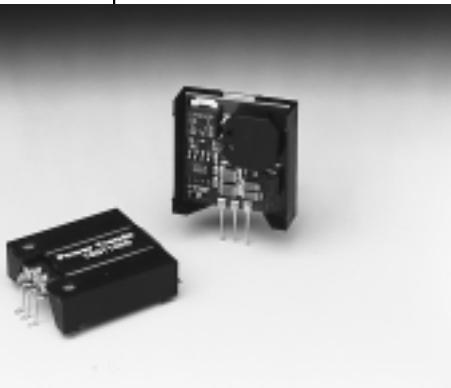
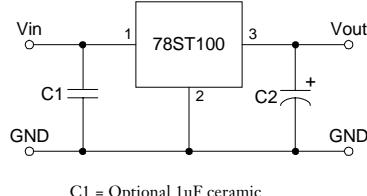


78ST100 Series**1.5 AMP POSITIVE STEP-DOWN
INTEGRATED SWITCHING REGULATOR**

Revised 6/30/98



- Very Small Footprint
- High Efficiency > 85%
- Self-Contained Inductor
- Internal Short-Circuit Protection
- Over-Temperature Protection
- Fast Transient Response
- Wide Input Range

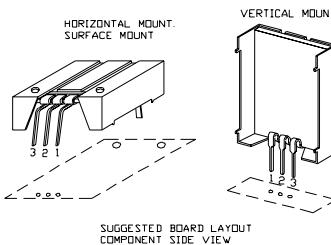
Standard Application

C1 = Optional 1μF ceramic

C2 = Required 100μF electrolytic

Pin-Out Information

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



Pkg Style 500

Specifications

Characteristics (T _a = 25°C unless noted)	Symbols	Conditions	78ST100 SERIES			
			Min	Typ	Max	Units
Output Current	I _o	Over V _{in} range	0.1*	—	1.5	A
Short Circuit Current	I _{sc}	V _{in} = V _{in} min	—	3.5	—	A _{pk}
Input Voltage Range	V _{in}	0.1 ≤ I _o ≤ 1.5A	V _o = 3.3V V _o = 5V V _o = 12V	7 7 14.5	— — —	26 30 30
Output Voltage Tolerance	ΔV _o	Over V _{in} range, I _o = 1.5A T _a = 0°C to +60°C	—	±1.0	±2.0	%V _o
Line Regulation	Reg _{line}	Over V _{in} range	—	±0.2	±0.4	%V _o
Load Regulation	Reg _{load}	0.1 ≤ I _o ≤ 1.5A	—	±0.1	±0.2	%V _o
V _o Ripple/Noise	V _n	V _{in} = 9V, I _o = 1.5A V _{in} = 16V, I _o = 1.5A	V _o = 5V V _o = 12V	65 90	—	mV _{pp} mV _{pp}
Transient Response (with 100μF output cap)	t _{tr}	50% load change V _o over/undershoot	—	100 5	—	μSec %V _o
Efficiency	η	V _{in} = 10V, I _o = 1A V _{in} = 10V, I _o = 1A V _{in} = 17V, I _o = 1A	V _o = 3.3V V _o = 5V V _o = 12V	— — —	80 85 90	% % %
Switching Frequency	f _o	Over V _{in} range, I _o = 1.5A	600	650	700	kHz
Absolute Maximum Operating Temperature Range	T _a	—	—	-40	—	+85
Recommended Operating Temperature Range	T _a	Free Air Convection, (40-60LFM) At V _{in} = 24V, I _o = 1.0A	—	-40	—	+80**
Thermal Resistance	θ _{ja}	Free Air Convection, (40-60LFM)	—	45	—	°C/W
Storage Temperature	T _s	—	—	-40	—	+125
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

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

**See Thermal Derating chart.

Note: The 78ST100 Series requires a 100μF electrolytic or tantalum output capacitor for proper operation in all applications.

The 78ST100 is a series of wide input voltage, 3-terminal Integrated Switching Regulators (ISRs). These ISRs have a maximum output current of 1.5A and an output voltage that is laser trimmed to a variety of industry standard voltages.

These 78 series regulators have excellent line and load regulation with internal short-circuit and over-temperature protection, are very flexible, and may be used in a wide variety of applications.

Ordering Information78ST1 **XX** **Y** C

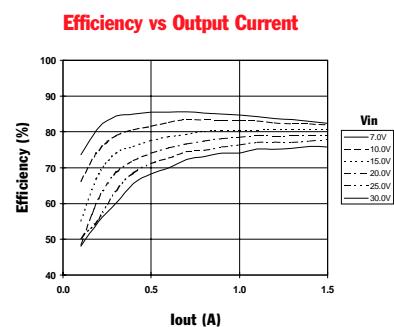
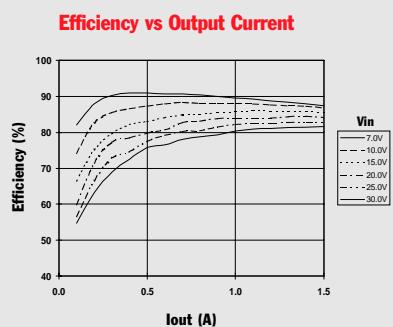
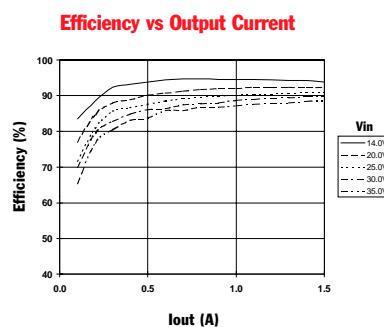
Output Voltage

33 = 3.3 Volts**36** = 3.6 Volts**05** = 5.0 Volts**51** = 5.1 Volts**65** = 6.5 Volts**07** = 7.0 Volts**08** = 8.0 Volts**09** = 9.0 Volts**12** = 12.0 Volts

Package Suffix

V = Vertical Mount**S** = Surface Mount**H** = Horizontal Mount

Mount

CHARACTERISTIC DATA**78ST133_ 3.3 VDC** (See Note 1)**78ST105_ 5.0 VDC** (See Note 1)**78ST112_ 12.0 VDC** (See Note 1)**Ripple vs Output Current**

Ripple (mV)

Iout (A)

Vin

7.0V
10.0V
15.0V
20.0V
25.0V
30.0V

Ripple vs Output Current

Ripple (mV)

Iout (A)

Vin

7.0V
10.0V
15.0V
20.0V
25.0V
30.0V

Ripple vs Output Current

Ripple (mV)

Iout (A)

Vin

14.0V
20.0V
25.0V
30.0V
35.0V

Thermal Derating (Ta) (See Note 2)

Iout (A)

Vin (Volts)

60°C
70°C
85°C

Thermal Derating (Ta) (See Note 2)

Iout (A)

Vin (Volts)

60°C
70°C
85°C

Thermal Derating (Ta) (See Note 2)

Iout (A)

Vin (Volts)

60°C
70°C
85°C

Power Dissipation vs Output Current

Pd (Watts)

Iout (A)

Vin

7.0V
10.0V
15.0V
20.0V
25.0V
30.0V

Power Dissipation vs Output Current

Pd (Watts)

Iout (A)

Vin

7.0V
10.0V
15.0V
20.0V
25.0V
30.0V

Power Dissipation vs Output Current

Pd (Watts)

Iout (A)

Vin

14.0V
20.0V
25.0V
30.0V
35.0V

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.)

Power Trends, Inc. 27715 Diehl Road, Warrenville, IL 60555 **(800) 531-5782** Fax: (630) 393-6902 <http://www.powertrends.com>

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PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
78ST105SCT	OBsolete SIP MODULE	EFC	3			TBD	Call TI	Call TI	-40 to 85		
78ST107HC	OBsolete SIP MODULE	EFA	3			TBD	Call TI	Call TI	-40 to 85		
78ST107SC	OBsolete SIP MODULE	EFC	3			TBD	Call TI	Call TI	-40 to 85		
78ST107SCT	OBsolete SIP MODULE	EFC	3			TBD	Call TI	Call TI	-40 to 85		
78ST107VC	OBsolete SIP MODULE	EFD	3			TBD	Call TI	Call TI	-40 to 85		
78ST108HC	OBsolete SIP MODULE	EFA	3			TBD	Call TI	Call TI	-40 to 85		
78ST108SC	OBsolete SIP MODULE	EFC	3			TBD	Call TI	Call TI	-40 to 85		
78ST108SCT	OBsolete SIP MODULE	EFC	3			TBD	Call TI	Call TI	-40 to 85		
78ST108VC	OBsolete SIP MODULE	EFD	3			TBD	Call TI	Call TI	-40 to 85		
78ST109SCT	OBsolete SIP MODULE	EFC	3			TBD	Call TI	Call TI	-40 to 85		
78ST109TC	OBsolete SIP MODULE	EFT	3			TBD	Call TI	Call TI	-40 to 85		
78ST112SCT	OBsolete SIP MODULE	EFC	3			TBD	Call TI	Call TI	-40 to 85		
78ST112TC	OBsolete SIP MODULE	EFT	3			TBD	Call TI	Call TI	-40 to 85		
78ST133SCT	OBsolete SIP MODULE	EFC	3			TBD	Call TI	Call TI	-40 to 85		
78ST136SC	OBsolete SIP MODULE	EFC	3			TBD	Call TI	Call TI	-40 to 85		
78ST136SCT	OBsolete SIP MODULE	EFC	3			TBD	Call TI	Call TI	-40 to 85		
78ST136VC	OBsolete SIP MODULE	EFD	3			TBD	Call TI	Call TI	-40 to 85		
78ST151HC	OBsolete SIP MODULE	EFA	3			TBD	Call TI	Call TI	-40 to 85		
78ST151SC	OBsolete SIP MODULE	EFC	3			TBD	Call TI	Call TI	-40 to 85		
78ST151SCT	OBsolete SIP MODULE	EFC	3			TBD	Call TI	Call TI	-40 to 85		
78ST151VC	OBsolete SIP MODULE	EFD	3			TBD	Call TI	Call TI	-40 to 85		
78ST165SCT	OBsolete SIP MODULE	EFC	3			TBD	Call TI	Call TI	-40 to 85		
78ST165VC	NRND SIP MODULE	EFD	3			TBD	Call TI	Call TI	-40 to 85		

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBsolete: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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