

# Power Supply Unit (PSU)

Super Junction MOSFETs:  
Optimal Efficiency and Reliability for High-Power Systems



Power Supply Units (PSU) are power conversion systems widely used in commercial and industrial applications, including AC-DC and DC-DC converters. PANJIT's Super Junction (SJ) MOSFETs offer an exceptional option for PSU systems, various DC-DC converter topologies, and Power Factor Correction (PFC) circuits due to their features that facilitate easy and efficient design solutions. Additionally, a key feature of PANJIT SJ MOSFETs is their excellent di/dt ruggedness of the body diode and optimized switching performance, which together enhance EMI performance. Beyond their outstanding performance, PANJIT SJ MOSFETs provide engineers and R&D developers with benefits such as extended lifespan and simplified design.

## ► Features

- Robustness of body diode
- Good EMI performance
- High efficiency
- High quality
- Low FOM

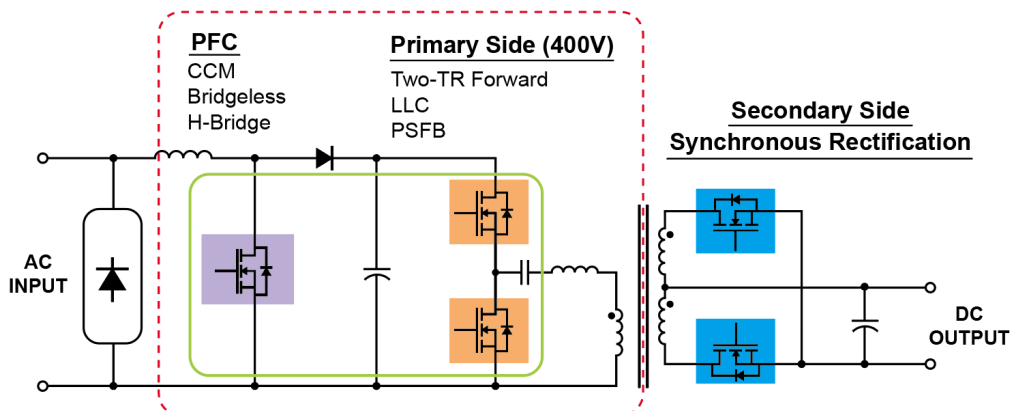
## ► Applications

- Telecommunications
- Server data centers
- PC power supplies
- Home appliances
- Gaming adapters
- PD chargers

## ► Super Junction MOSFETs for PSU Block Circuit

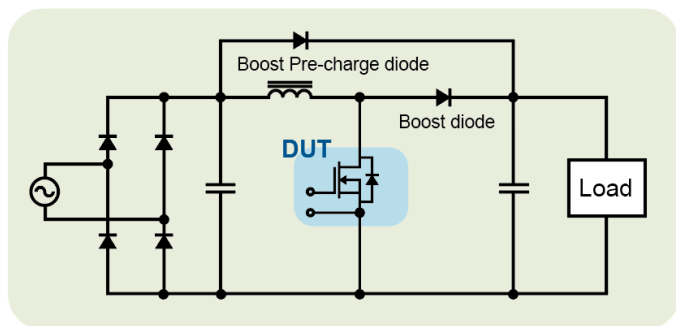
- PFC circuit for AC/DC converter
- Primary side switching for DC/DC converter

## ► PSU Block Diagram

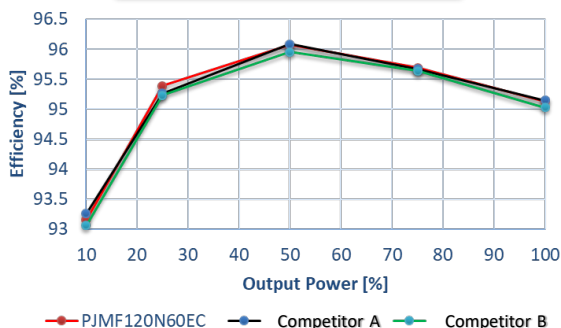


## System Evaluation

(600 W CCM PFC,  $V_{IN} = 110 \text{ Vac}/60 \text{ Hz}$ ,  $V_{OUT} = 400 \text{ V}$ ,  $F_{SW} = 65 \text{ kHz}$  with voltage spike  $< (BV \cdot 80\%)$ )



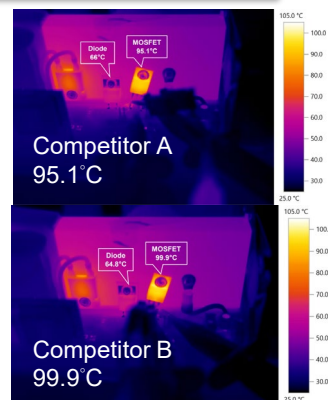
Efficiency @ Output Power



Test Parameters

| Parameters           | Specification               |
|----------------------|-----------------------------|
| Input Voltage        | 110 VAC / 60 Hz             |
| Output Voltage       | 400 VDC                     |
| Max. Power           | 750 W                       |
| Switching Frequency  | 65 kHz                      |
| Heatsink Temperature | 45°C<br>(Cooling & Heating) |
| Ambient Temperature  | 25°C                        |

Junction Temperature @ Full Load Operation



## Robustness Capability of Body Diode Maximum di/dt

Body diode di/dt test @  $I_F = 10 \text{ A}$

| Part Numbers | 500 A/us | 600 A/us | 700 A/us | 800 A/us | 900 A/us | 1000 A/us |
|--------------|----------|----------|----------|----------|----------|-----------|
| PJMF120N60EC | PASS     | PASS     | PASS     | PASS     | PASS     | PASS      |
| Competitor A | PASS     | Fail     | -        | -        | -        | -         |
| Competitor B | PASS     | PASS     | PASS     | PASS     | PASS     | PASS      |

## Products

\* Under Development

| Series            | BV<br>(V) | $R_{DS(on)}$<br>(mΩ) | TO-247AD-3LD   | ITO-220AB-F   | TO-220AB-L    | TO-252AA      | TO-263 / AB    | TOLLK          |
|-------------------|-----------|----------------------|----------------|---------------|---------------|---------------|----------------|----------------|
|                   |           |                      |                |               |               |               |                |                |
| SJ MOSFET<br>600V | 600       | 42                   | PJMH042N60FRC  |               |               |               |                |                |
|                   |           | 74                   | PJMH074N60FRCH |               |               |               |                |                |
|                   |           | 99                   | PJMH099N60EC   | PJMF099N60EC  | PJMP099N60EC  |               |                |                |
|                   |           | 105                  | PJMH105N60FRC  | PJMF105N60FRC | PJMP105N60FRC |               | PJMB105N60FRC  |                |
|                   |           | 120                  | PJMH120N60EC   | PJMF120N60EC  | PJMP120N60EC  |               |                |                |
|                   |           | 125                  | PJMH125N60FRC  | PJMF125N60FRC | PJMP125N60FRC |               | PJMB125N60FRC  |                |
| SJ MOSFET<br>650V | 650       | 60                   | PJMH060N65FR2  | PJMF060N65FR2 | PJMP060N65FR2 |               | PJMB060N65FR2* | PJMN060N65FR2* |
|                   |           | 75                   | PJMH080N65FR2  | PJMF080N65FR2 | PJMP080N65FR2 |               | PJMB080N65FR2* | PJMN080N65FR2* |
|                   |           | 130                  |                | PJMF130N65EC  | PJMP130N65EC  |               | PJMB130N65EC   |                |
|                   |           | 180                  | PJMH190N65FR2  | PJMF190N65FR2 | PJMP190N65FR2 | PJMD190N65FR2 | PJMB190N65FR2* | PJMN190N65FR2* |
|                   |           | 210                  |                | PJMF210N65EC  | PJMP210N65EC  |               | PJMB210N65EC   |                |
|                   |           | 390                  |                | PJMF390N65EC  | PJMP390N65EC  | PJMD390N65EC  | PJMB390N65EC   |                |
| 990               |           | PJMF990N65EC         | PJMP990N65EC   | PJMD990N65EC  |               |               |                |                |