



## CoreGaN 650V GaN HEMT

### Description

The CE65H270DNXI Series 650V, 270mΩ gallium nitride (GaN) FETs are normally-off devices.

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

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

### Application

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

### General Features

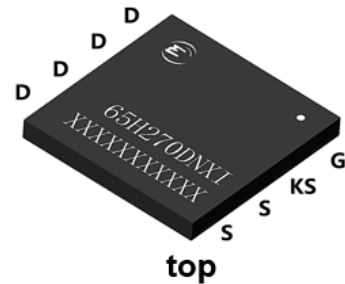
Easy to drive—compatible with standard gate drivers  
 Low conduction and switching losses  
 RoHS compliant and Halogen-free

### Benefits

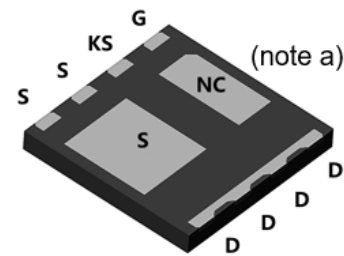
Increased efficiency through fast switching  
 Increased power density  
 Reduced system size and weight

## Ordering Information

Part Number	Package	Package Configuration
CE65H270DNXI	DFN 8*8	Source



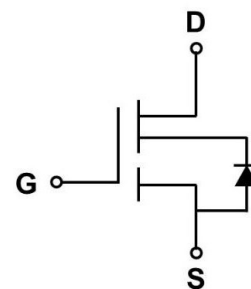
top



bottom

Note :

- a. NC solder pad represents GaN source & MOS Drain; The electrical connection is prohibited.



Circuit Symbol

## Features

$BV_{DSS}$	$R_{DS(on)}$	$I_{DS}$	$Q_G$
650V	270mΩ	9.8A	8.7nC



## Absolute Maximum Ratings

$T_c=25^\circ\text{C}$  unless otherwise stated

Symbol	Parameter	Limit value	Unit	
$V_{DSS}$	Drain to source voltage ( $T_J = -55^\circ\text{C}$ to $150^\circ\text{C}$ )	650		
$V_{(TR)DSS}$	Drain to source voltage-transient <sup>a</sup>	800	V	
$V_{GSS}$	Gate to source voltage	-20~+20		
$I_D$	Continuous drain current @ $T_c=25^\circ\text{C}$ <sup>b</sup>	9.8	A	
	Continuous drain current @ $T_c=125^\circ\text{C}$ <sup>b</sup>	4.4		
$I_{DM}$	Pulse drain current (pulse width: 10 $\mu\text{s}$ )	15	A	
$P_D$	Maximum power dissipation @ $T_c=25^\circ\text{C}$	62	W	
$T_c$	Operating temperature	Case	-55~150	$^\circ\text{C}$
$T_J$		Junction	-55~150	$^\circ\text{C}$
$T_S$	Storage temperature	-55~150	$^\circ\text{C}$	

Notes :

a. In off-state, spike duty cycle  $D < 0.01$ , spike duration  $< 1\mu\text{s}$

b. For increased stability at high current operation



## Thermal Resistance

Symbol	Parameter	Limit value	Unit
$R_{\theta JC}$	Junction-to-case	2	$^{\circ}\text{C} / \text{W}$



## Electrical Parameters

$T_J=25^\circ\text{C}$  unless otherwise stated

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
<b>Forward Device Characteristics</b>						
$V_{(BL)DSS}$	Drain-source voltage	650	-	-	V	$V_{GS}=0V$
$V_{GS(th)}$	Gate threshold voltage	3.3	3.9	4.5	V	$V_{DS}=1V, I_{DS}=1mA$
$\Delta V_{GS(th)}/T_J$	Gate threshold voltage temperature coefficient	-	-7	-	mV/°C	
$R_{DS(on)}$	Drain-source on-Resistance	-	270	320	mΩ	$V_{GS}=10V, I_D=1A, T_J=25^\circ\text{C}$
		-	570	-		$V_{GS}=10V, I_D=1A, T_J=150^\circ\text{C}$
$I_{DSS}$	Drain-to-source leakage current	-	1	10	μA	$V_{DS}=650V, V_{GS}=0V, T_J=25^\circ\text{C}$
		-	5	100		$V_{DS}=650V, V_{GS}=0V, T_J=150^\circ\text{C}$
$I_{GSS}$	Gate-to-source forward leakage current	-	-	±100	nA	$V_{GS}=\pm 20V$
$C_{ISS}$	Input capacitance	-	333	-	pF	$V_{GS}=0V, V_{DS}=400V, f=1MHz$
$C_{OSS}$	Output capacitance	-	18	-		
$C_{RSS}$	Reverse capacitance	-	3.7	-		
$Q_G$	Total gate charge	-	8.7	-	nC	$V_{DS}=400V, V_{GS}=0V \text{ to } 10V, I_D=1A$
$Q_{GS}$	Gate-source charge	-	2.2	-		
$Q_{GD}$	Gate-drain charge	-	2.6	-		
$Q_{OSS}$	Output charge	-	24	-	nC	$V_{GS}=0V, V_{DS}=0V \text{ to } 400V, f=1MHz$
$t_{D(on)}$	Turn-on delay	-	3.2	-	ns	$V_{DS}=400V, V_{GS}=0V \text{ to } 10V, I_D=2.1A,$ $R_{G-on(ext)}=6.8\Omega, R_{G-off(ext)}=2.2\Omega,$ $L=250\mu H$
$t_R$	Rise time	-	5.5	-		
$t_{D(off)}$	Turn-off delay	-	7.4	-		
$t_F$	Fall time	-	27	-		



## Electrical Parameters

$T_j=25^\circ\text{C}$  unless otherwise stated

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
<b>Reverse Device Characteristics</b>						
$V_{SD}$	Source-Drain reverse voltage	-	2.5	-	V	$V_{GS}=0\text{V}$ , $I_{SD}=10\text{A}$
$t_{RR}$	Reverse recovery time	-	14	-	ns	$I_F=5\text{A}$ , $V_{DD}=400\text{V}$ , $dI_F/dt=165\text{A}/\mu\text{s}$
$Q_{RR}$	Reverse recovery charge	-	6.5	-	nC	



### Typical Characteristics

$T_j=25^\circ\text{C}$  unless otherwise stated

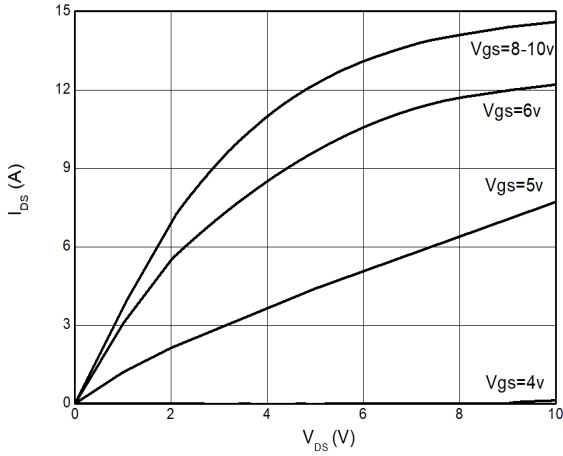


Figure 1. Typical Output Characteristics  $T_j=25^\circ\text{C}$

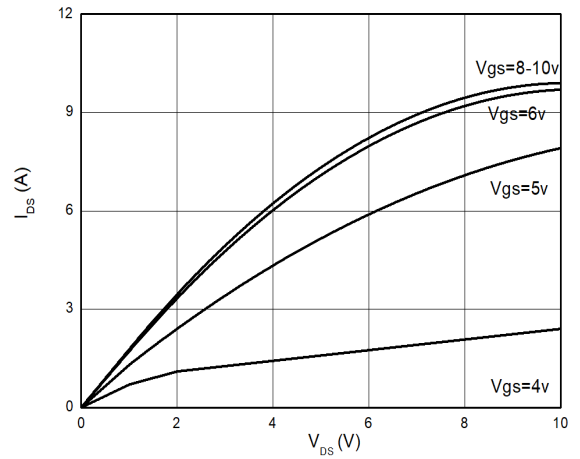


Figure 2. Typical Output Characteristics  $T_j=125^\circ\text{C}$

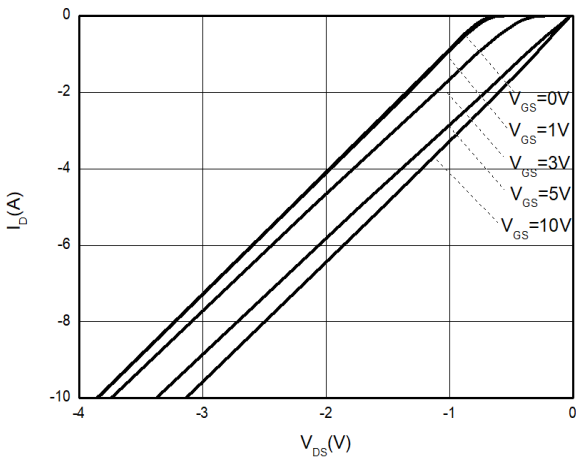


Figure 3. Channel Reverse Characteristics  $T_j=25^\circ\text{C}$

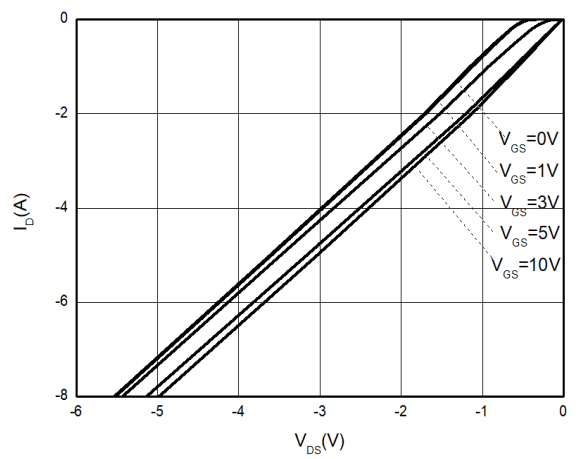


Figure 4. Channel Reverse Characteristics  $T_j=125^\circ\text{C}$



### Typical Characteristics

$T_j=25^\circ\text{C}$  unless otherwise stated

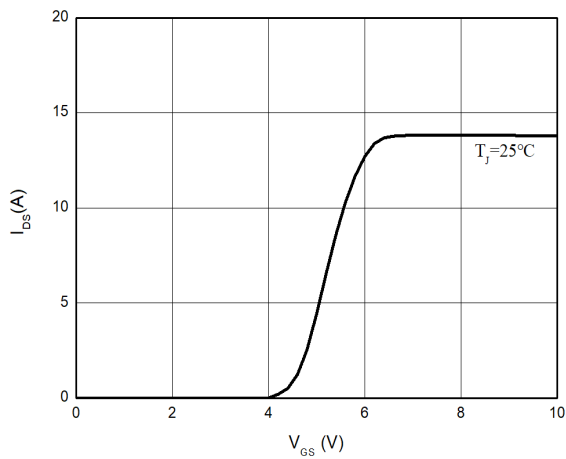


Figure 5. Typical Transfer Characteristics (V<sub>DS</sub>=10V)

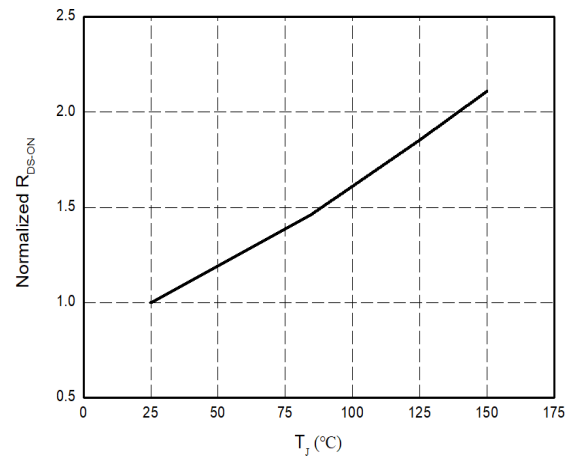


Figure 6. Normalized On-resistance

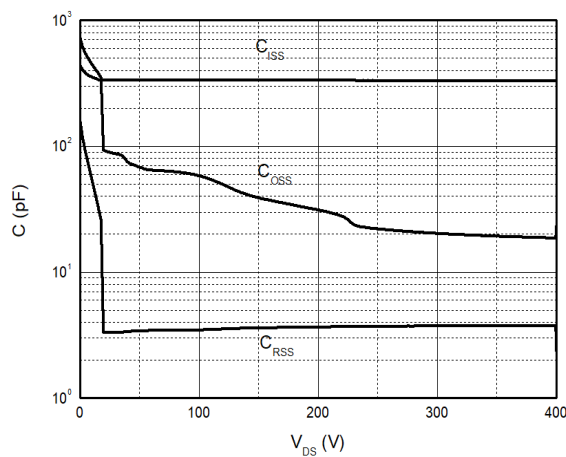


Figure 7. Typical Capacitance (f=1MHz)

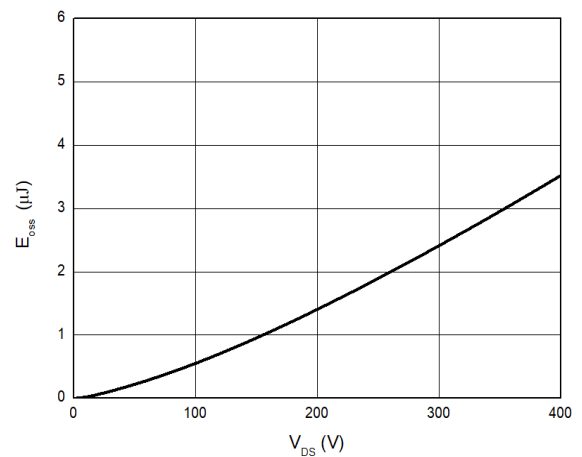


Figure 8. Typical C<sub>oss</sub> Stored Energy



### Typical Characteristics

$T_j=25^\circ\text{C}$  unless otherwise stated

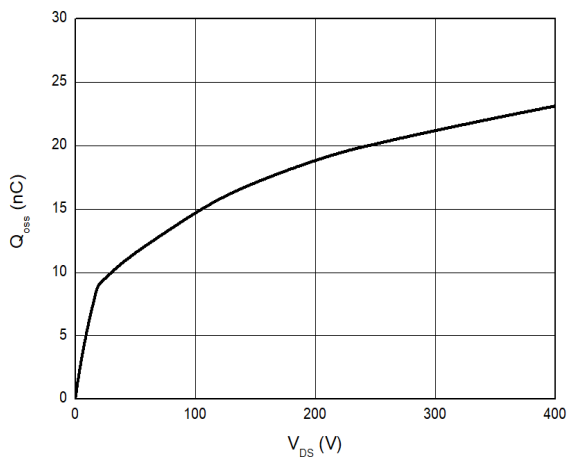


Figure 9. Typical  $Q_{oss}$

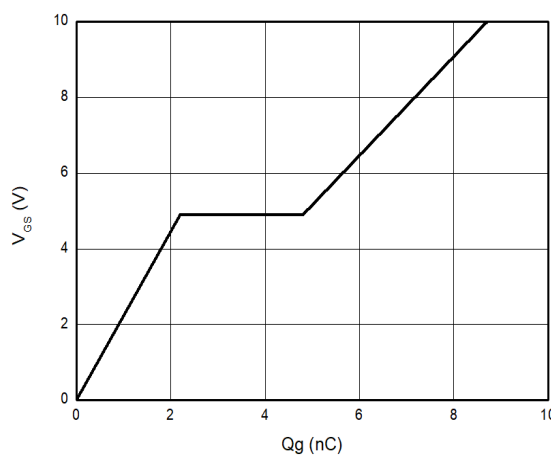


Figure 10. Typical Gate Charge ( $V_{DS}=400\text{V}$ ,  $I_D=1\text{A}$ )

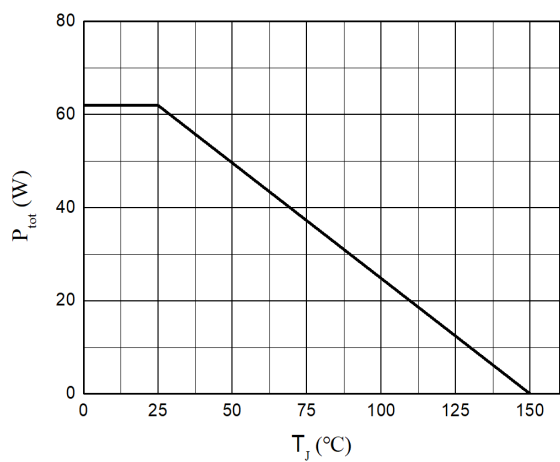


Figure 11. Power Dissipation

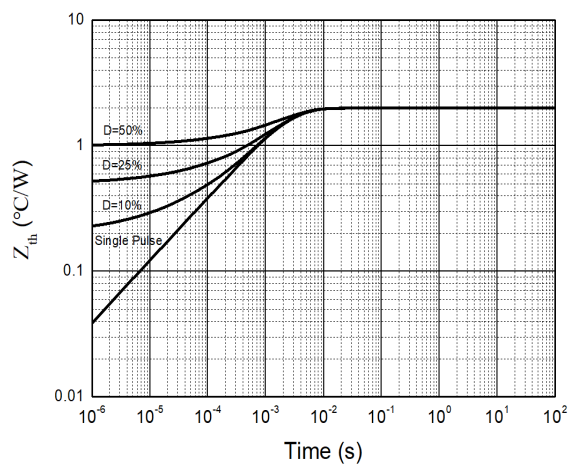


Figure 12. Transient Thermal Resistance





### Typical Characteristics

T<sub>J</sub>=25°C unless otherwise stated

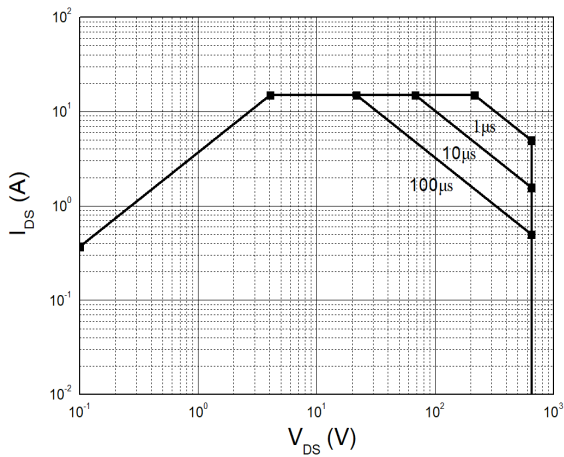


Figure 13. Safe Operating Area T<sub>J</sub>=25°C

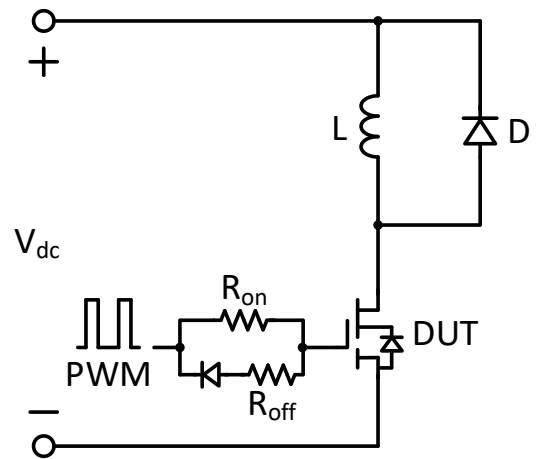


Figure 14. Switching times with inductive load

V<sub>DS</sub>=400V, V<sub>GS</sub>=0V to 10V, I<sub>D</sub>=2.1A,  
 R<sub>G-on(ext)</sub>=6.8Ω, R<sub>G-off(ext)</sub>=2.2Ω, L=250µH

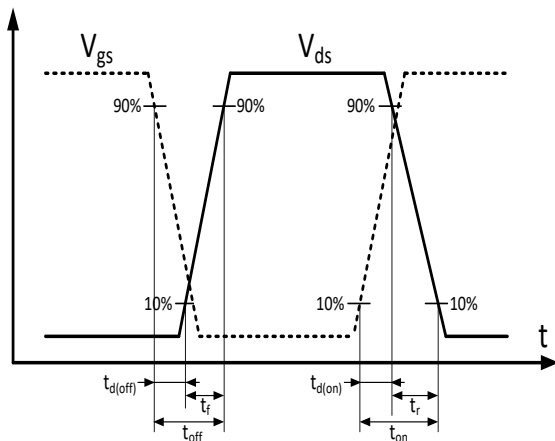
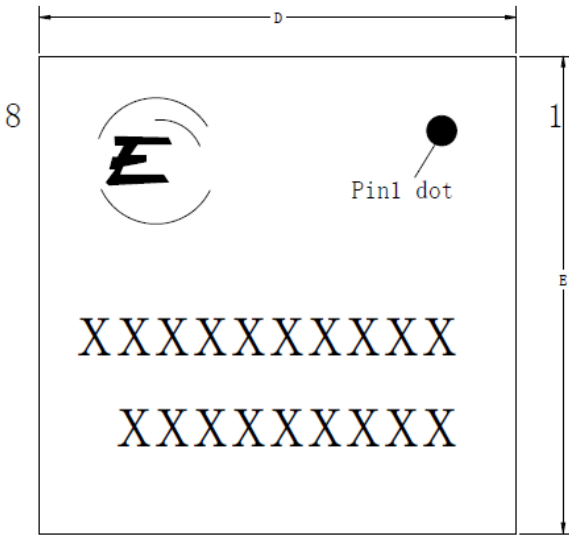


Figure 15. Switching times with waveform

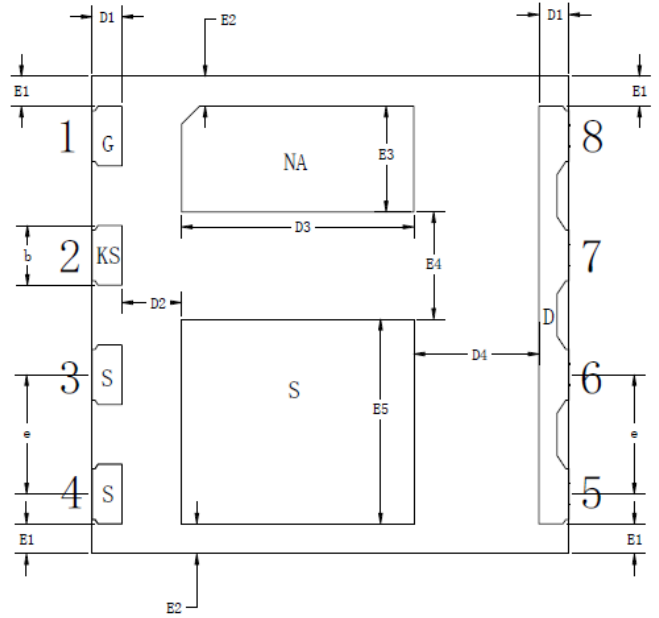


PACKAGE DIMENSIONS

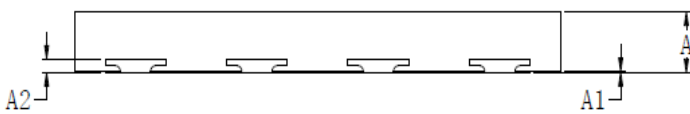
TOP VIEW



BOTTOM VIEW



Side View(left/right)



Symbol	Min. (mm)	Mean. (mm)	Max. (mm)
A	0.850	0.900	0.950
A1	0.000	0.020	0.050
A2	0.203REF		
D	7.900	8.000	8.100
E	7.900	8.000	8.100
D1	0.400	0.500	0.600
D2	0.900	1.000	1.100
D3	3.800	3.900	4.000
D4	2.000	2.100	2.200
E1	0.400	0.500	0.600
E2	0.400	0.500	0.600
E3	1.670	1.770	1.870
E4	1.700	1.800	1.900
E5	3.330	3.430	3.530
b	0.900	1.000	1.100
e	1.900	2.000	2.100



**CE65H270DNXI**

## Revision history

### Major changes since the last revision

Revision	Date	Description of changes
1.0	2023-12-25	Initial release