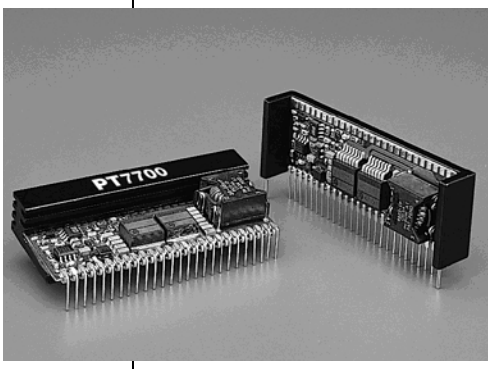
# PT7700 Series

## 15 AMP HIGH-PERFORMANCE "BIG HAMMER" PROGRAMMABLE ISR

**SLTS077**
***Revised 5/31/00***




The PT7700 is a new series of high-performance, 15 Amp Integrated Switching Regulators (ISRs) housed in a 27-pin SIP package. The 15A capability allows easy integration of the latest high-speed, low-voltage µPs and bus drivers into existing 5V systems.

The PT7700 series has been designed to work in parallel with one or more of the PT7749 - 15A current boosters for increased $I_{out}$ in increments of 15A.

Two products are offered in the series with different output voltage ranges that are easily programmed with a 4 bit input compatible with Intel's Pentium® Pro Processor. A differential remote sense is also provided which automatically compensates for any voltage drop from the ISR to the load.

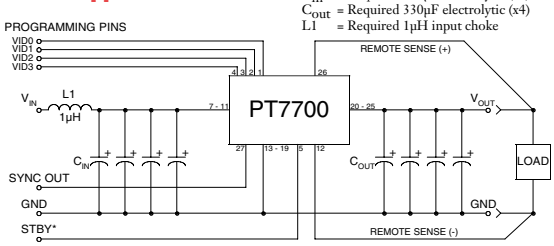
An input filter and 1200µF of output capacitance are required for proper operation.

## Features

- Single-Device: +5V input
- 4-bit Programmable:
  2V to 3.5V@15A or
  1.3V to 2V @ 15A output
- High Efficiency
- Input Voltage Range:
  4.5V to 5.5V
- Differential Remote Sense
- 27-pin SIP Package:
  V = 1.0"(H) x 3"(L) x 0.55"(W)
  H = 0.55"(H) x 3"(L) x 1.5"(W)
- Parallelable with PT7749
  15A "Current Boosters"

## Standard Application

$C_{in}$ = Required 330µF electrolytic (x4)
$C_{out}$ = Required 330µF electrolytic (x4)
L1 = Required 1µH 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 | $V_{in}$ | 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 | Sync Out |

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

## Ordering Information

**PT7701❑** = 2 to 3.5 Volts
**PT7702❑** = 1.3 to 2 Volts

**N** = Vertical through-hole
**A** = Horizontal through-hole
**C** = Horizontal surface-mount

## Programming Information

| VID3 | VID2 | VID1 | VID0 | PT7701 Vout | PT7702 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 |

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

## Specifications

| Characteristics ($T_A$ = 25°C unless noted) | Symbols | Conditions | | PT7700 SERIES Min | Typ | Max | Units |
|---|---|---|---|---|---|---|---|
| Output Current | $I_o$ | 4.5V ≤ $V_{in}$ ≤ 5.5V | | 0.1 (1) | — | 15 (2) | ADC |
| Input Voltage Range | $V_{in}$ | 0.1A ≤ $I_o$ ≤ 15A | | 4.5 (3) | — | 5.5 | VDC |
| Static Voltage Tolerance | $V_o$ | $V_{in}$ = +5V, $I_o$ = 15A<br>0°C ≤ $T_a$ ≤ +55°C | | $V_o$-0.05 | — | $V_o$+0.05 | VDC |
| Line Regulation | $Reg_{line}$ | 4.5V ≤ $V_{in}$ ≤ 5.5V, $I_o$ = 15A | | — | ±10 | — | mV |
| Load Regulation | $Reg_{load}$ | $V_{in}$ = +5V, 0.1 ≤ $I_o$ ≤ 15A | | — | ±10 | — | mV |
| $V_o$ Ripple/Noise pk-pk | $V_n$ | $V_{in}$ = +5V, $I_o$ = 15A | | — | 50 | — | mV |
| Transient Response<br>with $C_{out}$ = 1200µF | $t_{tr}$<br>$V_{os}$ | $I_o$ step between 7.5A and 15A<br>$V_o$ over/undershoot | | —<br>— | 100<br>200 | —<br>— | µSec<br>mV |
| Efficiency | η | $V_{in}$ = +5V, $I_o$ = 10A | $V_o$ = 3.3V<br>$V_o$ = 2.9V<br>$V_o$ = 2.5V<br>$V_o$ = 1.8V<br>$V_o$ = 1.5V | —<br>—<br>—<br>—<br>— | 89<br>87<br>85<br>79<br>77 | —<br>—<br>—<br>—<br>— | %<br>%<br>%<br>%<br>% |
| Switching Frequency | $f_o$ | 4.5V ≤ $V_{in}$ ≤ 5.5V<br>0.1A ≤ $I_o$ ≤ 15A | | 650 | 700 | 750 | kHz |
| Operating Temperature | $T_a$ | Forced Air Flow = 200 LFM<br>Over $V_{in}$ and $I_o$ Ranges | | 0 | — | +55 | °C |
| Storage Temperature | $T_s$ | — | | -40 | — | +125 | °C |
| Weight | — | — | | — | TBD | — | grams |
| Relative Humidity | — | Non-condensing | | 0 | — | 95 | % |

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

(2) The PT7700 series can be easily paralleled with one or more of the PT7749 slave modules to provide increased output current in increments of 15A. Please contact Power Trends for the appropriate application note.

(3) The minimum input voltage is 4.5V or $V_{out}$+1.2V, whichever is greater.

***Output Capacitors:*** *The PT7700 series requires A minimum output capacitance of 1200µF for proper operation. To reduce ESR, Power Trends recommends using four 330µF electrolytic capacitors in parallel.*

***Input Filter:*** *An input filter is required for all applications. The input inductor must be sized to handle 15ADC with a typical value of 1µH. The input capacitance must be rated for 14Arms of ripple current. Power Trends recommends using four Sanyo OSCON style capacitors with a 3.5Arms ripple current rating in parallel (p/n 6SA330M).*

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