TDM22544D OptiMOS™

Dual Phase 140A Power Stage Module with Integrated Inductor

Features

- Integrated dual converters including two smart power stages, two inductors, and decoupling capacitors
- Infineon's latest smart power stages utilize OptiMOS™-6 MOSFETs
- Output DC current capability of 70 A per phase (Thermally managed)
- Output peak current capability of 160 A
- Input voltage (VIN) range of 4.25 V to 16 V
- On-chip MOSFET Current sensing and reporting at 5 µA/A.
- 8mV / °C temperature analog output
- Output voltage range from 0.225 V up to 3 V at VIN = 12 V
- Operation up to 2 MHz
- VCC under voltage lockout (UVLO)
- Bootstrap under-voltage protection
- Auto-replenishment on bootstrap capacitors
- Over temperature protection and thermal shutdown
- Cycle-by-cycle over current Protection (OCP) and flag
- Compatible with 3.3 V tri-state PWM Input
- Body-Braking™ load transient support
- DEEP SLEEP mode for power saving via EN= low (32 µA typ per phase)
- Lead free RoHS compliant package
- Small LGA package in 10 mm (length) x 9 mm (width) x 8 mm (height)

Potential applications

- Artificial Intelligence accelerators chips
- CPU Power
- FPGA Power
- Telcom/datacenter

Product validation

Qualified for industrial applications according to JESD47 and IPC9701

Description

- High frequency, compact DC-DC converters
- Voltage Regulators for CPUs, GPUs, FPGAs and DDR memory arrays
- Server, communication and artificial intelligence systems.

The TDM22544D dual OptiMOS™ Power Module co-packages two smart power stages, two power inductors, and decoupling capacitors to implement two independent synchronous buck converters into a small 10mm x 9mm x 8mm package. The package is optimized for PCB layout, heat transfer, driver/MOSFET control timing, and minimal switch node ringing. The smart power stage pairs optimized gate drivers and MOSFETs to enable higher efficiency at lower output voltages required by cutting edge CPU, GPU, FPGA and DDR memory designs.

The improved MOSFET current-mirror current-output sensing achieves superior current sense accuracy versus best-in-class controller-based Inductor DCR sense as well as MOSFET Rdson current sense methods.

Protections include IC temperature reporting and over temperature protection feature (OTP with thermal shutdown), cycle-by-cycle over current protection (OCP), control MOSFET short detection (HSS - High side short detection), and VCC under-voltage protection. The OptiMOS™ Power Module power stage also features "refreshing" of bootstrap capacitor to prevent the bootstrap capacitor from over-discharging.

Inductors are optimized for switching frequencies between 600 kHz to 1.2 MHz, which enables high performance transient response while maintaining industry leading efficiency.

Table of contents

1 Ordering information

Table 1 Ordering Information

Part Number	Temp Range	Package	Orderable Part Number
TDM22544D	-40 to 125°C	LG-MLGA-72-6 10 mm x 9 mm x 8 mm	TDM22544DXUMA1

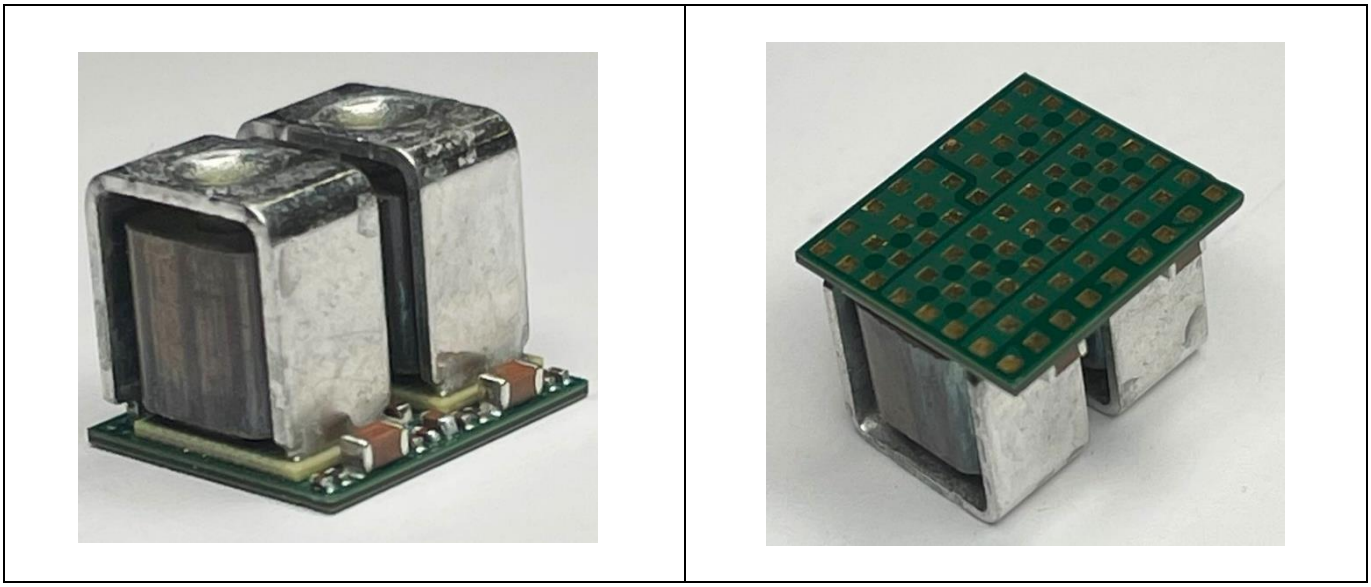

Figure 1 Picture of the Product, Top and Bottom Side

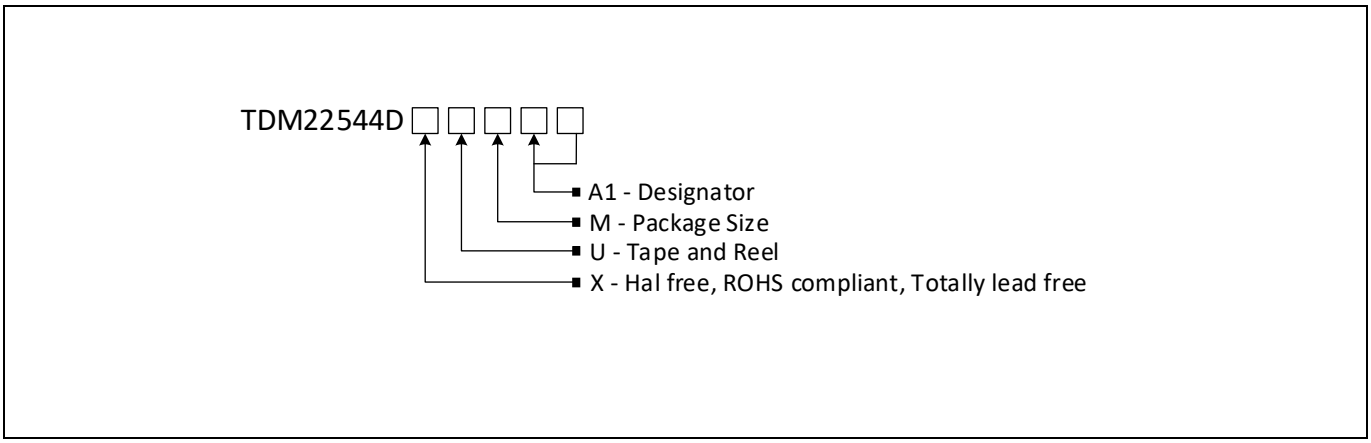

Figure 2 Part Number Configuration

2 Package

This section includes marking, mechanical and packaging information for TDM22544D.

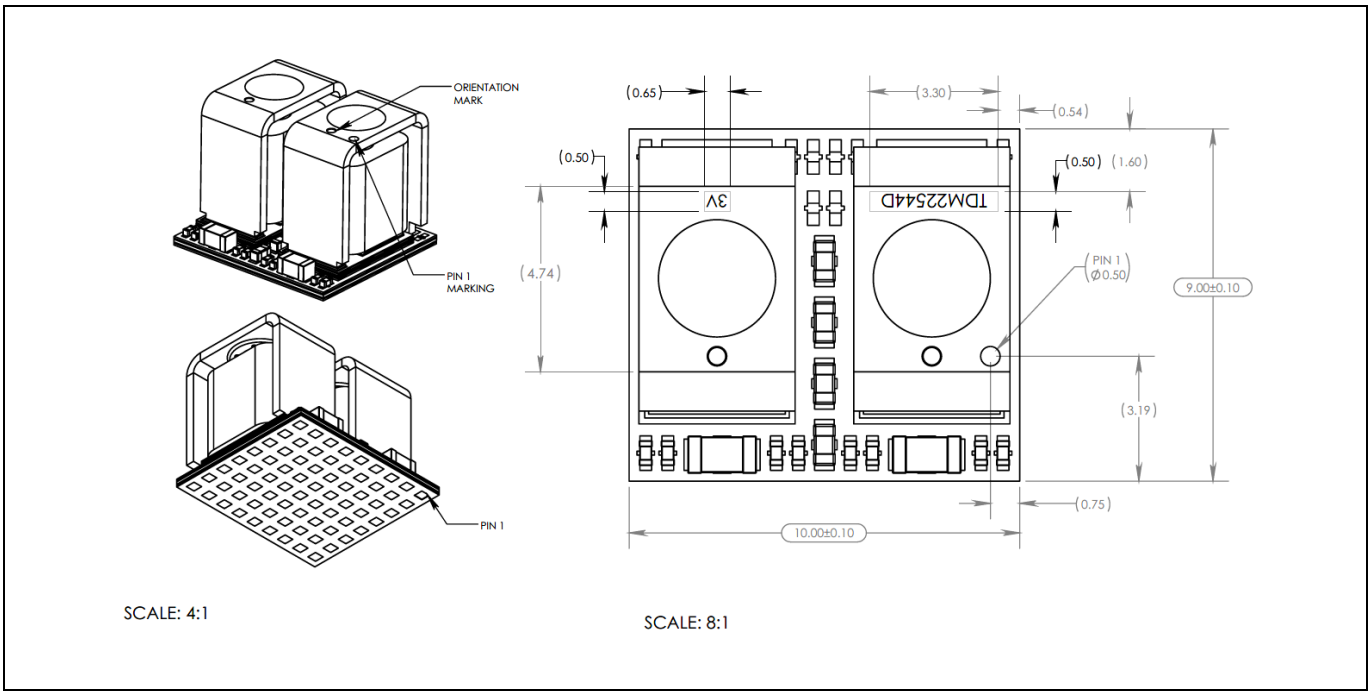

Figure 3 Package Marking

3 Environmental Qualifications

Table 2 Environmental Qualifications

Qualification Level		**Industrial**	
Moisture Sensitivity		9x10x8mm LG-MLGA-72-6 Package	JEDEC Level 3 @ 260 °C
ESD	[HBM] Human Body Model	ANSI/ESDA/JEDEC JS-001, Class 2 (2000V to <4000V)	
	[CDM] Charged Device Model	ANSI/ESDA/JEDEC JS-002, Class C3 (≥1000)	
RoHS Compliant		Yes	

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Document reference

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Revision History

TDM22544D short

Revision 2024-06-04, Rev. 1.0

Previous Revision

Revision	Date	Subjects (major changes since last revision)
1.0	2024-06-04	Release of final

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