DATA SHEET

NEC

BIPOLAR ANALOG INTEGRATED CIRCUIT

μPC2260

LOW DROPOUT VOLTAGE REGULATOR WITH SYSTEM RESET PIN

DESCRIPTION

The μPC2260 is a 500 mA maximum output current low dropout voltage regulator with a reset pin that outputs a reset signal when a drop in the output voltage is detected, and a reset signal output timing adjustment pin.

The output voltage is 5 V, and the minimum voltage difference between input and output is extremely low, making this product ideal for use in the power supply circuits of systems with built-in battery-driven microprocessors.

Because the reverse leakage current of this power supply is about 10 μA even if a voltage is applied to the output pin when the input voltage is cut off, a reverse protection diode is not necessary even in systems requiring battery backup.

FEATURES

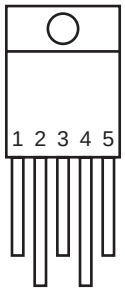
- Outputs reset signal (active low) when the output voltage drops.
- Power on reset constant can be set by attaching a single capacitor.
- Low minimum voltage difference between input and output

  V_{DIF} = 0.5 V TYP. (when I_O = 500 mA)
- Low reverse current leakage during back up

  I_{OLK} = 10 μA MAX. (at V_{IN} = 0 V, V_O = 5 V, 0°C ≤ T_J ≤ 125°C)

PIN CONFIGURATION (Marking Side)

5-pin plastic V-DIP (V)
μPC2260V



1: INPUT
2: RESET
3: GND
4: DELAY CAPACITOR
5: OUTPUT

ORDERING INFORMATION

Part Number	Package
μPC2260V	5-pin plastic V-DIP (V)

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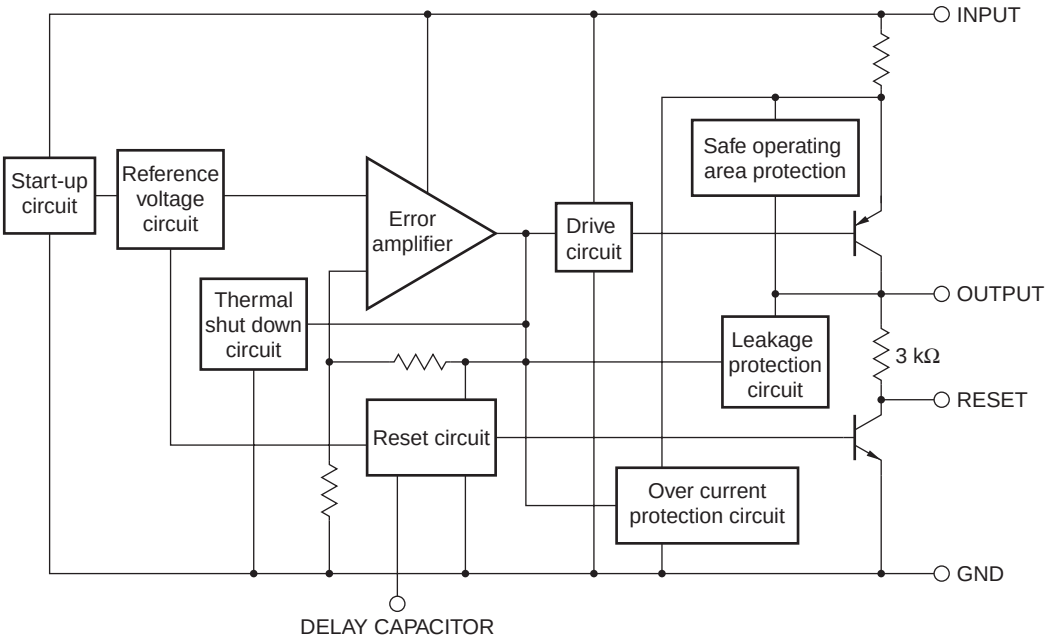
Date Published June 2000 NS CP (K)
Printed in Japan

BLOCK DIAGRAM



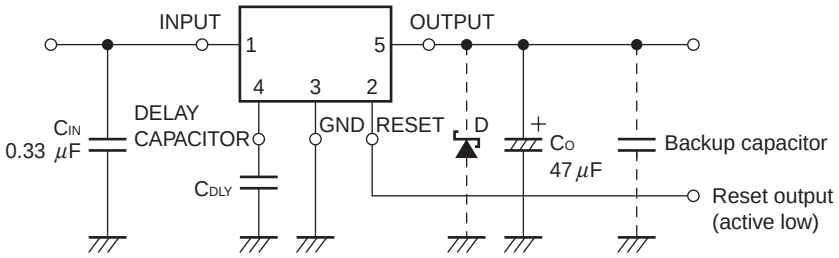
ABSOLUTE MAXIMUM RATINGS (T_A = +25 °C, unless otherwise specified.)

Parameter	Symbol	Ratings	Unit
Input Voltage	V_{IN}	−0.3 to +35	V
Reset Pin Applied Voltage	V_{RST}	−0.3 to +35	V
Total Power Dissipation (T_C = 25°C)	P_T	20 Note	W
Operating Ambient Temperature	T_A	−20 to +85	°C
Operating Junction Temperature	T_J	−20 to +150	°C
Storage Temperature	T_{stg}	−55 to +150	°C
Thermal Resistance (Junction to Case)	$R_{th\ (J-C)}$	4	°C/W
Thermal Resistance (Junction to Ambient Air)	$R_{th\ (J-A)}$	83	°C/W

Note The total loss is limited by an internal circuit. Where T_J > 150°C, an internal protection circuit cuts off the output.

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



C_{IN} : 0.1 μF to 0.47 μF. Determine the capacitance depending on the line between the power supply smoothing circuit and input pin.

Be sure to connect this capacitor to prevent abnormal oscillation. Use of a capacitor, such as a film capacitor, with excellent voltage and temperature characteristics is recommended. Note that some laminated ceramic capacitors have poor temperature and voltage characteristics. When using a laminated ceramic capacitor, the capacitance must be stable in the voltage and temperature ranges used.

C_O : Must be 47 μF or more. Be sure to connect this capacitor to prevent oscillation and to improve transient load stability.

Connect C_{IN} and C_O as close to the IC (within 1 to 2 cm) as possible. When using this product below 0°C, select an electrolytic capacitor with low impedance characteristics.

D : Connect Schottky barrier diode (with a low forward voltage) if the voltage on the OUTPUT pin is lower than that on the GND pin.

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Input Voltage	V_{IN}	6		20	V
Output Current	I_O	5		500	mA
Operating Junction Temperature	T_J	–20		+125	°C

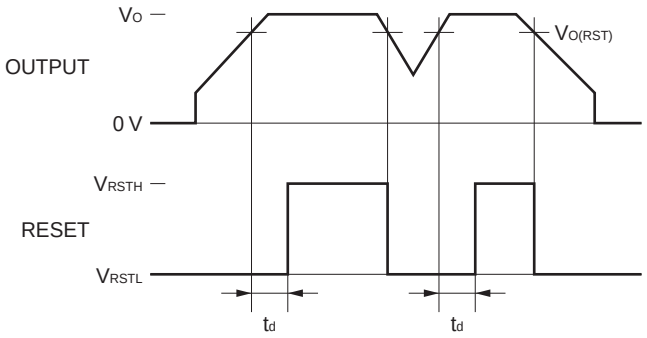
Caution The recommended operating range may be exceeded without causing any problems provided that the absolute maximum ratings are not exceeded. However, if the device is operated in a way that exceeds the recommended operating conditions, the margin between the actual conditions of use and the absolute maximum ratings is small, and therefore thorough evaluation is necessary. The recommended operating conditions do not imply that the device can be used with all values at their maximum values.

ELECTRICAL CHARACTERISTICS

(T_J = 25 °C, V_{IN} = 9 V, I_O = 350 mA, C_{IN} = 0.33 μF, C_O = 47 μF, unless otherwise specified.)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Output Voltage	V_O		4.8	5.0	5.2	V
		6 V ≤ V_{IN} ≤ 20 V, 5 mA ≤ I_O ≤ 500 mA, 0 °C ≤ T_J ≤ 125 °C	4.75		5.25	V
Line Regulation	REG_{IN}	6.5 V ≤ V_{IN} ≤ 20 V		5	50	mV
Load Regulation	REG_L	5 mA ≤ I_O ≤ 500 mA		10	50	mV
Operating Circuit Current	I_{BIAS}	I_O = 0 A		2	5	mA
		I_O = 500 mA			30	mA
Operating Circuit Current Change	ΔI_{BIAS}	6.5 V ≤ V_{IN} ≤ 20 V, I_O = 500 mA			10	mA
Output Noise Voltage	V_n	10 Hz ≤ f ≤ 100 kHz		130		$\mu V_{r.m.s.}$
Ripple Rejection	R•R	f = 120 Hz, 6.5 V ≤ V_{IN} ≤ 16.5 V	56	65		dB
Dropout Voltage	V_{DIF}	I_O = 500 mA		0.5	0.8	V
Peak Output Current	$I_{O\ peak}$		0.7	0.95	1.2	A
Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	I_O = 5 mA, 0 °C ≤ T_J ≤ 125 °C		0.4		mV/°C
OFF Output Leakage Current	I_{OLK}	V_{IN} = 0 V, V_O = 5 V, 0 °C ≤ T_J ≤ 125 °C			10	μA
Reset Output Voltage (High Level)	V_{RSTH}	I_{RSTH} = 100 μA, 0 °C ≤ T_J ≤ 125 °C	V_O – 0.5			V
Reset Output Voltage (Low Level)	V_{RSTL}	Reset output is active (low level), I_{RSTL} = 1.6 mA, 0 °C ≤ T_J ≤ 125 °C		0.6	0.8	V
Reset Output Leakage Current	I_{RLK}	$V_{O(RST)}$ ≤ V_O, 0 °C ≤ T_J ≤ 125 °C			10	μA
Output Voltage to Output Reset Signal	$V_{O(RST)}$	0 °C ≤ T_J ≤ 125 °C	V_O – 0.2		V_O – 0.1	V
Reset Output Delay Time	t_d	C_{DLY} = 0.1 μF, 0 °C ≤ T_J ≤ 125 °C		30		ms

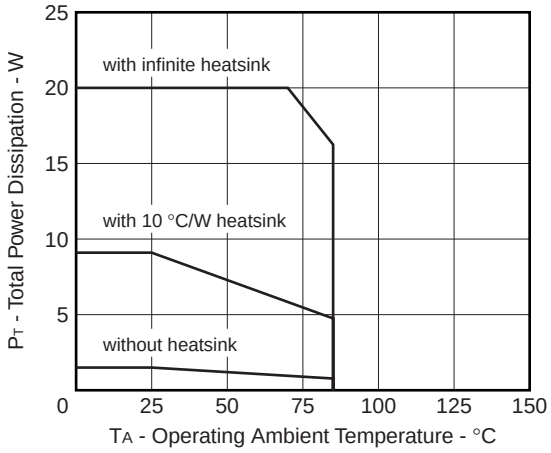
RESET OUTPUT RESPONSE CHARACTERISTICS



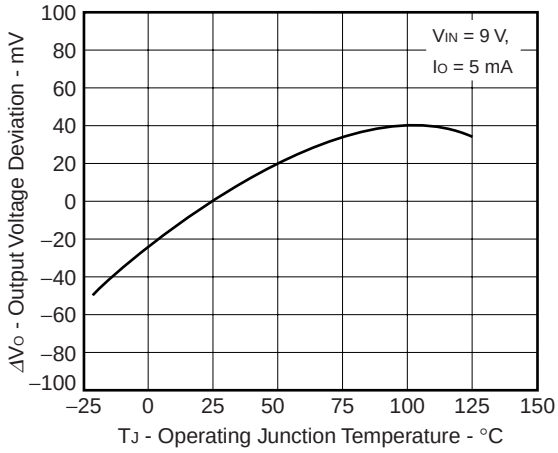
Remark t_d = 30 ms TYP. at C_{DLY} = 0.1 μF

TYPICAL CHARACTERISTIC (T_J = +25 °C, unless otherwise specified. Nominal)

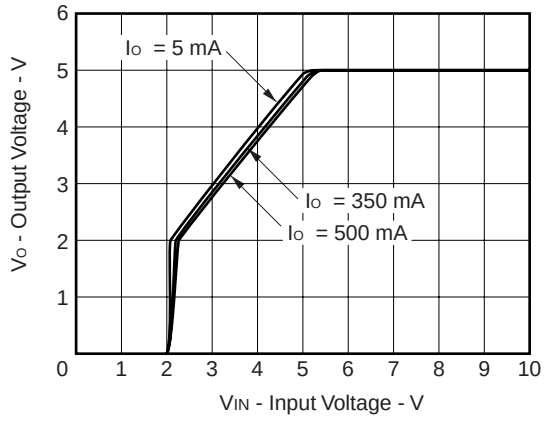
P_T vs T_A



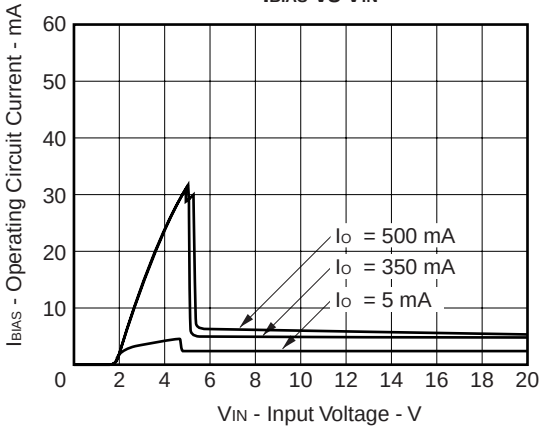
ΔV_O vs T_J



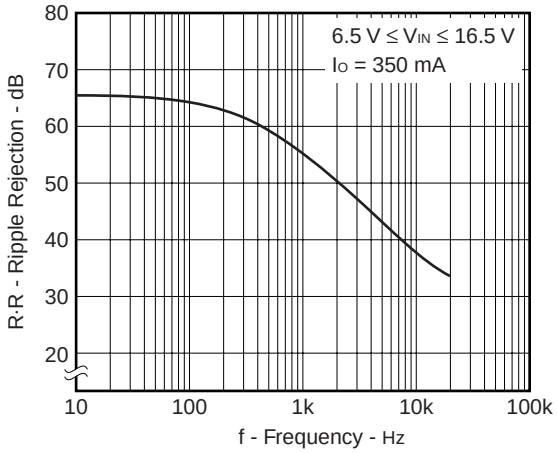
V_O vs V_{IN}



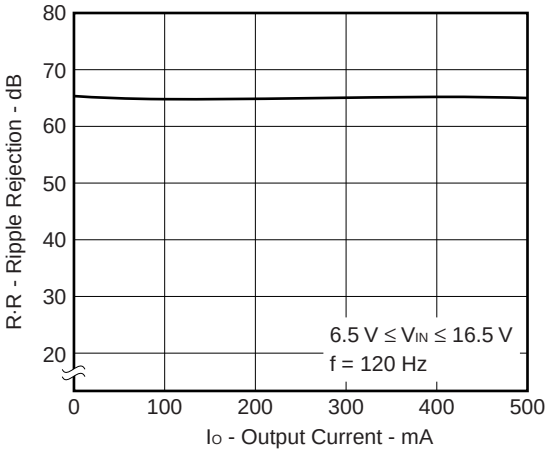
I_{BIAS} vs V_{IN}



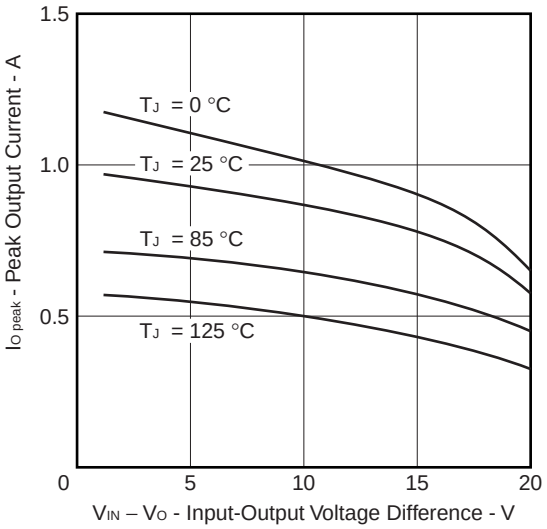
R·R vs f



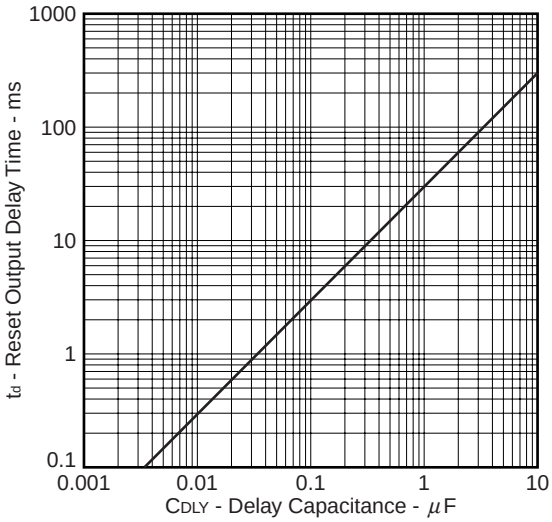
R·R vs I_O



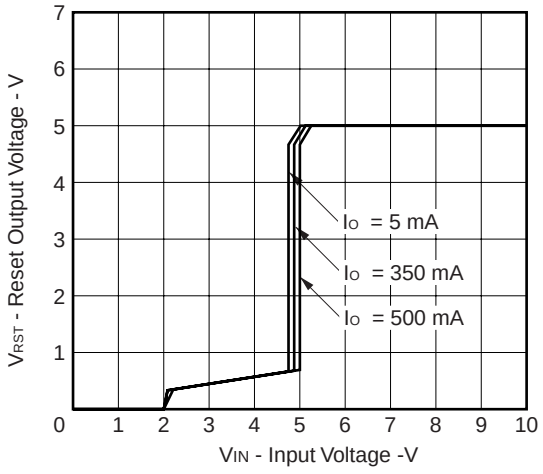
$I_{O\ peak}$ vs (V_{IN} – V_O)



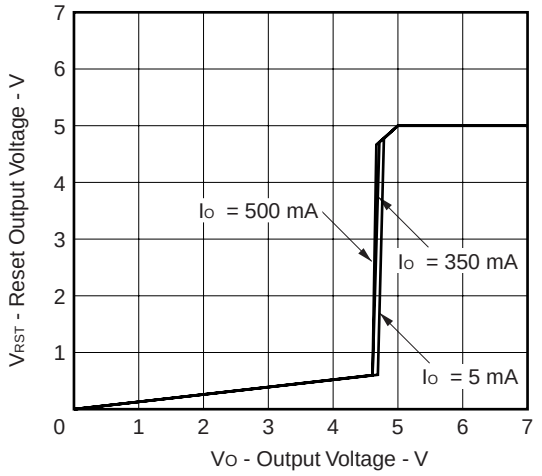
t_d vs C_{DLY}



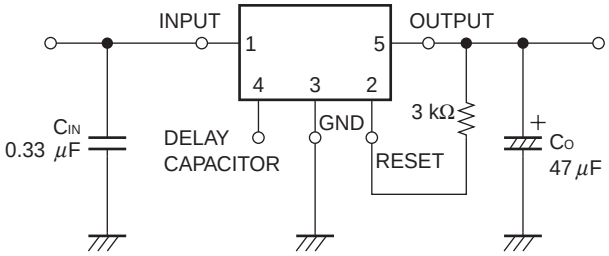
V_{RST} vs V_{IN}



V_{RST} vs V_O

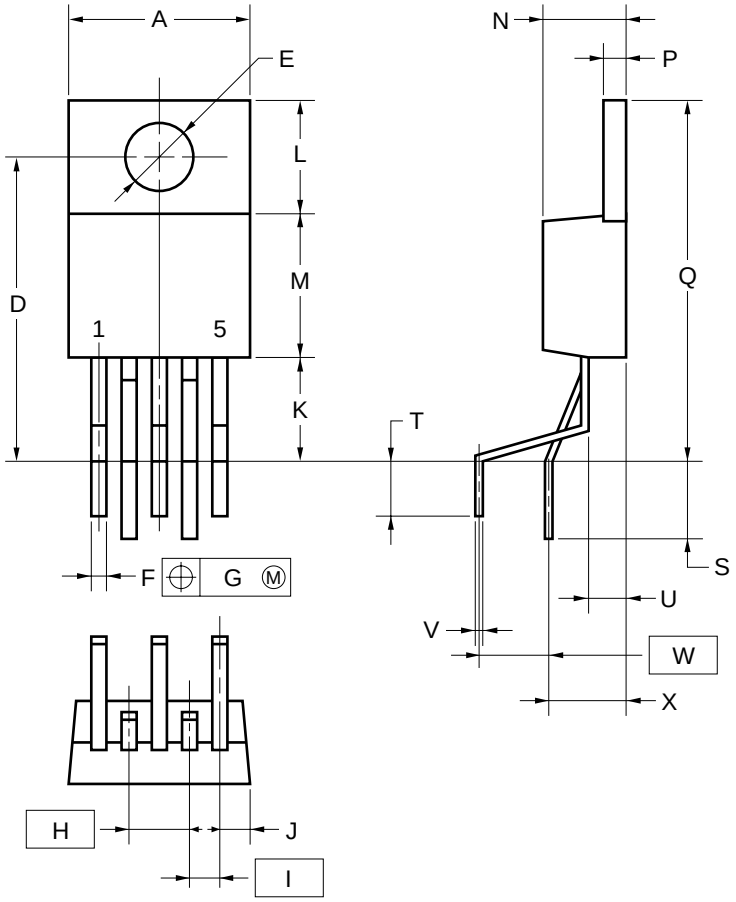


V_{RST} vs V_{IN}, V_{RST} vs V_O CHARACTERISTICS MEASUREMENT CIRCUIT



PACKAGE DRAWING

5-PIN PLASTIC V-DIP (V)



NOTE

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

ITEM	MILLIMETERS
A	10.4 MAX.
D	17.75±0.7
E	φ3.6±0.1
F	0.75±0.1
G	0.25
H	3.4
I	1.7
J	1.7 MAX.
K	5.0 MIN.
L	6.5
M	8.5
N	4.6±0.2
P	1.3±0.1
Q	21.15 MAX.
S	4.75±0.7
T	4.3±0.7
U	2.8±0.2
V	0.45±0.1
W	3.9
X	4.25±0.5

P5VP-340B3-3

RECOMMENDED SOLDERING CONDITIONS

When soldering this product, 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 Device

μPC2260V : 5-pin plastic V-DIP (V)

Process	Conditions
Wave soldering (only to leads)	Solder temperature: 260°C or below, Flow time: 10 seconds or less.

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.

[MEMO]

[MEMO]

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