

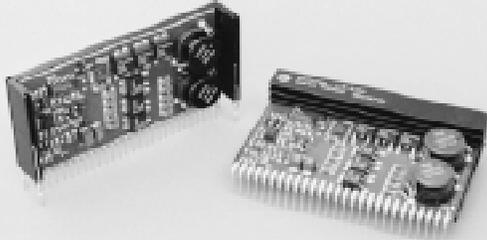
Description

The PT7778 is a high-output 32A Integrated Switching Regulator (ISR), housed in a 27-pin SIP package. The PT7778 is the 3.3V-input bus version of the PT7779. It includes short circuit protection and requires only 330 μ F of output capacitance for proper operation.

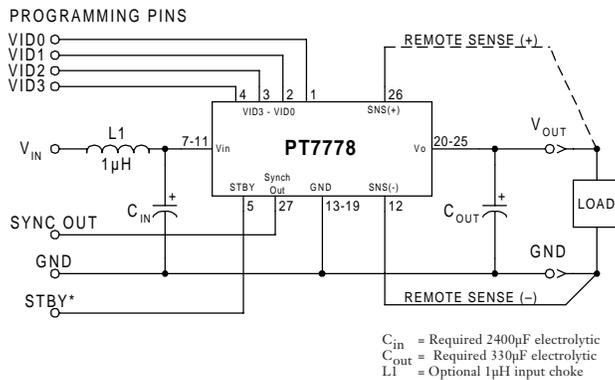
The output voltage of the PT7778 is programmable from 1.3V to 2.05V using a 4-bit input, which is compati-

ble with Intel's Pentium®II Processors. The 32A capability provides the ideal power source for the industry's latest high-speed, low-voltage μ Ps, DSPs, and custom VLSI devices. For additional current, the PT7778 may be paralleled with up to two PT7740 32A current boosters.

A differential remote sense is provided to compensate for 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	N/C	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	PT7778			
			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)	—	32 31	A
Input Voltage Range	V _{in}	0.1A ≤ I _o ≤ 32A	3.1	—	3.6	V
Output Voltage Tolerance	ΔV _o	V _{in} = +3.3V, I _o = 32A -40°C ≤ T _a ≤ +85°C	V _o -0.03	—	V _o +0.03	V
Line Regulation	Reg _{line}	3.1V ≤ V _{in} ≤ 3.6V, I _o = 32A	—	±10	—	mV
Load Regulation	Reg _{load}	V _{in} = +3.3V, 0.1 ≤ I _o ≤ 32A	—	±10	—	mV
V _o Ripple/Noise pk-pk	V _n	V _{in} = +3.3V, I _o = 32A	—	50	—	mV
Transient Response with C _{out} = 330 μ F	t _{rr}	I _o step between 16A and 32A	—	100	—	μ Sec
	V _{os}	V _o over/undershoot	—	200	—	mV
Efficiency	η	V _{in} = +3.3V, I _o = 20A, V _o = 1.8V	—	90	—	%
Switching Frequency	f _o	3.1V ≤ V _{in} ≤ 3.6V 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 PT7778 requires a minimum output capacitance of 330 μ F for proper operation. The PT7778 also requires an input capacitance of 2400 μ F, 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 1 μ H.

PT7778—3.3V

32 Amp Programmable Integrated Switching Regulator

Features

- +3.3V Input
- 32A Output (64A with PT7740 Booster)
- 4-bit Programmable: 1.3V to 2.05V
- High Efficiency
- Short Circuit Protection
- Differential Remote Sense
- 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

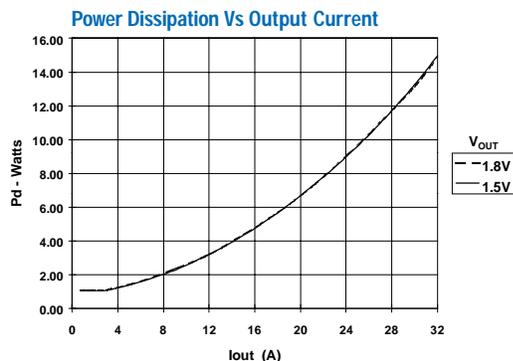
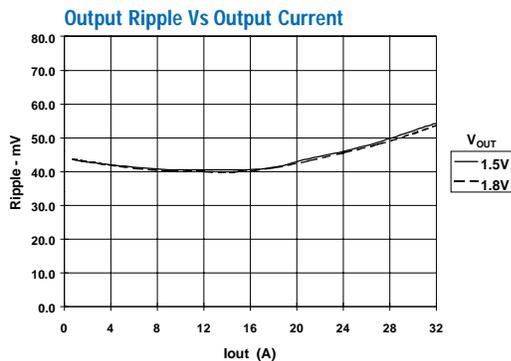
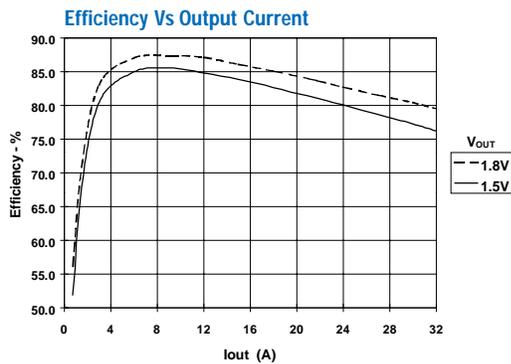
PT7778□ = 1.3 to 3.5 Volts
 For dimensions and PC board layout, see Package Style 1020 and 1030

PT Series Suffix (PT1234X)

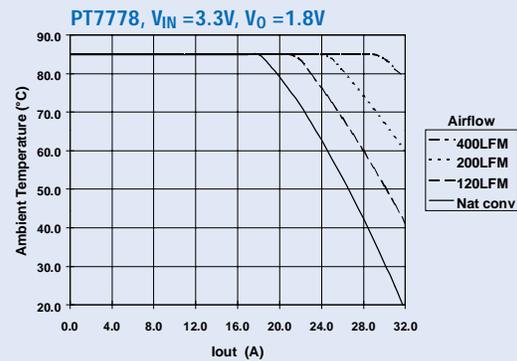
Case/Pin Configuration	
Vertical Through-Hole	N
Horizontal Through-Hole	A
Horizontal Surface Mount	C

TYPICAL CHARACTERISTICS

Performance Characteristics, V_{in} = 3.3V (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.

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