

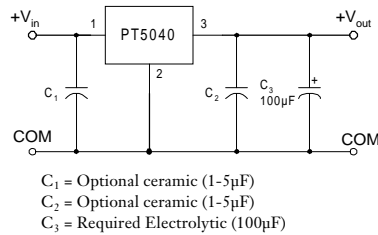
### Features

- Wide Input Voltage Range
- 85% Efficiency
- Internal Over-Temperature Protection
- Laser-trimmed Output Voltage
- Soft Start
- 5-Pin Mount Option (Suffixes L & M)

### Description

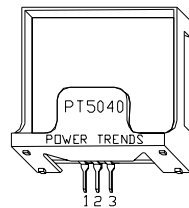
The PT5040 is a series of 3-pin boost-voltage Integrated Switching Regulators (ISRs). These ISRs are designed for use with +5V bus systems that require an additional regulated +8V to +20V with up to 1A of output current. These ISRs are packaged in the 3-pin, single in-line pin (SIP) package configuration.

### Standard Application



### Pin-Out Information

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



### Ordering Information

- PT5041□ = +12 Volts
- PT5042□ = +15 Volts
- PT5044□ = +8 Volts
- PT5045□ = +9 Volts
- PT5046□ = +10 Volts
- PT5047□ = +18 Volts
- PT5048□ = +12.6 Volts
- PT5049□ = +20 Volts

### PT Series Suffix (PT1234x)

Case/Pin Configuration	Order Suffix	Package Code*
Vertical	<b>N</b>	(EAD)
Horizontal	<b>A</b>	(EAA)
SMD	<b>C</b>	(EAC)
Horizontal, 2-pin Tab	<b>M</b>	(EAM)
SMD, 2-Pin Tab	<b>L</b>	(EAL)

\* Previously known as package styles 100/110.  
(Reference the applicable package code drawing for the dimensions and PC board layout)

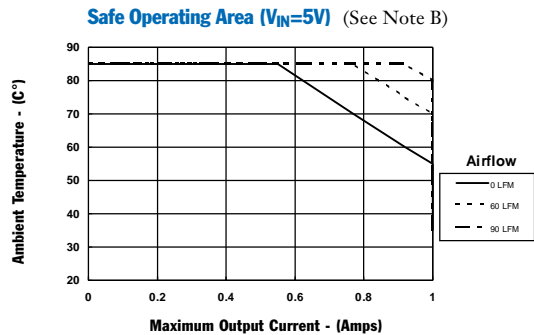
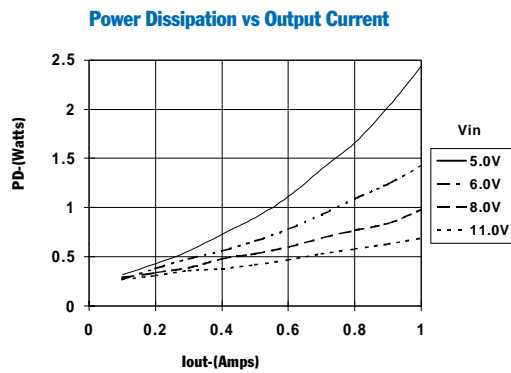
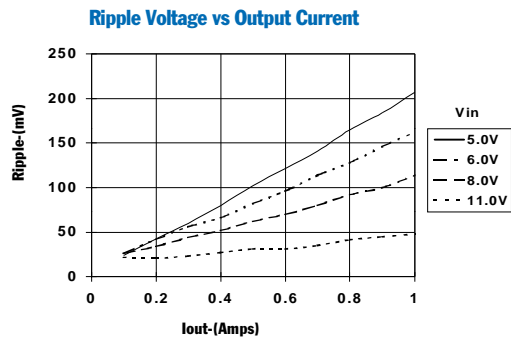
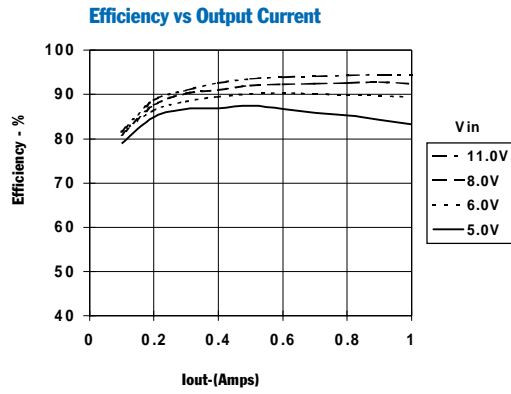
NOTE: Boost Topology ISRs are not Short-Circuit Protected.

### Specifications (Unless otherwise stated, $T_a = 25^\circ\text{C}$ , $V_{in} = 5\text{V}$ , $I_o = I_{o,max}$ , $C_3 = 100\mu\text{F}$ )

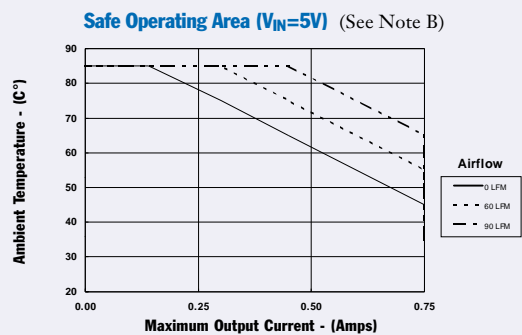
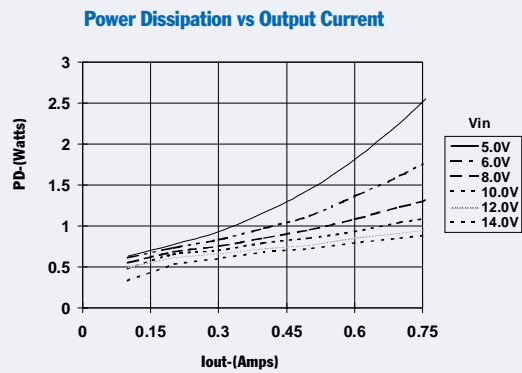
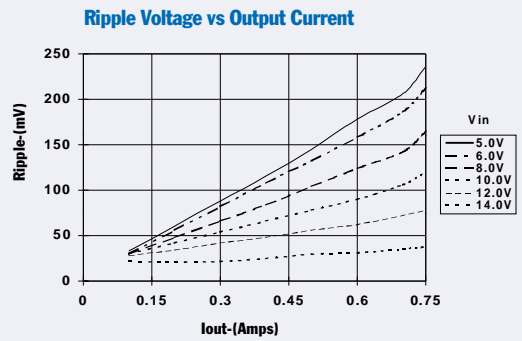
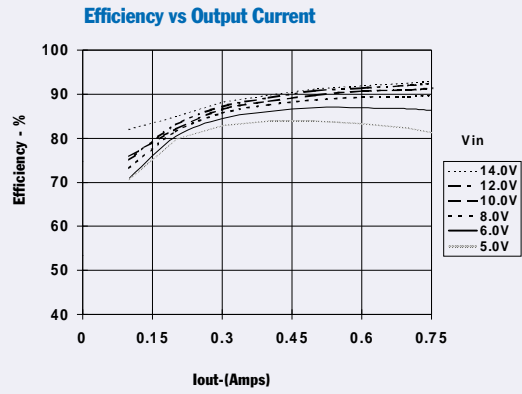
Characteristics	Symbol	Conditions	PT5040 SERIES			Units	
			Min	Typ	Max		
Output Current	$I_o$	Over $V_{in}$ range	PT5049	0.1 (1)	—	0.5	A
			PT5047	0.1 (1)	—	0.6	
			PT5041/48	0.1 (1)	—	1.0	
			PT5042	0.1 (1)	—	0.75	
			PT5044	0.1 (1)	—	1.5	
			PT5045/46	0.1 (1)	—	1.2	
Input Voltage Range	$V_{in}$	Over $I_o$ range	PT5047/5049	4.75	—	$(V_o - 1)$ 14	V
Output Voltage Tolerance	$\Delta V_o$	Over $V_{in}$ Range $T_a = -20^\circ\text{C}$ to SOA derating limit (3)	—	$\pm 1.5$	$\pm 3.0$	$\%V_o$	
Line Regulation	$Reg_{line}$	Over $V_{in}$ range	—	$\pm 0.5$	$\pm 1.0$	$\%V_o$	
Load Regulation	$Reg_{load}$	$I_{o,min} \leq I_o \leq I_{o,max}$	—	$\pm 0.5$	$\pm 1.0$	$\%V_o$	
Efficiency	$\eta$	$I_o = 0.5\text{A}$	—	85	—	%	
$V_o$ Ripple (pk-pk)	$V_r$	20MHz bandwidth	—	$\pm 2$	$\pm 5$	$\%V_o$	
Transient Response	$t_{tr}$ $V_{os}$	25% load change $V_o$ over/undershoot	—	500	—	$\mu\text{Sec}$	
			—	3.0	5.0	$\%V_o$	
Current Limit	$I_{lim}$	—	—	150 (2)	—	$\%I_{o,max}$	
Inrush Current	$I_{ir}$ $t_{ir}$	On start up	—	5.5 (3)	—	A	
			—	1	—	mSec	
Switching Frequency	$f_s$	Over $V_{in}$ and $I_o$ ranges	$V_o < 15\text{V}$	500	650	800	kHz
			$V_o \geq 15\text{V}$	650	800	950	
Operating Temperature Range	$T_a$	—	-20	—	+85 (4)	$^\circ\text{C}$	
Thermal Resistance	$\theta_{pa}$	Free Air Convection (40-60LFM)	—	40	—	$^\circ\text{C}/\text{W}$	
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, 20-2000 Hz	—	Suffixes N, A, & C Suffixes L & M	—	5	—	G's	
			—	20 (5)	—		
Weight	—	Suffixes N, A, & C Suffixes L & M	—	4.5	—	grams	
			—	6.5	—		

- Notes:**
- (1) The ISR will operate at no load with reduced specifications.
  - (2) Boost topology ISRs are not short circuit protected.
  - (3) The inrush current stated is above the normal input current for the associated output load.
  - (4) See Safe Operating Area curves or consult the factory for the appropriate derating
  - (5) The tab pins on the 5-pin mount package types (suffixes L & M) must be soldered. For more information see the applicable package outline drawing.

**PT5041, +12.0 VDC** (See Note A)



**PT5042, +15.0 VDC** (See Note A)



**Note A:** Characteristic data has been developed from actual products tested at 25°C. This data is considered typical data for the Converter.  
**Note B:** Thermal derating graphs are developed in free-air convection cooling, which corresponds to approximately 40–60LFM of airflow.

**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>
PT5041A	ACTIVE	SIP MOD ULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT5041C	ACTIVE	SIP MOD ULE	EAC	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT5041J	ACTIVE	SIP MOD ULE	EAJ	3	16	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT5041L	ACTIVE	SIP MOD ULE	EAL	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT5041M	ACTIVE	SIP MOD ULE	EAM	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT5041N	ACTIVE	SIP MOD ULE	EAD	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT5042A	ACTIVE	SIP MOD ULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT5042C	ACTIVE	SIP MOD ULE	EAC	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT5042L	ACTIVE	SIP MOD ULE	EAL	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT5042M	ACTIVE	SIP MOD ULE	EAM	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT5042N	ACTIVE	SIP MOD ULE	EAD	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT5044A	ACTIVE	SIP MOD ULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT5044C	ACTIVE	SIP MOD ULE	EAC	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT5044L	ACTIVE	SIP MOD ULE	EAL	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT5044M	ACTIVE	SIP MOD ULE	EAM	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT5044N	ACTIVE	SIP MOD ULE	EAD	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT5045A	ACTIVE	SIP MOD ULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT5045C	ACTIVE	SIP MOD ULE	EAC	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT5045L	ACTIVE	SIP MOD ULE	EAL	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT5046A	ACTIVE	SIP MOD ULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT5046C	ACTIVE	SIP MOD ULE	EAC	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT5046M	ACTIVE	SIP MOD ULE	EAM	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT5046N	ACTIVE	SIP MOD ULE	EAD	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT5047C	ACTIVE	SIP MOD ULE	EAC	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT5047H	ACTIVE	SIP MOD ULE	EAH	3	16	Pb-Free (RoHS)	Call TI	N / A for Pkg Type

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>
PT5047N	ACTIVE	SIP MOD ULE	EAD	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT5048A	ACTIVE	SIP MOD ULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT5048C	ACTIVE	SIP MOD ULE	EAC	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT5049A	ACTIVE	SIP MOD ULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT5049C	ACTIVE	SIP MOD ULE	EAC	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT5049L	ACTIVE	SIP MOD ULE	EAL	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT5049N	ACTIVE	SIP MOD ULE	EAD	3	35	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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