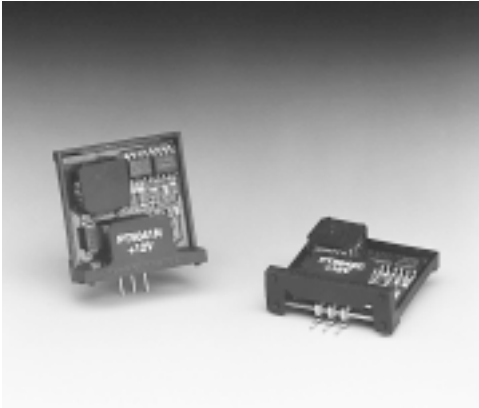


PT5040 Series

1-A Positive Step-up
Integrated Switching Regulator

SLTS026B

(Revised 12/19/2001)



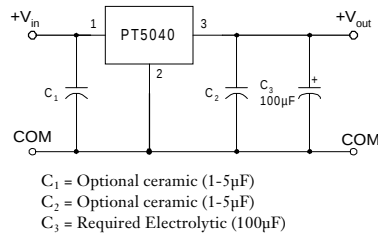
Features

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

Description

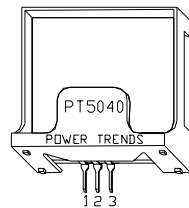
The PT5040 is a series of 3-pin boost-voltage Integrated Switching Regulators (ISRs). These ISRs are designed for use with +5V bus systems that require an additional regulated +8V to +20V with up to 1A of output current. These ISRs are packaged in the 3-pin, single in-line pin (SIP) package configuration.

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	N	(EAD)
Horizontal	A	(EAA)
SMD	C	(EAC)
Horizontal, 2-pin Tab	M	(EAM)
SMD, 2-Pin Tab	L	(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.

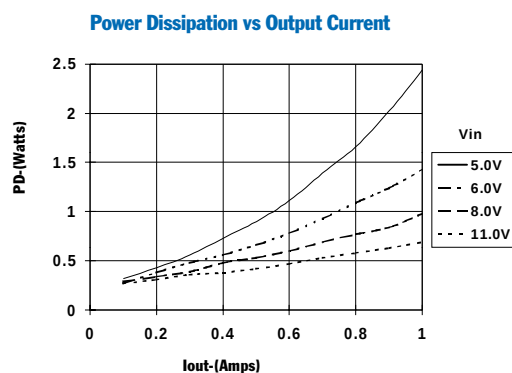
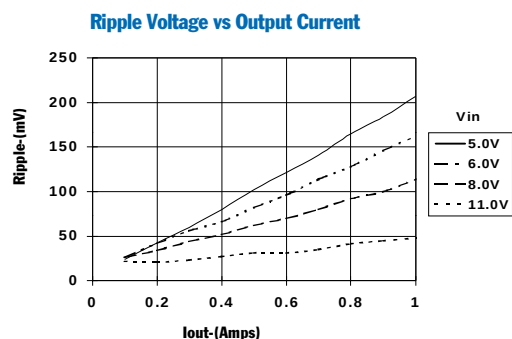
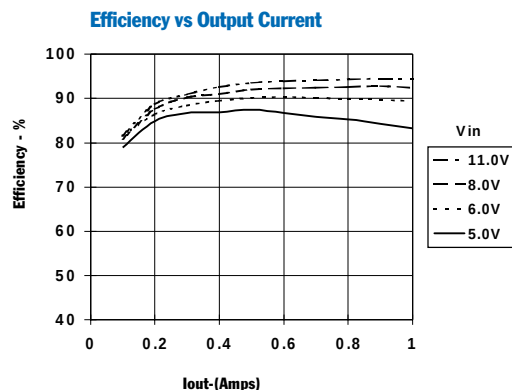
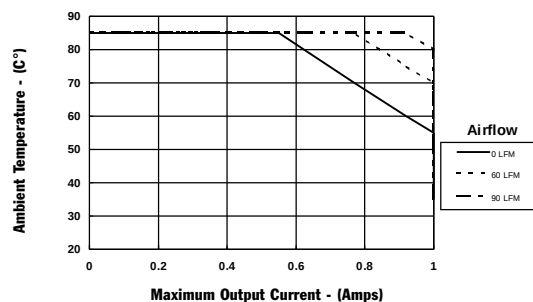
Specifications (Unless otherwise stated, T_a = 25°C, V_{in} = 5V, I_O = I_{Omax}, C₃ = 100µF)

Characteristics	Symbol	Conditions	PT5040 SERIES			Units
			Min	Typ	Max	
Output Current	I _O	Over V _{in} range	PT5049	0.1 (1)	—	0.5
			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
Output Voltage Tolerance	ΔV _O	Over V _{in} Range T _a = -20°C to SOA derating limit (3)	—	±1.5	±3.0	%V _O
Line Regulation	Reg _{line}	Over V _{in} range	—	±0.5	±1.0	%V _O
Load Regulation	Reg _{load}	I _{Omin} ≤ I _O ≤ I _{Omax}	—	±0.5	±1.0	%V _O
Efficiency	η	I _O = 0.5A	—	85	—	%
V _O Ripple (pk-pk)	V _r	20MHz bandwidth	—	±2	±5	%V _O
Transient Response	t _{tr} V _{os}	25% load change V _O over/undershoot	—	500	—	µSec
			—	3.0	5.0	%V _O
Current Limit	I _{lim}	—	—	150 (2)	—	%I _{Omax}
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 < 15V	500	650	800
			V _O ≥ 15V	650	800	950
Operating Temperature Range	T _a	—	—	-20	—	+85 (4)
Thermal Resistance	θ _{pa}	Free Air Convection (40-60LFM)	—	40	—	°C/W
Storage Temperature	T _s	—	—	-40	—	+125
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)	—	G's
Weight	—	Suffixes N, A, & C Suffixes L & M	—	4.5	—	grams
			—	6.5	—	grams

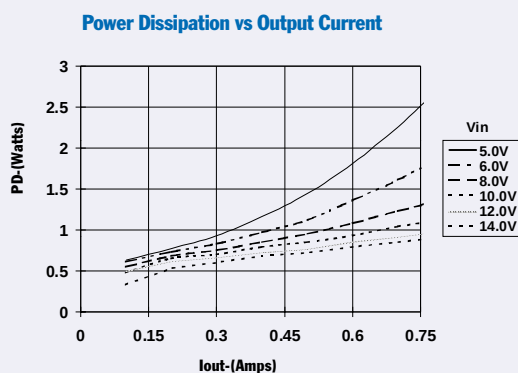
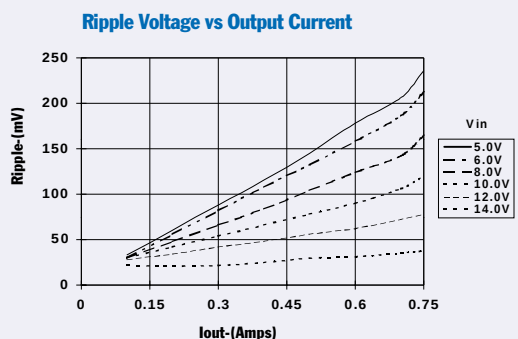
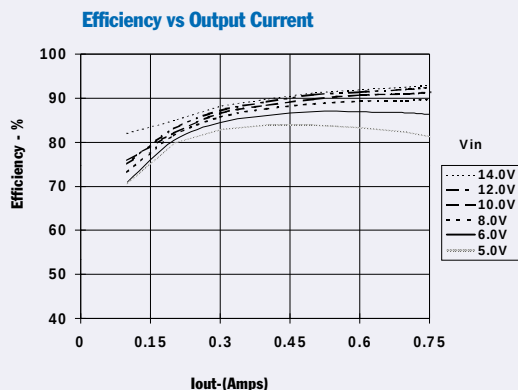
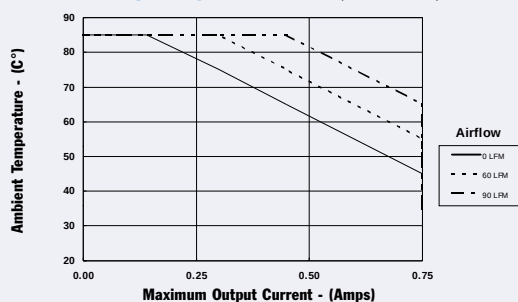
- Notes:**
- (1) The ISR will operate at no load with reduced specifications.
 - (2) Boost topology ISRs are not short circuit protected.
 - (3) The inrush current stated is above the normal input current for the associated output load.
 - (4) See Safe Operating Area curves or consult the factory for 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.

1-A Positive Step-up
Integrated Switching Regulator

PT5041, +12.0 VDC (See Note A)

**Safe Operating Area ($V_{IN}=5V$)** (See Note B)

PT5042, +15.0 VDC (See Note A)

**Safe Operating Area ($V_{IN}=5V$)** (See Note B)

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 40–60 LFM of airflow.

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/ Ball Finish	MSL Peak Temp ⁽³⁾	Samples (Requires Login)
PT5041A	NRND	SIP MODULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5041C	NRND	SIP MODULE	EAC	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM	
PT5041J	NRND	SIP MODULE	EAJ	3	16	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM	
PT5041L	NRND	SIP MODULE	EAL	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM	
PT5041M	NRND	SIP MODULE	EAM	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5041N	NRND	SIP MODULE	EAD	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5042A	NRND	SIP MODULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5042C	OBSOLETE	SIP MODULE	EAC	3		TBD	Call TI	Call TI	
PT5042L	NRND	SIP MODULE	EAL	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM	
PT5042M	NRND	SIP MODULE	EAM	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5042N	NRND	SIP MODULE	EAD	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5044A	NRND	SIP MODULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5044C	NRND	SIP MODULE	EAC	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM	
PT5044L	NRND	SIP MODULE	EAL	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM	
PT5044M	NRND	SIP MODULE	EAM	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5044N	NRND	SIP MODULE	EAD	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5045A	NRND	SIP MODULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5045C	NRND	SIP MODULE	EAC	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM	
PT5046A	NRND	SIP MODULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5046M	NRND	SIP MODULE	EAM	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5046N	NRND	SIP MODULE	EAD	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5047C	NRND	SIP MODULE	EAC	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM	
PT5047H	NRND	SIP MODULE	EAH	3	16	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5048A	NRND	SIP MODULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5048C	NRND	SIP MODULE	EAC	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM	
PT5049A	NRND	SIP MODULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5049C	NRND	SIP MODULE	EAC	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM	
PT5049N	NRND	SIP MODULE	EAD	3	35	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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