

PT7772—3.3V

32 Amp "Sledge Hammer"
Programmable ISR

Power Trends Products
from Texas Instruments

SLTS055A

(Revised 6/30/2000)

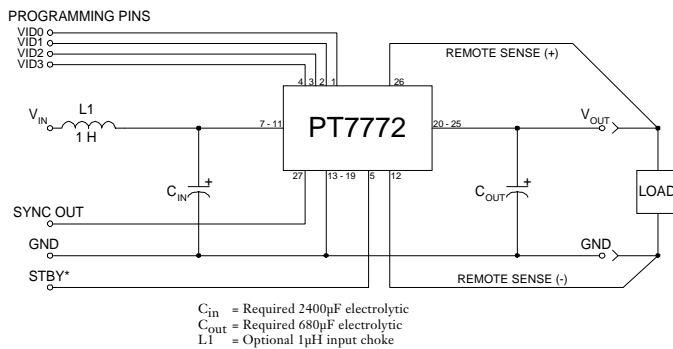
The PT7772 is a high-output Integrated Switching Regulator (ISR) housed in a 27-pin SIP package. The PT7772 operates from a 3.3V bus to provide a 32 amp low-voltage power source for the industry's latest high-speed μ Ps, ASICs, DSPs.

The PT7772 has been designed to work in parallel with one or more of the PT7746 -32A current boosters to increase the load current capability in increments of 32A.

The output voltage is programmable 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, to compensate for voltage drop between the ISR and load.

The PT7772 requires a capacitance of 2400 μ F at the input, and 680 μ F at the output for proper operation. Note that this product does not include short circuit protection.

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_{in}	20	V_{out}
8	V_{in}	21	V_{out}
9	V_{in}	22	V_{out}
10	V_{in}	23	V_{out}
11	V_{in}	24	V_{out}
12	Remote Sense Gnd	25	V_{out}
13	GND	26	Remote Sense V_{out}
		27	Sync Out

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

Specifications

Characteristics ($T_a = 25^\circ\text{C}$ unless noted)	Symbols	Conditions	PT7772 SERIES			
			Min	Typ	Max	Units
Output Current	I_o	$T_a = +60^\circ\text{C}$, 200 LFM, pkg N $T_a = +25^\circ\text{C}$, natural convection	0.1 (1) 0.1 (1)	— —	32 26	A A
Input Voltage Range	V_{in}	$0.1A \leq I_o \leq 32A$	3.1 (2)	—	3.6	V
Output Voltage Tolerance	ΔV_o	$V_{in} = +3.3V$, $I_o = 32A$ $0^\circ\text{C} \leq T_a \leq +55^\circ\text{C}$	$V_o - 0.03$	—	$V_o + 0.03$	V
Line Regulation	Reg_{line}	$3.1V \leq V_{in} \leq 3.6V$, $I_o = 32A$	—	± 10	—	mV
Load Regulation	Reg_{load}	$V_{in} = +3.3V$, $0.1 \leq I_o \leq 32A$	—	± 10	—	mV
V_o Ripple/Noise pk-pk	V_n	$V_{in} = +3.3V$, $I_o = 32A$	—	50	—	mV
Transient Response	t_{tr} V_{os}	$C_{out} = 680\mu\text{F}$, $I_o = 25\%$ load step from 24A V_o over/undershoot	— —	100 200	— —	μs mV
	t_{tr} V_{os}	$C_{out} = 2400\mu\text{F}$, $I_o = 50\%$ load step from 16A V_o over/undershoot	— —	100 200	— —	μs mV
Efficiency	η	$V_{in} = +3.3V$, $I_o = 20A$, $V_o = 1.8V$	—	90	—	%
Switching Frequency	f_o	$3.1V \leq V_{in} \leq 3.6V$ $0.1A \leq I_o \leq 32A$	650	700	750	kHz
Absolute Maximum Operating Temperature Range	T_a	—	0	—	$+85^{(3)}$	$^\circ\text{C}$
Storage Temperature	T_s	—	-40	—	+125	$^\circ\text{C}$
Weight	—	Vertical/Horizontal	—	53/66	—	grams

Notes: (1) The ISR will operate down to no load with reduced specifications.
(2) The minimum input voltage is 3.1V or $V_{out} + 1.2V$, whichever is greater.
(3) See Safe Operating Area curves for appropriate derating.

Output Capacitors: The PT7772 series requires a minimum output capacitance of 680 μ F for proper operation. Do not use Oscon type capacitors. The maximum allowable output capacitance is 30,000 μ 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 μ 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.

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32 Amp “Sledge Hammer”
Programmable ISR

Features

- +3.3V input
- 4-bit Programmable:
1.3V to 2.05V@32A
- High Efficiency
- Differential Remote Sense
- Parallelable with PT7746
32A “Current Booster”
- 27-pin SIP Package

Programming Information

VID3	VID2	VID1	VID0	V _{out}
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)

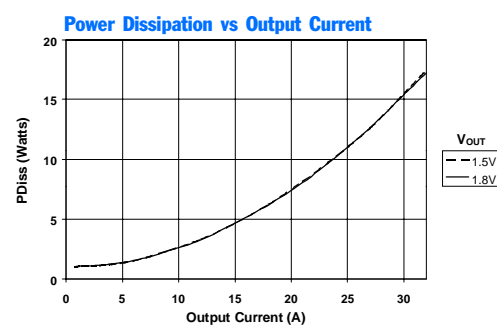
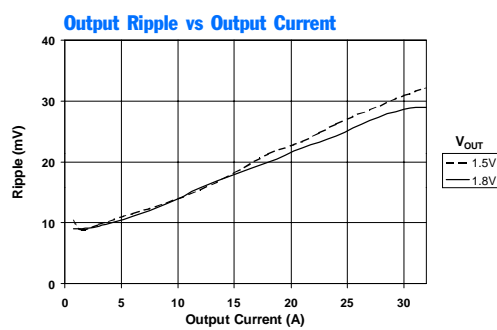
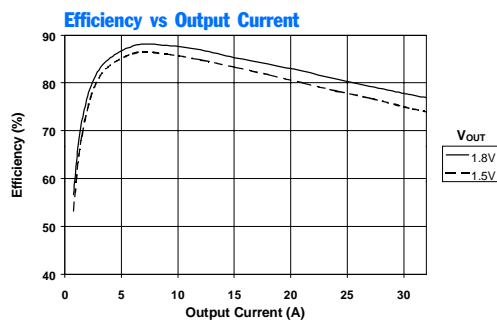
Case/Pin

Configuration

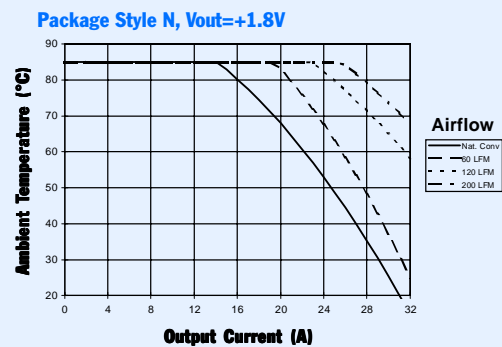
Vertical Through-Hole	N
Horizontal Through-Hole	A
Horizontal Surface Mount	C

TYPICAL CHARACTERISTICS

Characteristic Data, V_{IN} = 3.3V (See Note A)



Safe Operating Area, V_{IN} = 3.3V (See Note B)



Note A: All data listed in the above graphs has been developed from actual products tested at 25°C. This data is considered typical for the ISR.

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

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