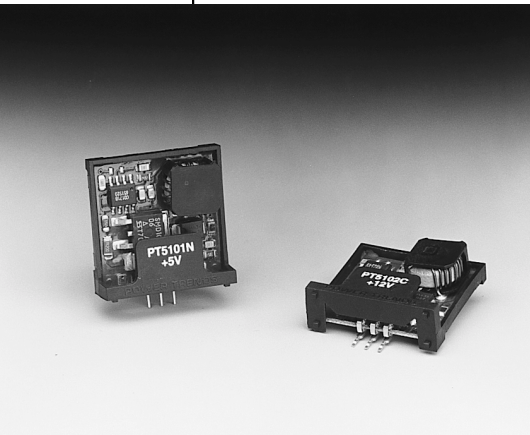


PT5120 Series

**1 AMP LOW VOLTAGE INPUT
INTEGRATED SWITCHING REGULATOR**

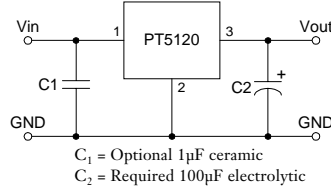
SLTS080
(Revised 6/4/98)



- Low Voltage Input (7V)
- 85% Efficiency
- Internal Short-Circuit Protection
- Over-Temperature Protection
- Laser-Trimmed Output Voltage

The PT5120 series is a low voltage input (typically 7V) version of Power Trends' easy-to-use, 1A positive step-down, 3-terminal Integrated Switching Regulators (ISRs). These ISRs are designed with premium low-threshold FETs for those power regulation applications requiring very low input/output voltage differentials such as battery powered equipment.

Standard Application



Pin-Out Information

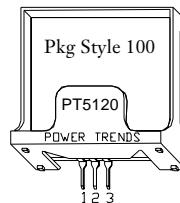
Pin	Function
1	V_{in}
2	GND
3	V_{out}

Ordering Information

PT5121 □ = + 5 Volts
PT5123 □ = + 3.3 Volts

PT Series Suffix (PT1234X)

Case/Pin Configuration	
Vertical Through-Hole	N
Horizontal Through-Hole	A
Horizontal Surface Mount	C



Specifications

Characteristics ($T_a = 25^\circ\text{C}$ unless noted)	Symbols	Conditions	PT5120 SERIES			Units
			Min	Typ	Max	
Output Current	I_o	Over V_{in} range	0.1*	—	1.0	A
Short Circuit Current	I_{sc}	$V_{in} = V_{in\ min}$	—	3.5	—	Apk
Input Voltage Range	V_{in}	$0.1 \leq I_o \leq 1.0\ \text{A}$ $V_o = 3.3\ \text{V}$ $V_o = 5\ \text{V}$	7 7	—	26 38	V V
Output Voltage Tolerance	ΔV_o	Over V_{in} Range, $I_o = 1.0\ \text{A}$ $T_a = 0^\circ\text{C}$ to $+60^\circ\text{C}$	—	± 1.5	± 3.0	% V_o
Line Regulation	Reg_{line}	Over V_{in} range	—	± 0.5	± 1.0	% V_o
Load Regulation	Reg_{load}	$0.1 \leq I_o \leq 1.0\ \text{A}$	—	± 0.5	± 1.0	% V_o
V_o Ripple/Noise	V_n	$V_{in} = V_{in\ min}$, $I_o = 1.0\ \text{A}$	—	± 2	—	% V_o
Transient Response with $C_o = 100\ \mu\text{F}$	t_{rr} V_{os}	25% load change V_o over/undershoot	— —	100 5.0	200 —	μSec % V_o
Efficiency	η	$V_{in} = 9\ \text{V}$, $I_o = 0.5\ \text{A}$, $V_o = 3.3\ \text{V}$ $V_{in} = 9\ \text{V}$, $I_o = 0.5\ \text{A}$, $V_o = 5\ \text{V}$	— —	82 85	— —	% %
Switching Frequency	f_o	Over V_{in} and I_o ranges, $V_o = 3.3\ \text{V}$ $V_o = 5\ \text{V}$	575 500	725 650	875 800	kHz
Absolute Maximum Operating Temperature Range	T_a		-20	—	+85	$^\circ\text{C}$
Recommended Operating Temperature Range	T_a	Free Air Convection, (40-60LFM) $V_o = 3.3\ \text{V}$ $V_o = 5\ \text{V}$	-20 -20	— —	+80** +80**	$^\circ\text{C}$
Thermal Resistance	θ_{ja}	Free Air Convection (40-60LFM) $V_o = 3.3\ \text{V}$ $V_o = 5\ \text{V}$	— —	45 50	— —	$^\circ\text{C}/\text{W}$
Storage Temperature	T_s		-40	—	+125	$^\circ\text{C}$
Mechanical Shock		Per Mil-STD-883D, Method 2002.3 1 msec, Half Sine, mounted to a fixture	—	500	—	G's
Mechanical Vibration		Per Mil-STD-883D, Method 2007.2 20-2000 Hz, Soldered in a PC board	—	5	—	G's
Weight			—	4.5	—	grams

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

**See Thermal Derating chart.

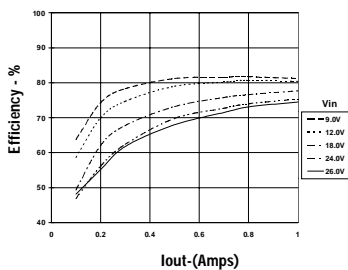
Note: The PT5120 Series requires a 100 μ F electrolytic or tantalum output capacitor for proper operation in all applications.

CHARACTERISTIC DATA

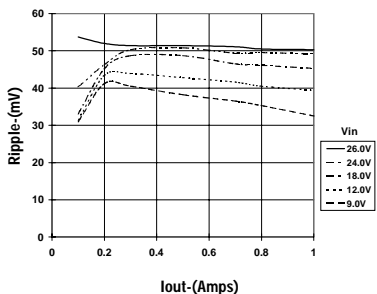
PT5120 Series

PT5123, 3.3 VDC (See Note 1)

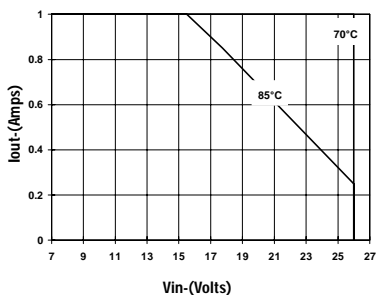
Efficiency vs Output Current



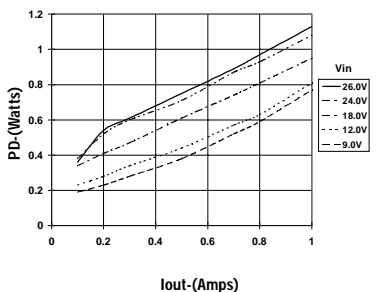
Ripple vs Output Current



Thermal Derating (T_a) (See Note 2)

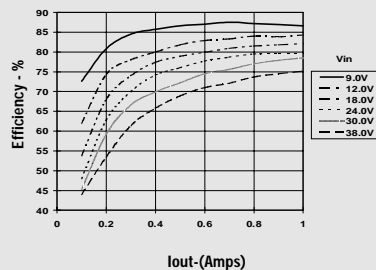


Power Dissipation vs Output Current

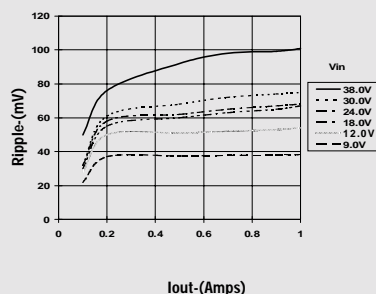


PT5121, 5.0 VDC (See Note 1)

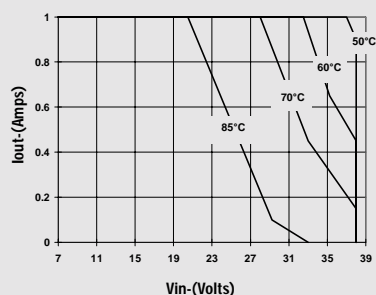
Efficiency vs Output Current



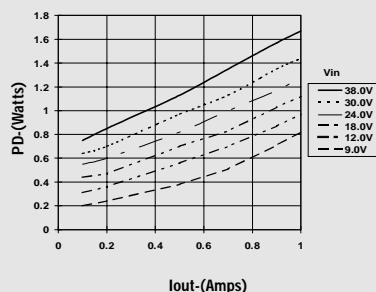
Ripple vs Output Current



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 Notes.)

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
PT5121C	NRND	SIP MOD ULE	EAC	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT5121CT	NRND	SIP MOD ULE	EAC	3		TBD	Call TI	Call TI
PT5123A	NRND	SIP MOD ULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT5123C	NRND	SIP MOD ULE	EAC	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM

⁽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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