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# 在线设计和仿真工具 入门指南



Infinite Online Engineering & Tools  
2019年6月7日



# Agenda

1

英飞凌在线设计和仿真工具概览

2

参数搜索产品选型工具

3

应用方案查找器

4

Infineon Designer在线时域仿真入门指南及其新特性

5

在线系统效率和热仿真：IPOSIM & PLECS

6

总结和技术支持

# Agenda

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# 在线设计和仿真工具

## 自助服务：便捷 – 快速 – 可扩展

1

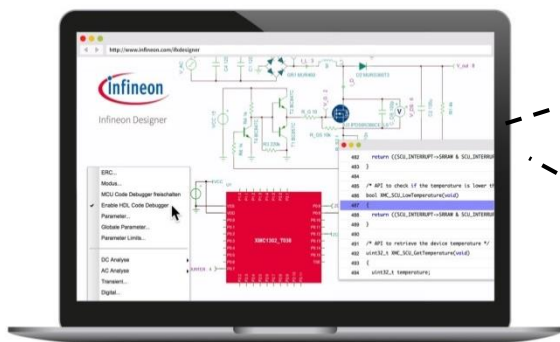
选择 – 比较 – 购买  
(在线)

2

原型设计和开发  
(离线)

3

批量采购和量产



- › 给所需应用选择合适的产品
- › 比较性能和效率
- › 购买合适的评估板或样片

- › 客户使用已有的离线开发设计工具
- › 缩短原型设计时间

- › 最快实现量产
- › 给终端客户最有性价比

- › [www.infineon.com/tools](http://www.infineon.com/tools) 基于产品级、应用级和系统级的选型工具
- › [www.infineon.com/ifxdesigner](http://www.infineon.com/ifxdesigner) 460多个用于电机控制、照明、射频前端、开关电源等的应用电路仿真
- › [www.infineon.com/solutionfinder](http://www.infineon.com/solutionfinder) 应用方案查找器，涵盖电机控制，开关电源，照明，DC-DC分布式供电
- › [www.infineon.com/iposim](http://www.infineon.com/iposim) 高功率模块和盘片在线仿真工具：功率损耗，热表现等

意识  
(兴趣)

选择  
(学习)

比较  
(评估)

购买样片  
(测试)

设计  
(决定)

批量购买和量产  
(使用)

售后  
(获得帮助)



在线工具 (无需安装)

[www.infineon.com/tools](http://www.infineon.com/tools)

Infineon Toolbox (离线为主)

[www.infineon.com/toolbox](http://www.infineon.com/toolbox)

## 如何选择合适的产品?

MOSFET Finder [Change Product Finder](#)

Parameter Selection

Breakdown Voltage:  Select VDS [V]

Drain Current  $I_D$  (max): at least  [A]

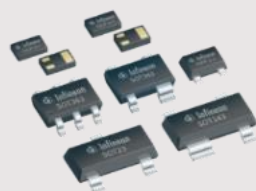
$R_{DS(on)}$  (max): below  [mOhm]

Gate Charge  $Q_G$ : below  [nC]

Feature Selection

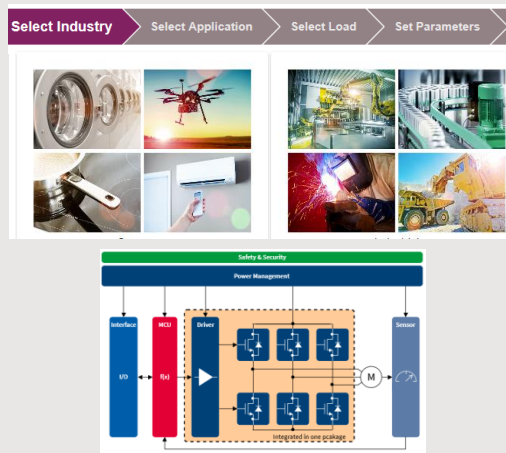
Type:  Select Type

Technology:  Select Technology



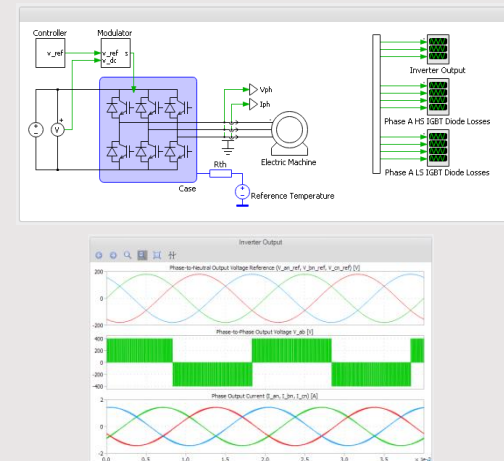
使用我们的产品查找工具  
(比如: [IGBT](#), [MOSFET](#), [IPM](#),  
[Gate Driver](#), [仿真模型](#)等)

## 如何选择应用解决方案?



使用[应用方案查找器](#)  
(比如: 电机控制, 开关电源, LED  
照明, DC-DC PoL分布式供电)

## 如何用仿真检测性能?



使用在线仿真工具  
(比如: [IPOSIM](#), [Infineon Designer](#), [XENSIV](#))

下载资料: 规格书, 仿真模型, BOM, 电路图, 评估版

# 基于参数搜索的产品查找工具 – 例：MOSFET查找器

› [www.infineon.com/cms/en/tools/solution-finder/product-finder/mosfet-finder/](http://www.infineon.com/cms/en/tools/solution-finder/product-finder/mosfet-finder/)

MOSFET Finder
Change Product Finder
Cross Reference

Parameter Selection

Breakdown Voltage
75 V
80 V

Drain Current  $I_D(\text{max})$ 
at least
100
[A]

$R_{DS(on)}$  (max)
below
200
[mOhm]

Gate Charge  $Q_G$ 
below
100
[nC]

Feature Selection

Type
N

Technology
Select Technology

Availability

Automotive
Industrial
Any

Package
PG-TDSON-8

Product Status
active and preferred

Reset all

Configure table
Compare
Share
Download
8 Results

| Product          | OPN                 | Product Status       | Order online | Package  | Online Simulation | Budgetary Price €/1k | Type |
|------------------|---------------------|----------------------|--------------|----------|-------------------|----------------------|------|
| › BSC026N08NS5   | BSC026N08NS5ATMA1   | active and preferred | Buy Online   | SuperSO8 | Simulate Online   | 1.03                 | N    |
| › BSC030N08NS5   | BSC030N08NS5ATMA1   | active and preferred | Buy Online   | SuperSO8 | Simulate Online   | 0.77                 | N    |
| › BSC037N08NS5   | BSC037N08NS5ATMA1   | active and preferred | Buy Online   | SuperSO8 | Simulate Online   | 0.76                 | N    |
| › BSC040N08NS5   | BSC040N08NS5ATMA1   | active and preferred | Buy Online   | SuperSO8 | Simulate Online   | 0.62                 | N    |
| › BSC047N08NS3 G | BSC047N08NS3GATMA1  | active and preferred | Buy Online   | SuperSO8 | Simulate Online   | 0.79                 | N    |
| › BSC057N08NS3 G | BSC057N08NS3GATMA1  | active and preferred | Buy Online   | SuperSO8 | Simulate Online   | 0.55                 | N    |
| › BSC036NE7NS3 G | BSC036NE7NS3GATM... | active and preferred | Buy Online   | SuperSO8 | Simulate Online   | 1.07                 | N    |
| › BSC042NE7NS3 G | BSC042NE7NS3GATM... | active and preferred | Buy Online   | SuperSO8 | Simulate Online   | 0.78                 | N    |

## Solution Finder

Select Industry
Select Application
Select Load
Set Parameters
Compare Solutions
Check Solutions
Buy Solution

Previous
Next

»

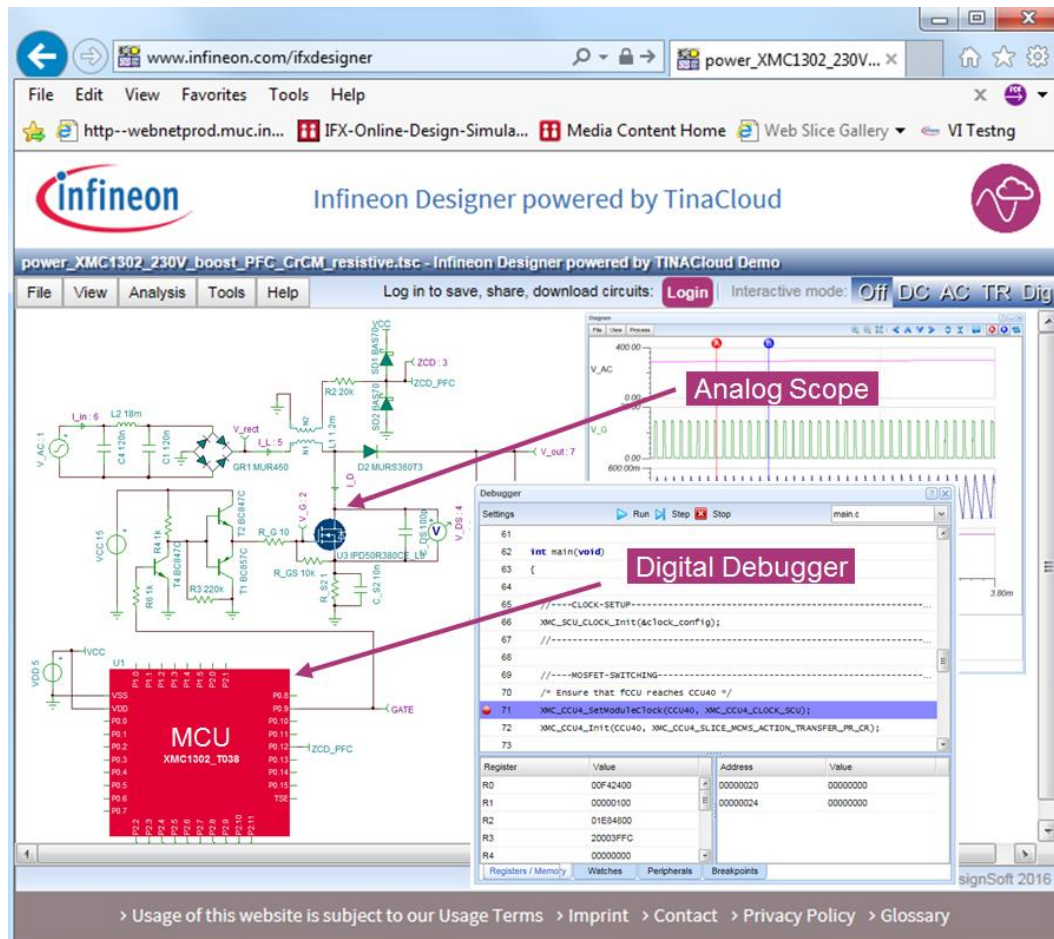
| Integration Level             | Products                                            | Chip Count | Foatprint [mm²] | Design Target  | Price  | Action                                                           |
|-------------------------------|-----------------------------------------------------|------------|-----------------|----------------|--------|------------------------------------------------------------------|
| Integrated driver/power stage | Controller: 1 x IRMCK099M<br>IPM: 1 x IRSM505-084DA | 2          | 373             | Easy to design | \$\$\$ | <div> Thermal Electrical </div> <div> Partner Network Buy </div> |

Rollover the block diagram for detailed product information and links.

Typical appearance

Previous
Next

- 强大的服务器配置：16核CPU内核，支持100个用户同时仿真
- 超过150个用于电机控制、照明、射频前端、开关电源等的应用电路



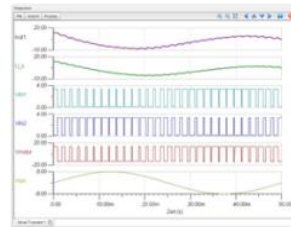
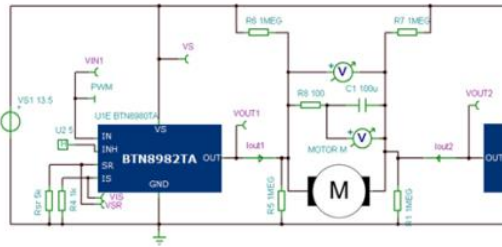
# Infineon Designer – 在线SPICE仿真引擎 ([www.infineon.com/ifxdesigner](http://www.infineon.com/ifxdesigner))



## 绝佳的用户体验

- › 全新全能电路编辑器!
- › 多浏览器支持 (Chrome, Edge, Firefox, Safari等等)
- › 无需安装
- › 无限免费仿真授权
- › 支持在线快速仿真

powered by...

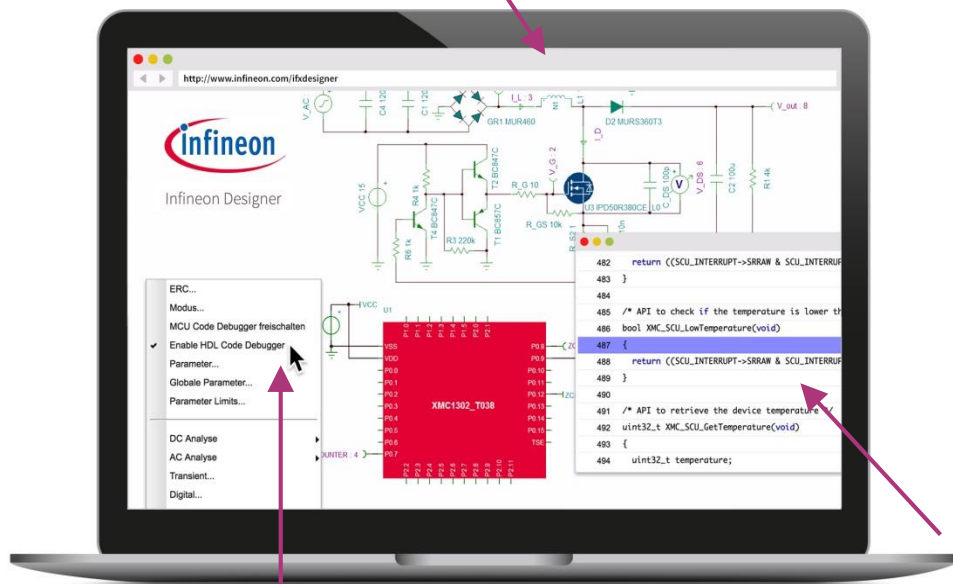


## 特性

- › 精准的时域信号仿真+系统能效仿真
- › 快速参数设置
- › 数字/模拟交互仿真
- › 已发布超过460个应用电路

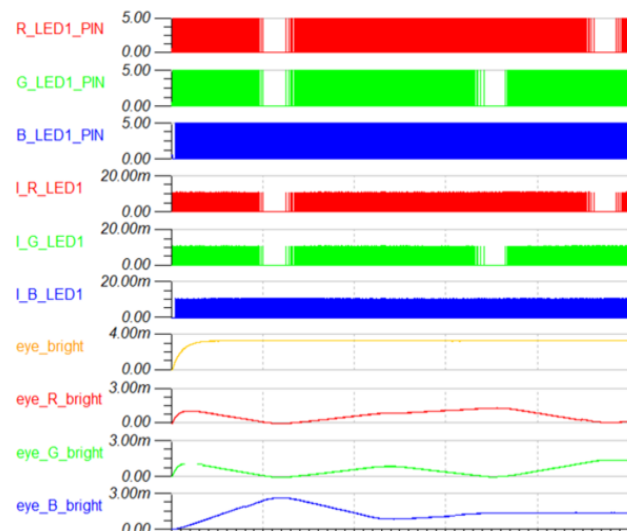
# Infineon Designer 使用案例: 数字/模拟交互仿真和在线代码调试

## 1 选择 XMC1200电路



## 2 选择仿真模式

样例电路: 32-bit MCU XMC1200  
controlling the RGB color walk with  
constant brightness



3

## 交互仿真处理器控制代码和 模拟电路

# Infineon Designer 使用案例：汽车级在线设计

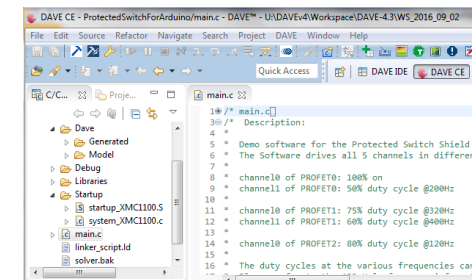
## 24V Arduino Shield PROFET™+ 24V Family

- 独特的附加价值
  - 通过点击鼠标在线探索评估板特性，无需阅读冗长的规格书和应用手册
  - 根据应用需求，在购买样片前，直接在线快速配置硬件和软件参数，熟悉评估板性能
- 在线仿真全套硬件和软件设计
  - 硬件：Arduino Shield
  - 软件：DAVE
  - 在线仿真：Infineon Designer (Spice)
  - 仿真引擎：DesignSoft

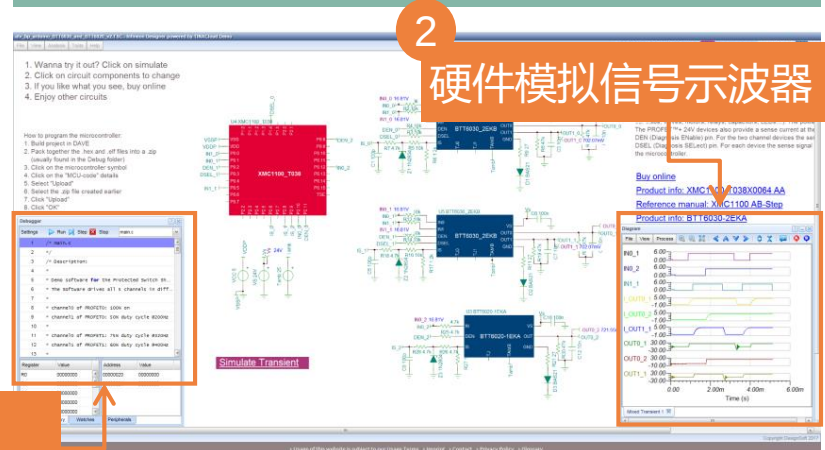
### 硬件



### 软件



### 在线仿真：结果快速可视化



1  
代码调试器

2  
硬件模拟信号示波器

# Agenda

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# 参数搜索产品选型工具

## 超过7000款英飞凌产品

> [www.infineon.com/cms/cn/tools/](http://www.infineon.com/cms/cn/tools/)

| 参数搜索选型工具                                                                                          |                                                                                                 |                                                                                                |                                                                                               |
|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| 功率器件                                                                                              | 混合信号&微控制器                                                                                       | 安全&芯片卡                                                                                         | 射频&传感器                                                                                        |
| <br>IGBT 分立器件 模块 | <br>栅极驱动器      | <br>安全及智能卡方案 | <br>ESD 保护 |
| <br>MOSFETs      | <br>智能开关       |                                                                                                | <br>磁传感器   |
| <br>IPM          | <br>电压调节器      |                                                                                                | <br>其他产品   |
| <br>双极型芯片 双极型模块  | <br>微控制器 (MCU) |                                                                                                |                                                                                               |
| <br>双极型三极管      | <br>收发机       |                                                                                                |                                                                                               |
| <br>二极管 (整流器)  |                                                                                                 |                                                                                                |                                                                                               |

# 参数搜索产品选型工具

## 实例：智能功率模块IPM选型工具

> [www.infineon.com/cms/en/tools/solution-finder/product-finder/ipm-finder/](http://www.infineon.com/cms/en/tools/solution-finder/product-finder/ipm-finder/)

1 其他选型工具

IPM Finder [Change Product Finder](#) > Cross Reference

2 IPM类型选择

Product Type Selection

Configuration Type: 3 Phase Inverter x

Switch Type: Select Switch Type

3 IPM参数筛选

Parameter Selection

Power (motor) at least 100 x [Watts]

Voltage at least [ ] [Volts]

Current at least [ ] [Amps]

Rds(on) at least [ ] [Ohms]

4 其他特性选择

Features Selection

Package Type: Select Package Type

☒ NTC ☐ Fault Clear ☐ Substrate

☐ OCP ☐ Fault Out ☐ Heatsink

☐ PFC ☐ Enable

> Reset all

Configure table [Compare](#) [Share](#) [Download](#) 2 Results

| Product         | Configuration       | Switch Type | P <sub>mot</sub> 10kHz | Voltage Class | Motor Current (Arms) | R <sub>DS(on)</sub> 25C max | Built in NTC | Online Simulation               |
|-----------------|---------------------|-------------|------------------------|---------------|----------------------|-----------------------------|--------------|---------------------------------|
| > IRSM506-076DA | 3 Phase Open Source | IGBT        | 105 W                  | 600 V         | 0.5 A                |                             | Yes          | <a href="#">Simulate Online</a> |
| > IRSM506-076PA | 3 Phase Open Source | IGBT        | 105 W                  | 600 V         | 0.5 A                |                             | Yes          | <a href="#">Simulate Online</a> |

5 比较特定产品

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# 应用方案查找器 – 电机控制半导体解决方案

## 教程：概览和选择工业领域

› [www.infineon.com/solutionfinder](http://www.infineon.com/solutionfinder)



The screenshot shows the Infineon Solution Finder interface. The top navigation bar includes the Infineon logo, a search bar, and links for 'Share Your Feedback', 'Technical Support', 'About', and 'English'. The main navigation bar features a sequence of steps: 'Select Industry' (highlighted), 'Select Application', 'Select Load', 'Set Parameters', 'Compare Solutions', 'Check Solutions', and 'Buy Solution'. Below this, a section titled 'In total: 764 solutions' prompts users to 'Please choose your Industry by clicking on the respective picture'. Four industry categories are displayed with representative images and solution counts: Consumer (340 solutions), Industrial / Commercial (48 solutions), Automotive (50 solutions), and Data Processing (326 solutions). On the right side, there are 'Previous' and 'Next' navigation buttons. Numbered annotations are present: 1 points to the 'Select Industry' step in the navigation bar; 2 points to the industry selection area; 3 points to the 'Previous' and 'Next' navigation buttons; and 4 points to the search bar and technical support links.

1 选择流程向导栏

4 搜索框和技术支持

3 导航键

2 选择工业领域

# 应用方案查找器 – 电机控制半导体解决方案

## 教程：选择应用

### Solution Finder

Select Industry **Select Application** Select Load Set Parameters Compare Solutions Check Solutions Buy Solution

Previous Next

« Your Selection  
Consumer

**1 您的选择历史**

**Filtered: 565 solutions**  
Please choose your application by clicking on the respective picture

**2 选择应用**

|                                        |                                              |                                           |
|----------------------------------------|----------------------------------------------|-------------------------------------------|
| <br>Home appliances<br>(522 solutions) | <br>Robotic vacuum cleaner<br>(64 solutions) | <br>E-bikes & E-Scooters<br>(8 solutions) |
| <br>Power tools<br>(7 solutions)       | <br>Multicopter<br>(22 solutions)            | <br>Low speed EV<br>(6 solutions)         |

Previous Next

# 应用方案查找器 – 电机控制半导体解决方案

## 教程：选择负载类型

Select Industry

Select Application

Select Load

Set Parameters

Compare Solutions

Check Solutions

Buy Solution

Previous

Next

«

Your Selection

Consumer

Robotic vacuum cleaner

Motor control and drives

Power Supply

Lighting

PoL

1

选择电机类型

| PMSM/BLDC Motor<br>16 solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Brushed DC<br>24 solutions                                                                                                                                                                                                                                                           | Permanent Magnet Stepper<br>24 solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>PMSM/BLDC Motor</div> <p>Permanent Magnet Synchronous Motor can be divided into two types, the non-salient and the salient type machine. Similar to DC machines, synchronous machines can produce torque when a rotating electromagnetic field and a constant field are standing still relative to each other.</p> <p>In Brushless DC motor the rotor consists of permanent magnets, while the stator is wound with a specific number of poles. It is essentially a PMSM motor with concentrated windings. Commonly it is also known as a PMSM with surface mounted magnets and concentrated windings.</p> | <div>Brushed DC</div> <p>A brushed DC motor converts DC electrical energy into mechanical energy. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor.</p> | <div>Permanent Magnet Stepper</div> <p>A stepper motor is an electromechanical device which converts electrical pulses into discrete mechanical movements. The rotor in the permanent magnet (PM) stepper motor has no teeth as with the VR motor. Instead, the rotor is magnetized with alternating north and south poles. These magnetized rotor poles provide an increased magnetic flux due to the permanent magnets. Because of this, the PM motor exhibits improved torque characteristics when compared with the Variable Reluctance Stepper Motor. The step angle is between the VR type and the hybrid stepper motor. It is often used in computer printers to advance paper.</p> |

2

电机类型描述

Previous

Next

# 应用方案查找器 – 电机控制半导体解决方案

## 教程： 设置参数

Select Industry

Select Application

Select Load

**Set Parameters**

Compare Solutions

Check Solutions

Buy Solution

Previous

Next

«

**Your Selection**

Consumer

Robotic vacuum cleaner

PMSM/BLDC Motor

Nominal link voltage [V]: 14.8

Electric power [W]: 22.5

Sensing: without sensor

Solution

Integrated driver/power stage

Chip Count: 4

Controller: IRMCK099M

Please type in the known motor parameters and click Next:

Nominal link voltage [V]

14.8

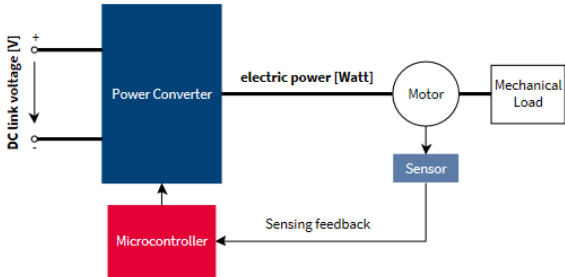
Electric power [W]

22.5

Sensing

without sensor

Rollover the block diagram for descriptions.



1

设置参数

2

参数设置解释框图

Previous

Next

# 应用方案查找器 – 电机控制半导体解决方案

## 教程： 比较推荐方案

1 推荐方案列表

2 方案集成度

3 权衡评级

4 各种操作

5 合适产品列表

各种操作

Previous Next

Your Selection

- Consumer
- Robotic vacuum cleaner
- PMSM/BLDC Motor

page [V]: 14.8  
V: 22.5  
sensor

Integrated driver/power stage  
Chip Count: 4  
Controller: IRMCK099M  
IPM: IRSM005-800MH

| Integration Level             | Products                                                                            | Chip Count | Footprint [mm²] | Design Target  | Price  |
|-------------------------------|-------------------------------------------------------------------------------------|------------|-----------------|----------------|--------|
| Integrated driver/power stage | Controller: 1 x IRMCK099M<br>IPM: 3 x IRSM005-800MH                                 | 4          | 193             | Easy to design | \$\$\$ |
| Discrete                      | Controller: 1 x IRMCK099M<br>Gate Driver: 3 x IRS2008S<br>MOSFET: 3 x BSC150N03LD G | 7          | 176.155         | Easy to design | \$     |

Thermal Electrical  
Partner Network Buy

Thermal Electrical  
Partner Network Buy

Controller Intelligent Power Modules

Show All Parameters

| Product                             | OPN       | Product Status           | Green                                        | Moisture Sensitivity Level | Package | Integration Level | Control Option |                   |
|-------------------------------------|-----------|--------------------------|----------------------------------------------|----------------------------|---------|-------------------|----------------|-------------------|
| <input checked="" type="checkbox"/> | IRMCK099M | IRMCK099M<br>IRMCK099MTR | active and preferred<br>active and preferred | yes<br>yes                 | 2       | QFN32             | MCE            | 1 motor           |
| <input type="checkbox"/>            | IRMCF143  | IRMCF143TR<br>IRMCF143TY | active active                                | yes<br>yes                 | 3       | LQFP64            | MCE+MCU        | 1 motor,<br>Servo |
| <input type="checkbox"/>            | IRMCK143  | IRMCK143TY<br>IRMCK143TR | active active                                | yes<br>yes                 | 3       | QFP64             | MCE+MCU        | 1 motor,<br>Servo |
| <input type="checkbox"/>            | IRMCF171  | IRMCF171TY<br>IRMCF171TR | active and preferred<br>active and preferred | yes<br>yes                 | 3       | LQFP48            | MCE+MCU        | 1 motor           |
| <input type="checkbox"/>            | IRMCK171  | IRMCK171TR<br>IRMCK171TY | active active                                | yes<br>yes                 | 3       | LQFP48            | MCE+MCU        | 1 motor           |
| <input type="checkbox"/>            | IRMCK341  | IRMCK341TY<br>IRMCK341TR | active active                                | yes<br>yes                 | 3       | QFP64             | MCE+MCU        | 1 motor           |

Products per page: 15 1-15 of 22

Previous Next

# 应用方案查找器 – 电机控制半导体解决方案

## 教程： 评估方案

1 系统仿真

2 电路框图

3 参数

4 仿真结果

5 已选和可供仿真产品列表

System Probes/Inverter Output

Phase-to-Neutral Output Voltage (Van, Vbn, Vcn) [V]

Phase-to-Phase Output Voltage Vab [V]

Phase Output Current (Ia, Ib, Ic) [A]

Inverter Losses

| Part Name | Total         | Efficiency |         |
|-----------|---------------|------------|---------|
| Switch    | IRSM005-800MH | 0.24 W     |         |
| Diode     | IRSM005-800MH | 0.54 W     |         |
| Inverter  | IRSM005-800MH | 0.78 W     | 95.89 % |

Phase A High Side Device Losses and Junction Temperatures

| Part Name | EOon          | EOff   | Total Switching | Cond.  | Avg. Junction Temp. | Max Junction Temp. |          |
|-----------|---------------|--------|-----------------|--------|---------------------|--------------------|----------|
| Switch    | IRSM005-800MH | 0.01 W | 0.01 W          | 0.02 W | 0.02 W              | 101.9 °C           | 102.0 °C |
| Diode     | IRSM005-800MH | 0.01 W | 0.01 W          | 0.08 W | 0.08 W              | 101.9 °C           | 102.0 °C |

Phase A Low Side Device Losses and Junction Temperatures

| Part Name | EOon          | EOff   | Total Switching | Cond.  | Avg. Junction Temp. | Max Junction Temp. |          |
|-----------|---------------|--------|-----------------|--------|---------------------|--------------------|----------|
| Switch    | IRSM005-800MH | 0.01 W | 0.01 W          | 0.02 W | 0.02 W              | 101.9 °C           | 102.0 °C |
| Diode     | IRSM005-800MH | 0.01 W | 0.01 W          | 0.08 W | 0.08 W              | 101.9 °C           | 102.0 °C |

Intelligent Power Modules

| Product       | OPN             | Product Status       | Green | Package  | Product Group | Voltage Class | Pmot (10kHz) | Rated Current | RDS(on) (25°C) |
|---------------|-----------------|----------------------|-------|----------|---------------|---------------|--------------|---------------|----------------|
| IRSM005-800MH | IRSM005-800MHTR | active and preferred | yes   | PQFN 7x8 | CIPOS™ Nano   | 40.0 V        | 165.0 W      | -             | 0.005 Ω        |

# 应用方案查找器 – 电机控制半导体解决方案

## 教程： 购买方案

1 所选方案

2 报告、合作伙伴、在线购买

Industry > Select Application > Select Load > Set Parameters > Compare Solutions > Check Solution

Previous

Next

|          | Integration Level             | Products                                            | Chip Count | Footprint [mm <sup>2</sup> ] | Design Target  | Price  | Action                                                       |
|----------|-------------------------------|-----------------------------------------------------|------------|------------------------------|----------------|--------|--------------------------------------------------------------|
| Solution | Integrated driver/power stage | Controller: 1 x IRMCK099M<br>IPM: 1 x IRSM505-065DA | 2          | 373                          | Easy to design | \$\$\$ | <div>Thermal Electrical</div> <div>Partner Network Buy</div> |

Rollover the block diagram for detailed product information and links.

Safety & Security

Power Management

Interface

MCU

Driver

Sensor

I/O

$f(x)$

Typical appearance

3 方案结构框图

4 评估板 (方案详情)

Previous

Next

# Agenda

---

1

英飞凌在线设计和仿真工具概览

2

参数搜索产品选型工具

3

应用方案查找器

4

Infineon Designer在线时域仿真入门指南及其新特性

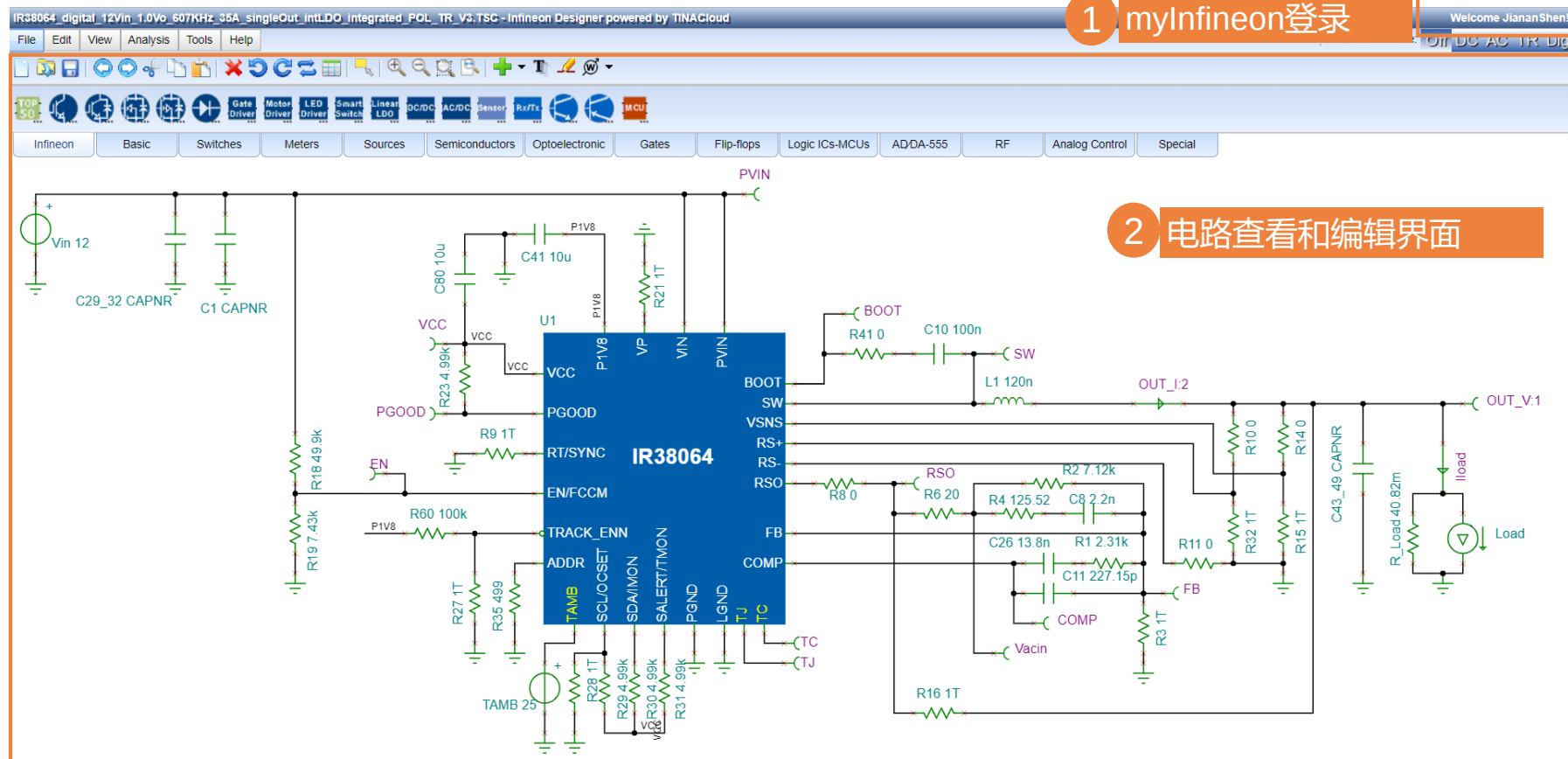
5

在线系统效率和热仿真：IPOSIM & PLECS

6

总结和技术支持

# Infinite Designer 全新亮点: 开放全能电路编辑器



- › 登录myInfineon账户
- › 建立全新电路或修改英飞凌提供的样例电路

# Infineon Designer 全新亮点:

## Design Tool - 电路参数设置和自动计算

1. Wanna try it out? Click on analysis
2. Double click on green window to design
3. If you like what you see, buy online
4. Enjoy other circuits

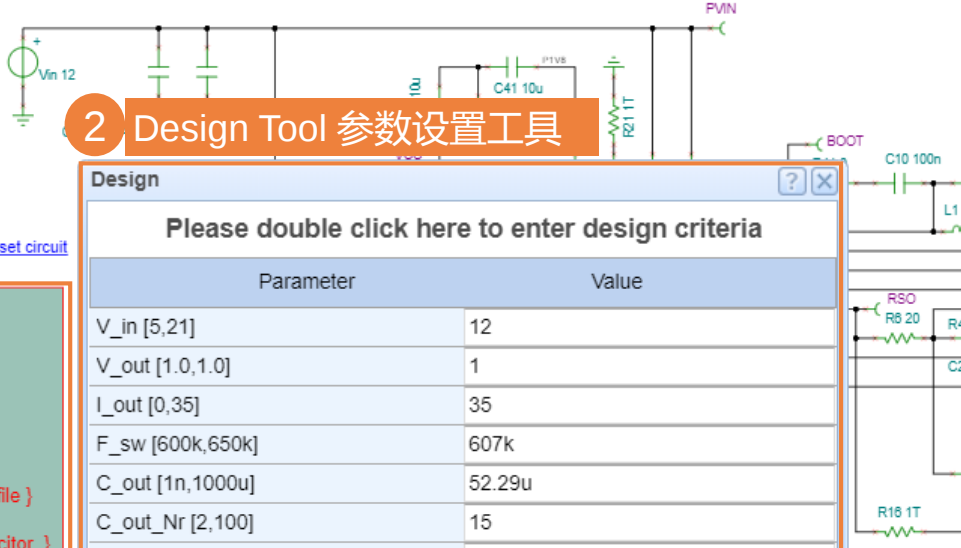
Transient Analysis - fast

### 1 参数显示窗口

```
{ Please double click here to enter design criteria }  
  
{ Input voltage }  
V_in := 12;  
{ Target output voltage - fixed due to Config file }  
V_out := 1;  
{ Maximum output current }  
I_out := 35;  
{ Target Switching Frequency - fixed due to Config file }  
F_sw := 607k;  
{ Derated (DC & AC) value for a single output capacitor }  
C_out := 52.29u;  
{ Number of output capacitors with value C_out }  
C_out_Nr := 15;  
{ Target Vout ripple }  
Vout_ripple := 10m;  
{ Compensation capacitor. Default is 2.2nF }  
C8_Cc := 2.2n;  
{ L_ripple vs Iout percentage }  
L_ripple_percentage := 35;  
{ Load step current }  
I_step := 10.5;
```

[Reset circuit](#)

### 2 Design Tool 参数设置工具



Design

Please double click here to enter design criteria

| Parameter                   | Value  |
|-----------------------------|--------|
| V_in [5,21]                 | 12     |
| V_out [1.0,1.0]             | 1      |
| I_out [0,35]                | 35     |
| F_sw [600k,650k]            | 607k   |
| C_out [1n,1000u]            | 52.29u |
| C_out_Nr [2,100]            | 15     |
| Vout_ripple [0,V_out*0.1]   | 10m    |
| C8_Cc [1n,4.7n]             | 2.2n   |
| L_ripple_percentage [20,50] | 35     |
| I_step [0,I_out-0.01]       | 10.5   |

Run Cancel Properties

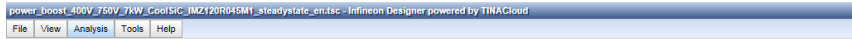
[onfig file](#)  
loaded accor  
the Data file  
anged or dis  
click on the

- › Design Tool 参数设置工具
  - 更简洁的参数设置
  - 更具自定义公式，快速自动计算和赋值电路参数和器件值

# Infineon Designer 全新亮点 其他特性



## 应用电路：可自由配置参数



1. Wanna try it out? Click on "Simulate Transient"
2. Set application parameters below or directly change any component

(1. click here to set application parameters)  
(2. click on "Run" to calculate components)  
(3. click on "OK" and Simulate Transient )

(Input voltage [V])  
V\_in = 400 (use 5... 1000)  
(Output voltage [V])  
V\_out = 750 (use higher than V\_in)  
(Output current [A])  
I\_out = 9.3 (<= 20)  
R\_load = V\_out / I\_out  
R\_load = [80.6452]

(Set inductance L [H])  
L = 300u  
(Set capacitance C [F])  
C = 1000u  
(Set gate resistance Rg [Ohm])  
Rg = 3

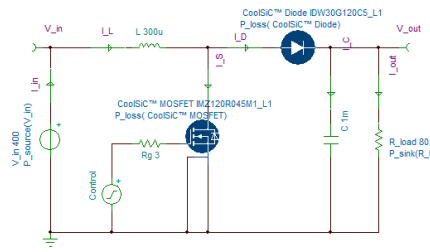
(= Control settings: change with care! =)  
(Switching frequency [Hz])  
fs = 100k (use 10k ... 200k)  
Duty = 1 - (V\_in / (V\_out + offset))  
Duty = [473.6842m]  
L\_INIT = L\_out / (1 - Duty) (inductor initial value)  
C\_INIT = V\_out (capacitor initial value)  
T = 1fs  
T\_on = Duty \* T  
T\_off = T - T\_on  
ControlT2 = T\_on  
ControlT5 = T\_off

Simulate Transient

Reset circuit

Click to select startup circuit

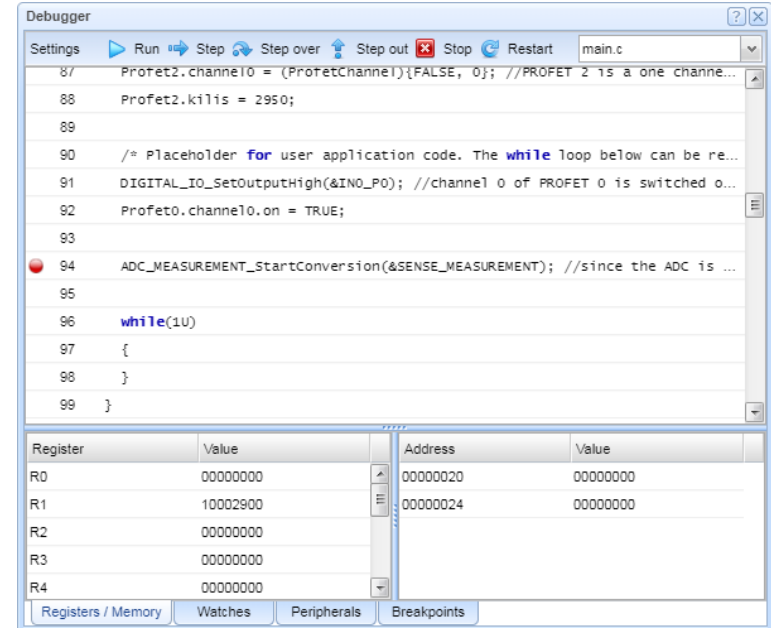
Click to select steady-state circuit



## 功率损耗和效率计算

| Compare Window                                                |            |                 |                  |           |
|---------------------------------------------------------------|------------|-----------------|------------------|-----------|
| Compare with: Power dissipation 1                             |            |                 |                  |           |
| Efficiency: 98.92% Total Input: 7.05k W Total Output: 6.97k W |            |                 |                  |           |
| Component                                                     | Power type | Power dissip... | Percentage (...) | Pass/Fail |
| V_in                                                          | Source     | 7.05k           | 100              | Pass      |
| R_load                                                        | Sink       | 6.97k           | 98.92            | Pass      |
| CoolSiC™ MOSFET                                               | Loss       | 31.31           | 0.44             | Pass      |
| CoolSiC™ Diode                                                | Loss       | 13.67           | 0.19             | Pass      |

## 进阶MCU代码调试功能



## 信号处理，比如：纹波

| Compare Window         |                 |                 |
|------------------------|-----------------|-----------------|
| Compare with: Ripple 1 |                 |                 |
| Signal Label           | Absolute Ripple | Relative Ripple |
| V_out                  | 44.20m          | 0.01%           |
| I_out                  | 548.10u         | 0.01%           |

## › 入门电路

- 学习Infineon Designer仿真基础知识
- 仿真首个简单的样例电路：反向逆变降压电路
- 修改器件、电路参数并编辑电路

## › 利用升压电路学习Infineon Designer进阶特性

- 用CoolMOS P7和CoolSiC二极管仿真升压电路
- 查看电路启动特性和稳态仿真，同时查看简介特性
- 用Design Tool设置参数重新配置电路
- 操作：建立第一个Infineon Designer电路

## › 用XMC/DAVE™程序控制电机

- 探索真实评估板的功能
- 在线交互仿真模拟电路和配套软件
- 添加代码断点并在线调试代码
- 安装DAVE™程序开发套件，修改代码并上传新代码仿真

## › 如何导入SPICE模型

# Infineon Designer案例

## 入门电路 (1/2: 电路仿真)

### Infineon Designer: Getting Started

Infineon Designer is based on the easy to use multi-language TinaCloud environment. This is the online version of the popular TINA circuit simulation software now running in your browser without installation, on multiple platforms (PC, laptop, mobile, tablets, etc.). Analog circuits are modeled in Spice and can be co-simulated with digital systems using hardware description languages such as VHDL and Verilog.

#### How to select a device?

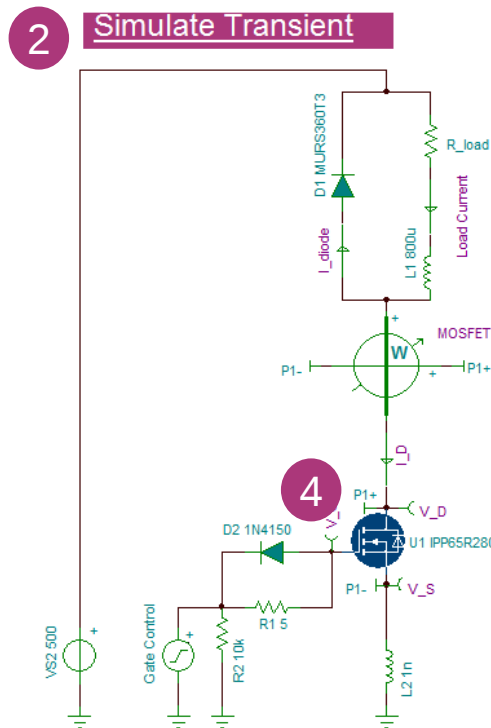
- 1) type Strg/CTRL-F and search for e.g. "U1"
- 2) the MOSFET device will turn red
- 3) click on the red symbol and open properties
- 4) click on "SubCkt-Type" to change the part
- 5) type the name into search or
- 6) use the pull-down to select a technology
- 7) click on OK and the part will change (may take a while)

#### How to search and display signals?

- 1) click on "Simulate Transient"
- 2) search with "Strg/CTRL-F" for "V\_G" voltage pin turning red
- 3) click on the voltage pin and open properties
- 4) change the "IO state" to "Output" for display
- 5) Label "V\_G:2" will be displayed as signal number 2
- 6) now simulate again and the signal will be displayed

#### How to save & share circuits?

- 1) click on login in the menu above
- 2) File -> Open -> Infineon Examples
- 3) change the circuit and click on File -> Save as
- 4) the circuit will be saved in the "My Circuits" folder
- 5) File -> Share and copy the link -or-
- 6) send an Email to share your circuit



6

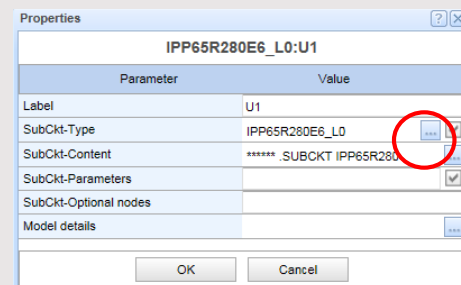
Log in to save, share, download circuits: [Login](#)

eMail Address

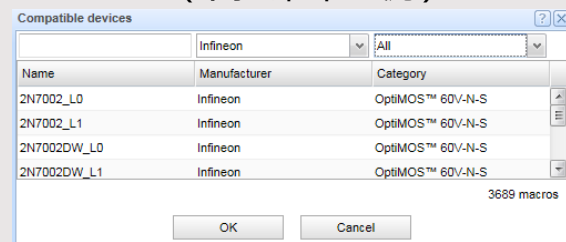
Password

[Logon](#)

1. 点击打开电路 [入门电路](#)
2. 点击启动仿真 [Simulate Transient](#)
3. 通过电路图了解应用电路功能和信号
4. 点击MOSFET图标后选择"SubCkt-type"项产品型号后的"..."



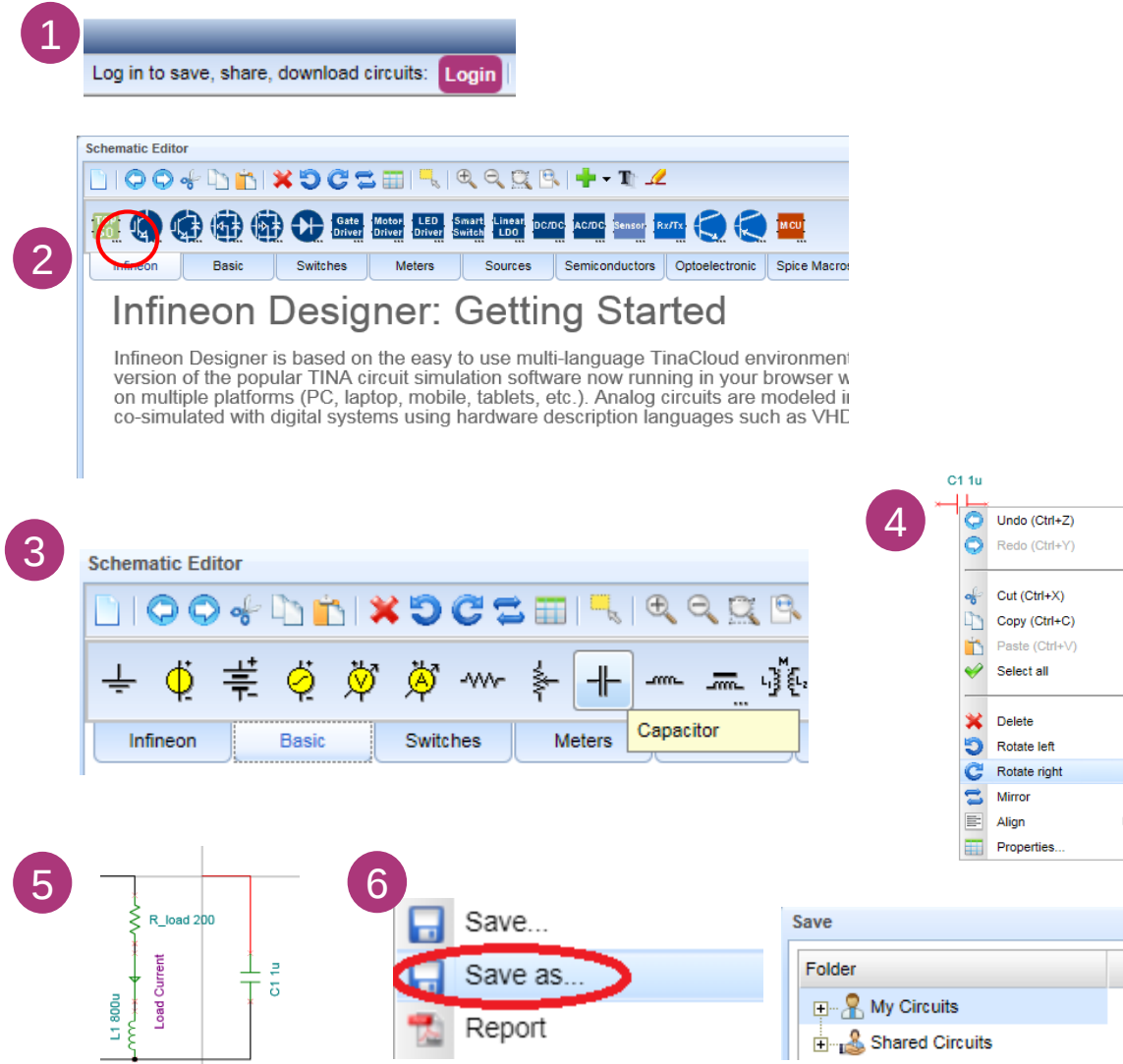
5. 在列表中重新选择一款别的 MOSFET (下拉菜单过滤)



6. 通过MyInfineon账户登录, 保存或分享您配置的电路

# Infinite Designer案例

## 入门电路 (2/2: 电路编辑)



1. 点击打开电路入门电路并用myInfineon账户登录
2. 点击不同的菜单选项并从“Infineon”选择所需器件。其他选项：如“基本”（电阻，电感，电容），仪表，发生源，半导体，等等。
3. 点击“基本”并添加一个电容器到当前电路
4. 选中电容器并右击鼠标旋转
5. 选中电容器端口并连线
6. 选择文件菜单栏的“另存为”并把电路保存到“我的电路”(MyCircuits)
7. 点击紫色超链接框再次启动仿真

[Simulate Transient](#)

# Infineon Designer案例

## 升压电路 (1/4: 系统效率)

**1**

**2**

**3**

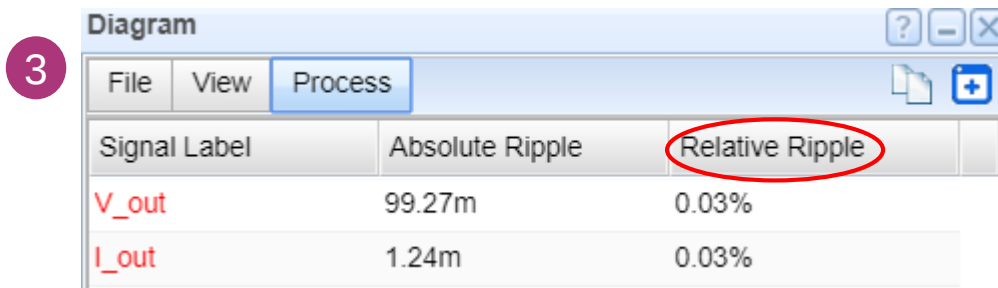
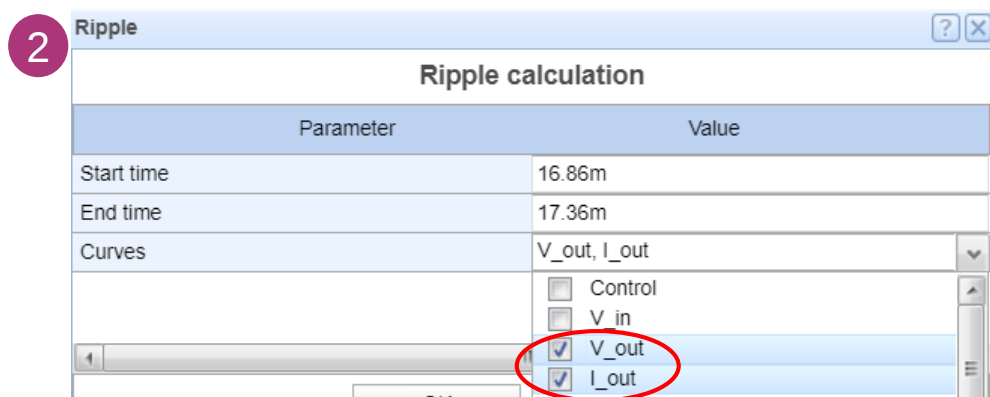
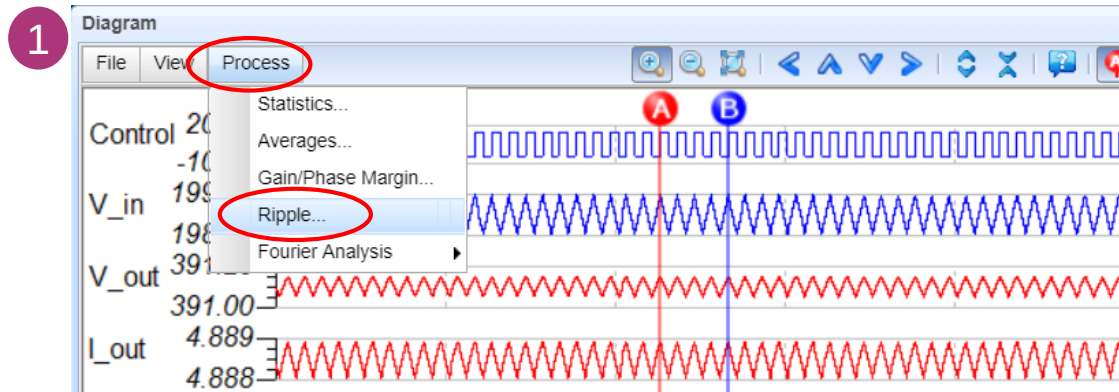
| Component | Power type | Power dissipation (W) | Percentage (%) | Pass/Fail |
|-----------|------------|-----------------------|----------------|-----------|
| V_in      | Source     | 1.95k                 | 100            | Pass      |
| R_load    | Sink       | 1.91k                 | 98.09          | Pass      |
| Diode     | Loss       | 7.4                   | 0.38           | Pass      |
| MOSFET    | Loss       | 20.24                 | 1.04           | Pass      |

**4**

1. 点击打开带已设定器件功率类型的升压电路并登录myInfineon账户
2. 打开菜单“分析 -> 瞬态...”，设定起始时间确保显示的信号处于电路稳态，勾选“Power dissipation analysis enabled”
3. 点击紫色超链接框启动系统效率和器件损耗的仿真  
**Simulate Efficiency**
4. 选择“Power dissipation”窗口，查看系统效率、器件损耗和器件是否符合该应用Pass/Fail
5. 选中瞬态 (Transient) 窗口，缩放全部 和放大 来检查信号细节，使用光标 和 来测量信号值

# Infineon Designer案例

## 升压电路 (2/4: 纹波计算)



1. 在上页提到的同一个瞬时信号窗口内，点击菜单栏中“过程 -> Ripple...”，从而打开纹波计算窗口
2. 选择需要纹波计算的信号，比如输出电压V\_out，输出电流I\_out
3. 查看对应信号的绝对纹波(Absolute Ripple)和相对纹波(Relative Ripple)
4. 通过类似步骤进行其他信号处理，比如：平均值计算，傅里叶分析，等等。

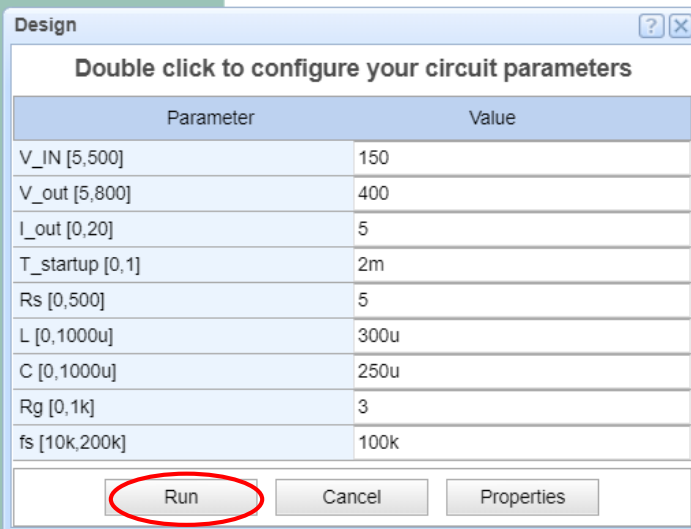
# Infineon Designer案例

## 升压电路 (3/4: 参数设置Design Tool)

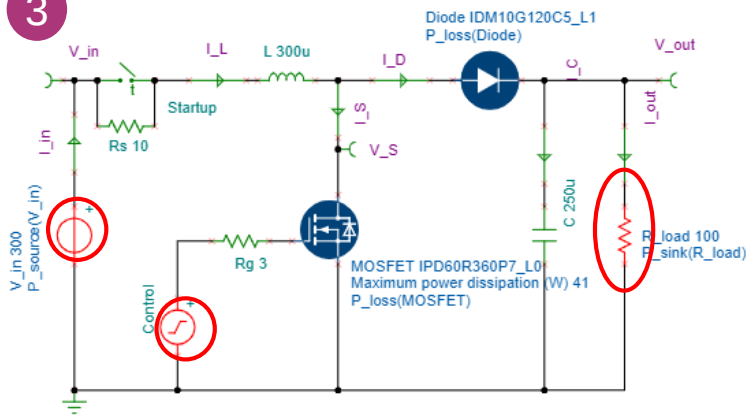
2

{ Double click to configure your circuit parameters }

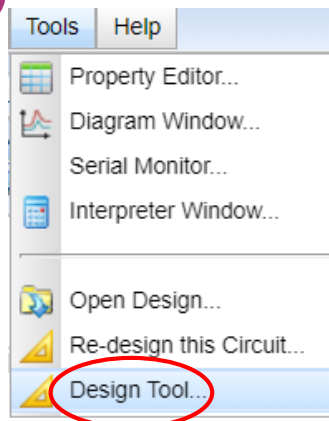
```
{ Input voltage [V] }  
V_IN := 150;  
{ Output voltage [V] }  
V_out := 400;  
{ Output current [A] }  
I_out := 5;  
{ Startup time [s] }  
T_startup := 2m;  
{ Startup resistance [Ohm] }  
Rs := 5;  
{ Inductance L [H] }  
L := 300u;  
{ Capacitance C [F] }  
C := 250u;  
{ Gate resistance Rg [Ohm] }  
Rg := 3;  
{ Switching freq [Hz] }  
fs := 100k;
```



3



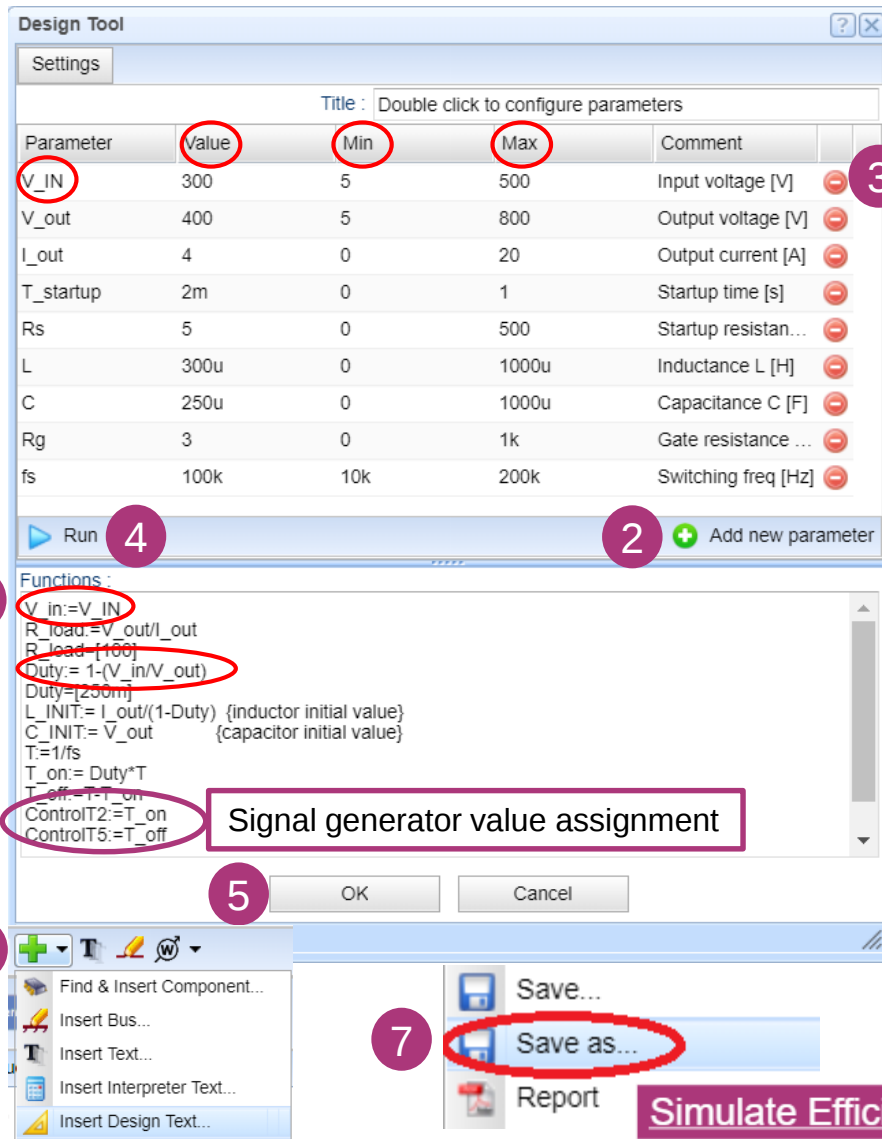
4



1. 关闭上页提到的信号图表窗口
2. 双击（需登录myInfineon账户）绿色参数配置框打开用于电路器件参数设置的设计工具(Design Tool)，设置完参数后点击“运行”用以执行计算和参数配置
3. 被修改参数的器件会以红色高亮显示，启动仿真查看修改参数后区别
4. 打开菜单“工具-> Design Tool...”来设置参数配置器的设定，比如修改特定计算公式或者修改赋值限定范围。

# Infineon Designer案例

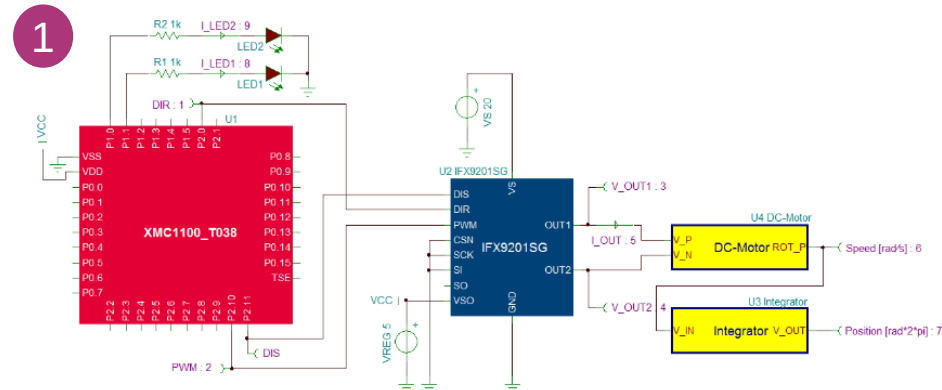
## 升压电路 (4/4: 参数设置Design Tool)



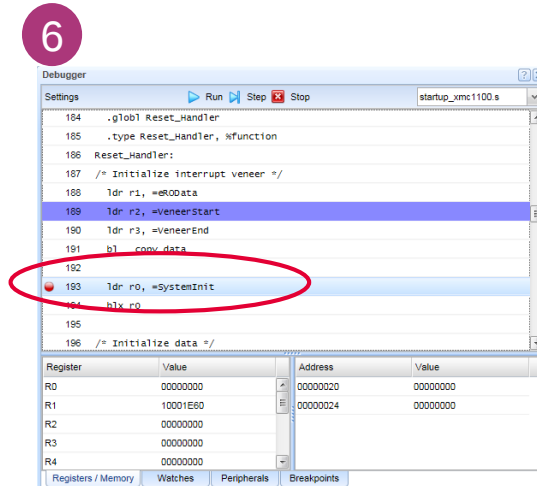
1. 编辑技术赋值公式，比如针对每个特定器件的基本赋值：  
V\_in:=V\_IN, V\_in是器件标签，V\_IN 是自己设定的全局变量，该全局变量用于配置框内对器件V\_in进行赋值，允许实际基础计算公式并赋值（参见左边例子）。
2. 在上方参数框内添加新参数，例如 V\_IN, 赋值，设定最大最小值并添加注解
3. 多余参数可被直接通过右边减号删除
4. 点击“运行”执行对Design Tool的重新配置
5. 点击“确定”确认并关闭Design Tool窗口
6. 点击菜单栏绿色加号图标 并点击“Insert Design Text...”，把刚刚设定的Design Tool参数配置框插入到电路编辑器中
7. 试验参数配置框，保存电路并启动仿真

# Infineon Designer XMC™ 程序调试案例

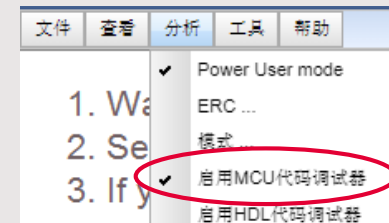
## H-Bridge Kit 2Go (1/3: 电路程序调试)



2 Simulate Transient



1. 点击打开电路 [H-Bridge Kit 2Go](#)
2. 点击启动仿真 **Simulate Transient**
3. 通过电路图了解应用电路功能和信号
4. 启用MCU代码调试器



5. 用TR交互模式开始交互瞬态仿真



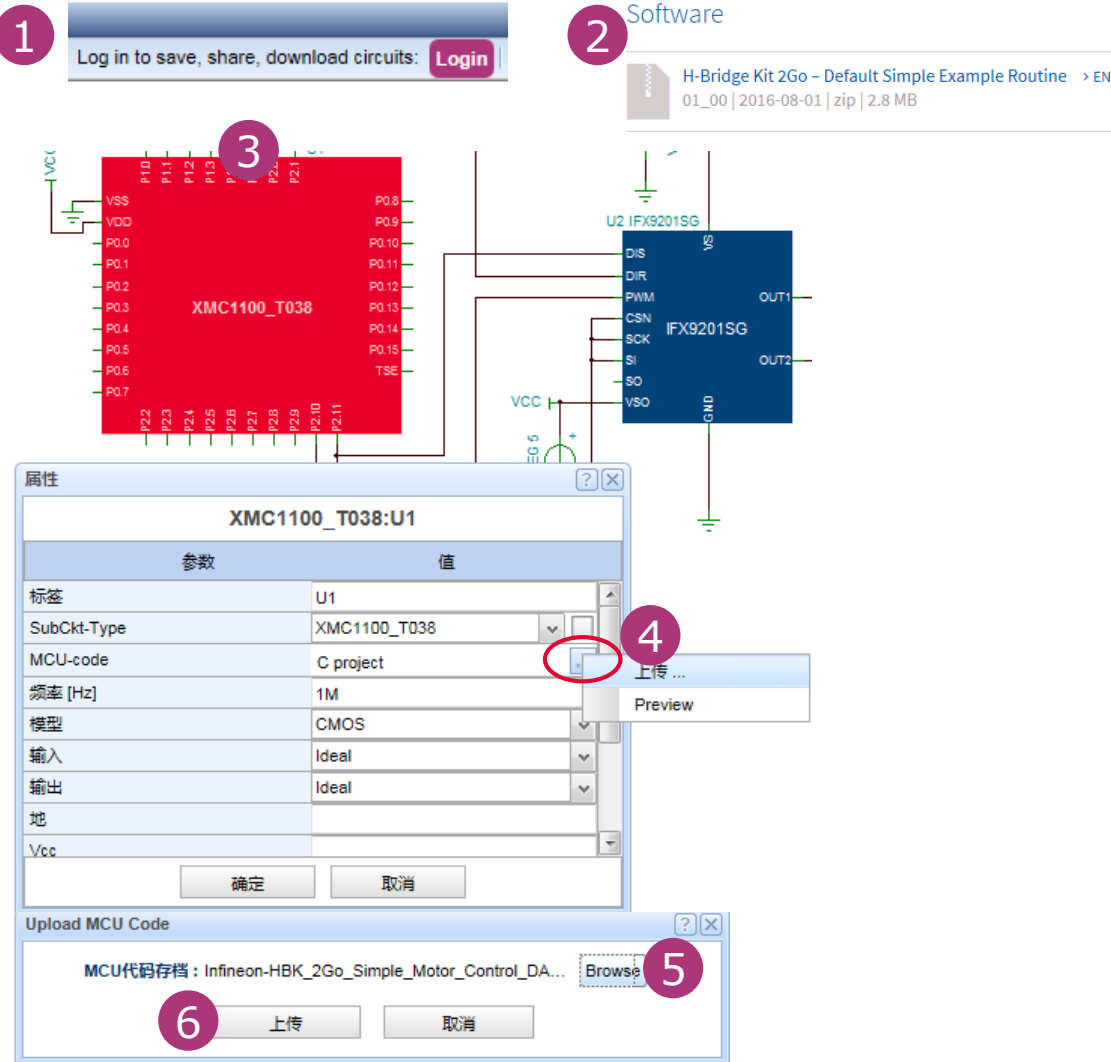
6. 在调试器窗口选择调试代码文件，设定断点并一步步调试
7. 在线购买样片或评估板



[Buy online](#)

# Infineon Designer XMC™ 程序调试案例

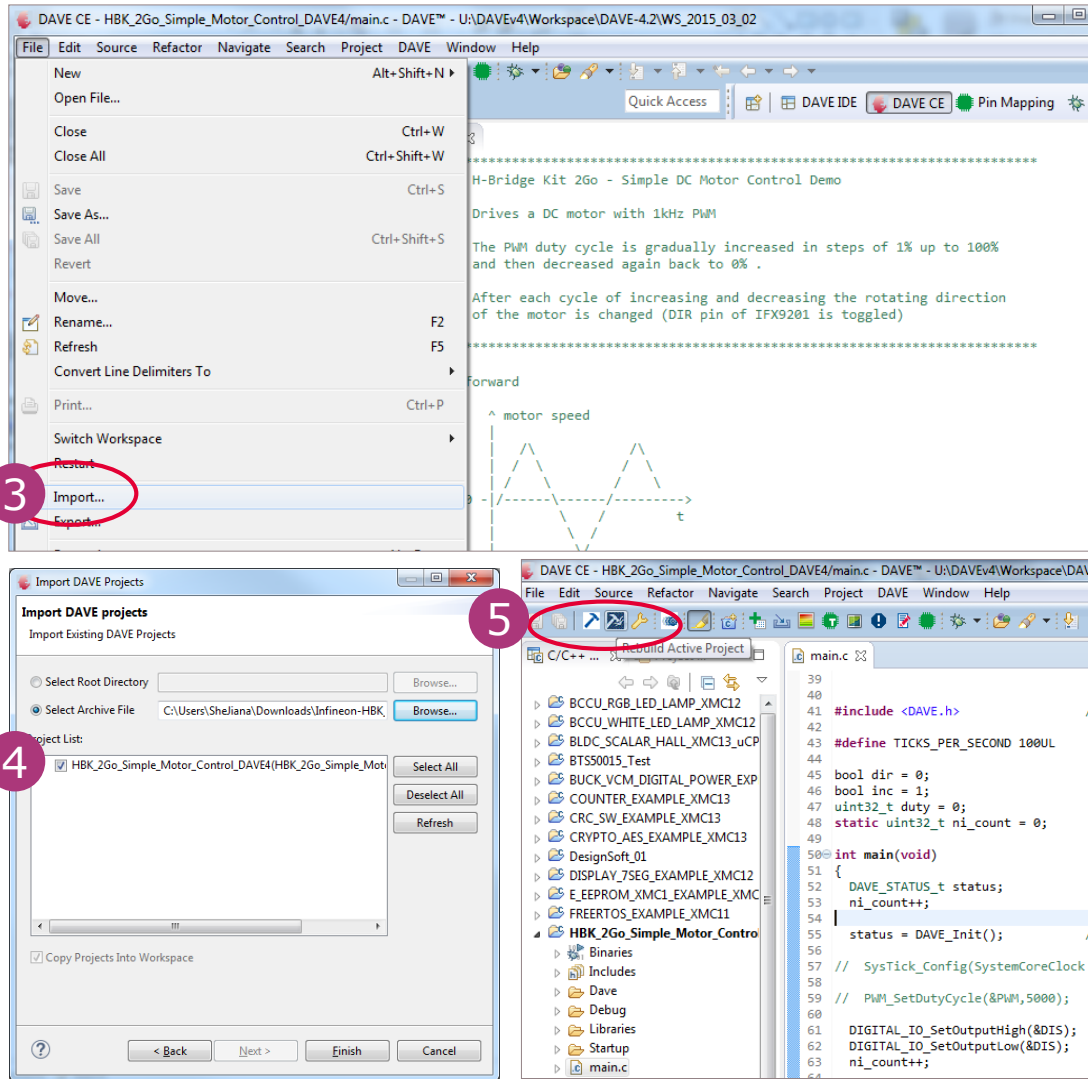
## H-bridge Kit 2Go (2/3: 上传软件)



1. 点击打开电路[H-bridge Kit 2Go](#)并用MyInfineon账户登录
2. 下载代码压缩包文件.zip  
[H-bridge Kit 2Go - default simple example routine](#) 评估板H-bridge Kit 2Go产品页[软件](#)和[工具选项卡](#)
3. 点击红色的XMC1100器件打开属性对话框
4. 点击MCU-code行的“...”打开上传代码
5. 选择路径确认已下载的代码压缩包(包括.elf, .hex 编译文件和源代码)
6. 上传代码Infineon-HBK\_2Go\_simple\_motor\_control\_DAVE4.zip-SW-v01\_00-EN.zip
7. 点击启动仿真 [Simulate Transient](#)
8. 查看仿真结果

# Infineon Designer XMC™ 程序调试案例

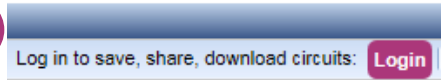
## H-bridge Kit 2Go (3/3: 修改代码并重新编译)



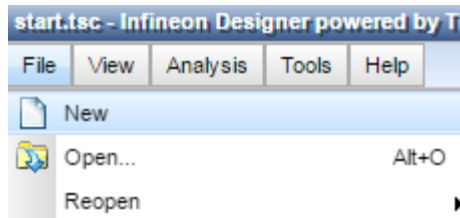
1. 下载并安装DAVE™开发套件  
[DAVE™ for windows](#)
2. 在评估板H-bridge Kit 2Go产品页  
[软件和工具选项卡](#), 下载代码压缩包  
文件.zip [H-bridge Kit 2Go –  
default simple example routine](#) 启  
动DAVE™并导入代码项目File →  
Import → Infineon DAVE™  
Project
3. 点击“Next”, 选择已下载代码压缩包  
路径并勾选项目
4. 修改代码并重新编译
5. 到DAVE™的Workspace工作空间目  
录并把整个项目目录打包成.zip
6. 重新回到电路点击红色XMC1100器  
件并上传修改后的代码

# 如何导入SPICE模型 (1/2)

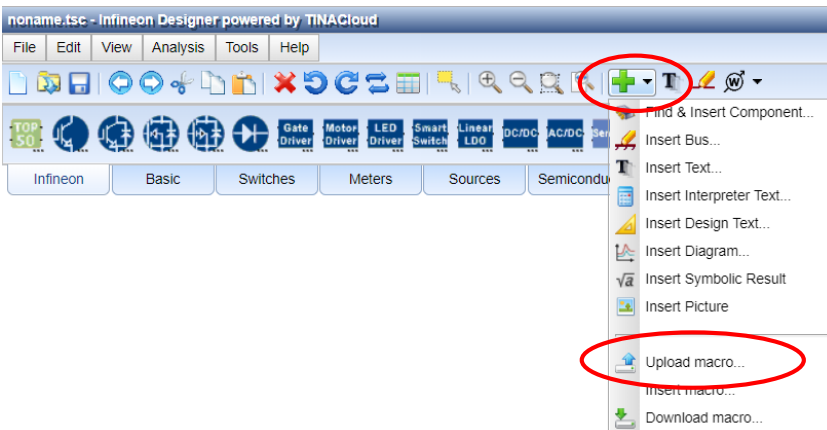
1



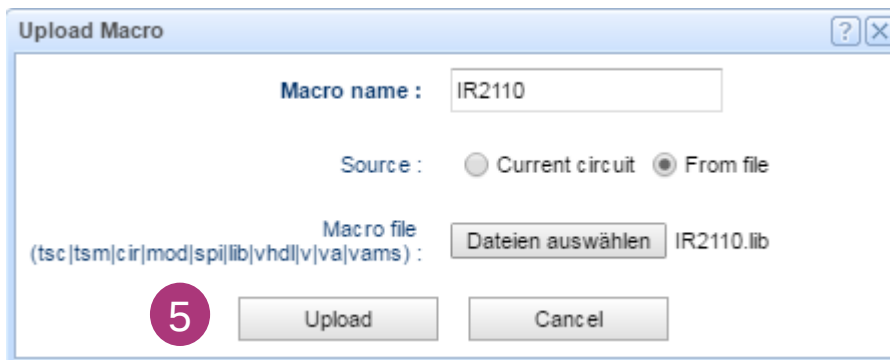
2



3



4



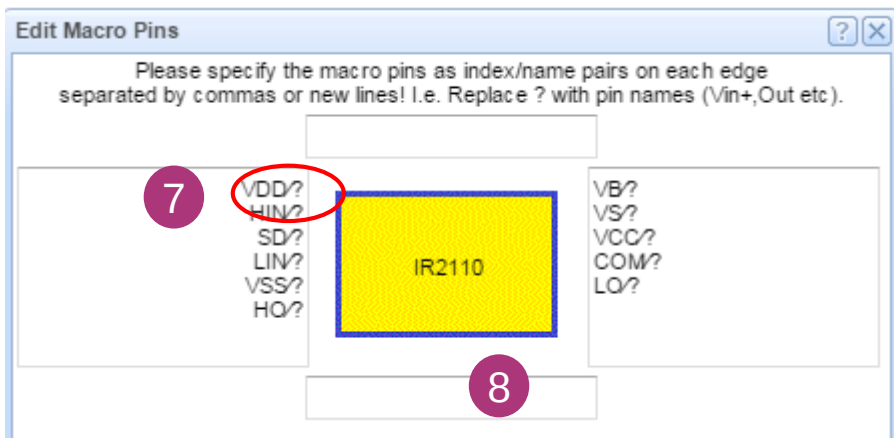
1. 用myInfineon账户[登录](#)
2. 选择菜单“文件 -> 新增”建立一个新的电路
3. 点击菜单栏图标  并点击“上传宏”(Upload macro)
4. 命名需上传的SPICE模型，选择“来自文件”，点击“Browse”并打开存储.SUBCKT格式SPICE模型的目录
5. 点击“上传”进入下一步

样例SPICE模型 [OrCAD Capture for IR2110](#)

```
.SUBCKT IR2110 VDD HIN SD
LIN VSS HO VB VS VCC COM
LO
+PARAMS:
+      T1=-40 T2=25
T3=125
...
.ENDS IR2110
```

# 如何导入SPICE模型 (2/2)

6



6. 编辑图标管脚分布

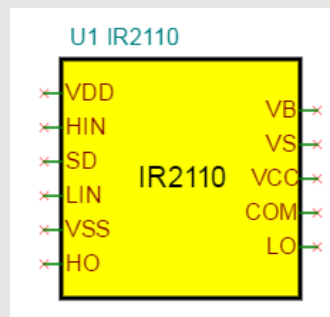
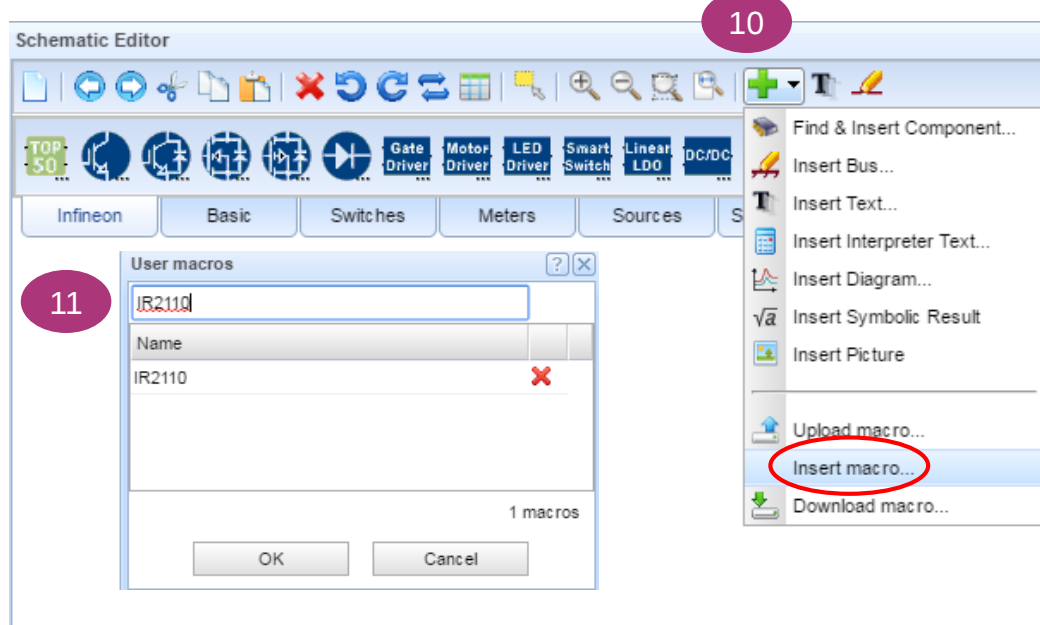
7. 可选：用新的管脚名替代“?”（?代表显示和模型中一样的管脚名）  
比如：VDD/? -> VDD/Vdd

8. 可选：把管脚根据需求分布在上、下、左、右

9. 点击“确定”完成上传模型

10. 点击菜单栏图标  且点击“Insert macro...”（插入模型）

11. 选择IR2110模型并放置到当前电路中使用



12. 完成电路设计并保存为自己的新电路：“Save...”或“另存为...”

13. 启动仿真测试电路

# Agenda

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1

英飞凌在线设计和仿真工具概览

2

参数搜索产品选型工具

3

应用方案查找器

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Infineon Designer在线时域仿真入门指南及其新特性

5

在线系统效率和热仿真：IPOSIM & PLECS

6

总结和技术支持

# 点击IPOSIM页面，开启功率模块和盘片热仿真之旅

## [www.infineon.com/iposim](http://www.infineon.com/iposim)



> Home > 设计工具



Start here



## 欢迎使用全新Infineon IPOSIM

感谢您使用IPOSIM - 用于英飞凌功率模块和盘片的，计算功率损耗和结温（热表现）的在线仿真工具。它将帮助您：

- 选择适用于指定拓扑的匹配产品
- 在给定工作条件下，计算器件的开关损耗和导通功率损耗以及热表现
- 比较不同工作条件下，不同产品的性能，并保存结果

3

第一步：注册myInfineon

请点击注册myInfineon。注意：您之前旧IPOSIM的账户无法登陆新系统。

第二步：登陆并选择拓扑

请登陆并选择符合您应用需求的拓扑。

第三步：输入参数

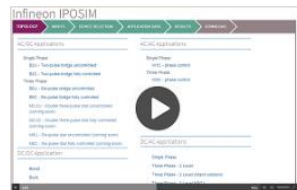
请设定输入参数或选择负载周期仿真。

第四步：选择器件\*

第五步：启动仿真并比较结果

第六步：技术支持

### 如何使用Infineon IPOSIM



### 如何使用Infineon IPOSIM

### Infineon书籍 - IGBT 模块



## 1. myInfineon账户注册

- 如已有该账户，跳过该步骤直接访问使用
- 由于欧盟新隐私保护法规定，原来老的IPOSIM系统的账户将不被自动转移，用户需重新注册myInfineon账户才能使用新系统

## 2. 入门指南

- 文档
- 视频

## 3. 一步步通过带有超链接的步骤解释操作

# 注册myInfineon

## 注册链接

1



2

注册“我的英飞凌”



电子邮箱

请输入有效的电子邮件地址。

请输入您的商务电子邮箱地址，以便了解“我的英飞凌”提供的各种优惠。

国家/区域

请输入您目前的工作地点所在的国家/区域

☐ 根据[隐私政策](#),我同意处理我的个人数据。

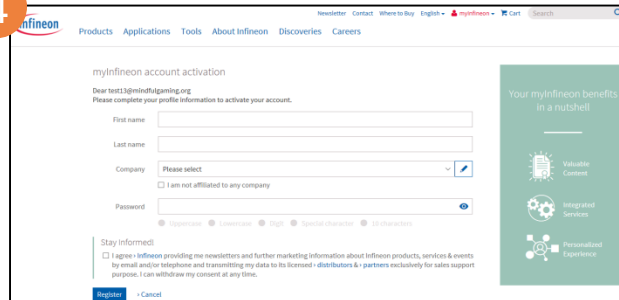
[注册](#)

已经有帐号? [登录](#)

3



4

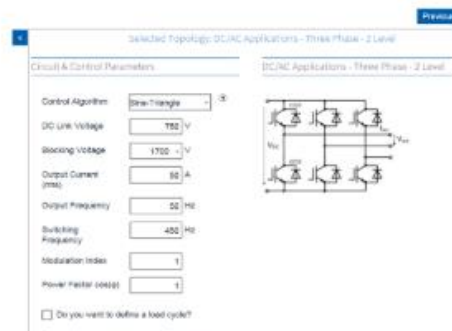


1. 点击英飞凌主页上方myInfineon下拉菜单中的“注册myInfineon账户”或直接点击[注册链接](#)
2. 在弹出的注册窗口中输入电子邮箱和国家/地区信息
3. 一份确认激活账户的电子邮件会被发送给您
4. 点击确认邮件中的链接并完善注册信息

## 第二步：登陆并选择拓扑



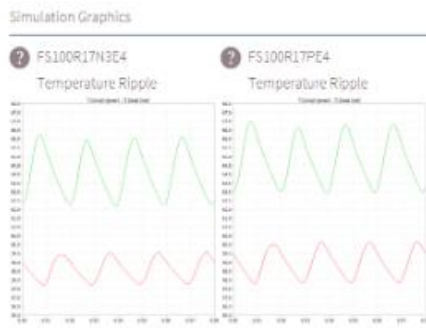
### 第三步：输入参数



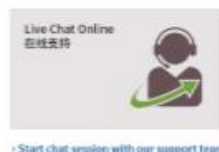
#### 第四步：选择器件"



### 第五步：启动仿真并比较结果



## 第六步：技术支持



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# 第一步：登陆并选择拓扑

- 1
- 2
- 3
- 4
- 5
- 6

拓扑 输入 设备选择 应用数据 结果 下载

## 交流/直流应用

单相

B2U – 双脉冲桥式无控制

B2C – 双脉冲桥式全控制

三相

B6U – 六脉冲桥式无控制

B6C – 六脉冲桥式全控制

M3.2U – 双六脉冲星形无控制

M3.2C – 双六脉冲星形全控制

M6U 六脉冲星形无控制

M6C 六脉冲星形全控制

## 直流/直流应用

升压

降压

DC decoupling

## 交流/交流应用

单相

W1C 相控制

三相

W3C 相控制

例如：三相双电平逆变器拓扑

## 直流/交流应用

单相

三相 – 双电平

三相 – 双电平（堆栈解决方案）

三相 – 三电平 NPC1

三相 – 三电平 NPC2

## 第二步：输入参数

[上一步](#)
[下一步](#)

所选拓扑: 直流/交流应用 - 三相 - 双电平

电路和控制参数

直流/交流应用 - 三相 - 双电平

控制算法

正弦-三角



直流母线电压

750 V

阻断电压

1700 V

输出电流均方根

50 A

输出频率

50 Hz

开关频率

2000 Hz

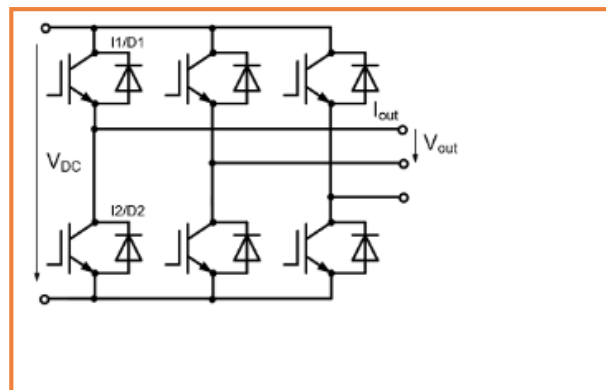
调制指数

1

功率因数  $\cos(\varphi)$

0.8

☐ 是否想要定义负载周期?



2

拓扑结构

1

设置参数，选择是否需要负载周期仿真

## 第三步：选择器件

上一步 下一步

所选拓扑: 直流/交流应用 - 三相 - 双电平

请选择产品进行下一步

按封装形式过滤 All 搜寻:

所选器件: FS100R17KE3 FS100R17PE4 清除选择 每页产品数: 50 1-50 of 173

|                                     |                    |     | 模块参数    |                      | IGBT参数              |                                |                                                  |                         | 二极管参数                   |                            |                                |                         |                         |           |
|-------------------------------------|--------------------|-----|---------|----------------------|---------------------|--------------------------------|--------------------------------------------------|-------------------------|-------------------------|----------------------------|--------------------------------|-------------------------|-------------------------|-----------|
|                                     | Device Name        | TIM | Package | V <sub>CES</sub> [V] | I <sub>on</sub> [A] | V <sub>CEsat</sub> , 125°C [V] | E <sub>on</sub> + E <sub>off</sub> , 125°C [mWs] | R <sub>thJH</sub> [K/W] | T <sub>vjmax</sub> [°C] | V <sub>F</sub> , 125°C [V] | E <sub>rec</sub> , 125°C [mWs] | R <sub>thJH</sub> [K/W] | T <sub>vjmax</sub> [°C] | Datasheet |
| <input type="checkbox"/>            | FS50R17KE3_B17     |     | Econo2  | 1700                 | 50                  | 2.40                           | 31.90                                            | 0.55                    | 125                     | 1.9                        | 13.60                          | 0.96                    | 125                     |           |
| <input type="checkbox"/>            | FP75R17N3E4        |     | Econo3  | 1700                 | 75                  | 2.35                           | 43.95                                            | 0.39                    | 150                     | 1.9                        | 17.20                          | 0.69                    | 150                     |           |
| <input type="checkbox"/>            | FP75R17N3E4_B11    |     | Econo3  | 1700                 | 75                  | 2.35                           | 43.95                                            | 0.39                    | 150                     | 1.9                        | 17.20                          | 0.69                    | 150                     |           |
| <input type="checkbox"/>            | FS75R17KE3         |     | Econo3  | 1700                 | 75                  | 2.40                           | 47.70                                            | 0.35                    | 125                     | 1.9                        | 20.50                          | 0.63                    | 125                     |           |
| <input checked="" type="checkbox"/> | FS100R17KE3        |     | Econo3  | 1700                 | 100                 | 2.40                           | 63.50                                            | 0.31                    | 125                     | 1.9                        | 27.30                          | 0.54                    | 125                     |           |
| <input type="checkbox"/>            | FS100R17KS4F       |     | Econo3  | 1700                 | 100                 | 4.90                           | 21.50                                            | 0.20                    | 125                     | 3.5                        | 1.10                           | 0.78                    | 125                     |           |
| <input type="checkbox"/>            | FS100R17N3E4       |     | Econo3  | 1700                 | 100                 | 2.35                           | 48.00                                            | 0.32                    | 150                     | 1.9                        | 20.00                          | 0.67                    | 150                     |           |
| <input type="checkbox"/>            | FS100R17N3E4_B11   |     | Econo3  | 1700                 | 100                 | 2.35                           | 48.00                                            | 0.32                    | 150                     | 1.9                        | 20.00                          | 0.67                    | 150                     |           |
| <input checked="" type="checkbox"/> | FS100R17PE4        |     | Econo3  | 1700                 | 100                 | 2.35                           | 48.00                                            | 0.33                    | 150                     | 1.9                        | 23.00                          | 0.60                    | 150                     |           |
| <input type="checkbox"/>            | IFS100B17N3E4P_B11 |     | Econo3  | 1700                 | 100                 | 2.35                           | 57.10                                            | 0.29                    | 150                     | 1.9                        | 24.00                          | 0.52                    | 150                     |           |
| <input type="checkbox"/>            | FF150R17KE4        |     | 62mm HB | 1700                 | 150                 | 2.35                           | 102.00                                           | 0.17                    | 150                     | 1.7                        | 40.00                          | 0.20                    | 150                     |           |

## 第四步：设置其他应用参数

上一步 下一步

«
所选拓扑: 直流/交流应用 - 三相

冷却条件

高级参数

负载周期数据

在定义散热器时需要帮助? ?

1. 散热器参数

FS100R17KE3

☐ 预定义的散热器  
☐ 用户自定义散热器  
☒ 固定散热器温度

FS100R17PE4

☐ 预定义的散热器  
☐ 用户自定义散热器  
☒ 固定散热器温度

2. 显示

$T_{\text{heatsink}}$ 

50 °C

$T_{\text{heatsink}}$ 

50 °C

1

设置散热器参数

2

设置高级参数和负载周期

2019-06-07

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Infineon Proprietary

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# 第四步：按需求设置负载周期

**冷却条件** | **高级参数** | **负载周期数据**

负载周期输入

Interpolation ☒

用户定义的负载周期数 ☐

(如果没有提供负载周期数, 则稳态模拟将运行。)

仿真特性 平均值 / 文波

选择仿真特性 温度波动

Excel 处理

将负载周期处理为 Excel 文件  
如要上传负载周期, 请首先选择 Excel 文件!

[下载](#)

请选择一个文件! Choose File No file chosen

[上传](#)

**1 设置负载周期基本信息**

**5 下载或上传负载周期(Excel)**

**2 设置负载周期**

**3 加减行数**

**4 保存负载周期便于超链接分享**

**负载周期数据**

| Time [s] | 输出电流均方根 [A] | 输出频率 [Hz] | 功率因数 cos(φ) | 开关频率 [Hz] | 调制指数 | 直流母线电压 [V] |
|----------|-------------|-----------|-------------|-----------|------|------------|
| 0        | 100         | 50        | 0.8         | 2000      | 1    | 750        |
| 2        | 200         | 50        | 0.8         | 2000      | 1    | 750        |
| 5        | 150         | 50        | 0.8         | 2000      | 1    | 750        |
| 10       | 150         | 50        | 0.8         | 2000      | 1    | 750        |
| 0        | 0           | 0         | 0           | 0         | 0    | 0          |

保存

## 第五步：启动仿真并比较结果

上一步

启动仿真

1

启动仿真

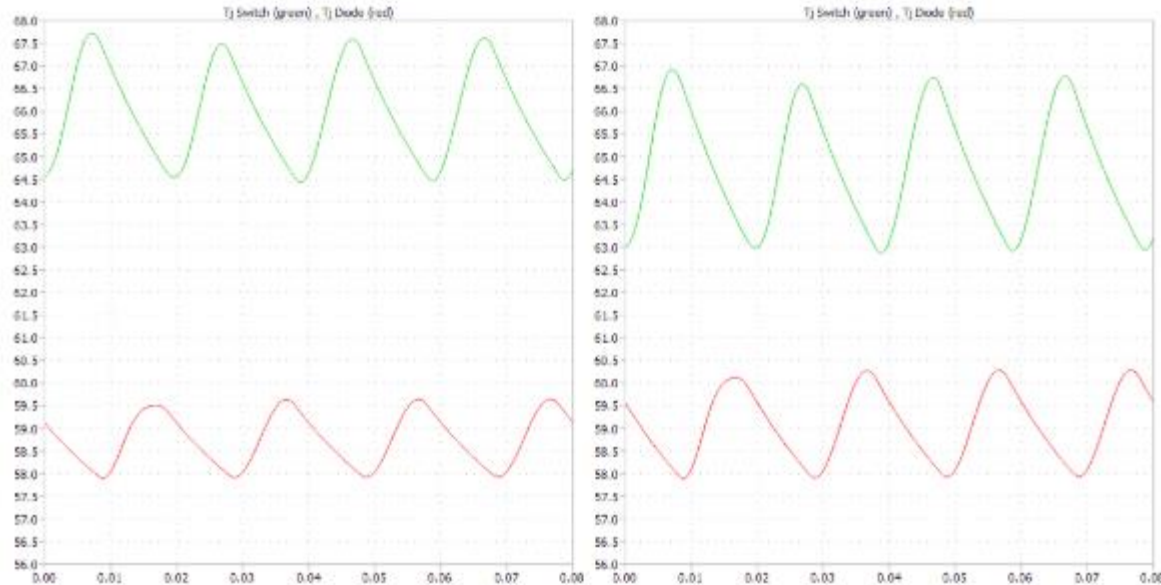
模拟图

? FS100R17KE3

? FS100R17PE4

温度波动

温度波动



2

多个IGBT模块  
的温度纹波

## 第五步：启动仿真并比较结果

Steady-State Analysis finished: Fri Jun 7 17:36:20 2019      Steady-State Analysis finished: Fri Jun 7 17:36:23 2019

| FS100R17KE3 |         | FS100R17PE4 |         |
|-------------|---------|-------------|---------|
| 仿真结果        |         | 仿真结果        |         |
| 最高结温        |         | 最高结温        |         |
| Switch      | 67.6 °C | Switch      | 66.8 °C |
| Diode       | 59.6 °C | Diode       | 60.3 °C |
| 开关功率损耗      |         | 开关功率损耗      |         |
| Switch      | 22 W    | Switch      | 14.7 W  |
| Diode       | 10.1 W  | Diode       | 8.9 W   |
| 导通功率损耗      |         | 导通功率损耗      |         |
| Switch      | 29.8 W  | Switch      | 29.8 W  |
| Diode       | 6.2 W   | Diode       | 6.2 W   |
| 总功率损耗       |         | 总功率损耗       |         |
| Switch      | 51.7 W  | Switch      | 44.4 W  |
| Diode       | 16.3 W  | Diode       | 15.1 W  |
| FS100R17KE3 |         | FS100R17PE4 |         |

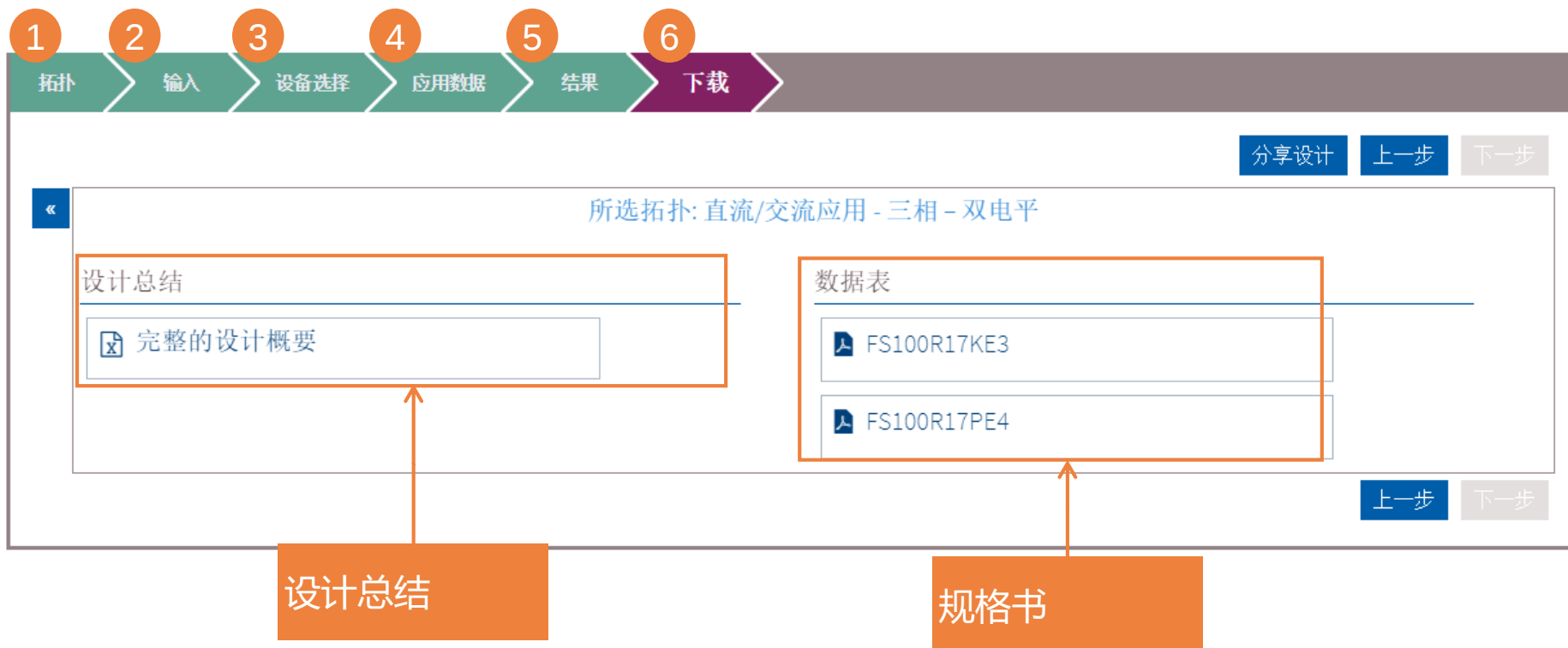
1

最高结温

2

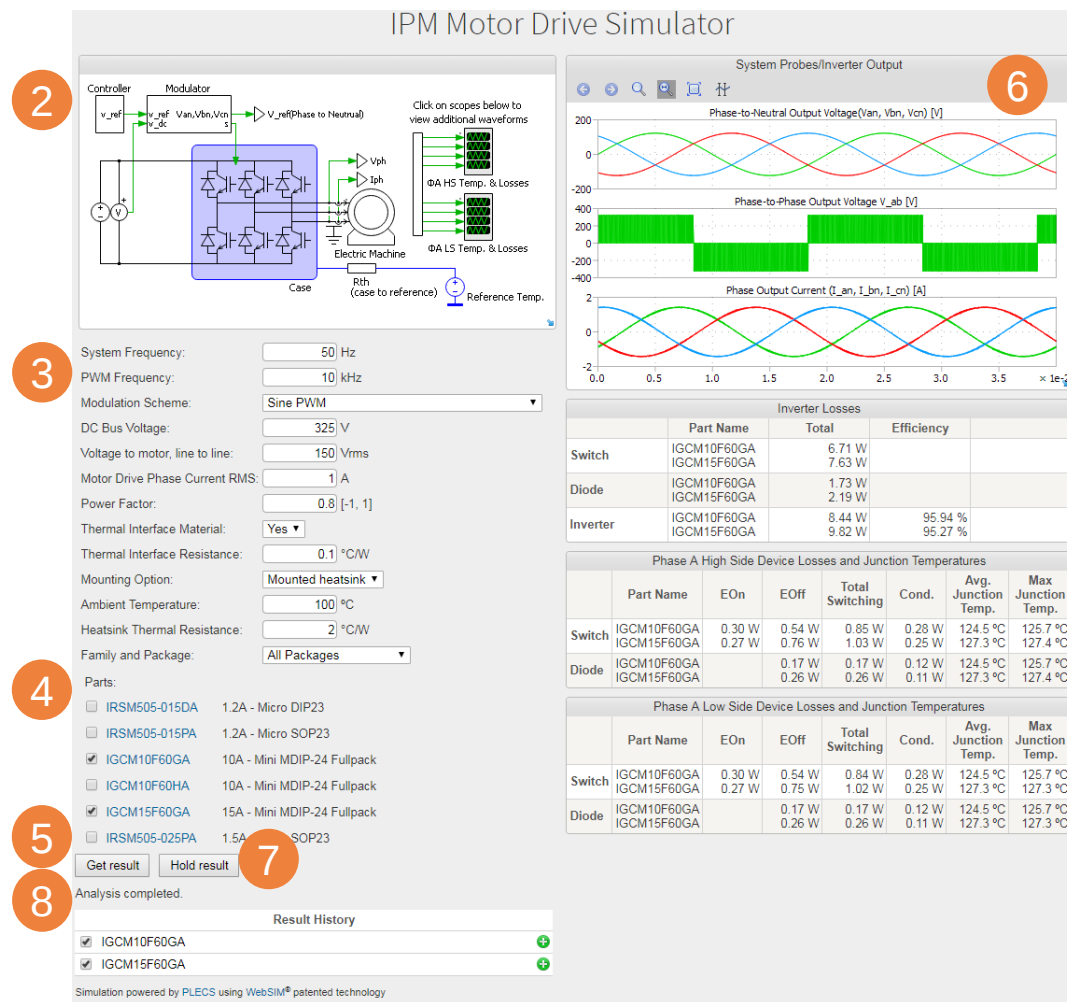
导通和开关损耗

## 第六步：下载结果



# PLECS 系统效率和热仿真实例

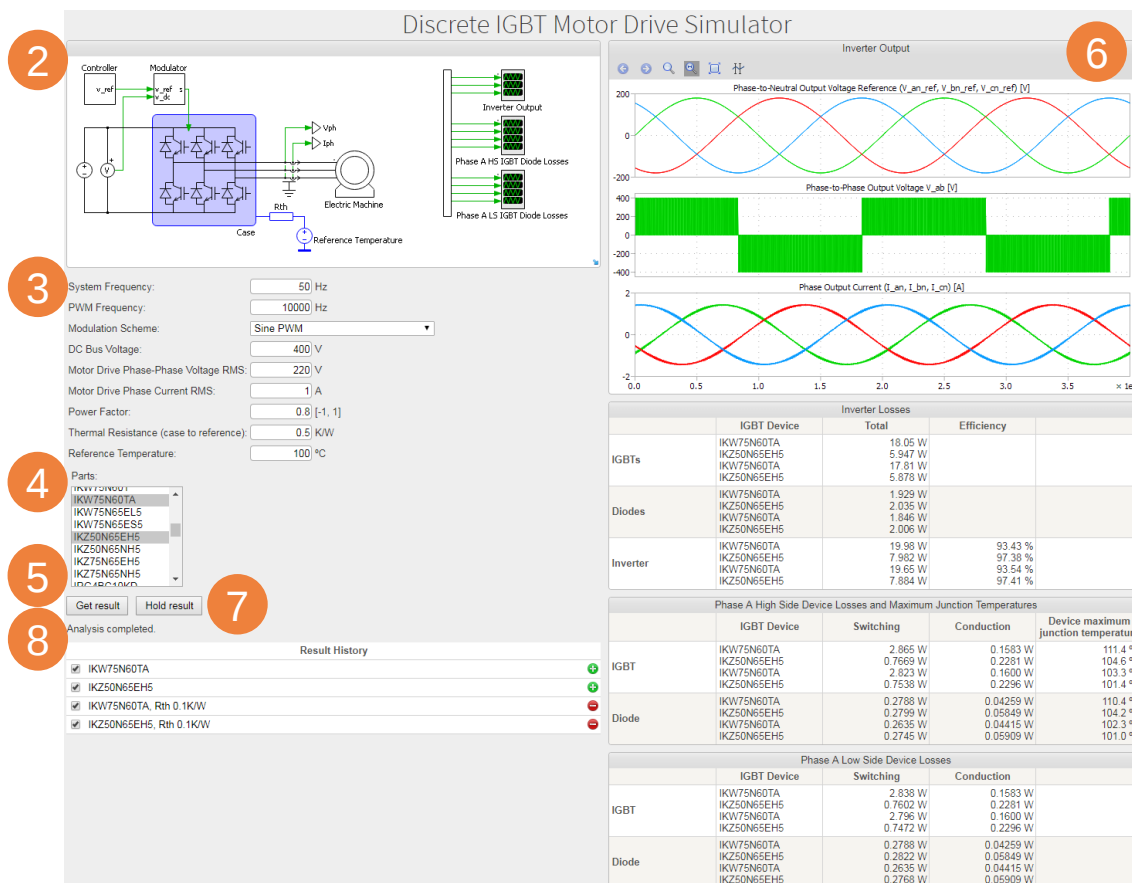
## IPM Motor Drive Simulator



1. 点击打开电路 [IPM Motor Drive Simulator](#)
2. 通过框图了解应用电路功能和信号
3. 设置应用参数和散热条件
4. 选择一个或多个产品
5. 点击'Get result'启动仿真
6. 查看仿真结果: 波形, 损耗 (losses), 效率 (efficiency), 结温 (junction temperature)
7. 点击'Hold result'保持目前仿真结果和之后仿真结果进行比较, 比如: 改变散热条件等
8. 重新点击'Get result'启动新的仿真并比较结果

# PLECS 系统效率和热仿真实例

## Discrete IGBT Motor Drive Simulator



1. 点击打开电路 [Discrete IGBT Motor Drive Simulator](#)
2. 通过框图了解应用电路功能和信号
3. 设置应用参数和散热条件
4. 选择产品：单击选择单个产品，Ctrl键和单击鼠标组合选择多个产品
5. 点击'Get result'启动仿真
6. 查看仿真结果: 波形，损耗 (losses)，效率 (efficiency)，结温 (junction temperature)
7. 点击'Hold result'保持目前仿真结果和之后仿真结果进行比较，比如：改变散热条件等
8. 重新点击'Get result'启动新的仿真并比较结果

# Agenda

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1

英飞凌在线设计和仿真工具概览

2

参数搜索产品选型工具

3

应用方案查找器

4

Infineon Designer在线时域仿真入门指南及其新特性

5

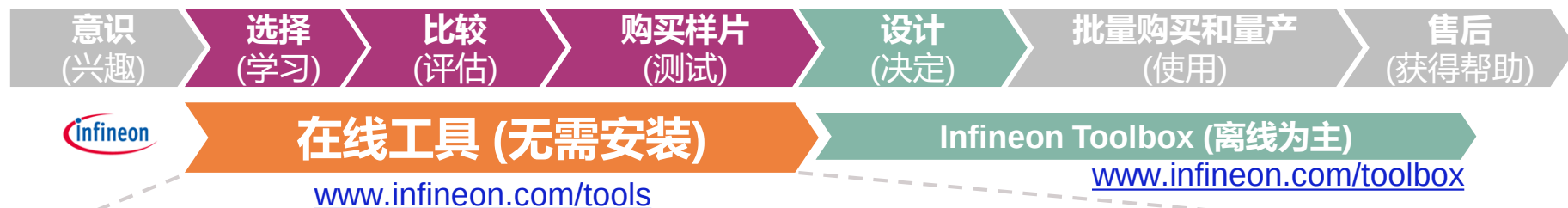
在线系统效率和热仿真：IPOSIM & PLECS

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总结和技术支持

# 在线仿真和设计工具 – 总结

[www.infineon.com/tools](http://www.infineon.com/tools)



| 如何选择合适的产品?                                                                                                          | 如何选择应用解决方案?                                                                                                                           | 如何用仿真检测性能?                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 产品级                                                                                                                 | 应用级                                                                                                                                   | 系统-仿真级                                                                                                                                                                                                                                                                                 |
| <ul style="list-style-type: none"><li>› <a href="#">17个产品查找器</a></li><li>› 基于参数搜索</li><li>› 适用于已确定产品类型和参数</li></ul> | <ul style="list-style-type: none"><li>› <a href="#">应用方案查找器</a></li><li>› 基于系统框图</li><li>› 流程清晰, 简便易用</li><li>› 结合参数查找和系统仿真</li></ul> | <ul style="list-style-type: none"><li>› <a href="#">Infineon Designer</a>基于Spice, 适用于瞬时信号仿真或在稳态下的系统效率和损耗仿真, 仿真过程详细, 耗时较长</li><li>› <a href="#">Infineon Designer</a>已发布超过460个应用电路</li><li>› <a href="#">IPOSIM/PLECS</a>基于查找表和公式计算, 用于系统效率、损耗和热仿真, 计算过程快速, IPOSIM也带有负载特性曲线仿真</li></ul> |

# 技术支持

› 请访问 [www.infineon.com/support](http://www.infineon.com/support)

## Support Page

Support is available in English, German and Mandarin from our talented team of experts.



› Start chat session with our support team



› Get product support from our technical experts



› Call us toll-free 24/7

Find an answer to your question

Please state your question (with at least 3 words)

### FAQ

1. Technical Support [CN] [DE]
2. Chip Card and Security Distis [CN] [DE]
3. HiRel Discretes for special applications, e.g. Aero and Space [CN] [DE]
4. Supplier Service, Supplier Page, page registration [CN] [DE]
5. Use Infineon Designer for Simulation and Development of your Circuit [CN] [DE]
6. How to login to myInfineon [CN] [DE]

## 资源列表 <https://www.infineon.com/tools>

### 查找工具

- › [Infineon 半导体应用方案查找器](#)
- › [Infineon 评估版查找工具](#)
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