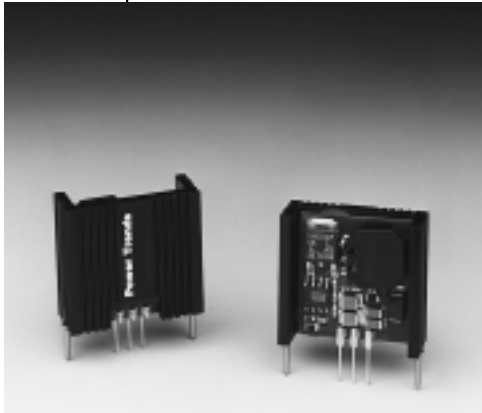


78ST300 Series

**3 AMP POSITIVE STEP-DOWN
INTEGRATED SWITCHING REGULATOR**

Revised 6/30/98

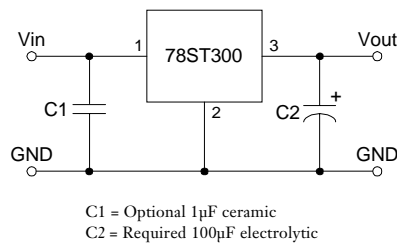


- High Efficiency > 80%
- Wide Input Range
- Self-Contained Inductor
- Short-Circuit Protection
- Over-Temperature Protection
- Fast Transient Response

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.

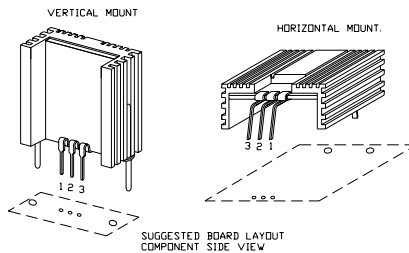
The 78ST300 series regulators have internal short-circuit and over-temperature protection and may be used in a wide variety of applications.

Standard Application



Pin-Out Information

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



Ordering Information

78ST3 **XX** **Y** **C**

Output Voltage
05 = 5.0 Volts

Package Suffix
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	78ST300 SERIES			Units
			Min	Typ	Max	
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	%V _o
Line Regulation	Reg _{line}	Over V _{in} range	—	±0.4	±0.8	%V _o
Load Regulation	Reg _{load}	0.1 ≤ I _o ≤ 3.0A	—	±0.2	±0.4	%V _o
Ripple/Noise	V _n	V _{in} = V _{in} min, I _o = 3.0A	—	1	—	%V _o
Transient Response (with 100 μ F output cap)	t _{tr}	50% load change V _o over/undershoot	—	100 5.0	—	μ Sec %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.

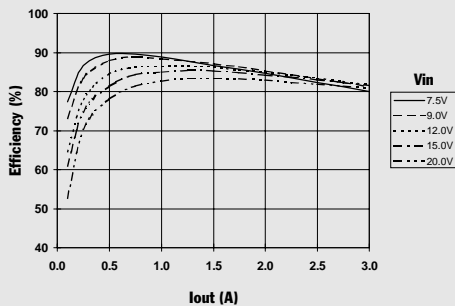
Note: The 78ST300 Series requires a 100 μ F electrolytic or tantalum output capacitor for proper operation in all applications.

CHARACTERISTIC DATA

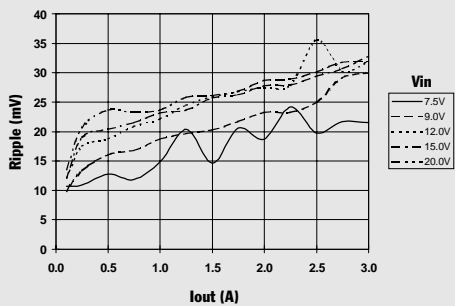
78ST305_ 5.0 VDC

(See Note 1)

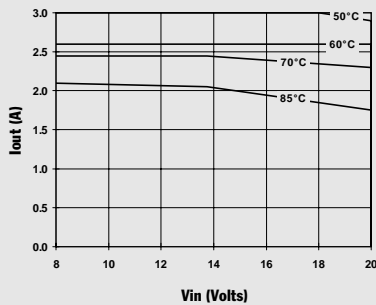
Efficiency vs Output Current



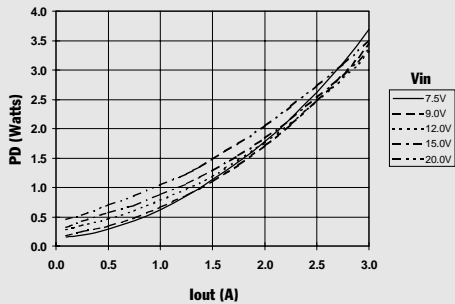
Ripple vs Output Current



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)

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
78ST305HC	NRND	SIP MOD ULE	EFH	3	20	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
78ST305SC	OBSOLETE	SIP MOD ULE	EFJ	3		TBD	Call TI	Call TI
78ST305SCT	OBSOLETE	SIP MOD ULE	EFJ	3		TBD	Call TI	Call TI
78ST305VC	NRND	SIP MOD ULE	EFF	3	20	Pb-Free (RoHS)	Call TI	N / A for Pkg Type

⁽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.

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