

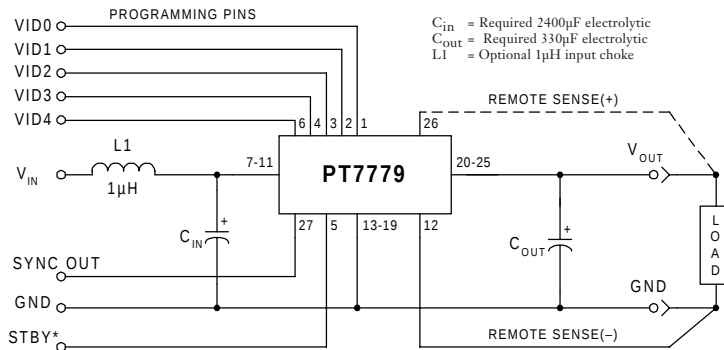
Description

The PT7779 is a high-output 32A Integrated Switching Regulator (ISR), housed in a 27-pin SIP package. The PT7779 is the next generation of the industry benchmark PT7771. The PT7779 includes short circuit protection and requires only 330µF of output capacitance for proper operation.

The 32A output capability allows the easy integration of the latest

high-speed, µPs, ASICs, DSPs into existing 5V systems. For additional current, the PT7779 is designed to operate with up to two PT7741 32A compatible current boosters. The output voltage is programmable from 1.3V to 3.5V using a 5-bit input, that is compatible with Intel's Pentium® II Processors. A differential remote sense compensates for any voltage drop between the ISR and load.

Standard Application



Pin-Out Information

Pin	Function	Pin	Function
1	VID0	15	GND
2	VID1	16	GND
3	VID2	17	GND
4	VID3	18	GND
5	STBY* Stand-by	19	GND
6	VID4	20	V _{OUT}
7	V _{IN}	21	V _{OUT}
8	V _{IN}	22	V _{OUT}
9	V _{IN}	23	V _{OUT}
10	V _{IN}	24	V _{OUT}
11	V _{IN}	25	V _{OUT}
12	Remote Sense Gnd (3)	26	Remote Sense V _{OUT}
13	GND	27	Sync Out
14	GND		

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

Specifications

Characteristics (T _a = 25°C unless noted)	Symbols	Conditions	PT7779			
			Min	Typ	Max	Units
Output Current	I _O	T _a = +60°C, 200 LFM, pkg N T _a = +25°C, natural convection	0.1 (1) 0.1 (1)	— —	31 32	A
Input Voltage Range	V _{IN}	0.1A ≤ I _O ≤ 32A	4.5	—	5.5	V
Output Voltage Tolerance	ΔV _O	V _{IN} = +5V, I _O = 32A -40°C ≤ T _a ≤ +85°C	V _O -0.03	—	V _O +0.03	V
Line Regulation	Reg _{line}	4.5V ≤ V _{IN} ≤ 5.5V, I _O = 32A	—	±10	—	mV
Load Regulation	Reg _{load}	V _{IN} = +5V, 0.1 ≤ I _O ≤ 32A	—	±10	—	mV
V _O Ripple/Noise pk-pk	V _n	V _{IN} = +5V, I _O = 32A	—	50	—	mV
Transient Response with C _{OUT} = 330µF	t _{rr} V _{OS}	I _O step between 16A and 32A V _O over/undershoot	— —	100 200	— —	µSec mV
			—	90	—	%
Efficiency	η	V _{IN} = +5V, I _O = 20A, V _O = 3.3V	—	90	—	%
Switching Frequency	f _O	4.5V ≤ V _{IN} ≤ 5.5V 0.1A ≤ I _O ≤ 32A	300	350	400	kHz
Absolute Maximum Operating Temperature Range	T _a	Over V _{IN} Range	-40	—	+85 (2)	°C
Storage Temperature	T _s	—	-40	—	+125	°C
Mechanical Vibration		Per Mil-STD-883D, Method 2007.2, 20-20,000Hz, Soldered in a PC board	—	10/15	—	G's
Weight	—	Vertical/Horizontal	—	53/66	—	grams

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

(2) Consult the Safe Operating Area curves, or contact the factory for the appropriate derating.

(3) If the remote sense ground is not used, pin 12 must be connected to pin 13 for optimum output voltage accuracy.

External Capacitors: The PT7779 requires a minimum output capacitance of 330µF for proper operation. The PT7779 also requires an input capacitance of 2400µF, which must be rated for a minimum of 2.0Arms of ripple current. For transient or dynamic load applications, additional capacitance may be required. For further information, see the accompanying application note on capacitor selection for this product.

Input Filter: An input filter inductor is optional for most applications. The input inductor must be sized to handle 32ADC with a typical value of 1µH.

Features

- +5V Input
- 32A Output
(64A with PT7741 Booster)
- 5-bit Programmable:
1.3V to 3.5V
- High Efficiency
- Short Circuit Protection
- Differential Remote Sense
- 27-pin SIP Package

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 12 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

PT7779□ = 1.3 to 3.5 Volts

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

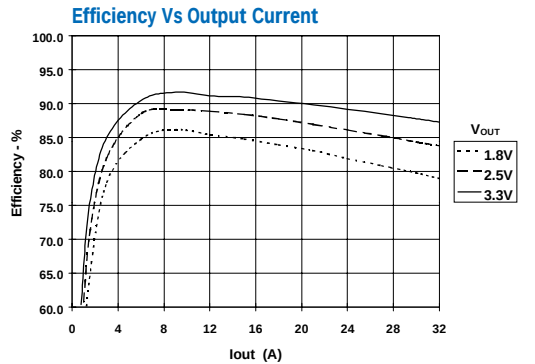
PT Series Suffix (PT1234X)

Case/Pin Configuration

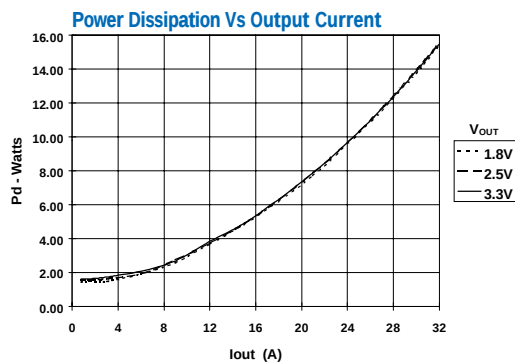
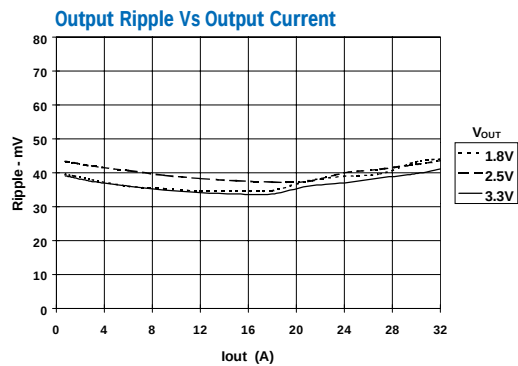
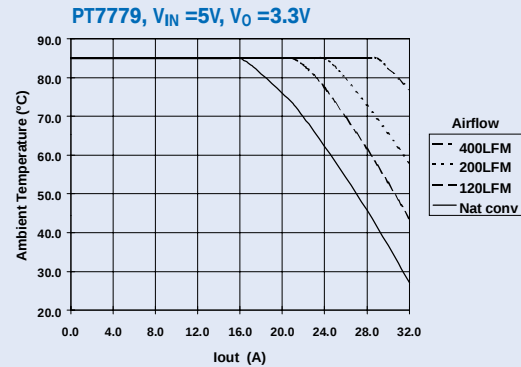
Vertical Through-Hole	N
Horizontal Through-Hole	A
Horizontal Surface Mount	C

TYPICAL CHARACTERISTICS

Performance Characteristics, $V_{in} = 5V$ (See Note A)



Safe Operating Area Curves (See Note B)



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.

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
PT7779C	NRND	SIP MOD ULE	EJC	27	6	TBD	Call TI	Level-1-215C-UNLIM
PT7779N	NRND	SIP MOD ULE	EJD	27	8	TBD	Call TI	Level-1-215C-UNLIM

⁽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.

OBSOLETE: 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

Amplifiers	amplifier.ti.com
Data Converters	dataconverter.ti.com
DLP® Products	www.dlp.com
DSP	dsp.ti.com
Clocks and Timers	www.ti.com/clocks
Interface	interface.ti.com
Logic	logic.ti.com
Power Mgmt	power.ti.com
Microcontrollers	microcontroller.ti.com
RFID	www.ti-rfid.com
RF/IF and ZigBee® Solutions	www.ti.com/lprf

Applications

Audio	www.ti.com/audio
Automotive	www.ti.com/automotive
Broadband	www.ti.com/broadband
Digital Control	www.ti.com/digitalcontrol
Medical	www.ti.com/medical
Military	www.ti.com/military
Optical Networking	www.ti.com/opticalnetwork
Security	www.ti.com/security
Telephony	www.ti.com/telephony
Video & Imaging	www.ti.com/video
Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2009, Texas Instruments Incorporated