650V,15A,80mΩ GaN MOS

Contents

1. Features

- 650 V enhancement mode power switch

- $R_{DS(on)}$ =80 mΩ

- $I_{DS(max)}$ = 15 A

- Easy gate drive requirements (0 V to 6 V)

- Very high switching frequency (> 10 MHz)

- Fast and controllable fall and rise times

- Zero reverse recovery loss

2. Device Information

2.1 Product list

Part Number	Marking Code	Package	Packing
HN65H15S080	HN6515S	DFN8x8	Tape 2.5k/reel

2.2 Pin Configuration
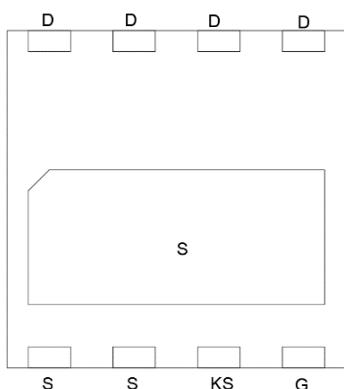
Bottom view
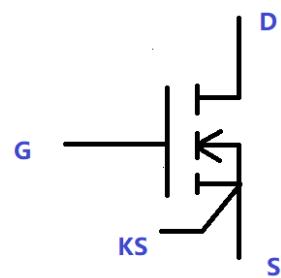
Electrical symbol

3. Applications

- Fast Battery Charging

- LED lighting drivers

- Power Factor Correction

- LLC Converters

- Wireless Power Transfer

4. Description

HN65H15S080 is an enhancement mode GaN-on-silicon transistor. GaN is a wide band gap semiconductor with high power density. The gallium nitride transistor is characterized by no body diode, so the reverse recovery charge is zero. The HN65H15S080 product adopts DFN8x8 package, which has high heat dissipation and extremely low on-resistance, so it is particularly suitable for high High-frequency and high-power applications

5. Absolute Maximum Ratings (T$_C$=25℃ unless otherwise specified）

Parameter	Symbol	Value	Unit	Condition
Drain-Source voltage	V$_{DS}$	650	V	
Gate-source voltage	V$_{GS}$	-10 to 6	V	
Continuous drain current*	I$_D$	15	A	Tc=25℃
		12	A	Tc=100℃
Operation and storage temperature	Tj	-55 to 150	℃	
	Tstg	-55 to 150	℃	

* An Estimated Value

6. **Electrical Characteristics** (Tc=25℃ unless otherwise specified)

6.1 Typical Performance – Static

Parameter	Symbol	Values			Unit	Test condition
		Min.	Type.	Max.		
Drain source breakdown voltage	BV_{DS}	650	/	/	V	VGS=0V, ID=20µA
Total drain leakage current	I_{DSS}	/	2	10	µA	VDS=650V, VGS=0V, Tj=25℃
		/	40	80	µA	VDS=650V, VGS=0V, Tj=150℃
Gate-to-source current	I_{GS}	/	500	/	µA	VDS=0V, VGS=6V, Tj=25℃
		/	3000	/	µA	VDS=0V, VGS=6V, Tj=150℃
Static drain-source on-resistance	$R_{DS(ON)}$	/	/	80	mΩ	VGS=6V, ID=5A, Tj=25℃
		/	/	180	mΩ	VGS=6V, ID=5A, Tj=150℃
Gate threshold voltage	$V_{GS(th)}$	0.8	1	1.2	V	VDS=VGS, ID=3.5mA
Forward voltage	V_{SD}	/	1.8	/	V	V_{GS}=0V, I_{SD}=1A

6.2 Typical Performance – Dynamic

| Parameter	Symbol	Values			Unit	Test condition
		Min	Type	Max		
Dynamic resistance	DR_{ON}	0.95	1.05	1.1	/	V_{DS}=750V, ID=5A
Input capacitance	C_{ISS}	/	175	/	pF	V_{DS}=400V, V_{GS}=0V, f=1MHz
Output capacitance	C_{OSS}	/	63	/	pF	
Reverse transfer capacitance	C_{RSS}	/	1.6	/	pF	
Output capacitance, energy related	$C_{OSS(er)}$	/	81	/	pF	V_{DS}=0V to 400V,V_{GS}=0V
Output capacitance time related	$C_{OSS(tr)}$	/	113	/	pF	
Total gate charge	Q_G	/	4.3	/	nC	V_{DS}=400V, V_{GS}=0V to 6V
Gate-drain charge	Q_{GD}	/	1.1	/	nC	
Gate-source charge	Q_{GS}	/	0.8	/	nC	
Gate Resistance	R_G	/	1.9	/	Ω	f = $f$res, Open drain

6.3 Characteristic Curve
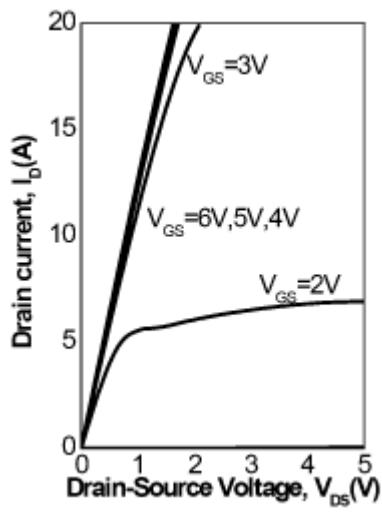

Typical output characteristics @ Tj=25℃
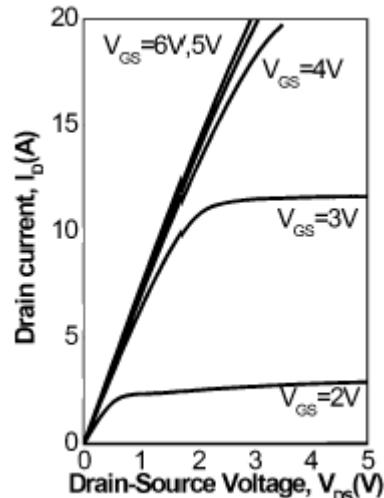

Typical output characteristics @ Tj=125℃
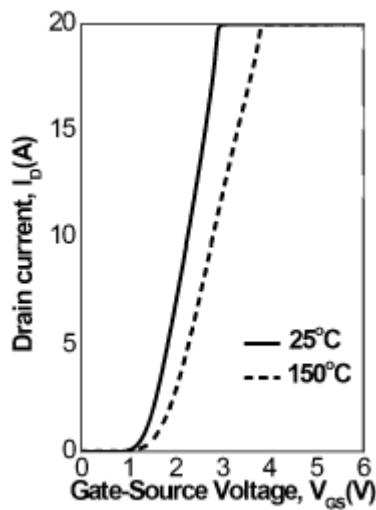
Typical transfer characteristics @ VDS=5V
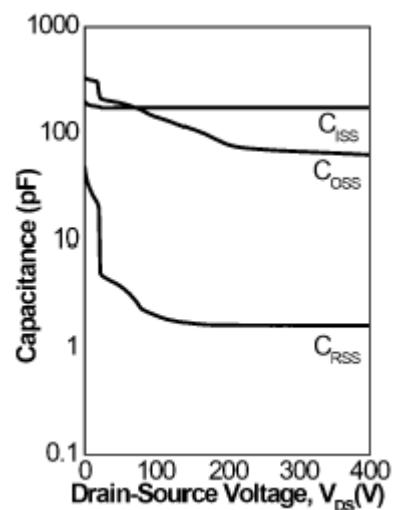

Typical capacitance characteristics @ 1MHz
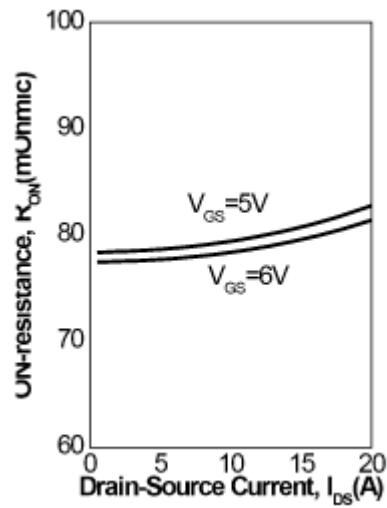
ON-resistance for various drain current @ 25℃
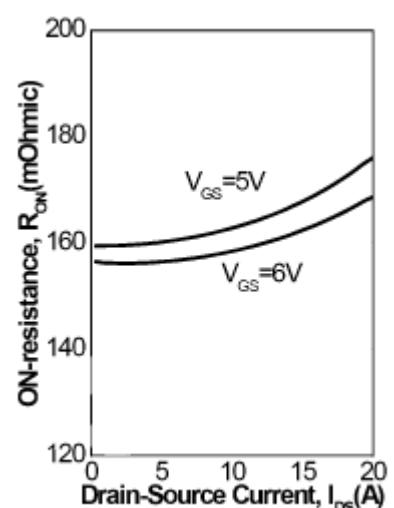
ON-resistance for various drain current @ 25℃
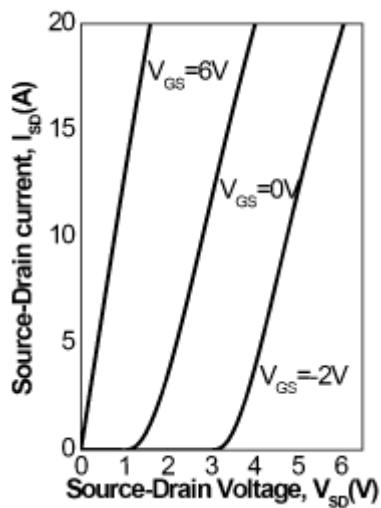
Typical reverse conduction characteristics
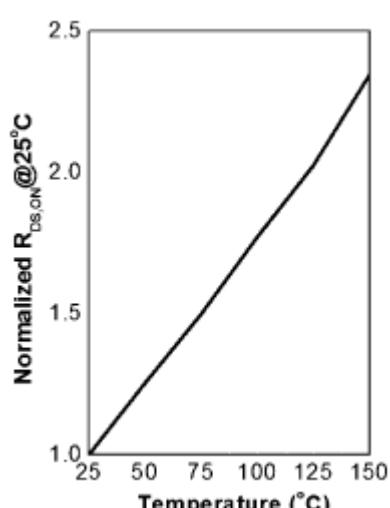
Normalized ON-resistance at various temperatures

7. Package

Dimensions(mm)			
Symbol	Min	Typ	Max
A	0.80	0.9	1
A1	REF 0.203		
b	0.95	1	1.05
D	7.9	8	8.1
D1	6.9	7	7.1
E	7.9	8	8.10
E1	3.1	3.2	3.30
e	REF 2		
k	REF 2.8		
L	0.45	0.5	0.55
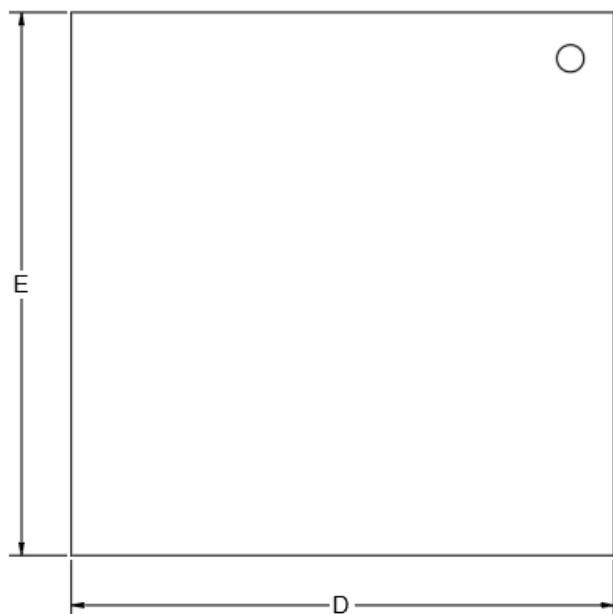
TOP VIEW

BOTTOM VIEW

SIDE VIEW