Wuxi Unigroup Microelectronics CO.,LTD.

30V N-Channel Trench MOSFET(Preliminary)

General Description

- Trench Power Technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- Optimized for fast-switching Applications

Applications

- Synchronous Rectification in DC/DC and AC/DC Converters
- Isolated DC/DC Converters in Telecom and Industrial

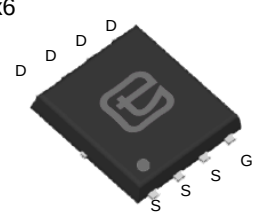
Product Summary

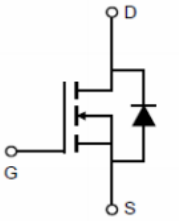
VDS	30V
I_D (at V_{GS}=10V)	120A
$R_{DS(ON)}$ (at V_{GS}=10V)	< 3.4mΩ
$R_{DS(ON)}$ (at V_{GS}=4.5V)	< 4.7mΩ

100% UIS Tested

RoHS

DFN5x6





Device	Package	Form	Marking
TTG120N03AT	DFN5x6	Tape&Reel	120N03AT

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current B	T_C = 25ºC	I_D	51	A
	T_C = 100ºC		51	
Pulsed Drain Current A		I_{DM}	360	A
Avalanche Current A		I_{AS}	30	A
Single Pulse Avalanche Energy L =0.3mH A		E_{AS}	135	mJ
Power Dissipation C	T_C = 25ºC	P_D	127	W
	T_C = 100ºC	P_D	82	W
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	ºC

Thermal Resistance

Parameter		Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	Steady-State	$R_{\Theta JC}$	1.24	ºC/W
Thermal Resistance, Junction-to-Ambient	Steady-State	$R_{\Theta JA}$	100	

Electrical Characteristics(T_J =25ºC unless otherwise noted)

Symbol	Parameter	Conditions		Value			Units
				Min	Typ	Max	
STATIC PARAMETERS							
BV_{DSS}	Drain-Source Breakdown Voltage	I_D =250μA,V_{GS} =0V		30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =30V, V_{GS} =0V	T_J =25ºC	--	--	1	μA
			T_J =100ºC	--	--	25	
I_{GSS}	Gate-Body Leakage Current	V_{DS} =0V, V_{GS} =±20V		--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} =V_{GS}, I_D =250μA		1	1.7	2.4	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} =10V, I_D =20A		--	2.6	3.4	mΩ
		V_{GS} =4.5V, I_D =20A		--	3.6	4.7	mΩ
g_{FS}	Forward Transconductance	V_{DS} =10V, I_D =20A		24.16	--	--	S
V_{SD}	Diode Forward Voltage	I_S =30A, V_{GS} =0V		--	--	1	V
I_S	Maximum Body-Diode Continuous Current [B]			--	--	51	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS} =0V, V_{DS} =15V, f =1MH_Z		--	2113	--	pF
C_{oss}	Output Capacitance			--	801	--	
C_{rss}	Reverse Transfer Capacitance			--	356	--	
SWITCHING PARAMETERS							
Q_g	Total Gate Charge	V_{GS} =10V,V_{DS} =15V, I_D =50A		--	89	--	nC
Q_{gs}	Gate Source Charge			--	9	--	
Q_{gd}	Gate Drain Charge			--	16	--	
$t_{D(on)}$	Turn-On Delay Time	V_{GS} =10V,V_{DS} =15V, I_D =50A, R_G =3Ω		--	12	--	ns
t_r	Turn-On Rise Time			--	11	--	
$T_{D(off)}$	Turn-Off Delay Time			--	40	--	
t_f	Turn-Off Fall Time			--	12	--	
t_{rr}	Body Diode Reverse Recovery Time	I_F =30A, di/dt =100A/μs		--	60	--	ns
Q_{rr}	Body Diode Reverse Recovery Charge			--	120	--	nC

A. Single pulse width limited by maximum junction temperature.

B. The maximum current rating is package limited.

C. The power dissipation P_D is based on $T_{J(MAX)}$ =175ºC, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

Typical Characteristics T_J = 25ºC, unless otherwise noted

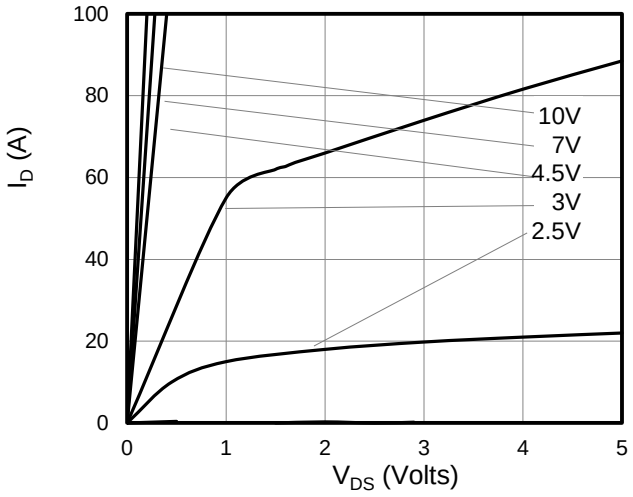


Figure 1: On-Region Characteristics

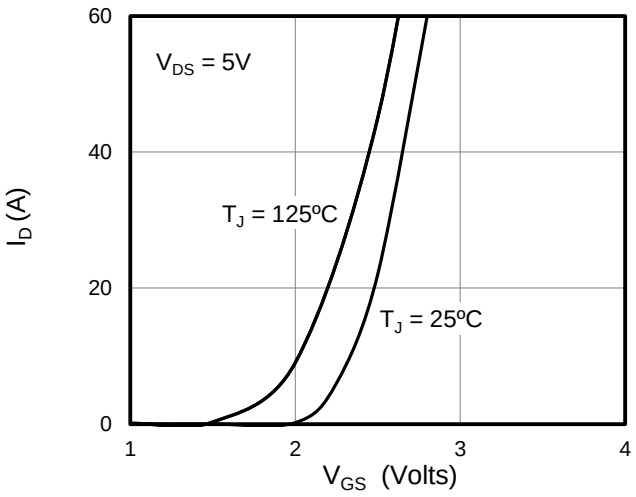


Figure 2: Transfer Characteristics

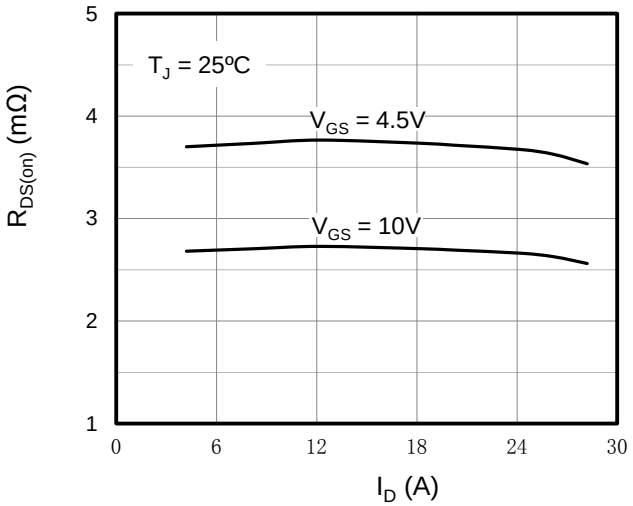


Figure 3: On-Resistance vs. Drain Current

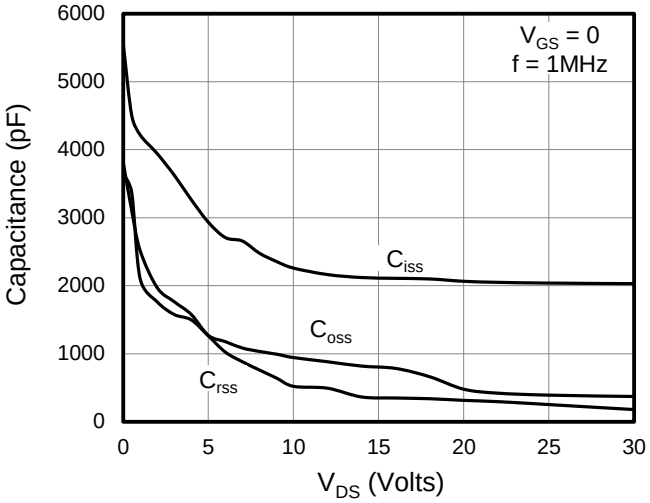


Figure 4: Capacitance Characteristics

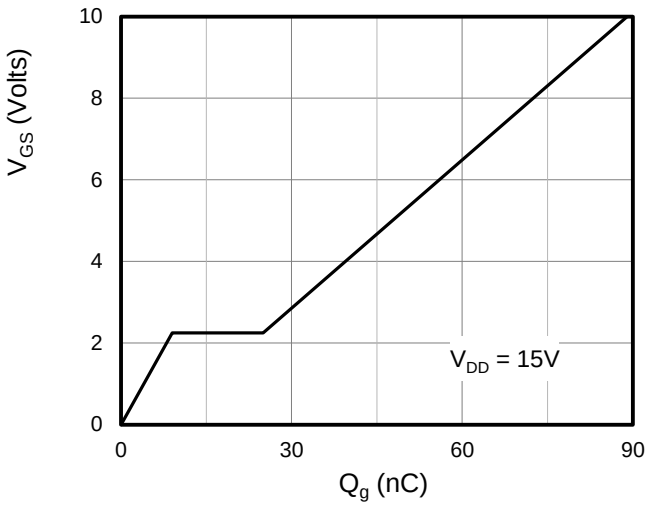


Figure 5: Gate Charge Characteristics

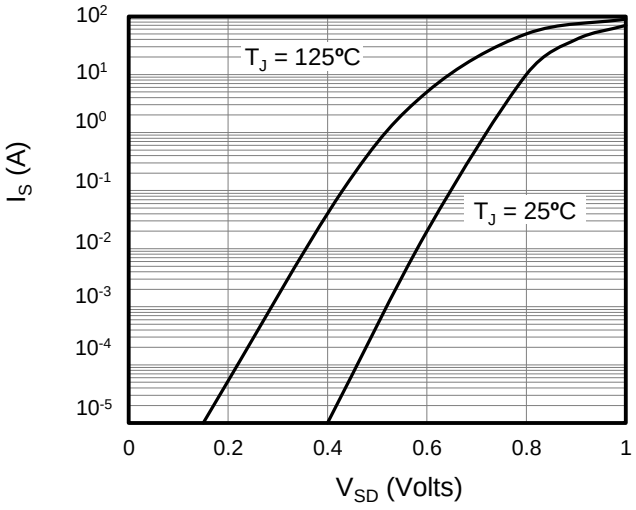


Figure 6: Body Diode Forward Voltage

Typical Characteristics T_J = 25ºC, unless otherwise noted

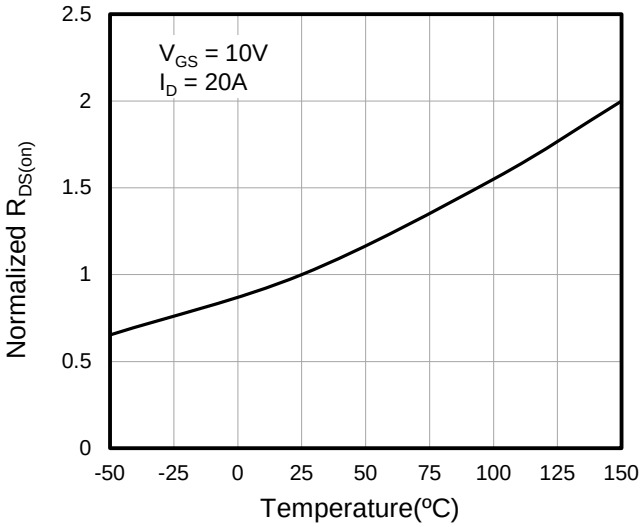


Figure 7: On-Resistance vs. Junction Temperature

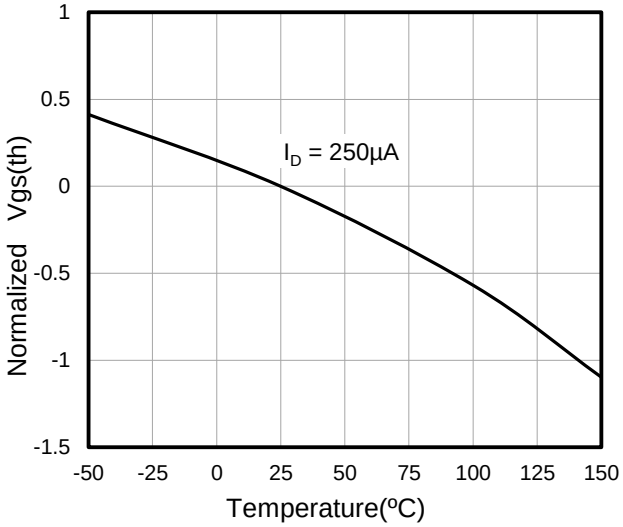


Figure 8: Vgs(th) vs. Junction Temperature

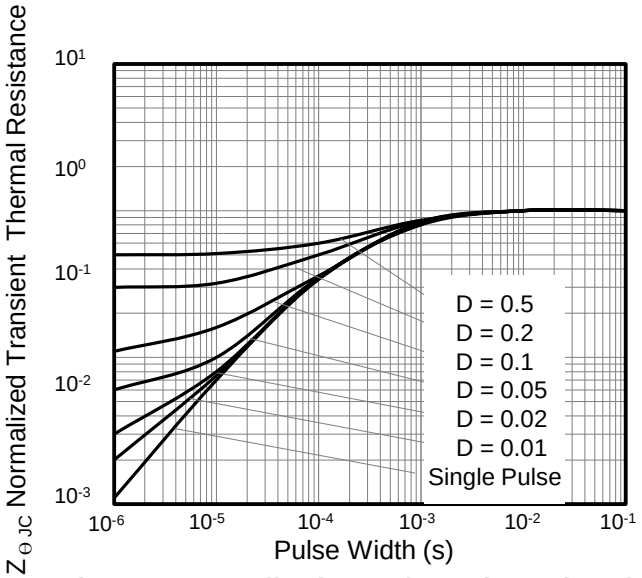


Figure 9: Normalized Transient Thermal Resistance

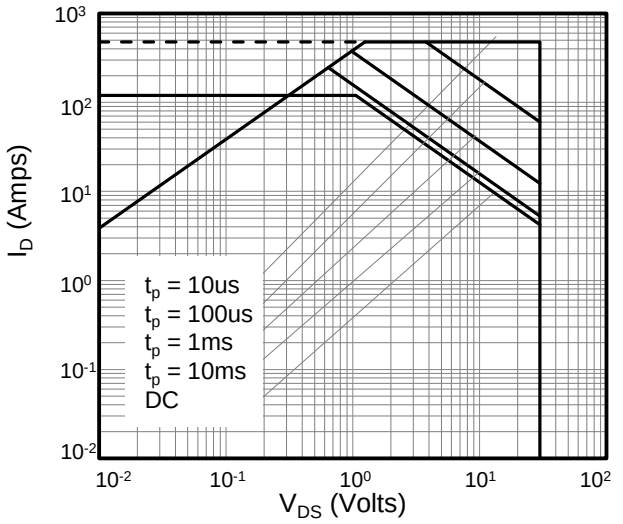


Figure 10: Safe Operating Area

Figure A：Gate Charge Test Circuit and Waveform

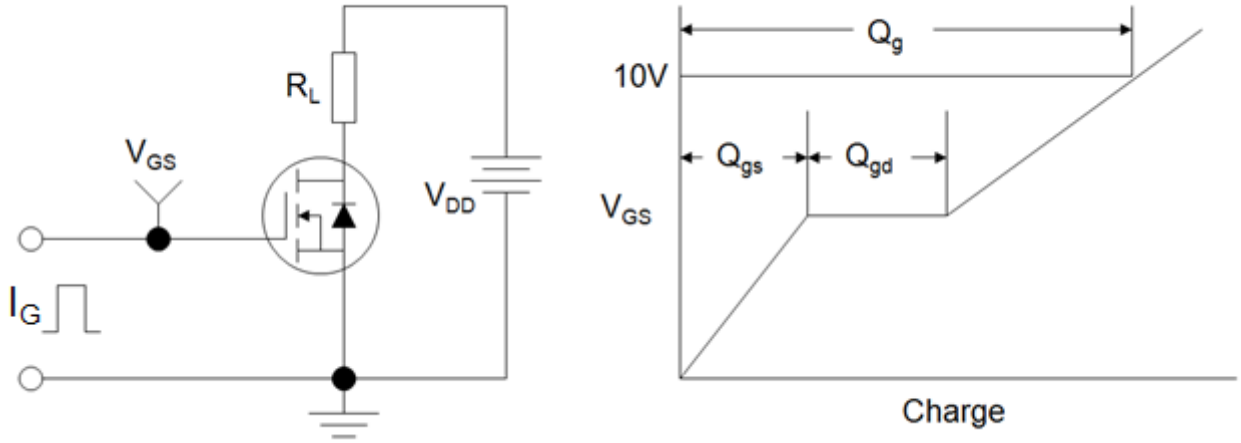


Figure B：Resistive Switching Test Circuit and Waveform

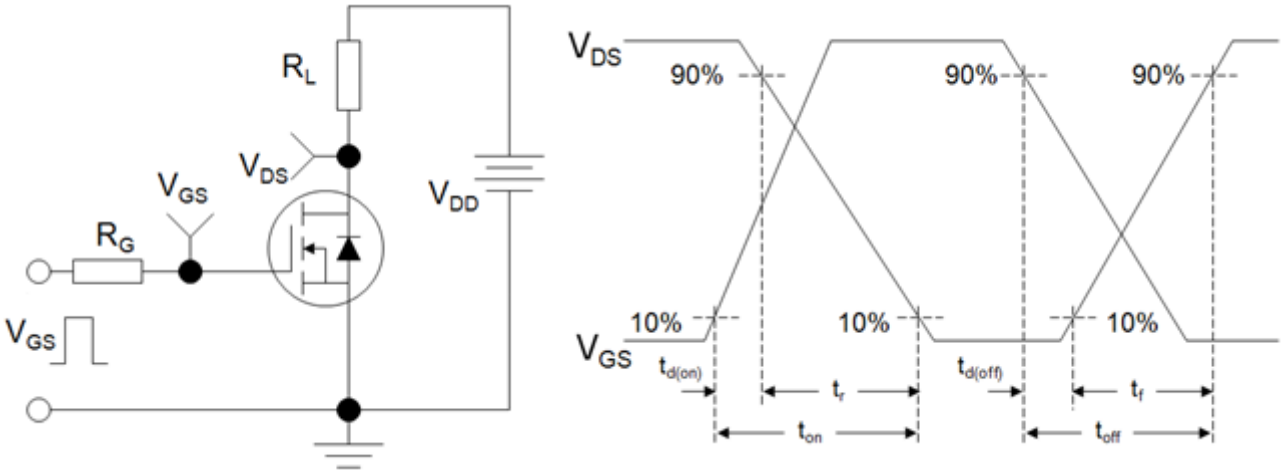
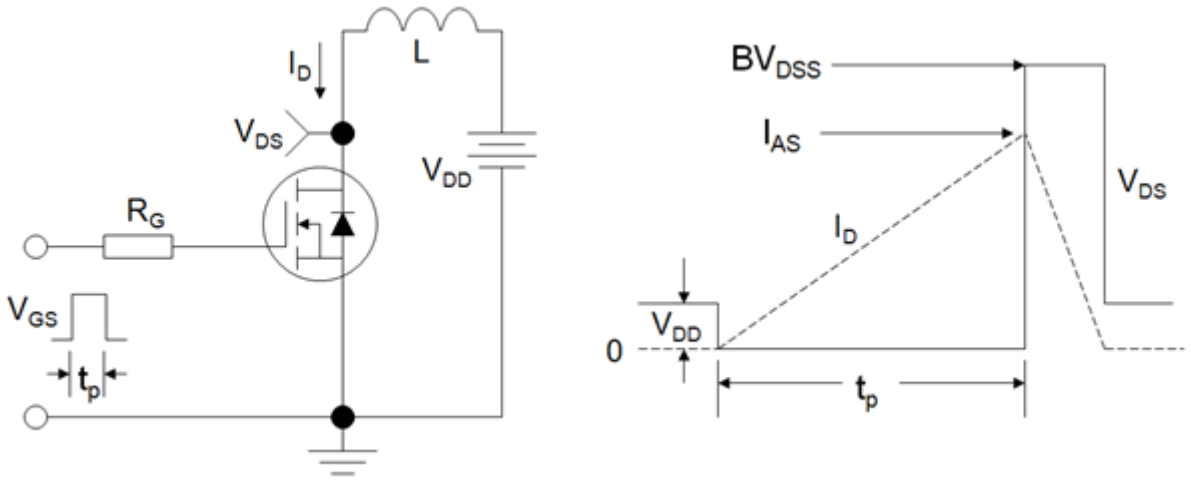
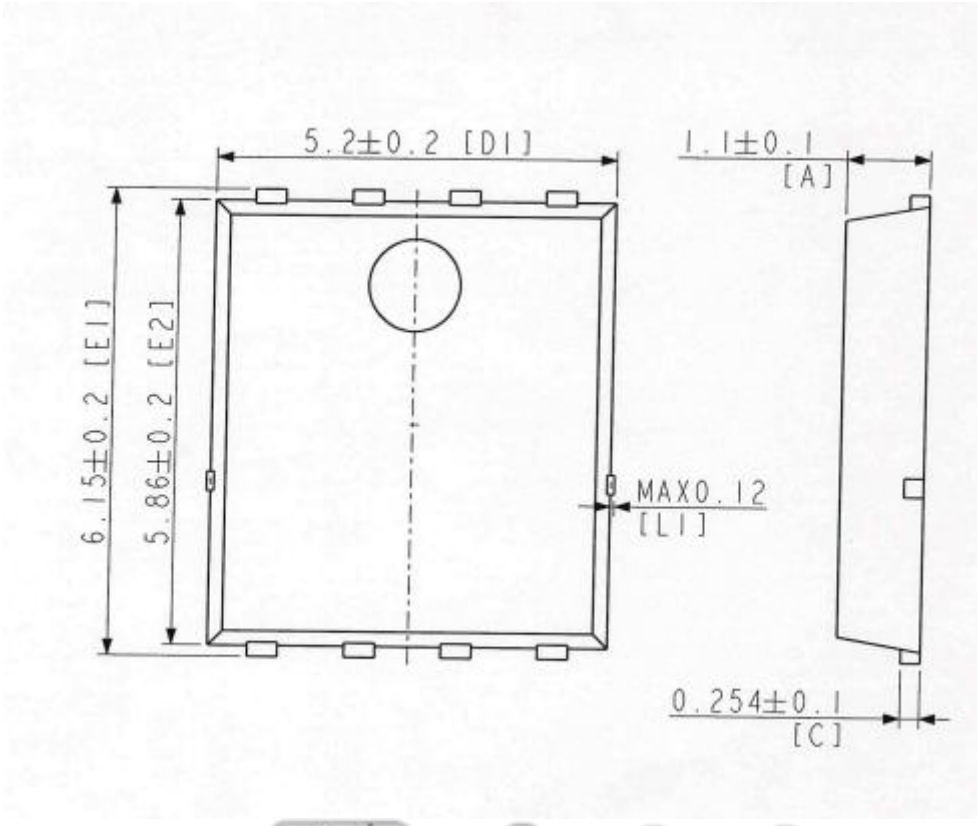
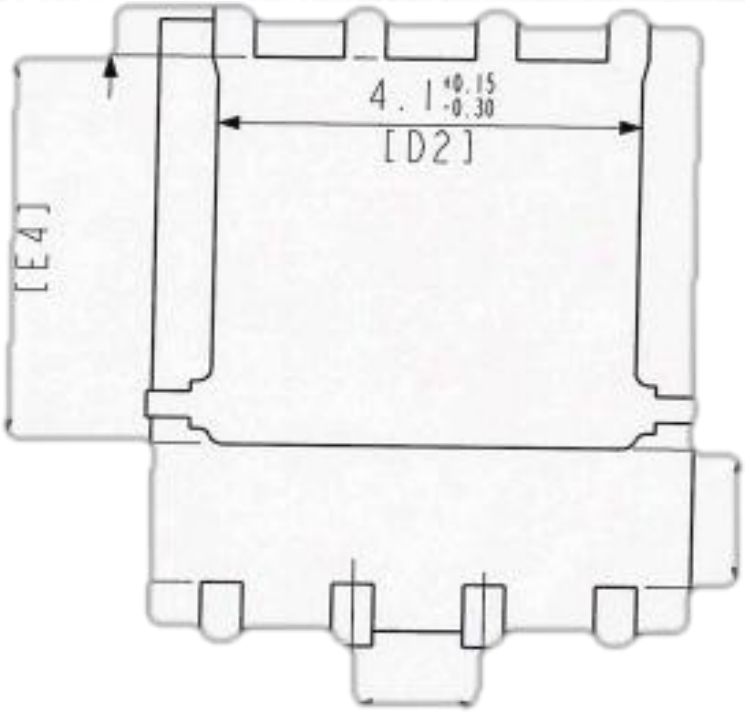


Figure C：Unclamped Inductive Switching Test Circuit and Waveform



DFN5x6(H)


5.2±0.2 [D1]
1.1±0.1
[A]
6.15±0.2 [E1]
5.86±0.2 [E2]
MAX0.12
[L1]
0.254±0.1
[C]


4.1 +0.15 -0.30
[D2]
[E4]

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