

# PT7772 Series

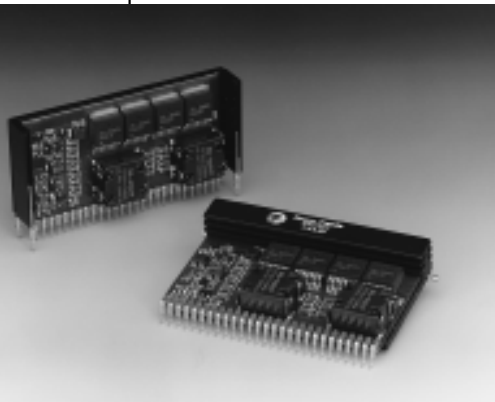
**32 AMP HIGH-PERFORMANCE  
"SLEDGE HAMMER" PROGRAMMABLE ISR**

**Revised 7/15/98**

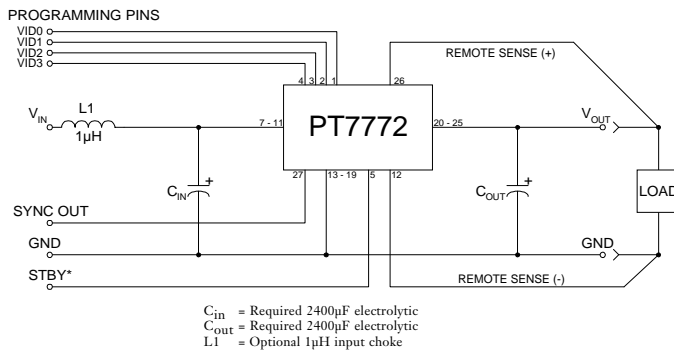
The PT7772 is a new series of high-performance, 32 Amp Integrated Switching Regulators (ISRs) housed in a 27-pin SIP package. The 32A capability allows easy integration of the latest high-speed, low-voltage  $\mu$ Ps, ASICs, DSPs, and bus drivers into existing 3.3V systems. The output voltage of the PT7772

can be easily programmed from 1.3V to 2.05V 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.

2400 $\mu$ F of output capacitance are required for proper operation.



### Standard Application



### Pin-Out Information

Pin	Function	Pin	Function
1	VID0	14	GND
2	VID1	15	GND
3	VID2	16	GND
4	VID3	17	GND
5	STBY* - Stand-by	18	GND
6	Do not connect	19	GND
7	V <sub>in</sub>	20	V <sub>out</sub>
8	V <sub>in</sub>	21	V <sub>out</sub>
9	V <sub>in</sub>	22	V <sub>out</sub>
10	V <sub>in</sub>	23	V <sub>out</sub>
11	V <sub>in</sub>	24	V <sub>out</sub>
12	Remote Sense Gnd	25	V <sub>out</sub>
13	GND	26	Remote Sense V <sub>out</sub>
		27	Sync Out

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

### Specifications

Characteristics (T <sub>a</sub> = 25°C unless noted)	Symbols	Conditions	PT7772 SERIES			Units
			Min	Typ	Max	
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 <sup>(1)</sup> 0.1 <sup>(1)</sup>	— —	32 26	A A
Input Voltage Range	V <sub>in</sub>	0.1A ≤ I <sub>o</sub> ≤ 32A	3.1 <sup>(2)</sup>	—	3.6	V
Output Voltage Tolerance	ΔV <sub>o</sub>	V <sub>in</sub> = +3.3V, I <sub>o</sub> = 32A 0°C ≤ T <sub>a</sub> ≤ +55°C	V <sub>o</sub> -0.03	—	V <sub>o</sub> +0.03	V
Line Regulation	Reg <sub>line</sub>	3.1V ≤ V <sub>in</sub> ≤ 3.6V, I <sub>o</sub> = 32A	—	±10	—	mV
Load Regulation	Reg <sub>load</sub>	V <sub>in</sub> = +3.3V, 0.1 ≤ I <sub>o</sub> ≤ 32A	—	±10	—	mV
V <sub>o</sub> Ripple/Noise pk-pk	V <sub>n</sub>	V <sub>in</sub> = +3.3V, I <sub>o</sub> = 32A	—	50	—	mV
Transient Response with C <sub>out</sub> = 2400 $\mu$ F	t <sub>tr</sub> V <sub>os</sub>	I <sub>o</sub> step between 16A and 32A V <sub>o</sub> over/undershoot	— —	100 200	— —	$\mu$ Sec mV
Efficiency	$\eta$	V <sub>in</sub> = +3.3V, I <sub>o</sub> = 20A, V <sub>o</sub> = 1.8V	—	90	—	%
Switching Frequency	f <sub>o</sub>	3.1V ≤ V <sub>in</sub> ≤ 3.6V 0.1A ≤ I <sub>o</sub> ≤ 32A	650	700	750	kHz
Absolute Maximum Operating Temperature Range	T <sub>a</sub>	—	0	—	+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	0	—	+65	°C
Storage Temperature	T <sub>s</sub>	—	-40	—	+125	°C
Weight	—	Vertical/Horizontal	—	53/66	—	grams

(1) ISR-will operate down to no load with reduced specifications. Please note that this product is not short-circuit protected.  
 (2) The minimum input voltage is 3.1V or V<sub>out</sub>+1.2V, whichever is greater.

**Output Capacitors:** The PT7772 series requires a minimum output capacitance of 2400 $\mu$ F for proper operation. Do not use Oscon type capacitors. The maximum allowable output capacitance is 30,000 $\mu$ F.

**Input Filter:** An input filter is optional for most applications. The input inductor must be sized to handle 32ADC with a typical value of 1 $\mu$ H. The input capacitance must be rated for a minimum of 2.6Arms of ripple current. For transient or dynamic load applications, additional capacitance may be required.

# PT7772 Series

## Features

- +3.3V input
- 5-bit Programmable:  
1.3V to 2.05V@32A
- High Efficiency
- Input Voltage Range:  
3.1V to 3.6V
- Differential Remote Sense
- 27-pin SIP Package

## Programming Information

VID3	VID2	VID1	VID0	Vout
1	1	1	1	1.30V
1	1	1	0	1.35V
1	1	0	1	1.40V
1	1	0	0	1.45V
1	0	1	1	1.50V
1	0	1	0	1.55V
1	0	0	1	1.60V
1	0	0	0	1.65V
0	1	1	1	1.70V
0	1	1	0	1.75V
0	1	0	1	1.80V
0	1	0	0	1.85V
0	0	1	1	1.90V
0	0	1	0	1.95V
0	0	0	1	2.00V
0	0	0	0	2.05V

Logic 0 = Pin 12 potential (remote sense gnd)  
 Logic 1 = Open circuit (no pull-up resistors)  
 VID3 may not be changed while the unit is operating.

## Ordering Information

PT7772□ = 1.3 to 2.05 Volts

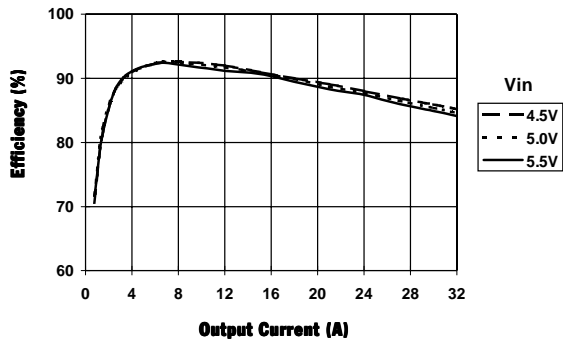
For dimensions and PC board layout, see Package Style 1020 and 1030

## PT Series Suffix (PT1234X)

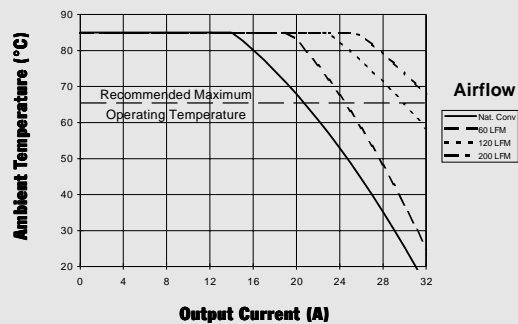
Case/Pin Configuration	
Vertical Through-Hole	<b>N</b>
Horizontal Through-Hole	<b>A</b>
Horizontal Surface Mount	<b>C</b>

## CHARACTERISTIC DATA

Efficiency vs Output Current (@Vout=+1.8V)

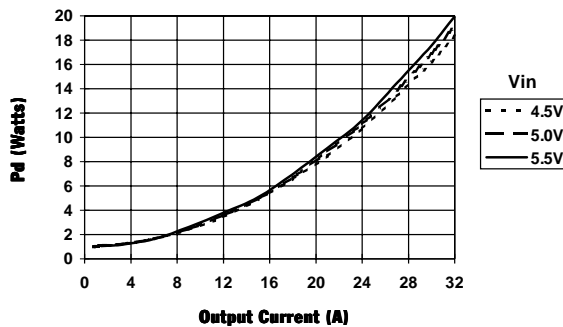


Safe Operating Area (@Vin=+3.3V, Vout=+1.8V, Pkg N)

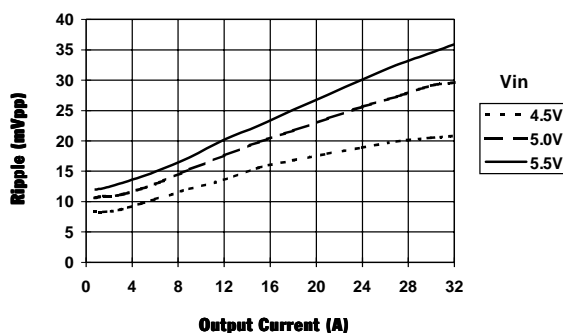


Note: SOA curves represent operating conditions at which internal components are at or below manufacturer's maximum rated operating temperatures.

Power Dissipation vs Output Current (@Vout=+1.8V)



Output Ripple vs Output Current (@Vout=+1.8V)



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