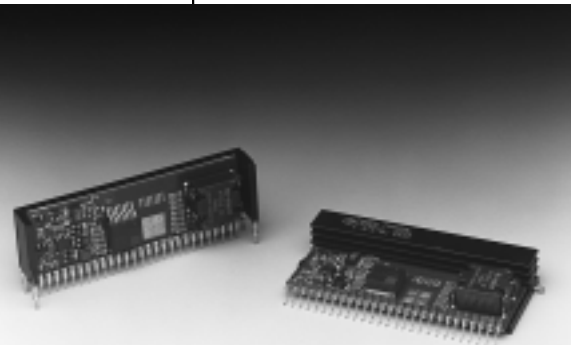


PT7600 Series

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 μ P's and bus drivers into existing 5V systems.

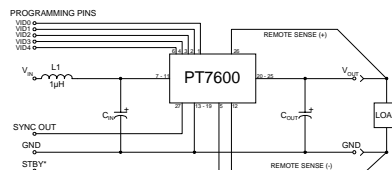
The output voltage of the PT7600 is easily programmed with a 5 bit input compatible with Intel's Pentium® II Processor from 1.3V to 3.5V. A differential remote sense is also provided which automatically compensates for any voltage drop from the ISR to the load.

1200 μ F of output capacitance are required for proper operation.

Pin-Out Information

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

Standard Application



C_{in} = Required 1200 μ F electrolytic
 C_{out} = Required 1200 μ F electrolytic
 L1 = Optional 1 μ H input choke

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

Specifications

Characteristics (T _a = 25°C unless noted)	Symbols	Conditions	PT7600 SERIES			
			Min	Typ	Max	Units
Output Current	I _o	T _a = +60°C, 200 LFM, pkg N T _a = +25°C, natural convection	0.1*	—	10	A
Input Voltage Range	V _{in}	0.1A \leq I _o \leq 10A	4.5**	—	5.5	V
Output Voltage Tolerance	Δ V _o	V _{in} = +5V, I _o = 10A 0°C \leq T _a \leq +55°C	V _o -0.03	—	V _o +0.03	V
Line Regulation	Reg _{line}	4.5V \leq V _{in} \leq 5.5V, I _o = 10A	—	\pm 10	—	mV
Load Regulation	Reg _{load}	V _{in} = +5V, 0.1 \leq I _o \leq 10A	—	\pm 10	—	mV
V _o Ripple/Noise pk-pk	V _n	V _{in} = +5V, I _o = 10A	—	50	—	mV
Transient Response with C _{out} = 1200 μ F	t _{tr} V _{os}	I _o step between 5A and 10A V _o over/undershoot	—	100 200	—	μ Sec mV
Efficiency	η	V _{in} = +5V, I _o = 10A	V _o = 3.3V V _o = 2.9V V _o = 2.5V V _o = 1.8V V _o = 1.5V	— 80 78 75 69 65	— — — — —	% % % % %
Switching Frequency	f _o	4.5V \leq V _{in} \leq 5.5V 0.1A \leq I _o \leq 10A	650	700	750	kHz
Absolute Maximum Operating Temperature Range	T _a		0	—	+85	°C
Recommended Operating Temperature Range	T _a	Forced Air Flow = 200 LFM Over V _{in} and I _o Ranges	0	—	+65***	°C
Storage Temperature	T _s		-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_{out}+1.2V, whichever is greater.

*** See SOA curves.

Output Capacitors: The PT7600 series requires a minimum output capacitance of 1200 μ F for proper operation. Do not use Oscon type capacitors. The maximum allowable output capacitance is 7,500 μ 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 μ 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.)

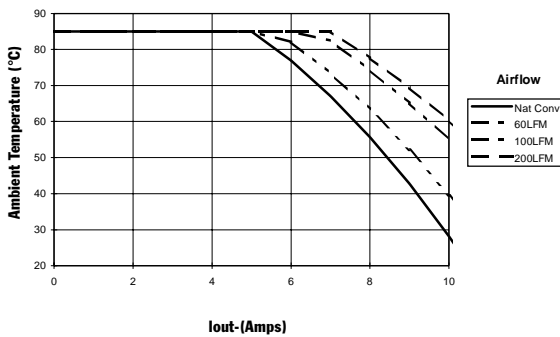
PT Series Suffix (PT1234X)

Case/Pin Configuration

Vertical Through-Hole	N
Horizontal Through-Hole	A
Horizontal Surface Mount	C

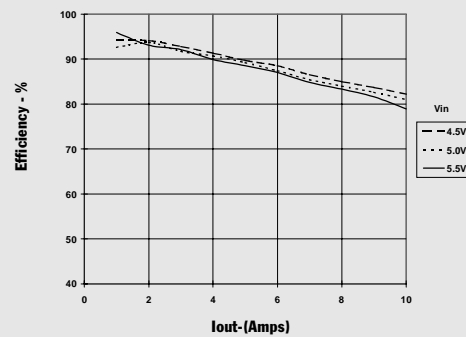
CHARACTERISTIC DATA

Safe Operating Area Curve (@V_{in}=+5V)

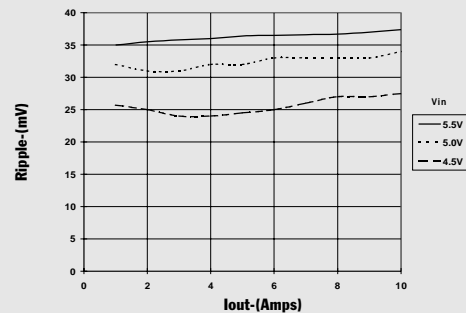


PT7601, 3.3 VDC (See Note 1)

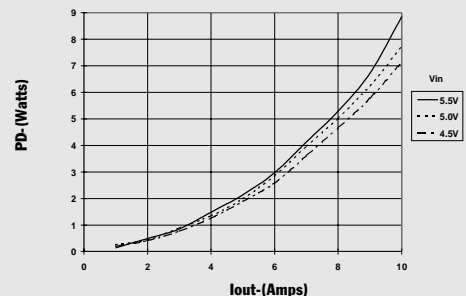
Efficiency vs Output Current



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.

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Samples (Requires Login)
PT7601A	LIFEBUY	SIP MODULE	EHA	27	8	TBD	Call TI	Level-1-215C-UNLIM	

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBsolete: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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