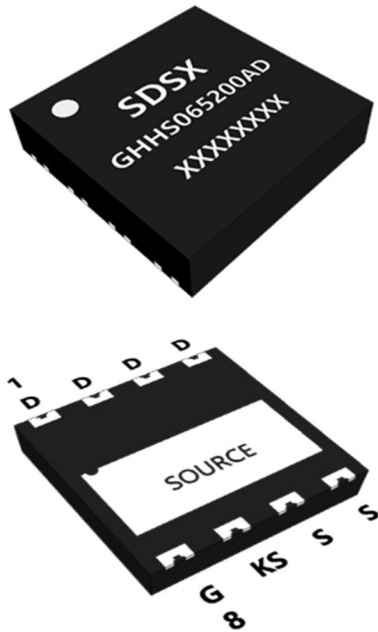


# GHHS065200AD

650V, 175mΩ Power Transistor



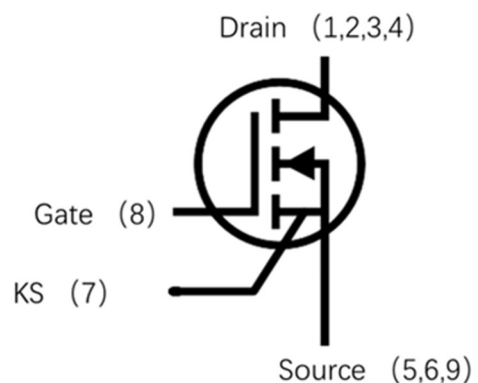
## Description

GHHS065200AD is N-channel 650 V Power GaN HEMT 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.

## Features

- 650V GaN E-mode Power Transistor
- Low 175 mΩ Resistance
- Zero reverse-recovery charge
- 8 x 8 mm footprint, 0.85 mm profile
- Minimized package inductance

## Functional Block Diagram



## Applications

- AC-DC converters
- DC-DC converters
- Totem pole PFC
- Fast battery charging
- Synchronous Rectification
- High density power conversion
- High efficiency power conversion

## Ordering Information

- GHHS065200AD

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## Static Parameters

Symbol	Parameter	Conditions	Units	Min	Typ	Max
$V_{GS(TH)}$	Gate threshold voltage	$V_{DS} = V_{GS}; I_D = 10 \text{ mA}$	V	—	1.0	—
$V_{DSS}$	Drain-source breakdown voltage	$V_{GS} = 0 \text{ V}; I_D = 5 \text{ } \mu\text{A}$	V	650	800	—
$I_{DSS}$	Zero gate voltage drain current	$V_{GS} = 0 \text{ V}; V_{DS} = 650 \text{ V}$	$\mu\text{A}$	—	1	5
$I_{GSS}$	Gate-source Leakage	$V_{GS} = 6 \text{ V}; V_{DS} = 0 \text{ V}$	$\mu\text{A}$	—	250	—
$R_{DS(on)}$	Static drain-source on resistance	$V_{GS} = 6 \text{ V}; I_D = 5 \text{ A}; T_J = 25 \text{ } ^\circ\text{C}$	mΩ	—	175	—
		$V_{GS} = 6 \text{ V}; I_D = 5 \text{ A}; T_J = 150 \text{ } ^\circ\text{C}$		—	370	—
$V_{SD}$	Reverse conduction voltage	$V_{GS} = 0 \text{ V}; I_{SD} = 1 \text{ A}$	V	—	2.0	—

## Dynamic Parameters

Symbol	Parameter	Conditions	Units	Min	Typ	Max
$C_{ISS}$	Input capacitance	$V_{GS} = 0 \text{ V};$	pF	—	87	—
$C_{OSS}$	Output capacitance	$V_{DS} = 400 \text{ V};$ $F = 1 \text{ MHz}$	pF	—	48	—
$C_{RSS}$	Reverse transfer capacitance		pF	—	1.35	—
$Q_G$	Gate charge	$V_{DS} = 400 \text{ V};$	nC	—	2.3	—
$Q_{GS}$	Gate to source charge	$I_D = 9 \text{ A};$ $V_{GS} = 6 \text{ V}$	nC	—	0.5	—
$Q_{GD}$	Gate to drain charge		nC	—	1.0	—
$Q_{RR}$	Reverse recovery charge	$V_{DS} = 400 \text{ V};$ $I_{SD} = 5 \text{ A};$	nC	—	0	—

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## Thermal and Soldering Characteristics ( Typical )

Symbol	Parameter	Value	Units
$R_{thJC}$	Thermal resistance (junction to case)	TBD	$^{\circ}\text{C}/\text{W}$
$R_{thJA}$	Thermal resistance (junction to ambient)	TBD	$^{\circ}\text{C}/\text{W}$
$T_{sold}$	Reflow soldering temperature	TBD	$^{\circ}\text{C}$

## Absolute Maximum Ratings

Symbol	Parameter	Units	Min	Typ	Max
$V_{DS,max}$	Breakdown voltage transient @ $T_c = 25^{\circ}\text{C}$	V	—	—	750
$V_{GS,max}$	Gate to source max. transient voltage @ $T_c = 25^{\circ}\text{C}$	V	-10	—	+7
$I_{DS,max}$	Drain to source DC current @ $T_c = 25^{\circ}\text{C}$	A	—	—	10
$I_{DS,max}$	Drain to source DC current @ $T_c = 100^{\circ}\text{C}$	A	—	—	8
$dv/dt_{max}$	Drain to source voltage slew rate	V/nS	—	—	TDB
$T_{J,max}$	Max junction temperature	$^{\circ}\text{C}$	—	—	150
$T_{stg}$	Storage temperature	$^{\circ}\text{C}$	-55	—	150

# GHHS065200AD

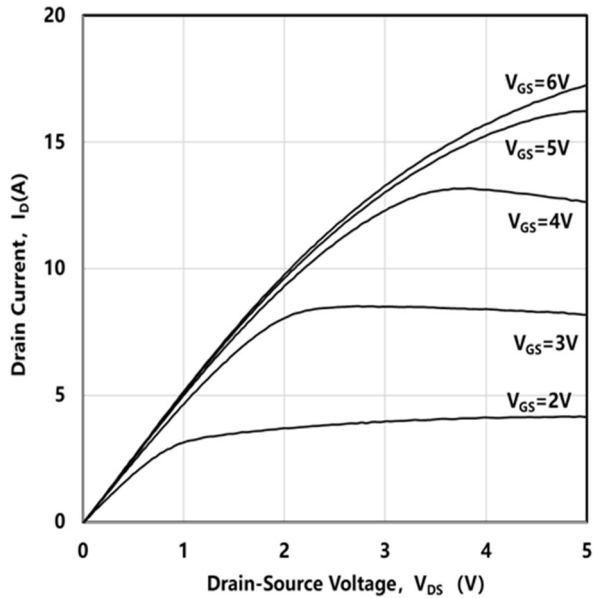
650V, 175mΩ Power Transistor



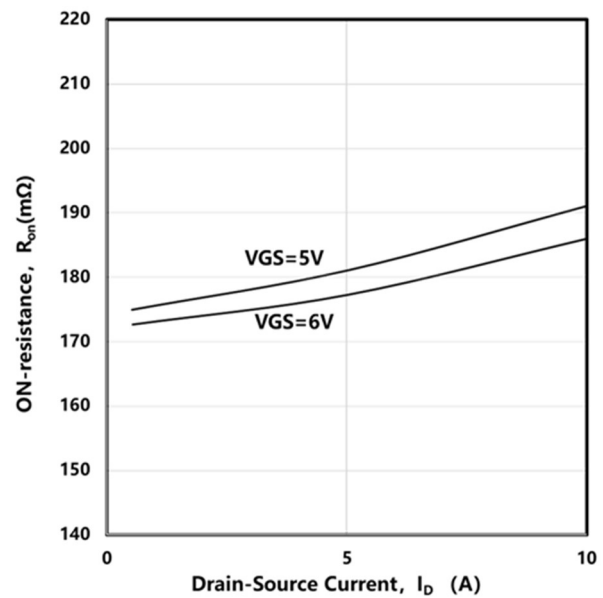
## Electrical Performance

Test conditions unless otherwise noted: Temp = +25 °C.

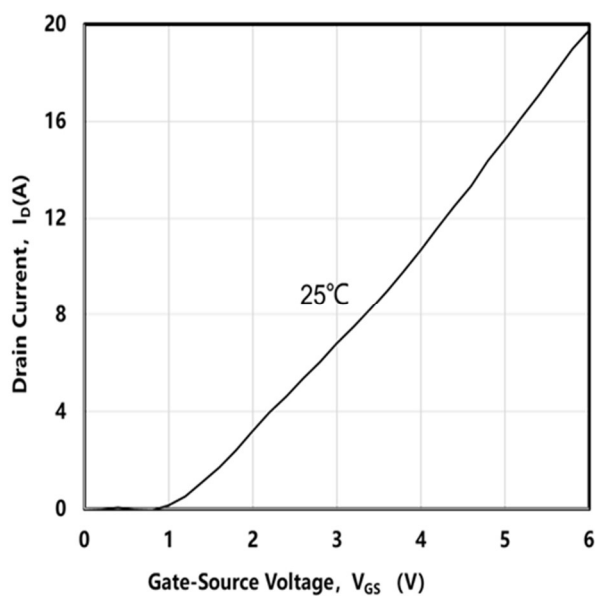
Typical output characteristics



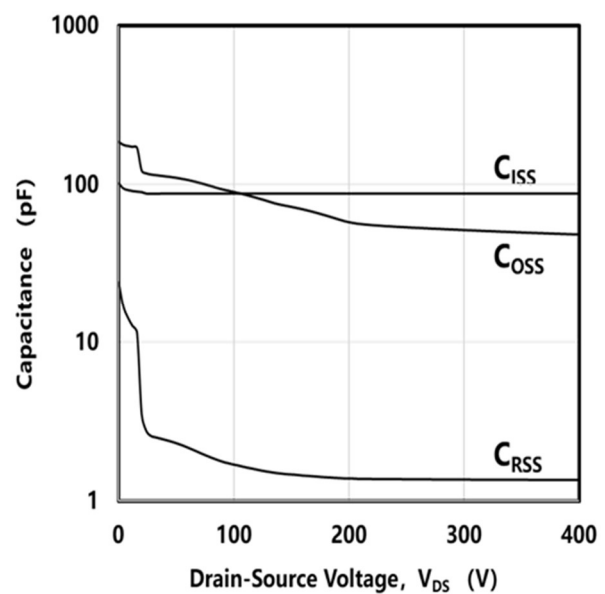
ON-resistance for various drain current



Typical transfer characteristics



Typical capacitance



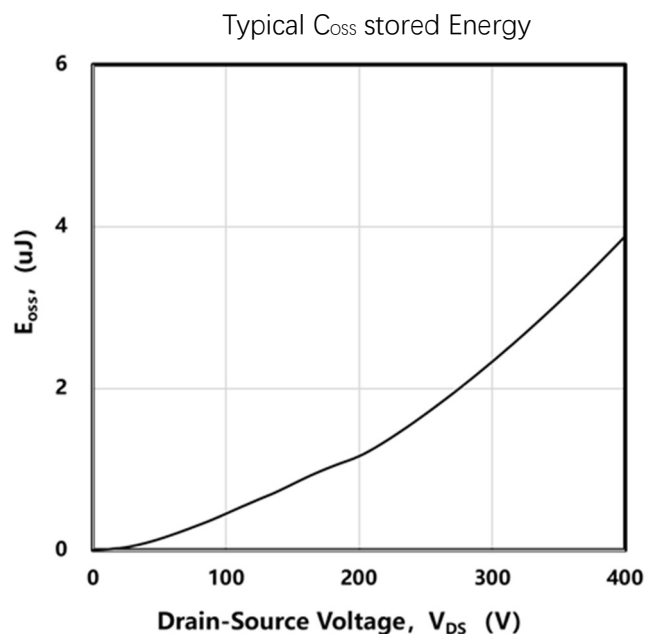
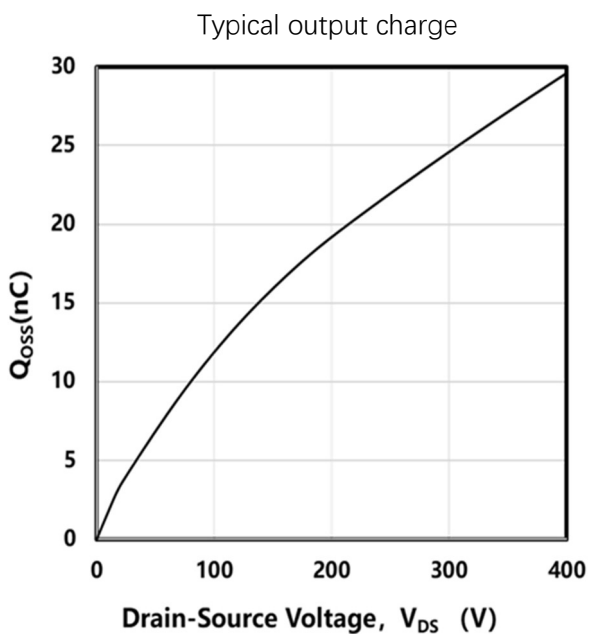
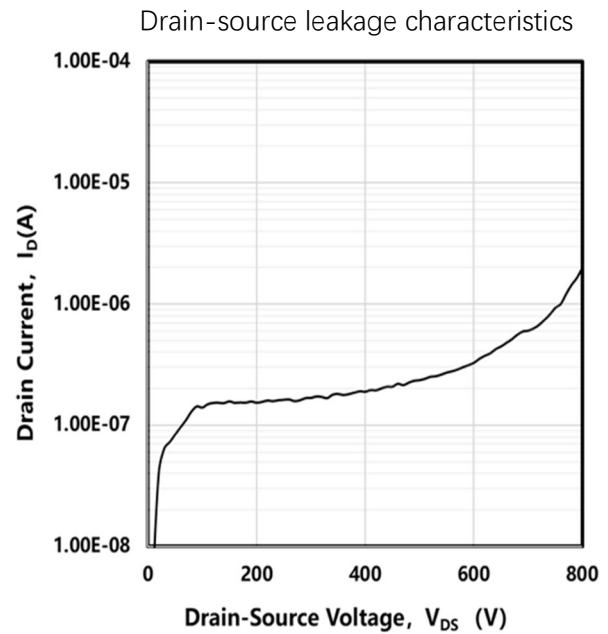
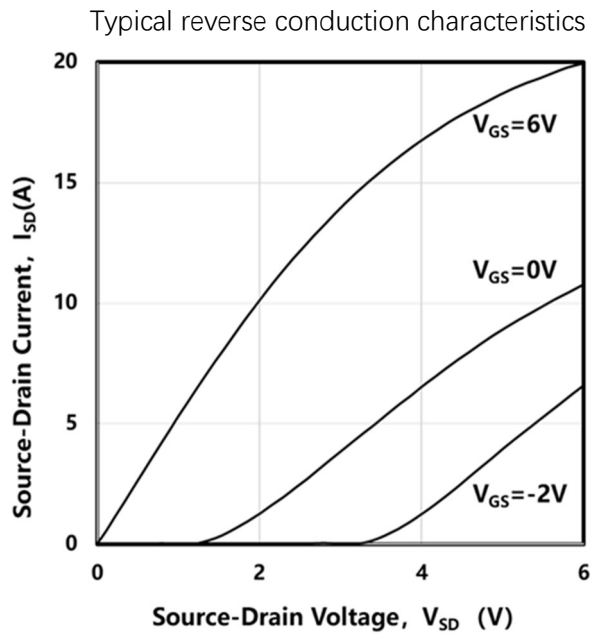
# GHHS065200AD

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## Electrical Performance

Test conditions unless otherwise noted: Temp = +25 °C.

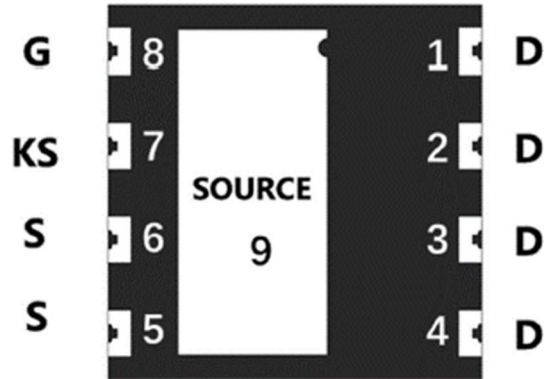


# GHHS065200AD

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## Pin Assignments and Description



Pin	Symbol	Description
1, 2, 3, 4	D	Drain pin
5, 6, 9	S	Source pin
7	KS	Kelvin Source pin
8	G	Gate pin

## Marking

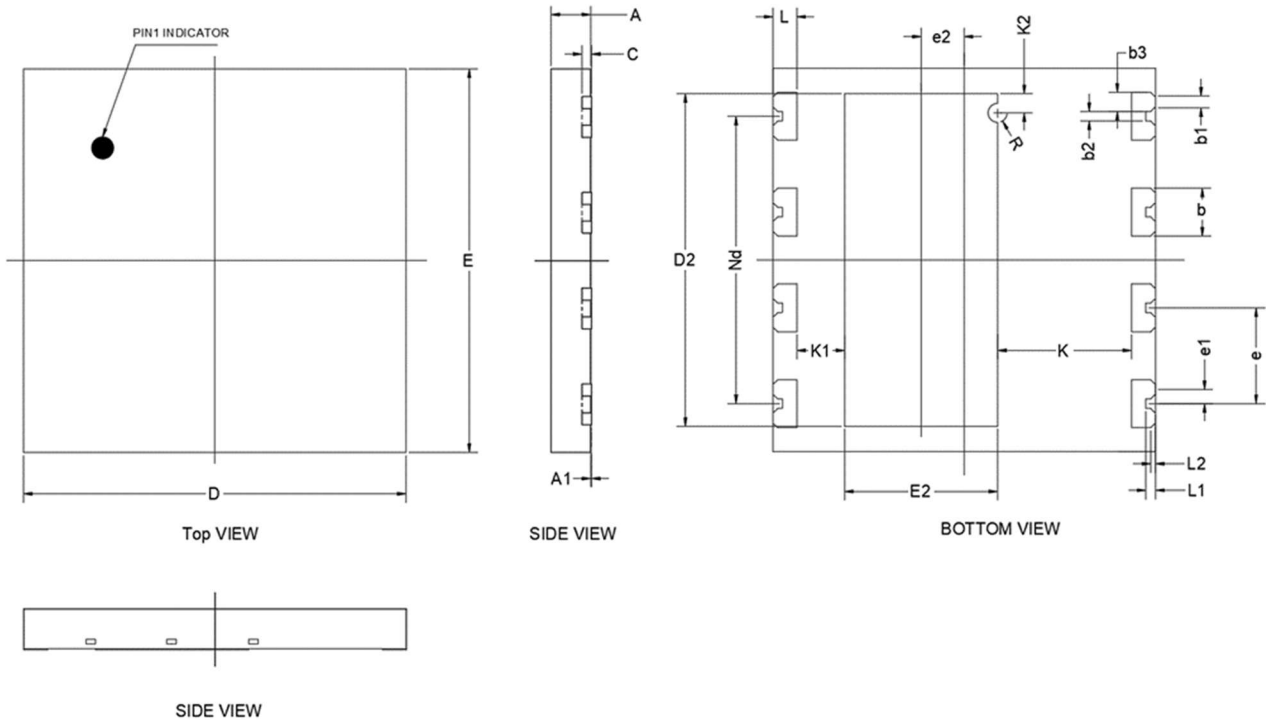
Row	Description	Detail
Row1	Company name	SDSX
Row2	Part number	GHHS065200AD
Row3	Lot Code	XXXXXXXX

# GHHS065200AD

650V, 175mΩ Power Transistor



## Package Dimensions



Symbol	mm		
	min	nom	max
A	0.80	0.85	0.90
A1	0	0.02	0.05
b	0.95	1.00	1.05
b1	0.25REF		
b2	0.20REF		
b3	0.35	0.40	0.45
C	0.203REF		
D	7.90	8.00	8.10
D2	6.84	6.94	7.04
Nd	6.00BSC		
e	2.00BSC		

Symbol	mm		
	min	nom	max
e1	0.30BSC		
e2	0.90BSC		
E	7.90	8.00	8.10
E2	3.10	3.20	3.30
L	0.45	0.50	0.55
L1	0.20REF		
L2	0.10REF		
K	2.80REF		
K1	1.00REF		
K2	0.40REF		
R	0.15	0.20	0.25

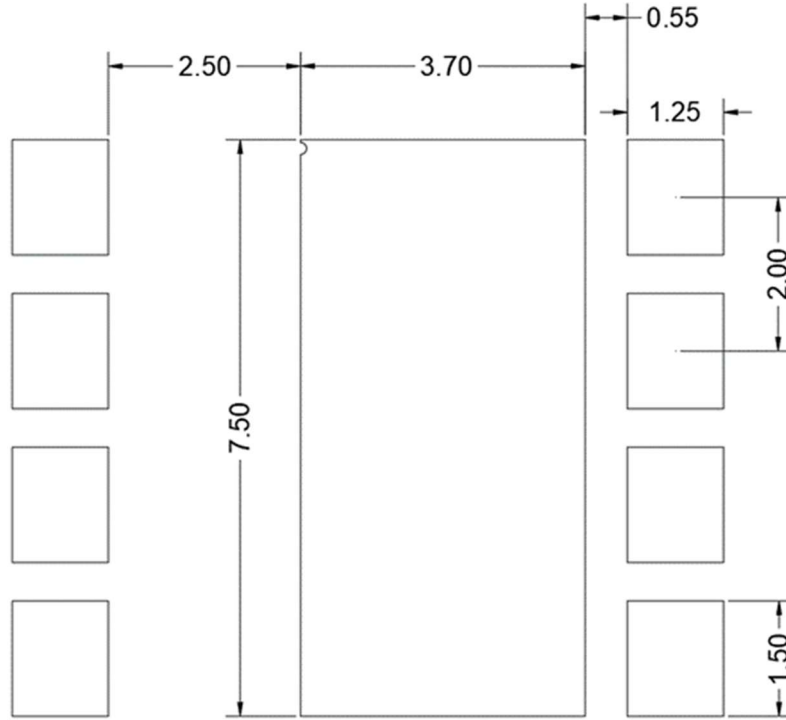
Notes: All dimensions are in millimeters.

# GHHS065200AD

650V, 175mΩ Power Transistor



## PCB Mounting Pattern



PCB Layout Footprint (Top View)

Notes: All dimensions are in millimeters.



# GHHS065200AD

650V, 175m $\Omega$  Power Transistor



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## Handling Precaution

ESD countermeasure methods should be developed and used to control potential ESD damage during handling in a factory environment at each manufacturing site.

## Solderability

Compatible with lead-free (260 °C maximum reflow temperature) soldering processes.

## RoHS Compliance

This product is compliant with the EU RoHs2.0, EU Directive 2015/863.

## Contact Information

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