ilmin3	-	10	-	-	mA
Temperature stability	Temp3	-	-	0.5	-	%
ON/OFF CONTROL PART						
On voltage	Von	Vout=Enabled	-	-	0.8	V
Off voltage	Voff	Vout=Disabled	2.0	-	-	V

* Note
Don' t exceed following current limit.
(Iout1 : 500 mA, Iout2 : 400 mA, Iout3 : 400 mA)

APPLICATION SUMMARY

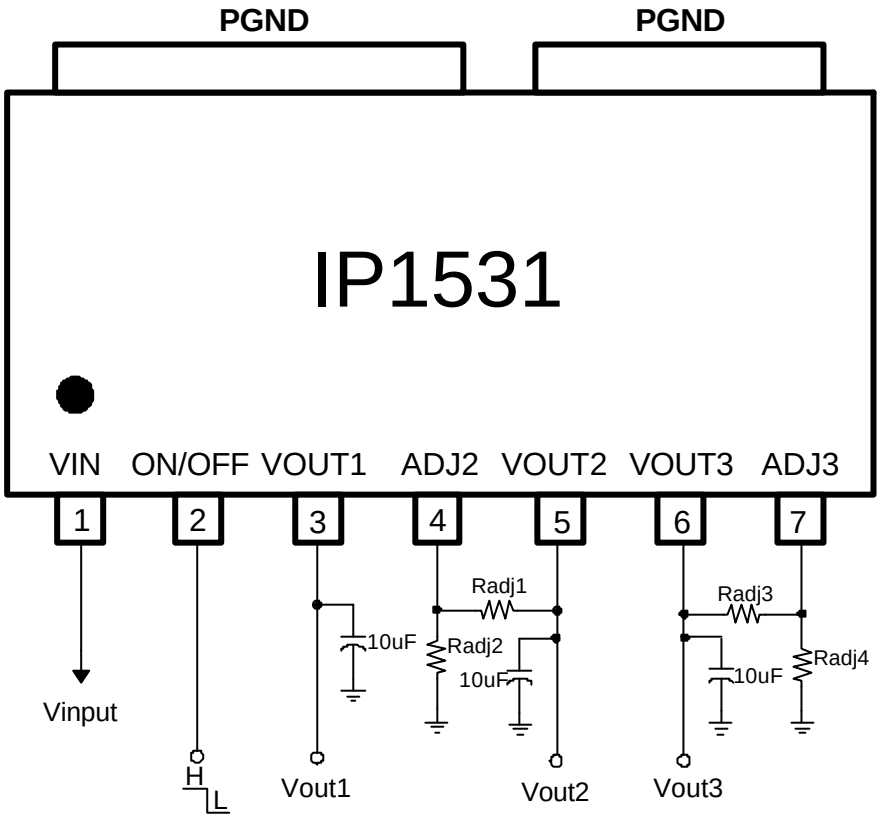
- **ON / OFF**

When you want to control output of the IP1531, use pin #2 as follows



As shown in figure
Pin#2 is positive input of the comparator,
and the other Input is threshold voltage.
If the voltage of the pin#2 rises above threshold voltage, then TR Q1 will be saturated and the main bias current will be shut down.

TYPICAL APPLICATION CIRCUIT

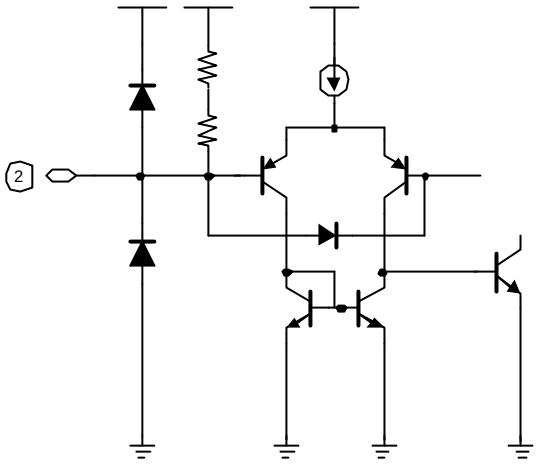
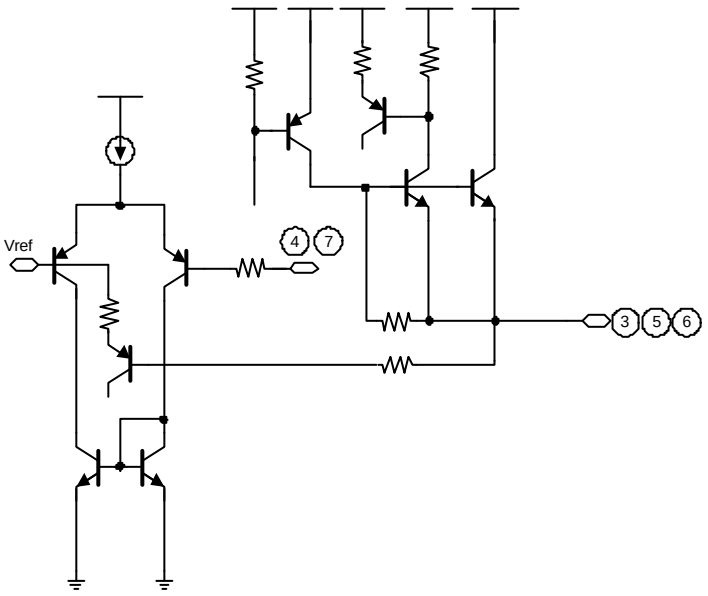


*CALCULATION OF OUTPUT VOLTAGE

VOUT2 = VREF (1 + (Radj1 / Radj2)) =1.25V (1 + (Radj1 / Radj2))

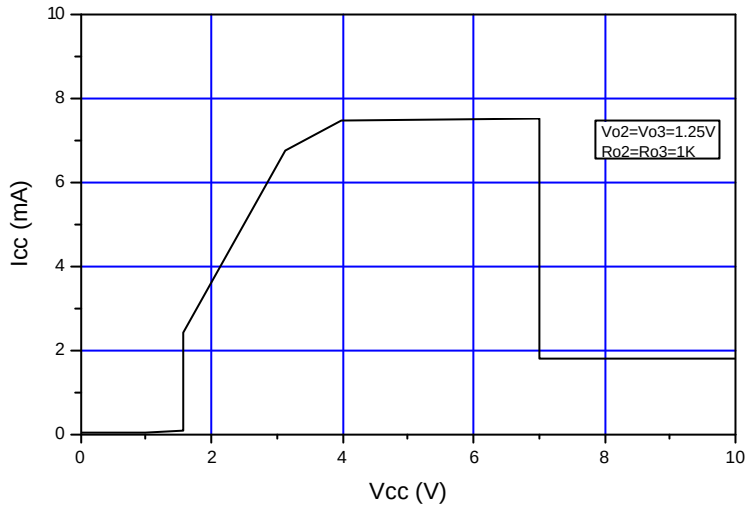
VOUT3 = VREF (1 + (Radj3 / Radj4)) =1.25V (1 + (Radj3 / Radj4))

INTERNAL CIRCUIT

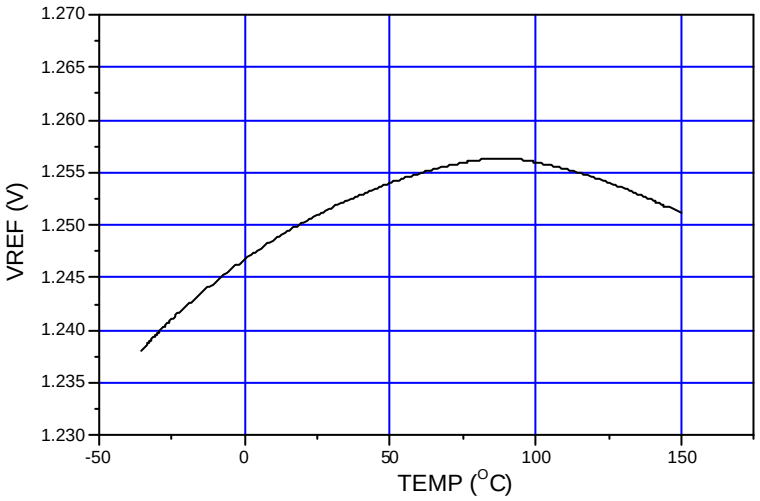
Pin no	Pin name	Internal circuit
2	ON/OFF	
3,5,6 4,7	Regulator Output1,2,3 Regulator Adjustable pin	

ELECTRICAL CHARACTERISTICS CURVES

QUIESCENT CURRENT

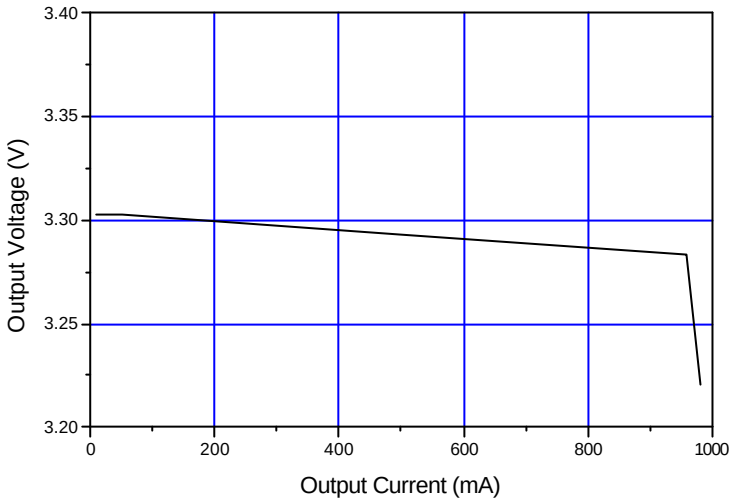


VREF TEMPERTURE STABILITY

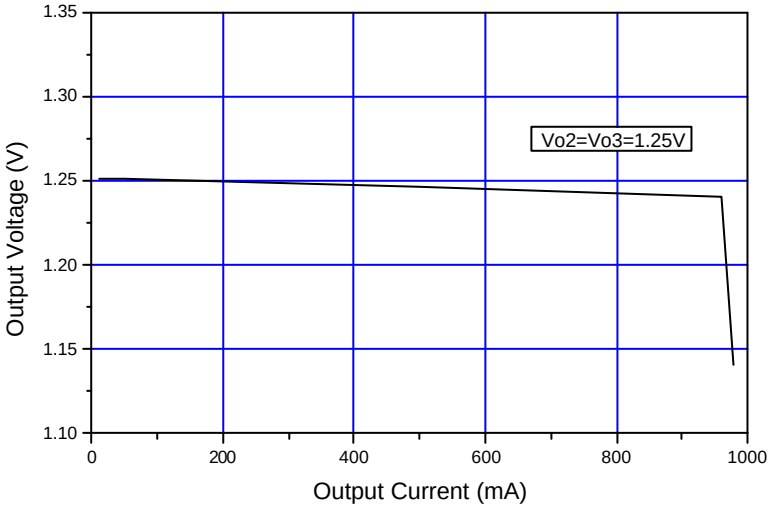


ELECTRICAL CHARACTERISTICS CURVES (Continued)

VOUT1 Load Regulation (Tj=25°C)

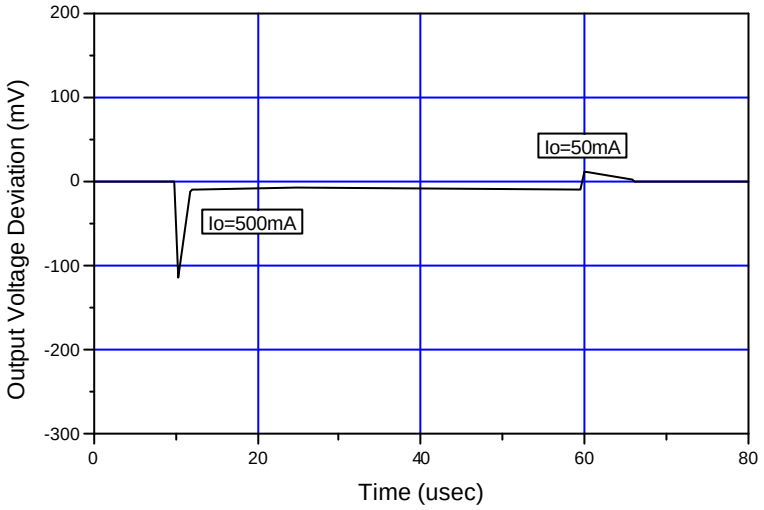


VOUT2,3 Load Regulation (Tj=25°C)

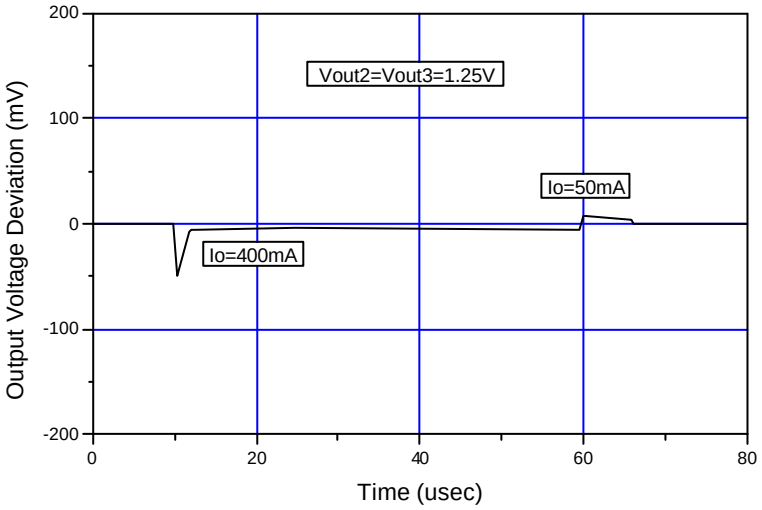


ELECTRICAL CHARACTERISTICS CURVES (Continued)

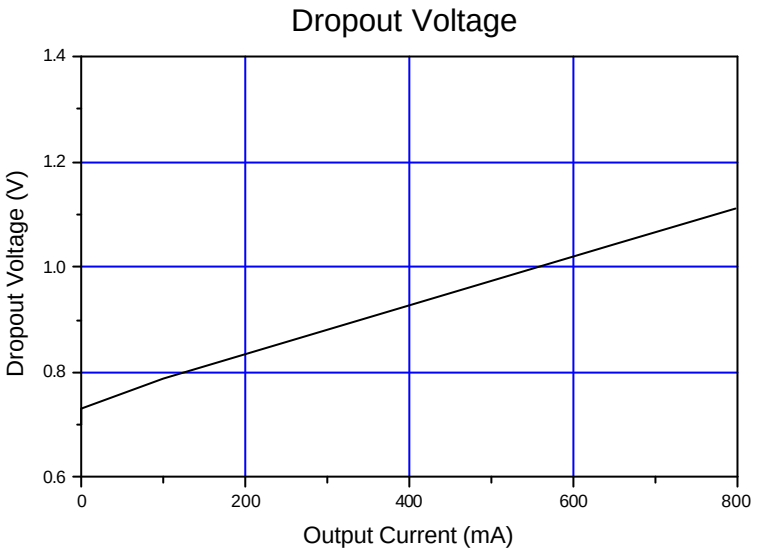
VOUT1 Load Transient Response



VOUT2,3 Load Transient Response



ELECTRICAL CHARACTERISTICS CURVES (Continued)



PACKAGE DIMENSION

14SOPH-8L

