



CoreGaN 650V GaN HEMT

Description

The CE65H600TOEI Series 650V, 600m Ω gallium nitride (GaN) FETs are normally-off devices.

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

Coreenergy 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

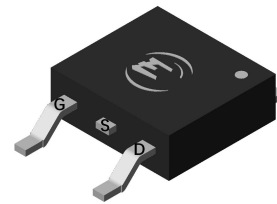
Increased efficiency through fast switching

Increased power density

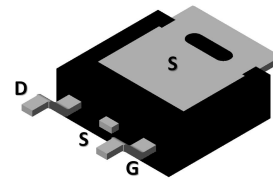
Reduced system size and weight

Ordering Information

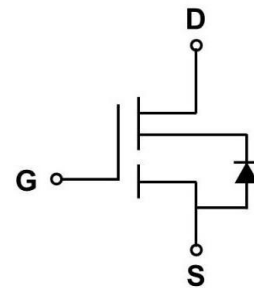
Part Number	Package	Package Configuration
CE65H600TOEI	TO252	Source



Top



Bottom



Circuit Symbol

Features

BV_{DSS}	$R_{DS(ON)}$	I_{DS}	Q_G
650V	600m Ω	4.8A	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°C)	650	
$V_{(TR)DSS}$	Drain to source voltage-transient ^a	900	V
V_{GSS}	Gate to source voltage	-20~+20	
I_D	Continuous drain current @ $T_C=25^\circ\text{C}$ ^b	4.8	A
	Continuous drain current @ $T_C=125^\circ\text{C}$ ^b	2.1	
I_{DM}	Pulse drain current (pulse width: 100 μs)	14	A
P_D	Maximum power dissipation @ $T_C=25^\circ\text{C}$	25	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 $<1\mu\text{s}$

b. For increased stability at high current operation



Thermal Resistance

Symbol	Parameter	Limit value	Unit
$R_{\theta JC}$	Junction-to-case	5	$^{\circ}\text{C} / \text{W}$



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	-	1.9	-	V	
ΔV _{GS(th)} /T _J	Gate threshold voltage temperature coefficient	-	-7	-	mV/°C	V _{DS} =1V, I _{DS} =1mA
R _{DS(on)}	Drain-source on-resistance	-	600	720	mΩ	V _{GS} =10V, I _D =1A, T _J =25°C
		-	1260	-		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	-	243	-	pF	V _{GS} =0V, V _{DS} =400V, f=1MHz
C _{OSS}	Output capacitance	-	5.3	-		
C _{RSS}	Reverse capacitance	-	0.4	-		
Q _G	Total gate charge	-	7	-	nC	V _{DS} =400V, V _{GS} =0V to 10V, I _D =1A
Q _{GS}	Gate-source charge	-	2.1	-		
Q _{GD}	Gate-drain charge	-	0.9	-		
Q _{OSS}	Output charge	-	9	-	nC	V _{GS} =0V, V _{DS} =0V to 400V, f=1MHz
t _{D(on)}	Turn-on delay	-	6	-	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	-	15	-		
t _{D(off)}	Turn-off delay	-	7	-		
t _F	Fall time	-	14	-		



Electrical Parameters

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

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
Reverse Device Characteristics						
V_{SD}	Source-Drain reverse voltage	-	2.2	-	V	$V_{GS}=0\text{V}$, $I_{SD}=2.5\text{A}$
t_{RR}	Reverse recovery time	-	14	-	ns	$I_F=2.5\text{A}$, $V_{DD}=400\text{V}$, $dI_F/dt=165\text{A}/\mu\text{s}$
Q_{RR}	Reverse recovery charge	-	6.5	-	nC	



Typical Characteristics

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

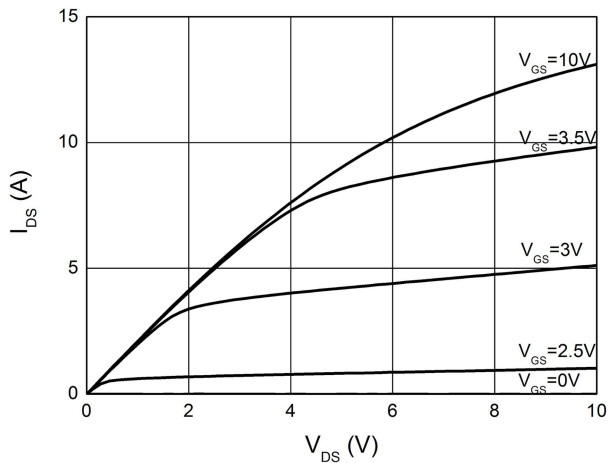


Figure 1. Typical Output Characteristics $T_J=25^\circ\text{C}$

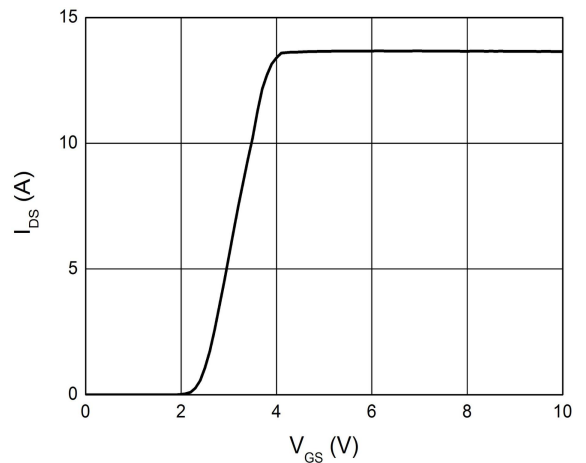


Figure 2. Typical Transfer Characteristics $T_J=25^\circ\text{C}$ ($V_{DS}=10V$)

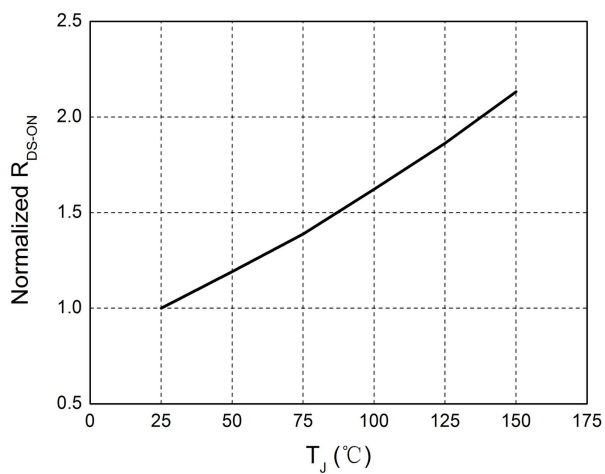


Figure 3. Normalized On-resistance



Typical Characteristics

T_J=25°C unless otherwise stated

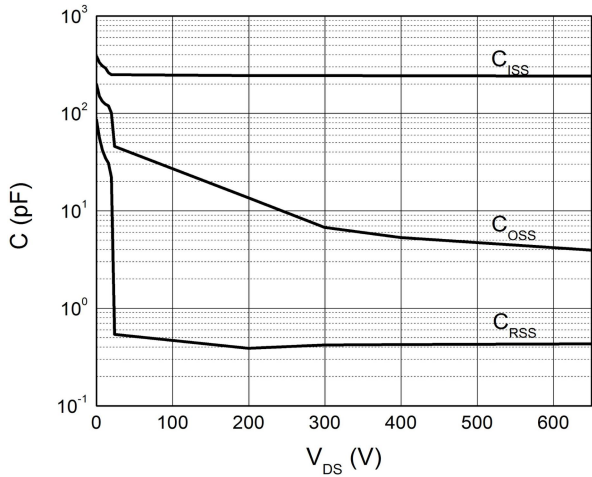


Figure 4. Typical Capacitance (f=1MHz)

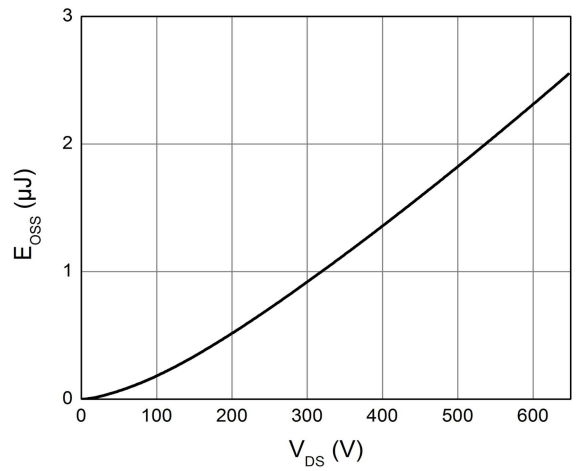


Figure 5. Typical C_{OSS} Stored Energy

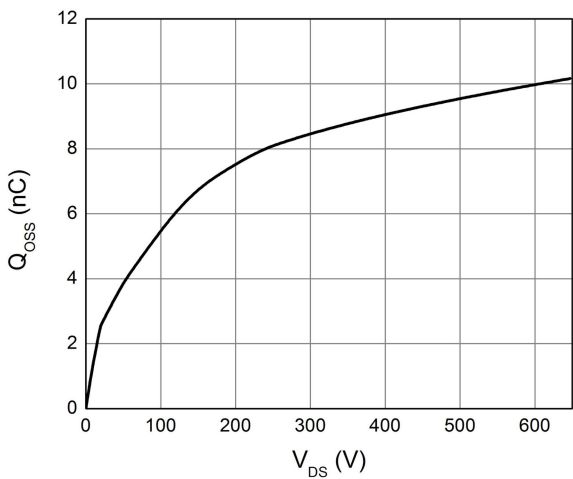


Figure 6. Typical Q_{OSS}

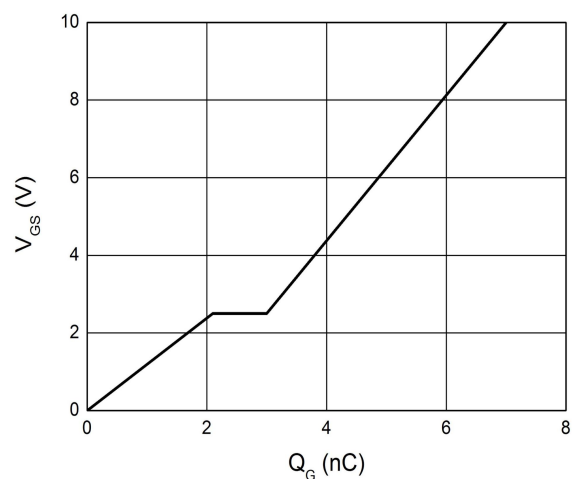


Figure 7. Typical Gate Charge (V_{DS}=400V, I_D=1A)



Typical Characteristics

T_J=25°C unless otherwise stated

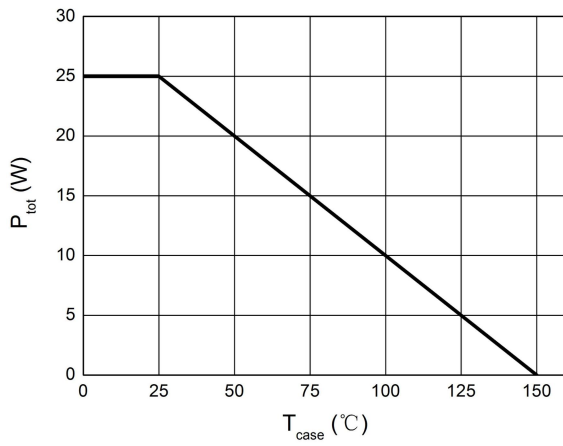


Figure 8. Power Dissipation

Typical Characteristics

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

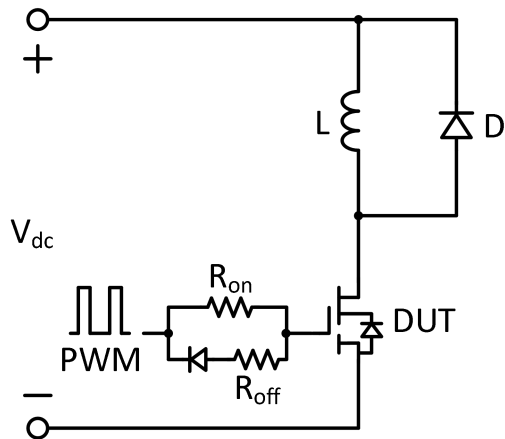


Figure 9. Switching times with inductive load

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

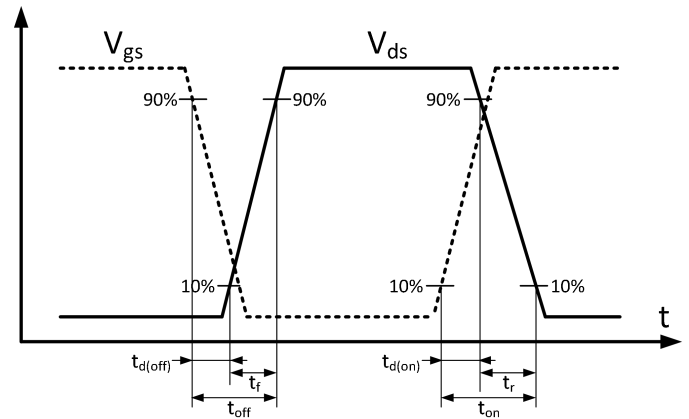
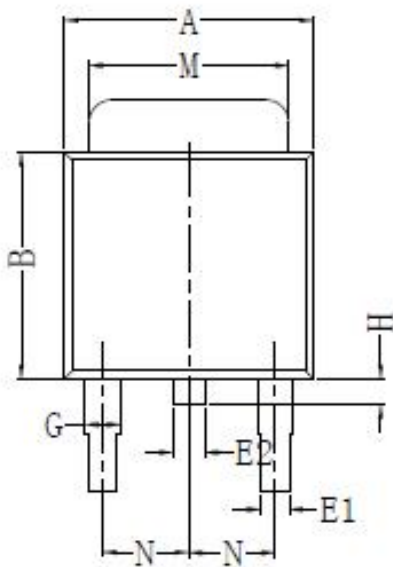


Figure 10. Switching times with waveform

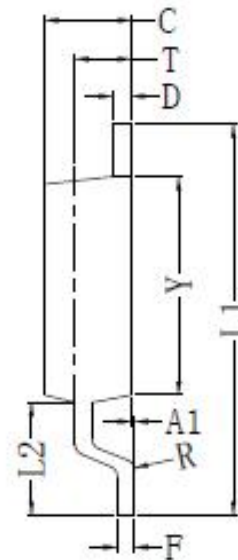
PACKAGE DIMENSIONS

TO252-2L

Top view



Side view



Symbol	Min. (mm)	Max. (mm)
A	6.30	6.90
A1	0.00	0.16
B	5.70	6.30
C	2.10	2.50
D	0.30	0.70
E1	0.60	0.90
E2	0.70	1.00
F	0.30	0.60
G	0.70	1.20
L1	9.40	10.50
L2	2.70	3.10
H	0.40	1.00
M	5.10	5.50
N	2.09	2.49
R	0.30	
T	1.40	1.60
Y	5.10	6.30