650V GaN HEMT

Description

The CC65H900DNZI Series 650V, 900mΩ gallium nitride (GaN) FETs are normally-off devices.

Classicchip GaN FETs offer better efficiency through lower gate charge, faster switching speeds, and lower dynamic onresistance, delivering significant advantages over traditional silicon (Si) devices.

Classicchip is a leading-edge wide band gap supplier with world-class innovation .

Automotive

- Adapter
- Renewable energy
- Telecom and data-com
- Servo motors
- Industrial
- Automotive

General Features

Easy to drive—compatible with standard gate drivers

Low conduction and switching losses

RoHS compliant and Halogen-free

Benefits

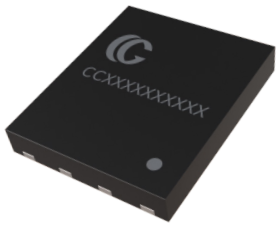
Increased efficiency through fast switching

Increased power density

Reduced system size and weight

Ordering Information

Part Number	Package	Package Configuration
CC65H900DNZI	DFN5*6	Source



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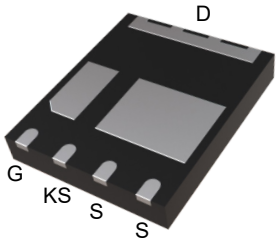

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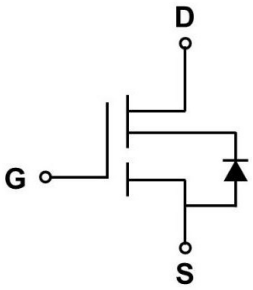


Circuit Symbol

Features

BV_{DSS}	R_{DSON}	I_{DS}	Q_G
650V	900 mΩ	3.4A	6nC

Absolute Maximum Ratings

T_C=25°C unless otherwise stated

Symbol	Parameter		Limit value	Unit
V_{DSS}	Drain to source voltage (T_J = -55°C to 150°C)		650	V
$V_{(TR)DSS}$	Drain to source voltage-transient [a]		800	
V_{GSS}	Gate to source voltage		-20~+20	
I_D	Continuous drain current @T_C=25°C [b]		3.4	A
	Continuous drain current @T_C=125°C [b]		1.6	
I_{DM}	Pulse drain current (pulse width: 100μs)		5	A
P_D	Maximum power dissipation @ T_C=25°C		21	W
T_C	Operating temperature	Case	-55~150	°C
T_J		Junction	-55~150	°C
T_S	Storage temperature		-55~150	°C

a. In off-state, spike duty cycle D<0.01, spike duration <1μs

b. For increased stability at high current operation

Thermal Resistance

Symbol	Parameter	Limit value	Unit
$R_{\theta JC}$	Junction-to-case	6	°C /W

Electrical Parameters

T_J=25°C unless otherwise stated

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
Forward Device Characteristics						
$V_{(BL)DSS}$	Drain-source voltage	650	-	-	V	V_{GS}= 0V
$V_{GS(th)}$	Gate threshold voltage	1.2	1.7	2	V	V_{DS}=1V, I_{DS}=1mA
$\triangle V_{GS(th)}/T_J$	Gate threshold voltage temperature coefficient	-	-7	-	mV/°C	
$R_{DS(on)}$	Drain-source on-Resistance	-	900	1080	mΩ	V_{GS}=10V, I_D=1A, T_J=25°C
		-	1900	-		V_{GS}=10V, I_D=1A, T_J=150°C
I_{DSS}	Drain-to-source leakage current	-	-	10	μA	V_{DS}=650V, V_{GS}= 0V, T_J=25°C
		-	-	100		V_{DS}=650V, V_{GS}= 0V, T_J=150°C
I_{GSS}	Gate-to-source forward leakage current	-	-	±100	nA	V_{GS}=±20V
C_{ISS}	Input capacitance	-	400	-	pF	V_{GS}=0V, V_{DS}=400V, f=1MHz
C_{OSS}	Output capacitance	-	9.2	-		
C_{RSS}	Reverse capacitance	-	3.8	-		
Q_G	Total gate charge	-	6	-	nC	V_{DS}=400V, V_{GS}=0V to 10V, I_D=1A
Q_{GS}	Gate-source charge	-	1.8	-		
Q_{GD}	Gate-drain charge	-	1.2	-		
Q_{OSS}	Output charge	-	12	-	nC	V_{GS}=0V, V_{DS}=0V to 400V, f=1MHz
$t_{D(on)}$	Turn-on delay	-	3.4	-	ns	V_{DS}=400V, V_{GS}=0V to 10V, I_D=2.1A, $R_{G-on(ext)}$=6.8Ω, $R_{G-off(ext)}$=2.2Ω, L=250μH
t_R	Rise time	-	5.3	-		
$t_{D(off)}$	Turn-off delay	-	7.6	-		
t_F	Fall time	-	27	-		

Electrical Parameters

T_J=25°C unless otherwise stated

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
Reverse Device Characteristics						
V_{SD}	Source-Drain reverse voltage	-	3.1	-	V	V_{GS}=0V, I_{SD}=2.5A
t_{RR}	Reverse recovery time	-	14	-	ns	I_F=2.5A, V_{DD}=400V, dI_F/dt=165A/μs
Q_{RR}	Reverse recovery charge	-	6.5	-	nC	

Typical Characteristics

T_J=25°C unless otherwise stated

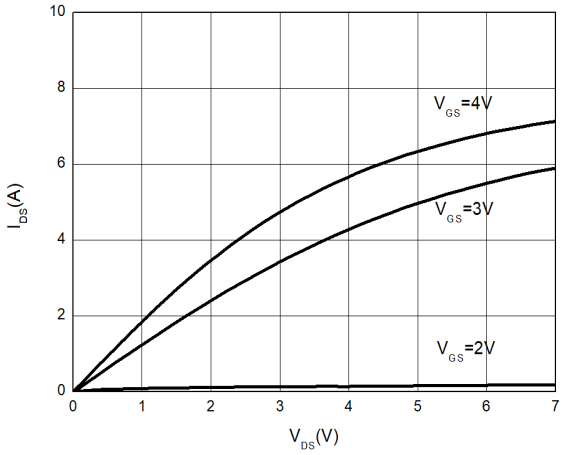


Figure 1. Typical Output Characteristics T_J=25°C

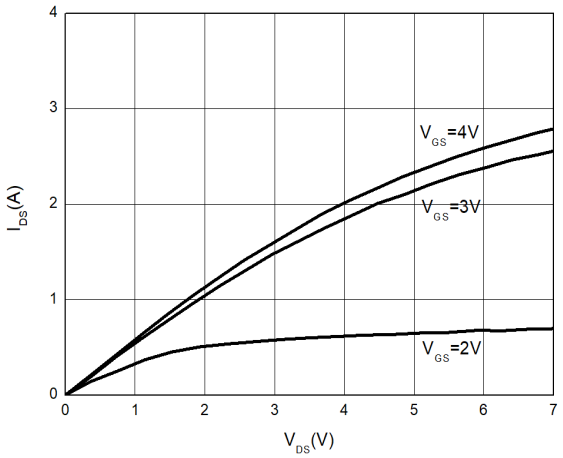


Figure 2. Typical Output Characteristics T_J=125°C

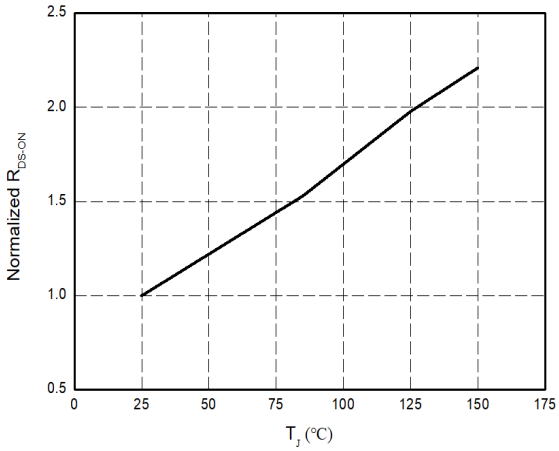


Figure 3. Normalized On-resistance

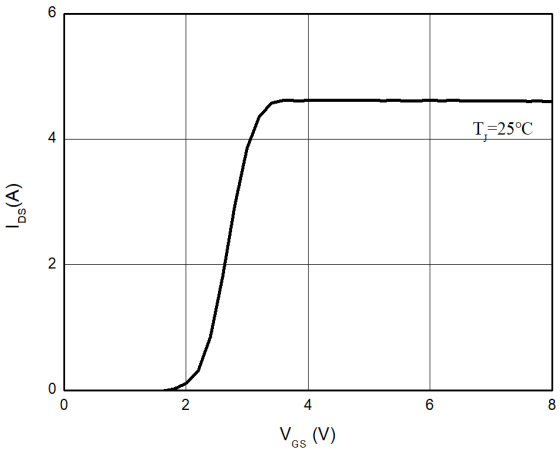


Figure 4. Typical Transfer Characteristics T_J=25°C

Typical Characteristics

T_J=25°C unless otherwise stated

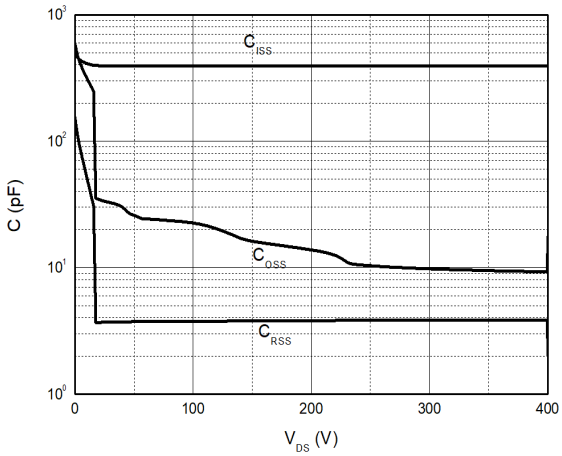


Figure 5. Typical Capacitance (f=1MHz)

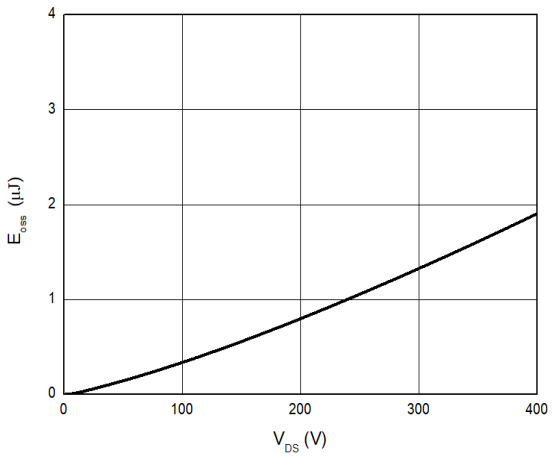


Figure 6. Typical C_{OSS} Stored Energy

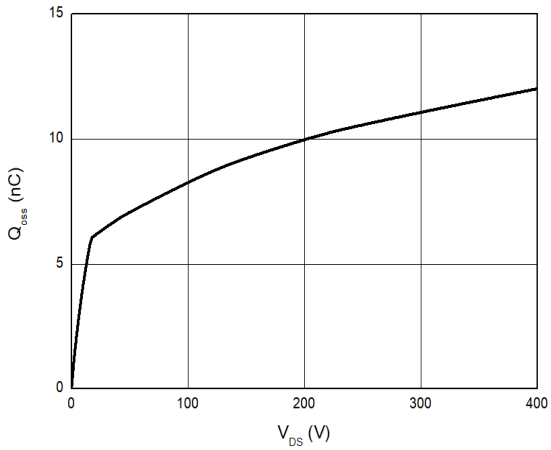


Figure 7. Typical Q_{OSS}

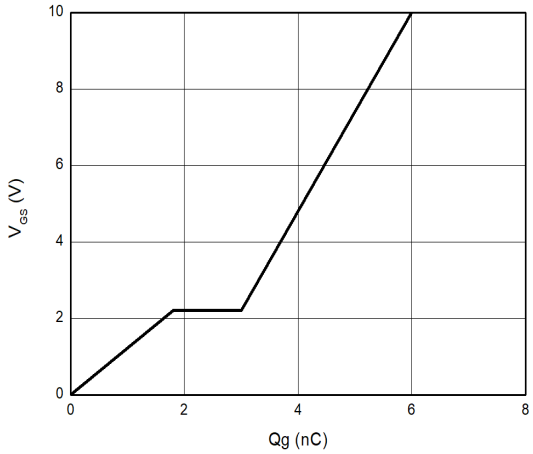


Figure 8. Typical Gate Charge (V_{DS}=400V, I_D=1A)

Typical Characteristics

T_J=25°C unless otherwise stated

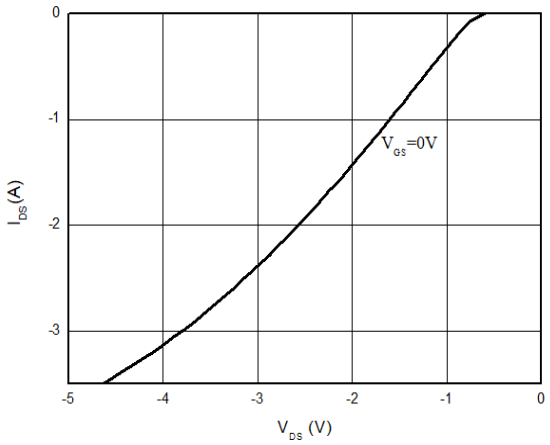


Figure 9. Channel Reverse Characteristics T_J=25°C

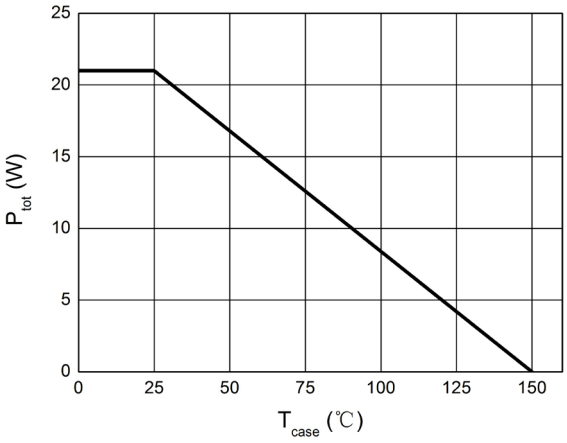


Figure 10. Power Dissipation

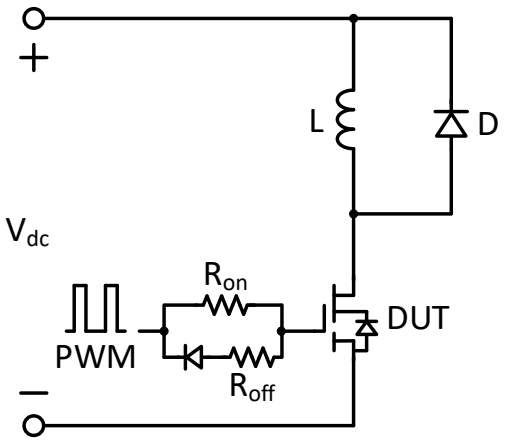


Figure 11 Switching times with inductive load

V_{DS}=400V, V_{GS}=0V to 10V, I_D=2.1A,
$R_{G-on(ext)}$=6.8Ω, $R_{G-off(ext)}$=2.2Ω, L=250μH

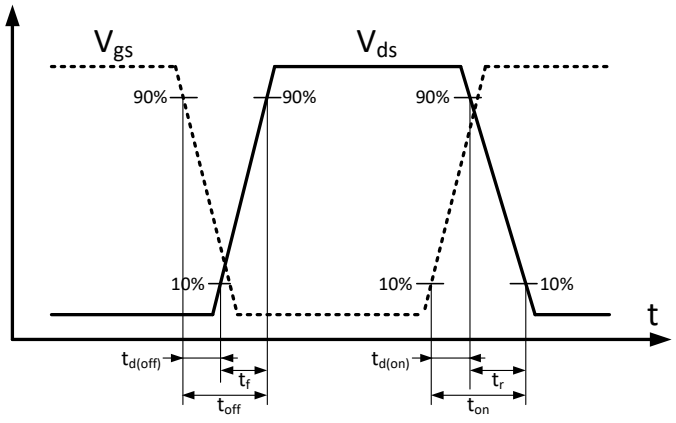
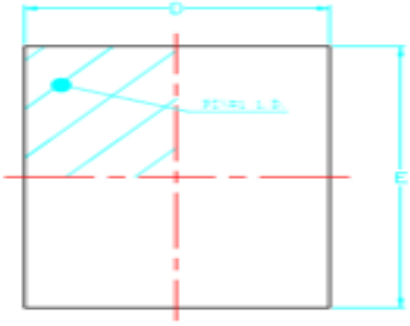
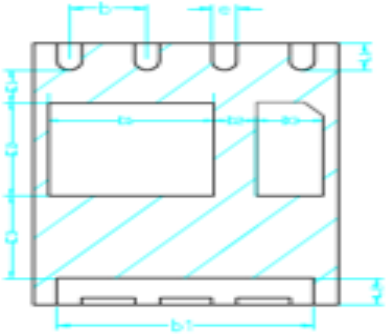


Figure 12. Switching times with waveform

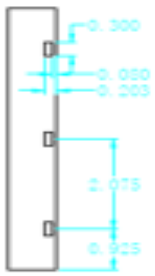
PACKAGE DIMENSIONS



TOP VIEW



BOTTOM VIEW



SIDE VIEW

SIDE VIEW

符号	尺寸（单位：mm）		
	最小值	标准值	最大值
A	0.80	0.90	1.00
A1	0.203Ref		
A2	——	0.02	0.05
D	4.90	5.00	5.10
E	5.90	6.00	6.10
D1	2.61	2.71	2.81
D2	0.60	0.70	0.80
D3	0.99	1.09	1.19
E1	0.65	0.75	0.85
E2	2.05	2.15	2.25
E3	1.80	1.90	2.00
b	1.17	1.27	1.37
b1	4.11	4.21	4.31
e	0.30	0.40	0.50
L1	0.50	0.60	0.70
L2	0.50	0.60	0.70