神匠創意股份有限公司

產品說明書

產品類別：GS GaN FET

產品名稱：GS GaN FET(650 V GaN FET)

Part No.GS75H250G4C

Part No.GS75H250G4LGS

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概說：

- The GS GaN FET 是以 GS Gen IV platform 製造的 gallium nitride (GaN)FET。GS Gen IV platform 技術著重在 epi 磊晶的均勻性、穩定性和較大的可用面積。
- 其中 GS75H250G4C 是裸晶(die)，GS75H250G4LGS 是將 GS75H250G4C 以 8x8 PQFN 封裝的完成品。
- 在使用上高度相容於市場常用的 TP65H300G4LSG GaN FET，可以直接轉換使用。
- 詳細資訊及應用範例見產品說明書及產品應用設計指南。

GS75H250G4C

裸晶規格書

GS75H250G4C

Preliminary Datasheet

Depletion-mode GaN HEMT Die

Physical Data (T_C=25°C unless otherwise stated)

Item	Dimensions/Thickness	Unit
X-dimension	1.61	mm
Y-dimension	1.5	
Thickness	0.38	
X and Y scribes	0.1x 0.1	
Gate (die backside)	1.61x 1.5	
Source pad	.918x .153	
Drain pad	1.098x .153	
Backside metal: Ti/Ni/Ag	100/200/500	nm
Source and Drain Bond Pad: AlCu(0.5%)/Al	8000	
Passivation: SiN	2000	

Key Specifications

Parameter	Value
V_{DS} (V)	650
V_{TDS} (V) max	725
$R_{DS(on)}$ (mΩ) max*	302
Qg (nC) typ	14

* Includes dynamic $R_{(on)}$

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Absolute Maximum Ratings (T_C=25°C unless otherwise stated)

Symbol	Parameter		Limit Value	Unit
$I_{D25°C}$ [a]	Continuous drain current @T_C=25°C		6.5	A
$I_{D100°C}$ [a]	Continuous drain current @T_C=100°C		4.1	A
I_{DM}	Pulsed drain current (pulse width: 10μs)		30	A
V_{DSS}	Drain to source voltage		650	V
V_{TDS}	Transient drain to source voltage [b]		725	V
V_{GS} (min)	Min. gate to source voltage	Continuous	-30	V
		Transient	-40	
V_{GS} (max)	Max gate to source voltage	Continuous	2	V
		Transient	10	
T_J	Operating temperature		-55 to +150	°C

Notes:
a. Tested in metal package with Cu base of 15mm x 15mm x 1mm (W x H x D)
b. In off-state, spike duty cycle D<0.01, spike duration <1μs

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Thermal Resistance

Symbol	Parameter	Typical	Unit
$R_{\Theta JC}$	Junction-to-case [a]	0.8	°C/W

Notes:
a. Tested in metal package with Cu base of 15mm x 15mm x 1mm (W x H x D)

Electrical Characteristics (T_C=25°C unless otherwise stated)

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
Static						
$V_{DSS\text{-}MAX}$	Maximum drain-source voltage	650	—	—	V	V_{GS}=-30V
$V_{GS(th)}$	Gate threshold voltage	-27	-20	-15	V	V_{DS}=10V, I_D=0.7mA
$R_{DS(on)}$ [a]	Drain-source on-resistance (T_J=25°C)	—	230	302	mΩ	V_{GS}=0V, I_D=30A, T_J=25°C
	Drain-source on-resistance (T_J=150°C)	—	475	—		V_{GS}=0V, I_D=30A, T_J=150°C
I_{DSS}	Drain-to-source leakage current	—	0.1	1	µA	V_{DS}=650V, V_{GS}=-30V, T_J=25°C
Dynamic						
C_{ISS}	Input capacitance	—	62	—	pF	V_{GS}=-30V, V_{DS}=400V, f=1MHz
C_{OSS}	Output capacitance	—	16	—		
C_{RSS}	Reverse transfer capacitance	—	12	—		
$C_{O(er)}$	Output capacitance, energy related [b]	—	21	—	pF	V_{GS}=-30V, V_{DS}=0V to 400V
$C_{O(tr)}$	Output capacitance, time related [b]	—	29	—		
Q_{oss}	Total output charge [b]	—	12	—	nC	V_{GS}=-30V, V_{DS}=0V to 400V
Q_g	Total gate charge	—	14	—	nC	V_{DS}=400V, V_{GS}=-30V to 0V, I_D=30A

Notes:
a. Bond wire resistance not included
b. Equivalent fixed capacitance for V_{DS} increases from 0V to 400V

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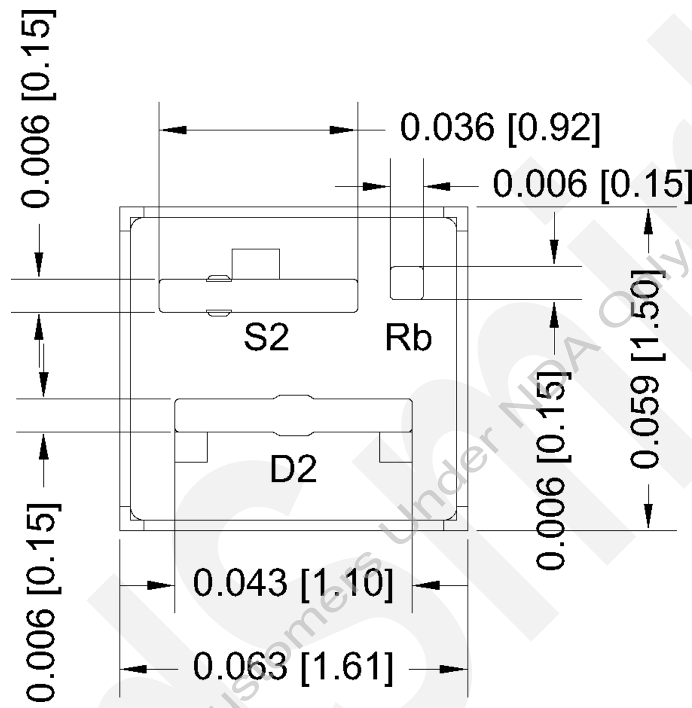
Mechanical Data
Dimensions in inches (millimeters)



GaN Systems
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Equivalent Circuit Diagram
The GaN HEMT is shown in black. It is designed to match with a 30V Si MOSFET (in grey) to form a cascode switch. Rds-on of the Si MOSFET should be 5-10% of that of the GaN HEMT.

G2: die bottom to be soldered to the common source of the cascode.