



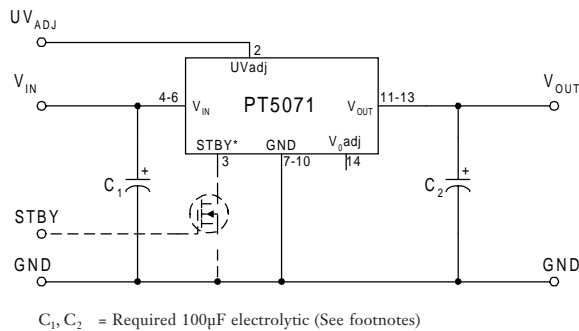
### Features

- 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

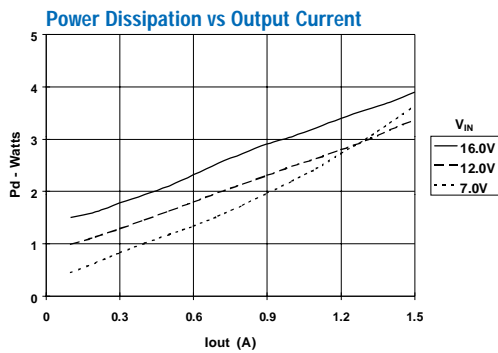
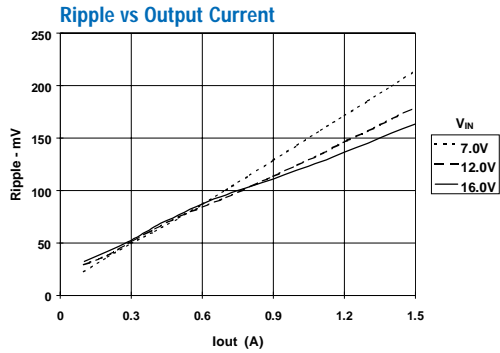
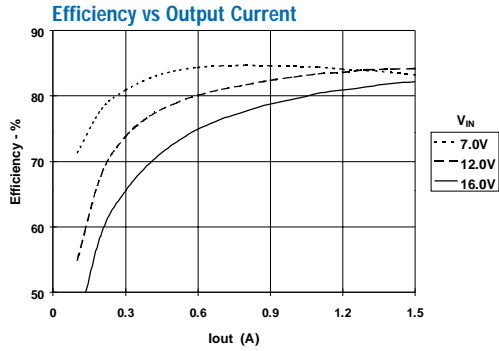
Characteristics ( $T_a = 25^\circ\text{C}$ unless noted)	Symbols	Conditions	PT5071			Units
			Min	Typ	Max	
Output Current	$I_o$	Over $V_{in}$ Range	0.1 (1)	—	1.5	A
Current Limit	$I_{lim}$	$V_{in} = 12\text{V}$	—	4.0	—	A
Input Voltage Range	$V_{in}$	$0.1\text{A} \leq I_o \leq I_{o,max}$	7.0	—	16.0	V
Output Voltage Tolerance	$\Delta V_o$	$V_{in} = 12\text{V}, I_o = I_{o,max}$ $-40^\circ\text{C} \leq T_a \leq +85^\circ\text{C}$	—	$\pm 1.0$	—	%
Output Voltage Adjust Range	$V_{o,adj}$		10	—	15	V
Line Regulation	$Reg_{line}$	Over $V_{in}$ Range, $I_o = I_{o,max}$	—	$\pm 0.5$	—	%
Load Regulation	$Reg_{load}$	$V_{in} = 12\text{V}, 0.1 \leq I_o \leq I_{o,max}$	—	$\pm 0.5$	—	%
$V_o$ Ripple/Noise	$V_n$	$V_{in} = 12\text{V}, I_o = I_{o,max}$	—	$\pm 2.0$	$\pm 3.0$	%
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	—	$\mu\text{Sec}$ % $V_o$
Efficiency	$\eta$	$V_{in} = 12\text{V}, V_o = 12\text{V}, I_o = 1.5\text{A}$	—	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  $0^\circ\text{C}$ , 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.

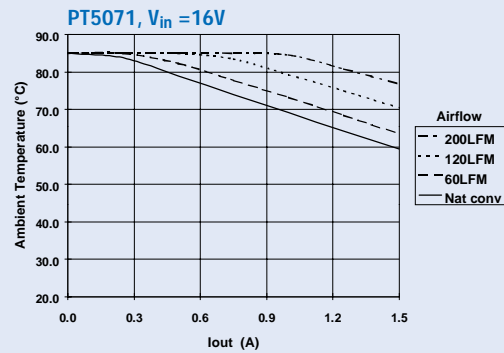
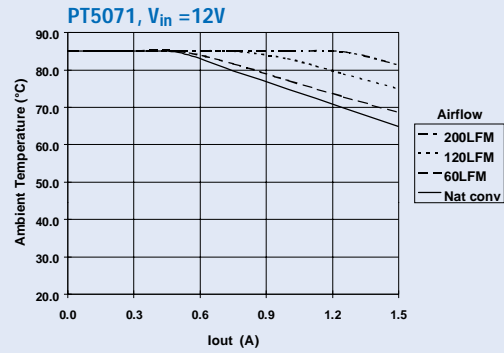
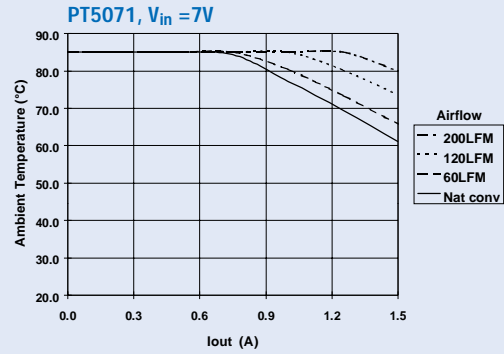
**Input/Output Capacitors:** The PT5071 regulator requires a 100 $\mu\text{F}$  electrolytic capacitor at the input and output for proper operation in all applications. The ESR (equivalent series resistance) of both capacitors must be less than 250m $\Omega$  @100kHz. In addition,  $C_1$  and  $C_2$  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 <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
PT5071A	NRND	SIP MOD ULE	EMF	14	10	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT5071C	NRND	SIP MOD ULE	EMG	14	10	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT5071N	NRND	SIP MOD ULE	EME	14	10	Pb-Free (RoHS)	Call TI	N / A for Pkg Type

<sup>(1)</sup> 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.

<sup>(2)</sup> 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)

<sup>(3)</sup> MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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