PT78HT200 Series

2 Amp Positive Step-Down Integrated Switching Regulator

Power Trends Products from Texas Instruments

SLTS057B

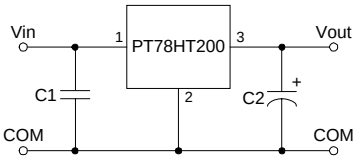
(Revised 10/15/2000)

- 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.

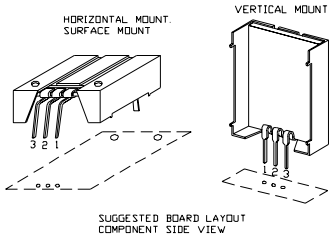
Standard Application



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

Pin-Out Information

Pin	Function
1	V_{in}
2	GND
3	V_{out}



Pkg Style 500

Ordering Information

PT78HT2 XX Y

Output Voltage
33 = 3.3 Volts
05 = 5.0 Volts
53 = 5.25 Volts
65 = 6.5 Volts
08 = 8.0 Volts

Package Suffix
V = Vertical Mount
S = Surface Mount
H = Horizontal Mount

Specifications

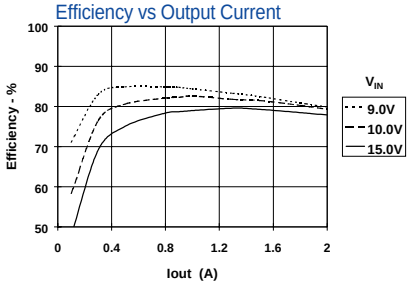
Characteristics (T_a = 25°C unless noted)	Symbols	Conditions		PT78HT200 SERIES Min	Typ	Max	Units
Output Current	I_o	Over V_{in} range		0.1 (2)	—	2.0	A
Short Circuit Current	I_{sc}	V_{in} = V_{in} min		—	6.0	—	Apk
Input Voltage Range	V_{in}	0.1 ≥ I_o ≥ 2.0A	V_o =3.3V V_o =5.0V V_o =6.5V V_o =8.0V	9 9 10.5 12	— — — —	15 28 28 28	V
Output Voltage Tolerance	ΔV_o	Over V_{in} range, I_o = 2.0A T_a = 0°C to +60°C		—	±1.0	±2.0	%Vo
Line Regulation	Reg_{line}	Over V_{in} range		—	±0.4	±0.8	%Vo
Load Regulation	Reg_{load}	0.1 ≤ I_o ≤ 2.0A		—	±0.2	±0.4	%Vo
Vo Ripple/Noise	V_n	V_{in} = V_{in} min, I_o = 2.0A		—	±1	—	%Vo
Transient Response (with 100µF output cap)	t_{tr}	50% load change Vo over/undershoot		—	100 5.0	—	µSec %Vo
Efficiency	η	V_{in}=9V, I_o = 2.0A V_{in} =12V, I_o =2.0A V_{in} =15V, I_o =2.0A	V_o =3.3V V_o =5.0V V_o =8.0V	— — —	80 85 90	— — —	%
Switching Frequency	f_o	Over V_{in} and I_o ranges	V_o ≥5.0V V_o =3.3V	700 950	750 1,000	800 1,050	kHz
Absolute Maximum Operating Temperature Range	T_a	Over V_{in} range		-40	—	+85 (3)	°C
Thermal Resistance	θ_{ja}	Free Air Convection, (40-60LFM)		—	40	—	°C/W
Storage Temperature	T_s	—		-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

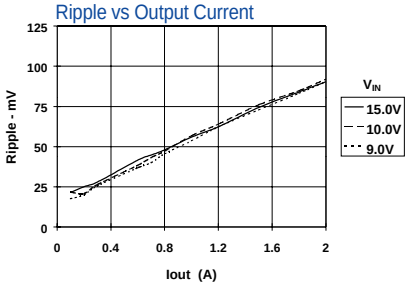
Typical Characteristics

PT78HT233 3.3 VDC (See Note A)

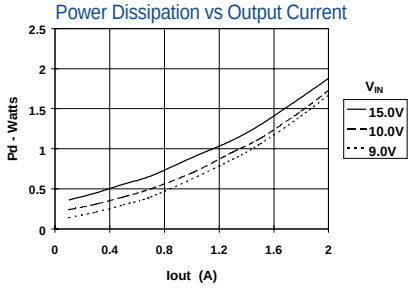
Efficiency vs Output Current



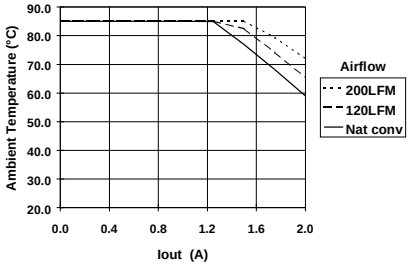
Ripple vs Output Current



Power Dissipation vs Output Current

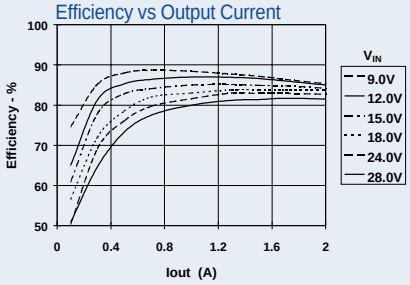


Safe Operating Area @V_{in} =12V (Note B)

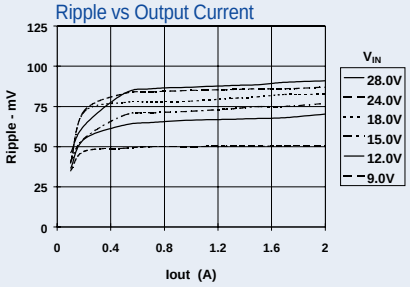


PT78HT205 5.0 VDC (See Note A)

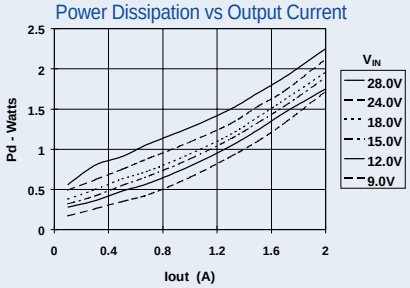
Efficiency vs Output Current



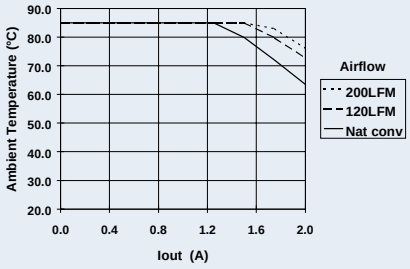
Ripple vs Output Current



Power Dissipation vs Output Current

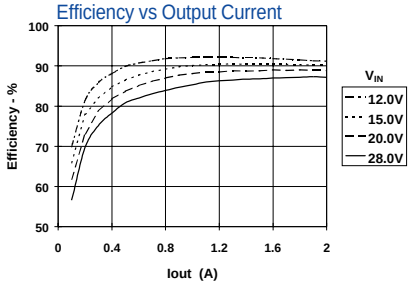


Safe Operating Area @V_{in} =15V (Note B)

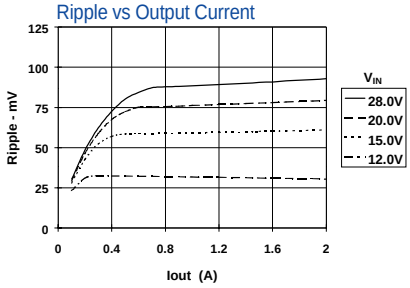


PT78HT208 8.0 VDC (See Note A)

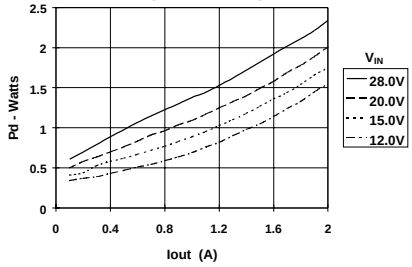
Efficiency vs Output Current



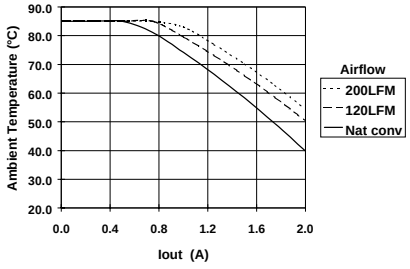
Ripple vs Output Current



Power Dissipation vs Output Current



Safe Operating Area @V_{in} =15V (Note B)



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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