

78ST212 Series

**12V 2 AMP POSITIVE STEP-DOWN
INTEGRATED SWITCHING REGULATOR**

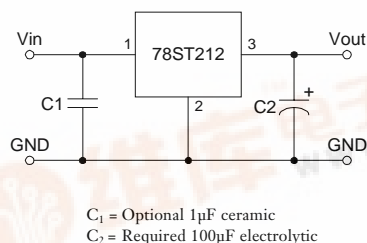
Revised 6/30/98



- High Efficiency > 87%
- Wide Input Range
- Aluminum Heatsink for Applications with Airflow
- Self-Contained Inductor
- Short Circuit Protection
- Over-Temperature Protection

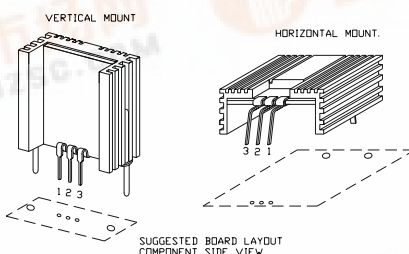
The 78ST212 is a series of wide input voltage, 3-terminal Integrated Switching Regulators (ISRs). With a surge capability of 3A and an output voltage that is laser trimmed, it is ideal for inductive load applications such as disk drive motors.

Standard Application



Pin-Out Information

Pin	Function
1	V _{in}
2	GND
3	V _{out}



Ordering Information

78ST2	XX	Y	C
Output Voltage	Package Suffix		
12 = 12.0 Volts	V = Vertical Mount H = Horizontal Mount		

(For dimensions and PC board layout see Package Style 600.)

Specifications

Characteristics (T _a = 25°C unless noted)	Symbols	Conditions	78ST212 SERIES			Units
			Min	Typ	Max	
Output Current	I _o	Over V _{in} range With forced air cooling	0.1*	—	2.0	A
Input Voltage Range	V _{in}	0.1 ≤ I _o ≤ 2.0A	14.5	—	28	V
Output Voltage Tolerance	ΔV _o	Over V _{in} range, I _o = 2.0A T _a = 0°C to +55°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 ≤ I _o ≤ 2.0A	—	±0.2	±0.4	%V _o
V _o Ripple/Noise	V _n	V _{in} = 17V, I _o = 2.0A, V _o = 12V	—	1.0	—	%V _o
Transient Response (with 100 μ F output cap)	t _{tr}	50% load change V _o over/undershoot	—	100 3.0	—	μ Sec %V _o
Efficiency	η	V _{in} = 17V, I _o = 2.0A	—	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	°C
Recommended Operating Temperature Range	T _a	Free Air Convection, (40-60LFM) at V _{in} = 24V, I _o = 2A	-40	—	+55**	°C
Thermal Resistance	θ_{ja}	Free Air Convection, (40-60LFM)	—	35	—	°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	—	10	—	G's
Weight	—	—	—	11	—	Grams

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

**See Thermal Derating chart.

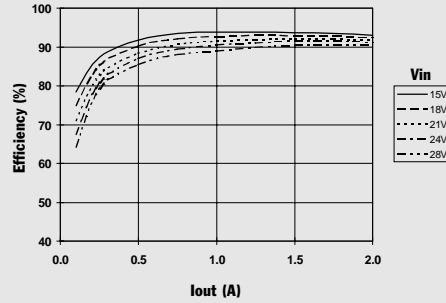
Note: The 78ST212 Series requires a 100 μ F electrolytic or tantalum output capacitor for proper operation in all applications.

CHARACTERISTIC DATA

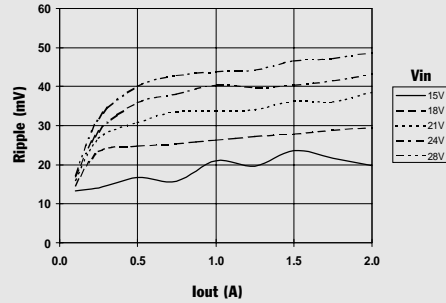
78ST212 Series

78ST212_ 12.0 VDC (See Note 1)

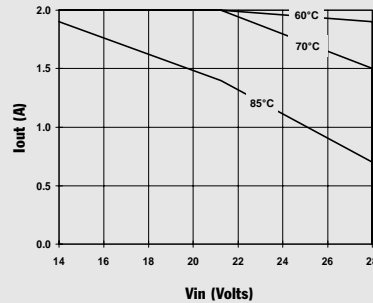
Efficiency vs Output Current



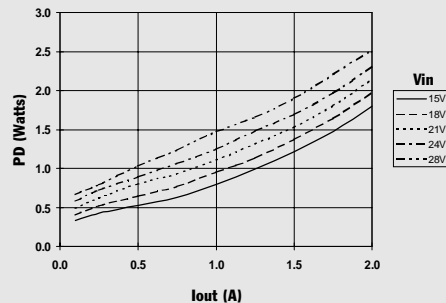
Ripple vs Output Current



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.)

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.