PRODUCT INFORMATION

Vol. 58

Low On-Resistance Power MOSFET Series Developed

Devices that Achieve the Industry's Lowest On Resistance in a TSSOP8 Package

CPH6403, FTD2011, FW231, FSS237

Overview

The trends towards increased functionality, miniaturization, thinner form factors, and lighter weight in portable battery-operated equipment such as portable telephones and portable information-processing terminals are accelerating. As a result, power management and high power conversion efficiencies are becoming increasingly important in power devices to provide longer battery life, high functionality, and reduced costs in battery driven systems. Accordingly, while miniaturization and thinner form factors are desired in the power devices used in this equipment, there is the problem that the on resistance increases as the size of the package used for these devices is reduced, and as a result of that the devices can no longer provide the performance required by the equipment. Thus there are strong desires for power MOSFETs that provide a low on resistance yet are provided in a miniature, thin form factor package.

Due to Sanyo's concern for the environment, Sanyo has developed and is now releasing a series of ultralow on-resistance MOSFET devices that achieve both the industry's lowest on resistance as well as miniaturization and a reduced thickness form factor. We have named our environmentally-friendly products, which include the low-saturation bipolar transistors announced previously, the ECoP Series (Environmentally Considered Product Series) and plan to continue to expand this series in the future.

The products of this release achieve an integration density that would be impossible with the earlier planar-type transistors by adopting a submicron-precision trench structure. The trench structure has the inherent problem that the capacity to resist gate breakdown is reduced by attempts to achieve a low gate drive voltage. Sanyo achieves low drive voltages and higher withstand voltages by using a Sanyo-developed highly reliable gate oxide layer formation technology and by integrating bidirectional Zener diodes between the gate and the source. At the same time as increasing the cell integration density to 25,000,000 cells per square inch, we also achieved a 45% reduction in the on resistance, resulting in an ultralow on resistance that would have been impossible with a planar structure by optimizing the profile design. We were also able to prevent the operation of parasitic bipolar transistors by reducing the feature size in the unit cell and by optimizing the profile design. This allowed us to achieve a significant increase in the withstand voltage to avalanche in these devices.

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To respond to user needs, this product series includes three package types: CPH, TSSOP8 and SOP8, and each of these achieves the industry's lowest on resistance for its class. In particular, the FTD2011 (TSSOP8) achieves an on resistance reduced by 15% over that of the industry's best previously announced product.

The CPH6403 includes the chip with the best low on-resistance performance in a Sanyo CPH (ECoP) package. The CPH is a Sanyo-original miniature high-power surface mounting package. This package significantly increases the flexibility in wiring design in end products and achieves miniaturization and reduced thickness in power devices.

The FTD2011 product includes the chip with the best low on-resistance performance in a TSSOP8 package. This package provides further miniaturization beyond that of the earlier SOP8 package, in particular, achieving a 33% reduction in the mounting area.

The FSS237 (single) and the FW231 (dual) products provide an on resistance reduced to 1/2 that of earlier SOP8 package products and thus can reduce power dissipation by 1/2 without modifying the end product printed circuit board.

Features

- Ultralow on resistance achieved
- Low drive voltage and high withstand voltage achieved
- High avalanche withstand voltage

Specification

Type No	VDSS (V)	ID (A)	PD (W)	RDSon at V_{GS} = 4V typ / max (mΩ)	RDSon at V_{GS} = 2.5V typ / max (mΩ)	Structure	Package
CPH6403	20	6	1.6	25/33	35/48	Nch single	CPH6
FTD2011	20	5	1.3	22/28	30/40	Nch dual	TSSOP8
FW231	20	9	1.7	15/20	20/27	Nch dual	SOP8
FSS237	20	14	2.0	6.5/9	9/12	Nch single	SOP8

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Sample Availability

Samples of the CPH6403, FTD2011, FW231, FSS237 are available in April 1998; production quantities will be anticipated in October 1998.

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