Power Gallium Nitride (GaN) FETs

Maximised power density with leading efficiency

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 high-voltage and low-voltage 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 low-voltage high-power & high-voltage low/mid-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)

Key applications 40 V bi-directional

- High-side load switch
- OVP protection in smart phone USB port
- DC-to-DC converters
- Power switch circuits
- Stand-by power system

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 $R_{th(j\text{-}mb)}$ 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
The path to Net Zero CO_2

- Solar (PV) inverters
- Server Titanium grade power supplies
- Battery storage/ UPS inverters
- Heat pumps

Industry 4.0

- Servo motor drives/ frequency inverters
- Telecom power supplies
- Class-D Audio amplifiers
- Welding machines

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EFFICIENCY WINS.

Power GaN FETs product portfolio

Types in **bold** represent new products
Types in **bold red** are in development
NRND - not recommended for new designs

Low voltage e-mode GaN FETs

Package	Type number	V_{DS} max (V)	$R_{DS(on)}$ max @ V_{GS} = 5 V (mΩ)	T_j max (°C)	I_D max (A)	$Q_{G(tot)}$ [typ] (nC)	Q_{OSS} [typ] (nC)
WLCSP8 (SOT8072)	GAN3R2-100CBE	100	3.2	150		9.2	50
WLCSP6 (SOT8090)	**GANE7R0-100CBA**		7		29		
WLCSP22 (SOT8089)	**GANE2R7-100CBA**		2.7		64		
VQFN7 (SOT8091-1)	**GANE1R8-100QBA**		1.8		100		
	GANE3R9-150QBA	150	3.9	150	100	20	130
FCLGA3 (SOT8073-1)	GAN7R0-150LBE		7	150		7.6	47

650 - 700 V e-mode GaN FETs

Package	Type number	V_{DS} max (V)	$R_{DS(on)}$ max @ V_{GS} = 6 V (mΩ)	T_j max (°C)	I_D max (A)	$Q_{G(tot)}$ [typ] (nC)	Q_{OSS} [typ] (nC)
DFN5060-5 (SOT8075-1)	GAN140-650FBE	650	140	150	17	3.5	33
	GAN190-650FBE		190	150	11.5	2.8	24.5
	GANE350-650FBA		350		6		
	GANE600-650FBA		600		3.3		
DFN8080-8 (SOT8074-1)	GAN080-650EBE		80	150	29	6.2	60
	GAN140-650EBE		140	150	17	3.5	33
	GAN190-650EBE		190	150	11.5	2.8	24.5
DPAK (SOT428-2)	**GANE140-700BBA**	700	140		17		
	GANE190-700BBA		190		11.5		
	GANE240-700BBA		240		10		
	GANE350-700BBA		350		6		

Bi-directional e-mode GaN FETs

Package	Type number	V_{DS} max (V)	$R_{DS(on)}$ max @ V_{GS} = 5 V (mΩ)	T_j max (°C)	I_D max (A)	$Q_{G(tot)}$ [typ] (nC)	Q_{OSS} [typ] (nC)
VQFN16 (SOT8092-1)	**GANB1R2-040QBA**	40	1.2		100		
WLCSP22 (SOT8086)	**GANB4R8-040CBA**		4.8	125	20	15.8	
WLCSP16 (SOT8087)	**GANB8R0-040CBA**		8		14		
WLCSP12 (SOT8088)	**GANB012-040CBA**		12		10		

650 V cascode GaN FETs

Package	Type number	V_{DS} max (V)	$R_{DS(on)}$ max @ V_{GS} = 10 V (mΩ)	T_j max (°C)	I_D max (A)	$Q_{G(tot)}$ [typ] (nC)	Q_{OSS} [typ] (nC)
CCPAK1212 (SOT8000)	**GAN039-650NBB**	650	39	150	58.5	26	
CCPAK1212i (SOT8005)	**GAN039-650NTB**		39	150	58.5	26	
TO-247-3L (SOT429-3)	**GAN041-650WSB**		41	175	47.2	22	
TO-247-3 (SOT429)	GAN063-650WSA (NRND)		60	175	34.5	15	
	GAN111-650WSB		114				

The innovators of copper-clip package technology

Nexperia brings 20 years of experience in high-quality, robust copper-clip SMD packaging to its GaN FET portfolio. The CCPAK comes in top-side (CCPAK1212) and bottom-side (CCPAK1212) cooling designs for enhanced flexibility and heat dissipation.

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For more information visit
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