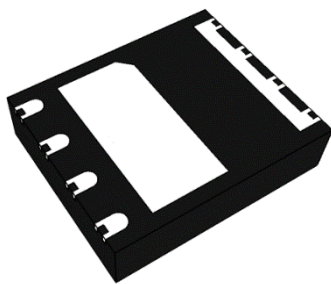


GHHS065400AD

650V, 340mΩ Power Transistor



Description

GHHS065400AD 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.

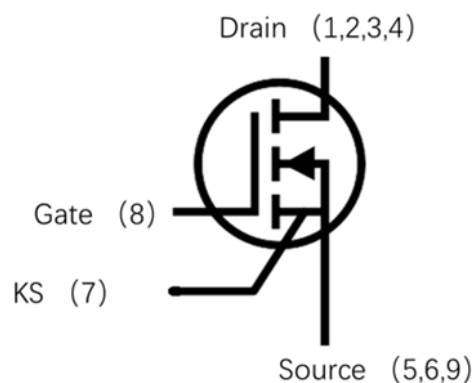
Features

- 650V GaN E-mode Power Transistor
- Low 340 mΩ Resistance
- Zero reverse-recovery charge
- 5 x 6 mm footprint, 0.85 mm profile
- Minimized package inductance

Applications

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

Functional Block Diagram



Ordering Information

- GHHS065400AD

GHHS065400AD

650V, 340mΩ Power Transistor



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	$V_{GS} = 0 \text{ V}; I_D = 5 \mu\text{A}$	V	650	750	—
I_{DSS}	Zero gate voltage drain current	$V_{GS} = 0 \text{ V}; V_{DS} = 650 \text{ V}$	μA	—	0.5	5
I_{GSS}	Gate-source Leakage	$V_{GS} = 6 \text{ V}; V_{DS} = 0 \text{ V}$	μA	—	10	—
$R_{DS(on)}$	Static drain-source on resistance	$V_{GS} = 6 \text{ V}; I_D = 3 \text{ A}; T_J = 25 \text{ }^\circ\text{C}$	mΩ	—	340	—
		$V_{GS} = 6 \text{ V}; I_D = 3 \text{ A}; T_J = 150 \text{ }^\circ\text{C}$		—	750	—
V_{SD}	Reverse conduction voltage	$V_{GS} = 0 \text{ V}; I_{SD} = 1 \text{ A}$	V	—	2.5	—

Dynamic Parameters

Symbol	Parameter	Conditions	Units	Min	Typ	Max
C_{ISS}	Input capacitance		pF	—	31	—
C_{OSS}	Output capacitance	$V_{GS} = 0 \text{ V}; V_{DS} = 400 \text{ V}; F = 1 \text{ MHz}$	pF	—	16.5	—
C_{RSS}	Reverse transfer capacitance		pF	—	0.8	—
Q_G	Gate charge		nC	—	TBD	—
Q_{GS}	Gate to source charge	$V_{DS} = 400 \text{ V}; I_D = 2 \text{ A}; V_{GS} = 6 \text{ V}$	nC	—	TBD	—
Q_{GD}	Gate to drain charge		nC	—	TBD	—
Q_{RR}	Reverse recovery charge	$V_{DS} = 400 \text{ V}; I_{SD} = 5 \text{ A};$	nC	—	0	—

GHHS065400AD

650V, 340mΩ Power Transistor



Thermal and Soldering Characteristics (Typical)

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

Absolute Maximum Ratings

Symbol	Parameter	Units	Min	Typ	Max
$V_{DS,max}$	Breakdown voltage transient @ $T_c = 25\text{ °C}$	V	—	—	750
$V_{GS,max}$	Gate to source max. transient voltage @ $T_c = 25\text{ °C}$	V	-10	—	+7
$I_{DS,max}$	Drain to source DC current @ $T_c = 25\text{ °C}$	A	—	—	7
$I_{DS,max}$	Drain to source DC current @ $T_c = 100\text{ °C}$	A	—	—	5
dv/dt_{max}	Drain to source voltage slew rate	V/nS	—	—	TDB
$T_{J,max}$	Max junction temperature	°C	—	—	150
T_{stg}	Storage temperature	°C	-55	—	150

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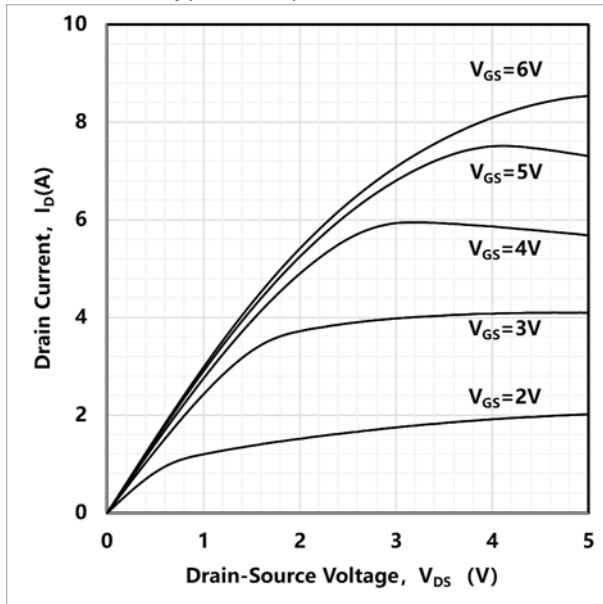
650V, 340mΩ Power Transistor



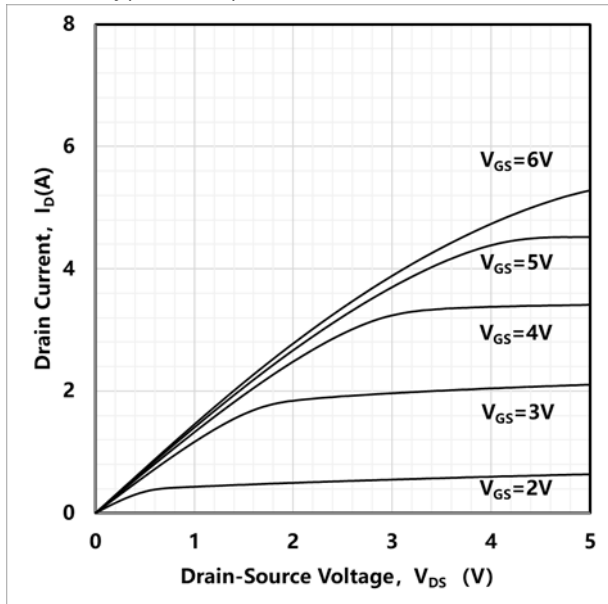
Electrical Performance

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

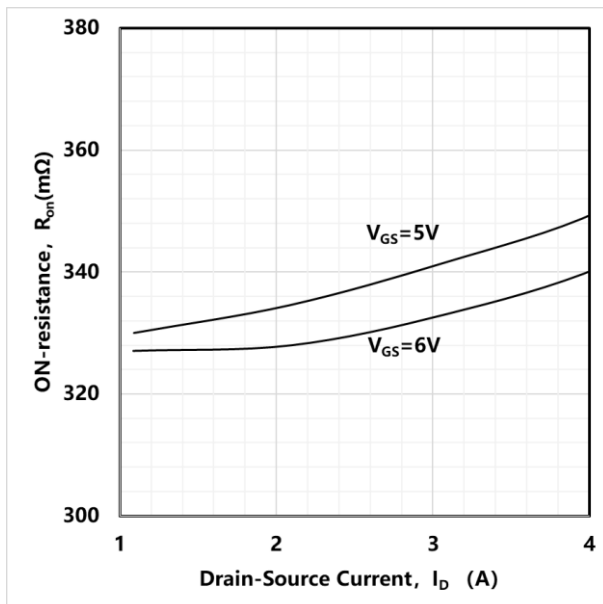
Typical output characteristics



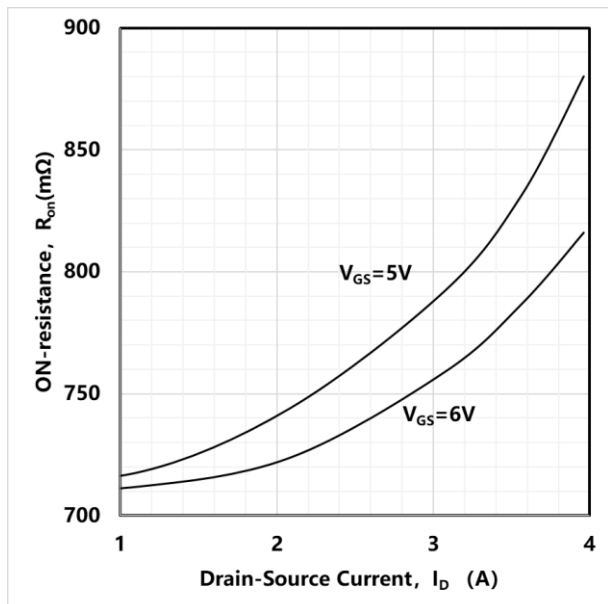
Typical output characteristics $T_J = 150^\circ\text{C}$



ON-resistance for various drain current



ON-resistance for various drain current $T_J = 150^\circ\text{C}$



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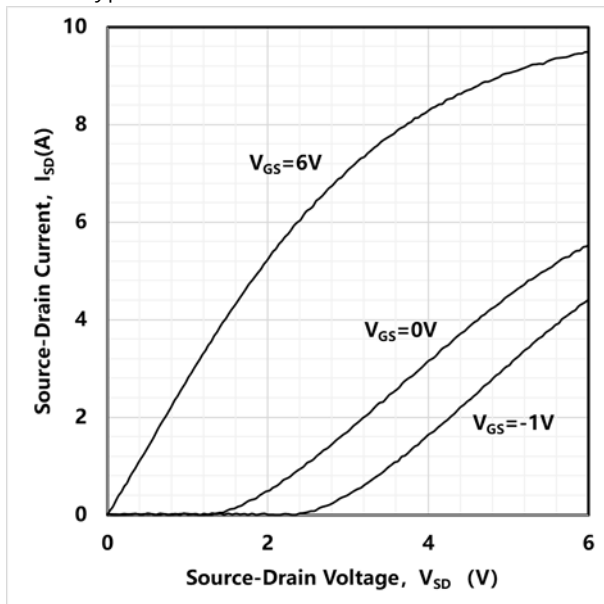
650V, 340mΩ Power Transistor



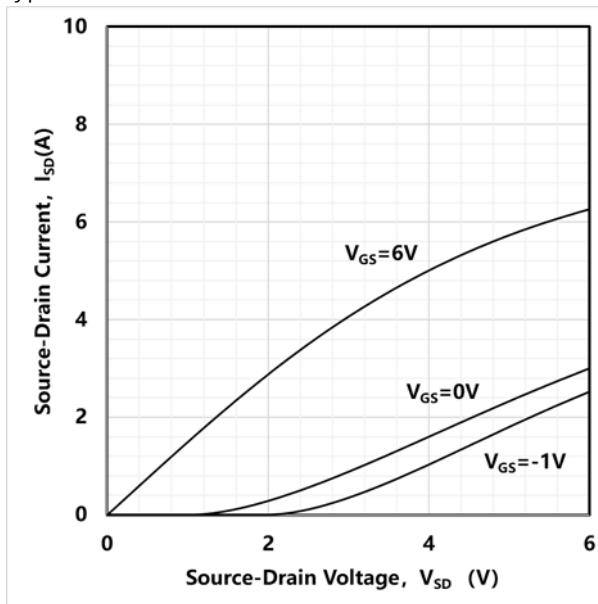
Electrical Performance

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

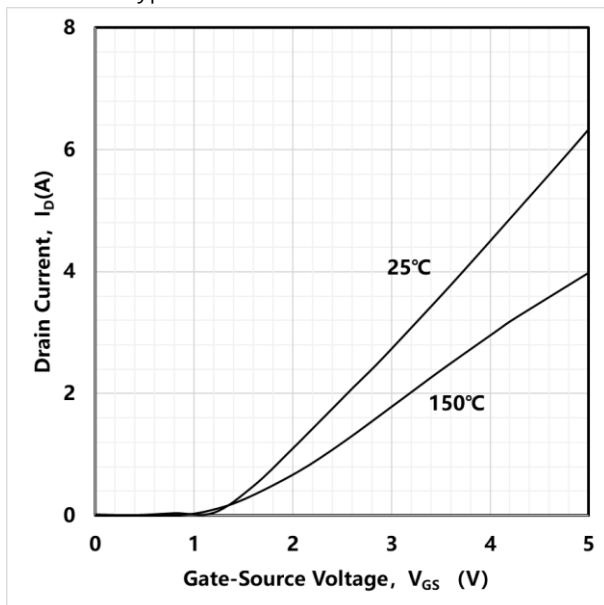
Typical reverse conduction characteristics



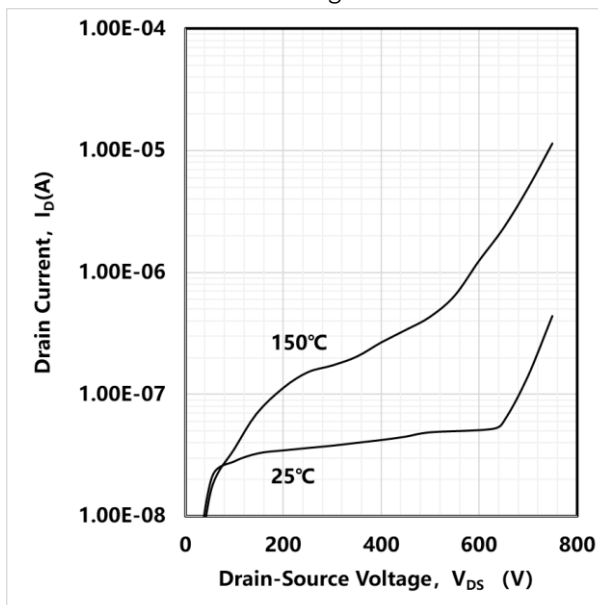
Typical reverse conduction characteristics $T_J = 150\text{ °C}$



Typical transfer characteristics



Drain-source leakage characteristics



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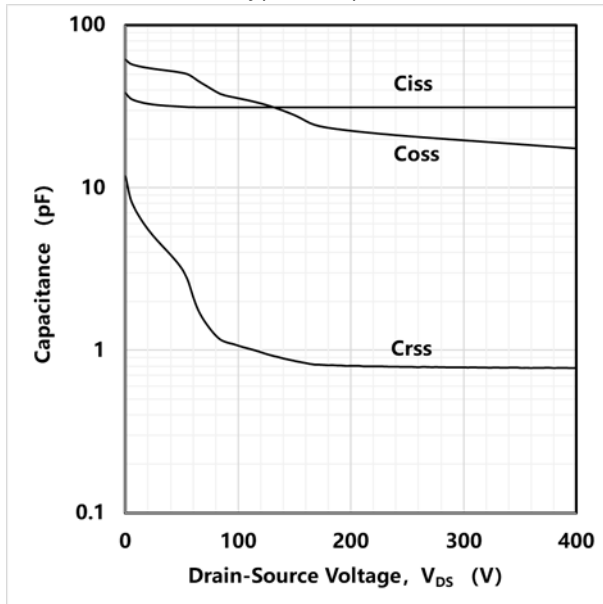
650V, 340mΩ Power Transistor



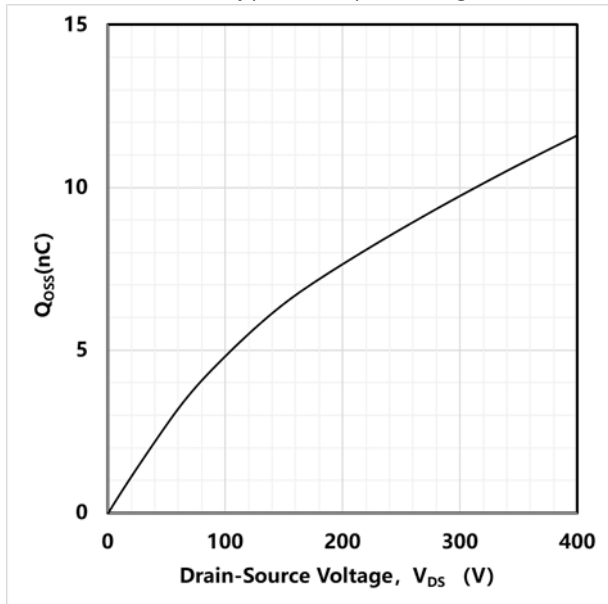
Electrical Performance

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

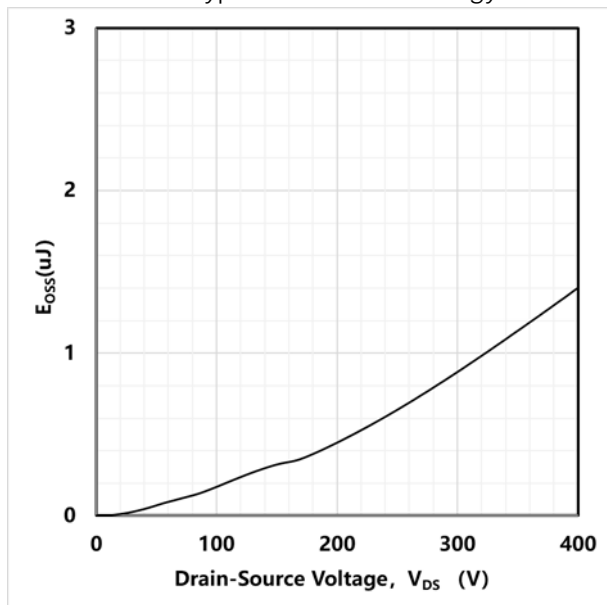
Typical capacitances



Typical output charge



Typical C_{oss} stored Energy

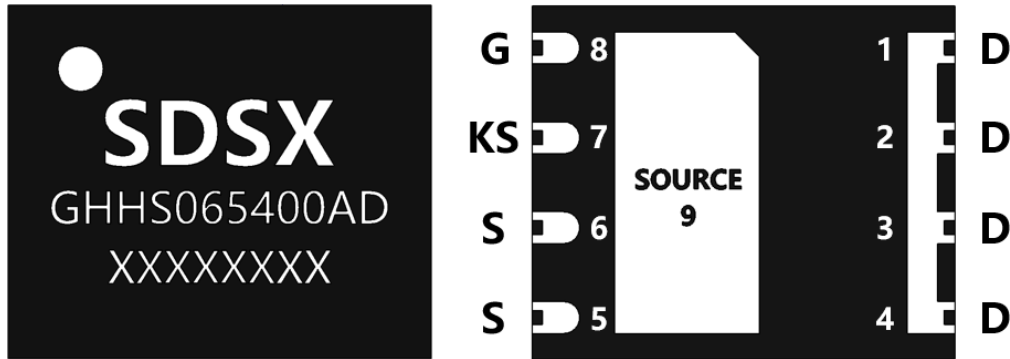


GHHS065400AD

650V, 340mΩ Power Transistor



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

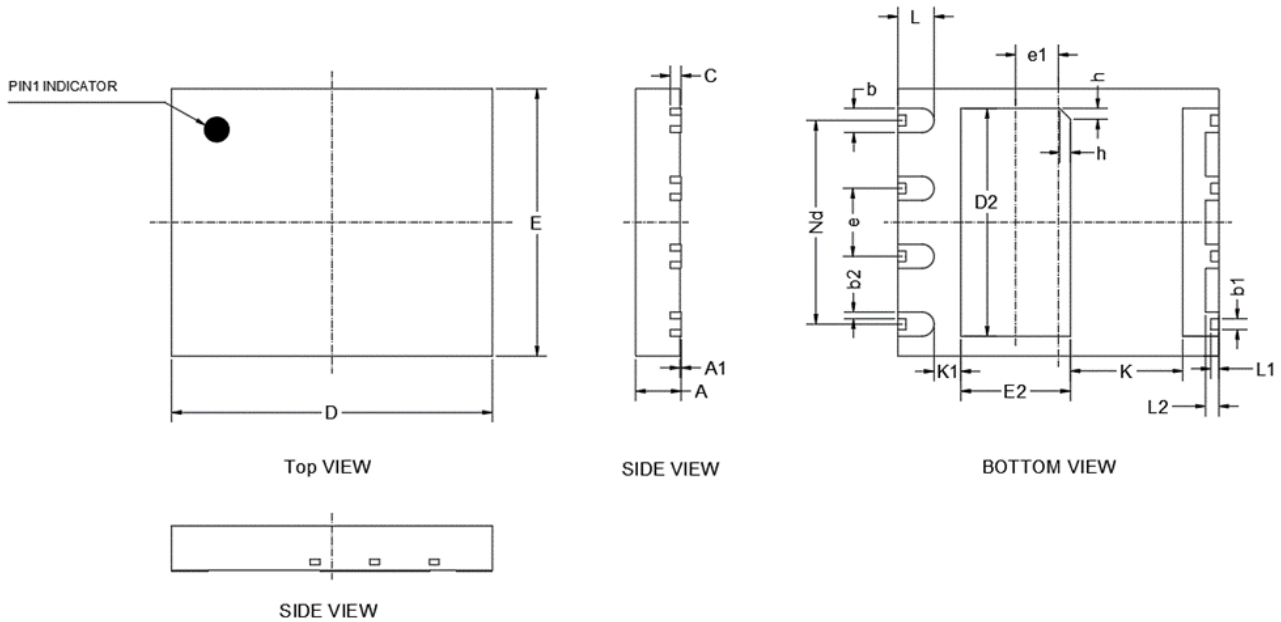
Row	Description	Detail
Row1	Company name	SDSX
Row2	Part number	GHHS065400AD
Row3	Lot Code	XXXXXXXX

GHHS065400AD

650V, 340mΩ Power Transistor



Package Dimensions



Symbol	mm		
	min	nom	max
A	0.80	0.85	0.90
A1	0	0.02	0.05
b	0.40	0.45	0.50
b1	0.20REF		
b2	0.125REF		
C	0.203REF		
D	5.90	6.00	6.10
D2	4.16	4.26	4.36
e	1.27BSC		
e1	0.80BSC		
Nd	3.81BSC		
E	4.90	5.00	5.10
E2	1.95	2.05	2.15
L	0.625	0.675	0.725
L1	0.15REF		
L2	0.25REF		
h	0.15	0.20	0.25
K	2.10REF		
K1	0.50REF		

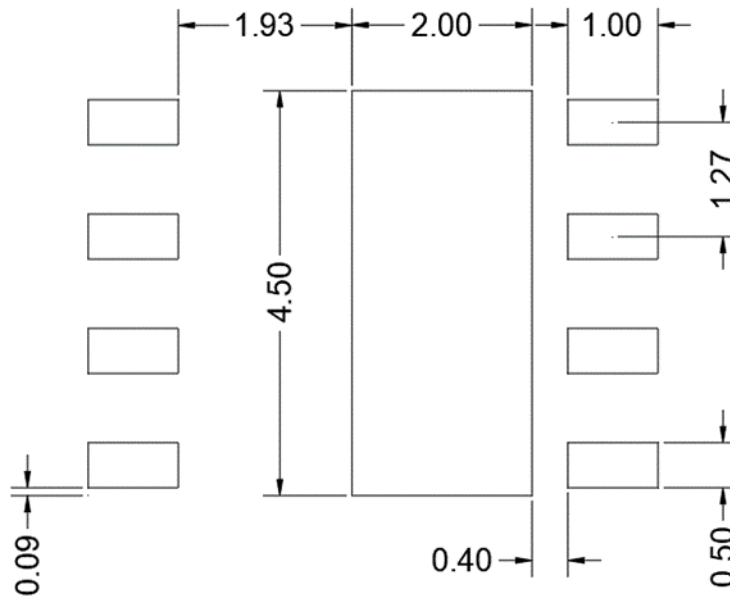
Notes: All dimensions are in millimeters.

GHHS065400AD

650V, 340mΩ Power Transistor



PCB Mounting Pattern



PCB Layout Footprint (Top View)

Notes: All dimensions are in millimeters.

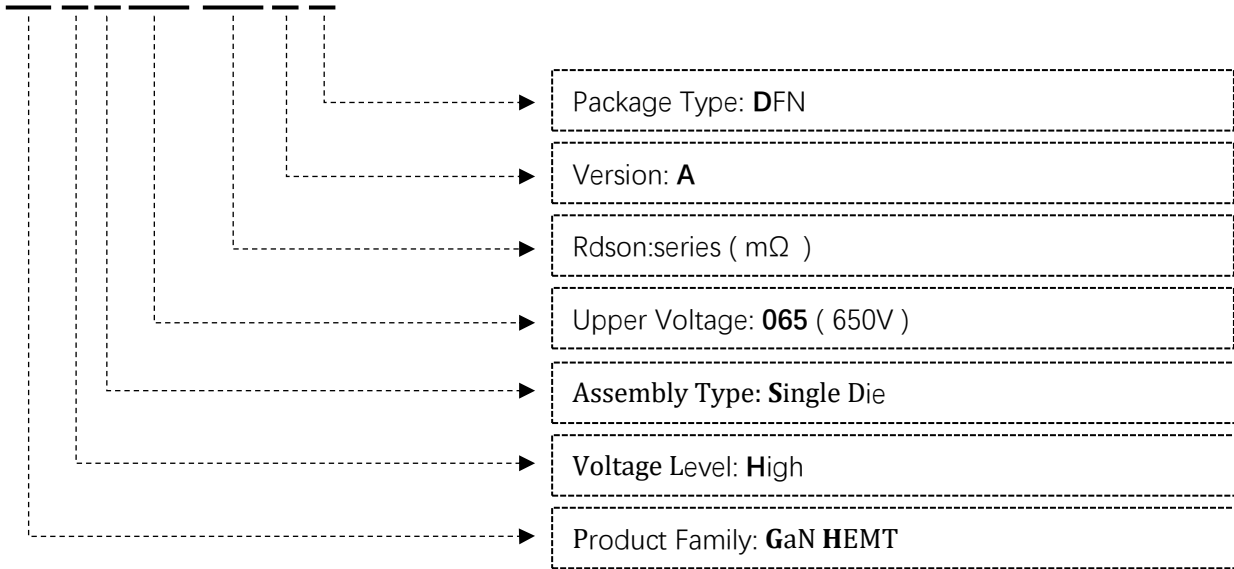
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650V, 340mΩ Power Transistor



Part Number System

GHHS065400AD



GHHS065400AD

650V, 340mΩ Power Transistor



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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