



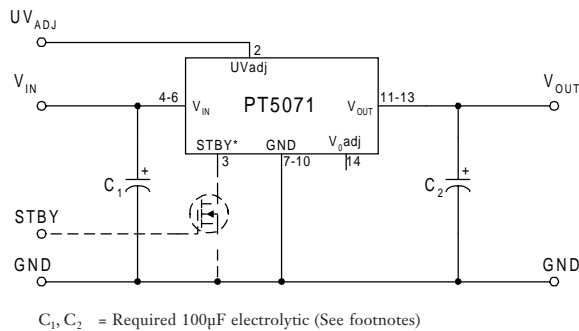
Features

- Single-Device:
+12V Output, 7-16V Input
- 84% Efficiency
- 14-Pin Excalibur™ Package
- Output Current Limit
- Adjustable Output Voltage
- Adjustable Undervoltage Lockout
- Solderable Copper Case

Description

The PT5071 is a 1.5-ampere rated step-up/step-down Integrated Switching Regulator (ISR) that provides a tightly regulated 12V output voltage from a 7V to 16V variable input source. This high-performance ISR has applications in systems where the input voltage straddles the desired 12V output. The regulator has an adjustable output voltage and input start-up threshold, and a standby function for power conservation.

Standard Application



Pin-Out Information

Pin	Function
1	N/C
2	UVLO Adj
3	STBY*
4	V_{in}
5	V_{in}
6	V_{in}
7	GND
8	GND
9	GND
10	GND
11	V_{out}
12	V_{out}
13	V_{out}
14	V_{out} Adjust

Ordering Information

PT5071□ = +12 Volts

PT Series Suffix (PT1234X)

Case/Pin Configuration

Vertical Through-Hole	N
Horizontal Through-Hole	A
Horizontal Surface Mount	C

(For dimensions and PC board layout, see Package Styles 1360 and 1370.)

For Inhibit pin:
 Open = output enabled
 Ground = output disabled

Specifications

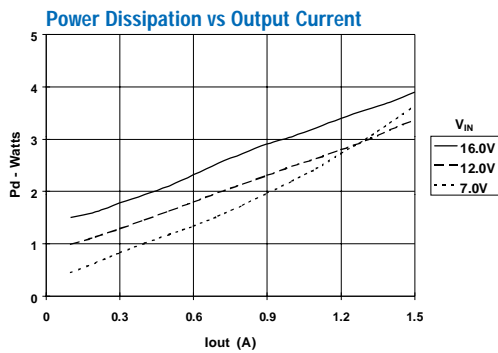
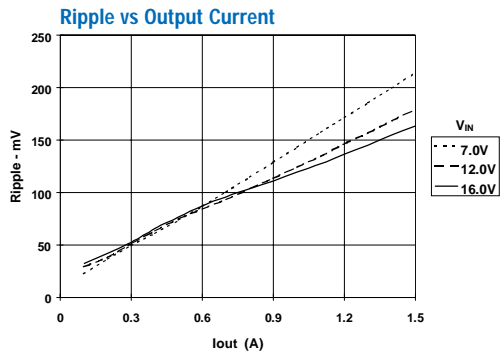
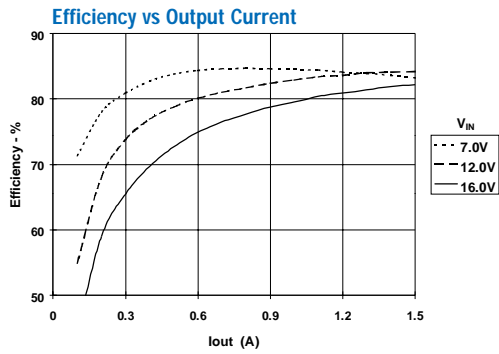
Characteristics ($T_a = 25^\circ\text{C}$ unless noted)	Symbols	Conditions	PT5071			Units
			Min	Typ	Max	
Output Current	I_o	Over V_{in} Range	0.1 (1)	—	1.5	A
Current Limit	I_{lim}	$V_{in} = 12\text{V}$	—	4.0	—	A
Input Voltage Range	V_{in}	$0.1\text{A} \leq I_o \leq I_{o,max}$	7.0	—	16.0	V
Output Voltage Tolerance	ΔV_o	$V_{in} = 12\text{V}, I_o = I_{o,max}$ $-40^\circ\text{C} \leq T_a \leq +85^\circ\text{C}$	—	± 1.0	—	%
Output Voltage Adjust Range	$V_{o,adj}$		10	—	15	V
Line Regulation	Reg_{line}	Over V_{in} Range, $I_o = I_{o,max}$	—	± 0.5	—	%
Load Regulation	Reg_{load}	$V_{in} = 12\text{V}, 0.1 \leq I_o \leq I_{o,max}$	—	± 0.5	—	%
V_o Ripple/Noise	V_n	$V_{in} = 12\text{V}, I_o = I_{o,max}$	—	± 2.0	± 3.0	%
Transient Response with $C_2 = 100\mu\text{F}$	t_{tr} V_{os}	Load step from 50% to 100% $I_{o,max}$, $V_{in} = 12\text{V}$ V_o over/undershoot	—	200 1.0	—	μSec % V_o
Efficiency	η	$V_{in} = 12\text{V}, V_o = 12\text{V}, I_o = 1.5\text{A}$	—	83	—	%
Switching Frequency	f_o	Over V_{in} Range $0.1\text{A} \leq I_o \leq I_{o,max}$	—	550	—	kHz
Absolute Maximum Operating Temperature Range	T_a	Over V_{in} range	-40 (2)	—	$+85$ (3)	$^\circ\text{C}$
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	—	TBD	—	G's
Mechanical Vibration		Per Mil-STD-883D, Method 2007.2, 20-2000 Hz, Soldered in a PC board	—	TBD	—	G's
Weight	—	—	—	25	—	grams

- Notes:**
1. The regulator will operate down to no load with reduced specifications.
 2. For operating temperatures below 0°C , it is recommended that tantalum capacitors be used at both the input and output.
 3. See SOA curves, or contact the factory for derating guidelines.

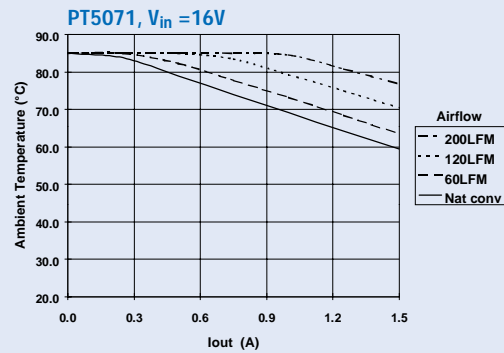
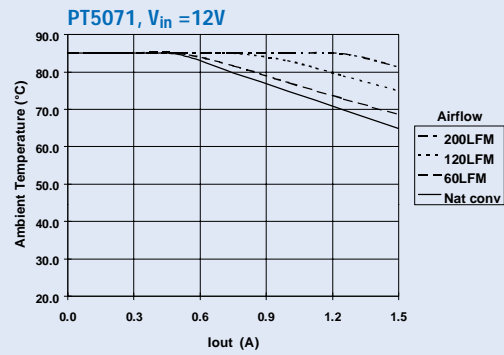
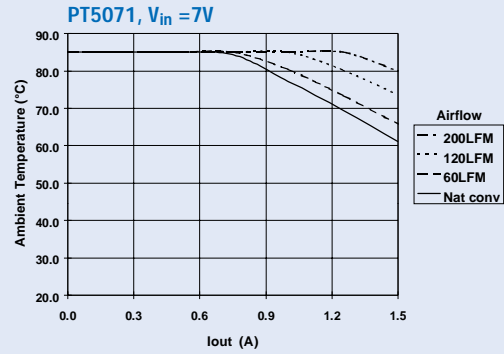
Input/Output Capacitors: The PT5071 regulator requires a 100 μF electrolytic capacitor at the input and output for proper operation in all applications. The ESR (equivalent series resistance) of both capacitors must be less than 250m Ω @100kHz. In addition, C_1 and C_2 must be rated to a minimum of 300mA rms ripple current.

1.5 Amp, 12V Step-Up/Step-Down Integrated Switching Regulator

PT5071 Performance, $V_o = 12V$ (See Note A)



Safe Operating Area Curves (See Note B)



Note A: All Characteristic data in the above graphs has been developed from actual products tested at 25°C. This data is considered typical data for the ISR.
 Note B: SOA curves represent operating conditions at which internal components are at or below manufacturer's maximum rated operating temperatures.

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
PT5071A	ACTIVE	SIP MOD ULE	EMF	14	10	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT5071C	ACTIVE	SIP MOD ULE	EMG	14	10	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT5071N	ACTIVE	SIP MOD ULE	EME	14	10	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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