Highlights

Semiconductor and Storage Products

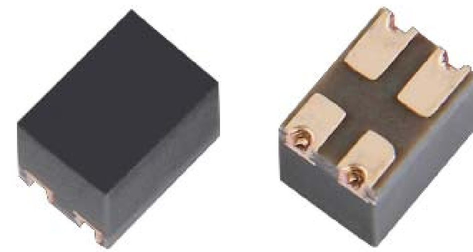
TLP3440S Photorelay in Ultrasmall S-VSON4 Package for High-Frequency Signal Transmission

Toshiba Electronic Devices & Storage Corporation released the TLP3440S, a photorelay in the industry's smallest S-VSON4 package(*), in September 2017. The S-VSON4 package has a 22.5% smaller footprint than the previous VSON4 package designed for tester applications. In addition, the TLP3440S provides an extended operating temperature range of up to 110°C, compared with the 85°C maximum operating temperature supported by conventional photorelays.

We offer a lineup of photorelays in the S-VSON4 package. The TLP3406S, TLP3407S, and TLP3409S are capable of switching 1.5 A at 30 V, 1 A at 60 V, and 0.65 A at 100 V, respectively, while the TLP3475S provides reduced insertion loss for high-frequency signal transmission.

The TLP3440S, a new addition to our photorelay portfolio, incorporates a lateral metal-oxide semiconductor field-effect transistor (MOSFET) with low output capacitance (C_{OFF}) to reduce the leakage current that occurs when a high-frequency signal is applied in the off state. The new photorelay helps to reduce the size of tester boards and increase the number of on-board photorelays.

(*) As of November 2017 for photorelays (as researched by Toshiba Electronic Devices & Storage Corporation)



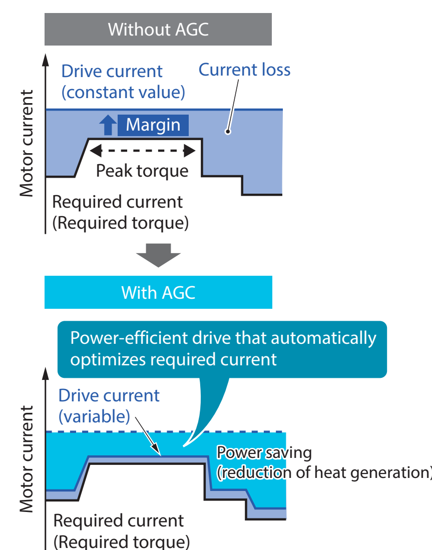
TLP3440S photorelay for high-frequency signal applications with small mounting area

Next-Generation Stepping Motor Driver IC with Anti-Stall Feedback Architecture

Stepping motors, which have mainly been utilized in office and industrial equipment, are being used more widely in a variety of applications due to their capability to control motor rotation speed without any speed feedback circuit. Demand for stepping motors is therefore increasing year by year.

Without a speed feedback circuit, however, there is a possibility that a motor might stall if the input pulse signals lose synchronicity with the motor's rotation. In order to avoid such motor stalls, a constant current that provides the peak load torque must be continuously delivered. This makes it difficult to reduce power consumption.

To address this problem, Toshiba Electronic Devices & Storage Corporation released the TB67S289 driver integrated circuit (IC) in September 2017 incorporating active gain control (AGC), our unique high-efficiency driving technology. AGC detects the induced voltage in real time and controls the drive current accordingly to prevent motor stalls. In addition, AGC, which is activated under a low-load condition, reduces current consumption during motor drive operation by up to 40% compared with the case in which AGC is not used. This, in turn, makes it possible to reduce the cost of the power supply unit.



AGC reduces the device and system power consumption, making it possible to reduce the cost of the power supply unit.

AGC technology to reduce drive current of stepping motor according to load

Voice Recognition HMI Solution Using TZ2100 Application Processor

Toshiba Electronic Devices & Storage Corporation has developed the RBTZ2100-6MA, a starter kit with the TZ2100 application processor that provides a low-cost human-machine interface (HMI) solution for voice operation and panel displays.

The RBTZ2100-6MA is capable of driving a WQVGA (400 × 240 pixels) panel without a dynamic random-access memory (DRAM). Instead of a DRAM, the RBTZ2100-6MA uses a 1 MB static RAM (SRAM) embedded in the TZ2100 application processor with an Arm® Cortex®-A9 core to run the voice trigger and D-Amp Driver® middleware in a non-operating-system environment.

A low-cost voice HMI solution has been realized with a two-layer board by eliminating the need for a DRAM and reducing the number of external parts.

Moreover, the compact dimensions of the RBTZ2100-6MA allow it to be incorporated into a user's current product to evaluate its voice HMI function and develop new products with a voice HMI.

WQVGA: wide quarter video graphics array

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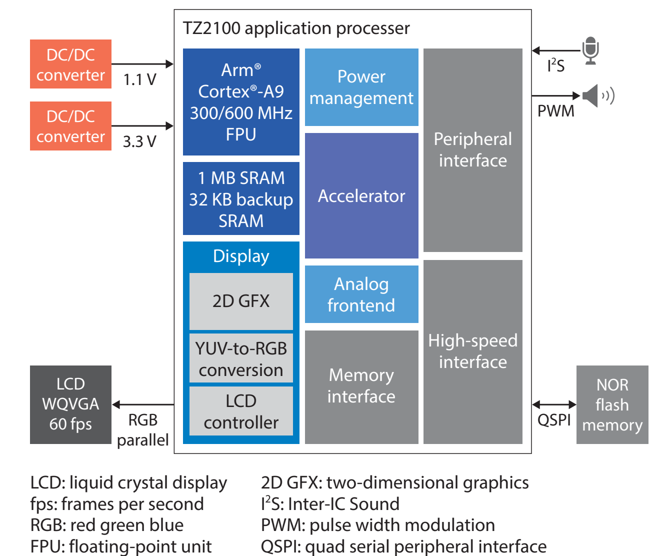
D-Amp Driver is a trademark or registered trademark of CRI Middleware Co., Ltd. in Japan and other countries.



Block diagram of example of voice HMI system using TZ2100 application processor

Helium-Sealed Nearline HDD with Industry's Highest Capacity of 14 Tbytes

With the fast-growing prevalence of IT services, the volume of data generated is increasing. In this situation, demand for high-capacity hard disk drives (HDDs) for data centers is increasing.

To meet this industry requirement, Toshiba Electronic Devices & Storage Corporation released a helium-sealed 3.5-inch(*1) 14 Tbyte(*2) nearline HDD in December 2017. The use of helium-sealing technology made it possible to incorporate nine platters into a 3.5-inch enclosure for the first time in the industry(*3) while maintaining the shock and vibration endurance and the reliability of conventional nearline HDDs. Additionally, the helium-sealing technology provides a 42% reduction in idle power consumption compared with the previous MG06ACA10T product and an increase in areal density due to improved head positioning accuracy. Consequently, the newly developed nearline HDD provides the industry's highest capacity of 14 Tbytes(*3) using conventional magnetic recording (CMR) technology that does not exhibit any decrease in transfer rate in random read/write environments.

(*1) Industry's standard form factor for HDDs

(*2) Definition of capacity: Toshiba Electronic Devices & Storage Corporation defines a terabyte (Tbyte) as 10^{12} (1 000 000 000 000) bytes.

(*3) As of December 2017 for 3.5-inch HDDs with a height of 26.1 mm (as researched by Toshiba Electronic Devices & Storage Corporation)

MG07ACA14T 14 Tbyte 3.5-inch HDD for nearline storage applications

BiCS FLASH™ 3D Flash Memory Fabricated Using 96-Layer Process Technology

Toshiba Memory Corporation has fabricated a prototype BiCS FLASH™ three-dimensional (3D) 96-layer 256 Gbit (32 Gbyte) 3-bit-per-cell (triple-level-cell (TLC)) flash memory and verified its basic performance.

The innovative 96-layer stacking process combines advanced circuit and manufacturing process technologies to achieve a roughly 40% increase in capacity per unit chip size over the 64-layer stacking process. The 96-layer stacking process reduces the cost per bit and increases the amount of memory capacity that can be manufactured per silicon wafer.

Mass production of the new flash memory is scheduled to begin in 2018. The new flash memory meets the market needs and performance specifications for a wide range of applications, including enterprise and consumer solid-state drives (SSDs), smartphones, tablets, and memory cards.

Following the 256 Gbit flash memory, we will apply the 96-layer stacking process technology to 512 Gbit (64 Gbyte) and higher-capacity flash memories. In addition, BiCS FLASH™ 3D flash memories fabricated using 4-bit-per-cell (quadruple-level-cell (QLC)) technology will be released in the near future.

BiCS FLASH™ 3D flash memory fabricated using 96-layer stacking process

Enterprise SSDs Utilizing 64-Layer 3D Flash Memory

Toshiba Memory Corporation has released the PM5 12 Gbit/s SAS (Serial Attached SCSI (Small Computer System Interface)) series and the CM5 NVM Express™ (NVMe™) series, the world's first enterprise SSDs utilizing 64-layer 3D flash memory(*). The use of our BiCS FLASH™ 3D flash memory made it possible to increase the storage capacity and reduce the cost of the new SSDs.

As the first such devices to be equipped with MultiLink SAS architecture, the PM5 series delivers the highest performance in the industry(*). Furthermore, the PM5 series supports Multi-Stream Write Technology, a feature that intelligently manages and groups data types, translating into increased performance, improved endurance, and enhanced quality of service (QoS).

The CM5 series, positioned as the next-generation NVMe™ SSD, supports the dual-port PCIe® Gen3 x4. The CM5 series also supports Multi-Stream Write Technology.

(*) As of August 2017 (as researched by Toshiba Memory Corporation)

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PM5 U.2

CM5 U.2

CM5 AIC

PM5/CM5 series enterprise SSDs

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