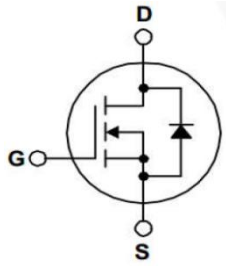
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MPT01N04

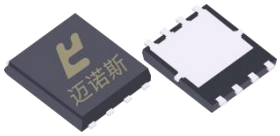
40V N-Channel Power MOSFET

Description

MPT01N04,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 Synchronous rectification and High speed switching Applications.



Schematic diagram



PDFN5*6-8L

General Features

① V_{DS}=40V, R_{dson}<1.0mΩ @V_{GS}=10V, I_D=326A (Typ:0.8mΩ)
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 Synchronous rectification
② High speed switching applications

Package Marking And Ordering Information：

Ordering Codes	Package	Product Code	Packing
MPT01N04	PDFN5*6-8L	T01N04	Reel

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate - Source Voltage	±20	V
I_D	Continuous Drain Current@T_C=25°C	326	A
	Continuous Drain Current @T_C=100°C	230	A
I_{DM}	Pulsed Drain Current	Refer to Fig.4	A
E_{AS}	Single Pulse Avalanche Energy L = 0.1mH	576	mJ
P_D	Power Dissipation T_C = 25°C	190	W
	Power Dissipation T_C = 100°C	95	W
T_J， T_{stg}	Operating Junction and Storage Temperature Range	-55 ~ +175	℃

Thermal characteristics

Symbol	Parameter	Max	Units
$R_{\theta JC}$	thermal resistance, Junction-Case	0.8	℃/W
$R_{\theta JA}$	thermal resistance, Junction-Ambient	42	℃/W

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	40	--	--	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=32V, V_{GS}=0V	--	--	1	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	--	0.8	1.0	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	2	3	4	V

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min	Typ	Max	
C_{iss}	Input Capacitance	V_{DS}=20V, V_{GS}=0V, f=1MHz	--	2900	--	pF
C_{oss}	Output Capacitance		--	1795	--	
C_{rss}	Reverse Transfer Capacitance		--	60	--	
Rg	Gate Resistance	f = 1MHz	--	1.7	--	Ω
Q_g	Total Gate Charge	V_{GS} = 0 to 10V V_{DS} = 20V, I_D = 20A	--	87	--	nC
Q_{gs}	Gate-Source charge		--	27	--	
Q_{gd}	Gate-Drain charge		--	15	--	

Switching Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min	Typ	Max	
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=20V, I_D=20A, V_{GS}=10V, R_G=3Ω, Resistive Load	--	20	--	ns
t_r	Rise Time		--	35	--	
$t_{d(off)}$	Turn-Off Delay Time		--	58	--	
t_f	Fall Time		--	17	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min	Typ	Max	
I_S	Continuous Source Current	T_C=25°C	--	--	326	A
T_{rr}	Reverse Recovery Time	I_F=20A，di/dt=100A/us	27	54	82	ns
Q_{rr}	Reverse Recovery Charge		--	80	--	uC
I_{SM}	Maximum Pulsed Body Diode Forward Current		--	--	1303	A
V_{SD}	Body Diode Forward Voltage	V_{GS} = 0V, I_S = 20A	--	--	1.2	V

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting T_J=25C, V_{DD}=20V, V_{GS}=10V, R_G=25ohm, L=3mH, I_{AS}=19.6A, V_{DD}=0V during time in avalanche.
3. $R_{\theta JA}$ is measured with the device mounted on a 1inch$_2$ pad of 2oz copper FR4 PCB.
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

Characteristics Curves

Figure 1: Power De-rating

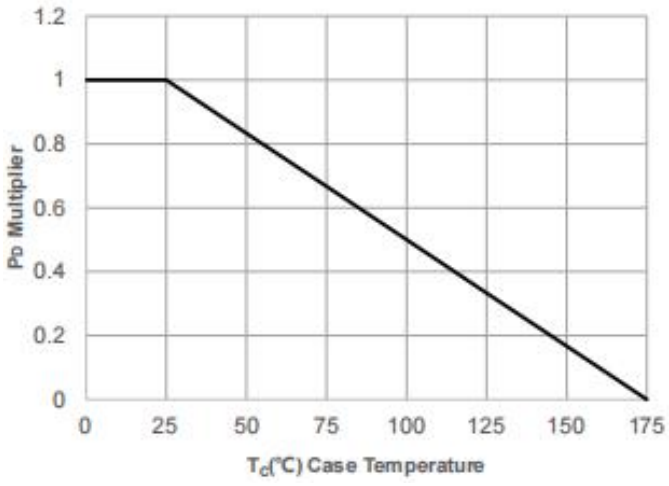


Figure 2: Current De-rating

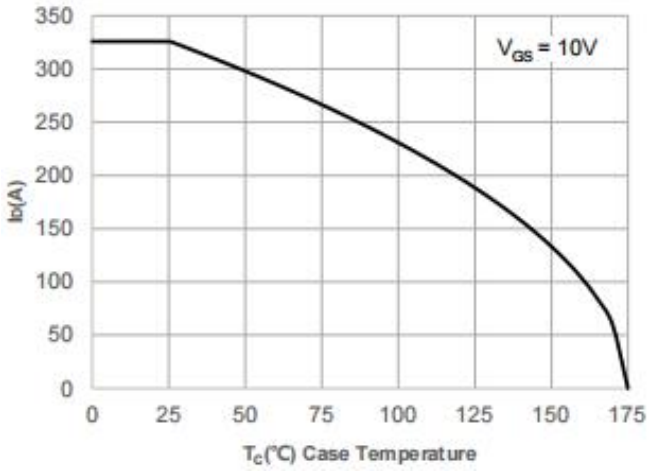


Figure 3: Normalized Maximum Transient Thermal Impedance

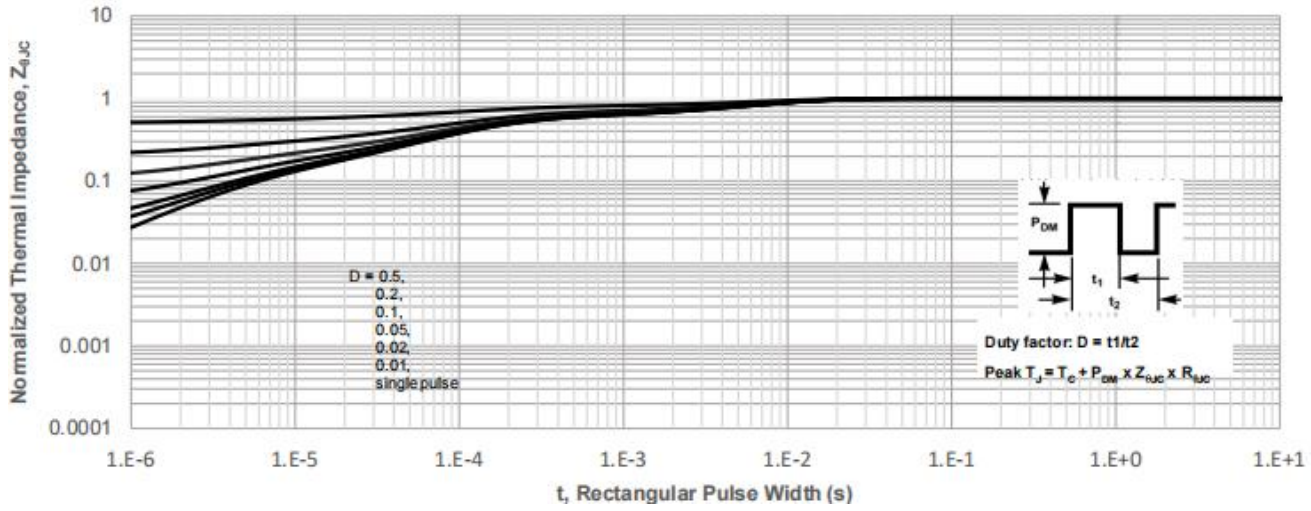


Figure 4: Peak Current Capacity

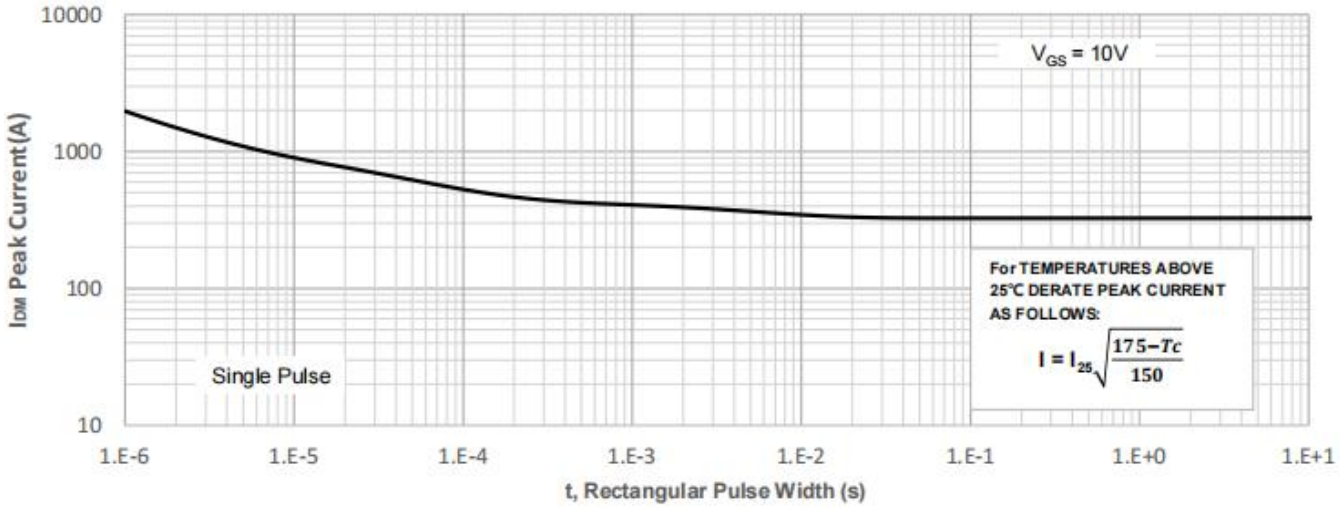


Figure 5: Output Characteristics

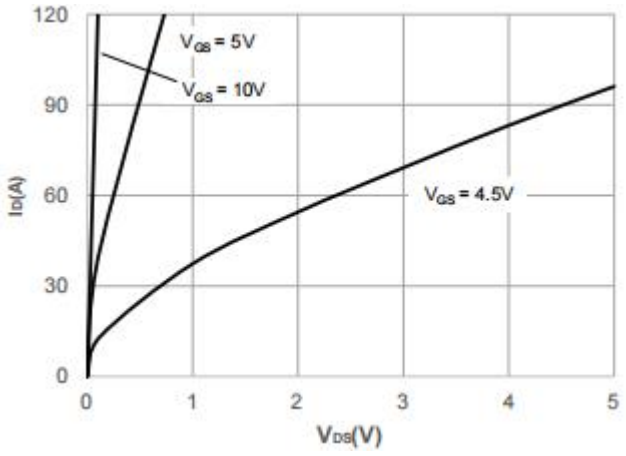


Figure 6: Typical Transfer Characteristics

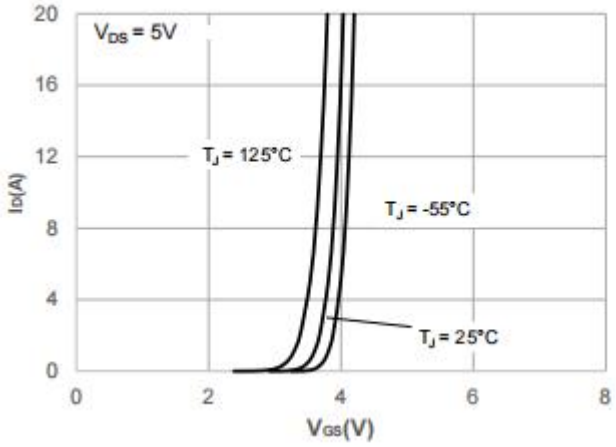


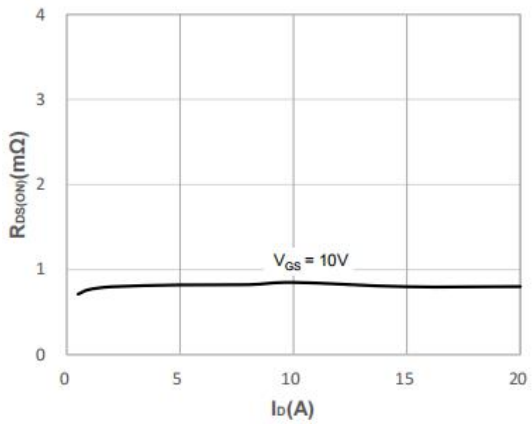
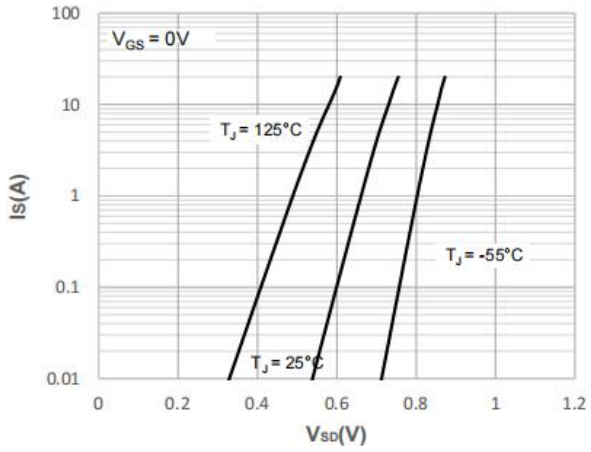
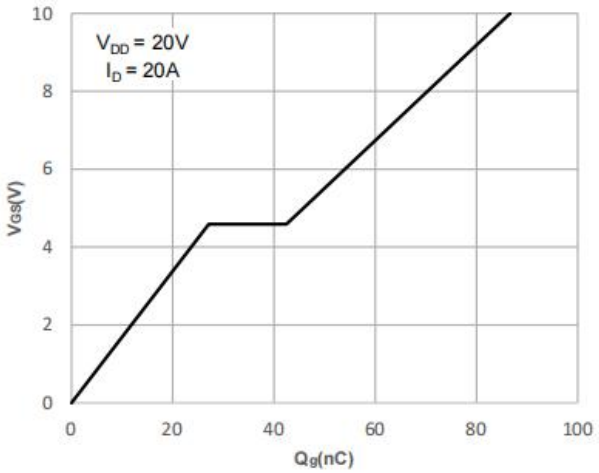
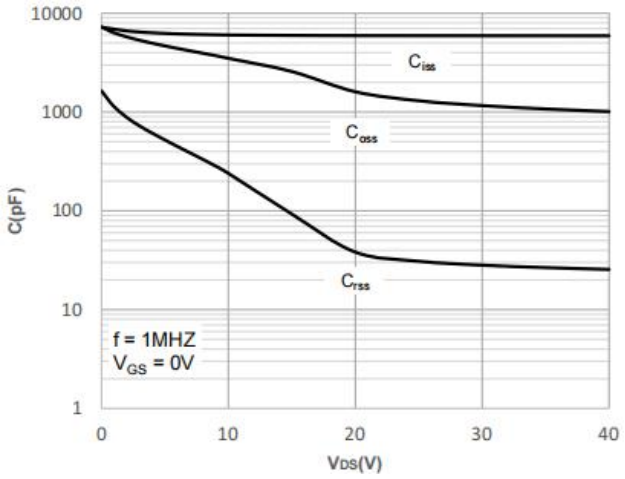
Figure 7: On-resistance vs. Drain Current	Figure 8: Body Diode Characteristics
	
Figure 9: Gate Charge Characteristics	**Figure 10: Capacitance Characteristics**
	

Figure 11: Normalized Breakdown Voltage vs. Junction Temperature

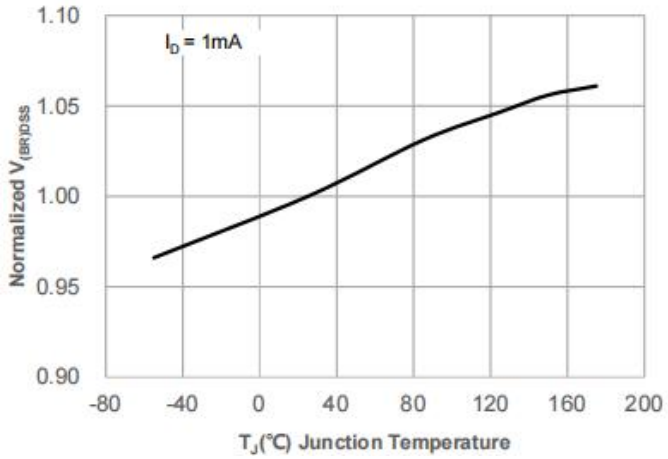


Figure 12: Normalized on Resistance vs. Junction Temperature

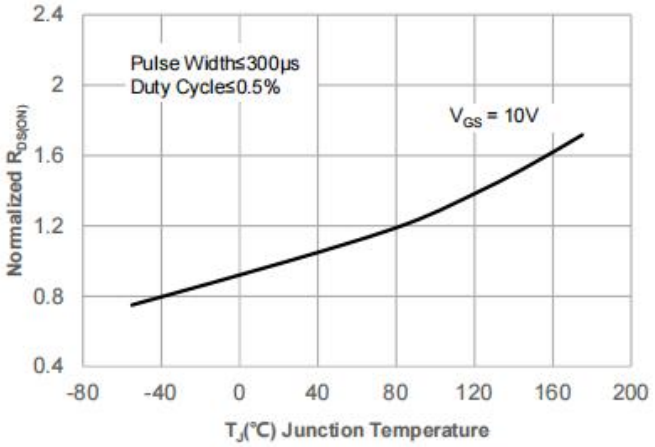


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

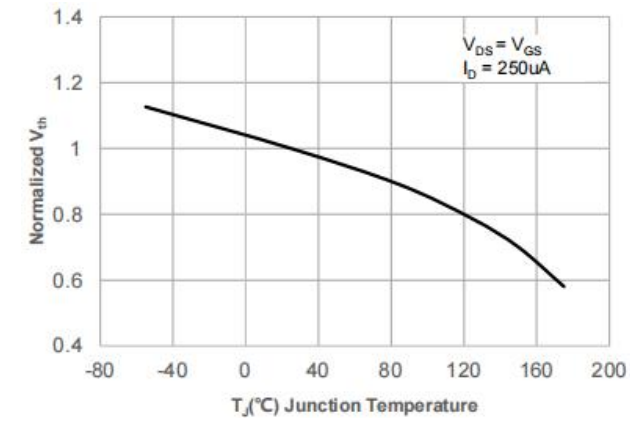


Figure 14: RDS(ON) vs. VGS

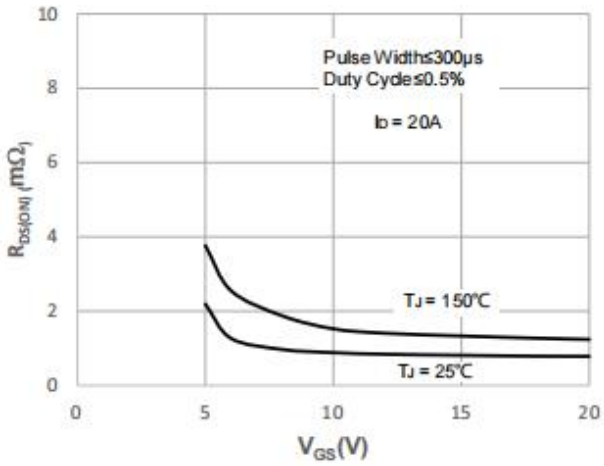
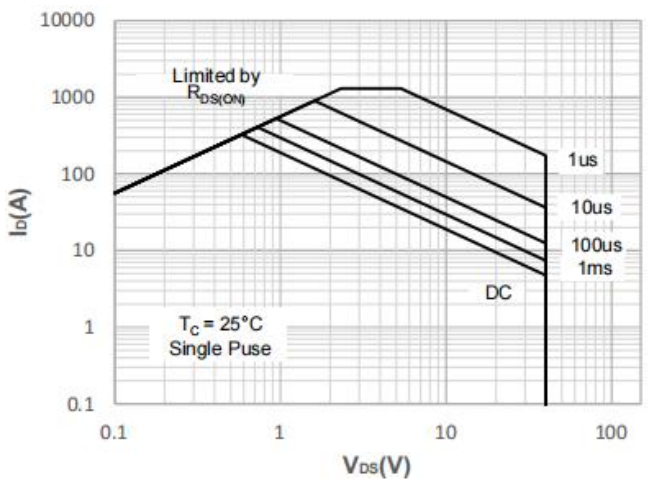
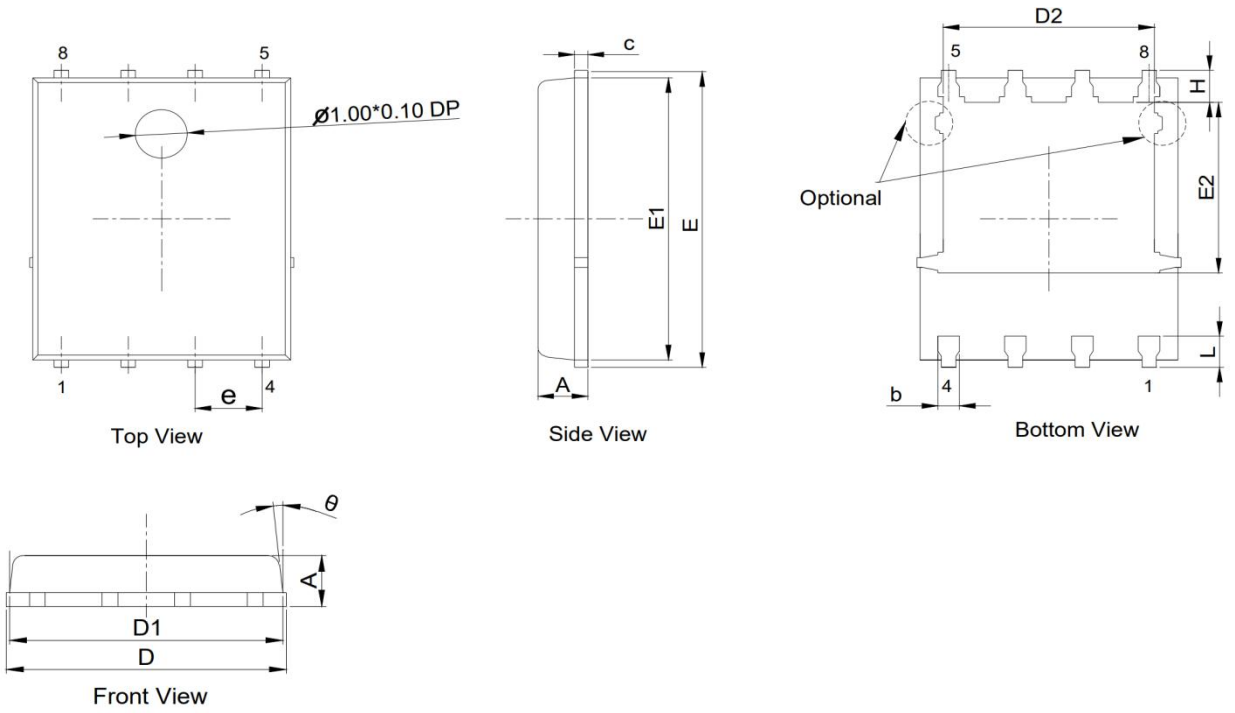


Figure 15: Maximum Safe Operating Area



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 without prior notice.

CONTACT:

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