NEC

BIPOLAR ANALOG INTEGRATED CIRCUT

μPC305

POSITIVE VOLTAGE STABILIZED POWER SUPPLY

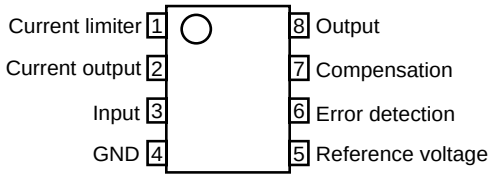
DESCRIPTION

The μPC305 is a high-performance stabilized power supply that can supply a constant voltage in a wide temperature range even if the input voltage or load voltage fluctuates, by integrating a high-gain error amplifier and a temperature-compensating constant-voltage diode on a single chip.

FEATURES

- Wide output voltage variable range Vo: 4.5 to 30 V, V_{DIF}: 3 to 30 V
- Excellent load stability 0.02%
- Good ripple rejection ratio 0.003%/V

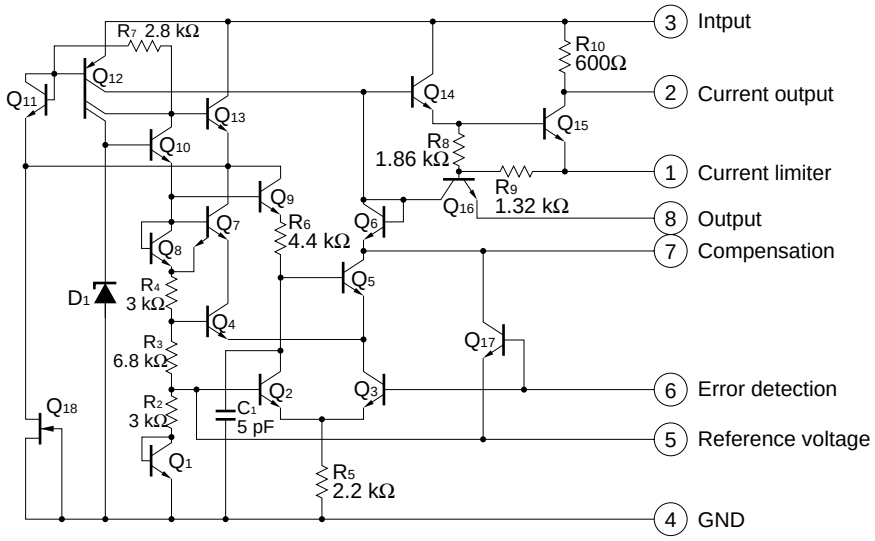
★ PIN CONFIGURATION (Top View)



★ ORDERING INFORMATION

Part Number	Package
μPC305G2	8-pin plastic SOP (5.72 mm (225))

EQUIVALENT CIRCUIT



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The mark ★ shows major revised points.

★ ABSOLUTE MAXIMUM RATINGS (Unless otherwise specified, T_A = 25°C)

Parameter	Symbol	Ratings	Unit
Input Voltage	V_{IN}	–0.3 to +40	V
Input - Output Voltage Difference	V_{DIF}	40	V
Maximum Output Current	I_O	50	mA
Total Loss	P_T	440[Note]	mW
Operating Temperature	T_A	0 to +70	°C
Storage Temperature	T_{stg}	–55 to +125	°C

Note Where T_A > +25°C, perform derating at T_J MAX. 125°C, –4.4 mW/°C.

Caution Product quality may suffer if the absolute maximum rating is exceed even momentarily for any parameter. That is, the absolute maximum ratings are rated values at which the product is on the verge of suffering physical damage, and therefore the product must be used under conditions that ensure that the absolute maximum ratings are not exceed.

ELECTRICAL SPECIFICATIONS (Unless otherwise specified, T_A = 25°C)

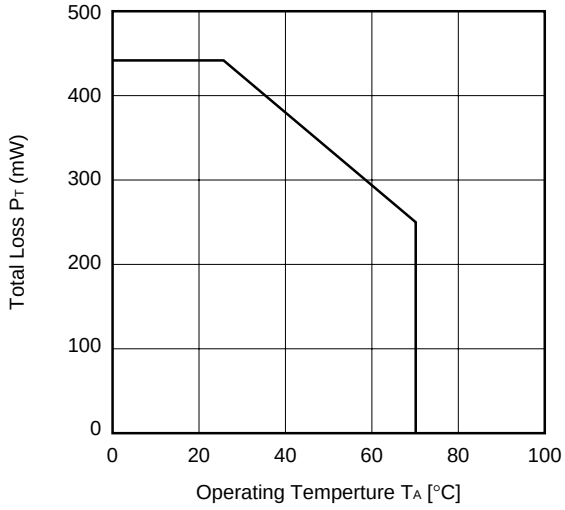
Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Input Voltage Range	V_{IN}		8.0		40	V
Output Voltage Range	V_{OUT}		4.5		30	V
Input - Output Voltage Difference	V_{DIF}		3.0		30	V
Load Stability	REG_L	$0 \le I_O \le 12$ mA, R_{SC} = 18 Ω		0.02	0.05	%
Input Stability	REG_{IN}	V_{IN} - $V_{OUT} \le 5$ V		0.025	0.06	%/V
		V_{IN} - V_{OUT} > 5 V		0.015	0.03	%/V
Ripple Rejection Ratio	REJ	C_{REF} = 10 μF, f = 120 Hz		0.003		%/V
Temperature Stability		0°C ≤ T_A ≤ 70°C		0.3	1.0	%
Reference Voltage	V_{REF}		1.65	1.8	1.90	V
Output Noise Voltage	V_N	10 Hz ≤ f ≤ 10 kHz, C_{REF} = 0 μF		0.005		%
		C_{REF} = 0.1 μF		0.002		%
Long-time Stability				0.1		%
Supply Current under No Load	I_{CC}	V_{IN} = 40 V		1.0	2.0	mA

Remark R_{SC} : Current-limiting resistor

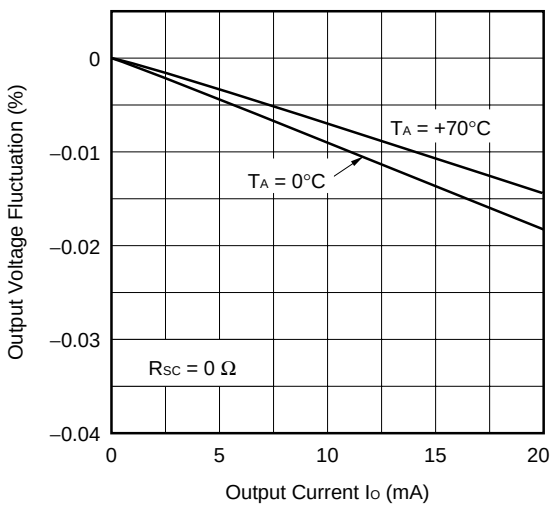
C_{REF} : Bypass capacitor of reference voltage pin

STANDARD CHARACTERISTIC CURVES
(Unless otherwise specified, T_A = 25ºC. Reference values)

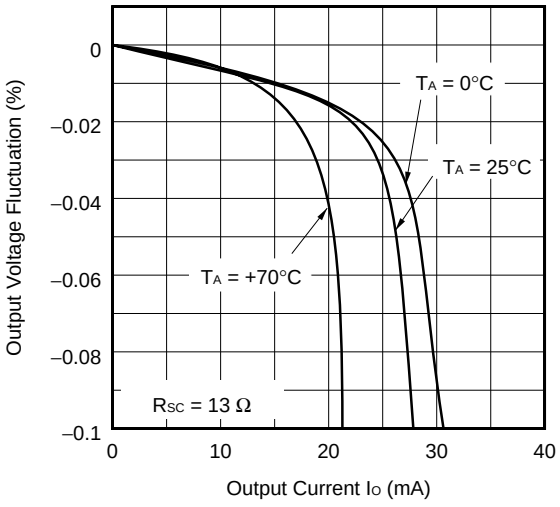
★ P_T vs.T_A CHARACTERISTICS



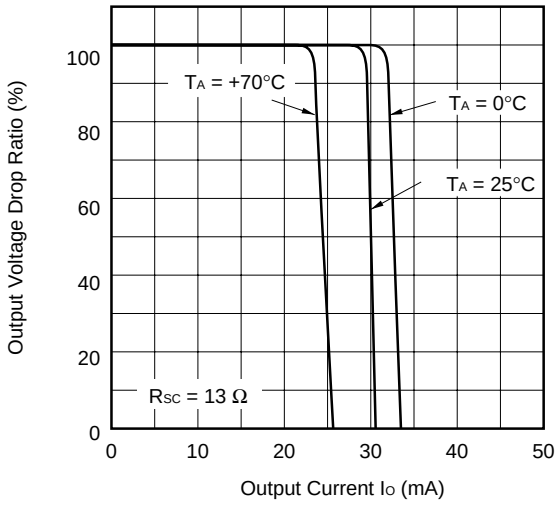
★ LOAD STABILITY (1)



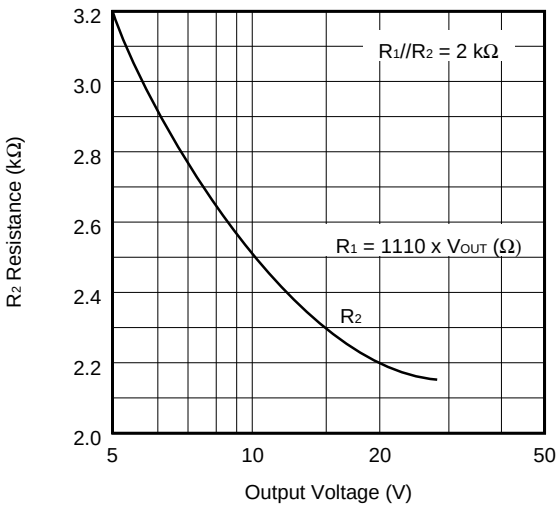
★ LOAD STABILITY (2)



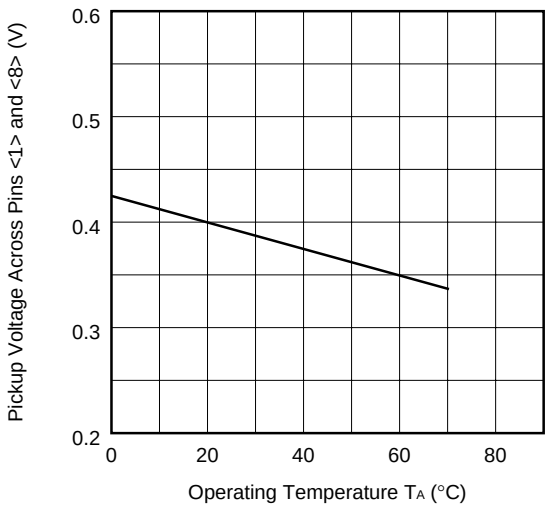
★ CURRENT-LIMITING CHARACTERISTICS



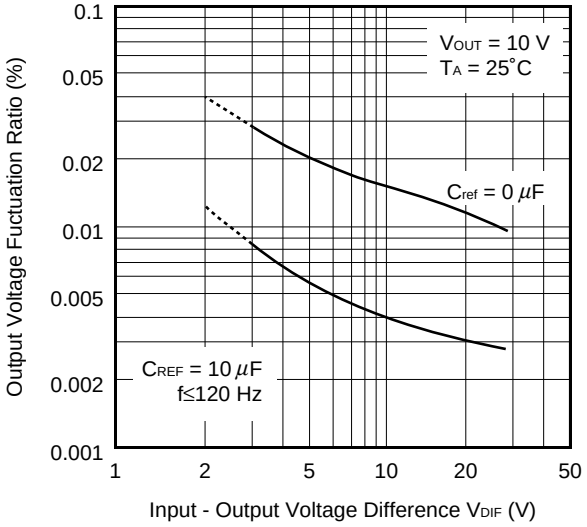
RESISTANCE FOR SETTING OUTPUT VOLTAGE



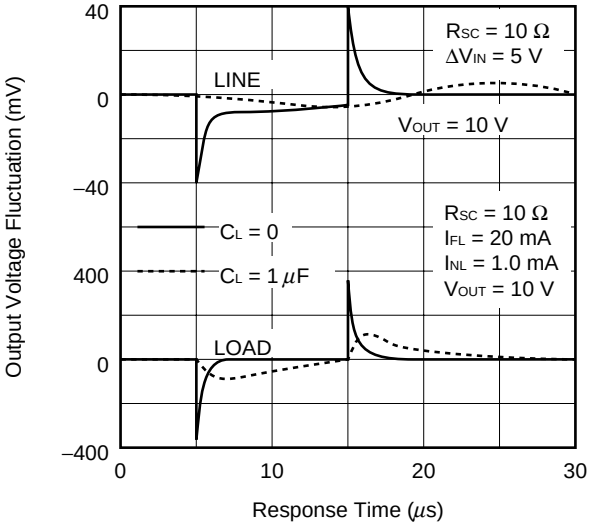
CURRENT-LIMITING PICKUP VOLTAGE



LINE REGULATION

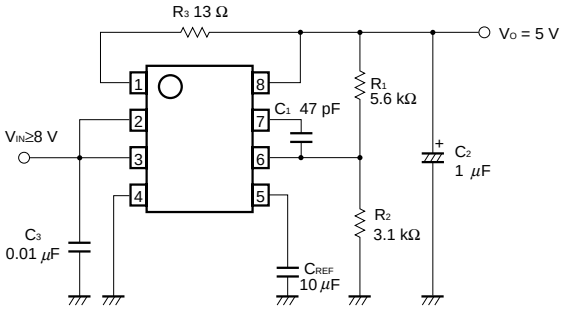


TRANSIENT RESPONSE TIME

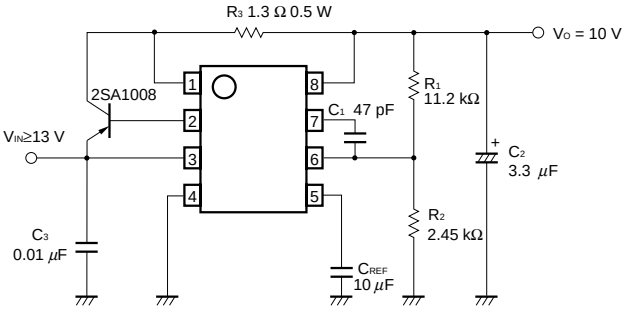


APPLICATION CIRCUIT EXAMPLES

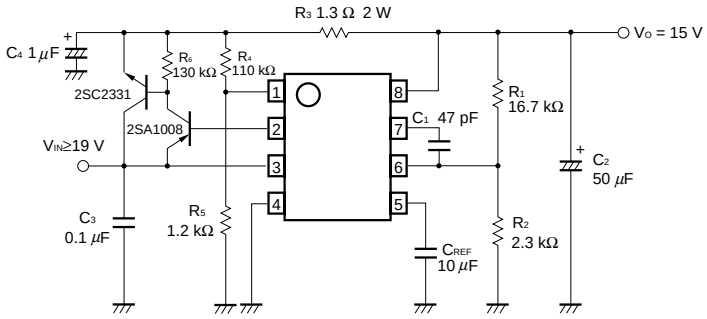
★ 5 V - 15 mA Regulator



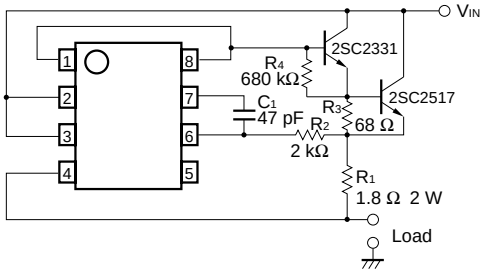
★ 10 V - 200 mA Regulator (Drooping Characteristics)



★ 15 V - 1 A Regulator (Fold-back Characteristics)



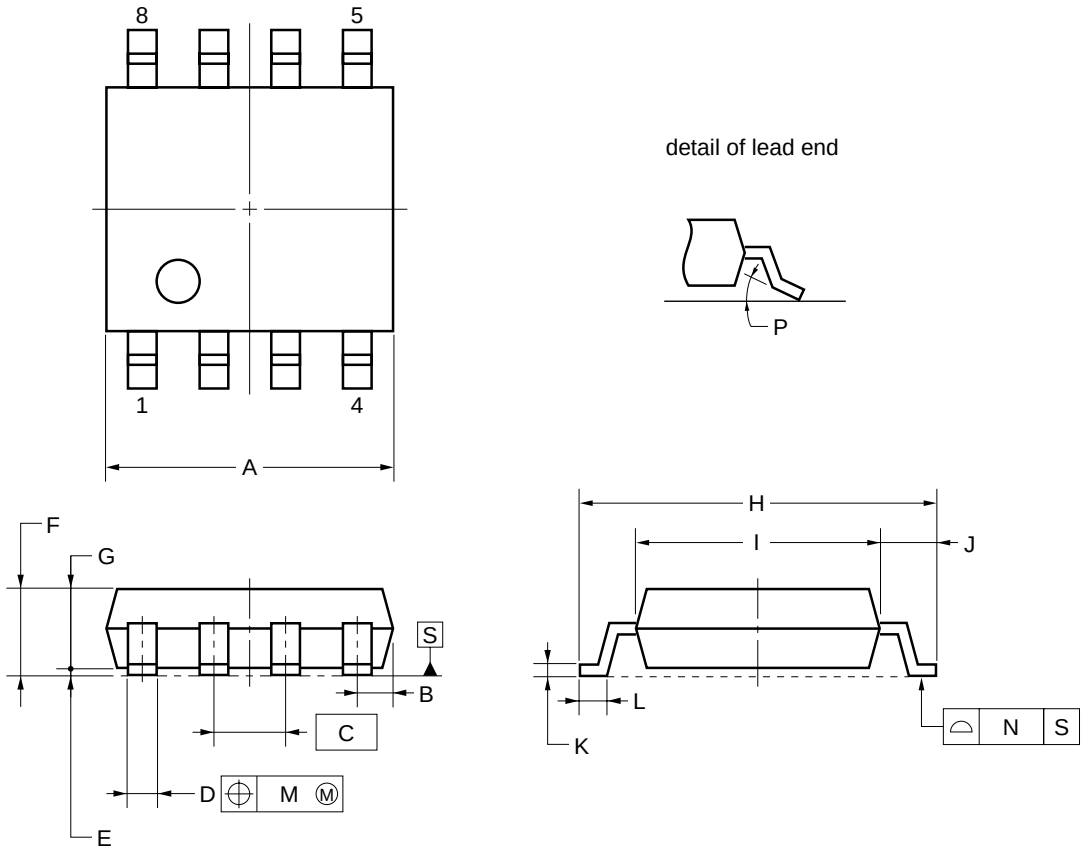
★ 1 A Constant-current Regulator



Caution Note the power consumption of the μPC305 when the output pin is short-circuited and that of the external transistor.

★ **PACKAGE DRAWINGS**

8-PIN PLASTIC SOP (5.72 mm (225))



NOTE

Each lead centerline is located within 0.12 mm of its true position (T.P.) at maximum material condition.

ITEM	MILLIMETERS
A	$5.2^{+0.17}_{-0.20}$
B	0.78 MAX.
C	1.27 (T.P.)
D	$0.42^{+0.08}_{-0.07}$
E	0.1±0.1
F	1.59±0.21
G	1.49
H	6.5±0.3
I	4.4±0.15
J	1.1±0.2
K	$0.17^{+0.08}_{-0.07}$
L	0.6±0.2
M	0.12
N	0.10
P	$3^{\circ}{}^{+7^{\circ}}_{-3^{\circ}}$

S8GM-50-225B-6

RECOMMENDED SOLDERING CONDITIONS

The μPC305 shoud be soldered and mounted under the following recommended conditions.

For details of the recommended soldering conditions, refer to the document Semiconductor **Device Mounting Technology Manual (C10535E)**.

For soldering methods and conditions other than those recommended below, contact an NEC Electronics sales representative.

Recommended Soldering Conditions for Surface Mounting Type

μPC305G2: 8-pin plastic SOP (5.72 mm (225))

Soldering Method	Soldering Conditions	Recommended Conditions Symbol
Infrared reflow	Package peak temperature: 230°C, Time: 30 sec max. (210°C min.), Number of times: once	IR30-00-1
VPS	Package peak temperature: 215°C, Time: 40 sec max. (200°C min.), Number of times: once	VP15-00-1
Wave soldering	Solder bath temperature: 260°C max., Time: 10 sec max., Number of times: once, Preheating temperature: 120°C max. (Package surface temperature)	WS60-00-1

Caution Do not use two or more soldering methods in combination (except partial heating).

- **The information in this document is current as of January, 2003. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC Electronics data sheets or data books, etc., for the most up-to-date specifications of NEC Electronics products. Not all products and/or types are available in every country. Please check with an NEC Electronics sales representative for availability and additional information.**
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