



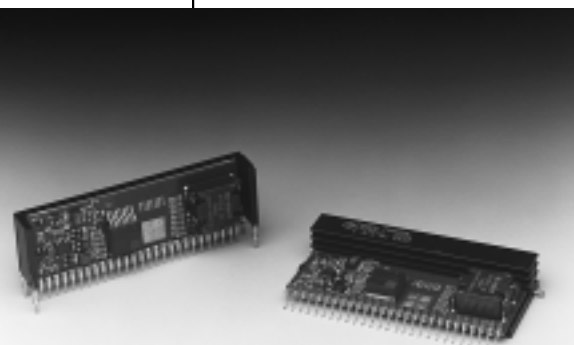
**THE DATASHEET OF  
PT7601A**



# PT7600 Series

## 10 AMP PROGRAMMABLE INTEGRATED SWITCHING REGULATOR

Revised 5/15/98



### Features

- Single-Device: +5V input
- 5-bit Programmable: 1.3V to 3.5V@10A
- High Efficiency
- Input Voltage Range: 4.5V to 5.5V
- Differential Remote Sense
- 27-pin SIP Package

The PT7600 is a new series of high-performance, 10 Amp Integrated Switching

Regulators (ISRs) housed in a 27-pin SIP package. The 10A capability allows easy integration of the latest high-speed, low-voltage  $\mu$ P's and bus drivers into existing 5V systems.

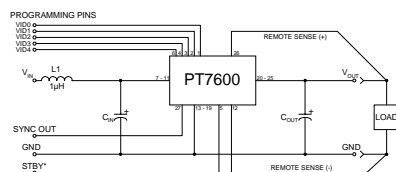
The output voltage of the PT7600 is easily programmed with a 5 bit input compatible with Intel's Pentium® II Processor from 1.3V to 3.5V. A differential remote sense is also provided which automatically compensates for any voltage drop from the ISR to the load.

1200 $\mu$ F of output capacitance are required for proper operation.

### Pin-Out Information

Pin	Function	Pin	Function	Pin	Function
1	VID0	10	V <sub>in</sub>	19	GND
2	VID1	11	V <sub>in</sub>	20	V <sub>out</sub>
3	VID2	12	Remote Sense Gnd	21	V <sub>out</sub>
4	VID3	13	GND	22	V <sub>out</sub>
5	STBY* - Stand-by	14	GND	23	V <sub>out</sub>
6	VID4	15	GND	24	V <sub>out</sub>
7	V <sub>in</sub>	16	GND	25	V <sub>out</sub>
8	V <sub>in</sub>	17	GND	26	Remote Sense V <sub>out</sub>
9	V <sub>in</sub>	18	GND	27	Do not connect

### Standard Application



C<sub>in</sub> = Required 1200 $\mu$ F electrolytic  
 C<sub>out</sub> = Required 1200 $\mu$ F electrolytic  
 L1 = Optional 1 $\mu$ H input choke

For STBY\* pin; open = output enabled; ground = output disabled.

### Specifications

Characteristics (T <sub>a</sub> = 25°C unless noted)	Symbols	Conditions	PT7600 SERIES			
			Min	Typ	Max	Units
Output Current	I <sub>o</sub>	T <sub>a</sub> = +60°C, 200 LFM, pkg N T <sub>a</sub> = +25°C, natural convection	0.1*	—	10	A
Input Voltage Range	V <sub>in</sub>	0.1A $\leq$ I <sub>o</sub> $\leq$ 10A	4.5**	—	5.5	V
Output Voltage Tolerance	$\Delta$ V <sub>o</sub>	V <sub>in</sub> = +5V, I <sub>o</sub> = 10A 0°C $\leq$ T <sub>a</sub> $\leq$ +55°C	V <sub>o</sub> -0.03	—	V <sub>o</sub> +0.03	V
Line Regulation	Reg <sub>line</sub>	4.5V $\leq$ V <sub>in</sub> $\leq$ 5.5V, I <sub>o</sub> = 10A	—	$\pm$ 10	—	mV
Load Regulation	Reg <sub>load</sub>	V <sub>in</sub> = +5V, 0.1 $\leq$ I <sub>o</sub> $\leq$ 10A	—	$\pm$ 10	—	mV
V <sub>o</sub> Ripple/Noise pk-pk	V <sub>n</sub>	V <sub>in</sub> = +5V, I <sub>o</sub> = 10A	—	50	—	mV
Transient Response with C <sub>out</sub> = 1200 $\mu$ F	t <sub>tr</sub> V <sub>os</sub>	I <sub>o</sub> step between 5A and 10A V <sub>o</sub> over/undershoot	—	100 200	—	$\mu$ Sec mV
Efficiency	$\eta$	V <sub>in</sub> = +5V, I <sub>o</sub> = 10A	V <sub>o</sub> = 3.3V V <sub>o</sub> = 2.9V V <sub>o</sub> = 2.5V V <sub>o</sub> = 1.8V V <sub>o</sub> = 1.5V	— 80 78 75 69 65	— — — — —	% % % % %
Switching Frequency	f <sub>o</sub>	4.5V $\leq$ V <sub>in</sub> $\leq$ 5.5V 0.1A $\leq$ I <sub>o</sub> $\leq$ 10A	650	700	750	kHz
Absolute Maximum Operating Temperature Range	T <sub>a</sub>		0	—	+85	°C
Recommended Operating Temperature Range	T <sub>a</sub>	Forced Air Flow = 200 LFM Over V <sub>in</sub> and I <sub>o</sub> Ranges	0	—	+65***	°C
Storage Temperature	T <sub>s</sub>		-40	—	+125	°C
Mechanical Shock		Per Mil-STD-883D, Method 2002.3 1 msec, Half Sine, mounted to a fixture	—	500	—	G's
Mechanical Vibration		Per Mil-STD-883D, Method 2007.2, 20-2000 Hz, Soldered in a PC board	—	10	—	G's
Weight	—	Vertical/Horizontal	—	31/41	—	grams

\* ISR-will operate down to no load with reduced specifications. Please note that this product is not short-circuit protected.

\*\* The minimum input voltage is 4.5V or V<sub>out</sub>+1.2V, whichever is greater.

\*\*\* See SOA curves.

**Output Capacitors:** The PT7600 series requires a minimum output capacitance of 1200 $\mu$ F for proper operation. Do not use Oscon type capacitors. The maximum allowable output capacitance is 7,500 $\mu$ F. See Capacitor Application Note.

**Input Filter:** An input filter is optional for most applications. The input inductor must be sized to handle 10ADC with a typical value of 1 $\mu$ H. The input capacitance must be rated for a minimum of 1.0 Arms of ripple current. For transient or dynamic load applications, additional capacitance may be required.

# PT7600 Series

## Programming Information

VID3	VID2	VID1	VID0	VID4=1 Vout	VID4=0 Vout
1	1	1	1	2.0V	1.30V
1	1	1	0	2.1V	1.35V
1	1	0	1	2.2V	1.40V
1	1	0	0	2.3V	1.45V
1	0	1	1	2.4V	1.50V
1	0	1	0	2.5V	1.55V
1	0	0	1	2.6V	1.60V
1	0	0	0	2.7V	1.65V
0	1	1	1	2.8V	1.70V
0	1	1	0	2.9V	1.75V
0	1	0	1	3.0V	1.80V
0	1	0	0	3.1V	1.85V
0	0	1	1	3.2V	1.90V
0	0	1	0	3.3V	1.95V
0	0	0	1	3.4V	2.00V
0	0	0	0	3.5V	2.05V

Logic 0 = Pin 12 (remote sense gnd) potential  
Logic 1 = Open circuit (no pull-up resistors)

## Ordering Information

PT7601□ = 1.3 to 3.5 Volts

(For dimensions and PC board layout, see Package Styles 800 & 810.)

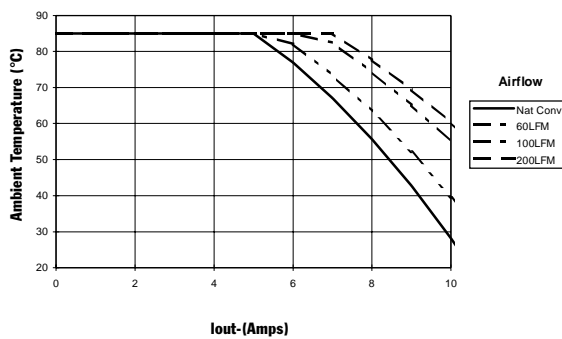
## PT Series Suffix (PT1234X)

### Case/Pin Configuration

Vertical Through-Hole	<b>N</b>
Horizontal Through-Hole	<b>A</b>
Horizontal Surface Mount	<b>C</b>

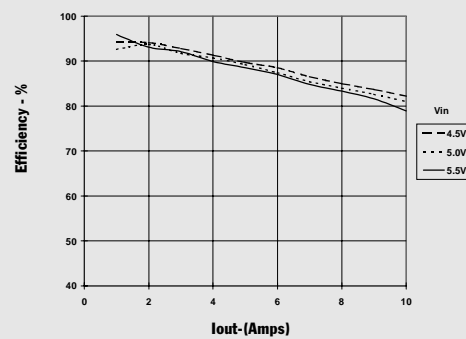
## CHARACTERISTIC DATA

Safe Operating Area Curve (@V<sub>in</sub>=+5V)

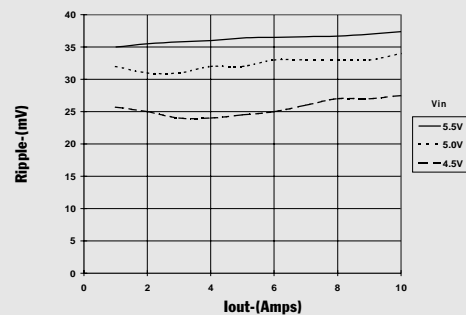


PT7601, 3.3 VDC (See Note 1)

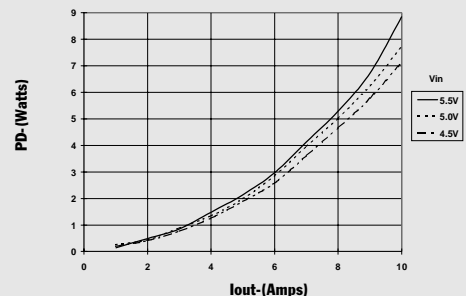
Efficiency vs Output Current



Ripple vs Output Current



Power Dissipation vs Output Current



Note 1: SOA curves represent operating conditions at which internal components are at or below manufacturer's maximum rated operating temperatures.

## IMPORTANT NOTICE

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

TI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF TI PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.

## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

 [View PT7601A on WIN SOURCE](#)

 [Texas Instruments](#) Information

## Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management