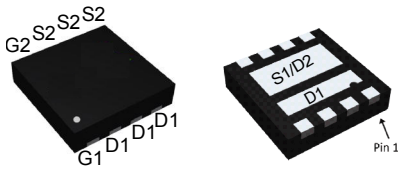
Features

- 20V/13A
  $R_{DS(ON)}$=5.2mΩ(typ.)@V_{GS}=4.5V
  $R_{DS(ON)}$=6.7mΩ(typ.)@V_{GS}=2.5V
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

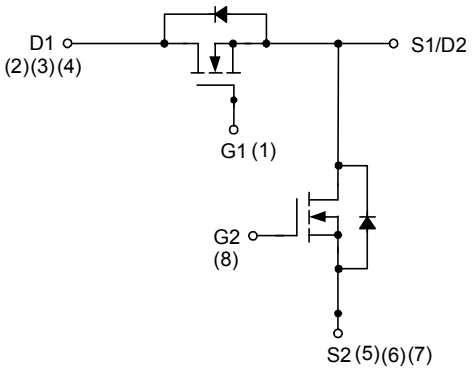
Applications

- Power Management in Notebook Computer, Portable Equipment and Battery Powered Systems.

Pin Description



TDFN3x3-8_EP2



N-Channel MOSFET

Absolute Maximum Ratings (T_A=25°C Unless Otherwise Noted)

Symbol	Parameter		Rating	Unit
Common Ratings				
V_{DSS}	Drain-Source Voltage		20	V
V_{GSS}	Gate-Source Voltage		±12	
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	
I_S	Diode Continuous Forward Current	T_C=25°C	13	A
I_D	Continuous Drain Current	T_C=25°C	13	A
		T_C=100°C	5.2	
I_{DM}[b]	Pulsed Drain Current	T_C=25°C	39	A
P_D	Maximum Power Dissipation	T_C=25°C	18	W
		T_C=100°C	7	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	7	°C/W
I_D	Continuous Drain Current	T_A=25°C	8	A
		T_A=70°C	6	
I_{DM}[b]	Pulsed Drain Current	T_A=25°C	32	A
P_D	Maximum Power Dissipation	T_A=25°C	1.6	W
		T_A=70°C	1	
$R_{\theta JA}$[c]	Thermal Resistance-Junction to Ambient	t ≤ 10s	43	°C/W
		Steady State	80	
I_{AS}[d]	Avalanche Current, Single pulse	L=0.1mH	9	A
E_{AS}[d]	Avalanche Energy, Single pulse	L=0.1mH	4.1	mJ

Note a : Maximum continuous current is limited by bonding wire.
Note b : Pulse width is limited by maximum junction temperature.
Note c : Surface mounted on 1in^2 pad area, steady state t = 999s.
Note d : UIS tested and pulse width limited by maximum junction temperature (initial temperature T_j=25°C).

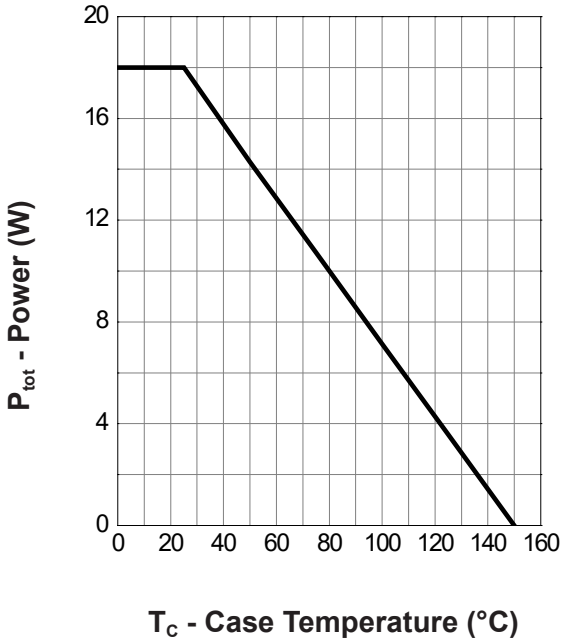
Electrical Characteristics (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=16V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	0.4	0.75	1	V
I_{GSS}	Gate Leakage Current	V_{GS}=±12V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$[e]	Drain-Source On-state Resistance	V_{GS}=4.5V, I_{DS}=4A	-	5.2	7	mΩ
		T_J=125°C	-	7	-	
		V_{GS}=2.5V, I_{DS}=3A	-	6.7	8	
Gfs	Forward Transconductance	V_{DS}=5V, I_{DS}=5A	-	10	-	S
Diode Characteristics						
V_{SD}[e]	Diode Forward Voltage	I_{SD}=2A, V_{GS}=0V	-	0.75	1.1	V
t_{rr}	Reverse Recovery Time	I_{SD}=4A, dI_{SD}/dt=100A/μs	-	4.8	-	ns
t_a	Charge Time		-	4	-	
t_b	Discharge Time		-	8.8	-	
Q_{rr}	Reverse Recovery Charge		-	3.2	-	nC
Dynamic Characteristics[f]						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	-	2	4	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=10V, Frequency=1.0MHz	-	2336	2697	pF
C_{oss}	Output Capacitance		-	266	-	
C_{rss}	Reverse Transfer Capacitance		-	178	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=10V, R_L=10Ω, I_{DS}=1A, V_{GEN}=4.5V, R_G=6Ω	-	4	8	ns
t_r	Turn-on Rise Time		-	13	24	
$t_{d(OFF)}$	Turn-off Delay Time		-	22	40	
t_f	Turn-off Fall Time		-	5	9	
Gate Charge Characteristics[f]						
Q_g	Total Gate Charge	V_{DS}=10V, V_{GS}=10V, I_{DS}=4A	-	12	17	nC
Q_g	Total Gate Charge	V_{DS}=10V, V_{GS}=4.5V, I_{DS}=4A	-	6.2	-	
Q_{gth}	Threshold Gate Charge		-	0.3	-	
Q_{gs}	Gate-Source Charge		-	0.6	-	
Q_{gd}	Gate-Drain Charge		-	2	-	

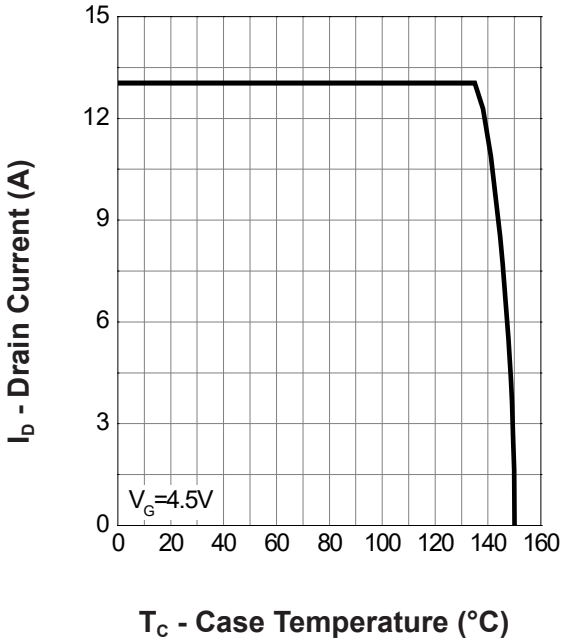
Note e : Pulse test ; pulse width≤300μs, duty cycle≤2%.
Note f : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

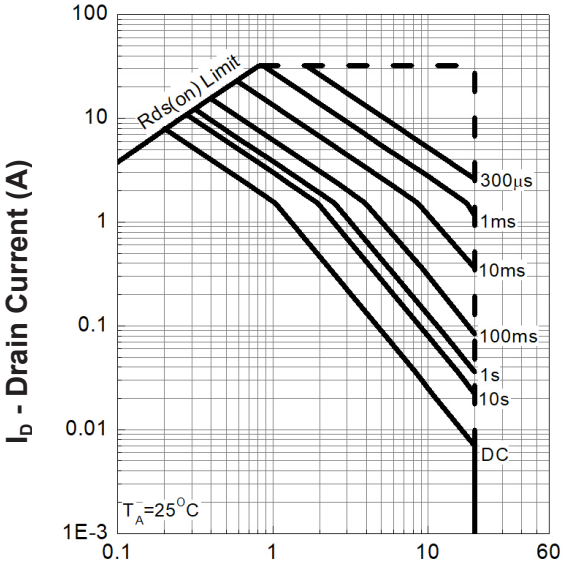
Power Dissipation



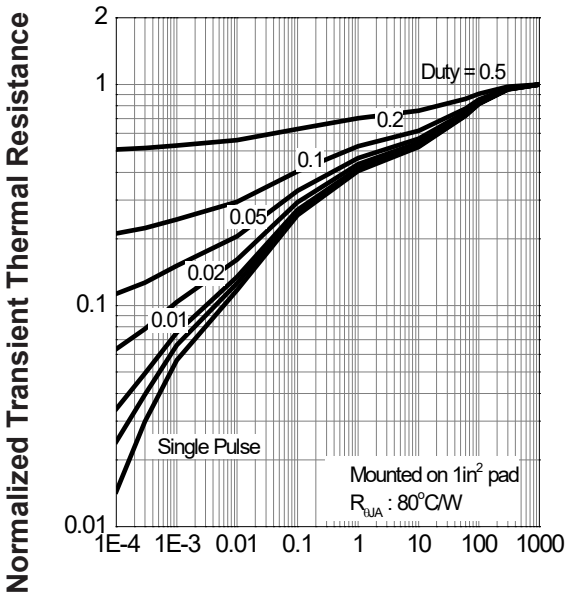
Drain Current



Safe Operation Area

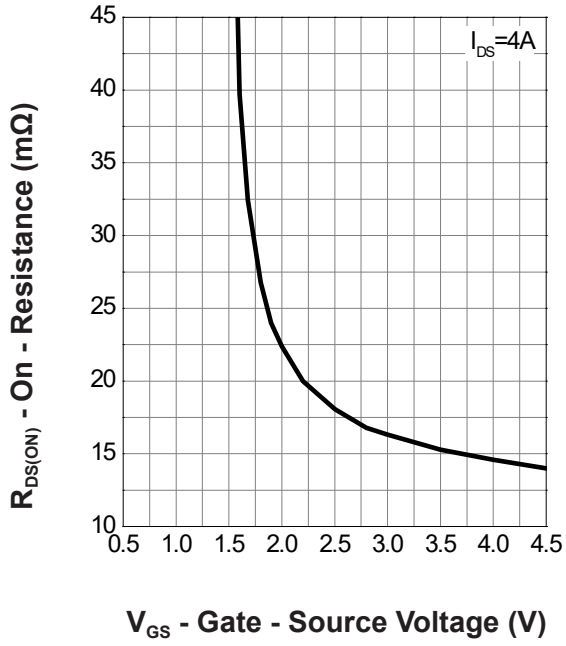


Thermal Transient Impedance

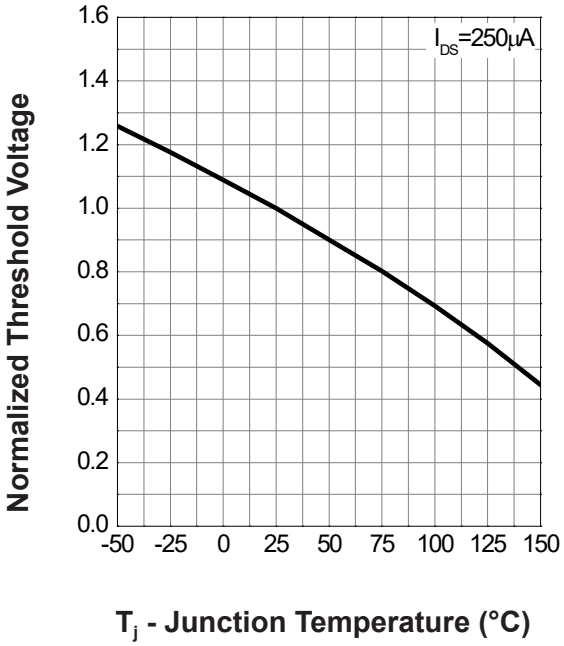


Typical Operating Characteristics(Cont.)

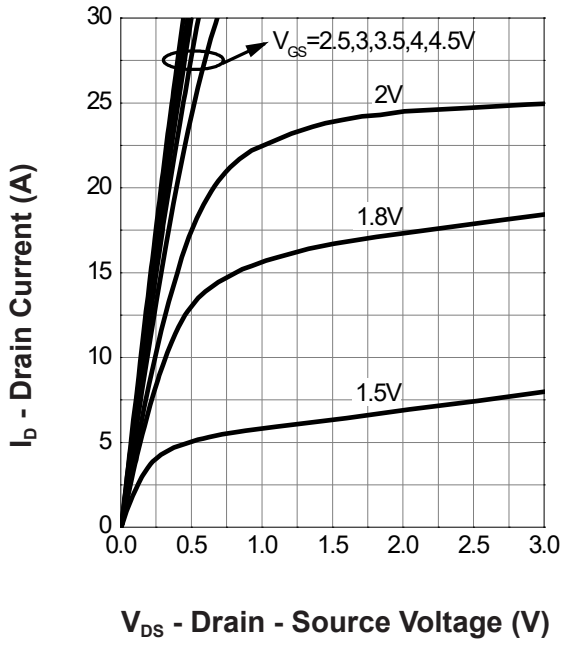
Gate-Source On Resistance



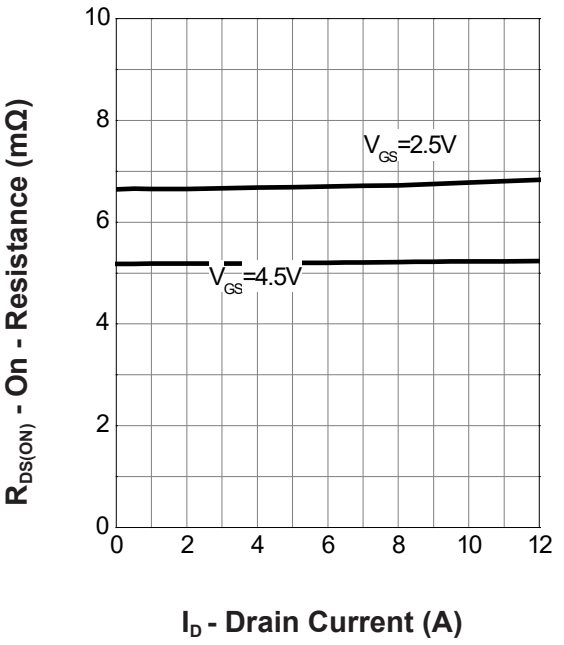
Gate Threshold Voltage



Output Characteristics

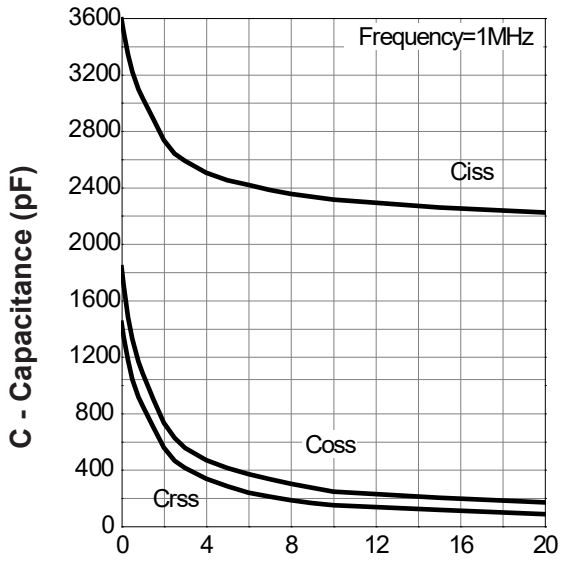


Drain-Source On Resistance

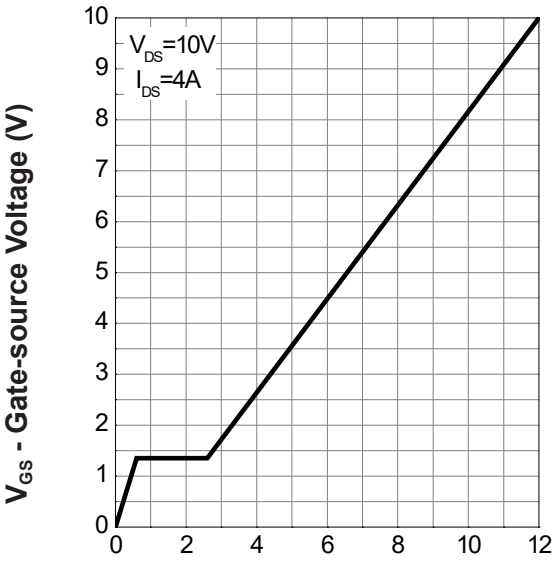


Typical Operating Characteristics(Cont.)

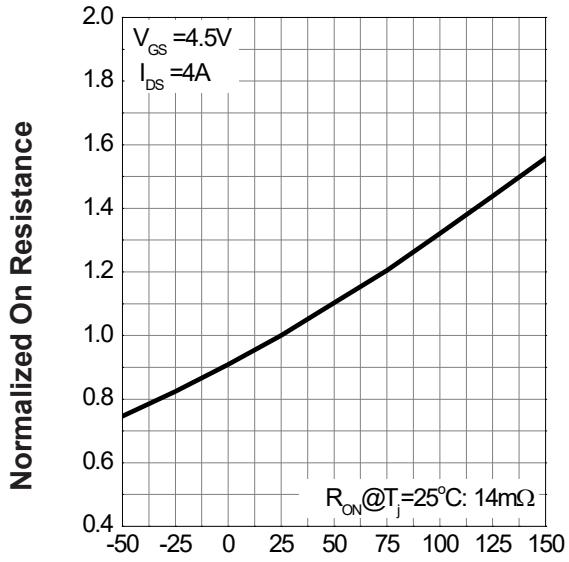
Capacitance



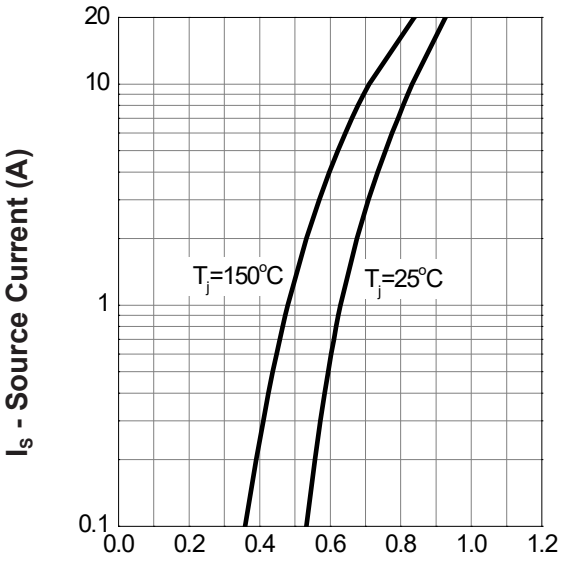
Gate Charge



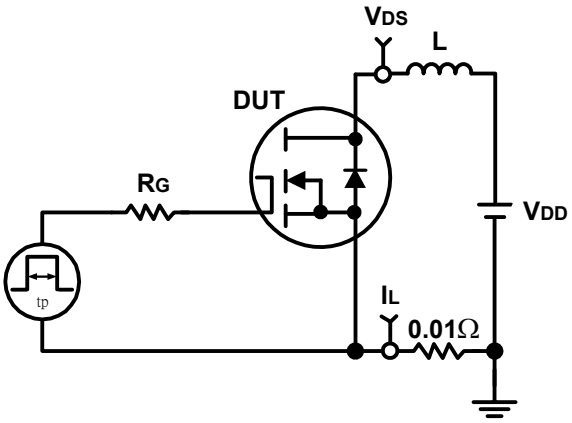
Drain-Source On Resistance

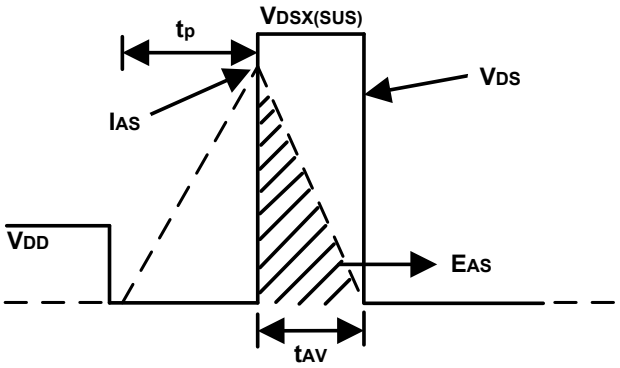


Source-Drain Diode Forward

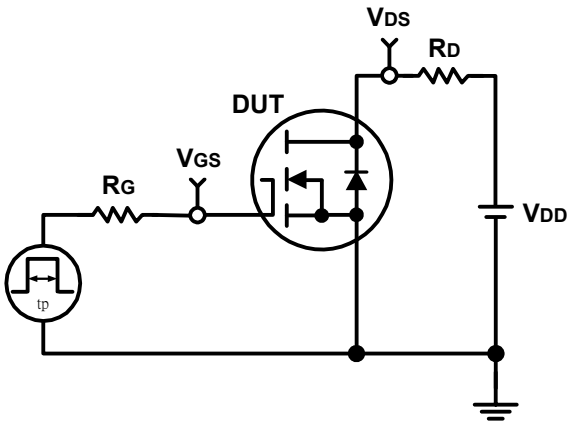


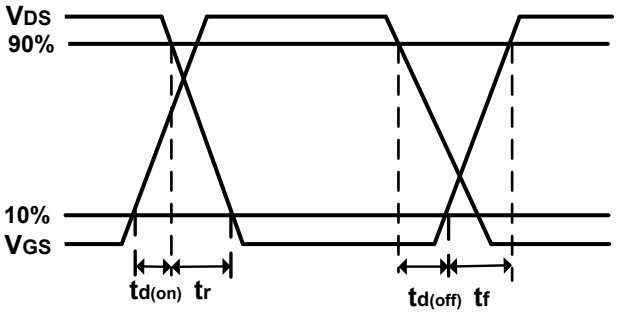
Avalanche Test Circuit and Waveforms



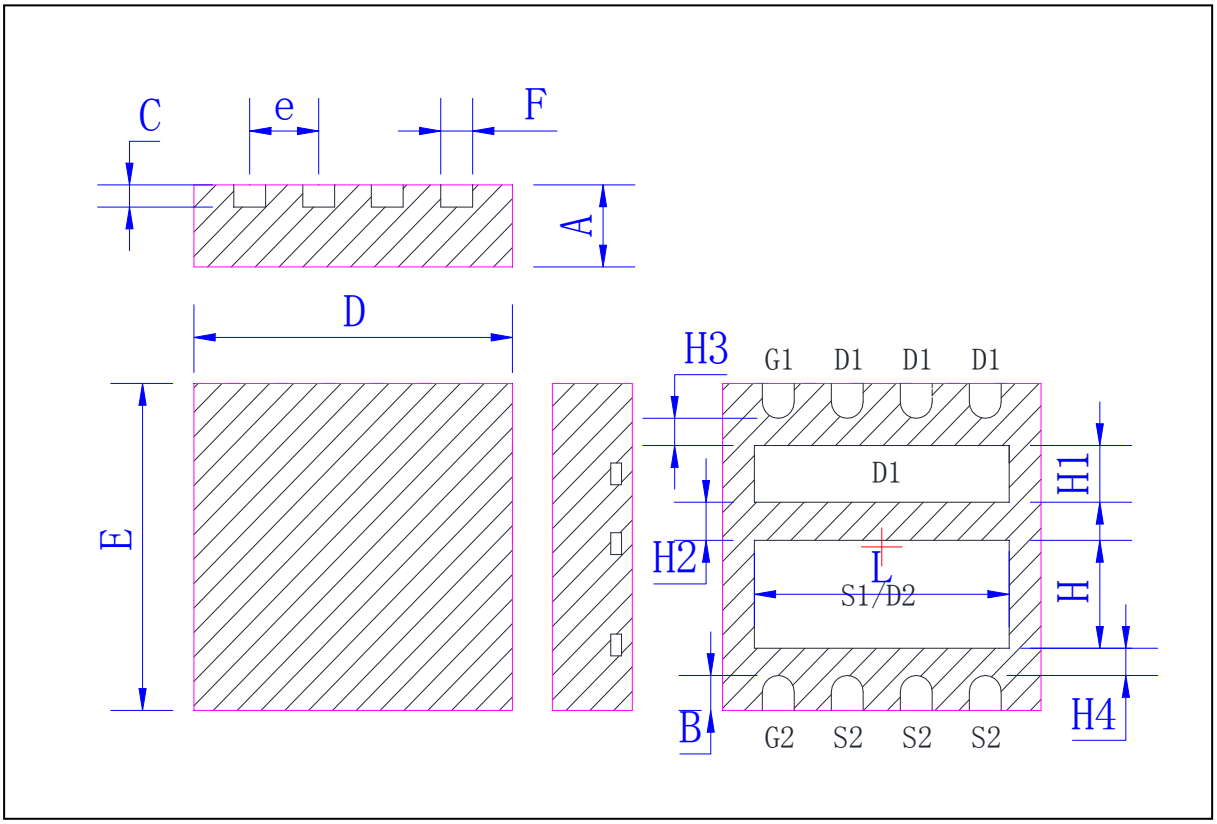


Switching Time Test Circuit and Waveforms





TDFN3*3-8_EP2 OUTLINE



Symbol	Min	Typ	Max
A	0.70	0.75	0.80
B	0.27	0.32	0.37
C	0.153	0.203	0.253
D	2.90	3.00	3.10
E	2.90	3.00	3.10
e	0.60	0.65	0.70
F	0.25	0.30	0.35
H	0.89	0.99	1.09
H1	0.42	0.52	0.62
H2	0.25	0.35	0.45
H3	0.15	0.25	0.35
H4	0.15	0.25	0.35
L	2.30	2.40	2.50