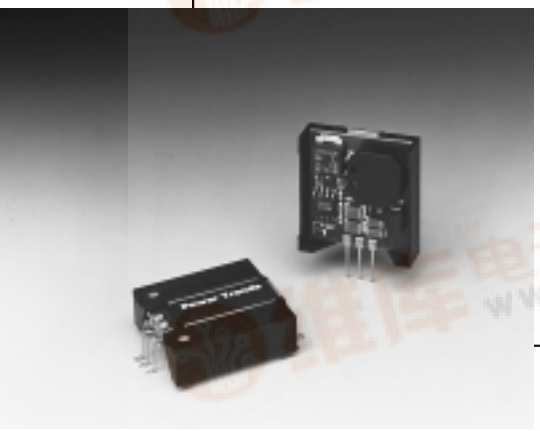
For assistance or to order, call (800) 531-5782

78ST200 Series

2 AMP POSITIVE STEP-DOWN INTEGRATED SWITCHING REGULATOR

Revised 6/30/98

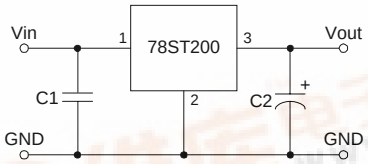


- High Efficiency > 82%
- Wide Input Range
- Self-Contained Inductor
- Short-Circuit Protection
- Over-Temperature Protection
- Fast Transient Response

The 78ST200 is a series of wide input voltage, 3 terminal Integrated Switching Regulators (ISRs). Employing a ceramic substrate, these ISRs have a maximum output current of 2A. The output voltage is laser trimmed for high accuracy.

The 78ST200 series regulators have internal short-circuit and over-temperature protection and may be used in a wide variety of applications.

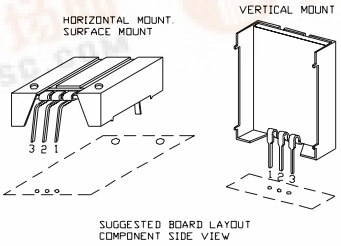
Standard Application



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

Pin-Out Information

Pin No.	Function
1	V_{in}
2	GND
3	V_{out}



Ordering Information

78ST2 **XX** **Y** C

Output Voltage	Package Suffix
33 = 3.3 Volts	**V** = Vertical Mount
35 = 3.45 Volts	**S** = Surface Mount
05 = 5.0 Volts	**H** = Horizontal Mount

(For dimensions and PC board layout see Package Style 500.)

Specifications

Characteristics (T_a = 25°C unless noted)	Symbols	Conditions	78ST200 SERIES Min	Typ	Max	Units
Output Current	I_o	Over V_{in} range	0.1*	—	2.0	A
Input Voltage Range	V_{in}	I_o = 0.1 to 3.0A V_o < 3.5V V_o = 5.0V	7 8	— —	15 20	V 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	$\%V_o$
Load Regulation	Reg_{load}	0.1 ≤ I_o ≤ 2.0A	—	±0.2	±0.4	$\%V_o$
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 V_o over/undershoot	—	100 5.0	—	µSec $\%V_o$
Efficiency	η	V_{in} = 9V, I_o = 2.0A, V_o = 5V	—	82	—	%
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	—	+85	°C
Recommended Operating Temperature Range	T_a	Free Air Convection, (40-60LFM) Over V_{in} and I_o ranges	-40	—	+85**	°C
Thermal Resistance	θ_{ja}	Free Air Convection, (40-60LFM)	—	38	—	°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	—	—	—	7	—	Grams

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

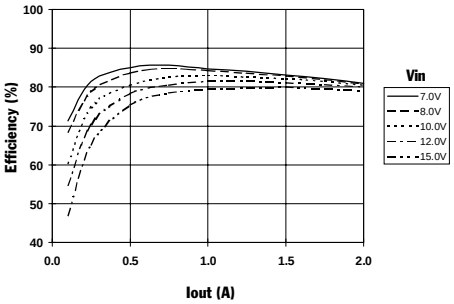
** See Thermal Derating chart.

Note: *The 78ST200 Series requires a 100µF electrolytic or tantalum output capacitor for proper operation in all applications.*

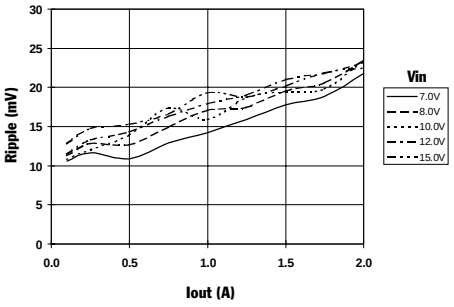
78ST233_ 3.3 VDC

(See Note 1)

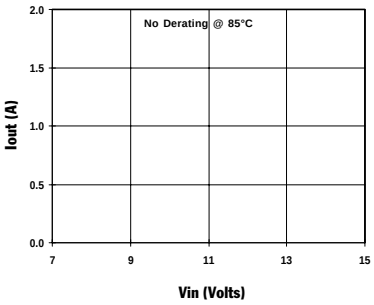
Efficiency vs Output Current



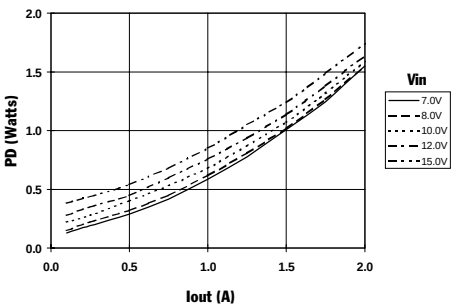
Ripple vs Output Current



Thermal Derating (T_a) (See Note 2)



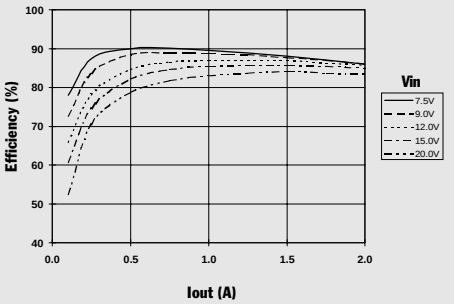
Power Dissipation vs Output Current



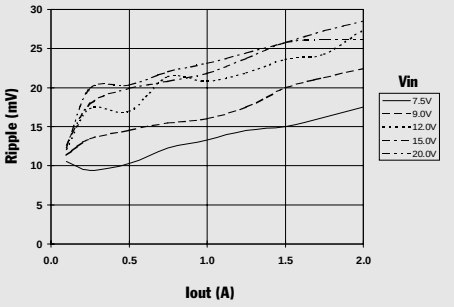
78ST205_ 5.0 VDC

(See Note 1)

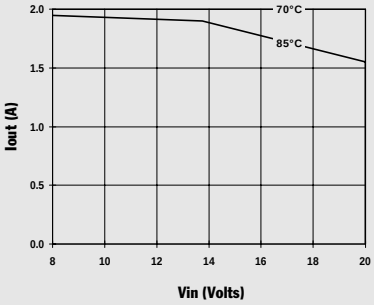
Efficiency vs Output Current



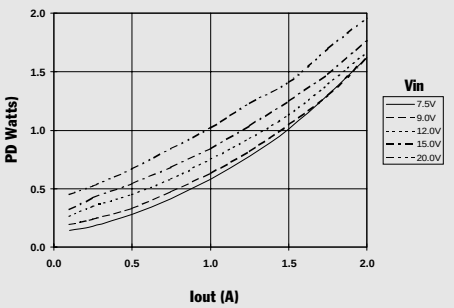
Ripple vs Output Current



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 Note)*

IMPORTANT NOTICE

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

TI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF TI PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.