

PT78ST100 Series

1.5 Amp Positive Step-Down
Integrated Switching Regulator



Power Trends Products
from Texas Instruments

SLTS059A

(Revised 6/30/2000)

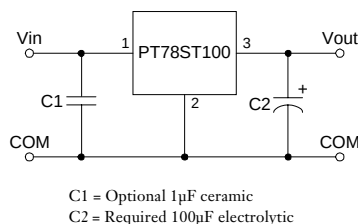
- Very Small Footprint
- High Efficiency > 85%
- Self-Contained Inductor
- Internal Short-Circuit Protection
- Over-Temperature Protection
- Fast Transient Response
- Wide Input Range

The PT78ST100 is a series of wide-input range, 3-terminal regulators.

These ISRs have a maximum output current of 1.5 Amps and an output voltage that is laser trimmed to a variety of industry standard voltages.

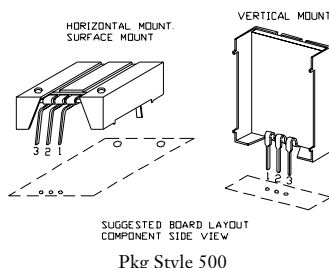
These 78 series regulators have excellent line and load regulation with internal short-circuit and over-temperature protection, and are offered in a variety of standard output voltages. These ISRs are very flexible and may be used in a wide variety of applications.

Standard Application



Pin-Out Information

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



Pkg Style 500

Ordering Information

PT78ST1 XX Y

Output Voltage

33 = 3.3 Volts
36 = 3.6 Volts
05 = 5.0 Volts
51 = 5.1 Volts
53 = 5.25 Volts
06 = 6.0 Volts
65 = 6.5 Volts
07 = 7.0 Volts
08 = 8.0 Volts
09 = 9.0 Volts
10 = 10.0 Volts
12 = 12.0 Volts
14 = 13.9 Volts
15 = 15.0 Volts

Package Suffix

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

Specifications

Characteristics (T _a = 25°C unless noted)	Symbols	Conditions	PT78ST100 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	—	Apk
Input Voltage Range	V _{in}	0.1 ≤ I _o ≤ 1.5A V _o = 3.3V V _o = 5V V _o = 12V	9 9 16	— — —	26 38 38	V V V
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	°C
Recommended Operating Temperature Range	T _a	Free Air Convection, (40-60LFM) At V _{in} = 24V, I _o = 1.0A	-40	—	+80**	°C
Thermal Resistance	θ _{ja}	Free Air Convection, (40-60LFM)	—	45	—	°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	—	—	—	6.5	—	grams

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

**See Thermal Derating chart.

Note: The PT78ST100 Series requires a 100µF electrolytic or tantalum output capacitor for proper operation in all applications.



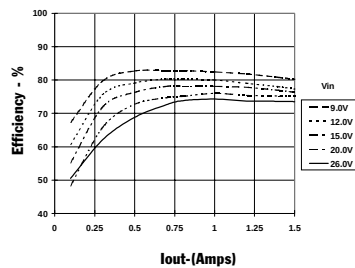
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1.5 Amp Positive Step-Down
Integrated Switching Regulator

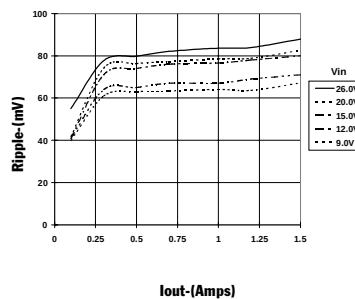
Typical Characteristics

PT78ST133, 3.3 VDC (See Note 1)

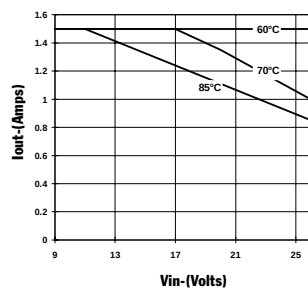
Efficiency vs Output Current



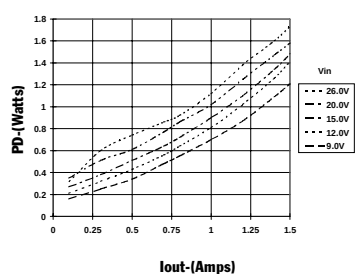
Ripple vs Output Current



Thermal Derating (Ta) (See Note 2)

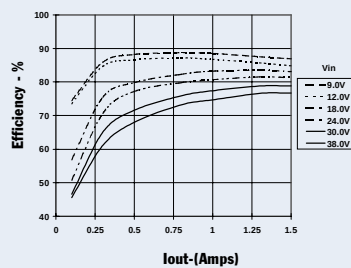


Power Dissipation vs Output Current

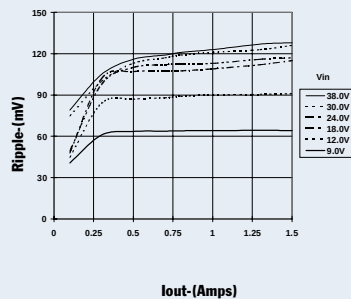


PT78ST105, 5.0 VDC (See Note 1)

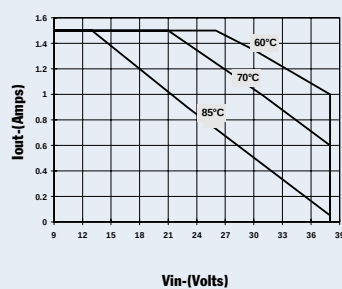
Efficiency vs Output Current



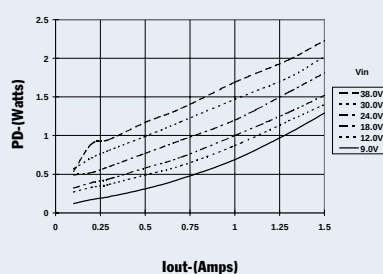
Ripple vs Output Current



Thermal Derating (Ta) (See Note 2)

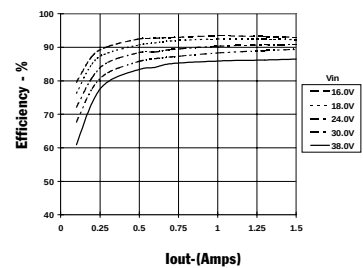


Power Dissipation vs Output Current

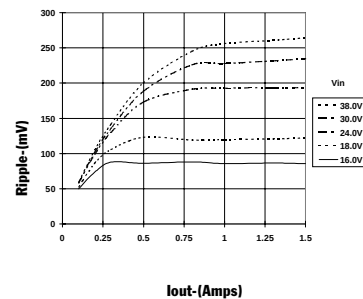


PT78ST112, 12.0 VDC (See Note 1)

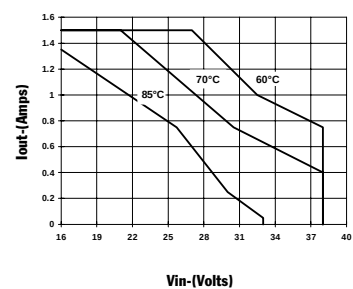
Efficiency vs Output Current



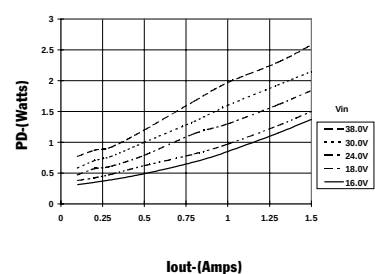
Ripple vs Output Current



Thermal Derating (Ta) (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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