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Texas Instruments
PT6202N

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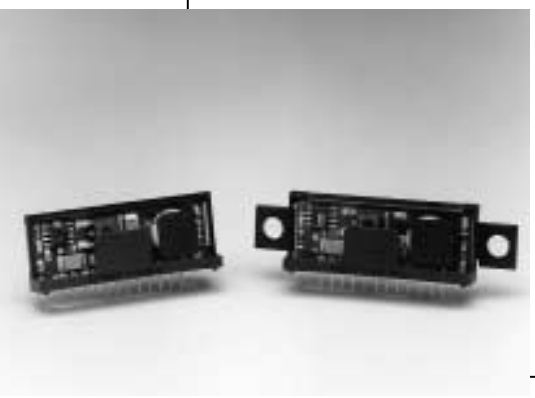
PT6200 Series

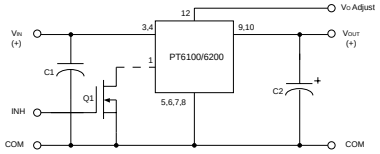
2 AMP HIGH-PERFORMANCE ADJUSTABLE ISR WITH ON/OFF CONTROL



- 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

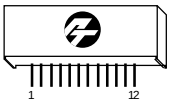


C_1 = Optional ceramic (1µF)
Q_1 = NFET
C_2 = Required 100µF electrolytic

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 V_o = 5V V_o = 12V	7 7.25 14.5	— — —	26 30 30	VDC VDC 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} V_{os}	50% load change V_o over/undershoot		— —	100 3.0	200 5.0	µSec %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	400 500 500	500 650 650	600 800 800	KHz KHz 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) Over V_{in} and I_o ranges	3.3V 5V 12V	-40 -40 -40	— — —	+85* +60* *	C
Thermal Resistance	θ_{JA}	Free Air Convection (40-60LFM)	V_o = 3.3V V_o = 5V V_o = 12V	— — —	25 30 35	— — —	C/W
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.*

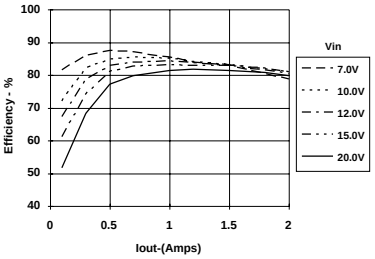
Power Trends, Inc. 27715 Diehl Road, Warrenville, IL 60555 **(800) 531-5782** Fax: (630) 393-6902

CHARACTERISTIC DATA

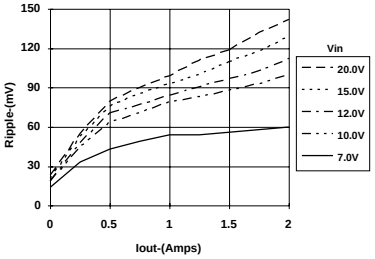
PT6203, 3.3 VDC

(See Note 1)

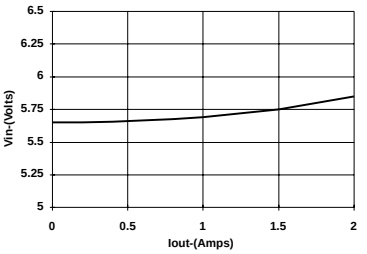
Efficiency vs Output Current



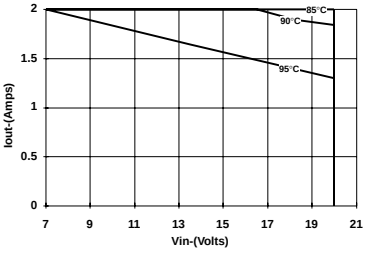
Ripple vs Output Current



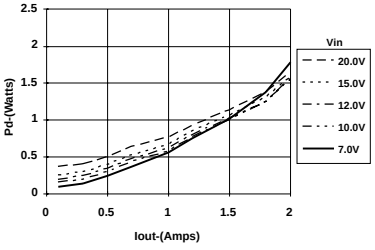
Minimum Input Voltage (See Note 2)



Thermal Derating (T_a) (See Note 3)



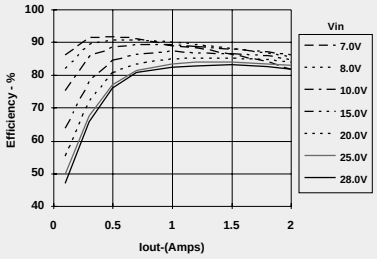
Power Dissipation vs Output Current



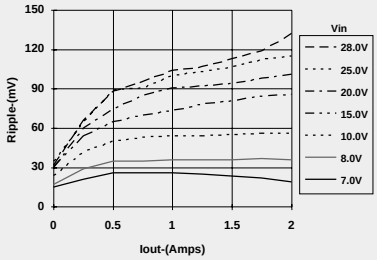
PT6202, 5.0 VDC

(See Note 1)

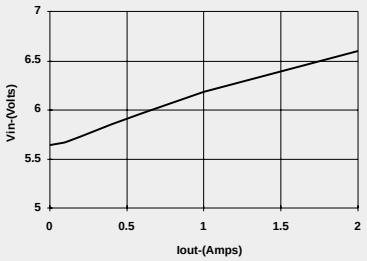
Efficiency vs Output Current



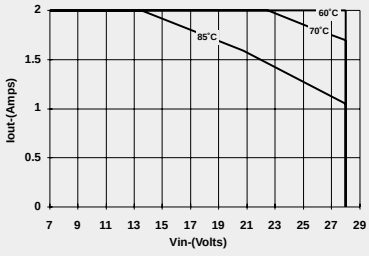
Ripple vs Output Current



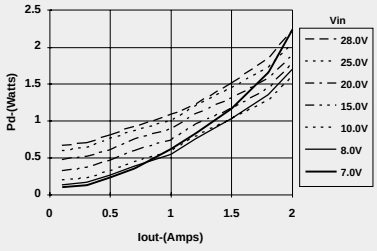
Minimum Input Voltage (See Note 2)



Thermal Derating (T_a) (See Note 3)



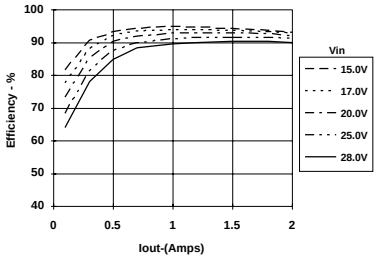
Power Dissipation vs Output Current



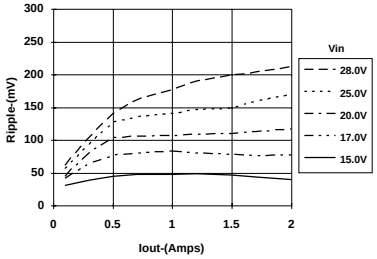
PT6204, 12.0 VDC

(See Note 1)

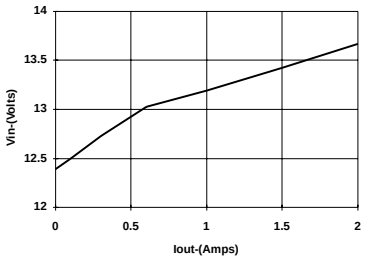
Efficiency vs Output Current



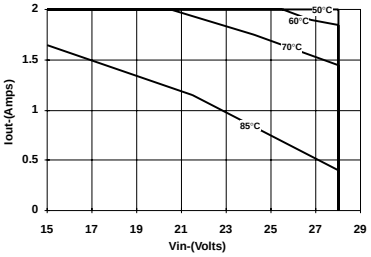
Ripple vs Output Current



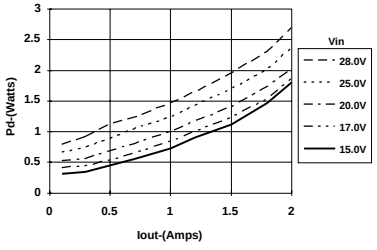
Minimum Input Voltage (See Note 2)



Thermal Derating (T_a) (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 V_{in} 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).*

PACKAGE OPTION ADDENDUM

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
PT6204A	NRND	SIP MOD ULE	EBA	12	12	Pb-Free (RoHS)	Call TI	N / A for Pkg Type
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.

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