NEC

BIPOLAR ANALOG INTEGRATED CIRCUT

μPC305

POSITIVE VOLTAGE STABILIZED POWER SUPPLY

DESCRIPTION

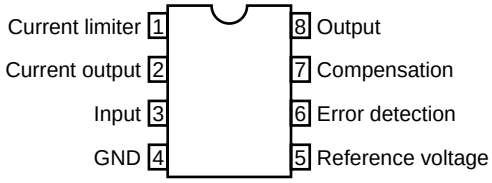
The μPC305 is a high-performance stabilized power supply that can supply a constant voltage in a wide temperature range even if the input voltage or load voltage fluctuates, by integrating a high-gain error amplifier and a temperature-compensating constant-voltage diode on a single chip.

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)

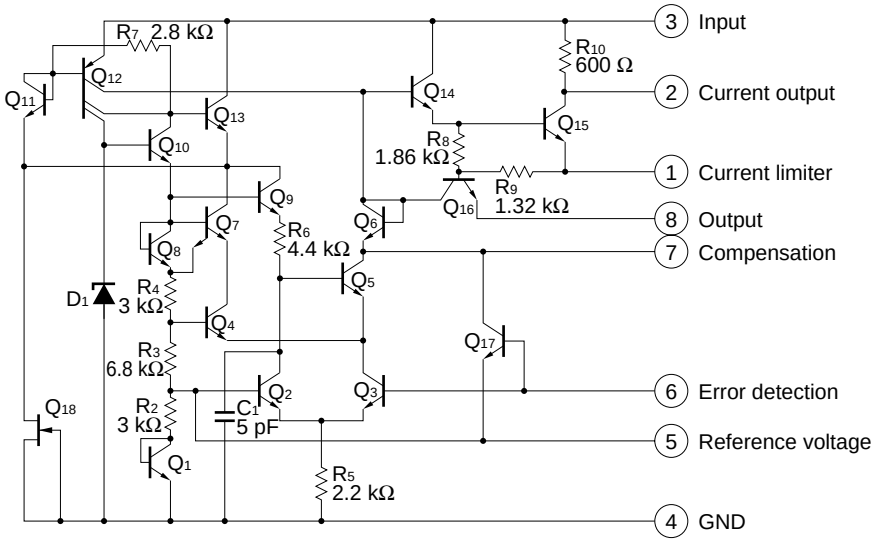
μPC305C, 305G2



ORDERING INFORMATION

Part Number	Package
μPC305C	8-pin plastic DIP (7.62 mm (300))
μPC305G2	8-pin plastic SOP (5.72 mm (225))

EQUIVALENT CIRCUIT



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Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

Document No. G10633EJ3V0DS00 (3rd edition)
Date Published December 1999 N CP(K)
Printed in Japan

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

Parameter	Symbol	μPC305C	μPC305G2	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	350 Note 1	440 Note 2	mW
Operating Temperature	T_A	0 to +70		°C
Storage Temperature	T_{stg}	–55 to +125		°C

Notes 1. Where T_A > +55°C, perform derating at T_J MAX. 125°C, –5 mW/°C.

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

Caution If any of the parameters exceeds the absolute maximum ratings, even momentarily, the quality of the product may be impaired. The absolute maximum ratings are values that may physically damage the product(s). Be sure to use the product(s) within the ratings.

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

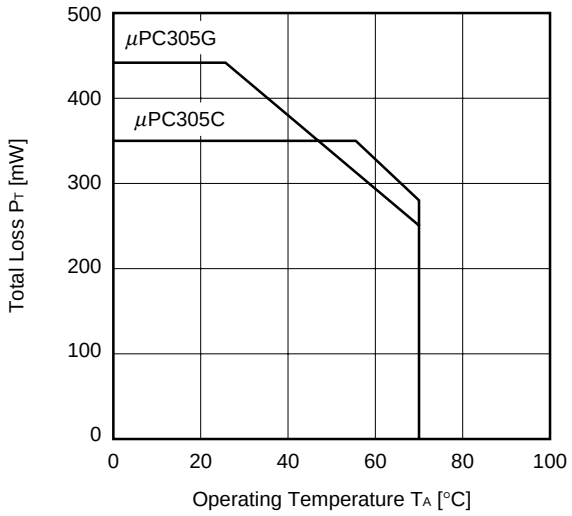
Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Input Voltage Range	V_{IN}		8.0		40	V
Output Voltage Range	V_{OUT}		4.5		30	V
Input – Output Voltage Difference	V_{DIF}		3.0		30	V
Load Stability	REG_L	$0 \le I_O \le 12$ mA, R_{SC} = 18 Ω		0.02	0.05	%
Input Stability	REG_{IN}	$V_{IN} - V_{OUT} \le 5$ V		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		$0°C \le T_A \le 70°C$		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

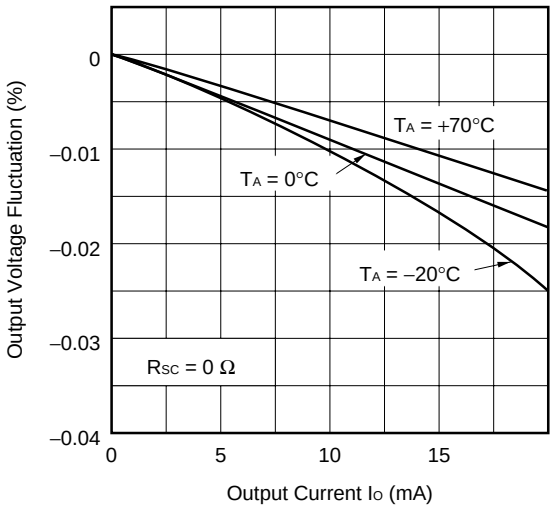
C_{REF} : Bypass capacitor of reference voltage pin

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

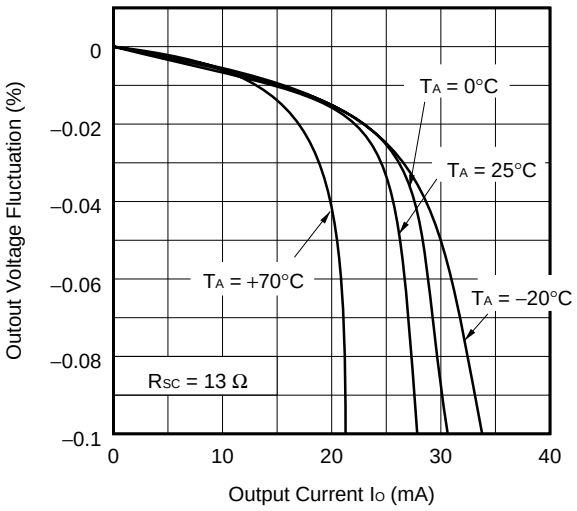
P_T vs T_A Characteristics



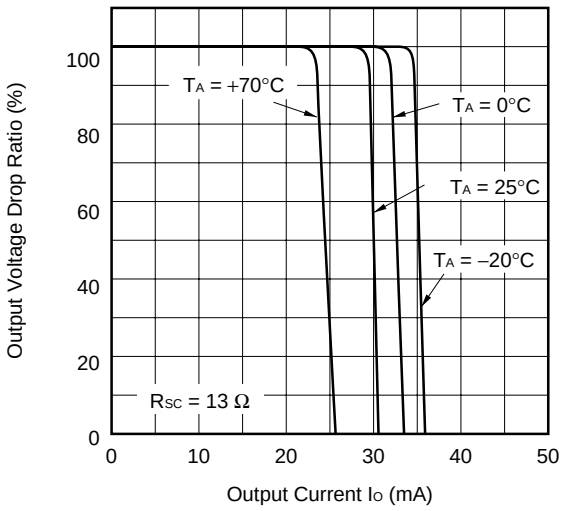
Load Stability (1)



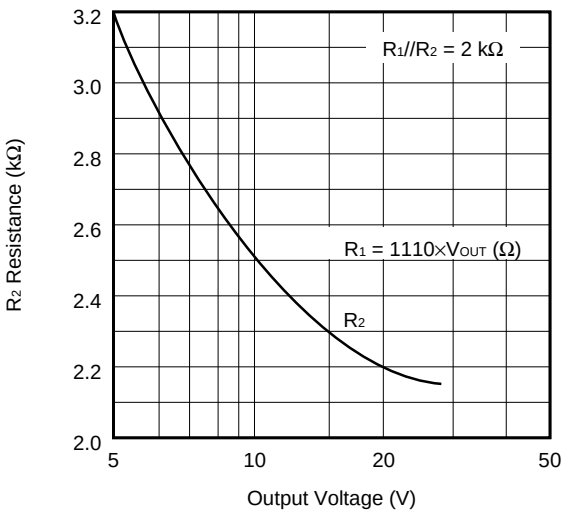
Load Stability (2)



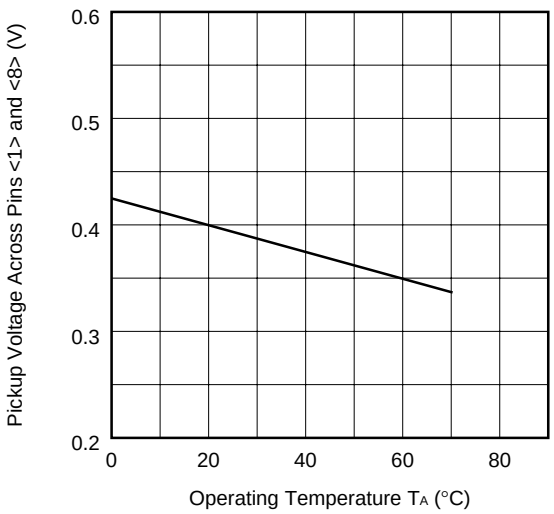
Current-limiting Characteristics



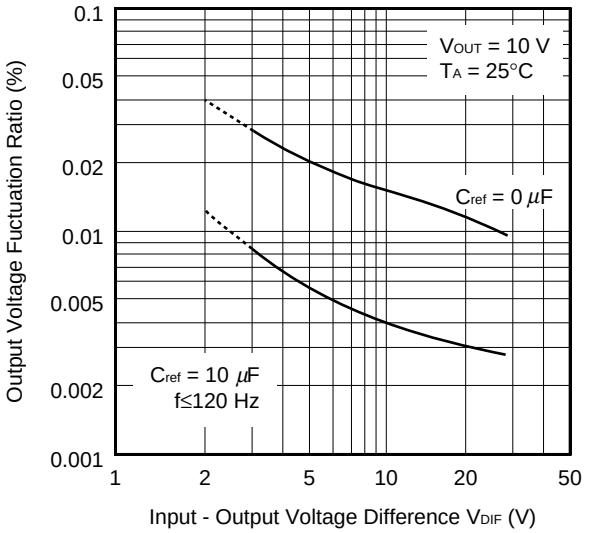
Resistance for Setting Output Voltage



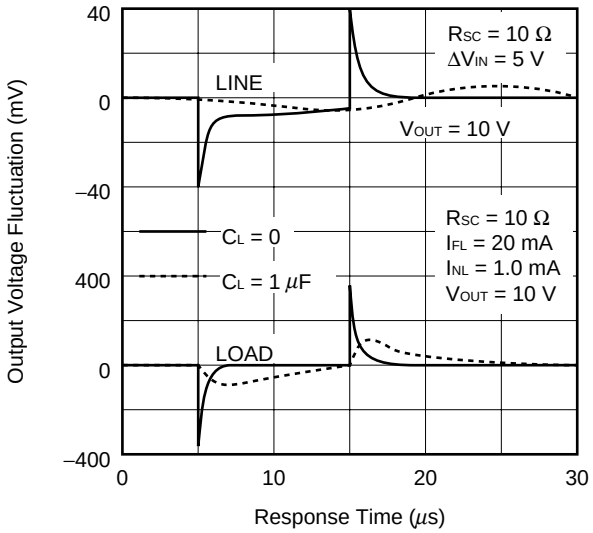
Current-limiting Pickup Voltage



Line Regulation

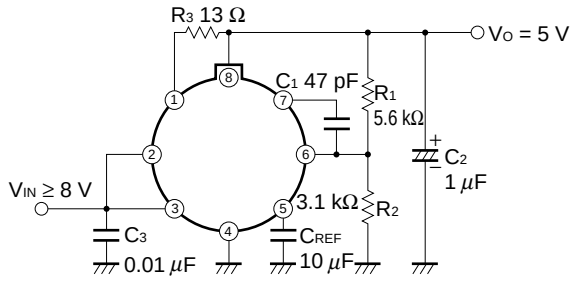


Transient Response Time

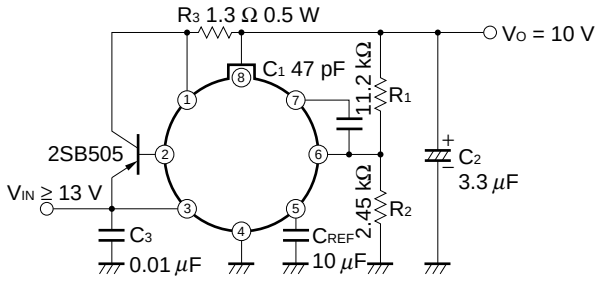


APPLICATION CIRCUIT EXAMPLES

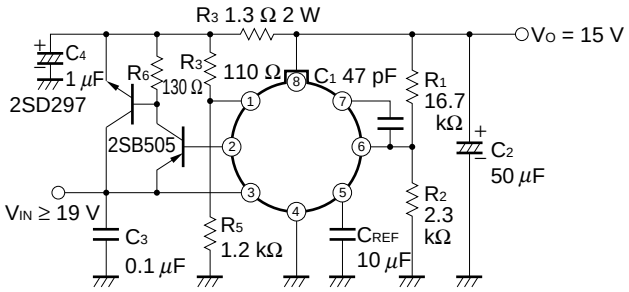
5 V-15 mA Regulator



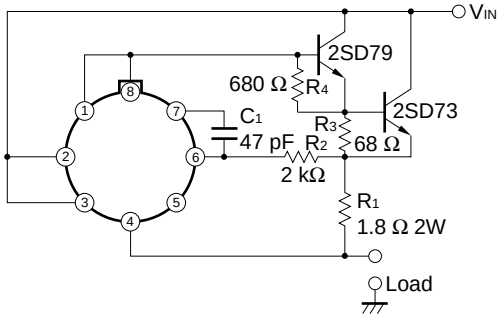
10 V-200 mA Regulator (Drooping Characteristics)



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



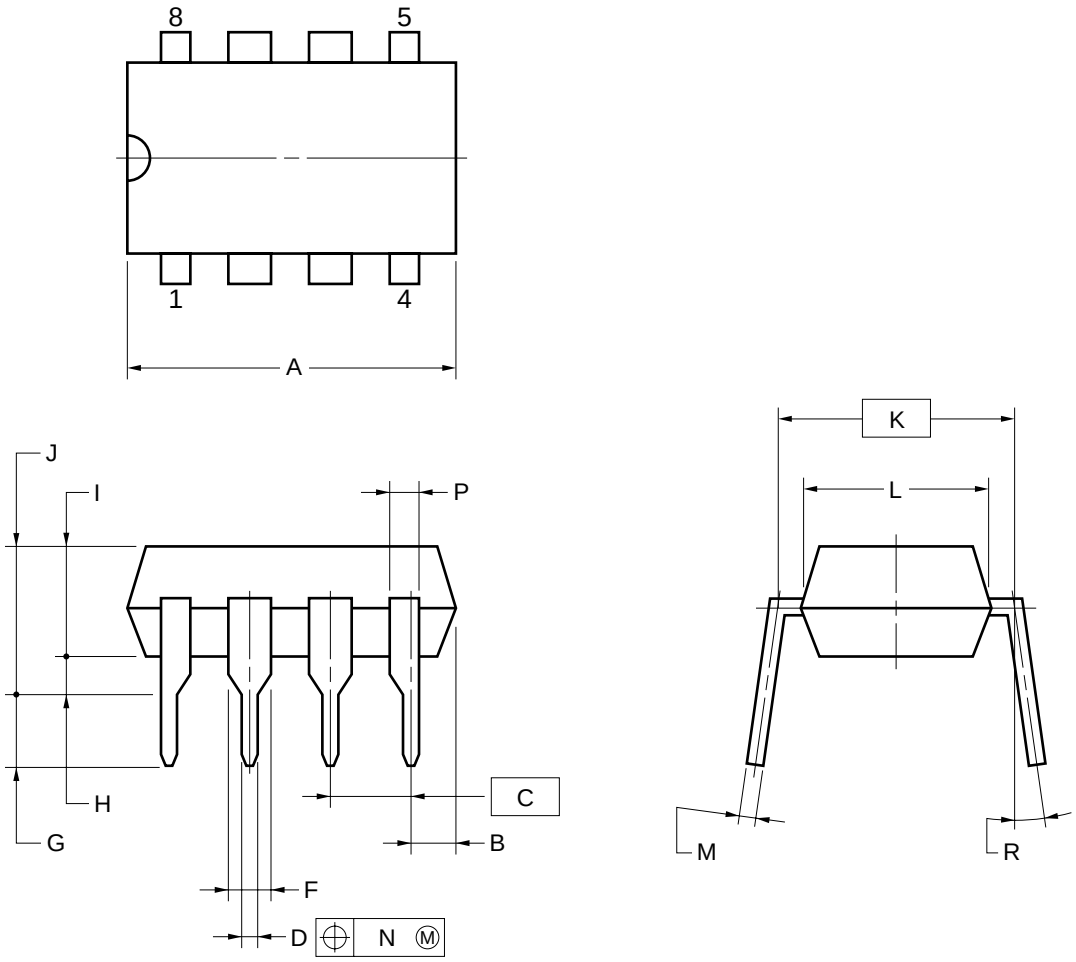
1A Constant-current Regulator



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 DIP (7.62mm(300))



NOTES

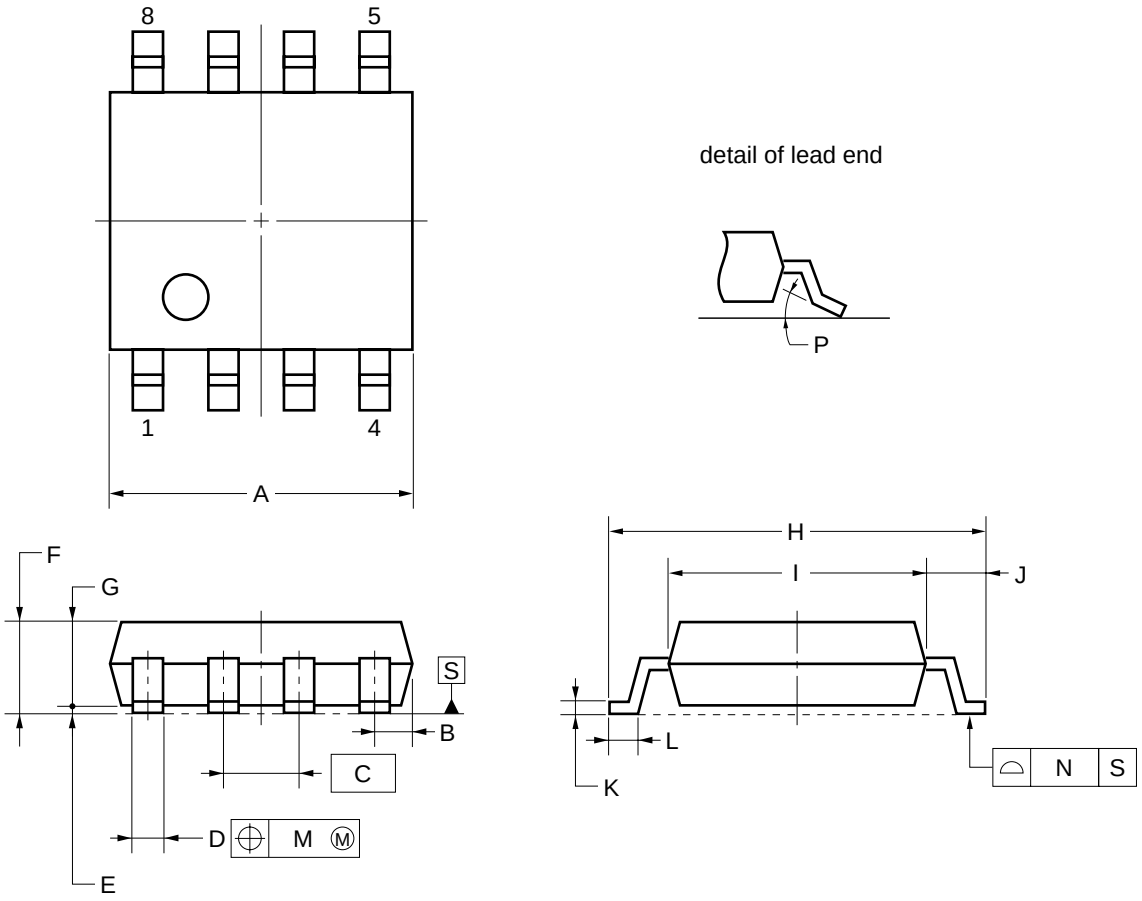
1. Each lead centerline is located within 0.25 mm of its true position (T.P.) at maximum material condition.

2. Item "K" to center of leads when formed parallel.

ITEM	MILLIMETERS
A	10.16 MAX.
B	1.27 MAX.
C	2.54 (T.P.)
D	0.50±0.10
F	1.4 MIN.
G	3.2±0.3
H	0.51 MIN.
I	4.31 MAX.
J	5.08 MAX.
K	7.62 (T.P.)
L	6.4
M	$0.25^{+0.10}_{-0.05}$
N	0.25
P	0.9 MIN.
R	0~15°

P8C-100-300B,C-2

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

Solder this product under the following recommended conditions.

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

For soldering methods and conditions other than those recommended, consult NEC.

Surface Mount 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).

Through Hole type

μPC305C: 8-pin plastic DIP (7.62 mm (300))

Soldering Method	Soldering Conditions	Recommended Conditions Symbol
Wave soldering	Solder bath temperature: 260°C max., Time: 10 sec max.	

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  - Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots
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