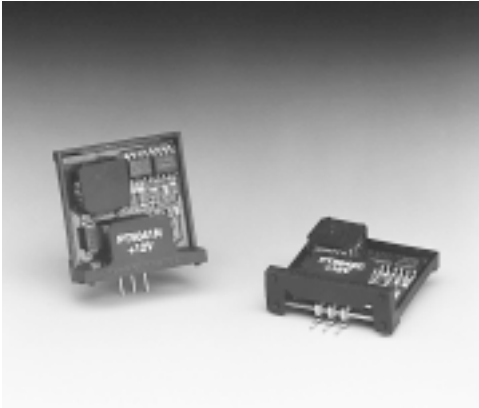


PT5040 Series

1-A Positive Step-up
Integrated Switching Regulator

SLTS026B

(Revised 12/19/2001)



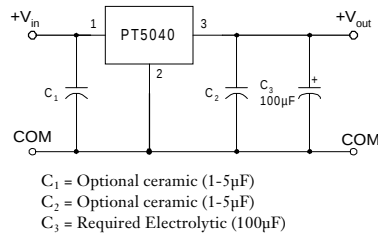
Features

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

Description

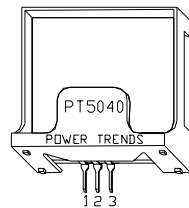
The PT5040 is a series of 3-pin boost-voltage Integrated Switching Regulators (ISRs). These ISRs are designed for use with +5V bus systems that require an additional regulated +8V to +20V with up to 1A of output current. These ISRs are packaged in the 3-pin, single in-line pin (SIP) package configuration.

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.

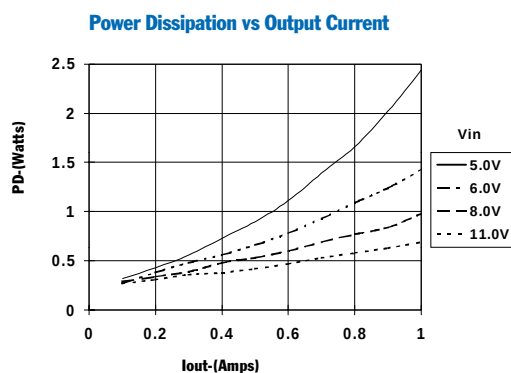
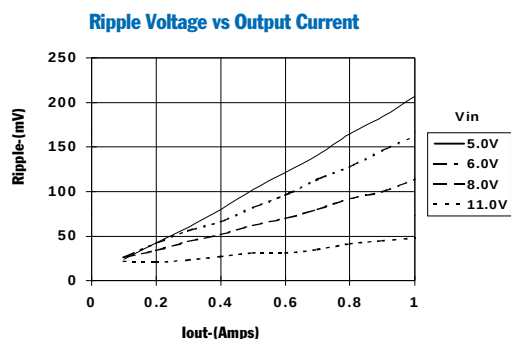
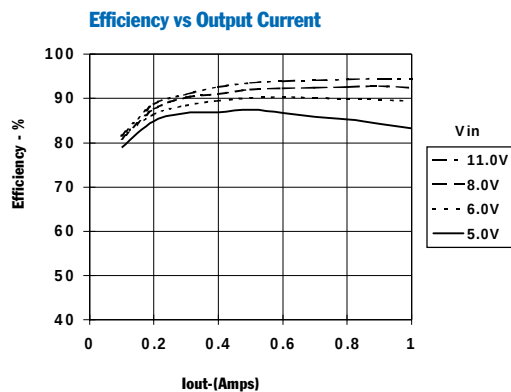
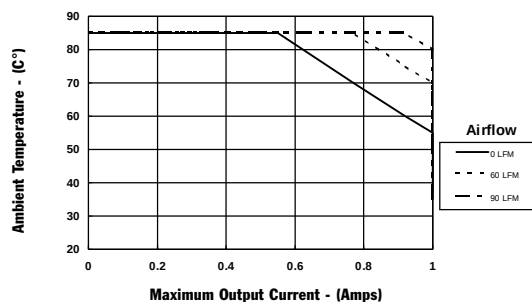
Specifications (Unless otherwise stated, $T_a = 25^\circ\text{C}$, $V_{in} = 5\text{V}$, $I_o = I_{o\text{max}}$, $C_3 = 100\mu\text{F}$)

Characteristics	Symbol	Conditions	PT5040 SERIES			Units
			Min	Typ	Max	
Output Current	I_o	Over V_{in} range	PT5049	0.1 (1)	—	0.5
			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 $T_a = -20^\circ\text{C}$ 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}	$I_{o\text{min}} \leq I_o \leq I_{o\text{max}}$	—	± 0.5	± 1.0	% V_o
Efficiency	η	$I_o = 0.5\text{A}$	—	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)	—	% $I_{o\text{max}}$
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
			$V_o \geq 15\text{V}$	650	800	950
Operating Temperature Range	T_a	—	—	-20	—	+85 (4)
Thermal Resistance	θ_{pa}	Free Air Convection (40-60LFM)	—	40	—	$^\circ\text{C/W}$
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

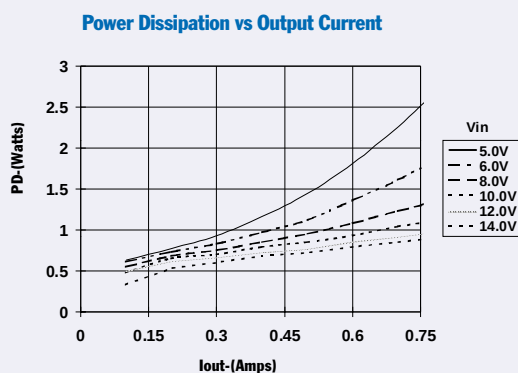
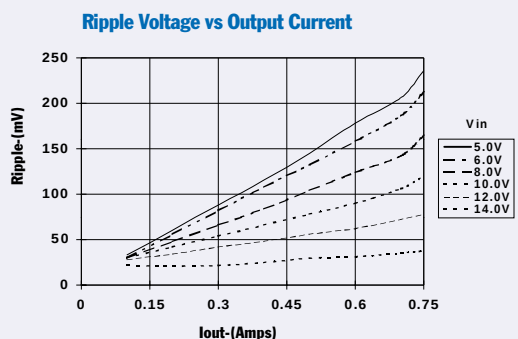
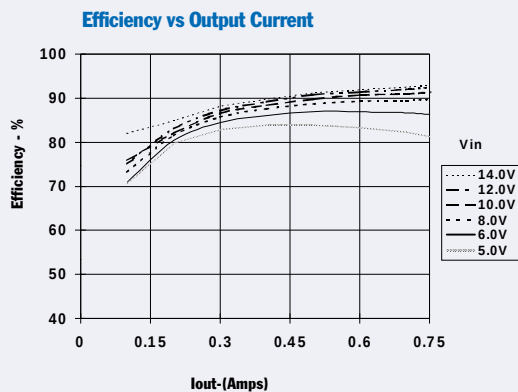
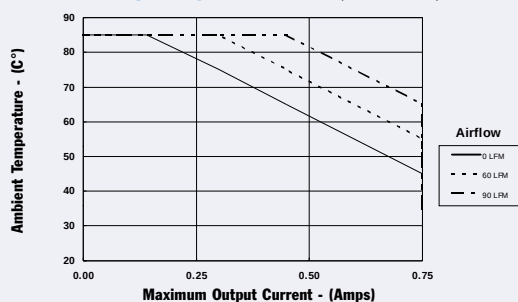
- Notes:**
- (1) The ISR will operate at no load with reduced specifications.
 - (2) Boost topology ISRs are not short circuit protected.
 - (3) The inrush current stated is above the normal input current for the associated output load.
 - (4) See Safe Operating Area curves or consult the factory for 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	LIFEBUY	SIP MODULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5041C	LIFEBUY	SIP MODULE	EAC	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM	
PT5041J	OBSOLETE	SIP MODULE	EAJ	3		TBD	Call TI	Call TI	
PT5041L	LIFEBUY	SIP MODULE	EAL	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM	
PT5041M	LIFEBUY	SIP MODULE	EAM	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5041N	LIFEBUY	SIP MODULE	EAD	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5042A	LIFEBUY	SIP MODULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5042L	LIFEBUY	SIP MODULE	EAL	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM	
PT5042M	LIFEBUY	SIP MODULE	EAM	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5042N	LIFEBUY	SIP MODULE	EAD	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5044A	LIFEBUY	SIP MODULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5044C	LIFEBUY	SIP MODULE	EAC	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM	
PT5044L	OBSOLETE	SIP MODULE	EAL	3		TBD	Call TI	Call TI	
PT5044M	LIFEBUY	SIP MODULE	EAM	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5044N	LIFEBUY	SIP MODULE	EAD	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5045A	LIFEBUY	SIP MODULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5045C	OBSOLETE	SIP MODULE	EAC	3		TBD	Call TI	Call TI	
PT5046A	OBSOLETE	SIP MODULE	EAA	3		TBD	Call TI	Call TI	
PT5046M	LIFEBUY	SIP MODULE	EAM	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Samples (Requires Login)
PT5046N	LIFEBUY	SIP MODULE	EAD	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5047C	LIFEBUY	SIP MODULE	EAC	3	35	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM	
PT5047H	LIFEBUY	SIP MODULE	EAH	3	16	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5048A	LIFEBUY	SIP MODULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5048C	OBSOLETE	SIP MODULE	EAC	3		TBD	Call TI	Call TI	
PT5049A	LIFEBUY	SIP MODULE	EAA	3	35	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	
PT5049C	OBSOLETE	SIP MODULE	EAC	3		TBD	Call TI	Call TI	
PT5049N	LIFEBUY	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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