

# Intelligent Power Modules (IPM)

February 2022



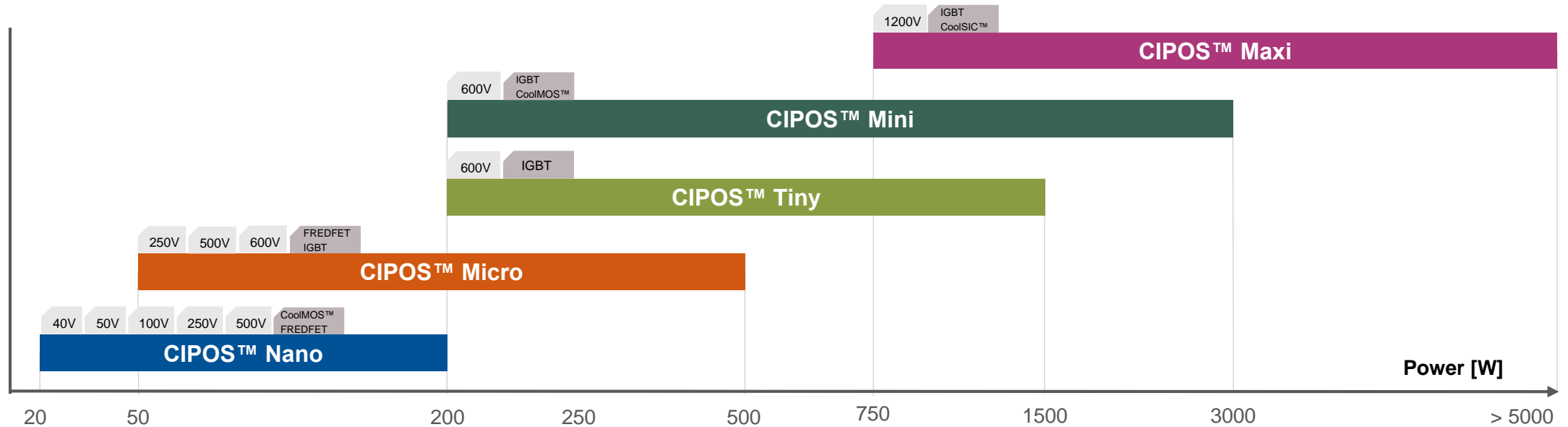
# Broad intelligent power module portfolio serving power ranges from 20 W to 5 kW plus

## Main Applications

Industrial Drives

Major Home Appl.

Small Home Appl.



### CIPOS™ Nano



7x8x0.9 mm

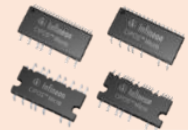
8x9x0.9 mm

12x12x0.9 mm

**For space constrained applications**

**Powering millions of personal cares and low power application**

### CIPOS™ Micro



29x12x2.9 mm

**Compact solution**

**Optimized solution for low power fan & pump**

### CIPOS™ Tiny

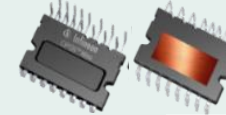


33x19x3.6 mm

**New solution for better design flexibility**

**Optimized solution for RAC and motor drives up to 1.5hp**

### CIPOS™ Mini

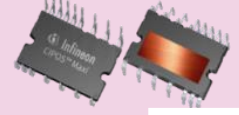


36x21x3.1 mm

**Broad range portfolio**

**Proven solution for MHA/Industrial drives**

### CIPOS™ Maxi



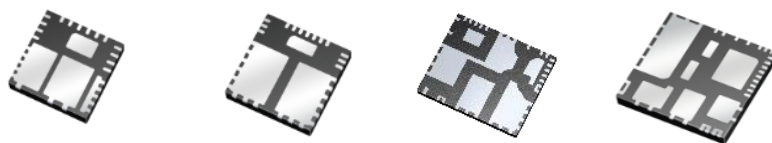
36x23x3.1 mm

**Highest power density**

**Ruggedized Industrial drives and CAC solution**

# CIPOS™ Nano IPM product family

## Product overview



Dimension [mm]	7x8	8x9	12x10	12x12
Configuration	Half-bridge	Half-bridge	H-bridge	3-phase
Voltage rating	40 V, 100 V	250 V, 500 V	250 V, 600 V	250 V, 500 V
RdsOn [max]	0.005 - 0.21 $\Omega$	0.15 – 1.7 $\Omega$	0.073 – 0.31 $\Omega$	0.45 – 6.0 $\Omega$

## Typical applications

- › Hair dryer
- › Fan motor
- › Pump
- › Air conditioner Indoor Unit
- › Air purifiers
- › Small kitchen appliances
- › CPAP machine



## Key features

- › Various topology solutions; Half-bridge, H-bridge, 3-phase
- › Broad product coverage in same footprint; 40 V - 500 V
- › Power capability from 20 W to 200 W
- › Optimized dv/dt for loss and EMI trade-off
- › Built-in NTC thermistor, Bootstrap function
- › Multiple protection; Overcurrent, Shoot-through, Over temperature, UVLO, Fault reporting

## Value proposition

- › Smallest modules in the market
- › Cost savings from smaller footprint and PCB size reduce
- › Half-bridge enables more PCB design flexibility, better heat dissipation
- › Same package/PCB design for multiple markets (Battery powered, AC plugged)

# CIPOS™ Micro IPM product family

## Product overview

DIP 29x12(F)  
SOP 29x12 (F)



Dimension [mm]	29x12x2.9		
Configuration	3-phase		
Voltage rating	250 V	500 V	600 V
MOSFET Rds(on) max	0.45 Ω	1.3, 1.7, 2.2, 4.0, 6.0 Ω	IGBT (2/4/6 A)

## Typical applications

- › Split air conditioning systems:
- › Indoor & outdoor fan drive
- › Circulation pumps
- › Ceiling & floor fans
- › Air purifiers
- › Small compressors
- › 10-200 W motor drives



## Key features

- › Wide range of product coverage with various switch technologies
- › Various application optimized options available
- › Pin-comparable solution to one of the main solution in the market

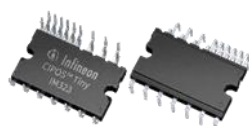
## Value proposition

- › Reduce system costs and fast time to market
- › Provide wide switching speed range
- › High power density and high efficiency and high output power in one small package
- › Offer very low loss by using the advanced MOSFET technology

# CIPOS™ Tiny IPM product family

## Product overview

DIP 33x19



Dimension [mm]	33x19x3.6
Configuration	3-phase inverter with open emitters
Voltage rating	600 V
IGBT Current Rating	6 A*, 10 A*, 15 A

\* coming soon

## Typical applications

- › Room air conditioning
- › HVAC outdoor fan
- › Fans and pumps
- › Washing machine
- › General motor drives



## Key features

- › Best optimized 600V IPM to provide high performance and **best efficiency for motor drives up to 1.5HP** specially for major home appliances and industry applications
- › Latest **600V Trenchstop™ RC-D2** Technology, with monolithically integrated diode
- › **IGBT's max. junction temperature 175 °C**
- › **Rugged new SOI gate driver** technology for negative voltage spike motor outputs
- › Cross conduction prevention and also turn off all switches in case of overcurrent and under voltage
- › **Robust & pin compatible full-pack package** DIP 33x19mm with **build in NTC**

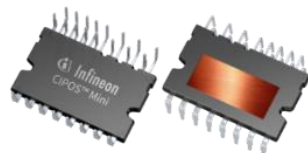
## Value proposition

- › **Proven & enhanced package robustness for high reliability**
- › **Full in-house production front-end and back-end for supply security**
- › **Latest switch and gate driver technology for best performance**
- › **Designed for fast time to market**

# CIPOS™ Mini IPM product family

## Product overview

DIP 36x21(D)



Dimension [mm]		36x21x3.1
Lineup	Inverter	600 V 4 A, 6 A, 10 A, 15 A, 20 A, 30 A 600 V 0.33 Ω
	SRM	600 V 15 A, 20 A
	PFC	650 V 20 A, 30 A
	PFC + Inverter	600 V 10 A, 15 A, 20 A

## Typical applications

- › Refrigerator, washing machine, room air conditioner
- › Door drives / GPI / sewing machine
- › General motor drive applications including industrial drives in the power range of 300 to 3 kw



## Key features

- › Wide range of current rating: 4 A to 30 A
- › High integration (bootstrap circuit, thermistor, single boost PFC)
- › Optimized for target application requirements (separate version for washing machine and air conditioner)

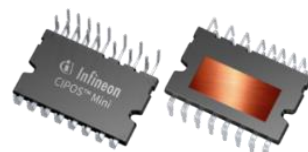
## Value proposition

- › Lower PCB size and system cost
- › Easy power extension from 300 W to 3 kW
- › Optimized performance for each application
- › UL certified package and temp sensor

# CIPOS™ Maxi IPM product family

## Product overview

DIP 36x23D



Dimension [mm]	36 x 22.7 x 3.1 mm <sup>3</sup> with 24 pins
Configuration	3-phase inverter with open emitters
Voltage rating	1200 V
IGBT current rating	5 A, 10 A, 15 A (TC = 80°C, TJ < 150°C)
SiC MOSFET ID DC drain current	20 A (TC = 80°C, TJ < 150°C)

## Key features

- › Offers the smallest package in 1200 V IPM class
- › Integrated 6 TRENCHSTOP™ IGBT 4 / CoolSiC™ MOSFET and a rugged 1200 V 6-channel SOI gate driver
- › Integrated bootstrap functionality
- › RFE pin with multi-functions
- › Multiple protect functions (overcurrent shutdown, under-voltage lockout at all channels, temperature monitoring)
- › An independent thermistor for temperature monitoring

## Typical applications

- › Commercial air conditioners
  - PFC (Active filter)
  - Compressor
  - Outdoor unit fan
- › Low power motor drives
- › Pumps
- › Fans



## Value proposition

- › The smallest package size in 1200 V IPM class with high power density and best performance
- › Enhanced robustness of gate driver technology for excellent protection
- › Adapted to high switching application with lower power loss
- › Simplified design and manufacturing



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