

# New 2300 voltage class

PrimePACK™ 3+ module for 1500 V PV central inverters







인피니언 전력반도체 솔루션  
가상부스에 오신 걸 환영합니다!



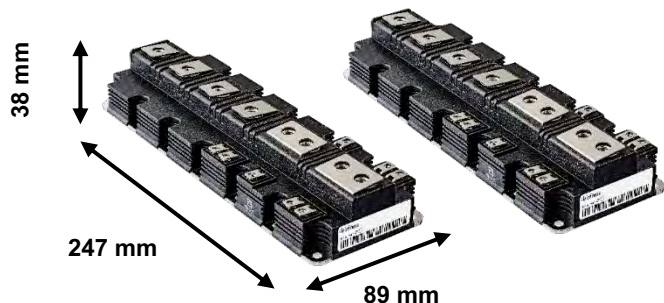
# PV central inverter key requirements

## Key requirements

- 
**System voltage of 1500 V DC**
  - high robustness against cosmic radiation (low CR-FIT)
  - creepage and clearance distances
- 
**High power density ( $\text{A}/\text{cm}^2$ ) for mechanical fit**
  - high power output  $P_{\text{out}} > 1 \text{ MW/subsystem}$
  - $P_{\text{out}} > 1 \text{ MW/subsystem}$  @ forced air cooling
- 
**High efficiency**
  - “low” total losses
  - switching frequency 2.5...4 kHz
- 
**Flexible design suitable for 2-level and 3-level NPC 2 topologies**

# PrimePACK™ 3+ package with IGBT7 chip

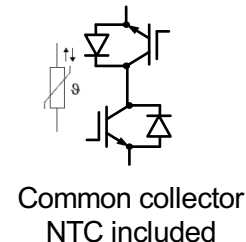
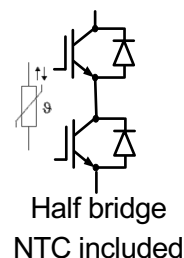
## Housing dimensions



Voltage class	2.3 kV	1.2 kV
Current rating	1800 A	2400 A
Topology	<b>Half-bridge</b>	<b>Common collector</b>
Technology	<b>IGBT7 / EC7</b>	<b>IGBT7 / EC7</b>
Type name	FF1800R23IE7	FF2400RB12IP7

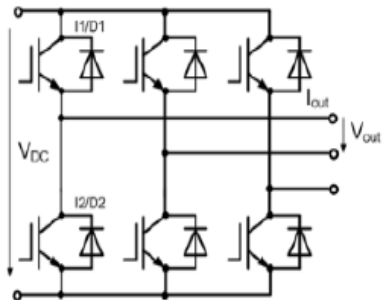
## Features and technologies

- ✓ 2.3 kV application-oriented voltage class with latest IGBT7 technology
- ✓ 1.2 kV IGBT7 technology with 2400 A to support max. power rating in the system
- ✓ Module set in the same housing
- ✓ NPC2-optimized common collector module layout
- ✓ PrimePACK™ housing with large creepage and clearance distances

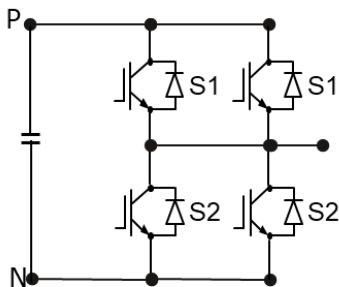


# 2-level design possibilities

## 2-level topology

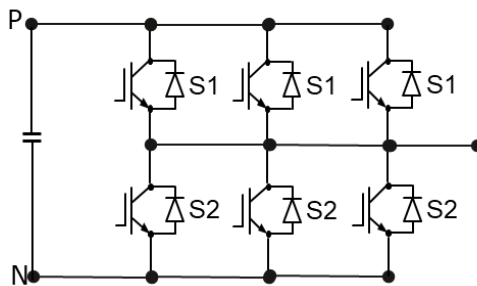


## 2-level, two-module configuration for increased power



**FF1800R23IE7**

## 2-level, three-module configuration for even more power



**FF1800R23IE7**

# 3-level NPC2 design possibilities

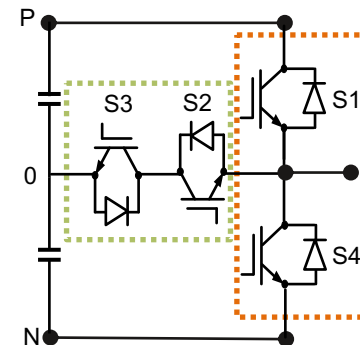
## 3-level NPC2 two-module configuration for increased power

FF2400RB12IP7



+

FF1800R23IE7



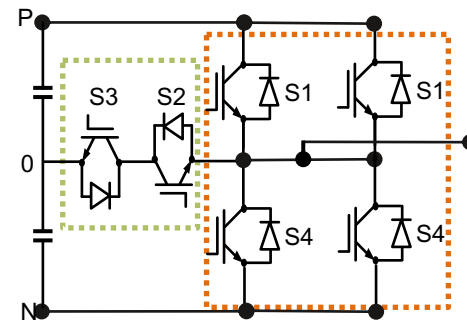
## 3-level NPC2 three-module configuration for even more power

FF2400RB12IP7



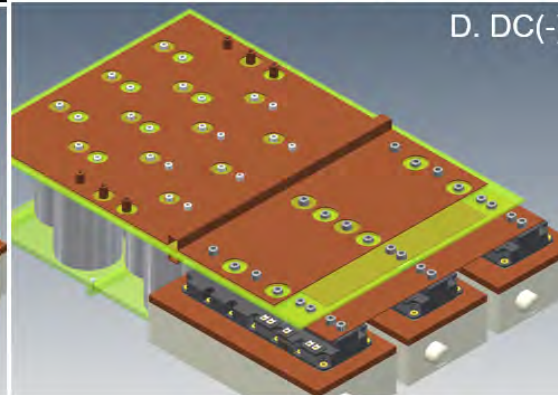
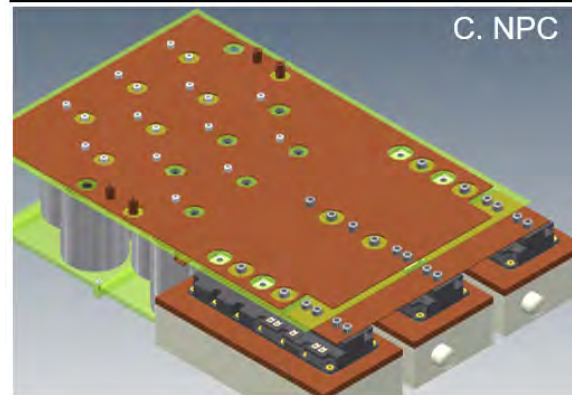
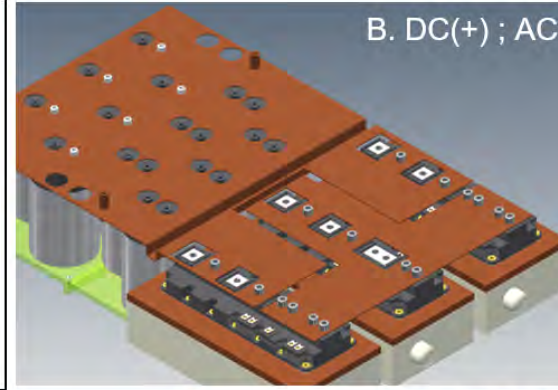
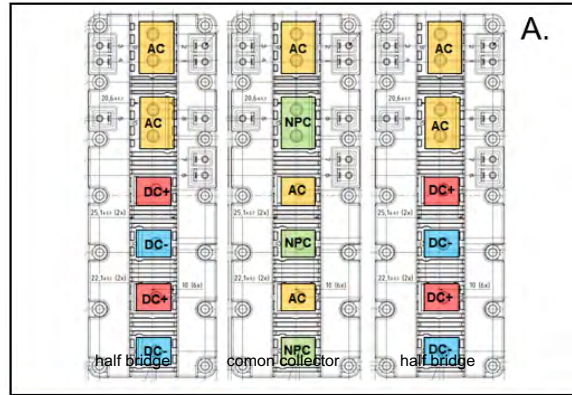
+

FF1800R23IE7



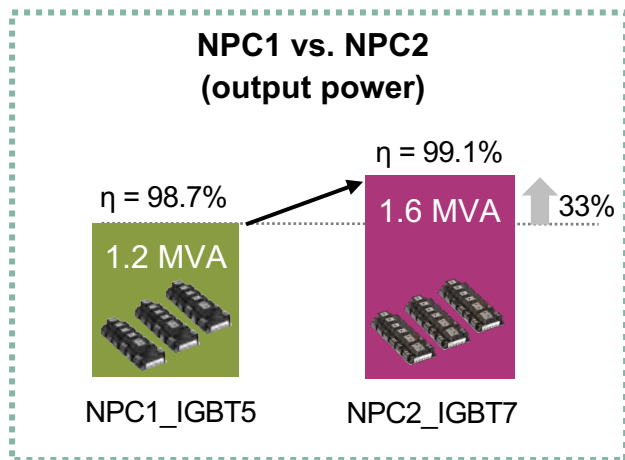


# Example of an optimized low-inductive and symmetrical module configuration for 3-level NPC2 topology



# Topology comparison: NPC1 vs. NPC2 in PrimePACK™ 3 package

## Comparison of NPC1 vs. NPC2 topology in PrimePACK™ 3 package

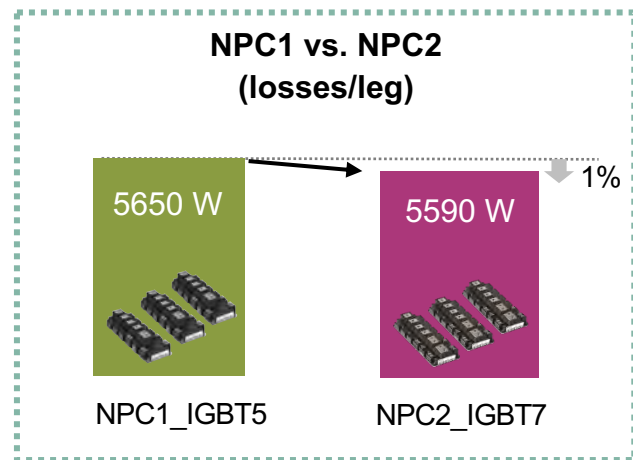


3 x FF1800R12IE5

2 x FF1800R23IE7 +  
FF2400RB12IE7

2300 V  
IGBT7

33% higher output power



$V_{DC} = 1200 \text{ V}$ ,  $V_{out} = 600 \text{ V}$ ,  $F_{sw} = 3.3 \text{ kHz}$ ,  $F_{out} = 50 \text{ Hz}$ ,  $PF = 1$ ,  $T_a = 60 \text{ }^{\circ}\text{C}$   
 $R_{th-s-a} = 0.009 \text{ K/W}$  &  $T_{vjmax} = 150 \text{ }^{\circ}\text{C}$

Inverter efficiency 0.4%





Part of your life. Part of tomorrow.