



**THE DATASHEET OF  
PT78ST212V**



## PT78ST200 Series

12V 2 Amp Positive Step-Down  
Integrated Switching Regulator

 Power Trends Products  
from Texas Instruments

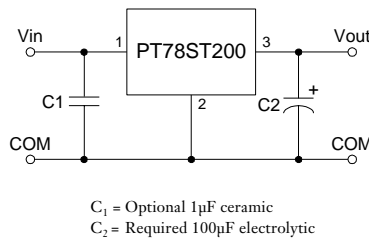
SLTS060A

(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

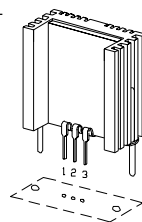
The Power Trends' PT78ST200 is a series of 3-terminal Integrated Switching Regulators (ISRs) that can supply up to 24 watts of regulated 12V power. With a surge capability of 3 Amps and an output voltage that is laser trimmed, it is ideal for inductive load applications such as disk drive motors.

### 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	$\Delta V_o$	Over $V_{in}$ range, $I_o = 2.0\text{A}$ $T_a = 0^\circ\text{C}$ to $+60^\circ\text{C}$	—	$\pm 1.0$	$\pm 2.0$	% $V_o$
Line Regulation	$Reg_{line}$	Over $V_{in}$ range	—	$\pm 0.4$	$\pm 0.8$	% $V_o$
Load Regulation	$Reg_{load}$	$0.1 \leq I_o \leq 2.0\text{A}$	—	$\pm 0.2$	$\pm 0.4$	% $V_o$
$V_o$ Ripple/Noise	$V_n$	$V_{in} = 17\text{V}$ , $I_o = 2.0\text{A}$ , $V_o = 12\text{V}$	—	120	—	mV <sub>pp</sub>
Transient Response (with 100 $\mu$ F output cap)	$t_{tr}$	50% load change $V_o$ over/undershoot	—	100	—	$\mu\text{Sec}$
			—	5.0	—	% $V_o$
Efficiency	$\eta$	$V_{in} = 17\text{V}$ , $I_o = 2.0\text{A}$	—	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	$\theta_{ja}$	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 $\mu$ F electrolytic or tantalum output capacitor for proper operation in all applications.

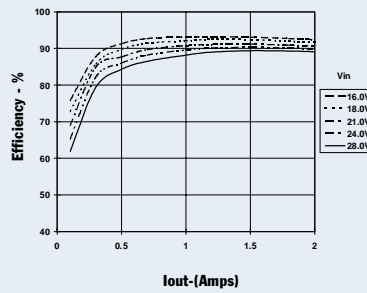
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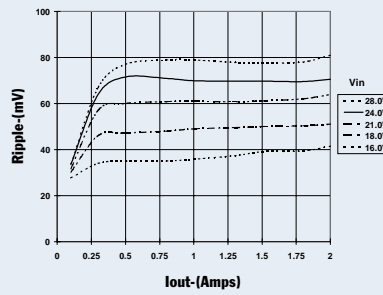
## Typical Characteristics

### PT78ST212 12.0 VDC (See Note 1)

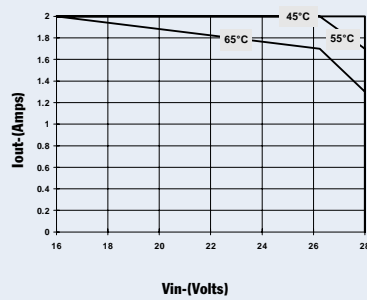
#### Efficiency vs Output Current



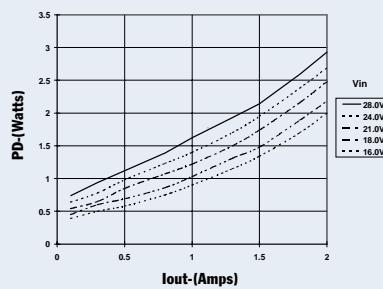
#### Ripple vs Output Current



#### Thermal Derating (T<sub>a</sub>) (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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