



GaNPower International Inc.

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230 -3410 LOUGHEED HWY  
VANCOUVER, BC, V5M 2A4 CANADA

# GPI65015DSOVP

Gate-Protected 650 V, 15 A GaN Power HEMT in 8X8 DFN package  
Proof of concept design, preliminary engineering samples

Datasheet — Testing data

## Features

Order Code	$V_{dss}$	$R_{dson}$	$I_d$
GPI65015DSOVP	650 V	85 m $\Omega$	15 A

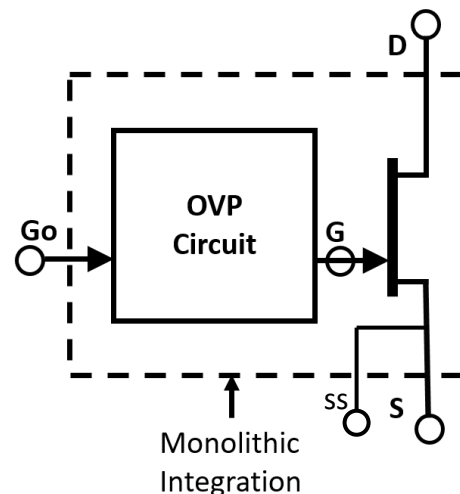
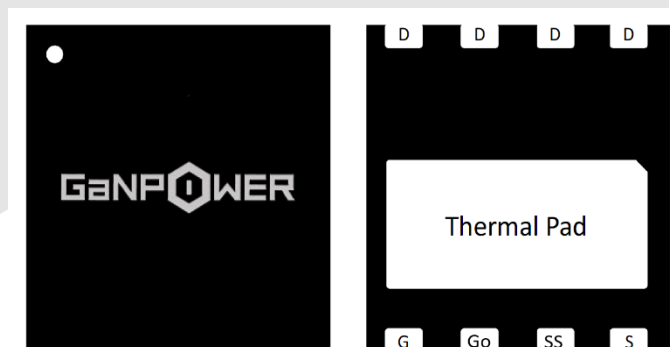
- Ultra-low  $R_{DS(on)}$
- High  $dv/dt$  capability
- Extremely low input capacitance
- Zero  $Q_{rr}$
- Gate over-voltage protection (OVP) up to 100V
- Wider gate driving range up to 15V
- Outstanding switching performance

## Applications

- Switching Power Applications

## 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. Over-voltage protection (OVP) circuit clamps the input gate driving voltage to below about 8 volt for safe operation. The OVP also makes it feasible to drive the transistor for a wider gate driving voltage of 5-15V. Monolithic integration reduces parasitic effects due to the OVP circuit.





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Static Parameters					
NO.	Parameters		Condition	Test data 1#	Unit
1	$V_{gs(TH)}$	Gate Threshold Voltage	$V_{ds}=V_{gs}$ $I_d=3.5mA$	1.2	V
2	$BV_{dss}$	Drain-Source breakdown voltage	$V_{gs}=0V$ $I_d=25\mu A$	>650	V
3	$I_{dss}$	Zero gate voltage drain current, $T_C = 25^\circ C$	$V_{gs}=0V$ $V_{ds}=650V$	0.26	$\mu A$
4	$I_{gss}$	Gate-Source Leakage	$V_{gs} = 6V$ $V_{ds} = 0V$	25.06	$\mu A$
5	$R_{dson}$	static Drain-Source on resistance, $T_C = 25^\circ C$	$V_{gs}=6V$ $I_d=2.5A$	0.085	$\Omega$
6	$V_{sd}$	Reverse conduction voltage	$I_{sd}=1A$ $V_{gs}=0V$	1.9	V
Dynamic Parameters				Test data	Unit
1	capacitance	$C_{iss}$	$V_{gs}=0V$ $V_{ds}=400V$ $f=1MHz$	116	pf
		$C_{oss}$		34	pf
		$C_{rss}$		4	pf
3	$Q_g$	Gate charge	$V_{ds}=400V$ $I_d=7.5A$ $V_{gs}=6V$	3.54	nC
	$Q_{gs}$			0.50	nC
	$Q_{gd}$			0.82	nC
Switching Performance				Test data	Unit
1	$t_{d(on)}$	Turn-on delay time	$V_{ds}=400V$ $I_d=2.5A$ $R_g=10\Omega$ $V_{gs}=6V$	4.9	ns
2	$t_r$	Rise time		10	ns
3	$t_{d(off)}$	Turn-off delay time		15	ns
4	$t_f$	Fall time		11	ns



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### 1. Ids-Vgs Curves

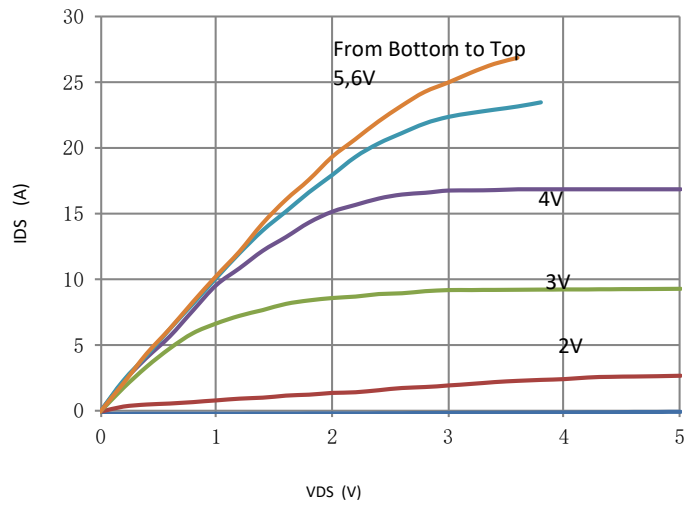
	0	0.2	0.4	0.6	0.8	1
VGS=1V	0	0.00002632592	0.00003837640	0.00005433120	0.00007167720	0.00008796480
VGS=2V	0	0.38	0.57	0.67	0.79	0.93
VGS=3V	0	1.91	3.62	5.1	6.33	7.11
VGS=4V	0	2.45	4.36	6.13	8.25	10.32
VGS=5V	0	2.52	4.58	6.73	8.78	10.87
VGS=6V	0	2.28	4.69	6.83	8.94	11.02
	0	1.2	1.4	1.6	1.8	2
VGS=1V	0	0.00011901120	0.00015178240	0.00018627840	0.00022681120	0.00025958240
VGS=2V	0	1.07	1.15	1.31	1.4	1.53
VGS=3V	0	7.73	8.19	8.69	8.97	9.16
VGS=4V	0	11.69	13.11	14.23	15.42	16.3
VGS=5V	0	12.89	14.74	16.28	17.85	19.25
VGS=6V	0	13.01	15.29	17.22	18.85	20.71
	0	2.2	2.4	2.6	2.8	3
VGS=1V	0	0.00029666560	0.00031736320	0.00040964000	0.00046914560	0.00053986240
VGS=2V	0	1.59	1.76	1.94	2.01	2.14
VGS=3V	0	9.28	9.48	9.55	9.71	9.91
VGS=4V	0	16.85	17.37	17.7	17.84	18.02
VGS=5V	0	20.73	21.83	22.66	23.46	23.99
VGS=6V	0	22.15	23.59	24.87	26.01	27.24
	0	3.2	3.4	3.6	3.8	4
VGS=1V	0	0.00061747840	0.00065197440	0.00070803040	0.00078650880	0.00081370890
VGS=2V	0	2.27	2.42	2.52	2.6	2.68
VGS=3V	0	10.02	10.15	10.31	10.36	10.38
VGS=4V	0	18.03	18.06	18.12	18.12	18.12
VGS=5V	0	24.52	24.81	25.01		
VGS=6V	0	28.08	28.92			
	0	4.2	4.4	4.6	4.8	5
VGS=1V	0	0.00088223520	0.00095726400	0.00107455040	0.00115561600	0.00125048000
VGS=2V	0	2.84	2.92	3.03	3.15	3.26
VGS=3V	0	10.39	10.4	10.41	10.42	10.42
VGS=4V	0	18.12	18.12	18.12	18.12	18.12
VGS=5V	0					



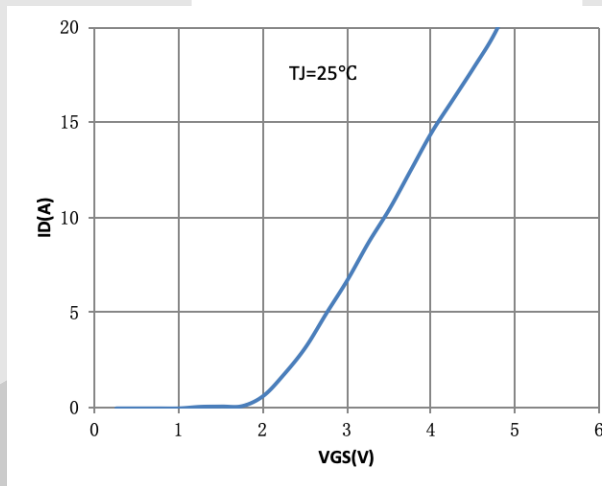
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VGS=6V	0								
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## 2. $I_{DS}$ - $V_{GS}$ Curve @ $V_{DS}=5V$

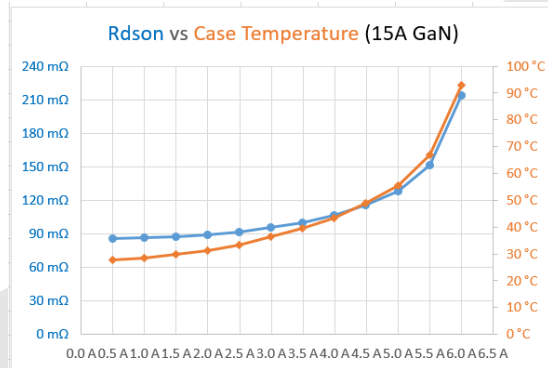


## 3. $R_{dson}$ vs. $I_d$ (DC measurement)

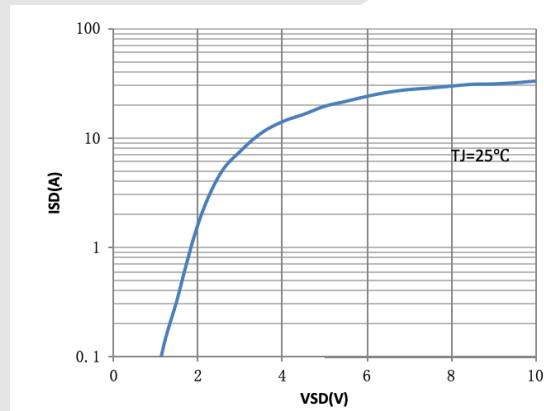


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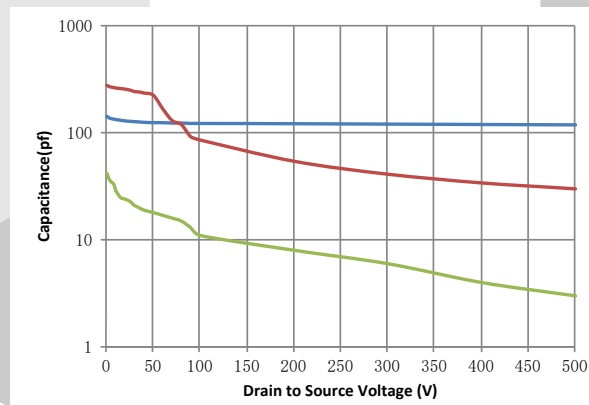
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#### 4. $I_{SD}-V_{SD}$ @ $V_{GS}=0V$



#### 5. Capacitance- $V_{DS}$



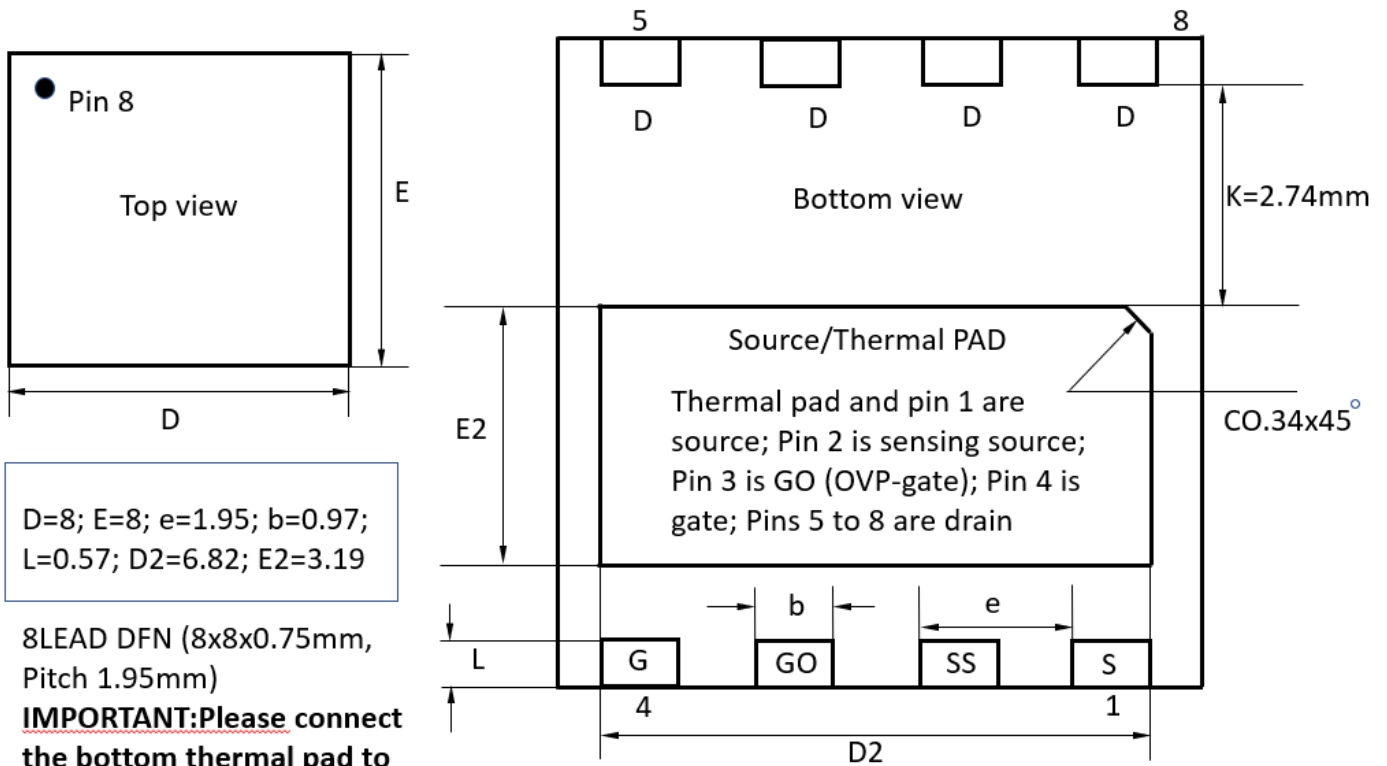
#### 6. Package information



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DFN8x8 OVP-GaN: Suggested driving range G: 5-6V; GO: 5-15V, protection > 30V



$D=8$ ;  $E=8$ ;  $e=1.95$ ;  $b=0.97$ ;  
 $L=0.57$ ;  $D2=6.82$ ;  $E2=3.19$

8LEAD DFN (8x8x0.75mm,  
Pitch 1.95mm)

**IMPORTANT:** Please connect  
the bottom thermal pad to  
the source electrode on PCB

