



Features

- 60A Output Current
- Multi-Phase Topology
- +5V Input
- 5-bit Programmable:
1.3V to 3.5V
1.075V to 1.850V
- High Efficiency
- Differential Remote Sense
- Short Circuit Protection
- Output Tracking Feature
- Over-Temp Shutdown
- Power Good & OV Flag
- Low-Profile Package
- Solderable Copper Case
- “Current Booster”
Compatible

Ordering Information

PT8001□ = 1.3 to 3.5 Volts
PT8002□ = 1.075 to 1.850 Volts

PT Series Suffix (PT1234X)

Case/Pin Configuration

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

For dimensions and PC board layout, see
Package Styles 1600, 1610 and 1615

Description

The PT8000 series is a 60 A high-performance, Integrated Switching Regulator (ISR) housed in a single low-profile 44-pin SIP package. Operating from an input voltage of +5V, the PT8000 series offers a state-of-the-art “Plug-in Power” solution for highly-integrated digital systems that demand high power supply currents at low voltages.

The output voltage from these modules is programmable over a preset range via a 5-bit input. The PT8001 may be set from 1.3V to 3.5V, which is compatible with Intel’s Pentium Pro® μ -processors. The output voltage of the PT8002 is programmable from 1.075V to 1.85V.

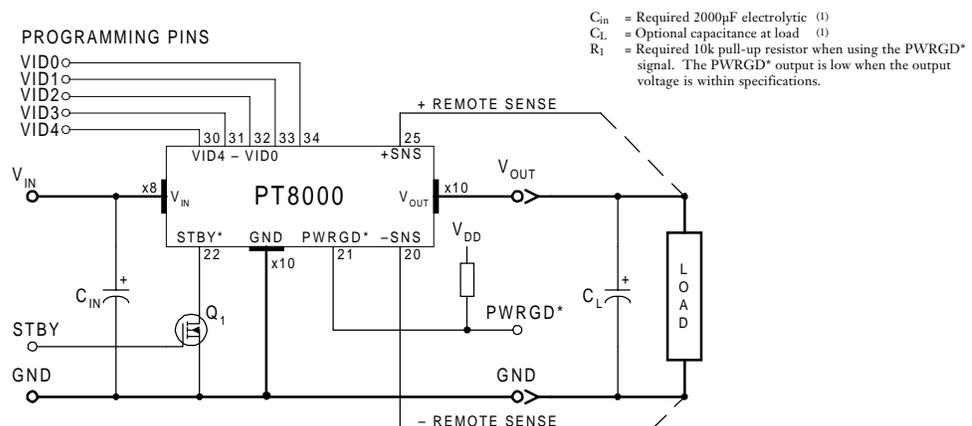
The PT8000 series incorporates many features to facilitate system

integration. Output short-circuit protection and over-temperature shutdown enables these modules to survive any load fault. Two self-diagnostic signals, “Power Good” (PWRGD*) and “Over-Voltage Flag” (OVF*) are provided. And a unique tracking feature allows the output to be synchronized to a master ramp voltage during power-up.

Other features include a standby input, and a differential remote sense to compensate for voltage drop between the ISR and load.

A low ESR capacitance of 2000 μ F is required at the input for proper operation.

Standard Application



Pin-Out Information

Pin	Function	PinFunction
1	V _{out}	16 GND
2	V _{in}	17 GND
3	V _{in}	18 GND
4	GND	19 V _{out}
5	GND	20 Remote Sense Gnd
6	V _{in}	21 PWRGD*
7	V _{in}	22 STBY*
8	V _{out}	23 OVF*
9	V _{out}	24 Track
10	V _{out}	25 Remote Sense V _{out}
11	Synch 1	26 V _{out}
12	Synch 2	27 GND
13	Synch 3	28 GND
14	Synch 4	29 GND
15	Do Not Connect	30 VID4

For STBY* pin; Open = output enabled
Gnd = output disabled.

PinFunction
31 VID3
32 VID2
33 VID1
34 VID0
35 V _{out}
36 V _{out}
37 V _{out}
38 V _{in}
39 V _{in}
40 GND
41 GND
42 V _{in}
43 V _{in}
44 V _{out}

Programming Information

					PT8001		PT8002	
					VID4=1	VID4=0	VID4=1	VID4=0
VID3	VID2	VID1	VID0	V _o	V _o	V _o	V _o	
1	1	1	1	2.0V	1.30V	1.075V	1.475V	
1	1	1	0	2.1V	1.35V	1.100V	1.500V	
1	1	0	1	2.2V	1.40V	1.125V	1.525V	
1	1	0	0	2.3V	1.45V	1.150V	1.550V	
1	0	1	1	2.4V	1.50V	1.175V	1.575V	
1	0	1	0	2.5V	1.55V	1.200V	1.600V	
1	0	0	1	2.6V	1.60V	1.225V	1.625V	
1	0	0	0	2.7V	1.65V	1.250V	1.650V	
0	1	1	1	2.8V	1.70V	1.275V	1.675V	
0	1	1	0	2.9V	1.75V	1.300V	1.700V	
0	1	0	1	3.0V	1.80V	1.325V	1.725V	
0	1	0	0	3.1V	1.85V	1.350V	1.750V	
0	0	1	1	3.2V	1.90V	1.375V	1.775V	
0	0	1	0	3.3V	1.95V	1.400V	1.800V	
0	0	0	1	3.4V	2.00V	1.425V	1.825V	
0	0	0	0	3.5V	2.05V	1.450V	1.850V	

Logic 0 = Pin 20 potential (remote sense gnd)
Logic 1 = Open circuit (no pull-up resistors)
VID3 and VID4 may not be changed while the unit is operating.

Specifications

Characteristics (T _a = 25°C unless noted)	Symbols	Conditions	PT8000 SERIES			Units
			Min	Typ	Max	
Output Current	I _o	T _a = +50°C, 400 LFM, pkg N T _a = +25°C, natural convection	0.1 (1) 0.1 (1)	—	60 (2) 30 (2)	A
Input Voltage Range	V _{in}	0.1A ≤ I _o ≤ 60A	4.5	—	5.5	V
Output Voltage Tolerance	ΔV _o	Over V _{in} range, I _o = I _{o,max} 0°C ≤ T _a ≤ +60°C	V _o -0.03	—	V _o +0.03	V
Line Regulation	Reg _{line}	Over V _{in} range, I _o = I _{max}	—	±1.0	±10	mV
Load Regulation	Reg _{load}	V _{in} = 5V, 0.1 ≤ I _o ≤ I _{o,max}	—	±1.0	±10	mV
V _o Ripple/Noise pk-pk	V _n	V _{in} = 5V, I _o = 60A	—	50	—	mV
Transient Response (no external capacitance)	t _{tr} V _{os}	I _o step from 30A to 60A in 6μs V _o over/undershoot	— —	50 100	— —	μs mV
Efficiency	η	V _{in} = +5V, I _o = 30A, V _o = 3.3V V _o = 1.8V	— —	92 86	— —	%
Switching Frequency	f _o	Over V _{in} and I _o ranges	1.3	—	1.5	MHz
STBY* (pin 22)	Off On		0 Note (2)	—	0.8	V
PWRGD* (pin 21)	On Off	85% < V _{out} < 115% of VID set point V _{out} < 85%, or V _{out} > 125% of VID set point	— —	500 500	— —	Ω kΩ
OVF* (pin 23)	On Off	V _{out} > 125% of VID set point V _{out} < 115% of VID set point	— —	500 500	— —	Ω kΩ
Over-temperature Shutdown Point	O _{TP}	Case temperature -Auto reset	—	105	—	°C
Absolute Maximum Operating Temperature Range	T _a	—	-40	—	+85 (3)	°C
Storage Temperature	T _s	—	-40	—	+125	°C
Weight	—	Vertical/Horizontal	—	110	—	grams

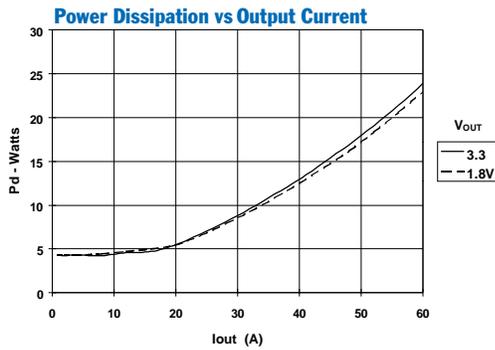
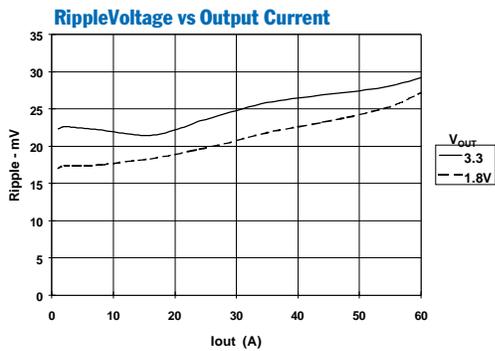
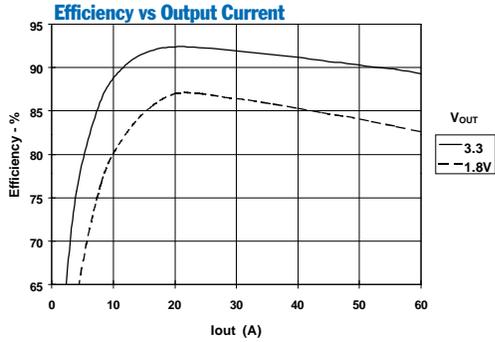
Notes: (1) The ISR will operate down to no load with reduced specifications.

(2) Specified as “Open-Circuit.” Either an “open-collector” bipolar transistor, or “open-drain” MOSFET is recommended for controlling this input.

(3) See Safe Operating Area curves or contact the factory to determine the appropriate derating.

Input Filter: To facilitate the high output fast transient performance, a high quality 2,000μF input capacitor(s) is required for the PT8000 series. Use either tantalum or Oscon® type capacitors with a maximum ESR (equivalent series resistance) of 20mΩ.

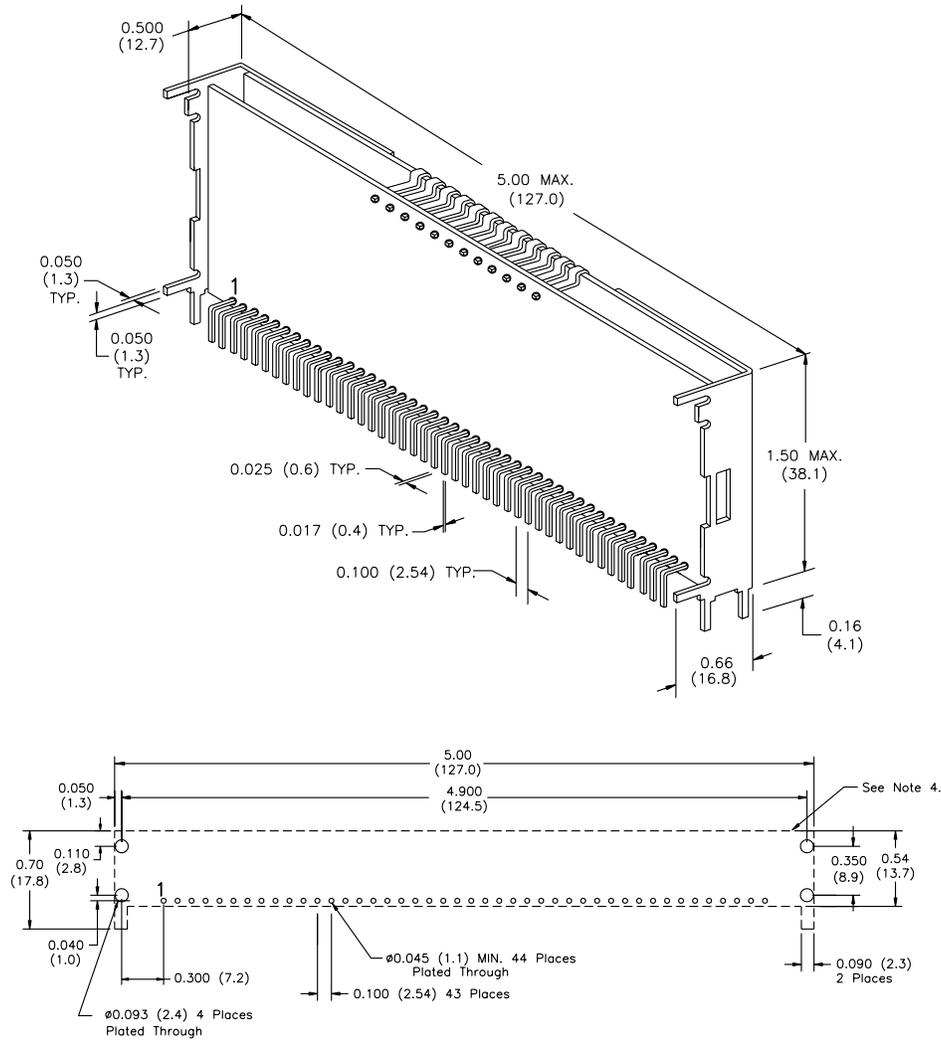
Performance Characteristics, $V_{in} = 5.0V$ (See Note A)



Note A: Characteristic data has been developed from actual products tested at 25°C. This data is considered typical for the regulator.
Note B: Safe Operating Area curves represent conditions at which internal components are at or below manufacturer's rated operating temperatures.

PACKAGE INFORMATION AND DIMENSIONS

Vertical Through-Hole Mount (Suffix N)



PC Layout

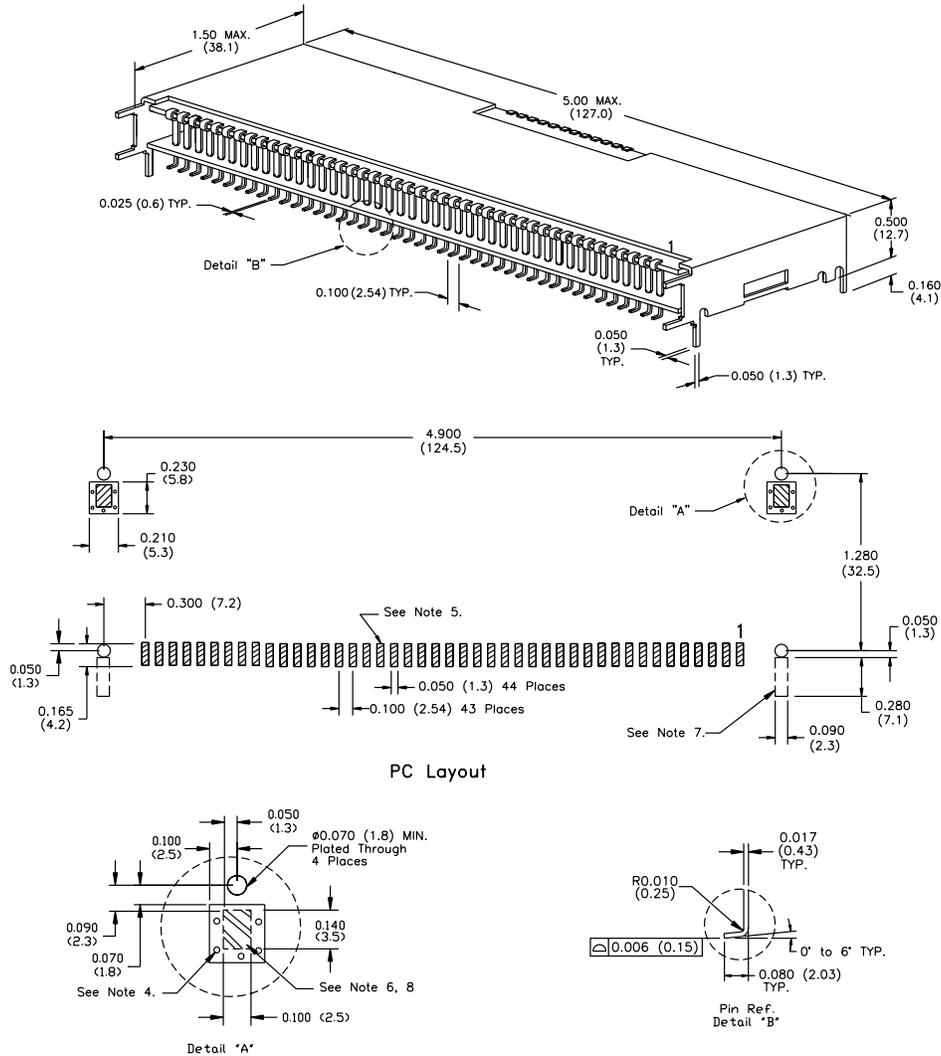
Notes: (Rev. A)

- 1: All dimensions are in inches (mm).
- 2: 2 place decimals are ± 0.030 ($\pm 0.8\text{mm}$).
- 3: 3 place decimals are ± 0.010 ($\pm 0.3\text{mm}$).
- 4: Recommended mechanical keep out area (dotted line).

**Power Trends proprietary package design.
All rights reserved. Patent pending.**

PACKAGE INFORMATION AND DIMENSIONS

Horizontal Surface Mount (Suffix C)



Notes: (Rev. B)

- 1: All dimensions are in inches (mm).
- 2: 2 place decimals are ± 0.030 ($\pm 0.8\text{mm}$).
- 3: 3 place decimals are ± 0.010 ($\pm 0.3\text{mm}$).
- 4: Vias are recommended to improve copper adhesion.
- 5: Power pin connections should utilize two or more vias per input, ground and output pin.
- 6: Solder mask openings to copper island for solder joints to mechanical pins.
- 7: Recommended mechanical keep out area (dotted lines).
- 8: Electrically connected case to ground plane.

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