CorEnergy®

CE65E300DNYI

CorEnergy 650V GaN HEMT

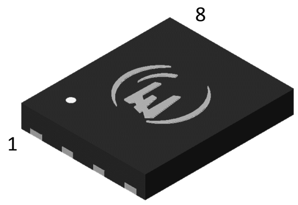
Description

The CE65E300DNYI Series 650V, 300mΩ gallium nitride (GaN) FETs are normally-off devices. Corenergy GaN FETs offer better efficiency through lower gate charge, faster switching speeds, and smaller reverse recovery charge, delivering significant advantages over traditional silicon (Si) devices.

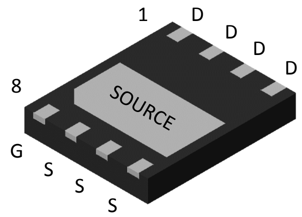
Corenergy is a leading-edge wide band gap supplier with world-class innovation .

Ordering Information

Part Number	Package	Package Configuration
CE65E300DNYI	DFN(5*6)	Source



Top



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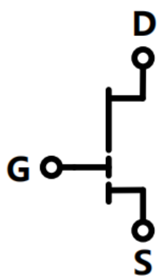


Circuit Symbol

Application

- Fast charger
- Renewable energy
- Telecom and data-com
- Servo motors
- Industrial
- Automotive

General Features

Low conduction and switching losses no free-wheeling diode required RoHS compliant and Halogen-free

Benefits

Increased efficiency through fast switching

Increased power density

Reduced system size and weight

Features

BV_{DSS}	R_{DSON}	I_{DS}	Q_G
650V	300mΩ	8A	1.35nC

Absolute Maximum Ratings

T_j=25°C unless otherwise stated

Symbol	Parameter		Limit value	Unit
$V_{DS,max}$	Drain to source voltage(T_j=-55°C to 150°C)		650	V
$V_{DS(transient)}$	Drain to source voltage-transient[a]		750	
V_{GS}	Gate to source voltage		-10～+7	
I_D	Continuous drain current @T_C=25°C[b]		8	A
	Continuous drain current @T_C=125°C[b]		3.5	
I_{DM}	Pulse drain current (pulse width: 300μs) @T_C=25°C		11	
	Pulse drain current (pulse width: 300μs) @T_C=125°C		6	
P_D	Maximum power dissipation @T_C=25°C		38	W
T_C	Operating temperature	Case	-55~150	°C
T_J		Junction	-55~150	°C
T_S	Storage temperature		-55~150	°C

Notes:

a.Non-repetitive events, T_{pulse} <200μs

b.For increased stability at high current operation

Thermal Resistance

Symbol	Parameter	Limit value	Unit
$R_{\theta JC}$	Junction-to-case	3.3	°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	2	2.5	3	V	I_D=10uA/mm, V_{DS}=1V, T_j=25°C
	Gate threshold voltage	-	2.8	-	V	I_D=10uA/mm, V_{DS}=1V, T_j=150°C
$R_{DS(on)}$	Drain-source on resistance	-	300	360	mΩ	V_{GS}=6V, I_D=1A, T_j=25°C
		-	660	-		V_{GS}=6V, I_D=1A, T_j=150°C
I_{DSS}	Drain-to-source leakage current	-	1	10	μA	V_{DS}=650V, V_{GS}=0V, T_j=25°C
		-	10	50		V_{DS}=650V, V_{GS}=0V, T_j=150°C
I_{GSS}	Gate-to-source forward leakage current	-	60	-	μA	V_{GS}=6V, V_{DS}=0V
C_{ISS}	Input capacitance	-	46	-	pF	V_{GS}=0V, V_{DS}=400V, f=1MHz
C_{OSS}	Output capacitance	-	18	-		
C_{RSS}	Reverse capacitance	-	0.7	-		
$C_{o(er)}$	Effective output capacitance (energy related)	-	27	-	pF	V_{GS}=0V, V_{DS}=0 to 400V
$C_{o(tr)}$	Effective output capacitance (time related)	-	40	-	pF	V_{GS}=0V, V_{DS}=0 to 400V
Q_{OSS}	Output Charge	-	16	-	nC	V_{GS}=0V, V_{DS}=0 to 400V
Q_G	Total gate charge	-	1.35	-	nC	V_{DS}=400V, V_{GS}=0 to 6V, I_D=1A
Q_{GS}	Gate-source charge	-	0.15	-		
Q_{GD}	Gate-drain charge	-	0.5	-		
$t_{d(on)}$	Turn-on delay time	-	4.4	-	nS	V_{DS}=400V, V_{GS}=0 to 6V, I_D=3A Rg_on(ext)=6.8Ω Rg_off(ext)=2.2Ω, L=250uH
$t_{d(off)}$	Turn-off delay time	-	4.1	-		
t_r	Rise time	-	11.8	-		
t_f	Fall time	-	11.2	-		
Reverse Device Characteristics						
V_{SD}	Reverse voltage	-	3	-	V	V_{GS}=0V, I_{SD}=3A
Q_{RR}	Reversere recovery charge	-	0	-	nC	I_{SD}=3A, V_{DS}=400V

Electrical Characteristics

T_j=25°C unless otherwise stated

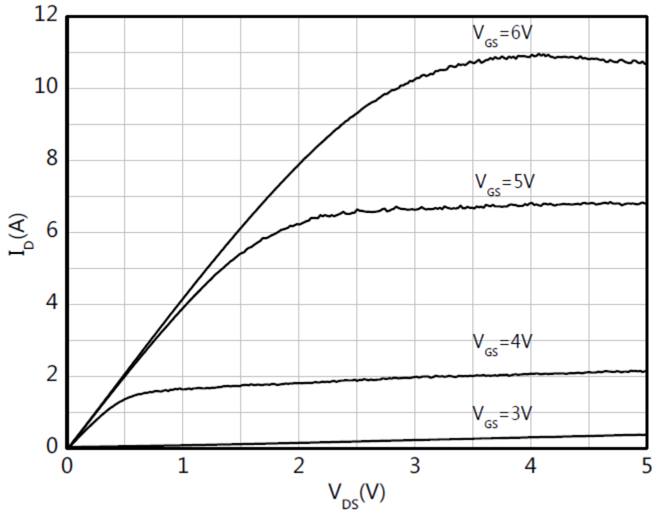


Figure 1. Typical Output Characteristics T_j=25°C

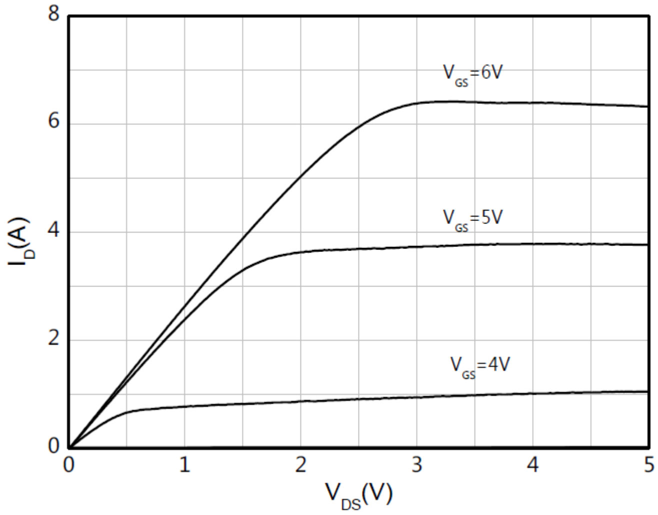


Figure 2. Typical Output Characteristics T_j=125°C

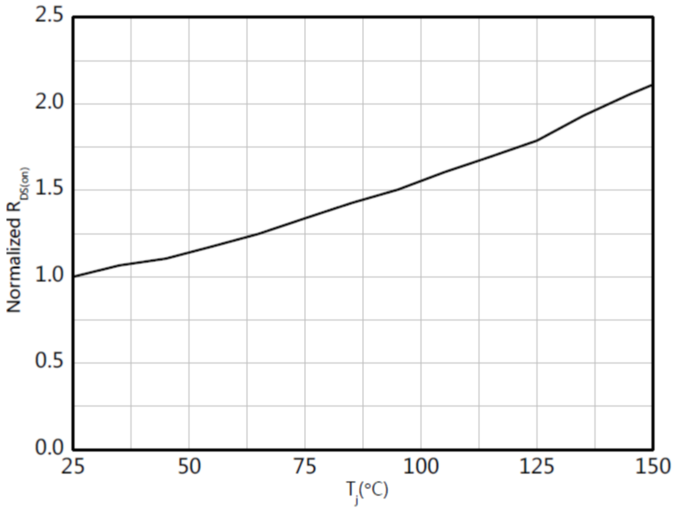


Figure 3. Drain-source On-state Resistance

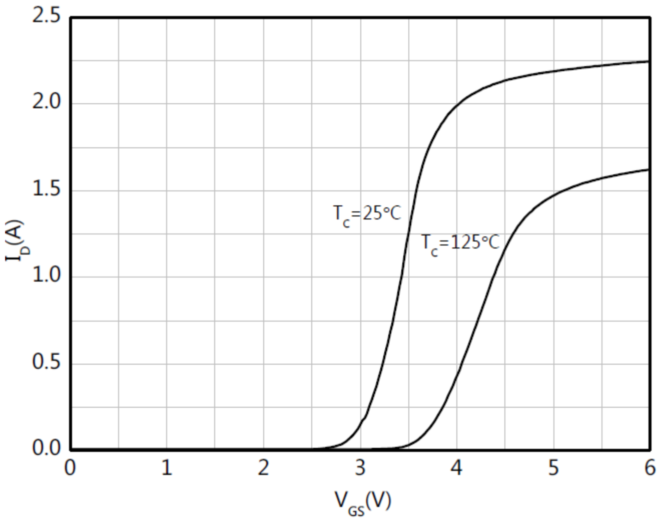


Figure 4. Typical Transfer Characteristics V_{DS}=1V

Electrical Characteristics

T_j=25°C unless otherwise stated

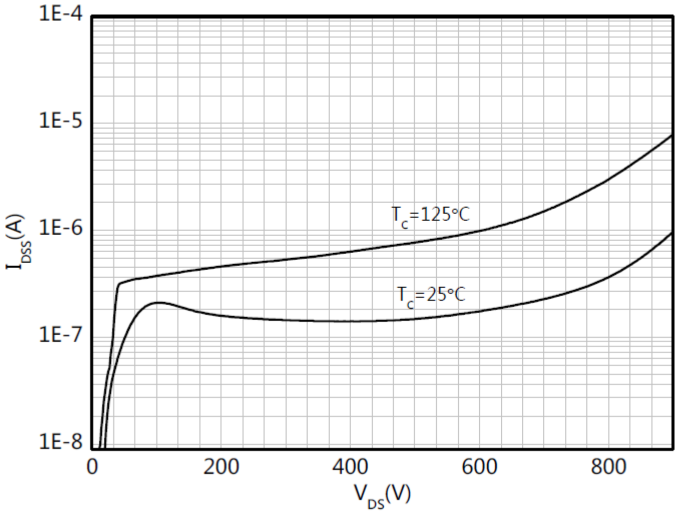


Figure 5. Drain-source Leakage Characteristics

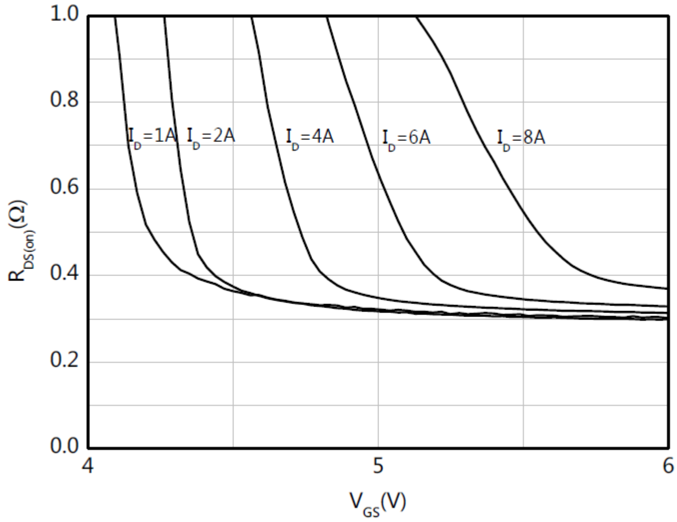


Figure 6. Typical On-state Resistance T_j=25°C

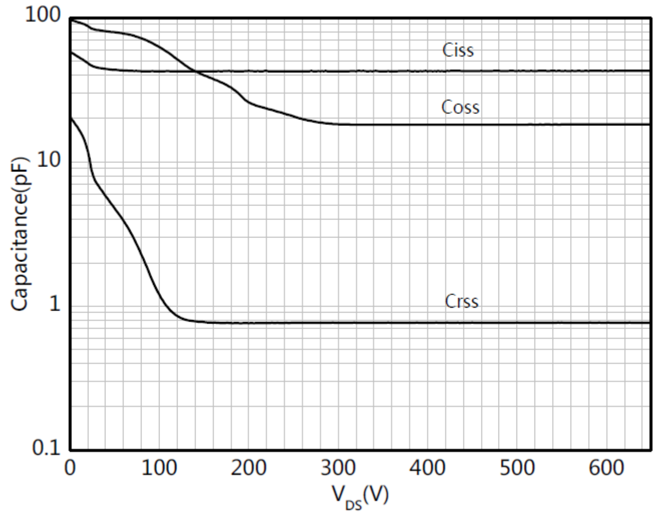


Figure 7. Typical Capacitance f=1MHz

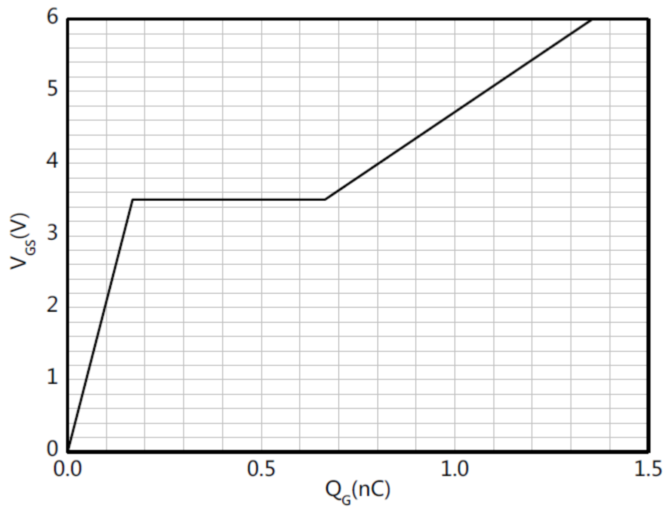


Figure 8. Typical Gate Charge (V_{DS}=400V, I_D=1A)

Electrical Characteristics

T_j=25°C unless otherwise stated

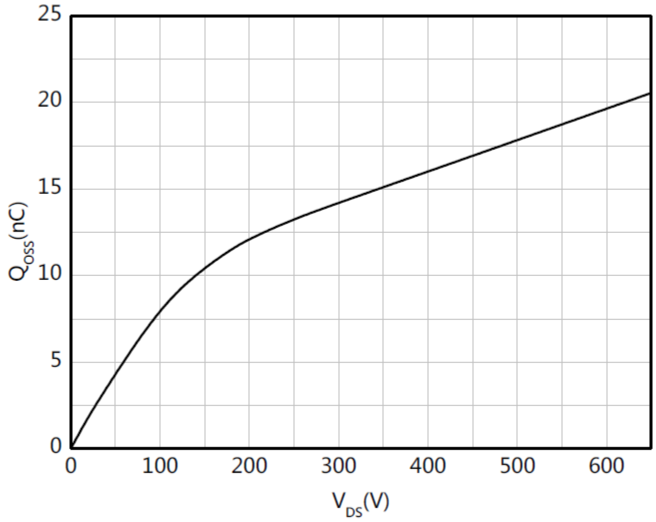


Figure 9. Typical Output Charge *f* =1MHz

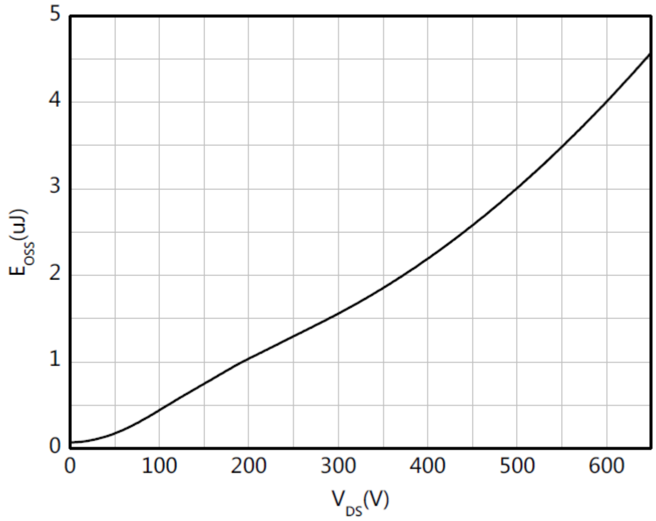


Figure 10. Typical Coss Stored Energy *f* =1MHz

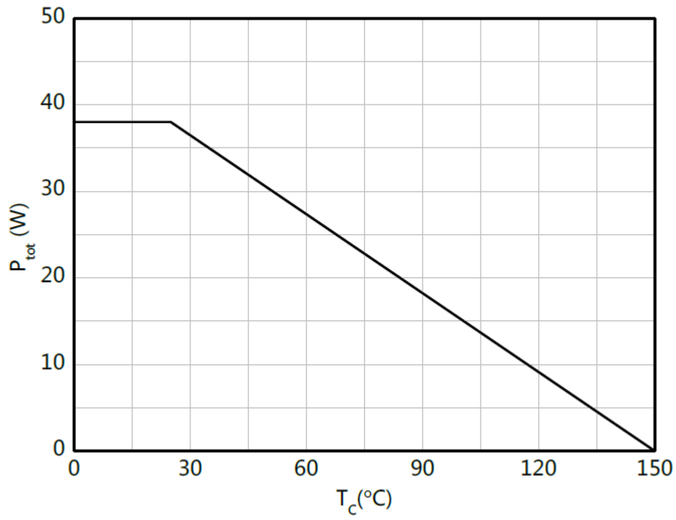


Figure 11. Power Dissipation

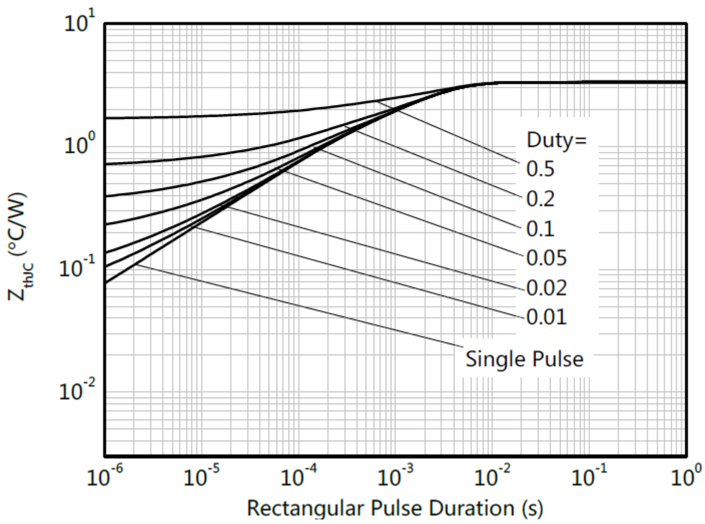


Figure 12. Transient Thermal Impedance

Electrical Characteristics

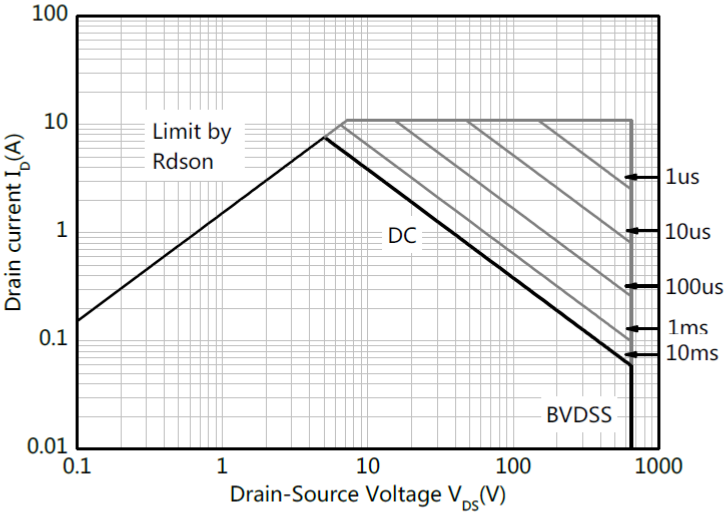


Figure 13. Safe Operation Area at T_C=25°C

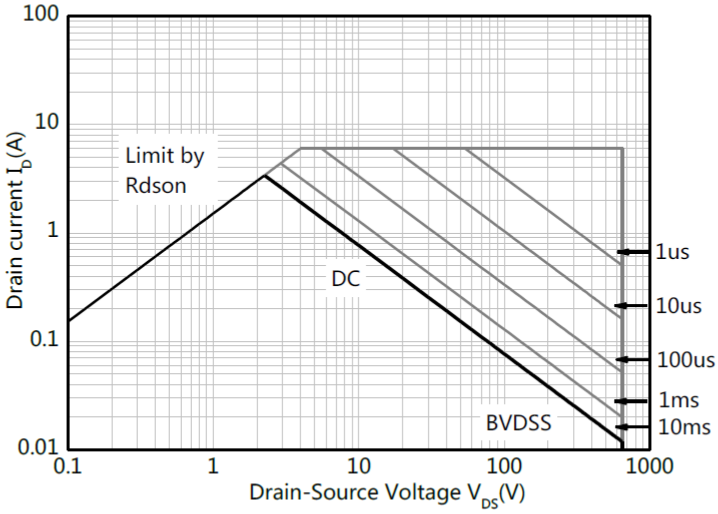


Figure 14. Safe Operation Area at T_C=125°C

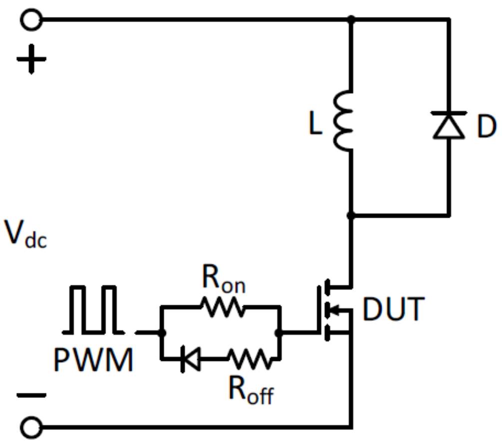


Figure 15. Switching Times With Inductive Load

V_{DS}=400V, V_{GS}=0V to 6V, I_D=3A,

$R_{G\text{-}on(ext)}$=6.8Ω, $R_{G\text{-}off(ext)}$=2.2Ω, L=250μH

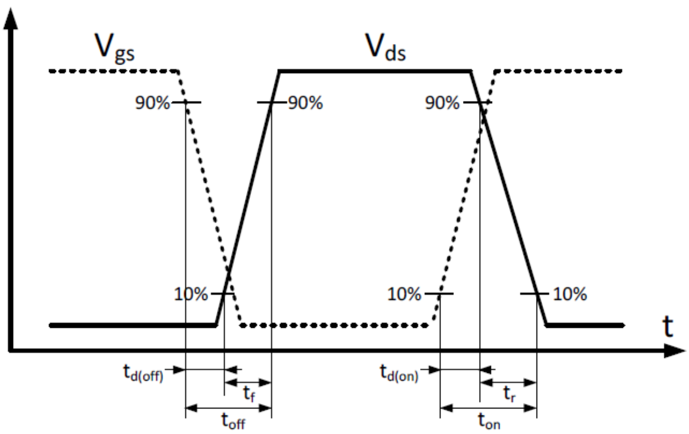
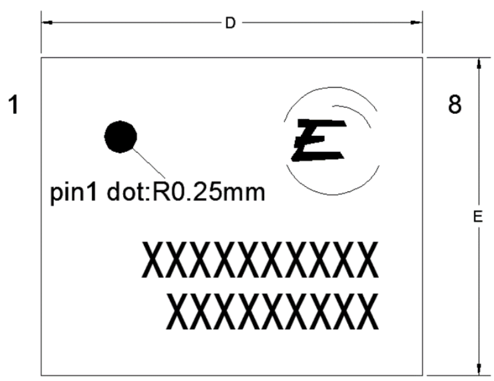


Figure 16. Switching Times With Waveform

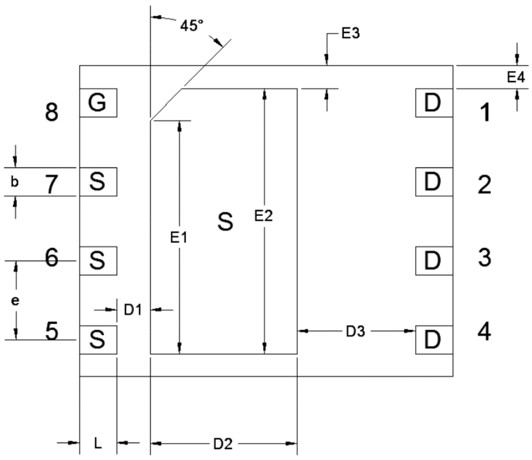
PACKAGE DIMENSIONS

DFN5*6-8L-A

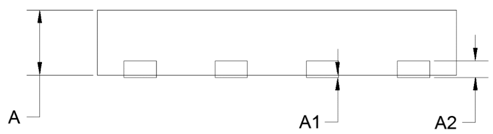
Top view



Bottom view



Side view(left/right)



Symbol	Min. (mm)	Mean. (mm)	Max. (mm)
A	0.85	0.90	0.95
A1	0	0.02	0.05
A2	0.203REF		
D	5.9	6	6.1
E	4.9	5	5.1
D1	0.43	0.53	0.63
D2	2.27	2.37	2.47
D3	1.8	1.9	2
E1	3.65	3.75	3.85
E2	4.16	4.26	4.36
E3	0.27	0.37	0.47
E4	0.27	0.37	0.47
b	0.4	0.45	0.5
e	1.17	1.27	1.37
L	0.5	0.6	0.7