

GPI65007DF56

N-channel 650V 7A GaN Power HEMT in DFN 5X6 Package

Datasheet version 3.1

Features

BV_{DSS}	$R_{DS(ON)}$	I_{DS}	Q_G
700 V	170 m Ω	7 A	2.1 nC

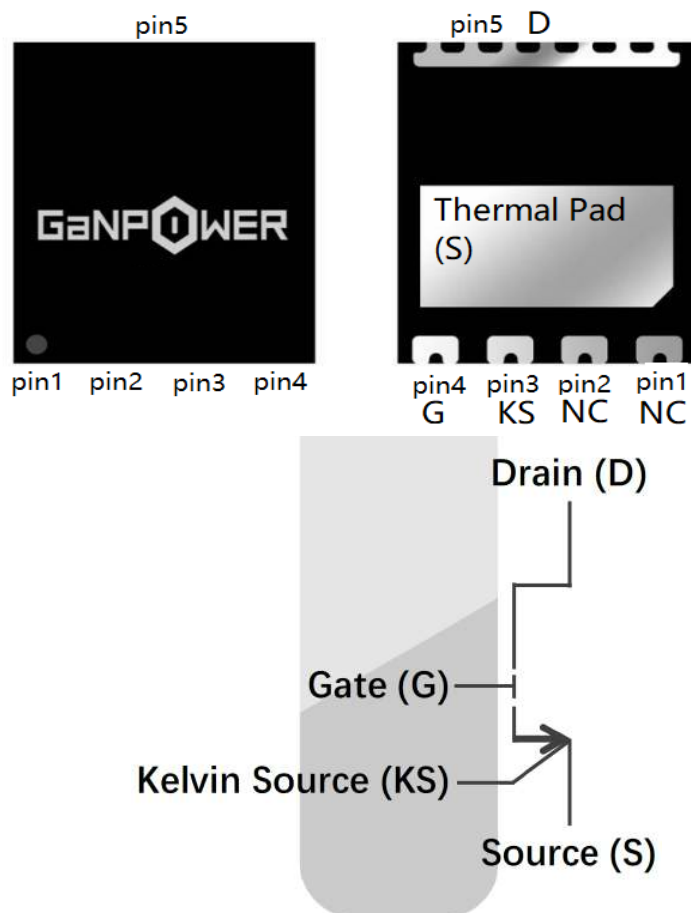
- Ultra-low $R_{DS(ON)}$
- High dv/dt capability
- Extremely low input capacitance
- Zero Q_{rr}
- Outstanding switching performance
- Low Profile

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.





GaNPower International Inc.

WWW.IGANPOWER.COM
230 -3410 LOUGHEED HWY
VANCOUVER, BC, V5M 2A4 CANADA

Device Characteristics

Static Parameters				Test data			
	Parameters		Conditions	Min	Typical	Max	Unit
1	$V_{GS(TH)}$	Gate threshold voltage	$V_{DS}=V_{GS}$, $I_D=5mA$ ($T_J=25\text{ }^{\circ}C$)	0.9	1.2	2.9	V
			$V_{DS}=V_{GS}$, $I_D=5mA$ ($T_J=150\text{ }^{\circ}C$)		1.15		V
2	BV_{DSS}	Drain-Source breakdown voltage	$V_{GS}=0V$, $I_D < 20\text{ }\mu A$ ($T_J=25\text{ }^{\circ}C$)		700		V
3	I_{DSS}	Zero gate voltage drain leakage current	$V_{GS}=0V$, $V_{DS}=650V$ $T_J=25\text{ }^{\circ}C$		0.01	12	μA
4	I_{GSS}	Gate-Source Leakage	$V_{GS}=6V$, $V_{DS}=0V$		19	700	μA
5	$R_{DS(on)}$	drain-source on resistance	$V_{GS}=6V$, $I_D=1.4A$ $T_J=25\text{ }^{\circ}C$		170	225	m Ω
			$V_{GS}=6V$, $I_D=1.4A$ $T_J=150\text{ }^{\circ}C$		360		m Ω
6	V_{SD}	Reverse conduction voltage	$I_{SD}=0.2A$, $V_{GS}=0V$	1.2	1.9	3	V
7	R_G	Gate resistance	$f=25MHz$ Open drain		1.5		Ω
Dynamic Parameters				Test data			
	Parameters		Conditions	Min	Typical	Max	Unit
1	C_{ISS}	Input capacitance	$V_{GS}=0V$		76.1		pf
2	C_{OSS}	Output capacitance	$V_{DS}=400V$		20.9		pf
3	C_{RSS}	Reverse transfer capacitance	$F=1MHz$		0.42		pf
4	$C_{O(ER)}$	Effective output capacitance, energy related	$V_{DS}=0-400V$		35		pf
5	Q_G	Gate charge	$V_{DS}=400V$		2.1		nC
6	Q_{GS}	Gate to source charge	$I_D=1.75A$		0.4		nC
7	Q_{GD}	Gate to drain charge	$V_{GS}=6V$		0.52		nC
8	Q_{OSS}	Output Charge	$V_{DS}=0-400V$		22		nC
9	Q_{RR}	Reverse recovery charge			0		nC

For more information, visit us at: www.iganpower.com, or contact us at information@iganpower.com



GaNPower International Inc.

WWW.IGANPOWER.COM
230 -3410 LOUGHEED HWY
VANCOUVER, BC, V5M 2A4 CANADA

Switching Performance				Test data			
	Parameters		Conditions	Min	Typical	Max	Unit
1	$t_{D(ON)}$	Turn-on delay time	$V_{DS} = 400V$ $I_D = 1.75A$ $R_G = 10\Omega$ $V_{GS} = 6V$		4		ns
2	t_R	Rise time			8		ns
3	$t_{D(OFF)}$	Turn-off delay time			14		ns
4	t_F	Fall time			8		ns

Absolute Max. Ratings

	Symbols	Parameters	Value	Unit
1	V_{DS-max}	Breakdown voltage transient @ $T_{case}=25^{\circ}C$	800	V
2	V_{DS-max}	Breakdown voltage transient @ $T_{case}=125^{\circ}C$	650	V
3	V_{GS-max}	Gate to source max. voltage @ $T_{case}=25^{\circ}C$	-12 to +7.5	V
4	I_{DS-max}	Drain to source pulse current @ $T_{case}=25^{\circ}C$, pulse width 10 μs , $V_{GS} = 6V$	16	A
5	I_{DS-max}	Drain to source pulse current @ $T_{case}=100^{\circ}C$	7	A
6	dv/dt_{-max}	Drain to source voltage slew rate	200	V/ns
7	T_{J-max}	Max junction temperature	150	$^{\circ}C$
8	$T_{S-storage}$	Storage temperature	-55 to 150	$^{\circ}C$

Thermal and Soldering Characteristics (Typical)

	Symbols	Parameters	Value	Unit
1	R_{thJC}	Thermal resistance (junction to case)	2.2	$^{\circ}C/W$
2	R_{thJA}	Thermal resistance (junction to ambient)	62	$^{\circ}C/W$
3	T_{solder}	Reflow soldering temperature	250	$^{\circ}C$

Ordering

Order Code	Package Type	Packaging Method	Qty
GPI65007DF	DFN surface mount, bottom cooled, 5X6 mm		

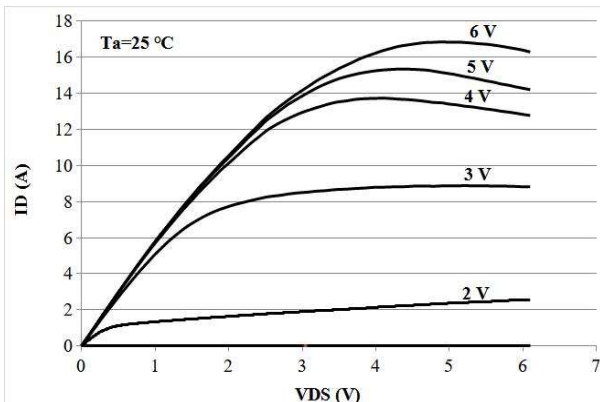
Electrical Performance

For more information, visit us at: www.iganpower.com, or contact us at information@iganpower.com

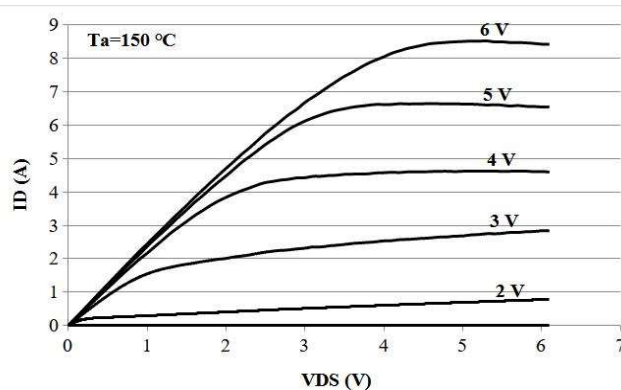


GaNPower International Inc.

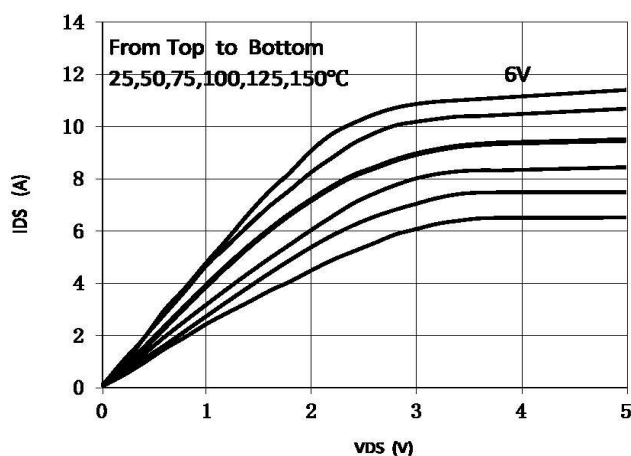
WWW.IGANPOWER.COM
230 -3410 LOUGHEED HWY
VANCOUVER, BC, V5M 2A4 CANADA



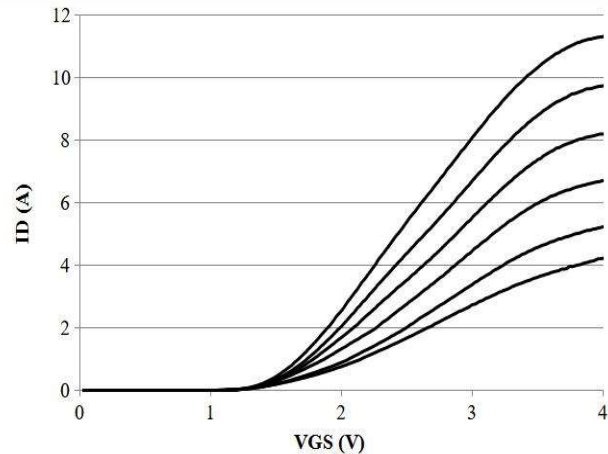
I_{DS} vs. V_{DS} @ $T_j = 25^\circ\text{C}$



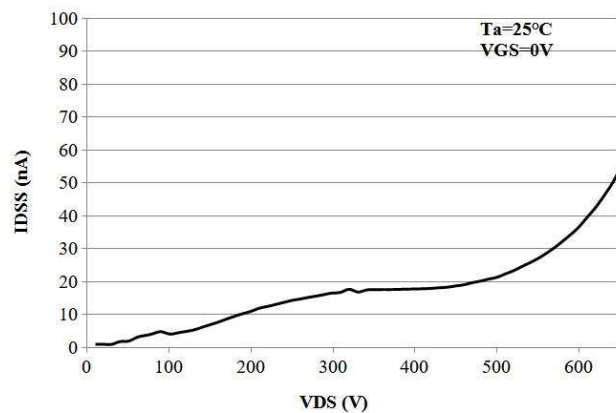
I_{DS} vs. V_{DS} @ $T_j = 150^\circ\text{C}$



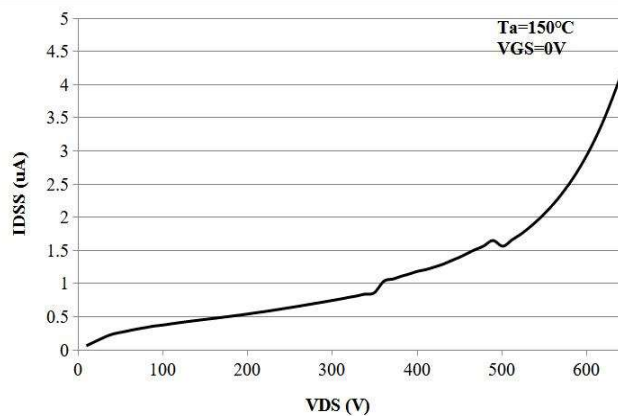
I_{DS} vs. V_{DS} @ $V_{GS} = 6\text{V}, T_j = 25-150^\circ\text{C}$



I_{DS} vs. V_{GS} @ $T_j = 25^\circ\text{C} - 150^\circ\text{C}$, step 25°C



Breakdown voltage @ $T_j = 25^\circ\text{C}, V_{GS} = 0\text{V}$

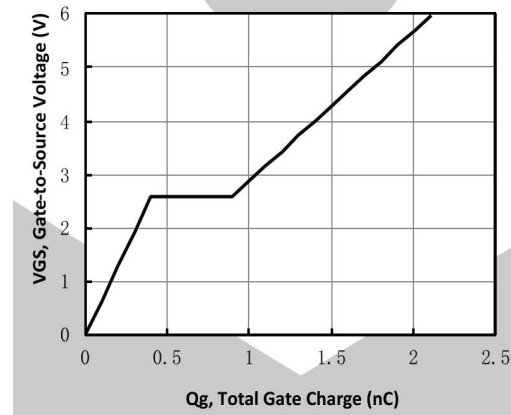
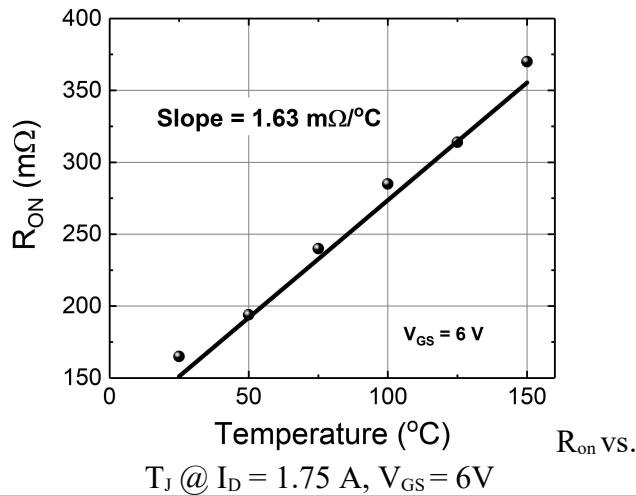


Breakdown voltage @ $T_j = 150^\circ\text{C}, V_{GS} = 0\text{V}$

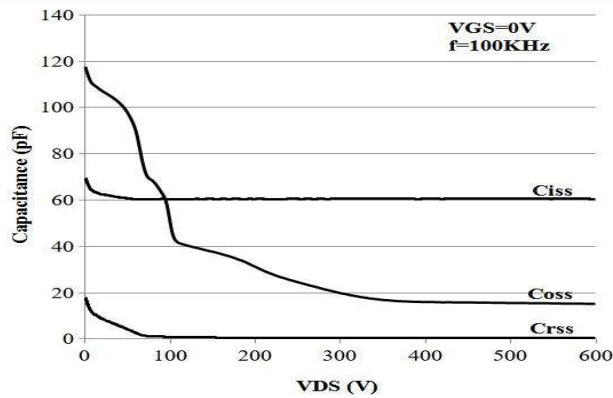


GaNPower International Inc.

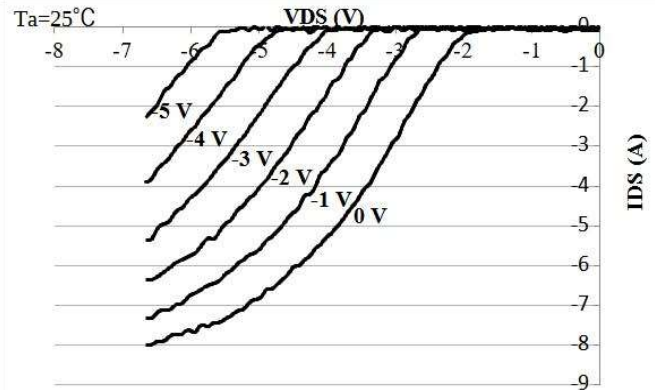
WWW.IGANPOWER.COM
230 -3410 LOUGHEED HWY
VANCOUVER, BC, V5M 2A4 CANADA



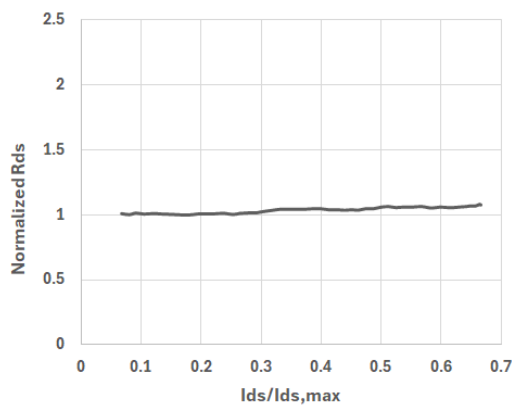
Q_G - V_{GS} curve



Capacitance vs. V_{DS} Curve @ $T_J = 25^{\circ}\text{C}$

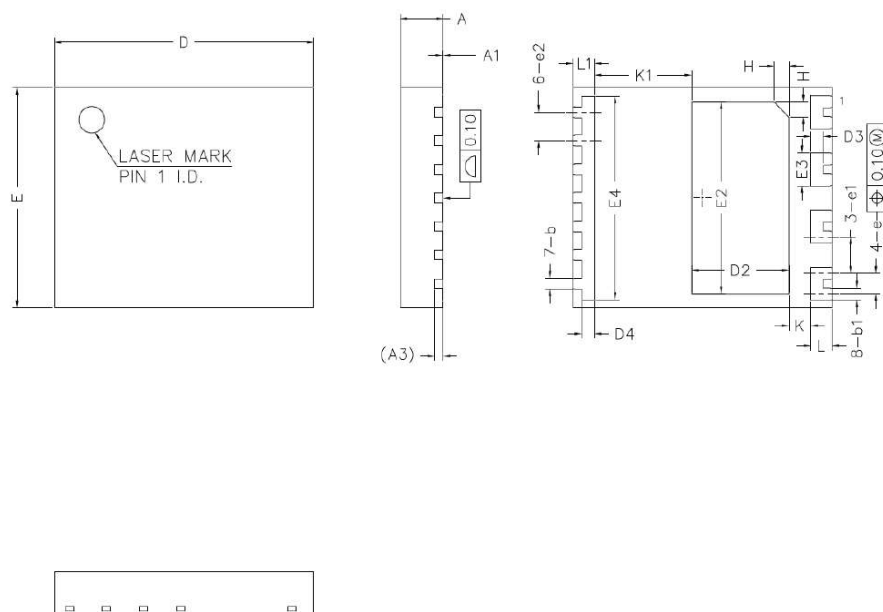


I_{SD} vs. V_{SD} reverse conduction curve @ $T_J = 25^{\circ}\text{C}$



Normalized $R_{DS(on)}$ vs. I_{DS} @ $T_J = 25^{\circ}\text{C}$

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



GaNPower International Inc.

WWW.IGANPOWER.COM
230 -3410 LOUGHEED HWY
VANCOUVER, BC, V5M 2A4 CANADA

Further Information

Important Notice—Unless expressly approved in writing by an authorized representative of GaNPower, GaNPower components are not designed, authorized or warranted for use in lifesaving, life sustaining, military, aircraft, or space applications, nor in products or systems where failure or malfunction may result in personal injury, death, or property or environmental damage. The information given in this document shall not in any event be regarded as a guarantee of performance. GaNPower hereby disclaims any or all warranties and liabilities of any kind, including but not limited to warranties of non-infringement of intellectual property rights. All other brand and product names are trademarks or registered trademarks of their respective owners. Information provided herein is intended as a guide only and is subject to change without notice. The information contained herein or any use of such information does not grant, explicitly, or implicitly, to any party any patent rights, licenses, or any other intellectual property rights. All rights reserved.

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.