

PT78ST200 Series

12V 2 Amp Positive Step-Down
Integrated Switching Regulator

 Power Trends Products
from Texas Instruments

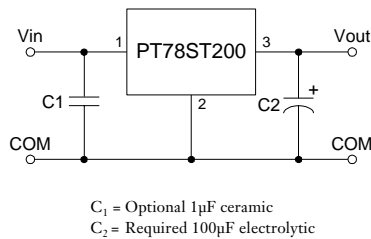
SLTS060A

(Revised 6/30/2000)

- High Efficiency > 87%
- Wide Input Range
- Aluminum Heatsink for Applications with Airflow
- Self-Contained Inductor
- Short Circuit Protection
- Over-Temperature Protection
- Pin Compatible with Linear 3-Terminal, "78" Series Regulators
- Small Footprint

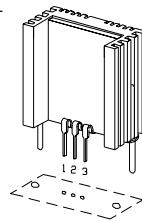
The Power Trends' PT78ST200 is a series of 3-terminal Integrated Switching Regulators (ISRs) that can supply up to 24 watts of regulated 12V power. With a surge capability of 3 Amps and an output voltage that is laser trimmed, it is ideal for inductive load applications such as disk drive motors.

Standard Application



Pin-Out Information

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



SUGGESTED BOARD LAYOUT
COMPONENT SIDE VIEW
Pkg Style 600

Ordering Information

PT78ST2 XX Y

Output Voltage

12 = 12.0 Volts

Package Suffix

V = Vertical Mount

Specifications

Characteristics ($T_a = 25^\circ\text{C}$ unless noted)	Symbols	Conditions	PT78ST200 SERIES			Units
			Min	Typ	Max	
Output Current	I_o	Over V_{in} range With forced air cooling	0.1*	—	2.0	A
Short Circuit Current	I_{sc}	$V_{in} = V_{in\ min}$	—	5.0	—	Apk
Input Voltage Range	V_{in}	$0.1 \leq I_o \leq 2.0\text{A}$	16	—	28	V
Output Voltage Tolerance	ΔV_o	Over V_{in} range, $I_o = 2.0\text{A}$ $T_a = 0^\circ\text{C}$ to $+60^\circ\text{C}$	—	± 1.0	± 2.0	% V_o
Line Regulation	Reg_{line}	Over V_{in} range	—	± 0.4	± 0.8	% V_o
Load Regulation	Reg_{load}	$0.1 \leq I_o \leq 2.0\text{A}$	—	± 0.2	± 0.4	% V_o
V_o Ripple/Noise	V_n	$V_{in} = 17\text{V}$, $I_o = 2.0\text{A}$, $V_o = 12\text{V}$	—	120	—	mV _{pp}
Transient Response (with 100 μ F output cap)	t_{tr}	50% load change V_o over/undershoot	—	100	—	μ Sec
			—	5.0	—	% V_o
Efficiency	η	$V_{in} = 17\text{V}$, $I_o = 2.0\text{A}$	—	87	—	%
Switching Frequency	f_o	Over V_{in} and I_o ranges	0.95	1.0	1.05	MHz
Absolute Maximum Operating Temperature Range	T_a	—	-40	—	+65	$^\circ\text{C}$
Recommended Operating Temperature Range	T_a	Free Air Convection, (40-60LFM) at $V_{in} = 24\text{V}$, $I_o = 2\text{A}$	-40	—	+55**	$^\circ\text{C}$
Thermal Resistance	θ_{ja}	Free Air Convection, (40-60LFM)	—	35	—	$^\circ\text{C}/\text{W}$
Storage Temperature	T_s	—	-40	—	+125	$^\circ\text{C}$
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	—	10	—	G's
Weight	—	—	—	11	—	Grams

*ISR will operate down to no load with reduced specifications.

**See Thermal Derating chart.

Note: The PT78ST200 Series requires a 100 μ F electrolytic or tantalum output capacitor for proper operation in all applications.

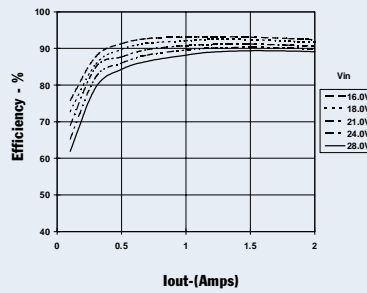
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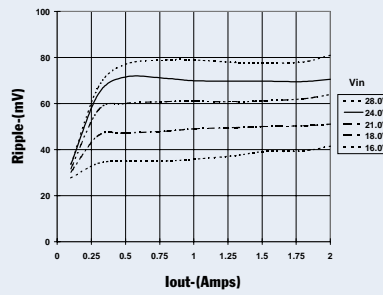
Typical Characteristics

PT78ST212 12.0 VDC (See Note 1)

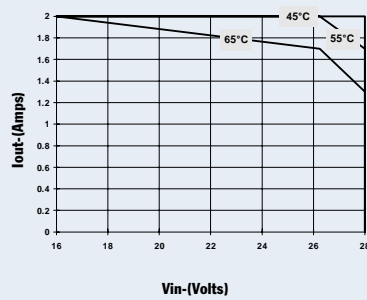
Efficiency vs Output Current



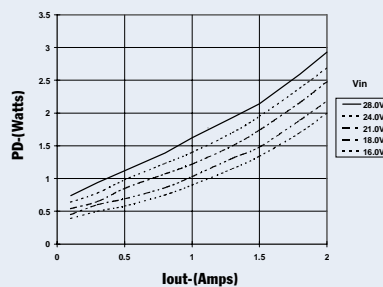
Ripple vs Output Current



Thermal Derating (T_a) (See Note 2)



Power Dissipation vs Output Current



Note 1: All data listed in the above graphs, except for derating data, has been developed from actual products tested at 25°C. This data is considered typical data for the ISR.
Note 2: Thermal derating graphs are developed in free air convection cooling of 40-60 LFM. (See Thermal Application Notes.)

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