Power Gallium Nitride (GaN) FETs

Efficient and effective power FETs

Whether for low- or high-power conversion applications, power Gallium Nitride FETs (GaN FETs) are increasingly making their way into mainstream markets. For a variety of 650 V and 150 V applications GaN FETs deliver the fastest transition/switching capability (highest dv/dt and di/dt), and best power efficiency. Additionally, Nexperia power GaN FETs bring enhanced power density through reduced conduction and switching losses. Nexperia GaN FETs are available in 2 configurations:

### Enhancement mode (e-mode)
(for ≤ 150 V high-power & 650 V low-power applications)
- Enhancement mode transistor-normally off power switch
- Ultra-high switching frequency
- Leading soft-switching performance
- No reverse-recovery charge
- Low gate charge, low output charge
- High performance (>99% efficiency)
- Tight dynamic characteristics
- Easy to drive, 0 to 5 V gate drive
- Qualified for industrial applications according to JEDEC standard

### Key applications ≤ 150 V high-power
- 400 V-48 V LLC converter for datacenters
- 48 V to POL direct conversion
- Power supply (AC/DC) fast-charging for e-mobility
- USB-C power delivery fast-charging for portables
- LiDAR (non-automotive)
- Class D audio amplifiers

### Key applications 650 V low-power
- Datacom and telecom (AC/DC and DC/DC)
- Photovoltaic (PV) micro inverter (DC/AC)
- Industrial (DC/AC)
- BLDC / micro servo motor drives
- LED driver
- TV power supply unit (PSU)

### Cascode mode
(for 650 V high-power applications)
- 3 times lower inductances than industry-standard packages for lowest switching losses & EMI
- Higher reliability compared to wire-bonded solutions
- 99% power conversion efficiency
- Up to 1 MHz in soft-switching (high power density)
- Easy to design gate drive, 0 to 12 V
- Low $R_{th(j-mb)}$ typ for optimal cooling & 175 °C rated
- Virtually no $Q_{rr}$
- Flexible gull winged leads for temperature cycling & board level reliability
- MSL1 & Halogen free qualifications

### Key applications 650 V high-power
- Industry 4.0
  - Servo motor drives/ frequency inverters
  - Telecom power supplies
  - Class-D Audio amplifiers
  - Welding machines

### The path to Net Zero CO₂
- Solar (PV) inverters
- Server Titanium grade power supplies
- Battery storage/ UPS inverters
- Heat pumps
## Power GaN FETs product portfolio

### Industrial 650 V SMD and through-hole GaN FETs

<table>
<thead>
<tr>
<th>Package</th>
<th>Type name</th>
<th>Configuration</th>
<th>$V_{DS\text{[max]}}$ (V)</th>
<th>$R_{DS(on)\text{[max]} @ V_{GS} = 6 \text{ V or 10 \text{ V}} \text{ (mΩ) }}$</th>
<th>$I_{D\text{[max]}}$ (A)</th>
<th>$Q_{G}$ (nC)</th>
<th>$Q_{oss}$ (nC)</th>
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<tbody>
<tr>
<td>CCPAK1212 (SMD)</td>
<td>GAN039-650NBB</td>
<td>Cascode</td>
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<td>60</td>
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<td>TO-247 (Through-hole)</td>
<td>GAN063-650WSA</td>
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<td>60</td>
<td>35</td>
<td>125</td>
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<td>GAN111-650WSB</td>
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<td>DFN8080i (SMD)</td>
<td>GAN080-650EBE</td>
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<td>GAN140-650FBE</td>
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<td>17</td>
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<td>GAN190-650FBE</td>
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<td>190</td>
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<td>2.8</td>
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### Industrial 100 - 150 V WLCSP & LGA GaN FETs

<table>
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<th>Package</th>
<th>Type name</th>
<th>Configuration</th>
<th>$V_{DS\text{[max]}}$ (V)</th>
<th>$R_{DS(on)\text{[max]} @ V_{GS} = 5 \text{ V}} \text{ (mΩ) }}$</th>
<th>$I_{D\text{[max]}}$ (A)</th>
<th>$Q_{G}$ (nC)</th>
<th>$Q_{oss}$ (nC)</th>
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<td>WLCSP8 (SMD)</td>
<td>GAN3R2-100CBE</td>
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### The innovators of copper-clip package technology

Nexperia brings 20 years’ experience of producing high-quality, highly robust, copper-clip SMD packaging to the power GaN FET portfolio.

For added flexibility in designs and to further improve heat dissipation, CCPAK is available in both top-side cooling (CCPAK1212) and bottom-side cooling package designs (CCPAK1212i).

For more information on Nexperia GaN FETs, including datasheets, application notes, videos, blogs, news and more. Visit nexperia.com/gan-fets