

# 8983

## SPINDLE & VOICE-COIL ACTUATION MANAGER/DRIVER

The A8983CJT provides for complete spindle and voice coil power electronics for small form-factor HDDs (hard disk drives). The large-scale integration and use of advanced DABiC (digital/analog-BiCMOS) merged technologies result in minimum power dissipation, minimum operating voltage, and minimum external components.

The spindle driver system incorporates a three-phase MOS power driver and a back-EMF sensing motor commutation scheme. A patented circuit eliminates the need for an external current-sense resistor, achieving additional headroom. Intrinsic ground clamp and flyback diodes are also provided.

The voice-coil system incorporates a MOS H-bridge driver, sense amplifier, error amplifier, and programmable retract circuitry.

The spindle and voice-coil control functions are supplemented by an ENERGY MANAGER™, which efficiently channels available spindle BEMF to protect the heads and the data disk during system power supply failure. Active regeneration of spindle BEMF provides nearly lossless conversion of spindle BEMF into supply voltage to operate the voice coil motor for parking the heads. A dc-to-dc converter provides for full power MOS  $r_{DS(on)}$  performance at minimum supply voltages. In addition, the ENERGY MANAGER provides several energy-saving sleep modes and latched fault states for undervoltage and serial port commanded fault.

The A8983CJT is supplied in a 64-lead low-profile quad flatpack for surface-mount applications.

### FEATURES

#### Voice Coil Motor Driver:

- Low  $r_{DS(on)}$  MOS Outputs
- Zero Deadband
- Externally Determined Transconductance, with Hi/Lo Configuration Switched via Serial Port
- Current Sensing with External Series Sense Resistor
- Serial Port Programmable Actuator Retract Circuitry
- Retract Circuitry Functional to 1.7 V Spindle BEMF

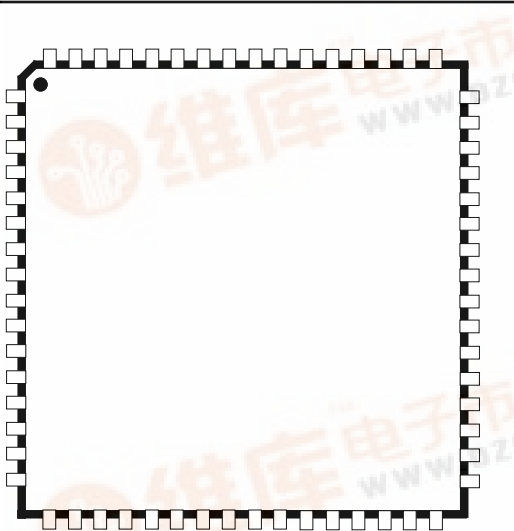
#### Spindle Motor Controller/Driver:

- Low  $r_{DS(on)}$  MOS Outputs
- Back-EMF Circuitry Eliminates Hall-Effect Sensors
- Adaptive Commutation Delay Programmable via Serial Port
- Programmable Slew Rate (soft switching) Eliminates Snubbers
- Intrinsic Ground Clamp and Flyback Diodes

### ABSOLUTE MAXIMUM RATINGS at $T_A = +25^\circ\text{C}$

Load Supply Voltage, $V_{CC(PWR)}$ .....	<b>7.0 V</b>
Spindle Output Current, $I_{OUT(S)}$ .....	<b><math>\pm 1.6</math> A</b>
Voice-Coil Output Current, $I_{OUT(A)}$ .....	<b><math>\pm 0.9</math> A</b>
Logic Supply Voltage $V_{CC(D)}$ .....	<b>6.0 V</b>
Operating Temperature Range, $T_A$ .....	<b><math>0^\circ\text{C}</math> to <math>+70^\circ\text{C}</math></b>

Output current rating may be restricted to a value determined by system concerns and factors. These include: system duty cycle and timing, ambient temperature, and use of any heatsinking and/or forced cooling.

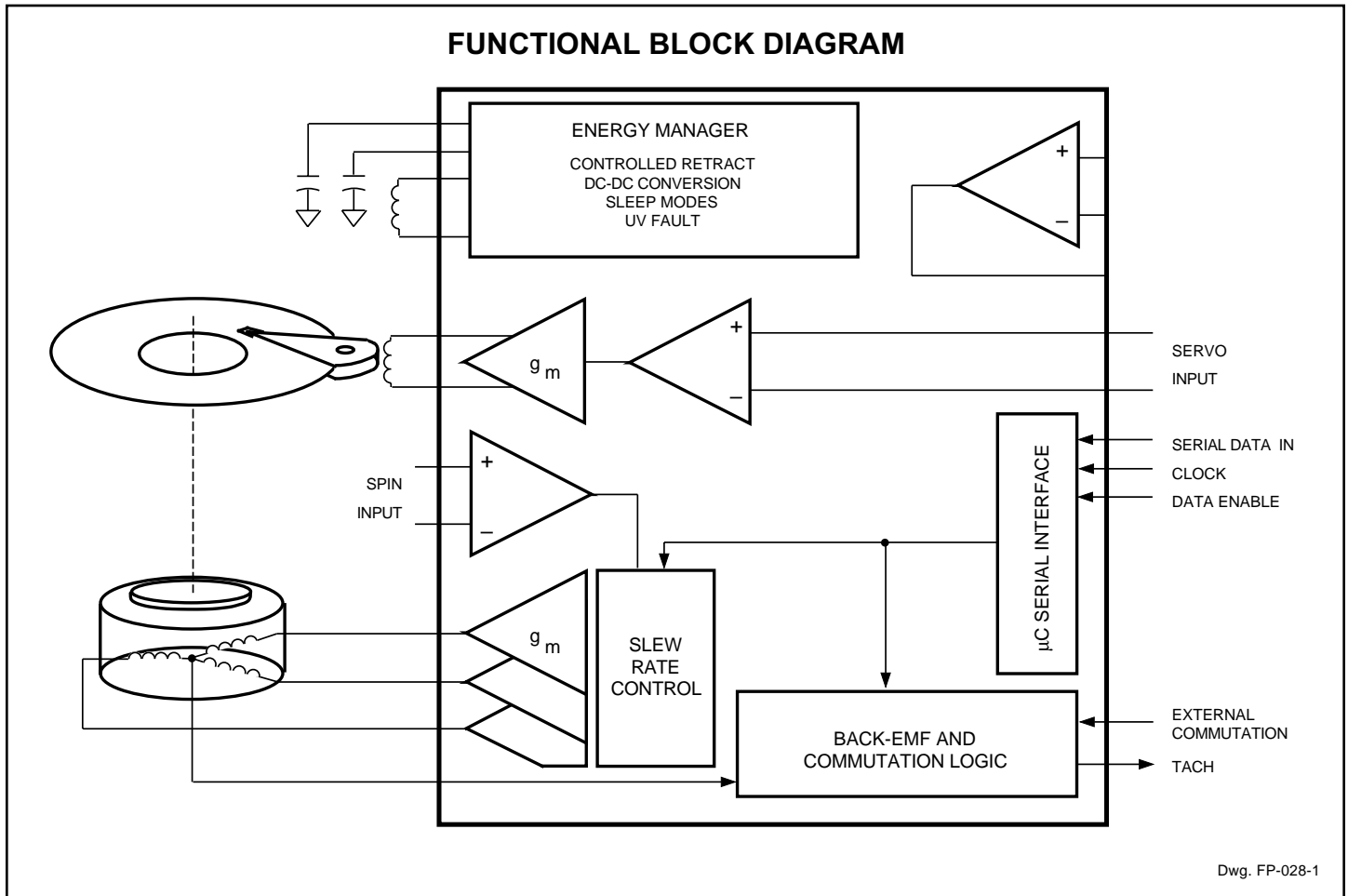


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ACTUATION MANAGER/DRIVER



- Patented Lossless Current Sensing Eliminates Need for External Current-Sense Resistor
- Externally Determined Transconductance, with Hi/Lo Configuration Switched via Serial Port
- Forward or Reverse Torque Serial Port Bit Allows Improved Speed Disturbance Performance
- Dynamic Braking with User Delay, Activated by Undervoltage or Serial Port Command

- Power-On-Reset Generator for Power Up or Power Loss with User-Defined Delay
- Chip Powers Up in Sleep Mode for Minimum Power Dissipation
- External 2 MHz System Clock, or Internal Serial Port Trimmed 2 MHz Clock
- System Diagnostics
- Uncommitted Op-amp

**Energy Manager:**

- 3.0 V to 5.5 V Operation
- DC-to-DC Converter Maintains  $r_{DS(on)}$  Performance at Low Supply
- Independent Power-Down (Sleep) Modes for all Functional Blocks
- Efficient Active Regeneration Supplies Power During Retract
- Supply Under-Voltage Fault Monitor with Adjustable Trip Point