

GPI65010DF56

N-channel 650V 10A GaN Power HEMT in 5X6 DFN package

Datasheet version: 3.1

Features

BV_{DSS}	$R_{DS(on)}$	I_{DS}	Q_G
700 V	120 m Ω	10 A	2.6 nC

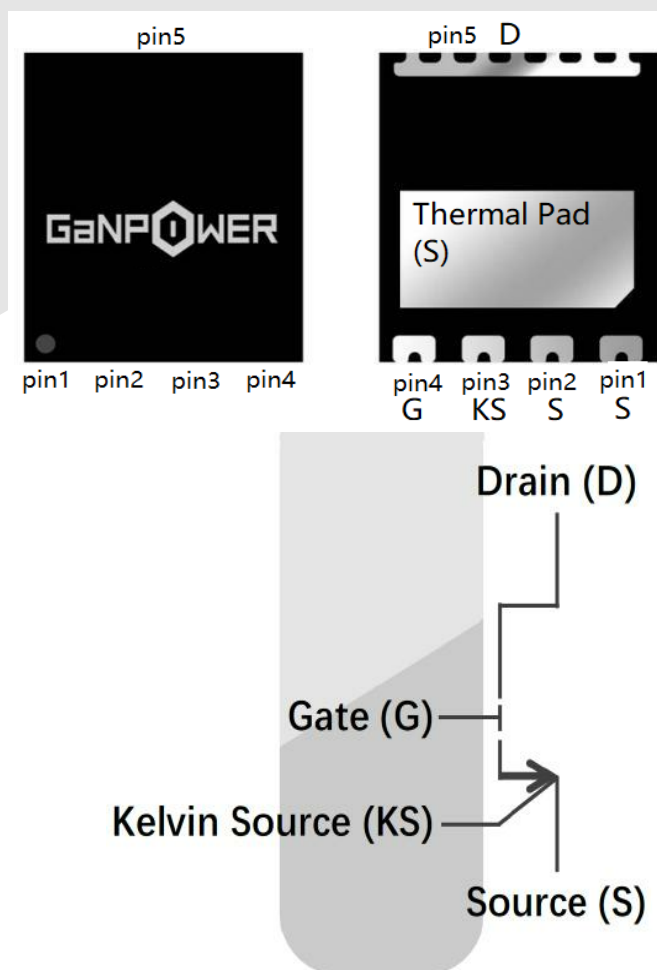
- Ultra-low $R_{DS(on)}$
- High dv/dt capability
- Extremely low input capacitance
- Zero Q_{rr}
- Outstanding switching performance
- Low Profile

Applications

- Switching Power Applications
- Adapters, Quick Chargers

Description

These devices are N-channel 650 V Power GaN HEMTs based on proprietary E-mode GaN on silicon technology. The resulting product has extremely low on state resistance, very low input capacitance and zero reverse recovery charge making it especially suitable for applications which require superior power density, ultra-high switching frequency and outstanding efficiency.





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Device Characteristics

Static Parameters				Test data			
	Parameters		Conditions	Min	Typical	Max	Unit
1	$V_{GS(TH)}$	Gate threshold voltage	$V_{DS}=V_{GS}$ $I_D=7mA$	0.9	1.4	2.9	V
2	BV_{DSS}	Drain-Source breakdown voltage	$V_{GS}=0V$ $I_D<25\mu A$		700		V
3	I_{DSS}	Zero gate voltage drain current, $T_C = 25C^\circ$	$V_{GS}=0V$ $V_{DS}=650V$		0.1	15	μA
4	I_{GSS}	Gate-Source Leakage	$V_{GS}=6V$ $V_{DS}=0V$		27	1000	μA
5	$R_{DS(ON)}$	Static drain-source on resistance, $T_C = 25C^\circ$	$V_{GS}=6V$ $I_D=2A$	87	120	162	m Ω
6	V_{SD}	Reverse conduction voltage	$I_{SD}=0.3A$ $V_{GS}=0V$	1.5	1.8	3.0	V
Dynamic Parameters				Test data			
	Parameters		Conditions	Min	Typical	Max	Unit
1	C_{ISS}	Input capacitance	$V_{GS}=0V$		90		pf
	C_{OSS}	Output capacitance	$V_{DS}=400V$		25		pf
	C_{RSS}	Reverse transfer capacitance	$f=1MHz$		0.9		pf
3	Q_G	Gate charge	$V_{DS}=400V$		2.6		nC
	Q_{GS}	Gate to source charge	$I_D=9A$		0.5		nC
	Q_{GD}	Gate to drain charge	$V_{GS}=6V$		0.65		nC
2	Q_{RR}	Reverse recovery charge			0		nC
Switching Performance				Test data			
	Parameters		Conditions	Min	Typical	Max	Unit
1	$t_{D(ON)}$	Turn-on delay time	$V_{DS}=600V$		8		ns
2	t_R	Rise time	$I_D=3A$		12		ns
3	$t_{D(OFF)}$	Turn-off delay time	$R_G=10\Omega$		9		ns
4	t_F	Fall time	$V_{GS}=6V$		16		ns



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Absolute Max. Ratings

	Symbols	Parameters	Value	Unit
1	V_{DS-max}	Breakdown voltage transient @ $T_{case}=25^{\circ}C$	800	V
2	V_{GS-max}	Gate to source max. transient voltage @ $T_{case}=25^{\circ}C$	-12 to +7.5	V
3	I_{DS-max}	Drain to source DC current @ $T_{case}=25^{\circ}C$	10	A
4	I_{DS-max}	Drain to source DC current @ $T_{case}=100^{\circ}C$	8	A
5	dv/dt_{-max}	Drain to source voltage slew rate	200	V/nS
6	T_J-max	Max junction temperature	150	$^{\circ}C$
7	$T_S-storage$	Storage temperature	-55 to 150	$^{\circ}C$

Thermal and Soldering Characteristics (Typical)

	Symbols	Parameters	Value	Unit
1	R_{thJC}	Thermal resistance (junction to case)	1.4	$^{\circ}C /W$
2	T_{solder}	Reflow soldering temperature	250	$^{\circ}C$

Ordering

Order Code	Package Type	Packaging Method	Qty
GPI65010DF56	DFN surface mount, bottom cooled, 5X6 mm	Tape and Reel	3500



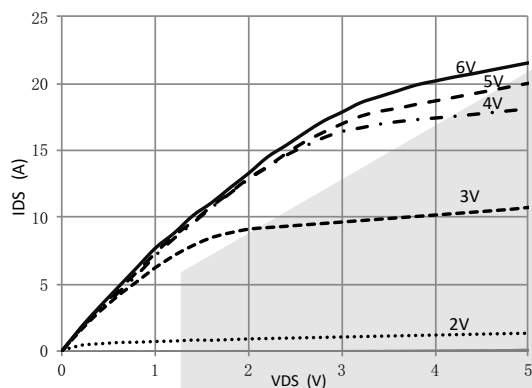
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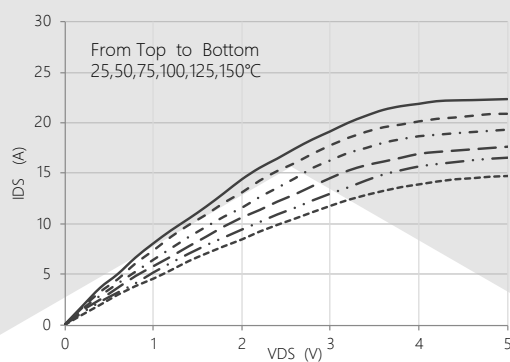
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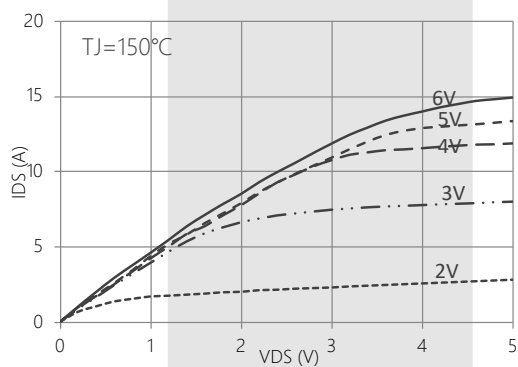
Electrical Performance



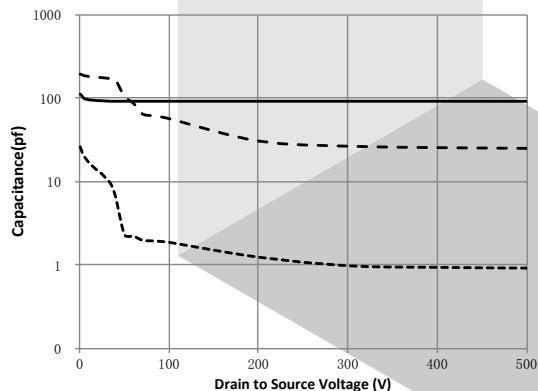
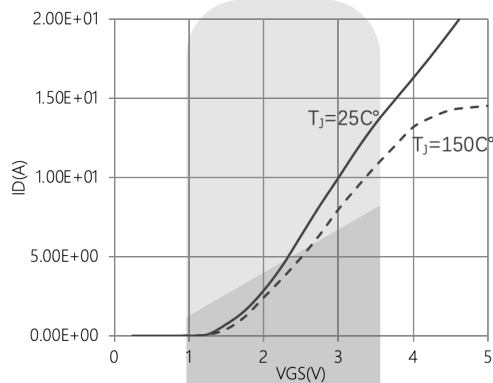
$I_{DS} - V_{DS}$ curves @ 25°C



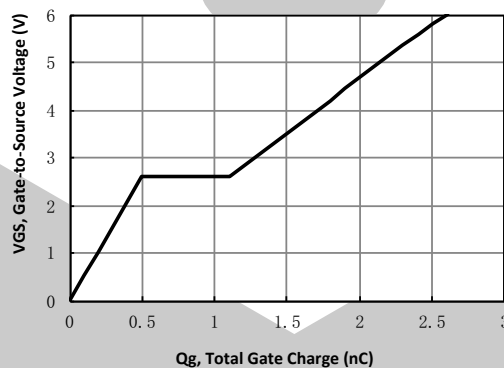
$I_{DS} - V_{DS}$ curves @ $V_{GS} = 6\text{V}$ & different Temperatures



$I_{DS} - V_{DS}$ curves @ 150°C



Capacitance

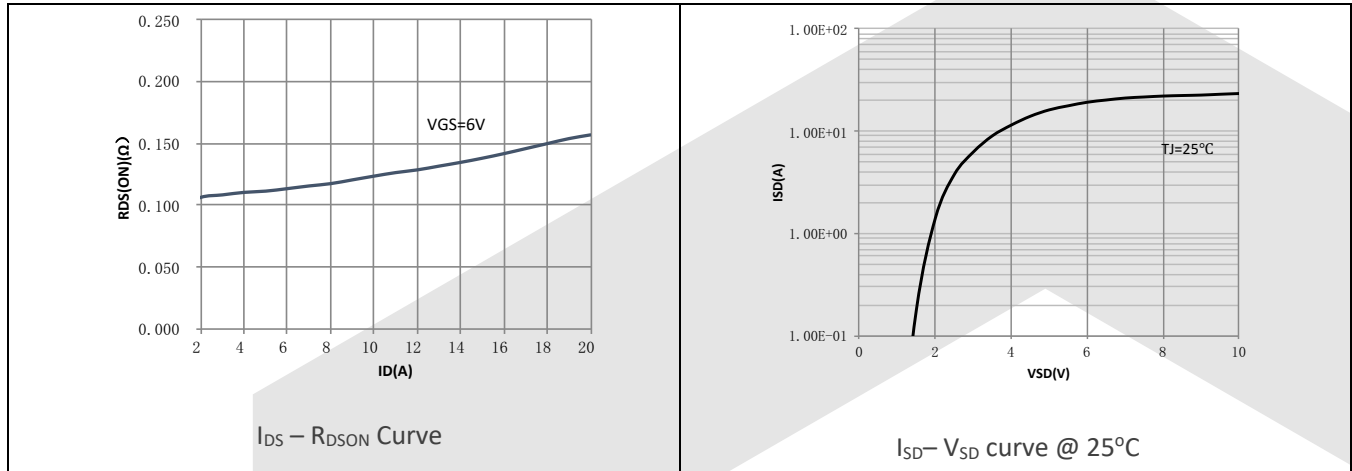


$V_{GS} - Q_G$ curve

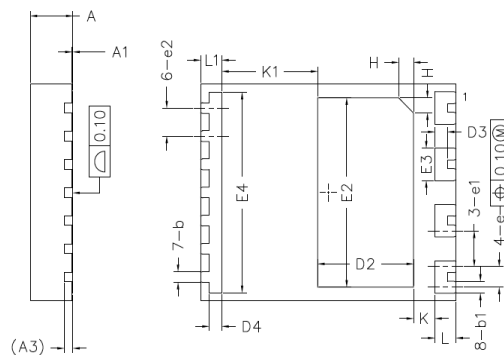
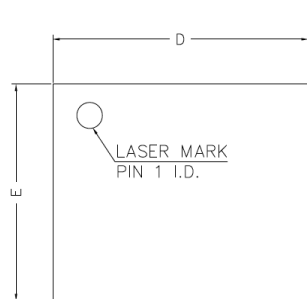


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Package Information



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0.00	0.02	0.05
A3	0.203REF		
b	0.20	0.25	0.30
b1	0.225	0.275	0.325
D	5.90	6.00	6.10
E	4.90	5.00	5.10
D2	2.15	2.25	2.35
E2	4.27	4.37	4.47
D3	0.20	0.30	0.40
E3	0.65	0.75	0.85
D4	0.20	0.30	0.40
E4	4.525	4.625	4.725
e	0.375	0.475	0.575
e1	0.725	0.825	0.925
e2	0.55	0.65	0.75
H	0.35REF		
K	0.35	0.50	0.65
K1	2.10	2.25	2.40
L	0.40	0.50	0.60
L1	0.40	0.50	0.60





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Further Information

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Data Source— Data here are based on recent tests but all parameters may not be up to date. Actual final test data from packaging production are available for selected customers upon request.