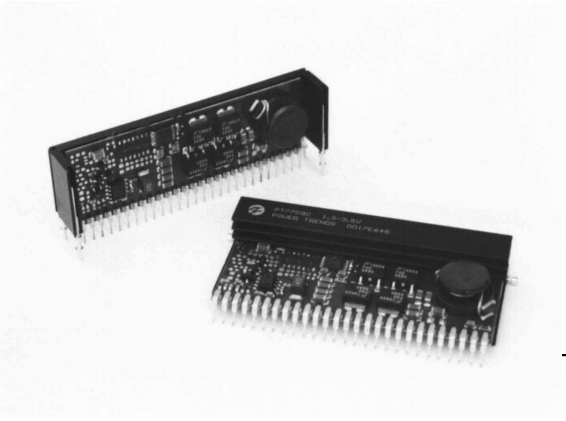
PT7743—5.0V

20 Amp "Current Booster" for PT7709 Integrated Switching Regulator

Power Trends Products from Texas Instruments

SLTS086

(Revised 6/30/2000)



Description

The PT7743 is a 20 Amp "Current Booster" for the PT7709 housed in the same 27-pin SIP package.

Multiple PT7743 boosters will operate in parallel with one PT7709 product, boosting output current in increments of 20A. Combinations of a PT7709 regulator and PT7743 current boosters can supply power for virtually any multiple mega-processor application.

A PT7743 current booster adds a parallel output stage that is driven directly by the regulator. This allows the system to run in perfect synchronization to provide a low noise solution.

The PT7743 only operates in combination with a PT7709 series regulator, and is not a stand-alone product. Please refer to the PT7709 data sheet for the performance specifications.

The booster uses the same 27-pin case and has the same package options as its companion regulator.

Features

- 20A Current Boost
- Tracks Vo of a PT7709
- High Efficiency
- Input Voltage Range: 4.5V to 5.5V
- Synchronized with PT7709
- 27-pin SIP Package
- Connect up to 2 in Parallel for 60 Amps

Pin-Out Information

Pin	Function	Pin	Function
1	Do not connect	14	GND
2	Do not connect	15	GND
3	Do not connect	16	GND
4	Do not connect	17	GND
5	Do not connect	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	Do not connect	25	V_{out}
13	GND	26	Do not connect
		27	Master Sync In

Ordering Information

PT7743❑

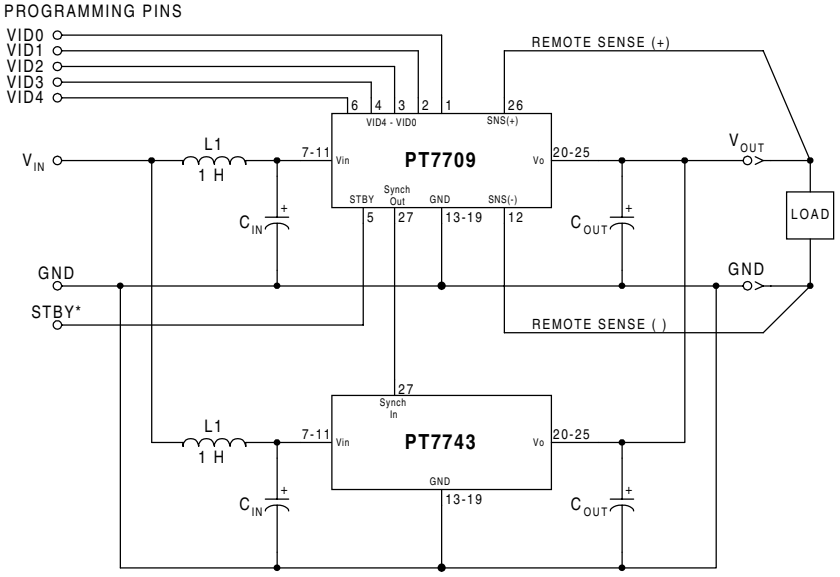
(For dimensions and PC Board layout, see Package Styles 800 and 810.)

PT Series Suffix

(PT1234X)

Case/Pin Configuration	
Vertical Through-Hole	**N**
Horizontal Through-Hole	**A**
Horizontal Surface Mount	**C**

Standard Application



External Capacitors: *The PT7743 requires a minimum ouput capacitance of 330µF for proper operation. The PT7743 also requires an input capacitance of 1500µF, which must be rated for a minimum of 1.4Arms of ripple current. For transient or dynamic load applications additional capacitance may be required. For further information refer to the application note regarding capacitor selection for the this product.*

Input Filter: *An input filter inductor is optional for most applications. The inductor must be sized to handle 20ADC with a typical value of 1µH.*

Capacitor Recommendations for the PT7708/09 Regulators and PT7742/43 Current Boosters

Input Capacitors

The recommended input capacitance is determined by 1.4 ampere minimum ripple current rating and 1500µF minimum capacitance. Capacitors listed below must be rated for a minimum of 2x the input voltage with +5V operation. Ripple current and ≤100mΩ Equivalent Series Resistance (ESR) values are the major considerations along with temperature when selecting the proper capacitor.

Output Capacitors

The minimum required output capacitance is 330µF with a maximum ESR less than or equal to 100mΩ. Failure to observe this requirement may lead to regulator instability or oscillation. Electrolytic capacitors have poor ripple performance at frequencies greater than 400kHz, but excellent low frequency transient response. Above the ripple frequency ceramic decoupling capacitors are necessary to improve the transient response and reduce any microprocessor high frequency noise components apparent during higher current excursions. Preferred low ESR type capacitor part numbers are identified in the Table 1 below.

Tantalum Characteristics

Tantalum capacitors with a minimum 10V rating are recommended on the output bus, but only the AVX TPS Series, Sprague 594/595 Series, or Kemet T495/T510 Series. The AVX TPS Series, Sprague Series or Kemet Series capacitors are specified over other types due to their higher surge current, excellent power dissipation and ripple current ratings. As an example, the TAJ Series by AVX is not recommended. This series exhibits considerably higher ESR, reduced power dissipation and lower ripple current capability. The TAJ Series is a less reliable compared to the TPS series when determining power dissipation capability.

Capacitor Table

Table 1 identifies the characteristics of capacitors from a number of vendors with acceptable ESR and ripple current (rms) ratings. The suggested minimum quantities per regulator for both the input and output buses are identified.

This is not an extensive capacitor list. The table below is a selection guide for input and output capacitors. Other capacitor vendors are available with comparable RMS ripple current rating and ESR (Equivalent Series Resistance at 100kHz). These critical parameters are necessary to insure both optimum regulator performance and long capacitor life.

Table 1 Capacitors Characteristic Data

Capacitor Vendor/ Series	Capacitor Characteristics					Quantity		
	Working Voltage	Value(µF)	(ESR) Equivalent Series Resistance	105°C Maximum Ripple Current(Irms)	Physical Size(mm)	Input Bus	Output Bus	Vendor Number
Panasonic FC	16V	2200	0.038Ω	2000mA	18x16.5	1	1	EEVFC1C222N
Surface Mtg	35V	330	0.065Ω	1205mA	12.5x16.5		1	EEVFC1V331LQ
FA	10V	680	0.090Ω	755mA	10x12.5		1	EEUFA1A681
	16V	1800	0.032Ω	2000mA	18x15	1	1	EEUFA1C182A
United Chemi -Con	25V	330	0.084Ω	825mA	10x16		1	LXV25VB331M10X16LL
	16V	2200	0.038Ω	1630mA	16x20	1	1	LXV16VB222M16X20LL
LFVSeries	16V	470	0.084Ω/2=042Ω	825mA x2	10x16		1	LXV16VB471M10X16LL
Nichicon	10V	680	0.090Ω	770mA	10x15		1	UPL1A681MHH6
PL Series	10V	1800	0.044Ω	1420mA	16x15	1	1	UPL1A182MHH6
PM Series	25V	330	0.095Ω	750mA	10x15		1	UPL1E331MPH6
Oscon SS	10V	330	0.025W/4=0.006Ω	>9800mA	10x10.5	4	N/R	10SS330M
SV	10V	330	0.020/4=0.005Ω	>9800mA	10.3x12.6	4	(Note)	10SV330M(Sufvace Mtg
AVX	10V	330	0.100/5=20Ω	3500mA	7.3Lx	5	1	TPSV337M010R0100
Tanatalum	10V	330	0.060Ω	1826mA	4.3Wx	5	1	TPSV337M010R0060
TPS- Series					4.1H			
Sprague Tantalum	10V	330	0.045W/4=0.011Ω	>4500mA	7.3L x 5.7W x	5	1	594D337X0010R2T Surface Mount
595D/594D	10V	680	0.090Ω	>1660mA	4.0H	2	1	595D687X0010R2T
Kemet Tantalum	10V	330	0.035Ω	2000mA	4.3Wx7.3L x4.0H	5	1	510X337M010AS
T510/T495 Series	10V	220	0.070Ω/2=0.035Ω	>2000mA		6	2	T495X227M010AS Surface Mount
Sanyo Poscap TPB	10V	220	0.040Ω	3000mA	7.2L x 4.3W x 3.1H	6	2	10TPB220M Surface Mount

Note: *(N/R) is not recommended for this application, due to extremely low Equivalent Series Resistance (ESR)*

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)
PT7743A	NRND	SIP MODULE	EHA	27		TBD	Call TI	Call TI	Samples Not Available
PT7743C	NRND	SIP MODULE	EHC	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.
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.

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