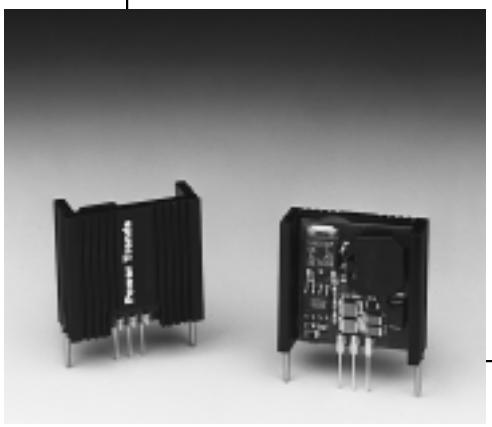
78ST300 Series

3 AMP POSITIVE STEP-DOWN INTEGRATED SWITCHING REGULATOR

Revised 6/30/98

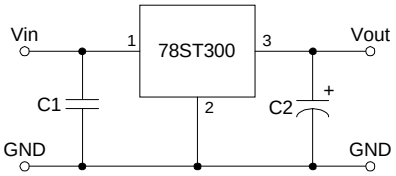


- High Efficiency > 80%
- Wide Input Range
- Self-Contained Inductor
- Short-Circuit Protection
- Over-Temperature Protection
- Fast Transient Response

The 78ST300 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 3A. The output voltage is laser trimmed for high accuracy.

The 78ST300 series regulators have internal short-circuit and over-temperature protection and may be used in a wide variety of applications.

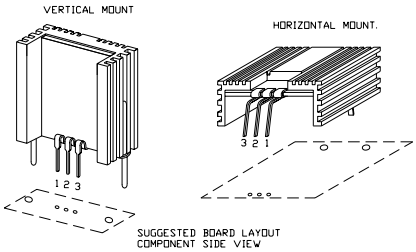
Standard Application



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

Pin-Out Information

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



Ordering Information

78ST3 XX Y C

- XX — Output Voltage: **05** = 5.0 Volts
- Y — Package Suffix: **V** = Vertical Mount, **H** = Horizontal Mount
- C

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

Specifications

Characteristics (T_a = 25°C unless noted)	Symbols	Conditions	78ST300 SERIES Min	Typ	Max	Units
Output Current	I_o	Over V_{in} range	0.1*	—	3.0	A
Input Voltage Range	V_{in}	I_o = 0.1 to 3.0A	8	—	20	V
Output Voltage Tolerance	ΔV_o	Over V_{in} range 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}	$0.1 \le I_o \le 3.0A$	—	±0.2	±0.4	$\%V_o$
Ripple/Noise	V_n	$V_{in} = V_{in}$ min, I_o = 3.0A	—	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 = 3.0A	—	80	—	%
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	—	+70	°C
Recommended Operating Temperature Range	T_a	Free Air Convection, (40-60LFM) Over V_{in} and I_o ranges	-40	—	+70**	°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.

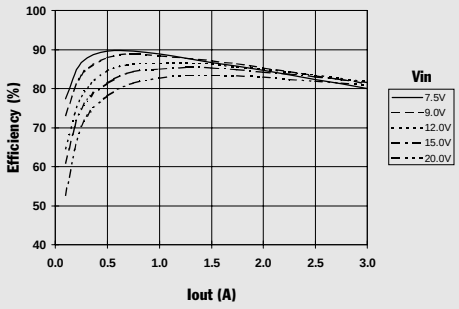
** See Thermal Derating chart.

Note: *The 78ST300 Series requires a 100µF electrolytic or tantalum output capacitor for proper operation in all applications.*

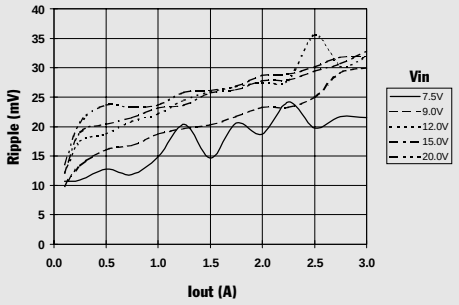
78ST305_ 5.0 VDC

(See Note 1)

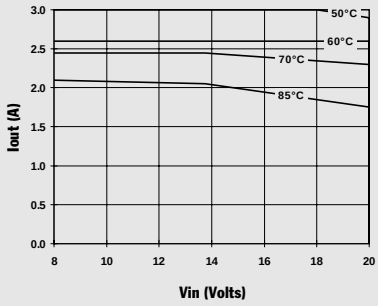
Efficiency vs Output Current



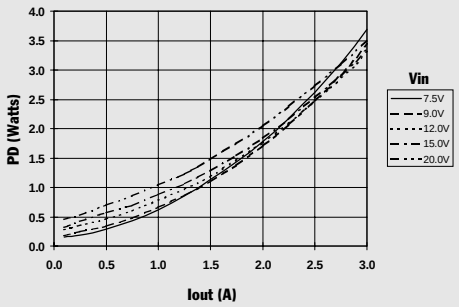
Ripple vs Output Current



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)*

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