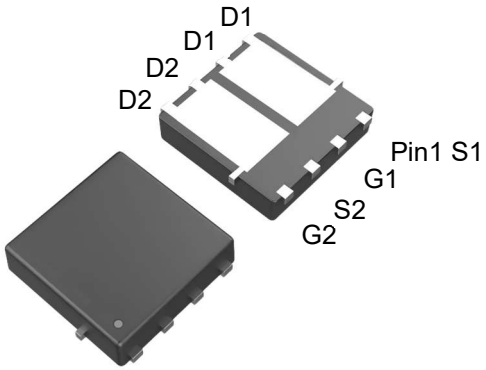
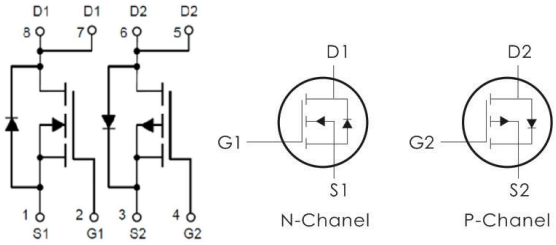
Description：

This N+P Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.





Features：

N-Channel: V_{DS}=40V,I_D=40A,$R_{DS(ON)}$<6mΩ@V_{GS}=10V（Typ:5mΩ）

P-Channel: V_{DS}=-40V,I_D=-40A,$R_{DS(ON)}$<13mΩ@V_{GS}=-10V（Typ:9mΩ）

1) Low gate charge.
2) Green device available.
3) Advanced high cell denity trench technology for ultra low $R_{DS(ON)}$.
4) Excellent package for good heat dissipation.
5) MSL3

Package Marking and Ordering Information：

Part NO.	Package	Packing
ZHM4008	DFN5*6-8D	5000 pcs/Reel

Absolute Maximum Ratings：(T_C=25℃ unless otherwise noted)

Symbol	Parameter	N-Channel	P-Channel	Units
V_{DS}	Drain-Source Voltage	40	-40	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D	Continuous Drain Current- T_C=25℃ [1]	40	-40	A
	Continuous Drain Current-T_C=100℃ [1]	35	-35	
I_{DM}	Pulsed Drain Current [2]	200	-200	A
E_{AS}	Single pulse avalanche energy[3]	90	100	mJ
P_D	Power Dissipation - T_C=25℃	25	30	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150		℃

Thermal Characteristics：

Symbol	Parameter	N-CH	P-CH	Units
$R_{\theta JC}$	Thermal Resistance,Junction to Cast	5	4.1	℃/W

N-Channel Electrical Characteristics：(TC=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BVDSS	Drain- Sourtce Breakdown Voltage	V_{GS}=0V, I_D=250μA	40	---	---	V
IDSS	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=40V	---	---	1	μA
IGSS	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	1	---	2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance[4]	V_{GS}=10V, I_D=20A	---	5	6	mΩ
		V_{GS}=4.5V, I_D=10A	---	7	9	mΩ
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=20V, V_{GS}=0V, f=1MHz	---	2380	---	pF
C_{oss}	Output Capacitance		---	191	---	
C_{rss}	Reverse Transfer Capacitance		---	151	---	
Switching Characteristics[4]						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=20V, I_D=20A, R_{ENG}=3Ω, V_{GS}=10V	---	10	---	ns
t_r	Rise Time		---	29	---	ns
td(off)	Turn-Off Delay Time		---	42	---	ns
t_f	Fall Time		---	7	---	ns
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=20V, I_D=20A	---	35	---	nC
Qgs	Gate-Source Charge		---	10	---	nC
Qgd	Gate-Drain “Miller” Charge		---	10	---	nC
Drain-Source Diode Characteristics						
VSD	Diode Forward Voltage	V_{GS}=0V, I_{SD}=15A V_D=V_G=0V	---	---	1.2	V
IS	Continuous Drain Curren		---	---	40	A
ISM	Pulsed Drain Current	V_{GS}=0V, I_S=30A	---	---	160	A
Trr	Reverse Recovery Time	I_F=20A, T_J=25℃ dI/dt=100A/us	---	11	---	ns
Qrr	Reverse Recovery Charge		---	5	---	nC

Notes:

1. Computed continuous current assumes the condition of $T_{j,Max}$ while the actual continuous current depends on the thermal & electro-mechanical application board design
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
3. EAS condition : T_J=25℃, V_{DD}=20V, V_G=10V, L=0.5mH 4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

Test Circuit

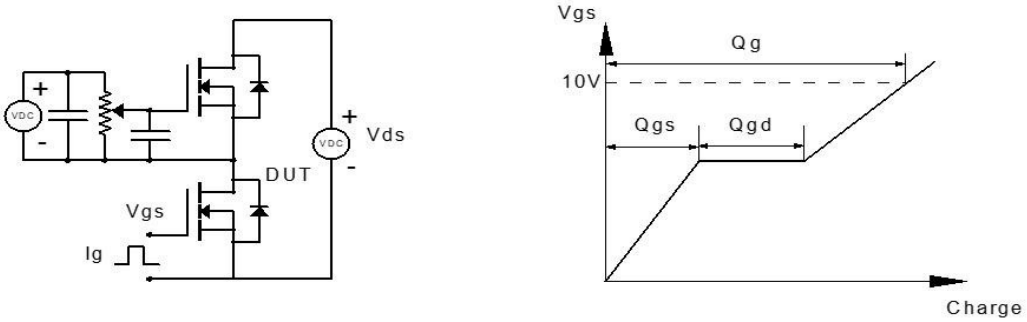


Figure 1: Gate Charge Test Circuit & Waveform

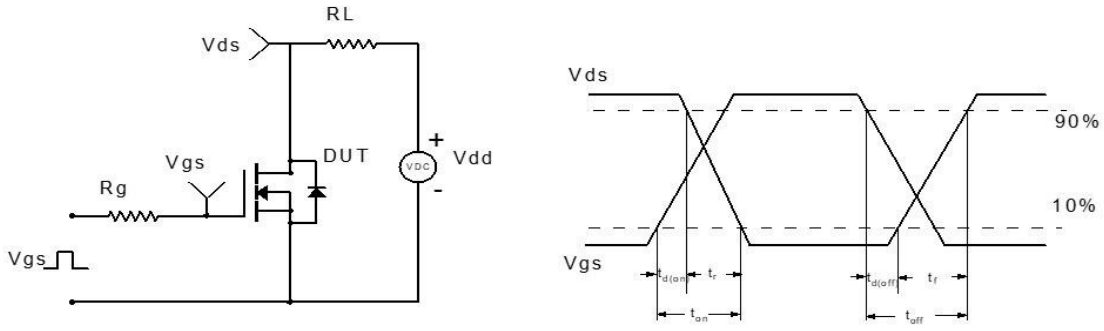


Figure 2: Resistive Switching Test Circuit & Waveform

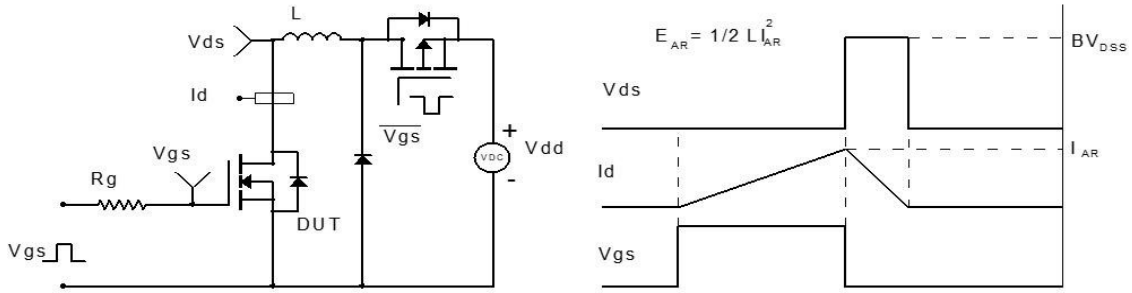


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

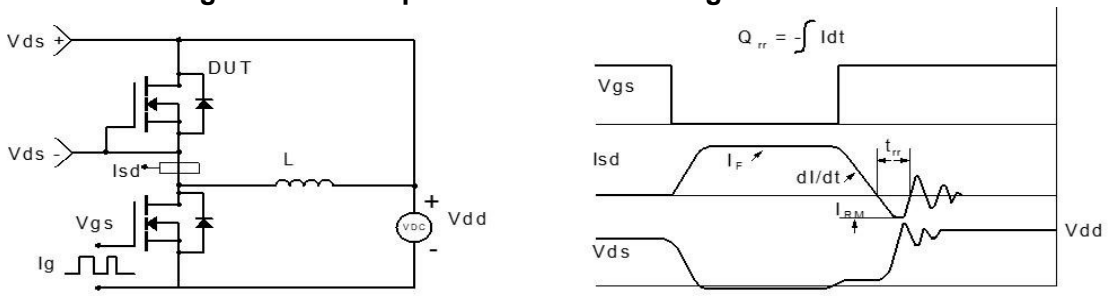


Figure 4: Diode Recovery Test Circuit & Waveform

P-Channel Electrical Characteristics: (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	-40	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=-40V	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	-1	---	-2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance[3]	V_{GS}=-10V,I_D=-20A	---	9	13	mΩ
		V_{GS}=-4.5V,I_D=-10A	---	13	17	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=20V, V_{GS}=0V, f=1MHz	---	2100	---	pF
C_{oss}	Output Capacitance		---	270	---	
C_{rss}	Reverse Transfer Capacitance		---	215	---	
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD}= -20V，I_D=-11A V_{GS}= -10V, R_{GEN}=2.5Ω	---	10	---	ns
t_r	Rise Time		---	21	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	53	---	ns
t_f	Fall Time		---	29	---	ns
Q_g	Total Gate Charge	V_{GS}=-10V,V_{DS}=-20V, I_D=-11A	---	35	---	nC
Q_{gs}	Gate-SourceCharge		---	6.2	---	nC
Q_{gd}	Gate-Drain “Miller” Charge		---	7.3	---	nC
Drain-Source Diode Characteristics						
I_S	Continuous Drain to Source Diode	V_D=V_G=0V	---	---	-40	A
I_{SM}	Pulsed Drain to Source Diode		---	---	-160	---
Trr	Reverse Recovery Time	I_F=-11A,T_J=25℃ dI/dt=100A/us	---	35	---	ns
Qrr	Reverse Recovery Charge		---	40	---	nC
V_{SD}	Source-Drain Diode Forward Voltage	V_{GS}=0V,I_S=-11A	---	---	-1.2	V

Notes:

1. Computed continuous current assumes the condition of $T_{j,Max}$ while the actual continuous current depends on the thermal & electro-mechanical application board design
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
3. EAS condition: T_J=25℃, V_{DD}= -20V, V_G= -10V, L=0.5mH
4. Pulse Test: Pulse Width≤300uS, Duty Cycle≤0.5%

Typical Characteristics： (T_C=25℃ unless otherwise noted)

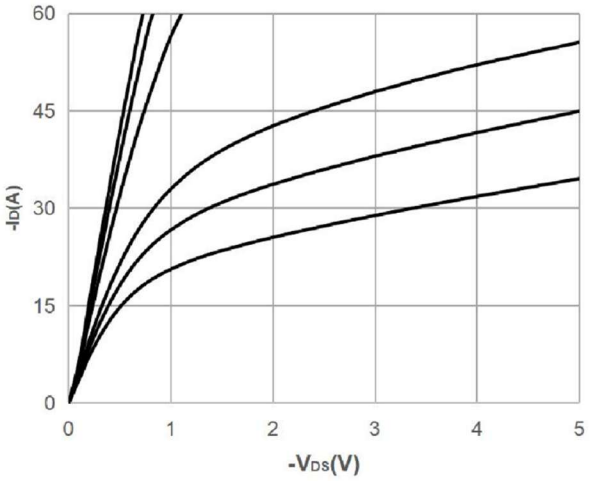


Figure1: Output Characteristics

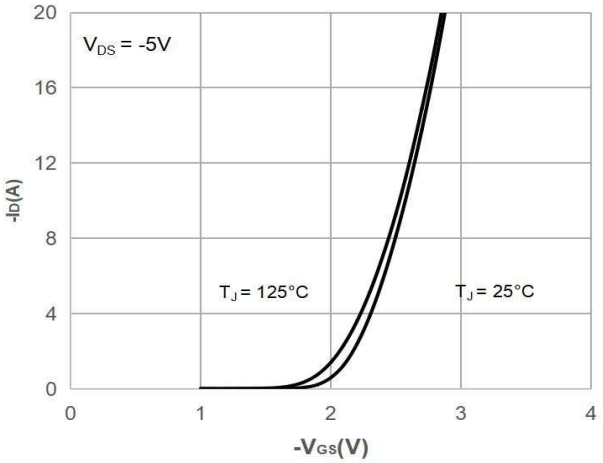


Figure 2: Typical Transfer Characteristics

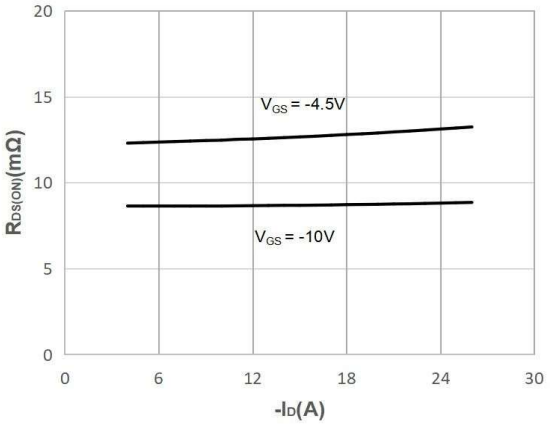


Figure 3: On-resistance vs. Drain Current

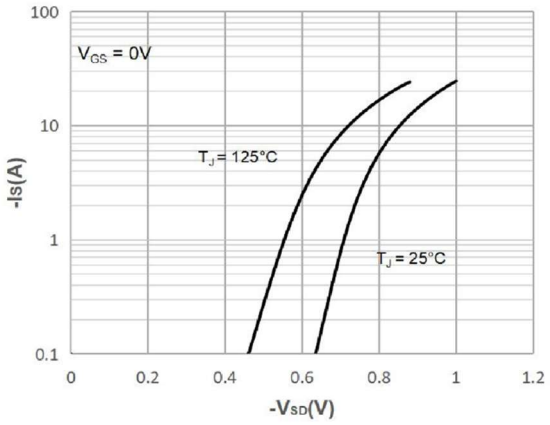


Figure 4: Body Diode Characteristics

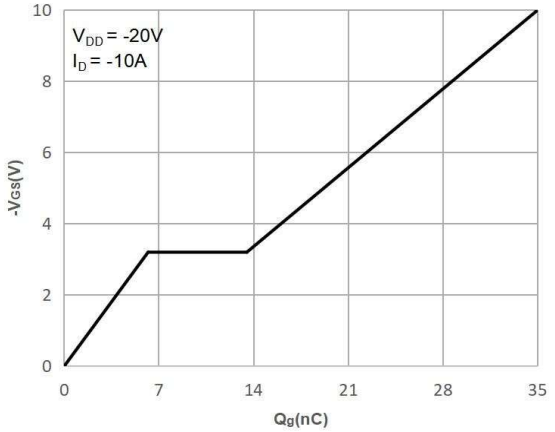


Figure 5: Gate Charge Characteristics

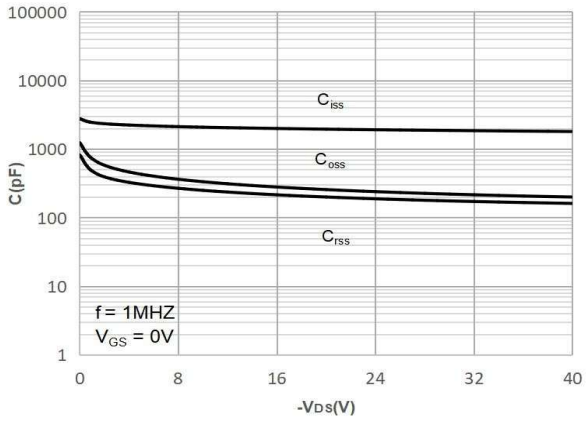


Figure 6: Capacitance Characteristics

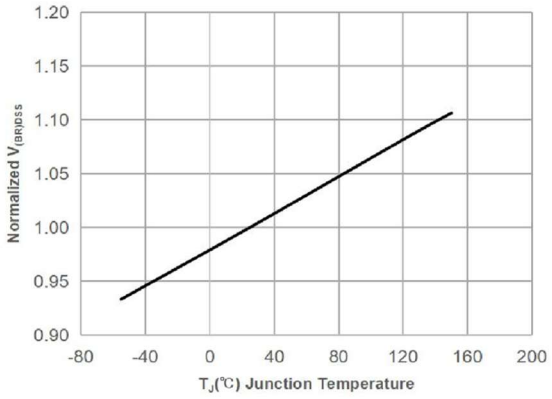


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

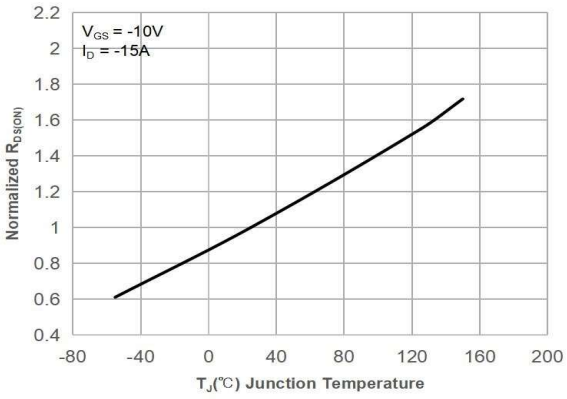


Figure 8: Normalized on Resistance vs. Junction Temperature

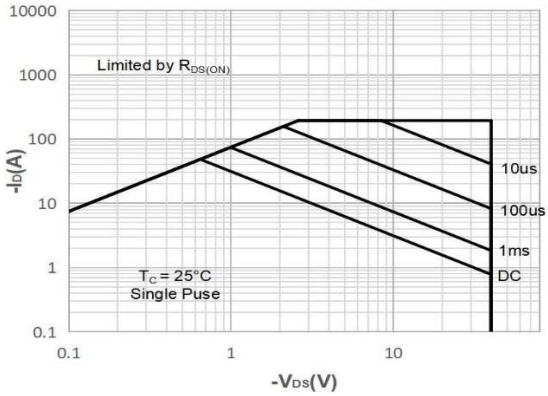


Figure 9: Maximum Safe Operating Area

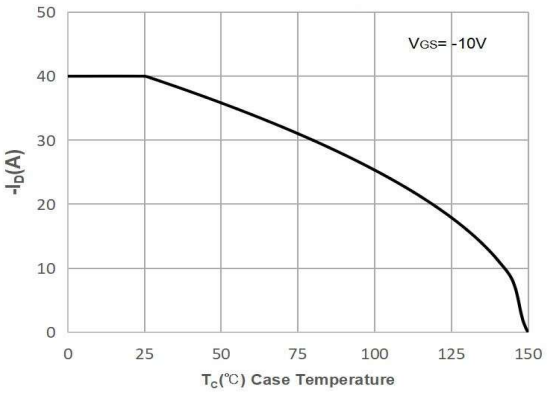


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

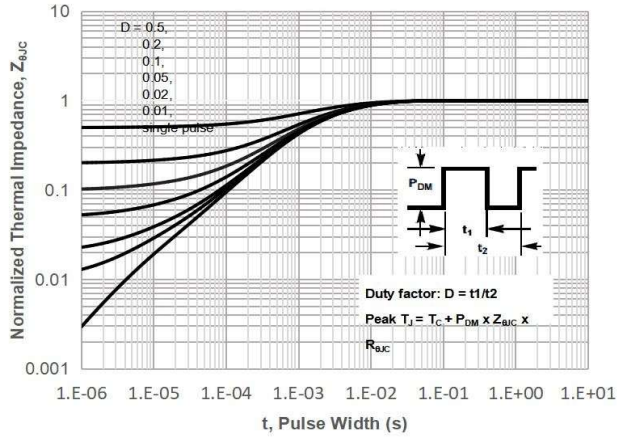


Figure.11: Maximum Effective Transient Thermal Impedance

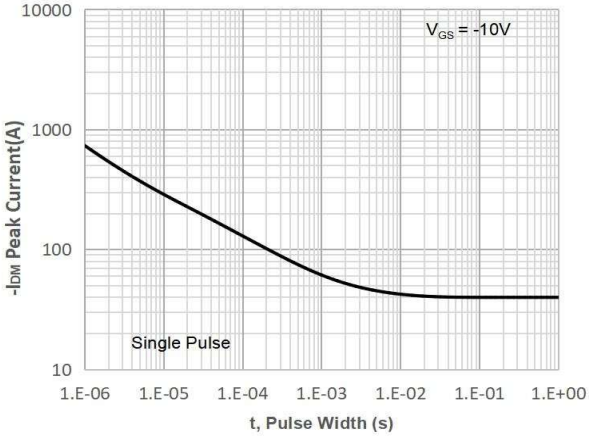
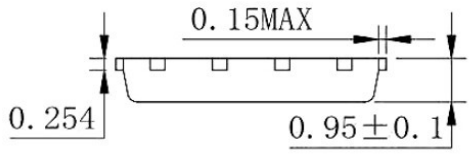
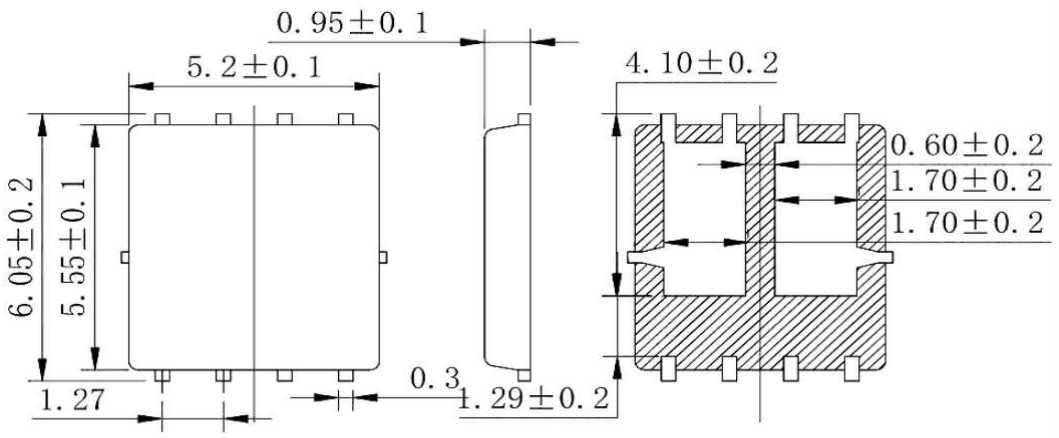


Figure.12: Peak Current Capacity

DFN5x6-8D Package Information：



UNIT：mm



Previous version

Version	Date	Subjects (major changes since last revision)
1.0	2025-05-13	Release of final version