PRODUCT INFORMATION

Vol. 83

Intelligent Power Device for Power-Saving Switched Power Supplies Developed

Industry's first three output mode monolithic IC features a minimum standby power of 0.1 W.

TND745B5

Overview

With energy saving and environmental protection being of increasing concern around the world, one area of concern that is close at hand is reducing the power consumed by electric appliances used in homes. In particular, the power consumption when these devices are turned off, that is, when they are in the standby state, is said to account for more than 10% of their power consumption.

Sanyo has now developed the TND745B5 ExPD (Excellent Power Device) for use in switched power supplies that support reduced standby mode power consumption as an extension to Sanyo's ECoP (Environmentally Considered Products) series that provide all of Sanyo's basic transistor concepts, namely light weight, high speed, saved power, and environmental consideration.

The TND745B5 can implement, with just one chip, a PWM (Pulse Width Modulation) control power supply for both standby and normal operating modes. In particular, the TND745B5 does not need the sub-power supply, which was previously required to reduce power consumption in standby mode. This means that it is possible to implement a power supply that supports reduced standby mode power consumption with little need to worry about increased costs or larger circuit areas.

This product also incorporates Sanyo's energy-saving multifunction feature that allows power devices to support a wide range of applications that require standby power in the equipment design specifications. Since the TND745B5 can support a wide range of standby mode power levels, from 0.1 W, the industry's lowest level, to a maximum of 3 W, it provides a wide range of latitude for the designer.

Sanyo's power saving multifunction feature refers to a function that allows applications to use one of the following two modes according to the power required during standby, in addition to normal output mode. Thus applications can select from one of three output modes to match the needs of the equipment design.

Standby mode 1: When between 1 and 3 W are required in standby mode.

This mode reduces switching loss to 1/5 of that in normal operation by switching the oscillator frequency from the 105 kHz used in normal mode to 20 kHz.

Standby mode 2: When between .1 and 1.0 W are required in standby mode.

In this mode, the oscillator is operated intermittently while providing the standby mode oscillator frequency of 20 kHz. Although a zener diode is typically used to smooth the output voltage in this mode, until now it has been difficult to create power supplies with good efficiency characteristics due to the large power loss associated with this method.

Sanyo has now developed a unique control system that allows a feedback signal from the load circuit to be input to the soft start pin. This allows the output voltage to be smoothed using intermittent oscillation, and at the same time allows unnecessary standby mode power to be minimized. As a result, this device can not only implement a 0.1 W low-power standby mode function, but it can also at the same time create a power supply circuit with excellent efficiency. (Sanyo has applied for a patent on this technology.)

Furthermore, although the noise problem has been seen as a serious issue for earlier PWM control circuits, this device achieves low noise characteristics equivalent to those of RCC (ring choke converter) circuits by optimizing the circuit constants used.

The TND745B5 is optimal for power supplies in domestic (Japan) 40 W class electrical products, such as video decks, TVs, monitors, printers, facsimile units, and home electronic games. Sanyo plans to develop and manufacture a series of similar products that can handle the different input voltages and output power levels used around the world so that this technology can contribute to energy savings in home appliances around the world.

Features

- Power saving multifunction feature allows applications to select one of two standby modes according to the standby power required.

  Standby mode 1: Frequency switching

  Standby mode 2: Frequency switching + intermittent oscillator operation + soft start
- High efficiency and low noise PWM control achieved by drive circuit parameter optimization.

  High efficiency: Maximum efficiency of over 80%

  Low noise: Noise levels equivalent to those achieved by RCC circuits.
- Miniature package: TO-220-5H
- Full complement of protection functions

  Overcurrent protection, thermal protection, overvoltage protection, and soft start circuit

• High voltage handling capacity power MOSFET and PWM control circuit implemented on a single monolithic chip.

Specifications

Parameter	Symbol	Ratings
Drain voltage	VD	400 V
On resistance	RDS (on)	1.8 Ω (Typical value)
Oscillator frequency	Fosco	105 kHZ (Typical value)
IC protection current control	OCL	3.5 A (Typical value)
Shunt regulator voltage	VREG	5.9 V (Typical value)
Package		TO-220-5H

ample Availability

Sample of the TND745B5 will be available early in August 1999; production quantities will be anticipated in the end of 1999.

JULY 21, 1999

PRODUCT INFORMATION

- Any and all SANYO products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your SANYO representative nearest you before using any SANYO products described or contained herein in such applications.
- SANYO assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all SANYO products described or contained herein.
- Specifications of any and all SANYO products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.
- SANYO Electric Co., Ltd. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all SANYO products (including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.
-
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the SANYO product that you intend to use.
- Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.