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## PT78HT200 Series

**2 Amp Positive Step-Down  
Integrated Switching Regulator**

**Power Trends Products  
from Texas Instruments**

SLTS057B

(Revised 10/15/2000)



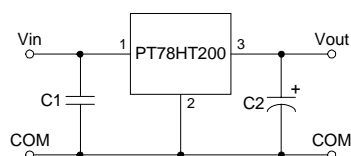
- High Efficiency: Up to 90%
- Wide Input Range
- Self-Contained Inductor
- Short-Circuit Protection
- Over-Temperature Protection
- Fast Transient Response

The PT78HT200 is a series of fixed output, wide-input range, 3-terminal Integrated Switching Regulators (ISRs). These ISRs have a maximum output

current of 2A. The output voltage is also laser trimmed for high accuracy. Features include excellent line and load regulation, internal short-circuit and over-temperature protection.

The PT78HT200 series is available in three package outlines, including horizontal SMD. Their small size and output voltage selection makes these regulators ideal for use in a variety of applications.

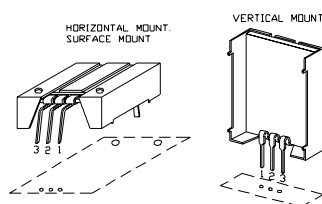
### Standard Application



C1 = Optional 1µF ceramic  
C2 = Required 100µF electrolytic (1)

### Pin-Out Information

Pin	Function
1	V <sub>in</sub>
2	GND
3	V <sub>out</sub>



Pkg Style 500

### Ordering Information

PT78HT2	XX	Y
Output Voltage		Package Suffix
33 = 3.3 Volts		V = Vertical Mount
05 = 5.0 Volts		S = Surface Mount
53 = 5.25 Volts		H = Horizontal Mount
65 = 6.5 Volts		
08 = 8.0 Volts		

### Specifications

Characteristics (T <sub>a</sub> = 25°C unless noted)	Symbols	Conditions	PT78HT200 SERIES			
			Min	Typ	Max	Units
Output Current	I <sub>O</sub>	Over V <sub>in</sub> range	0.1 (2)	—	2.0	A
Short Circuit Current	I <sub>sc</sub>	V <sub>in</sub> = V <sub>in</sub> min	—	6.0	—	Apk
Input Voltage Range	V <sub>in</sub>	0.1 ≥ I <sub>O</sub> ≥ 2.0A V <sub>O</sub> = 3.3V V <sub>O</sub> = 5.0V V <sub>O</sub> = 6.5V V <sub>O</sub> = 8.0V	9 9 10.5 12	— — — —	15 28 28 28	V
Output Voltage Tolerance	ΔV <sub>O</sub>	Over V <sub>in</sub> range, I <sub>O</sub> = 2.0A T <sub>a</sub> = 0°C to +60°C	—	±1.0	±2.0	%V <sub>O</sub>
Line Regulation	Reg <sub>line</sub>	Over V <sub>in</sub> range	—	±0.4	±0.8	%V <sub>O</sub>
Load Regulation	Reg <sub>load</sub>	0.1 ≤ I <sub>O</sub> ≤ 2.0A	—	±0.2	±0.4	%V <sub>O</sub>
V <sub>O</sub> Ripple/Noise	V <sub>n</sub>	V <sub>in</sub> = V <sub>in</sub> min, I <sub>O</sub> = 2.0A	—	±1	—	%V <sub>O</sub>
Transient Response (with 100µF output cap)	t <sub>tr</sub>	50% load change V <sub>O</sub> over/undershoot	—	100 5.0	—	µSec %V <sub>O</sub>
Efficiency	η	V <sub>in</sub> = 9V, I <sub>O</sub> = 2.0A V <sub>in</sub> = 12V, I <sub>O</sub> = 2.0A V <sub>in</sub> = 15V, I <sub>O</sub> = 2.0A V <sub>O</sub> = 3.3V V <sub>O</sub> = 5.0V V <sub>O</sub> = 8.0V	— — — —	80 85 90	—	%
Switching Frequency	f <sub>O</sub>	Over V <sub>in</sub> and I <sub>O</sub> ranges V <sub>O</sub> ≥ 5.0V V <sub>O</sub> = 3.3V	700 950	750 1,000	800 1,050	kHz
Absolute Maximum Operating Temperature Range	T <sub>a</sub>	Over V <sub>in</sub> range	-40	—	+85 (3)	°C
Thermal Resistance	θ <sub>ja</sub>	Free Air Convection, (40-60LFM)	—	40	—	°C/W
Storage Temperature	T <sub>s</sub>	—	-40	—	+125	°C
Mechanical Shock	—	Per Mil-STD-883D, Method 2002.3	—	500	—	G's
Mechanical Vibration	—	Per Mil-STD-883D, Method 2007.2, 20-2000 Hz, soldered in a PC board	—	5	—	G's
Weight	—	—	—	6.5	—	Grams

Notes: (1) The PT78HT200 Series requires a 100µF electrolytic or tantalum output capacitor for proper operation in all applications.

(2) ISR will operate down to no load with reduced specifications.

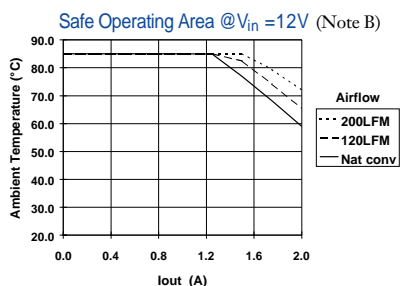
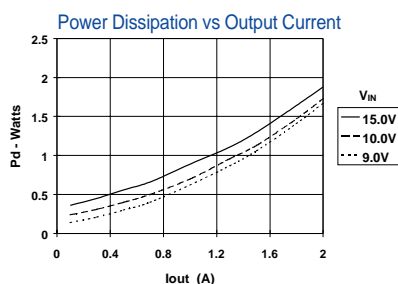
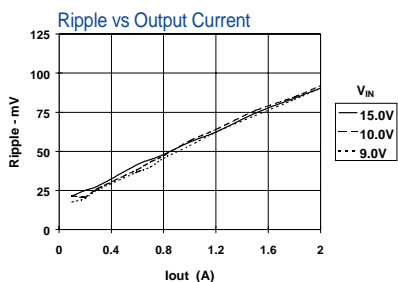
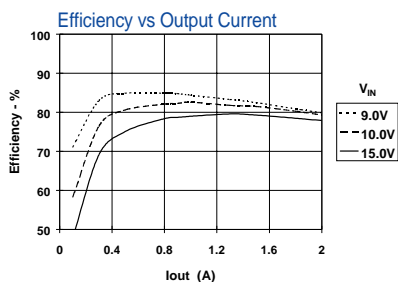
(3) See Safe Operating Area curves for derating

## PT78HT200 Series

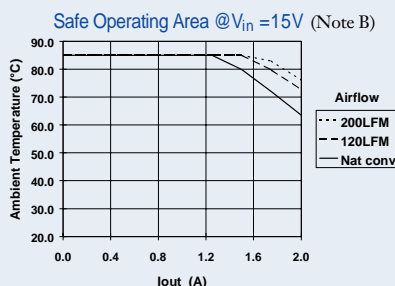
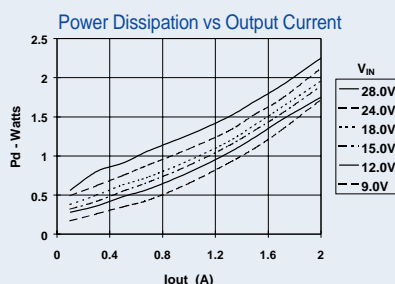
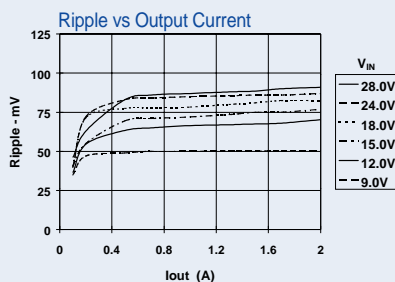
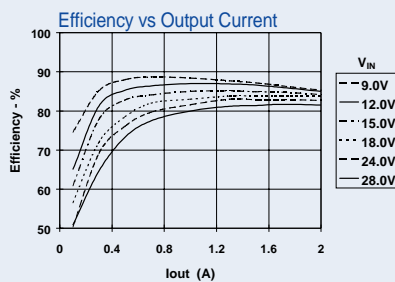
## Typical Characteristics

2 Amp Positive Step-Down  
Integrated Switching Regulator

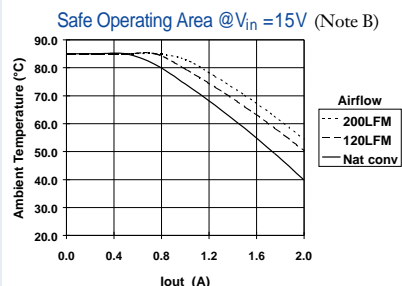
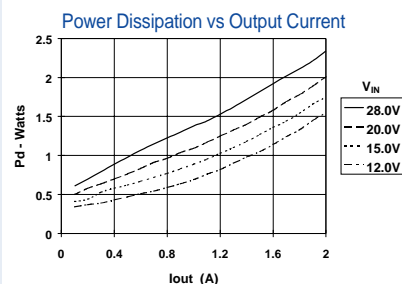
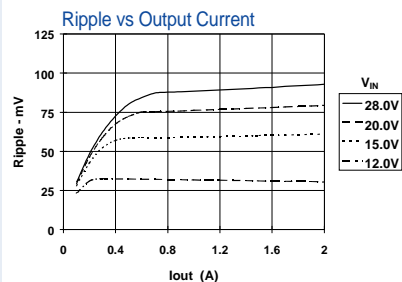
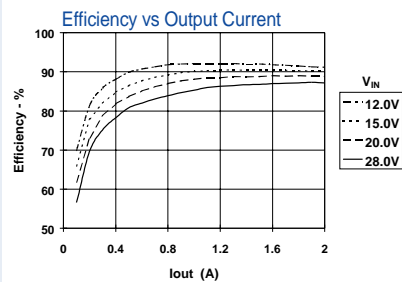
PT78HT233 3.3 VDC (See Note A)



PT78HT205 5.0 VDC (See Note A)



PT78HT208 8.0 VDC (See Note A)



Note A: All characteristic data has been developed from actual products tested at 25°C. This data is considered typical data 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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