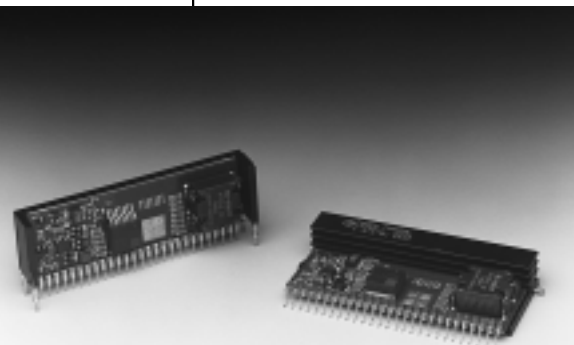


PT7600 Series

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

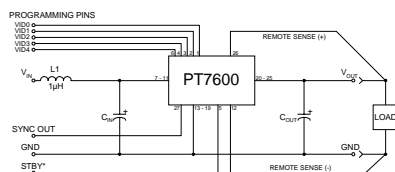
The PT7600 is a new series of high-performance, 10 Amp Integrated Switching

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.

Standard Application



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

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 |

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

Specifications

| Characteristics ($T_a = 25^\circ\text{C}$ unless noted) | Symbols | Conditions | PT7600 SERIES | | | |
|---|----------------------|---|---|---------------------------------|-----------------------|-----------------------|
| | | | Min | Typ | Max | Units |
| Output Current | I_o | $T_a = +60^\circ\text{C}$, 200 LFM, pkg N $T_a = +25^\circ\text{C}$, natural convection | 0.1* | — | 10 | A |
| Input Voltage Range | V_{in} | $0.1\text{A} \leq I_o \leq 10\text{A}$ | 4.5** | — | 5.5 | V |
| Output Voltage Tolerance | ΔV_o | $V_{in} = +5\text{V}$, $I_o = 10\text{A}$ $0^\circ\text{C} \leq T_a \leq +55^\circ\text{C}$ | $V_o - 0.03$ | — | $V_o + 0.03$ | V |
| Line Regulation | Reg_{line} | $4.5\text{V} \leq V_{in} \leq 5.5\text{V}$, $I_o = 10\text{A}$ | — | ± 10 | — | mV |
| Load Regulation | Reg_{load} | $V_{in} = +5\text{V}$, $0.1 \leq I_o \leq 10\text{A}$ | — | ± 10 | — | mV |
| V_o Ripple/Noise pk-pk | V_n | $V_{in} = +5\text{V}$, $I_o = 10\text{A}$ | — | 50 | — | mV |
| Transient Response with $C_{out} = 1200\mu\text{F}$ | t_{tr} V_{os} | I_o step between 5A and 10A V_o over/undershoot | — | 100 200 | — | μSec mV |
| Efficiency | η | $V_{in} = +5\text{V}$, $I_o = 10\text{A}$ | $V_o = 3.3\text{V}$ $V_o = 2.9\text{V}$ $V_o = 2.5\text{V}$ $V_o = 1.8\text{V}$ $V_o = 1.5\text{V}$ | — 80 78 75 69 65 | — — — — — | % % % % % |
| Switching Frequency | f_o | $4.5\text{V} \leq V_{in} \leq 5.5\text{V}$ $0.1\text{A} \leq I_o \leq 10\text{A}$ | 650 | 700 | 750 | kHz |
| Absolute Maximum Operating Temperature Range | T_a | | 0 | — | +85 | $^\circ\text{C}$ |
| Recommended Operating Temperature Range | T_a | Forced Air Flow = 200 LFM Over V_{in} and I_o Ranges | 0 | — | +65*** | $^\circ\text{C}$ |
| Storage Temperature | T_s | | -40 | — | +125 | $^\circ\text{C}$ |
| 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 $V_{out} + 1.2\text{V}$, 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.)

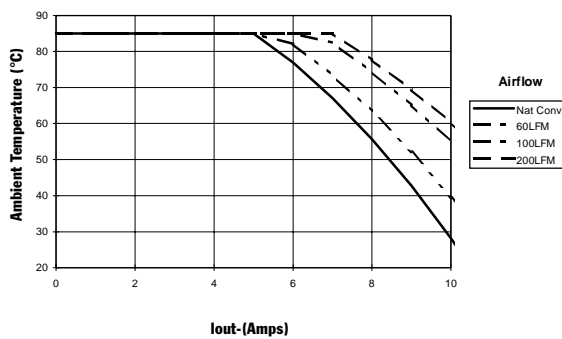
PT Series Suffix (PT1234X)

Case/Pin Configuration

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

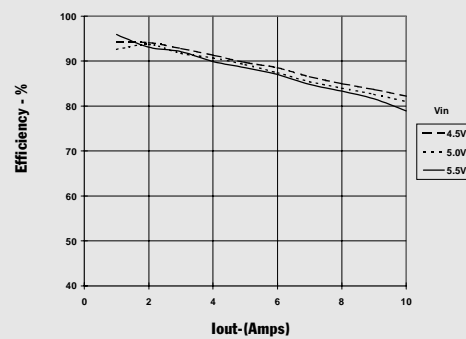
CHARACTERISTIC DATA

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

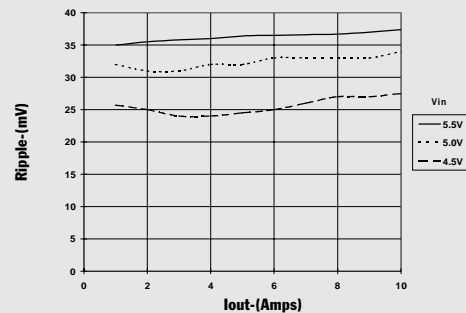


PT7601, 3.3 VDC (See Note 1)

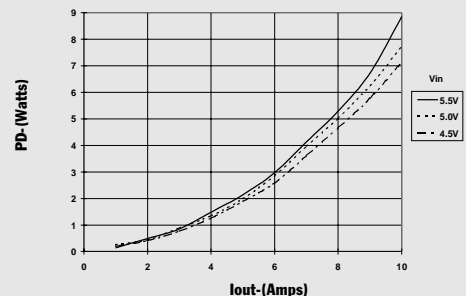
Efficiency vs Output Current



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.

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