

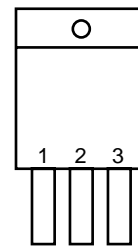
3-TERMINAL NEGATIVE ADJUSTABLE REGULATOR

The μPC337 is an adjustable 3-terminal negative 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 excess of 1.5 A
- On-chip some protection circuit (over current protection, SOA protection and thermal shut down).

★ PIN CONFIGURATION (Marking Side)

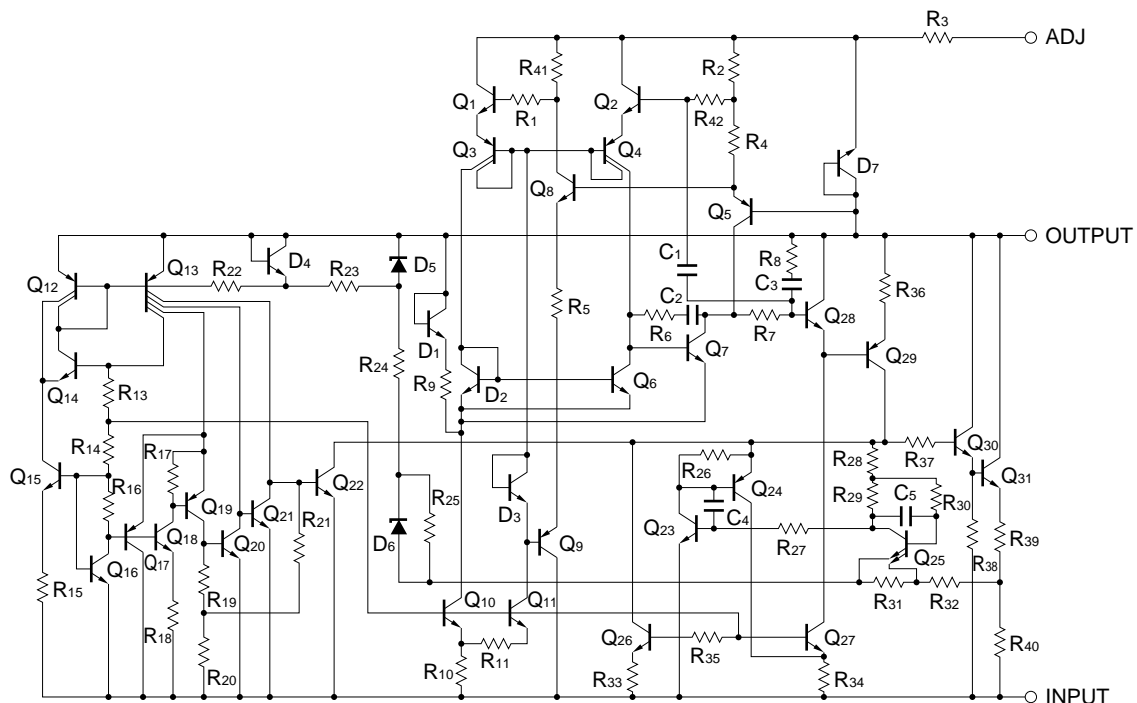


1 : ADJ
2 : INPUT
3 : OUTPUT

★ ORDERING INFORMATION

Part Number	Package
μPC337HF	3-pin plastic SIP (MP-45G) (isolated TO-220)

EQUIVALENT CIRCUIT



The information in this document is subject to change without notice.

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	P _T	15 ^{Note}	V
Operating Ambient Temperature	T _A	–20 to +85	°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)}	7	°C/W
★ Thermal Resistance (junction to ambient)	R _{th(J-A)}	65	°C/W

Note Internally limited.

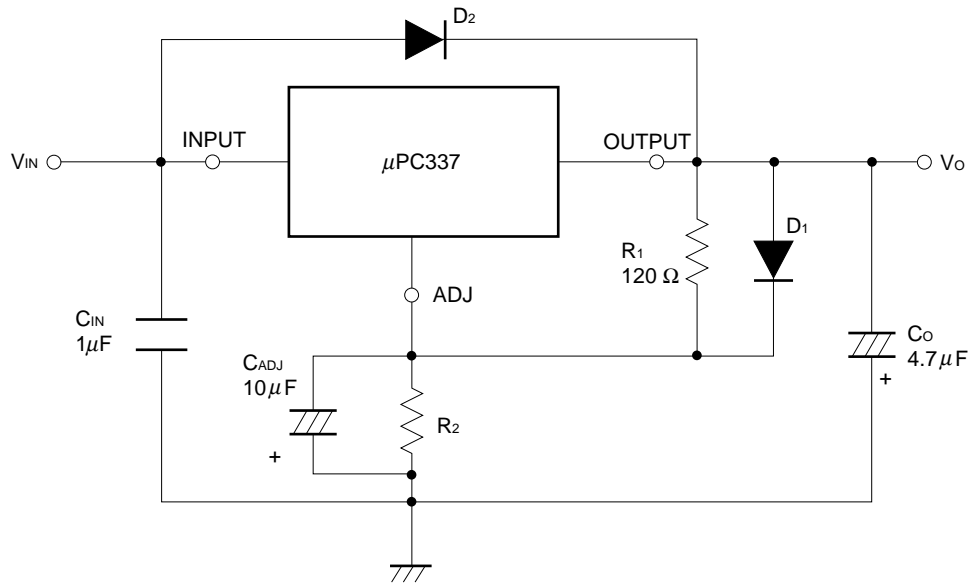
When operating junction temperature rise up to 150 °C (≤200 °C), the internal circuit shutdown output voltage.

- ★ **Caution Exposure to Absolute Maximum Ratings for extended periods may affect device reliability; exceeding the ratings could cause permanent damage. The parameters apply independently. The device should be operated within the limits specified under DC and AC Characteristics.**

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Input-Output Voltage Differential	V _{IN} – V _O	–3	–5	–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

★ TYPICAL CONNECTION



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

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

V _O (V)	R ₂ (Ω : TYP.)
-1.25	0
-2.5	120
-5.0	360
-12	1032
-24	2184
-30	2760

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

C_O : Need to stop the oscillation for the long output wiring 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} from output short.

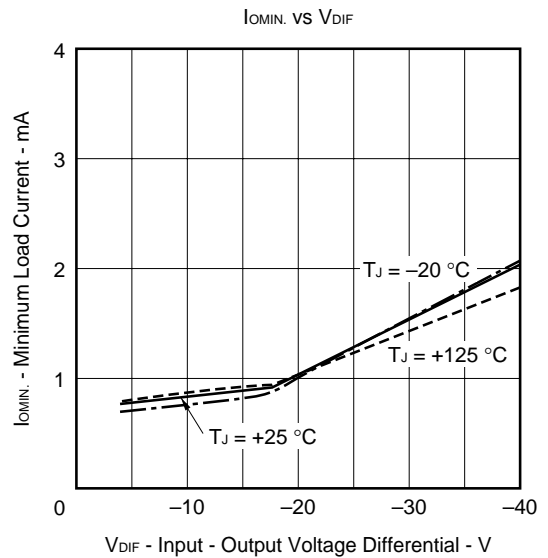
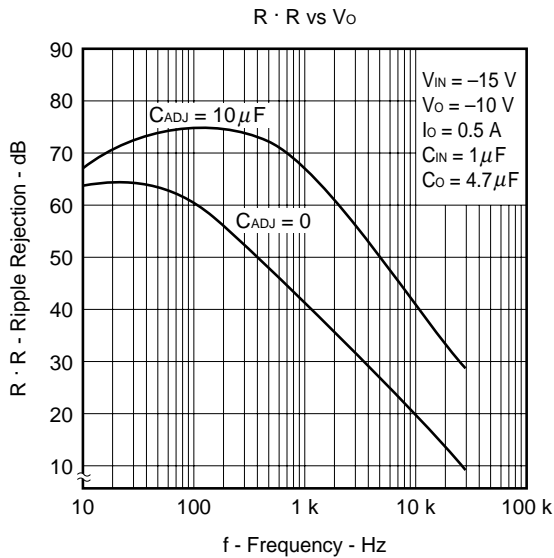
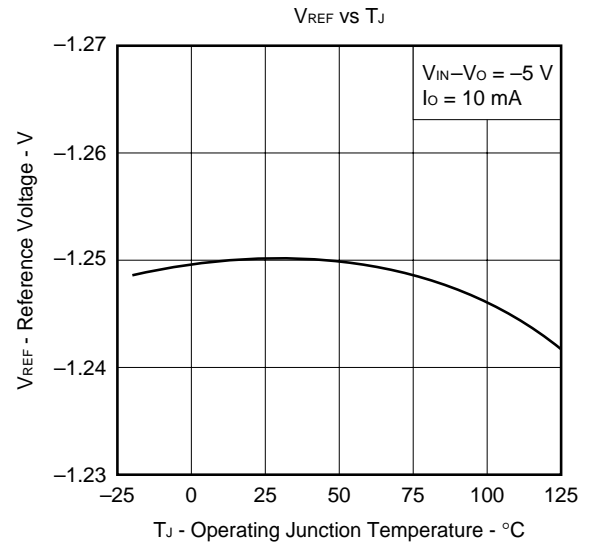
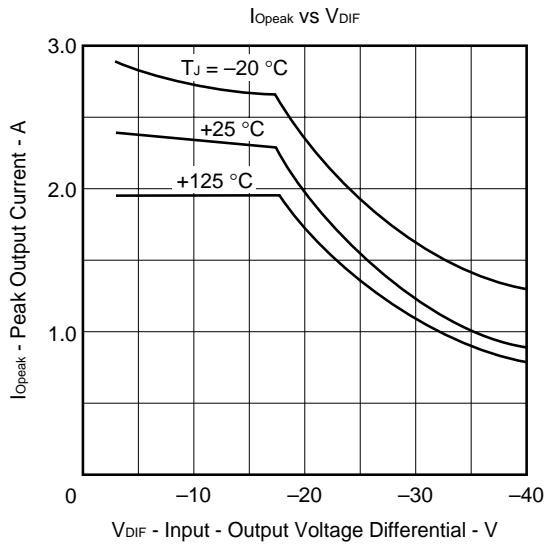
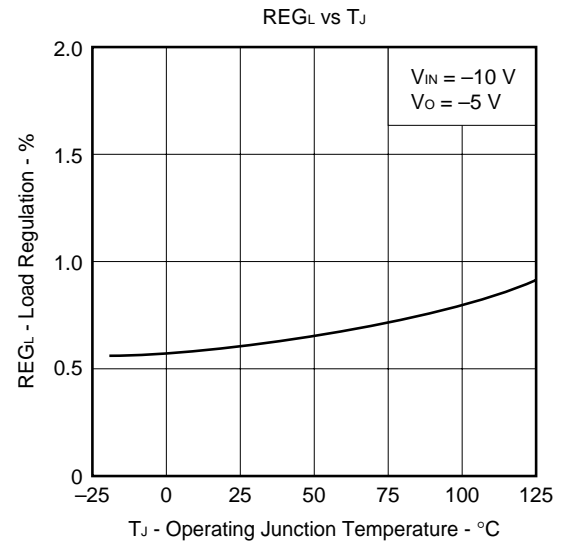
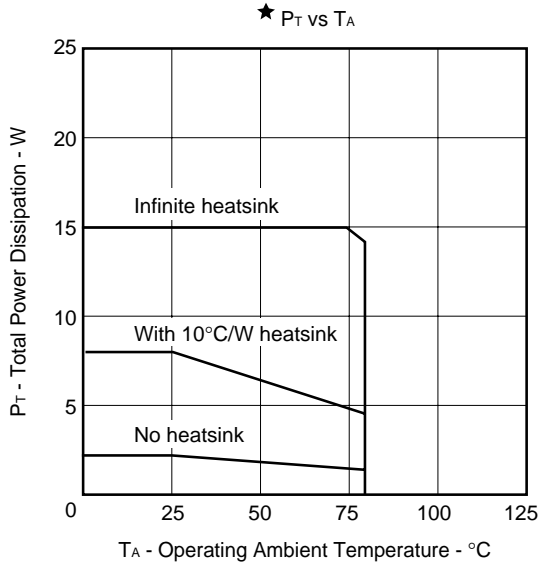
D₂ : Need for V_{IN} > V_O.

ELECTRICAL CHARACTERISTICS ($V_{IN} - V_O = -5\text{ V}$, $I_O = 0.5\text{ A}$, $0\text{ }^\circ\text{C} \leq T_J \leq +125\text{ }^\circ\text{C}$, unless otherwise specified.)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
Line Regulation	REG _{IN}	$T_J = 25\text{ }^\circ\text{C}$, $3\text{ V} \leq V_{IN} - V_O \leq 40\text{ V}$ ^{Note}		0.005	0.04	%/V	
		$0\text{ }^\circ\text{C} \leq T_J \leq 125\text{ }^\circ\text{C}$, $3\text{ V} \leq V_{IN} - V_O \leq 40\text{ V}$ ^{Note}		0.01	0.07	%/V	
Load Regulation	REG _L	$T_J = 25\text{ }^\circ\text{C}$, $10\text{ mA} \leq I_O \leq 1.5\text{ A}$ ^{Note}	$ V_O \leq 5\text{ V}$	30	50	mV	
			$ V_O \geq 5\text{ V}$	0.6	1.0	%	
		$0\text{ }^\circ\text{C} \leq T_J \leq 125\text{ }^\circ\text{C}$, $10\text{ mA} \leq I_O \leq 1.5\text{ A}$ ^{Note}	$ V_O \leq 5\text{ V}$	45	70	mV	
			$ V_O \geq 5\text{ V}$	0.9	1.5	%	
Thermal Regulation	REG _{TH}	$T_J = 25\text{ }^\circ\text{C}$, $ V_{IN} - V_O = 40\text{ V}$, $V_O = -10\text{ V}$, $0\text{ A} \leq I_O \leq 0.25\text{ A}$, $t = 10\text{ ms}$		0.005	0.04	%/W	
ADJ pin Output Current	I _{ADJ}			60	100	μA	
★ I _{ADJ} Change	ΔI _{ADJ}	$T_J = 25\text{ }^\circ\text{C}$, $3\text{ V} \leq V_{IN} - V_O \leq 40\text{ V}$, $10\text{ mA} \leq I_O \leq 1.5\text{ A}$, $P_T \leq 15\text{ W}$		2	5	μA	
★ Reference Voltage	V _{REF}	$3\text{ V} \leq V_{IN} - V_O \leq 40\text{ V}$, $10\text{ mA} \leq I_O \leq 1.5\text{ A}$, $P_T \leq 15\text{ W}$	-1.20	-1.25	-1.30	V	
Temperature Stability of V _{REF}	ΔV _{REF} /ΔT	$0\text{ }^\circ\text{C} \leq T_J \leq 125\text{ }^\circ\text{C}$, $I_O = 5\text{ mA}$		-0.6		%	
Minimum Load Current	I _{OMIN.}	$ V_{IN} - V_O = 40\text{ V}$		2.1	10	mA	
Peak Output Current	I _{Opeak}	$3\text{ V} \leq V_{IN} - V_O \leq 15\text{ V}$	1.5	2.3	2.9	A	
		$T_J = 25\text{ }^\circ\text{C}$, $ V_{IN} - V_O = 40\text{ V}$	0.15	0.8		A	
Output Noise Voltage (RMS)	V _n	$T_J = 25\text{ }^\circ\text{C}$, $10\text{ Hz} \leq f \leq 10\text{ kHz}$		0.002		%	
Ripple Rejection	R • R	$T_J = 25\text{ }^\circ\text{C}$, $\Delta V_{IN} = 1\text{ V}_{r.m.s}$ $f = 120\text{ Hz}$, $V_O = -10\text{ V}$	C _{ADJ} = 0		60		dB
			C _{ADJ} = 10 μF	66	75		dB

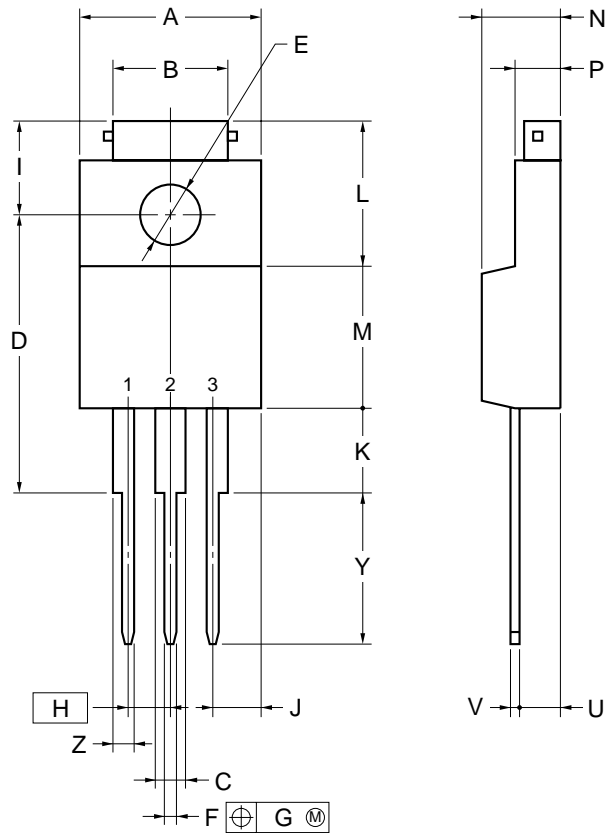
Note Measured at constant junction temperature, using pulse testing with a low duty cycle.
PW = 10 ms, Duty Cycle ≤ 2 %

TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise specified.)



★ 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

★ **RECOMMENDED SOLDERING CONDITIONS**

When soldering these products, it is highly recommended to observe the conditions as shown below. If other soldering processes are used, or if the soldering is performed under different conditions, please make sure to consult with our sales offices.

For more details, refer to our document "**SEMICONDUCTOR DEVICE MOUNTING TECHNOLOGY MANUAL (C10535E)**".

Type of Through-hole Devices

μPC337HF: 3-pin plastic SIP (MP-45G)

Process	Conditions
Wave soldering (only to leads)	Solder temperature: 260 °C or below, Flow time: 10 seconds or less.
Partial heating method	Pin temperature: 300 °C or below, Heat time: 3 seconds or less (per each lead).

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.

★ **REFERENCE DOCUMENTS**

QUALITY GRADES ON NEC SEMICONDUCTOR DEVICES	C11531E
SEMICONDUCTOR DEVICE MOUNTING TECHNOLOGY MANUAL	C10535E
NEC IC PACKAGE MANUAL (CD-ROM)	C13388E
GUIDE TO QUALITY ASSURANCE FOR SEMICONDUCTOR DEVICES	MEI-1202
SEMICONDUCTORS SELECTION GUIDE	X10679E
NEC SEMICONDUCTOR DEVICE RELIABILITY/QUALITY CONTROL SYSTEM	IEI-1212
-THREE TERMINAL REGULATOR	

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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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Anti-radioactive design is not implemented in this product.