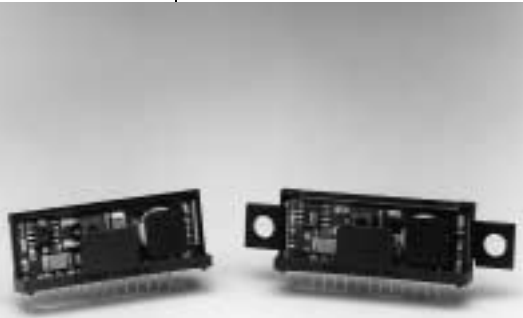


PT6200 Series

SLTS063

**2 AMP HIGH-PERFORMANCE ADJUSTABLE
ISR WITH ON/OFF CONTROL**

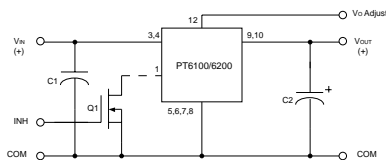


- 90% Efficiency
- Adjustable Output Voltage
- Internal Short Circuit Protection
- Over-Temperature Protection
- On/Off Control (Ground Off)
- Small SIP Footprint
0.36" x 1.64" x 0.60"(H)

The PT6200 Series is a line of High-Performance 2 Amp, 12-Pin SIP (Single In-line Package) Integrated Switching Regulators (ISRs) designed

to meet the on-board power conversion needs of battery powered or other equipment requiring high efficiency and small size. This high performance ISR family offers a unique combination of features combining 90% typical efficiency with open-collector on/off control and adjustable output voltage. Quiescent current in the shutdown mode is less than 100µA.

Standard Application

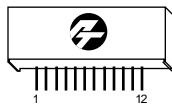


C₁ = Optional ceramic (1µF)
Q₁ = NFET
C₂ = Required 100µF electrolytic

Pin-Out Information

Pin No.	Function
1	Inhibit
2	N/C
3	V _{in}
4	V _{in}
5	GND
6	GND

Pin No.	Function
7	GND
8	GND
9	V _{out}
10	V _{out}
11	N/C
12	V _{out Adj}



Ordering Information

PT6202□ = +5 Volts

PT6203□ = +3.3 Volts

PT6204□ = +12 Volts
(For dimensions, see page 65.)

PT Series Suffix (PT1234X)

Case/Pin Configuration	Heat Tab Configuration	
	None	Side
Vertical Through-Hole	N	R
Horizontal Through-Hole	A	G
Horizontal Surface Mount	C	B

(See Thermal Application Notes on page 44 for heat tab application data.)

Specifications

Characteristics (T _a =25C unless note d)	Symbols	Conditions	PT6200 SERIES				
			Min	Typ	Max	Units	
Output Current	I _o	Over V _{in} range	0.1**	—	2.0	Amps	
Current Limit	I _{cl}	V _{in} = V _o + 5V	—	3.5	4.5	Amps	
Short Circuit Current	I _{sc}	V _{in} = V _o + 5V	—	5.0	—	Apk	
Input Voltage Range	V _{in}	0.1 ≤ I _o ≤ 2.0 Amp	V _o = 3.3V	7	—	26	VDC
			V _o = 5V	7.25	—	30	VDC
			V _o = 12V	14.5	—	30	VDC
Static Voltage Tolerance	V _o	Over V _{in} Range, I _o = 2.0 Amp T _A = -40° C to shutdown	—	±1.0	±2.0	%V _o	
Line Regulation	Reg _{line}	Over V _{in} range	—	±0.25	±0.5	%V _o	
Load Regulation	Reg _{load}	0.1 ≤ I _o ≤ 2.0 Amp	—	±0.25	±0.5	%V _o	
Ripple/Noise	V _n	V _{in} = V _o + 5V, I _o = 2.0 Amp	—	±2	—	%V _o	
Transient Response with C _o = 100µF	t _{tr}	50% load change	—	100	200	µSec	
	V _{os}	V _o over/undershoot	—	3.0	5.0	%V _o	
Efficiency	η	V _{in} =8V, I _o = 0.5 Amp, V _o = 3.3V V _{in} =8V, I _o = 0.5 Amp, V _o = 5V V _{in} =15V, I _o = 0.5 Amp, V _o = 12V	—	85	—	%	
			—	90	—	%	
			—	93	—	%	
Switching Frequency	f _o	Over V _{in} and I _o ranges, V _o = 3.3V V _o = 5V V _o = 12V	400	500	600	KHz	
			500	650	800	KHz	
			500	650	800	KHz	
Shutdown Current	I _{sc}	V _{in} = 15V	—	100	—	µAmp	
Quiescent Current	I _{nl}	I _o = 0A, V _{in} = 10V	—	10	—	mAmp	
Output Voltage Adjustment Range	V _o	Below V _o Above V _o	See Application Notes on page 40.				
Operating Temperature	T _A	Free Air Convection, (40-60LFM) 5V Over V _{in} and I _o ranges 12V	3.3V	-40	—	+85*	C
			5V	-40	—	+60*	
			12V	-40	—	*	
Thermal Resistance	θ _{JA}	Free Air Convection (40-60LFM)	V _o = 3.3V	—	25	—	C/W
			V _o = 5V	—	30	—	
			V _o = 12V	—	35	—	
Storage Temperature	T _s	—	-40	—	+125	C	
Mechanical Shock	—	Per Mil-STD-883D, Method 2002.3 Condition A, 1 msec, Half Sine, mounted to a fixture	—	—	500	G's	
Mechanical Vibration	—	Per Mil-STD-883D, Method 2007.2 Condition A, 20-2000 Hz	—	—	15	G's	
Weight	—	—	—	8.5	—	grams	
Relative Humidity	—	Non-condensing	0	—	95	%	

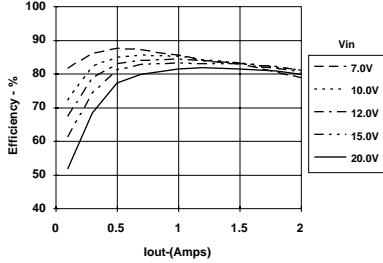
*See Thermal Derating chart. ** ISR will operate down to no load with reduced specifications.
Note: The PT6200 Series requires a 100µF electrolytic or tantalum output capacitor for proper operation in all applications.

C H A R A C T E R I S T I C D A T A

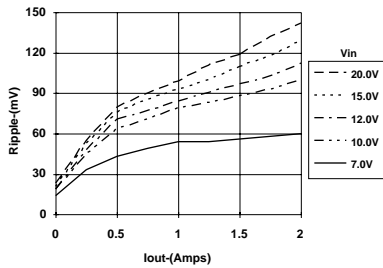
PT6203, 3.3 VDC

(See Note 1)

Efficiency vs Output Current

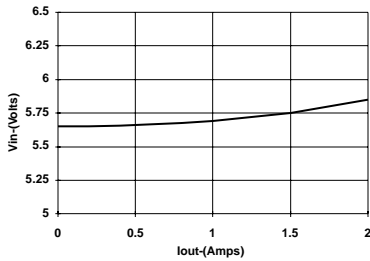


Ripple vs Output Current



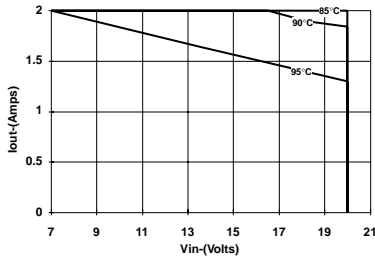
Minimum Input Voltage

(See Note 2)

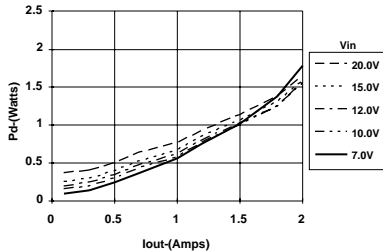


Thermal Derating (Ta)

(See Note 3)



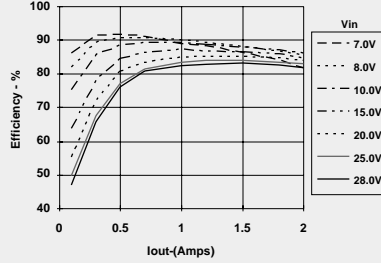
Power Dissipation vs Output Current



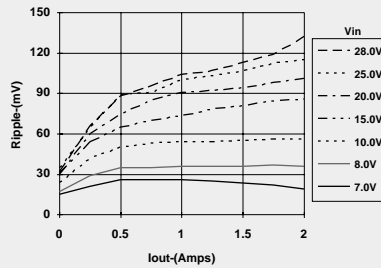
PT6202, 5.0 VDC

(See Note 1)

Efficiency vs Output Current

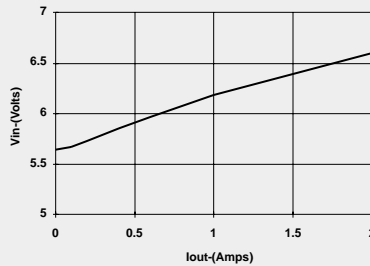


Ripple vs Output Current



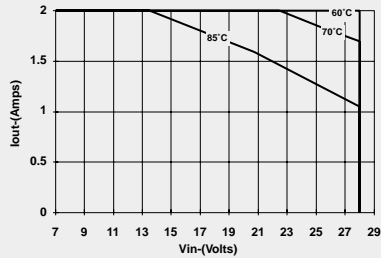
Minimum Input Voltage

(See Note 2)

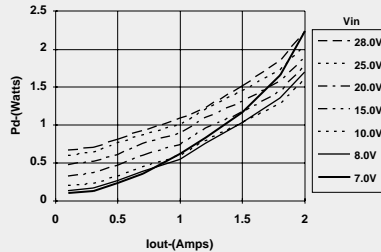


Thermal Derating (Ta)

(See Note 3)



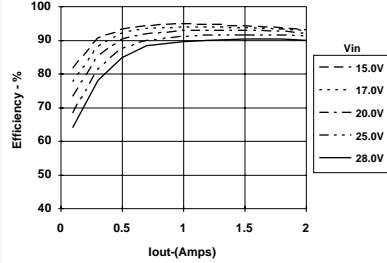
Power Dissipation vs Output Current



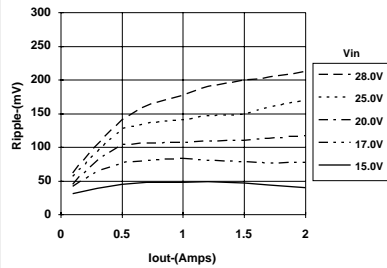
PT6204, 12.0 VDC

(See Note 1)

Efficiency vs Output Current

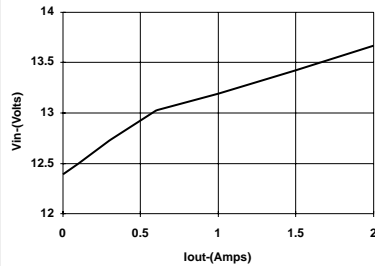


Ripple vs Output Current



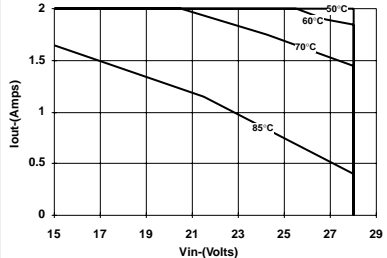
Minimum Input Voltage

(See Note 2)

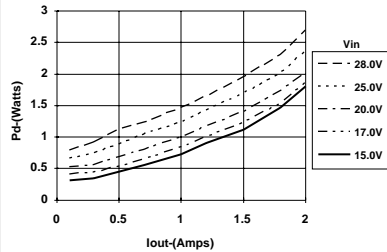


Thermal Derating (Ta)

(See Note 3)



Power Dissipation vs Output Current



Note 1: All data listed in the above graphs, except for derating data, has been developed from actual products tested at 25°C. This data is considered typical data for the ISR.

Note 2: Minimum Vin data is typical and is not guaranteed. The data corresponds to a 2% output voltage drop.

Note 3: Thermal derating graphs are developed in free air convection cooling of 40-60 LFM with no optional heat tab. (See Thermal Application Notes).

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
PT6202A	NRND	SIP MOD ULE	EBA	12	12	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT6202B	NRND	SIP MOD ULE	EBK	12	12	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT6202C	NRND	SIP MOD ULE	EBC	12	12	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT6202G	NRND	SIP MOD ULE	EBG	12	12	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT6202J	OBSOLETE	SIP MOD ULE	EBJ	12		TBD	Call TI	Call TI
PT6202N	NRND	SIP MOD ULE	EBD	12	12	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT6202R	NRND	SIP MOD ULE	EBE	12	12	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT6202S	OBSOLETE	SIP MOD ULE	EBF	12		TBD	Call TI	Call TI
PT6203A	NRND	SIP MOD ULE	EBA	12	12	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT6203C	NRND	SIP MOD ULE	EBC	12	12	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT6203H	OBSOLETE	SIP MOD ULE	EBH	12		TBD	Call TI	Call TI
PT6203N	NRND	SIP MOD ULE	EBD	12	12	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT6203R	NRND	SIP MOD ULE	EBE	12	12	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT6204A	NRND	SIP MOD ULE	EBA	12	12	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT6204B	NRND	SIP MOD ULE	EBK	12	12	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT6204C	NRND	SIP MOD ULE	EBC	12	12	Pb-Free (RoHS)	Call TI	Level-1-215C-UNLIM
PT6204G	NRND	SIP MOD ULE	EBG	12	12	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT6204H	OBSOLETE	SIP MOD ULE	EBH	12		TBD	Call TI	Call TI
PT6204J	OBSOLETE	SIP MOD ULE	EBJ	12		TBD	Call TI	Call TI
PT6204N	NRND	SIP MOD ULE	EBD	12	12	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT6204R	NRND	SIP MOD ULE	EBE	12	12	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
PT6204S	OBSOLETE	SIP MOD ULE	EBF	12		TBD	Call TI	Call TI

⁽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.

Important Information and Disclaimer:The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products		Applications	
Amplifiers	amplifier.ti.com	Audio	www.ti.com/audio
Data Converters	dataconverter.ti.com	Automotive	www.ti.com/automotive
DSP	dsp.ti.com	Broadband	www.ti.com/broadband
Interface	interface.ti.com	Digital Control	www.ti.com/digitalcontrol
Logic	logic.ti.com	Military	www.ti.com/military
Power Mgmt	power.ti.com	Optical Networking	www.ti.com/opticalnetwork
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
Low Power Wireless	www.ti.com/lpw	Telephony	www.ti.com/telephony
		Video & Imaging	www.ti.com/video
		Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments
Post Office Box 655303 Dallas, Texas 75265