

**PT6700 Series****13 AMP PROGRAMMABLE  
INTEGRATED SWITCHING REGULATOR**

Revised 9/13/99

New Space-Saving Package



Patent pending on package assembly

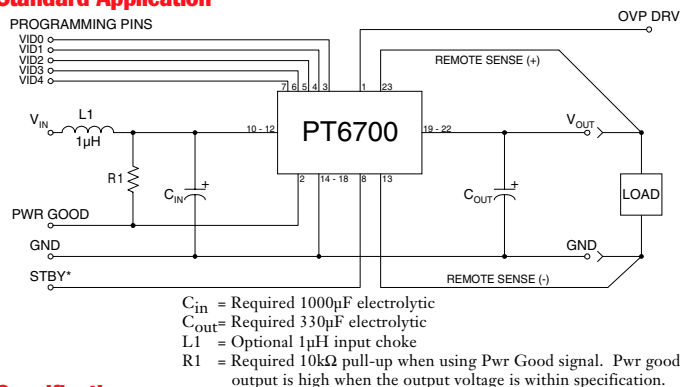


The PT6700 is a new series of high-performance, 13 Amp Integrated Switching Regulators (ISRs) housed in a unique, space-saving 23-pin SIP package. The 13A capability allows easy integration of the latest high-speed, low-voltage  $\mu$ Ps and bus drivers into existing 5V systems.

The output voltage of the PT6700 can be programmed easily from 1.3V to 3.5V with a 5-bit input compatible

with Intel's Pentium® II Processor.

The PT6700 includes a differential remote sense which automatically compensates for any voltage drop from the ISR to the load. Also provided are internal short circuit protection, OVP drive and a power good output signal. When over-voltage is detected, the PT6700 provides drive for an external crowbar or other protection circuitry.

**Standard Application****Pin-Out Information**

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

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

**Specifications**

Characteristics (T <sub>a</sub> = 25°C unless noted)	Symbols	Conditions	PT6700 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* 0.1*	—	13 13	A A
Input Voltage Range	V <sub>in</sub>	0.1A ≤ I <sub>o</sub> ≤ 13A	4.5	—	5.5	V
Output Voltage Tolerance	ΔV <sub>o</sub>	V <sub>in</sub> = +5V, I <sub>o</sub> = 13A -40°C ≤ T <sub>a</sub> ≤ +65°C	V <sub>o</sub> -0.03	—	V <sub>o</sub> +0.03	V
Line Regulation	Reg <sub>line</sub>	4.5V ≤ V <sub>in</sub> ≤ 5.5V, I <sub>o</sub> = 13A	—	±10	—	mV
Load Regulation	Reg <sub>load</sub>	V <sub>in</sub> = +5V, 0.1 ≤ I <sub>o</sub> ≤ 13A	—	±20	—	mV
V <sub>o</sub> Ripple/Noise	V <sub>n</sub>	V <sub>in</sub> = +5V, I <sub>o</sub> = 13A	—	50	—	mV
Transient Response with C <sub>out</sub> = 330 $\mu$ F	t <sub>tr</sub> V <sub>os</sub>	I <sub>o</sub> step between 6A and 12A V <sub>o</sub> over/undershoot	— —	70 100	— —	$\mu$ Sec mV
Efficiency	$\eta$	V <sub>in</sub> = +5V, I <sub>o</sub> = 8A 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	— — — — —	91 90 89 85 83	— — — — —	% % % % %
Switching Frequency	f <sub>o</sub>	4.5V ≤ V <sub>in</sub> ≤ 5.5V 0.1A ≤ I <sub>o</sub> ≤ 12.5A	300	350	400	kHz
Absolute Maximum Operating Temperature Range	T <sub>a</sub>	—	-40	—	+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	-40	—	+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	—	TBD	—	G's
Mechanical Vibration		Per Mil-STD-883D, Method 2007.2, 20-2000 Hz, Soldered in a PC board	—	TBD	—	G's
Weight	—	—	—	26	—	grams

\* ISR will operate down to no load with reduced specifications.

**Output Capacitors:** The PT6700 series requires a minimum output capacitance of 330 $\mu$ F. The maximum allowable output capacitance is 15,000 $\mu$ F.

**Input Filter:** An input filter is optional for most applications. The input inductor must be sized to handle 12.5ADC with a typical value of 1 $\mu$ H. The input capacitance must be rated for a minimum of 1.6Arms of ripple current. For transient or dynamic load applications, additional capacitance may be required.

**PT6700 Series****Features**

- Space Saving SIP Package
- +5V input
- 5-bit Programmable:  
1.3V to 3.5V@13A
- High Efficiency
- Input Voltage Range:  
4.5V to 5.5V
- Differential Remote Sense
- Short Circuit Protection
- Over-Voltage Drive
- Power Good Signal

**Ordering Information****PT6701□** = 1.3 to 3.5 Volts*(For dimensions and PC board layout, see Package Styles 1300 and 1310.)***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>

**Programming Information**

VID3	VID2	VID1	VID0	VID4=1	VID4=0
				Vout	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

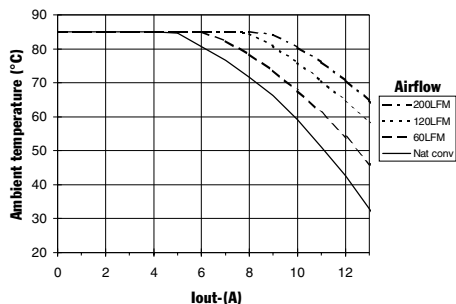
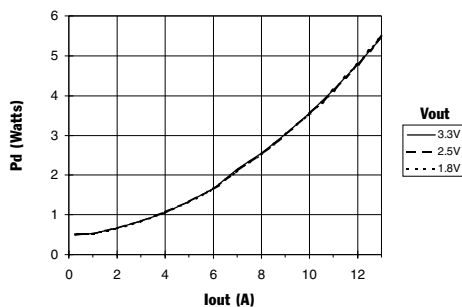
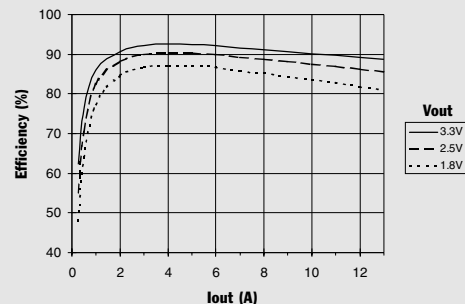
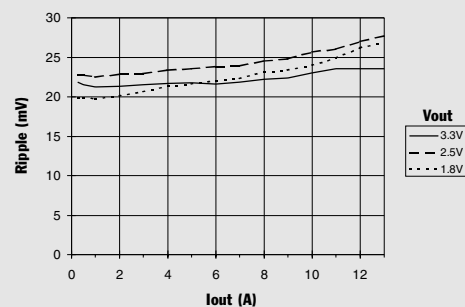
Logic 0 = Pin 13 potential (remote sense gnd)

Logic 1 = Open circuit (no pull-up resistors)

VID3 and VID4 may not be changed while the unit is operating.

**PT6700 Product Family**

	Input Voltage	Vout Adjust	OVP/ Pwr Good	Requires +12V Bias
<b>PT6701</b>	5V	VID	✓	
<b>PT6702</b>	3.3V	VID	✓	
<b>PT6705</b>	5V	Resistor		✓
<b>PT6715</b>	5V	Resistor		
<b>PT6721</b>	12V	VID	✓	
<b>PT6725</b>	12V	Resistor		

**C H A R A C T E R I S T I C   D A T A****PT6701, Vin = 5.0V****Safe Operating Area, Vout = 3.3V****Power Dissipation vs Output Current****PT6701, Vin = 5.0V** (Typical performance at  $T_a = 25^\circ\text{C}$ )**Efficiency vs Output Current****Ripple vs Output Current**

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