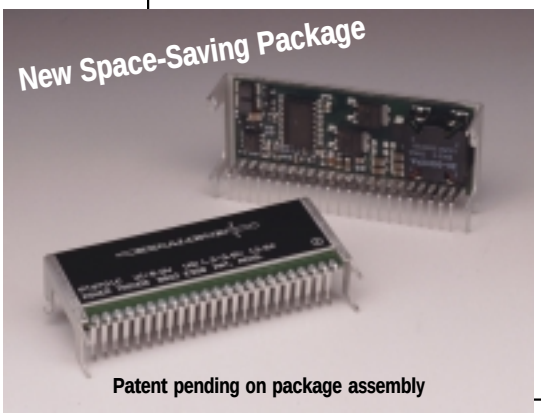
PT6700 Series

13 AMP PROGRAMMABLE INTEGRATED SWITCHING REGULATOR

SLTS040
Revised 9/13/99

EXCALIBUR



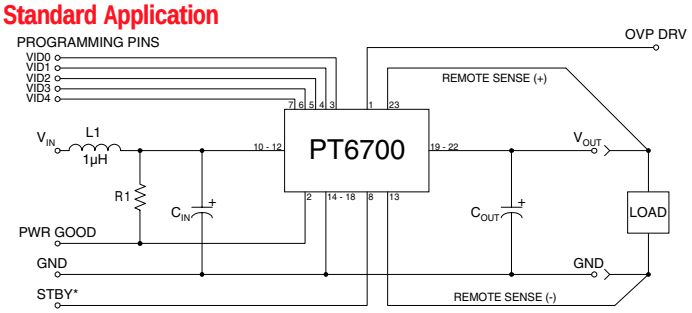
Patent pending on package assembly

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 µPs 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



C_{in} = Required 1000µF electrolytic
C_{out} = Required 330µF electrolytic
L1 = Optional 1µH input choke
R1 = Required 10kΩ pull-up when using Pwr Good signal. Pwr good output is high when the output voltage is within specification.

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_{out}
8	STBY*	20	V_{out}
9	Do not connect	21	V_{out}
10	V_{in}	22	V_{out}
11	V_{in}	23	Remote Sense V_{out}
12	V_{in}		

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

Specifications

Characteristics (T_a = 25°C unless noted)	Symbols	Conditions		PT6700 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* 0.1*	— —	13 13	A A
Input Voltage Range	V_{in}	0.1A ≤ I_o ≤ 13A		4.5	—	5.5	V
Output Voltage Tolerance	ΔV_o	V_{in} = +5V, I_o = 13A -40°C ≤ T_a ≤ +65°C		V_o-0.03	—	V_o+0.03	V
Line Regulation	Reg_{line}	4.5V ≤ V_{in} ≤ 5.5V, I_o = 13A		—	±10	—	mV
Load Regulation	Reg_{load}	V_{in} = +5V, 0.1 ≤ I_o ≤ 13A		—	±20	—	mV
V_o Ripple/Noise	V_n	V_{in} = +5V, I_o = 13A		—	50	—	mV
Transient Response with C_{out} = 330µF	t_{tr} V_{os}	I_o step between 6A and 12A V_o over/undershoot		— —	70 100	— —	µSec mV
Efficiency	η	V_{in} = +5V, I_o = 8A	V_o = 3.3V V_o = 2.9V V_o = 2.5V V_o = 1.8V V_o = 1.5V	— — — — —	91 90 89 85 83	— — — — —	% % % % %
Switching Frequency	f_o	4.5V ≤ V_{in} ≤ 5.5V 0.1A ≤ I_o ≤ 12.5A		300	350	400	kHz
Absolute Maximum Operating Temperature Range	T_a	—		-40	—	+85	°C
Recommended Operating Temperature Range	T_a	Forced Air Flow = 200 LFM Over V_{in} and I_o Ranges		-40	—	+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		—	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 ouput capacitance of 330µF. The maximum allowable output capacitance is 15,000µF.*

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 1µH. 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.*

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

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 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.

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	N
Horizontal Through-Hole	A
Horizontal Surface Mount	C

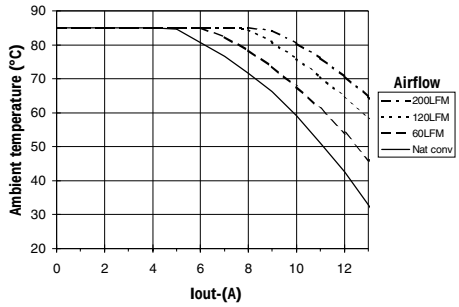
PT6700 Product Family

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

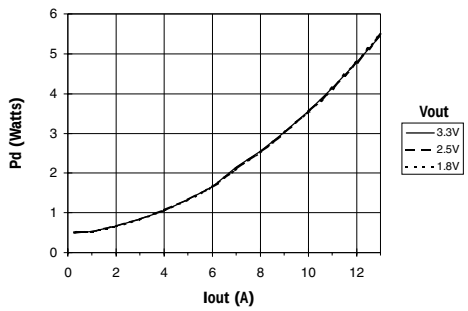
CHARACTERISTIC DATA

PT6701, Vin = 5.0V

Safe Operating Area, Vout = 3.3V

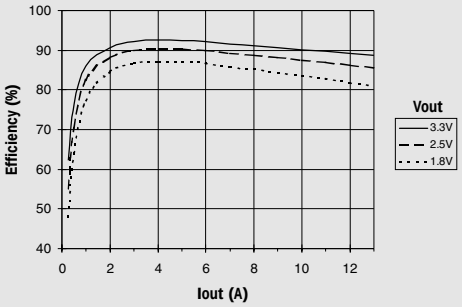


Power Dissipation vs Output Current

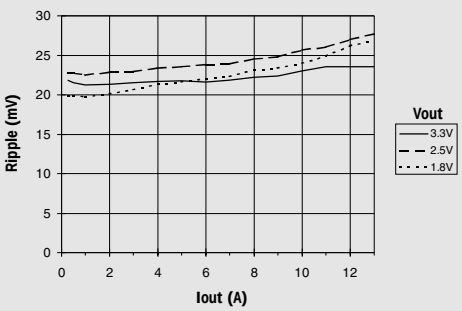


PT6701, Vin = 5.0V *(Typical performance at T_a = 25°C)*

Efficiency vs Output Current



Ripple vs Output Current



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