

TMC INTEGRATED CIRCUITS

POWER DRIVERS FOR STEPPER MOTORS

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TRINAMIC: Key Facts

- Silicon Vendor (fabless) for Motion Control ICs
- Trinamic develops and markets ASSPs:
Application Specific Standard Products
- Trinamic focuses on the market of fractional
horse power motion control
(Stepper & BLDC motors of 28mm up to 86mm)

Your hosts



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TRINAMIC: Product Range

- Integrated Circuits
 - Controller
 - Driver
 - MOSFETs
- Off-the shelf motion control solutions (Modules)
- Mechatronic solutions (PANdrives)
- Bus interface converters

POWER DRIVER FOR STEPPER MOTORS

TYPE	DESCRIPTION	stallGuard™	MOSFETs
TMC236	Microstep driver, 1.5A		integrated
TMC246	Microstep driver, 1.5A	✓	integrated
TMC239	Microstep driver, 4A		external
TMC249	Microstep driver, 4A	✓	external

TMC 236/239: Stepper Motor Driver



Common Features:

- 2-phase bipolar stepper motor driver
- SPI and Analog Interface
- Up to 16 times micro stepping w/ integrated 4 Bit DACs via SPI, 64 micro steps via analog control
- Low temperature operation
- 3.3V to 5V for digital part; up to 34V motor supply voltage



TMC 236: Stepper Motor Driver

Features:

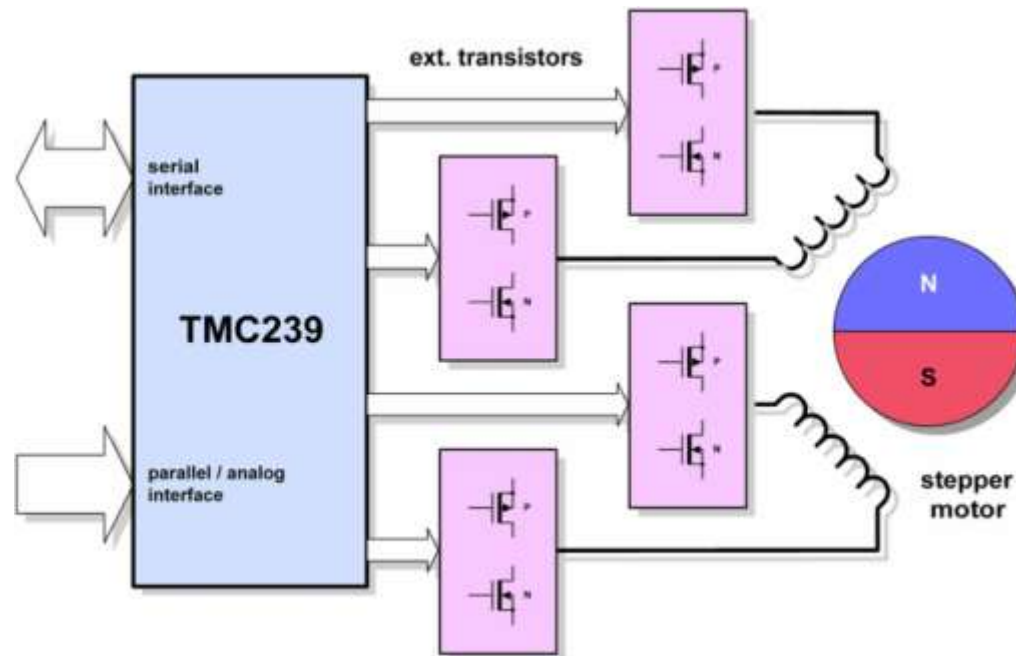
- TRINAMIC USPs:
Advanced technology - lowest power dissipation on the market
- No heatsink needed
- Up to 1.5A (peak) phase current



TMC 239: Stepper Motor Driver

Features:

- TMC239 up to 6A (peak) with external MOSFETs
- with additional predrivers



TMC 246/249: Stepper Driver with stallGuard™

Common features:

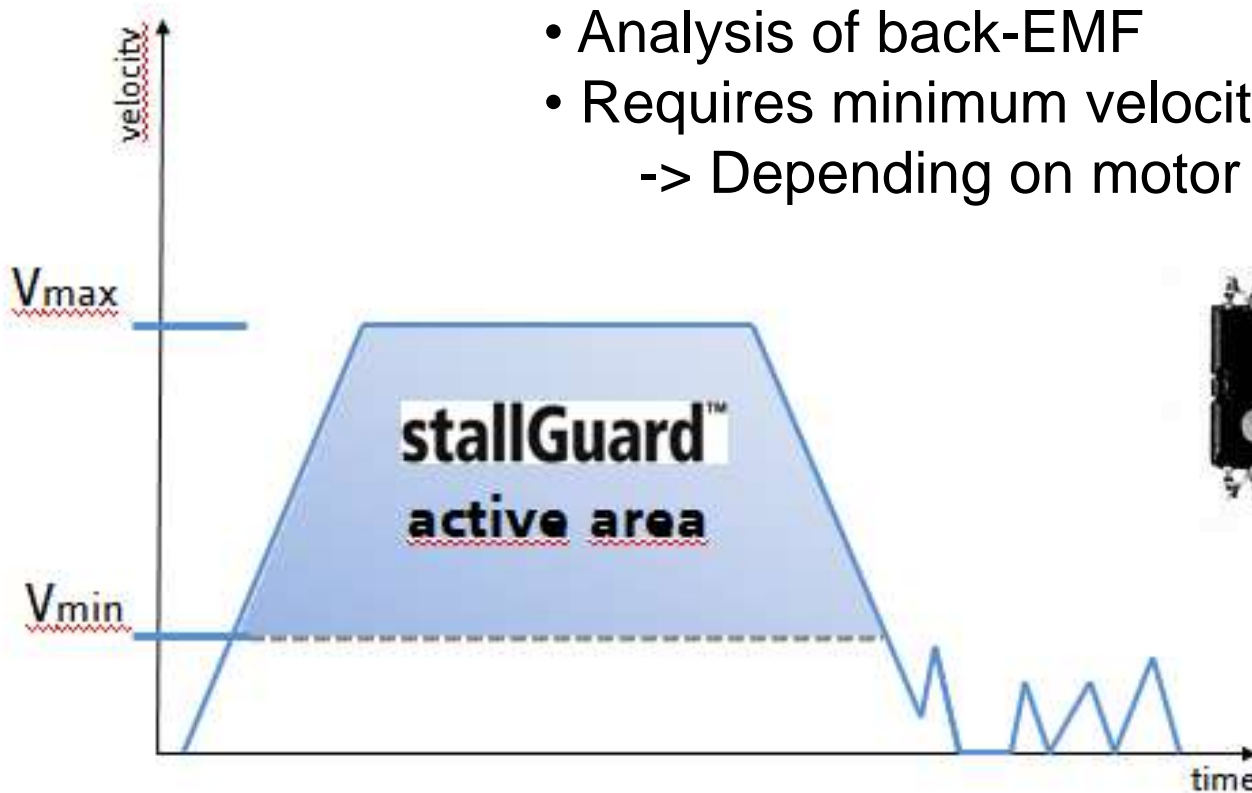
- Compatible to TMC236 and TMC239 with additional **StallGuard™** feature
- Stall Detection Load Angle Measurement
- Reduction of system cost
 - No need of limit-switches and cables
- Higher reliability without additional cost
- Low noise during mechanical reference search



stallGuard™: Principle of Operation

STEPPER MOTOR DRIVER

- Analysis of back-EMF
- Requires minimum velocity
 - > Depending on motor characteristics



TRINAMIC: Services



- Lifecycles of up to 5 years
 - Advantages for our customers:
 - Reduces costs of re-designing, re-qualification and re-certifying
 - Saves valuable resources
 - Reduces time-to-market
- Lead times:
 - quantities of up to 5,000pcs in rather short notice
 - bigger volumes on request
- After sales & Support:
 - user manuals
 - online support forum of TRINAMIC with quick and competent support from TRINAMIC and an active discussion group

COMPETITION



- Competitors: Allegro, Luminary Micro, Elmos
TRINAMIC TMC236/246 vs. Allegro A3972

TRINAMIC

- Size: 12*12*1,6 (mm)
- Power dissipation: 1.1 W
- extremely high efficiency
→ operation up to 125°C
- No heat sink
- stallGuard™
- operating voltage: 34V, up to 60V
using a few add. components
- No limit switches
- No current measurement
- Increased safety
- Short circuit protected
- dual interface option
- programmable slope control

Allegro

- Size: 30*10,9*8,6 (mm)
- Power dissipation: 3.1 W
- operation up to 85°C
- internal UVLO and thermal shutdown circuitry
- crossover-current protection
- sleep and idle modes
- operating voltage: 50 V

THE MARKET

- Market drivers:
 - Increasing need for environmental protection
 - Increasing performance in office automation
 - Reduction of power dissipation
 - Electronic motion control replaces mechanics
- How to identify?
 - Trade associations
 - Newsletter
 - Trade magazines
 - Business directories

APPLICATIONS: Biotech/ Medical

- Microscopy
- Laboratory automation
- Cell technology



analyzer



DNA test material mixer



auto refracto-
/keratometer



microscope



APPLICATIONS: Consumer Electronics

- Office automation
 - Printer, scanner, copy machines
- Cash vending machines
- Ticket- and POS printer
- Mechanical entertainment
- Sewing machines



ATM machines



Sewing machine



pay machine



gambling machine



printer

APPLICATIONS: Industrial

- Industrial automation
 - Robotics, wood processing
- Laboratory automation
- Surveillance cameras, rotary antenna
- Regulated gas- and water valves
- Electronic lens adjustment
 - LCD projector, microscope, telescope



Surveillance cameras



textile



projector



dosing pump

SUCCESS STORIES



Industry	Textile machines
Application	drive system for splicing
Product	TMC236
Volume	280k
Why Trinamic?	<ul style="list-style-type: none">▪ Lowest power dissipation in class▪ Highest reliability▪ Best diagnostics

Q&A



If you have questions, please don't hesitate to get in contact with TRINAMIC:

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