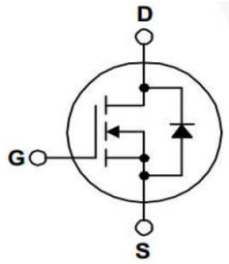
迈诺斯科技

MPT013N03L

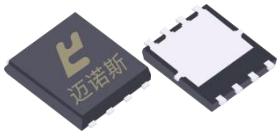
30V N-Channel Power MOSFE

Description

MPT013N03L,the N-channel Enhanced Power MOSFETs, is obtained by advanced double trench technology which reduce the conduction loss,improve switching performance and enhance the avalanche energy. This is suitable device for BMS and high current switching applications.



Schematic diagram



PDFN5*6-8

General Features

① V_{DS}=30V, R_{dson}<1.7mΩ @V_{GS}=10V, I_D=210A (Typ:1.3mΩ)
② Fast Switching
③ Low On-Resistance
④ Low Gate Charge
⑤ Low Reverse transfer capacitance
⑥ High avalanche ruggedness
⑦ RoHS product

Application

① Load Switch
② PWM Application
③ Power Management

Package Marking And Ordering Information：

Ordering Codes	Package	Product Code	Packing
MPT013N03L	PDFN5*6-8	T013N03L	Reel

ABSOLUTE RATINGS at T_C=25°C，unless otherwise specified

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate - Source Voltage	±20	V
I_D	Continuous Drain Current@T_C=25°C	210	A
	Continuous Drain Current @T_C=100°C	115	A
I_{DM}	Pulsed Drain Current	728	A
I_{AS}	Single Pulse Avalanche Current L = 0.1mH	40	A
E_{AS}	Single Pulse Avalanche Energy L = 0.1mH	80	mJ
P_D	Power Dissipation T_C = 25°C	96	W
	Power Dissipation T_C = 100°C	38	W
T_J， T_{stg}	Operating Junction and Storage Temperature Range	-55 ~ +150	℃

Thermal characteristics

Symbol	Parameter	Max	Units
$R_{\theta JC}$	thermal resistance, Junction-Case	1.3	℃/W
$R_{\theta JA}$	thermal resistance, Junction-Ambient	45	℃/W

Notes:

1. Pluse width limited by maximum junction temperature.
2. Pulse test : Pulse width ≤ 100μs, duty cycle ≤ 2%.
3. Device mounted on 1 inch FR4 PCB with 2oz.Copper.
4. Device mounted on infinite heatsink.

Electrical Characteristics at T_C=25°C, unless otherwise specified

OFF Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min	Typ	Max	
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	30	--	--	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=24V, V_{GS}=0V	--	--	1	μA
		V_{DS}=24V, V_{GS}=0V @T_C=55°C	--	--	5.0	μA
$I_{GSS(F)}$	Gate-Source Forward Leakage	V_{GS}=+20V	--	--	100	nA
$I_{GSS(R)}$	Gate-Source Reverse Leakage	V_{GS}=-20V	--	--	-100	nA

ON Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min	Typ	Max	
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS}=10V, I_D=20A	--	1.3	1.7	mΩ
		V_{GS}=4.5V, I_D=15A	--	1.9	2.5	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1.1	1.6	2.2	V
g_{fs}	Forward Transconductance	V_{DS} = 5.0V, I_D = 20A	--	46	--	S
V_{SD}	Diodes Forward Voltage	I_S = 2.0A, V_{GS} = 0V	--	0.7	1.2	V

Pulse width tp≤300μs, δ≤2%

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min	Typ	Max	
C_{iss}	Input Capacitance	V_{DS}=15V, V_{GS}=0, f=1MHz	--	2900	--	pF
C_{oss}	Output Capacitance		--	1795	--	
C_{rss}	Reverse Transfer Capacitance		--	60	--	

Switching Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min	Typ	Max	
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=15V, I_D=20A, V_{GS}=10V, R_G=3Ω, Resistive Load	--	5.4	--	ns
t_r	Rise Time		--	18	--	
$t_{d(off)}$	Turn-Off Delay Time		--	33	--	
t_f	Fall Time		--	17	--	
Q_g	Total Gate Charge@ V_{GS} = 10V	V_{DS} = 15V, I_D = 20A V_{GS} = 0 to 10V	--	47	--	nC
Q_g	Total Gate Charge@ V_{GS} = 4.5V		--	22	--	
Q_{gs}	Gate-Source charge		--	8.3	--	
Q_{gd}	Gate-Drain charge		--	5.8	--	
R_g	Gate Resistance	V_{GS} = 0V, V_{DS} = 0V, f = 1MHz	--	1.5	--	Ω

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min	Typ	Max	
I_S	Continuous Source Current	T_C=25°C	--	--	210	A
T_{rr}	Reverse Recovery Time	I_F=20A, di/dt=100A/us	--	46	--	ns
Q_{rr}	Reverse Recovery Charge		--	65	--	uC

Notes:

5.Measured under pulsed conditions. Pulse width ≤ 300μs, duty cycle ≤ 2%.

6.Guaranteed by design, not subject to production

Characteristics Curves

Figure 1: Output Characteristics

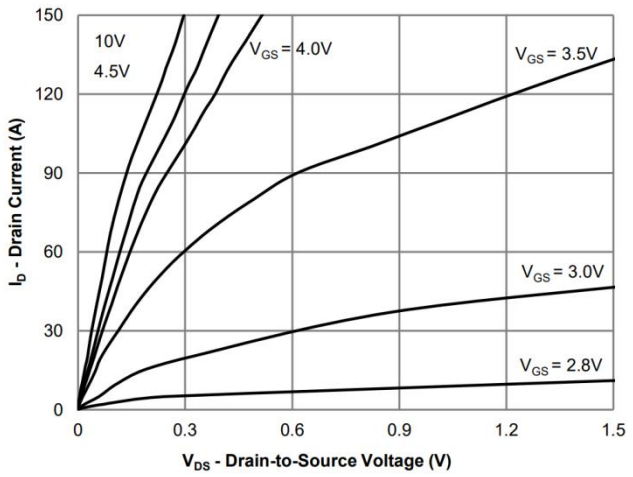


Figure 2: Transfer Characteristics

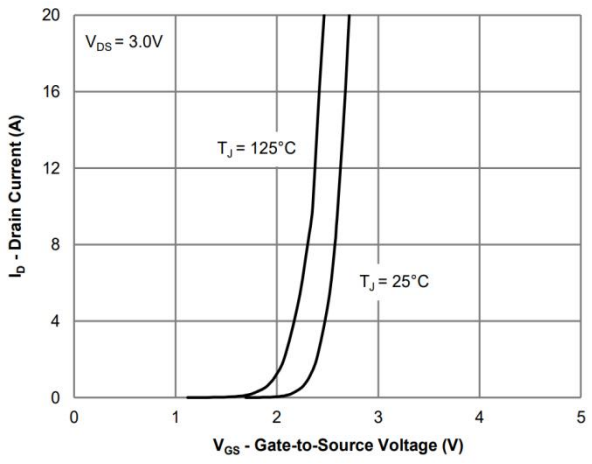


Figure 3: On-Resistance vs. Gate-Source Voltage

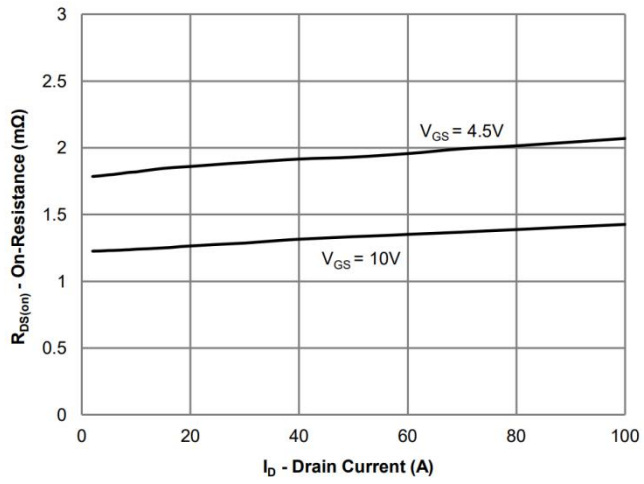


Figure 4: On-Resistance vs. Gate-Source Voltage

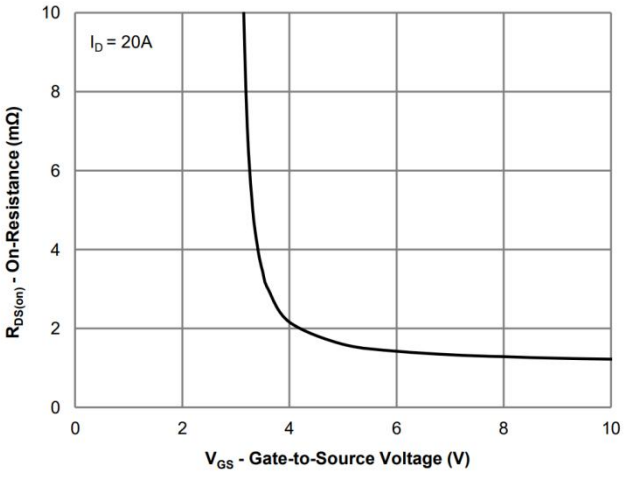


Figure 5: On-Resistance vs. Junction Temperature

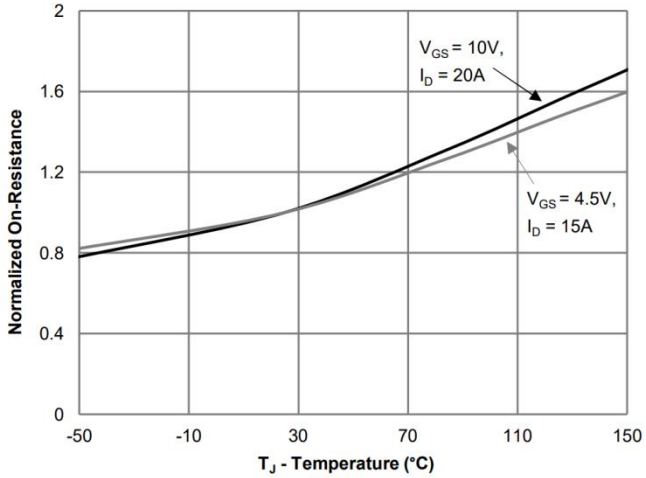


Figure 6: Source-Drain Diode Forward Voltage

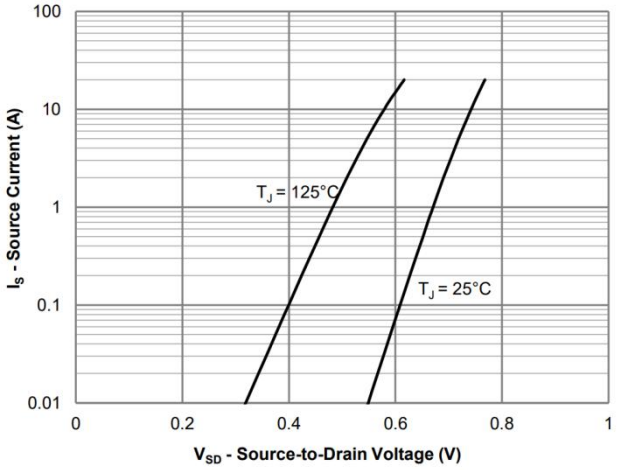


Figure 7: Capacitance Characteristics

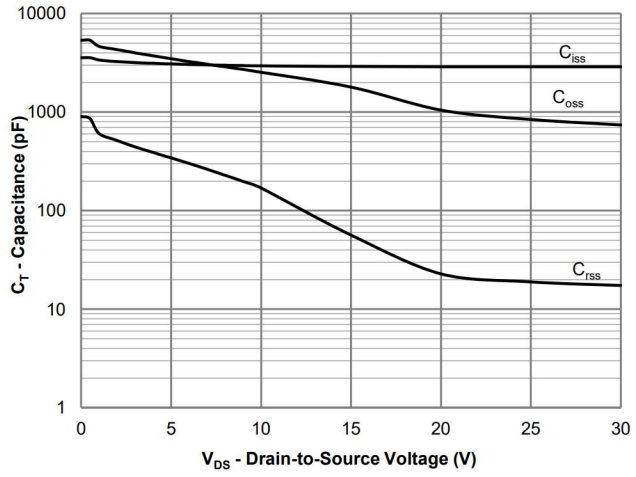


Figure 8: Gate Charge Characteristics

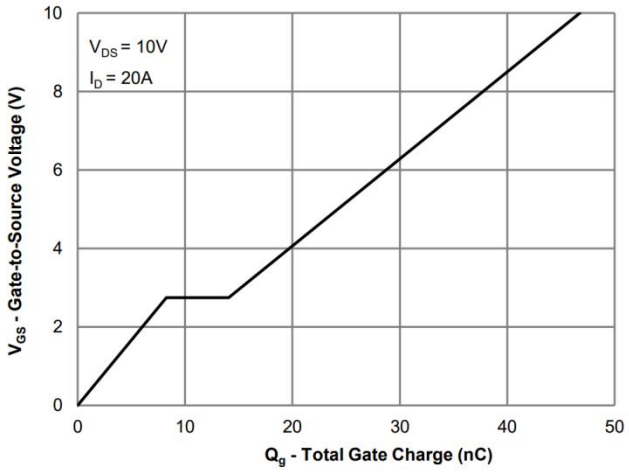


Figure 9: Current Derating

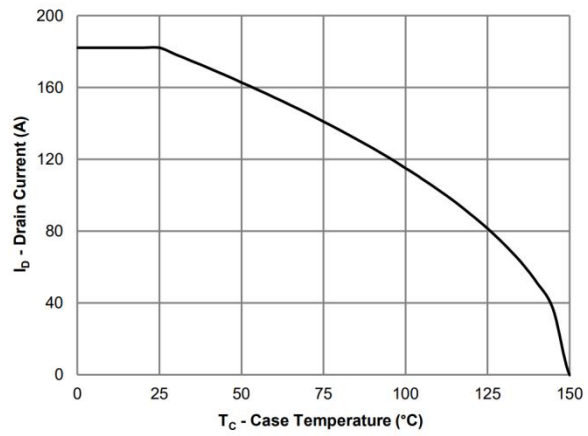


Figure 10: Power Derating

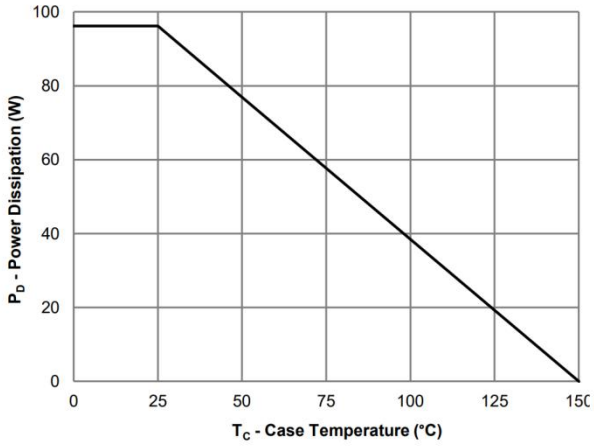


Figure 11: Single Pulse Power, Junction-to-Case

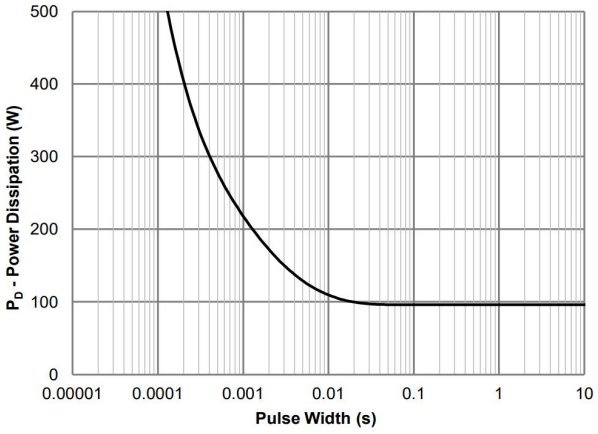


Figure 12: Safe Operating Area

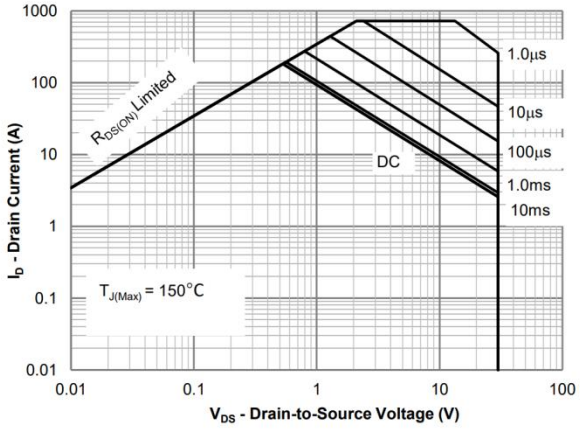
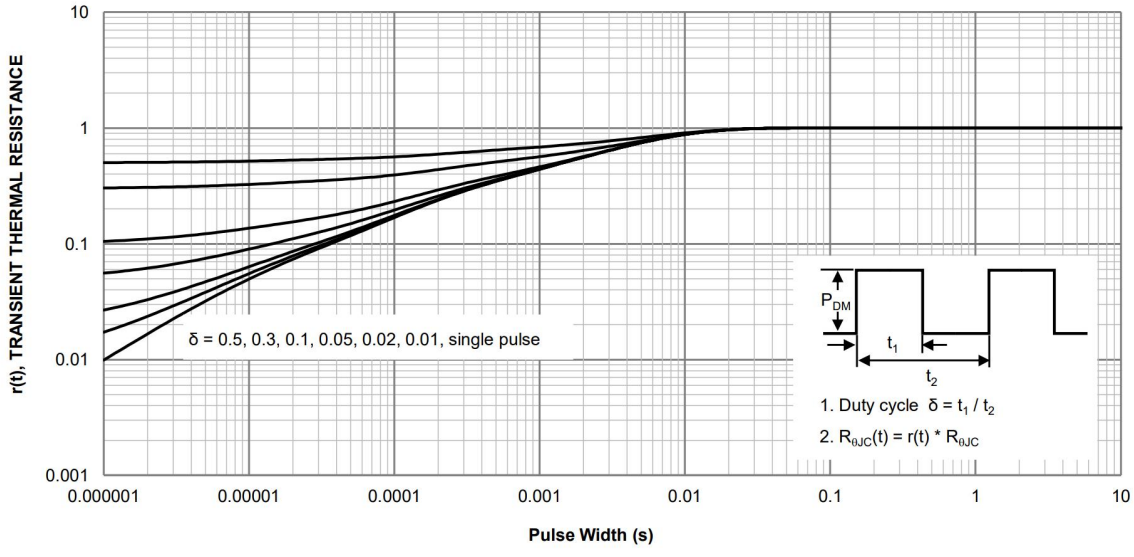


Figure 13: Normalized Thermal Transient Impedance



Test Circuit and Waveform

Figure 14. Resistive Switching Test Circuit	Figure 15. Resistive Switching Waveforms

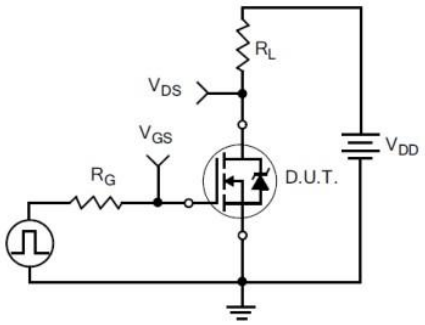
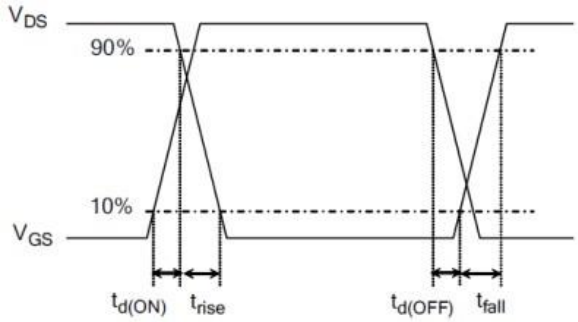

	

Figure 16. Gate Charge Test Circuit	**Figure 17. Gate Charge Waveforms**

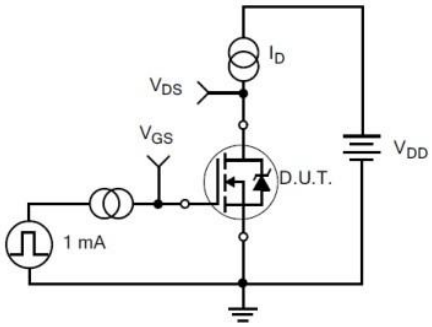
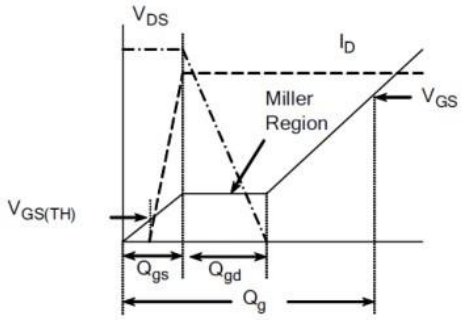

	

Figure 18. Diode Reverse Recovery Test Circuit	**Figure 19. Diode Reverse Recovery Waveform**

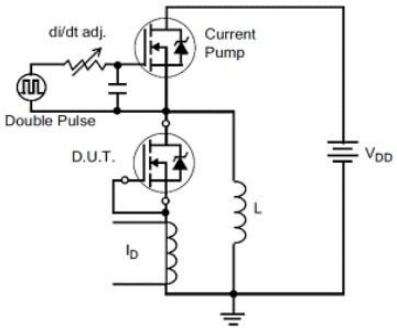
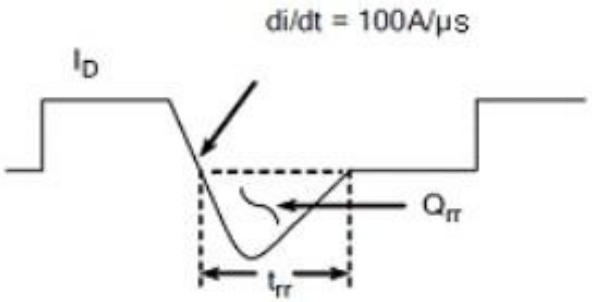
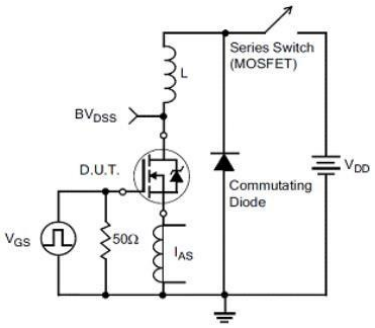
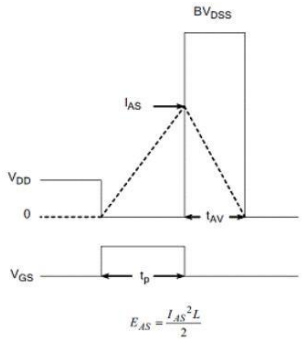
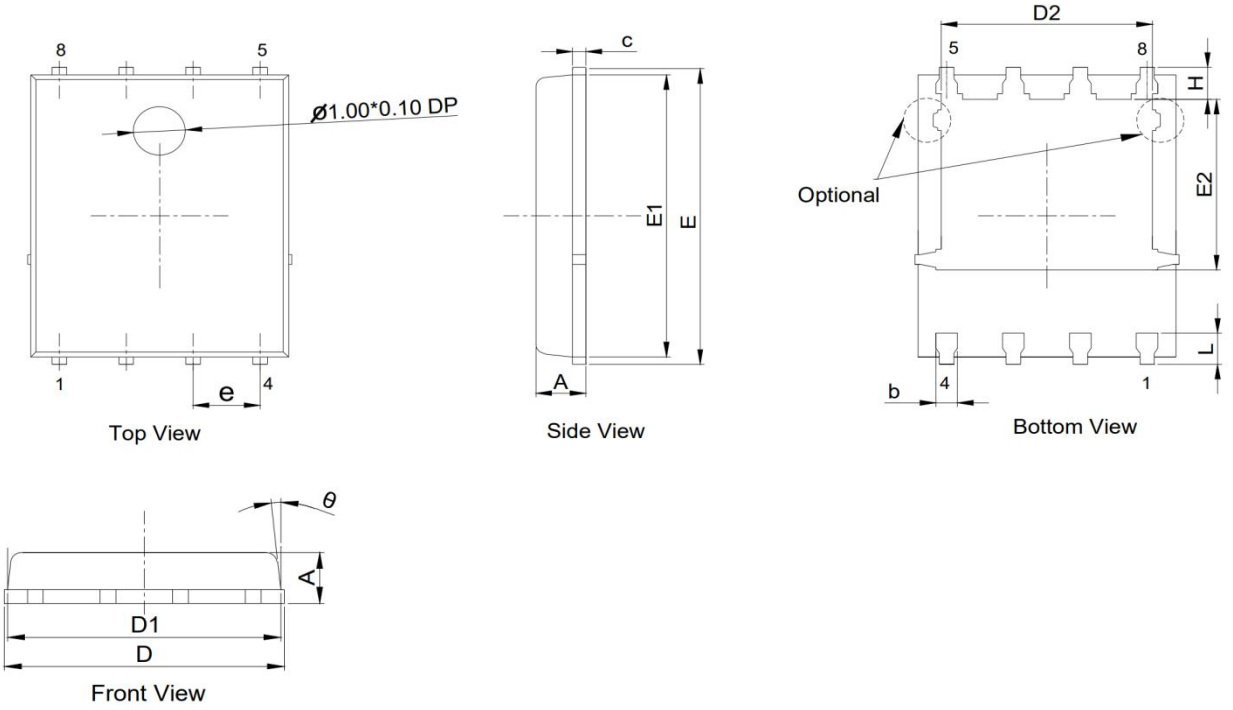

	

Figure 20. Unclamped Inductive Switching Test Circuit	**Figure 21. Unclamped Inductive Switching Waveform**
	

Package Description



DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	0.90	--	1.20
b	0.20	--	0.51
c	0.21	0.25	0.34
D	4.90	--	5.40
D1	4.80	--	5.30
D2	3.70	--	4.50
E	5.90	--	6.50
E1	5.65	5.80	5.95
E2	3.32	3.50	3.83
e	1.27BSC		
H	0.50	--	0.93
L	0.45	--	0.91
θ	0°	--	12°

PDFN5*6-8L Package

NOTE:

1. Exceeding the maximum ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. Please do not exceed the absolute maximum ratings of the device when circuit designing.
2. When installing the heat sink, please pay attention to the torsional moment and the smoothness of the heat sink.
3. MOSFETs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.
4. Shenzhen Minos reserves the right to make changes in this specification sheet and is subject to change withoutprior notice.

CONTACT:

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