

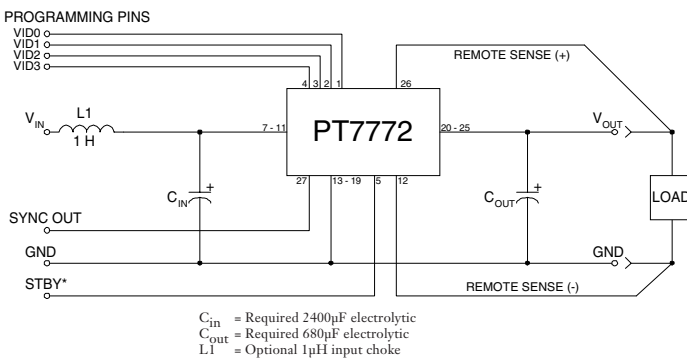
The PT7772 is a high-output Integrated Switching Regulator (ISR) housed in a 27-pin SIP package. The PT7772 operates from a 3.3V bus to provide a 32 amp low-voltage power source for the industry's latest high-speed μ Ps, ASICs, DSPs.

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.

PT7772—3.3V

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

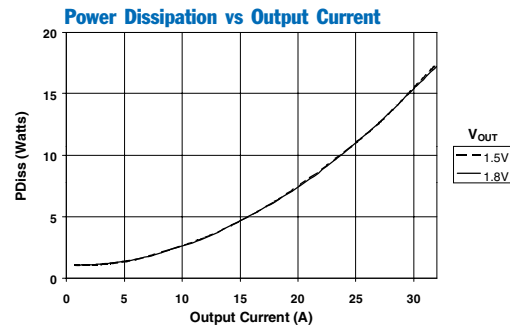
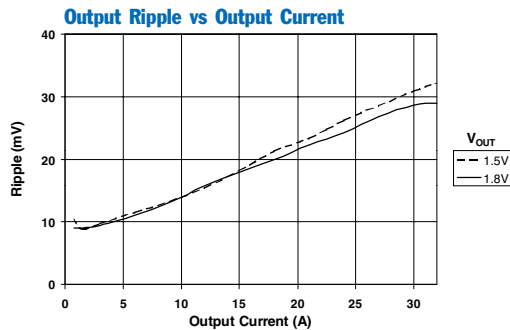
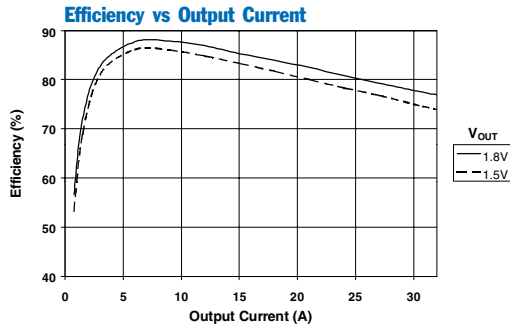
PT Series Suffix (PT1234X)

Case/Pin Configuration

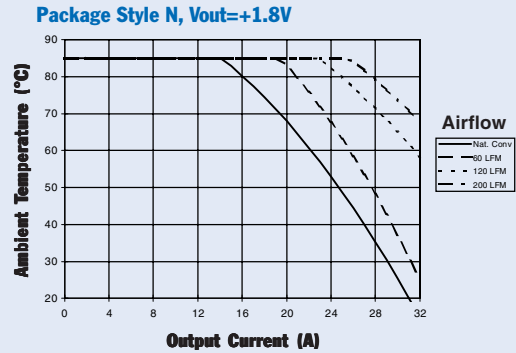
Vertical Through-Hole	N
Horizontal Through-Hole	A
Horizontal Surface Mount	C

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.

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/ Ball Finish	MSL Peak Temp ⁽³⁾	Samples (Requires Login)
PT7772N	NRND	SIP MODULE	EJD	27		TBD	Call TI	Call TI	Samples Not Available

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSELETE: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products		Applications	
Amplifiers	amplifier.ti.com	Audio	www.ti.com/audio
Data Converters	dataconverter.ti.com	Automotive	www.ti.com/automotive
DLP® Products	www.dlp.com	Communications and Telecom	www.ti.com/communications
DSP	dsp.ti.com	Computers and Peripherals	www.ti.com/computers
Clocks and Timers	www.ti.com/clocks	Consumer Electronics	www.ti.com/consumer-apps
Interface	interface.ti.com	Energy	www.ti.com/energy
Logic	logic.ti.com	Industrial	www.ti.com/industrial
Power Mgmt	power.ti.com	Medical	www.ti.com/medical
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
RFID	www.ti-rfid.com	Space, Avionics & Defense	www.ti.com/space-avionics-defense
RF/IF and ZigBee® Solutions	www.ti.com/lprf	Video and Imaging	www.ti.com/video
		Wireless	www.ti.com/wireless-apps

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2010, Texas Instruments Incorporated