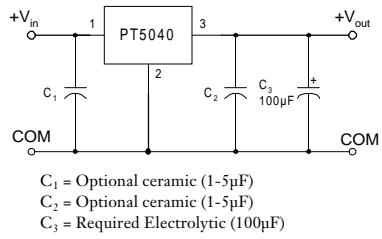


Standard Application



Features

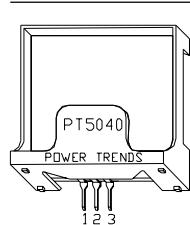
- Wide Input Voltage Range
- 85% Efficiency
- Internal Over-Temperature Protection
- Laser-trimmed Output Voltage
- Soft Start
- 5-Pin Mount Option (Suffixes L & M)

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.

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				
			Min	Typ	Max	Units	
Output Current	I_o	Over V_{in} range	PT5049 PT5047 PT5041/48 PT5042 PT5044 PT5045/46	0.1 (1) 0.1 (1) 0.1 (1) 0.1 (1) 0.1 (1) 0.1 (1)	— — — — — —	0.5 0.6 1.0 0.75 1.5 1.2	A
Input Voltage Range	V_{in}	Over I_o range	PT5047/5049	4.75 4.75	— —	($V_o - 1$) 14	V
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	R_{line}	Over V_{in} range	—	—	± 0.5 ± 1.0	% V_o	
Load Regulation	R_{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 3.0	— 5.0	μSec % V_o	
Current Limit	I_{lim}	—	—	150 (2)	—	% $I_{o\text{max}}$	
Inrush Current	I_{ir} t_{ir}	On start up	—	5.5 (3) 1	— —	A mSec	
Switching Frequency	f_s	Over V_{in} and I_o ranges	$V_o < 15\text{V}$ $V_o \geq 15\text{V}$	500 650 800	650 800 950	800 950	kHz
Operating Temperature Range	T_a	—	—	-20	—	+85 (4)	°C
Thermal Resistance	θ_{ja}	Free Air Convection (40-60LFM)	—	40	—	—	°C/W
Storage Temperature	T_s	—	—	-40	—	+125	°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 20 (5)	—	G's	
Weight	—	Suffixes N, A, & C Suffixes L & M	—	4.5 6.5	—	—	grams

Notes: (1) The ISR will operate at no load with reduced specifications.

(2) Boost topology ISRs are not short circuit protected.

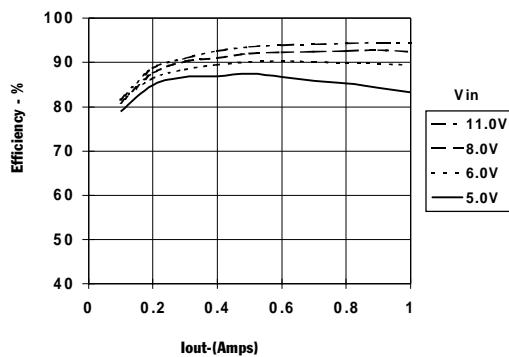
(3) The inrush current stated is above the normal input current for the associated output load.

(4) See Safe Operating Area curves or consult the factory for the appropriate derating.

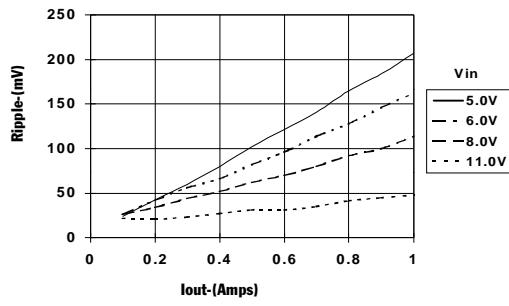
(5) The tab pins on the 5-pin mount package types (suffixes L & M) must be soldered. For more information see the applicable package outline drawing.

PT5041, +12.0 VDC (See Note A)

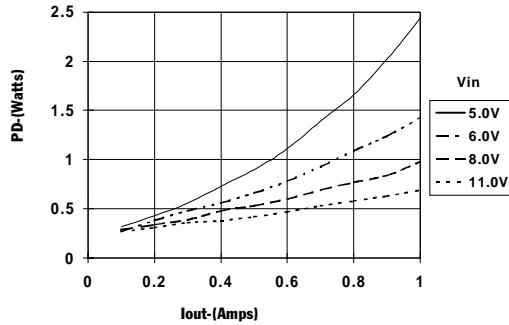
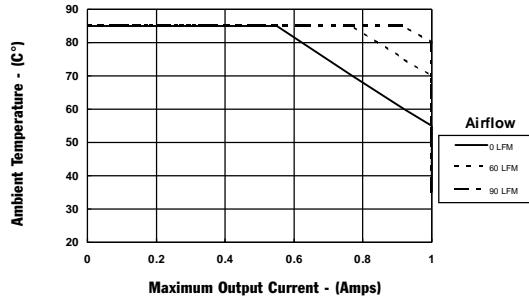
Efficiency vs Output Current



Ripple Voltage vs Output Current

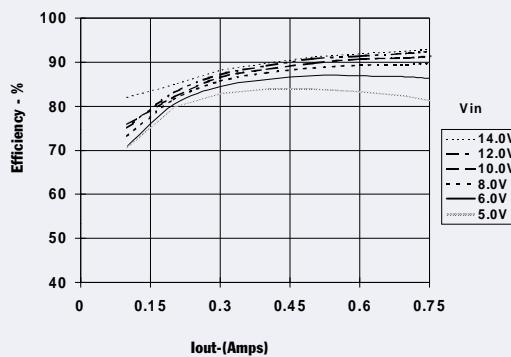


Power Dissipation vs Output Current

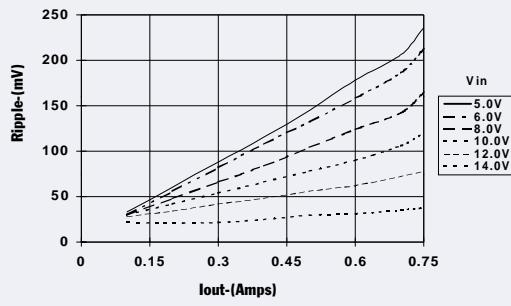
Safe Operating Area ($V_{IN}=5V$) (See Note B)

PT5042, +15.0 VDC (See Note A)

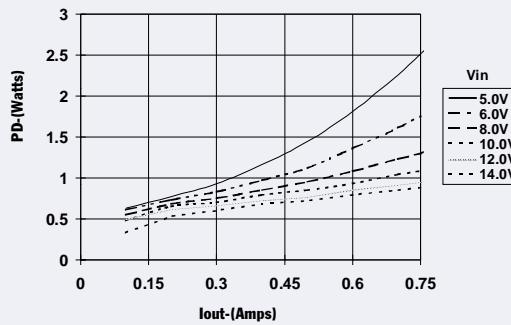
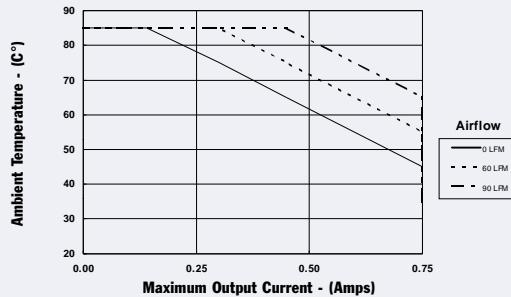
Efficiency vs Output Current



Ripple Voltage vs Output Current



Power Dissipation vs Output Current

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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