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Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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3-TERMINAL POSITIVE ADJUSTABLE REGULATOR

DESCRIPTION

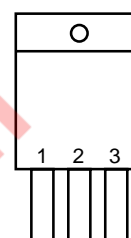
The μPC317 is an adjustable 3-terminal positive voltage regulator, which has 1.5 A capable for the output current. The output voltage can be set any value between 1.3 V and 30 V by two external resistors.

FEATURES

- Output current is up to 1.5 A
- On-chip some protection circuit (over current protection, SOA protection and thermal shut down).

PIN CONFIGURATION (Marking Side)

μPC317HF, μPC317HF-AZ



1 : ADJ
2 : OUTPUT
3 : INPUT

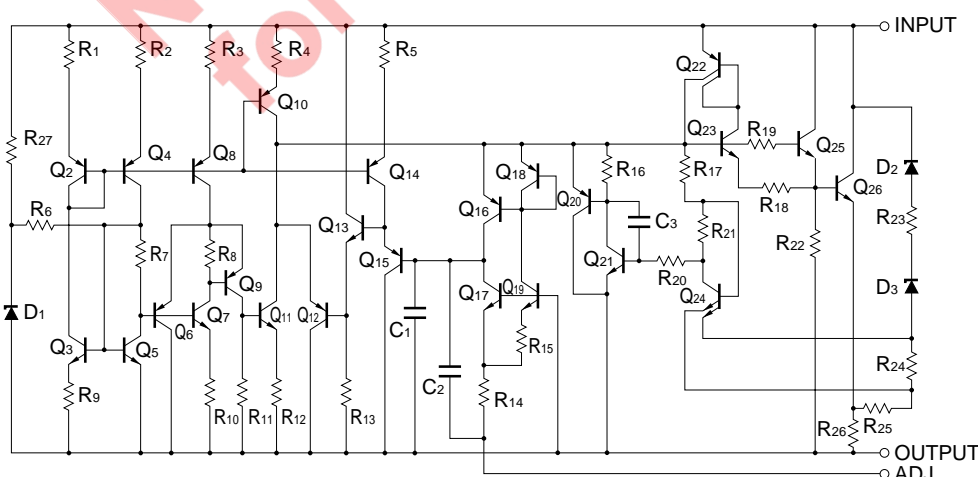
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ORDERING INFORMATION

Part Number	Package	Output Voltage	Marking	Package Type
μPC317HF	3PIN PLASTIC SIP (MP-45G) (Isolated TO-220)	1.3 V to 30 V	C317	Packed in envelope
μPC317HF-AZ ^{Note}	3PIN PLASTIC SIP (MP-45G) (Isolated TO-220)	1.3 V to 30 V	C317	Packed in envelope

Note Pb-free (This product does not contain Pb in external electrode.)

EQUIVALENT CIRCUIT



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Not all products and/or types are available in every country. Please check with an NEC Electronics sales representative for availability and additional information.

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

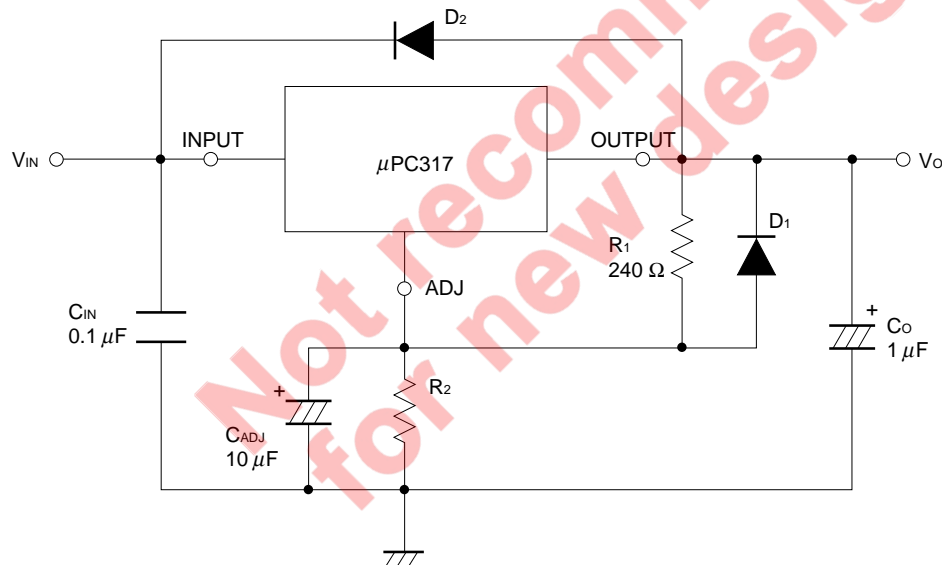
Parameter	Symbol	Rating	Unit
Input-Output Voltage Differential	V _{IN} – V _O	40	V
Total Power Dissipation (T _C = 25°C)	P _T	15 ^{Note}	W
Operating Ambient Temperature	T _A	–20 to +80	°C
Operating Junction Temperature	T _J	–20 to +150	°C
Storage Temperature	T _{stg}	–65 to +150	°C
Thermal Resistance (junction to case)	R _{th (J–C)}	5	°C/W
Thermal Resistance (junction to ambient)	R _{th (J–A)}	65	°C/W

Note Internally limited.

When operating junction temperature rise above 150°C, the internal protection circuit shutdown output voltage.

Caution Product quality may suffer if the absolute maximum rating is exceeded 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 exceeded.

TYPICAL CONNECTION



Remark R₁, R₂ : Resistor to set the output voltage.

$$V_O = \left(1 + \frac{R_2}{R_1}\right) \cdot V_{REF} + I_{ADJ} \cdot R_2 \approx \left(1 + \frac{R_2}{R_1}\right) \cdot V_{REF}$$

C_{IN} : Need to stop the oscillation for the long input wire length.

C_O : Need to stop the oscillation for the long output wire length.

Improve the transient stability of the output voltage when the load current is suddenly changed.

C_{ADJ} : Improve the ripple rejection and the oscillate rejection.

D₁ : Protect against C_{ADJ} when output pin is shorted.

D₂ : Need for V_{IN} < V_O.

V _O (V)	R ₂ (Ω : TYP.)
2.5	240
5.0	720
12	2064
24	4368
30	5520

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Input-Output Voltage Differential	$V_{IN} - V_O$	3		38.7	V
Input Voltage	V_{IN}	4.3		40	V
Output Voltage	V_O	1.3		30	V
Output Current	I_O	0.01		1.5	A
Operating Junction Temperature	T_J	-20		+125	°C

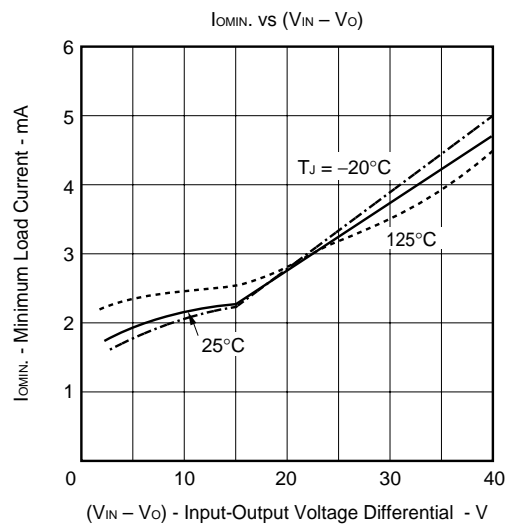
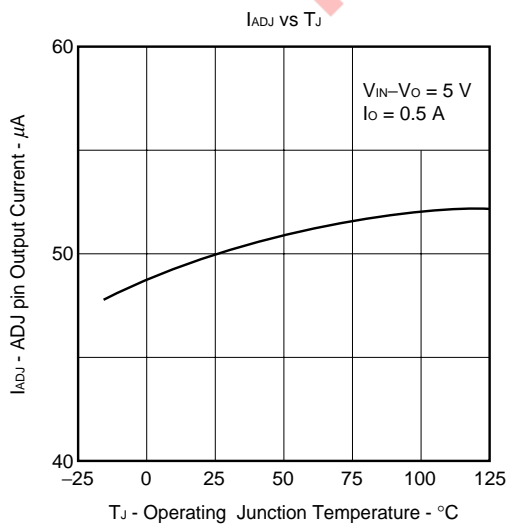
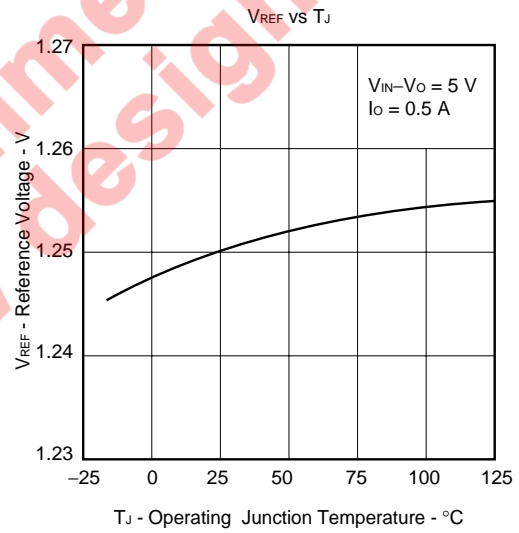
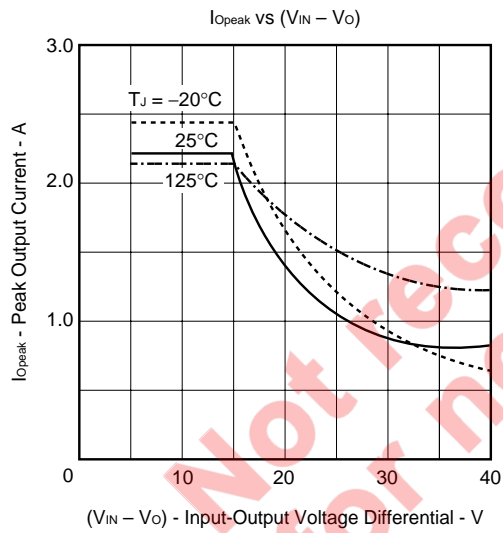
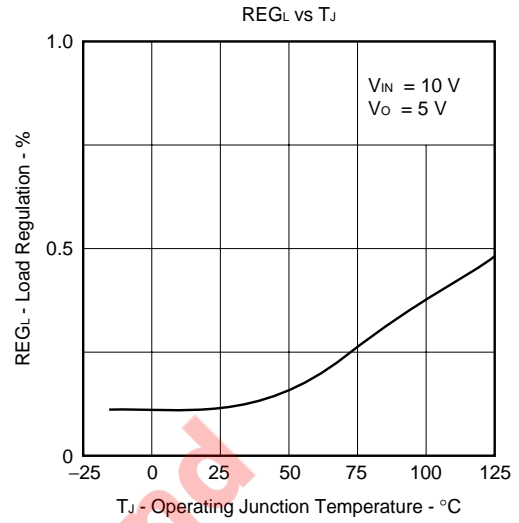
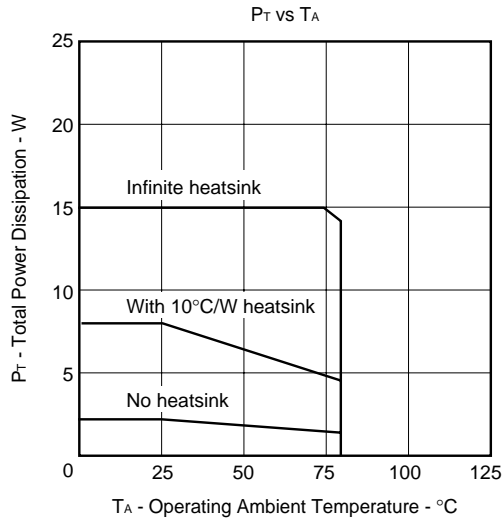
ELECTRICAL CHARACTERISTICS

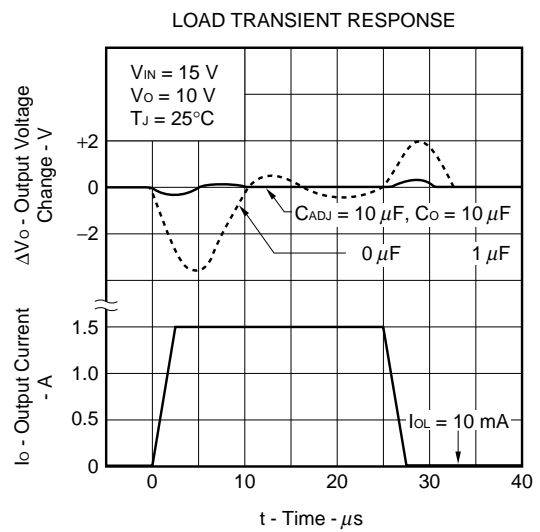
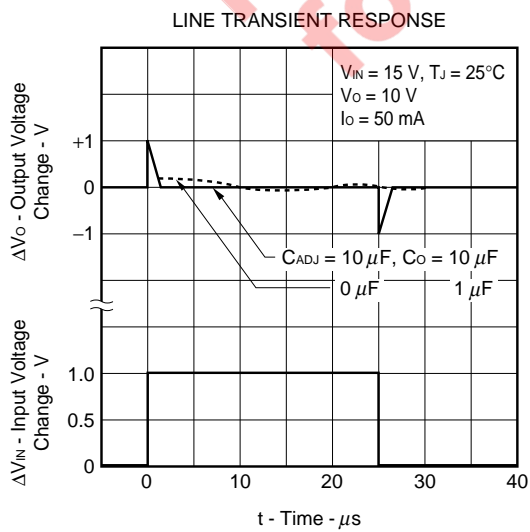
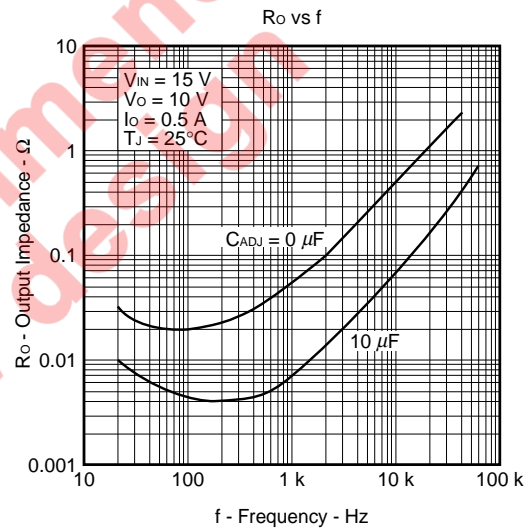
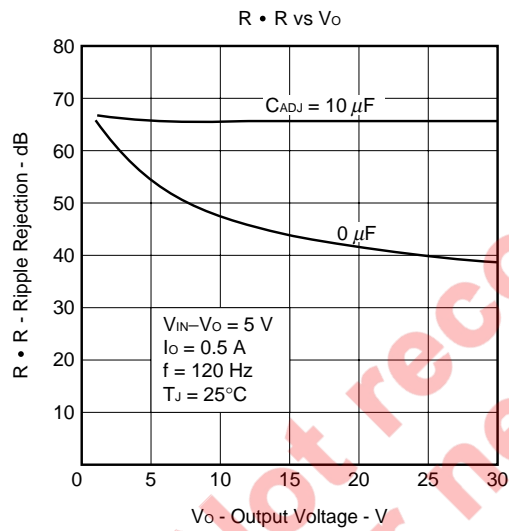
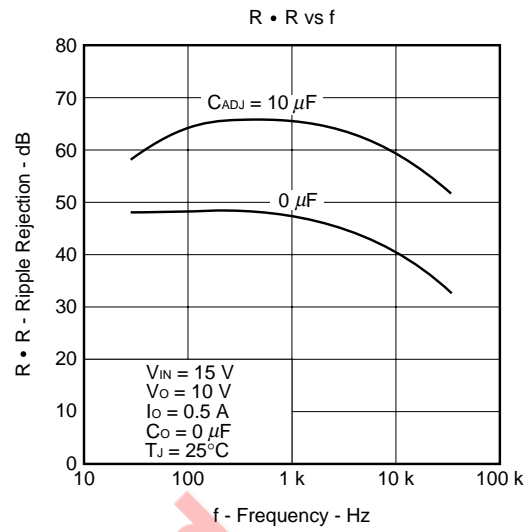
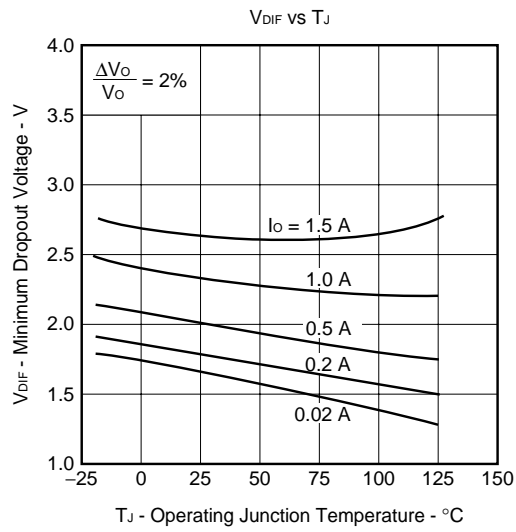
(V_{IN} - V_O = 5 V, I_O = 0.5 A, 0°C ≤ T_J ≤ +125°C, unless otherwise specified.)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Line Regulation	REG _{IN}	T _J = 25°C, 3 V ≤ (V _{IN} - V _O) ≤ 40 V, I _O = 0.1 A		0.01	0.04	%/V
		3 V ≤ (V _{IN} - V _O) ≤ 40 V, I _O = 0.1 A		0.02	0.07	%/V
Load Regulation	REG _L	T _J = 25°C				
		10 mA ≤ I _O ≤ 1.5 A				
		10 mA ≤ I _O ≤ 1.5 A				
		10 mA ≤ I _O ≤ 1.5 A				
Thermal Regulation	REG _{TH}	T _A = 25°C, 0.2 ms ≤ t ≤ 20 ms ^{Note}		0.01	0.07	%/W
ADJ pin Output Current	I _{ADJ}			50	100	μA
I _{ADJ} Change	ΔI _{ADJ}	10 mA ≤ I _O ≤ 1.5 A, P _T ≤ 15 W		0.4	5	μA
Reference Voltage	V _{REF}	10 mA ≤ I _O ≤ 1.5 A, P _T ≤ 15 W	1.20	1.25	1.30	V
Temperature Stability of V _{REF}	ΔV _{REF} /ΔT			0.7		%
Minimum Load Current	I _{OMIN}	V _{IN} - V _O = 40 V		4.7	10	mA
Peak Output Current	I _{Opeak}	5 V ≤ (V _{IN} - V _O) ≤ 15 V	1.5	2.2	2.9	A
		V _{IN} - V _O = 40 V	0.15	0.8		A
Output Noise Voltage (RMS)	V _n	T _J = 25°C, 10 Hz ≤ f ≤ 10 kHz		0.001		%
Ripple Rejection	R • R	T _J = 25°C, ΔV _{IN} = 1 V _{r.m.s.}				
		f = 120 Hz, V _O = 10 V				

Note Pulse testing Duty Cycle ≤ 2%

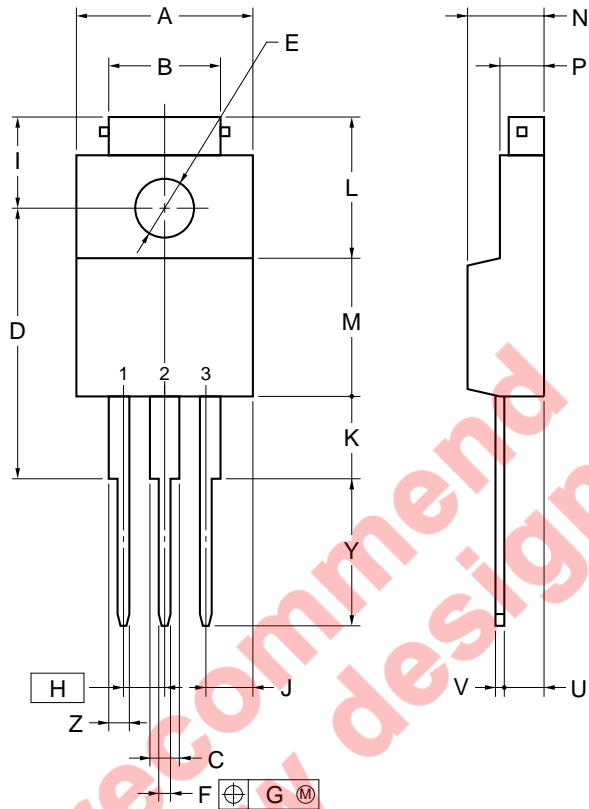
TYPICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$, unless otherwise specified. Reference Values.)





PACKAGE DRAWING

3PIN PLASTIC SIP (MP-45G)



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

ITEM	MILLIMETERS
A	10.0±0.2
B	7.0±0.2
C	1.50±0.2
D	17.0±0.3
E	φ3.3±0.2
F	0.75±0.10
G	0.25
H	2.54 (T.P.)
I	5.0±0.3
J	2.46±0.2
K	5.0±0.2
L	8.5±0.2
M	8.5±0.2
N	4.5±0.2
P	2.8±0.2
U	2.4±0.5
V	0.65±0.10
Y	8.9±0.7
Z	1.30±0.2

P3HF-254B-4

<R> RECOMMENDED SOLDERING CONDITIONS

The μPC317 should be soldered and mounted under the following recommended conditions.

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

For technical information, see the following website.

Semiconductor Device Mount Manual (<http://www.necel.com/pkg/en/mount/index.html>)

Through-hole devices

μPC317HF: 3PIN PLASTIC SIP (MP-45G) (Isolated TO-220)

Process	Conditions	Recommend
Wave soldering (only to leads)	Solder temperature: 260°C or below, Flow time: 10 seconds or less.	WS60-00-1
Partial heating method	Pin temperature: 350°C or below, Heat time: 3 seconds or less (Per each pin).	P350

μPC317HF-AZ: 3PIN PLASTIC SIP (MP-45G) (Isolated TO-220) ^{Note}

Process	Conditions	Recommend
Wave soldering (only to leads)	Solder temperature: 260°C or below, Flow time: 10 seconds or less.	WS60-00-1
Partial heating method	Pin temperature: 350°C or below, Heat time: 3 seconds or less (Per each pin).	P350

Note Pb-free (This product does not contain Pb in external electrode.)

Caution For through-hole device, the wave soldering process must be applied only to leads, and make sure that the package body does not get jet soldered.

<R> REFERENCE DOCUMENTS

Document Name	Document No.
Usage of Three-Terminal Regulators User's Manual	G12702E
Semiconductor Device Mount Manual	http://www.necel.com/pkg/en/mount/index.html
Review of Quality and Reliability Handbook Information	C12769E

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