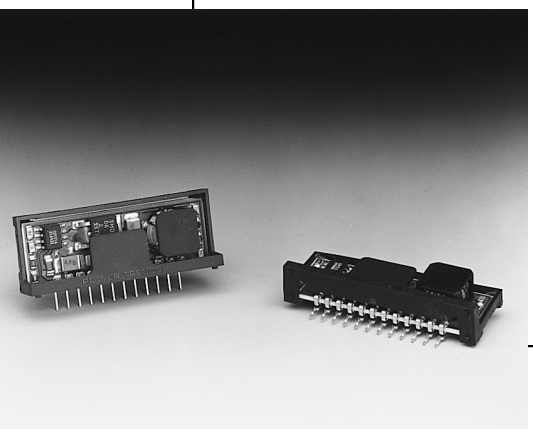
PT6310 Series

2 AMP ADJUSTABLE POSITIVE STEP-DOWN INTEGRATED SWITCHING REGULATOR

SLTS076
(Revised 8/17/99)

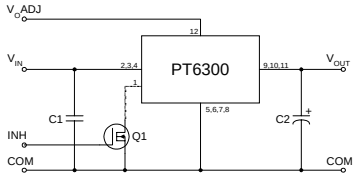


- 87% Efficiency
- Adjustable Output Voltage
- Internal Short Circuit Protection
- Over-Temperature Protection
- On/Off Control (Ground Off)
- Small SIP Footprint
- Wide Input Range

The PT6310 series is a High-Performance 2 Amp, 12-Pin SIP (Single In-line Package) Integrated Switching Regulator (ISR) 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 offers a unique combination of features combining 87% typical efficiency with open-collector on/off control and adjustable output voltage.

Quiescent current in the shutdown mode is typically less than 100µA.

Standard Application



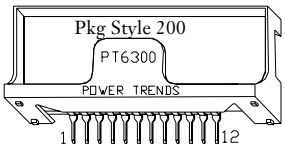
C_1 = Optional 1µF ceramic
C_2 = Required 100µF electrolytic
Q_1 = NFET

Pin-Out Information

Pin	Function
1	Inhibit (30V max)
2	V_{in}
3	V_{in}
4	V_{in}
5	GND
6	GND
7	GND
8	GND
9	V_{out}
10	V_{out}
11	V_{out}
12	V_{out} Adj

Ordering Information

PT6310☐ = +14.6 Volts
PT6311☐ = +15.5 Volts
PT6312☐ = +15.0 Volts
PT6313☐ = +8.0 Volts



PT Series Suffix (PT1234X)

Case/Pin Configuration	
Vertical Through-Hole	N
Horizontal Through-Hole	A
Horizontal Surface Mount	C

Specifications

Characteristics (T_a = 25°C unless noted)	Symbols	Conditions	PT6310 Series Min	Typ	Max	Units
Output Current	I_o	Over V_{in} range	0.1*	—	2.0	A
Short Circuit Current	I_{sc}	$V_{in} = V_o + 5V$	—	5.0	—	Apk
Input Voltage Range	V_{in}	$0.1 \le I_o \le 2.0$ A	$V_o + 4$	—	38**	V
Output Voltage Tolerance	ΔV_o	Over V_{in} Range, I_o = 2.0 A T_a = 0°C to +60°C	—	±1.0	±2.0	$\%V_o$
Line Regulation	Reg_{line}	Over V_{in} range	—	±0.25	±0.5	$\%V_o$
Load Regulation	Reg_{load}	$0.1 \le I_o \le 2.0$ A	—	±0.25	±0.5	$\%V_o$
V_o Ripple/Noise	V_n	$V_{in} = V_{in}$ min, I_o = 2.0A	—	±2	—	$\%V_o$
Transient Response with C_o = 100µF	t_{tr} V_{os}	50% load change V_o over/undershoot	— —	100 5.0	200 —	µSec $\%V_o$
Efficiency	η	V_{in}=24V, I_o = 2.0 A	—	87	—	%
Switching Frequency	f_o	Over V_{in} and I_o ranges PT6312 only	600 500	700 550	800 600	kHz kHz
Shutdown Current	I_{sc}	V_{in} = 15V	—	100	—	µA
Quiescent Current	I_{nl}	I_o = 0A, V_{in} =10V	—	10	—	mA
Output Voltage Adjustment Range	V_o	Below V_o Above V_o	See Application Notes.			
Absolute Maximum Operating Temperature Range	T_a		-40	—	+85	°C
Recommendated Operating Temperature Range	T_a	Free Air Convection, (40-60LFM) At V_{in} = 18V, I_o = 2.0A	-40	—	+70	°C
Thermal Resistance	θ_{ja}	Free Air Convection (40-60LFM)	—	30	—	°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, Method 2007.2, 20-2000 Hz,Soldered in a PC board	—	10	—	G's
Weight	—	—	—	6.5	—	grams

* ISR will operate to no load with reduced specifications.

** Input voltage cannot exceed 30V when the inhibit function is used.

Note: *The PT6310 requires a 100µF electrolytic or tantalum output capacitor for proper operation in all applications.*

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)
PT6311N	ACTIVE	SIP MODULE	EBD	12	12	TBD	Call TI	Level-1-215C-UNLIM
PT6312B	ACTIVE	SIP MODULE	EBK	12	12	TBD	Call TI	Level-1-215C-UNLIM
PT6312N	ACTIVE	SIP MODULE	EBD	12	12	TBD	Call TI	Level-1-215C-UNLIM
PT6312R	ACTIVE	SIP MODULE	EBE	12	12	TBD	Call TI	Level-1-215C-UNLIM
PT6313A	ACTIVE	SIP MODULE	EBA	12	12	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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