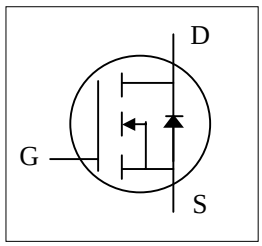
XP3NA4R2AYT

Halogen-Free Product

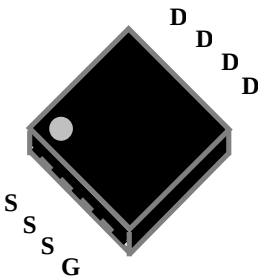
N-CHANNEL ENHANCEMENT MODE

POWER MOSFET

- **Simple Drive Requirement**
- **Small Size & Ultra_Low $R_{DS(ON)}$**
- **RoHS Compliant & Halogen-Free**



BV_{DSS}	30V
$R_{DS(ON)}$	4.2mΩ



PMPAK® 3 x 3

Description

XP3NA4R2A series are innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

The PMPAK ® 3 x 3 package is special for voltage conversion application using standard infrared reflow technique with the backside heat sink to achieve the good thermal performance.

Absolute Maximum Ratings@T_j=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@T_C=25℃	Drain Current, V_{GS} @ 10V[4](Silicon Limited)	66	A
I_D@T_C=25℃	Drain Current, V_{GS} @ 10V[4](Package Limited)	40	A
I_D@T_C=100℃	Drain Current, V_{GS} @ 10V[4](Package Limited)	40	A
I_D@T_A=25℃	Drain Current, V_{GS} @ 10V[3]	20.9	A
I_D@T_A=70℃	Drain Current, V_{GS} @ 10V[3]	16.7	A
I_{DM}	Pulsed Drain Current[1]	160	A
P_D@T_C=25℃	Total Power Dissipation	31.2	W
P_D@T_A=25℃	Total Power Dissipation	3.12	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Value	Unit
Rthj-c	Maximum Thermal Resistance, Junction-case	4	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient[3]	40	℃/W

Electrical Characteristics@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	30	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=19A	-	-	4.2	mΩ
		V_{GS}=4.5V, I_D=12A	-	-	7.8	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	1.3	-	2.3	V
g_{fs}	Forward Transconductance	V_{DS}=5V, I_D=19A	-	65	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=24V, V_{GS}=0V	-	-	10	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±20V, V_{DS}=0V	-	-	±0.1	uA
Q_g	Total Gate Charge[5]	I_D=19A	-	38	60.8	nC
Q_{gs}	Gate-Source Charge[5]	V_{DS}=15V	-	6	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge[5]	V_{GS}=10V	-	10	-	nC
$t_{d(on)}$	Turn-on Delay Time[5]	V_{DS}=15V	-	9.5	-	ns
t_r	Rise Time[5]	I_D=19A	-	57	-	ns
$t_{d(off)}$	Turn-off Delay Time[5]	R_G=6Ω	-	39	-	ns
t_f	Fall Time[5]	V_{GS}=10V	-	82	-	ns
C_{iss}	Input Capacitance[5]	V_{GS}=0V	-	1610	2576	pF
C_{oss}	Output Capacitance[5]	V_{DS}=25V	-	245	-	pF
C_{rss}	Reverse Transfer Capacitance[5]	f=1.0MHz	-	200	-	pF
R_g	Gate Resistance	f=1.0MHz	-	1.8	3.6	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=19A, V_{GS}=0V	-	-	1.2	V
t_{rr}	Reverse Recovery Time[5]	I_S=19A, V_{GS}=0V,	-	12	-	ns
Q_{rr}	Reverse Recovery Charge[5]	dI/dt=100A/μs	-	4	-	nC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Pulse test

3.Surface mounted on 1 in^2 2oz copper pad of FR4 board, t ≤10sec; 135°C/W when mounted on min. copper pad.

4.Package limitation current is 40A .

5.Guaranteed by design.

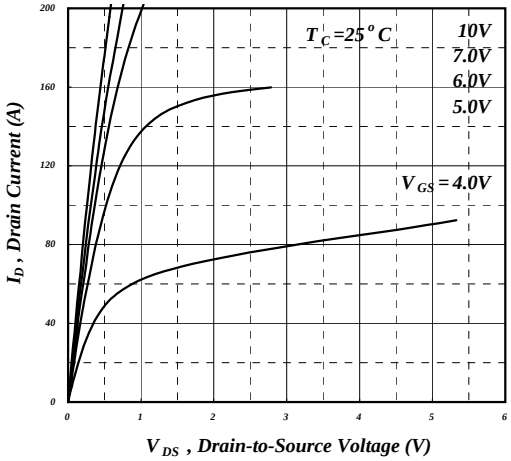


Fig 1. Typical Output Characteristics

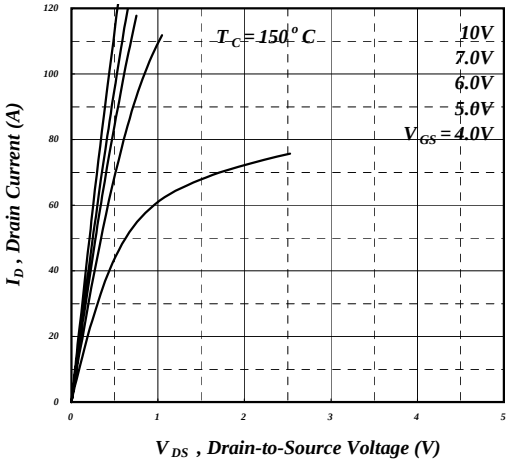


Fig 2. Typical Output Characteristics

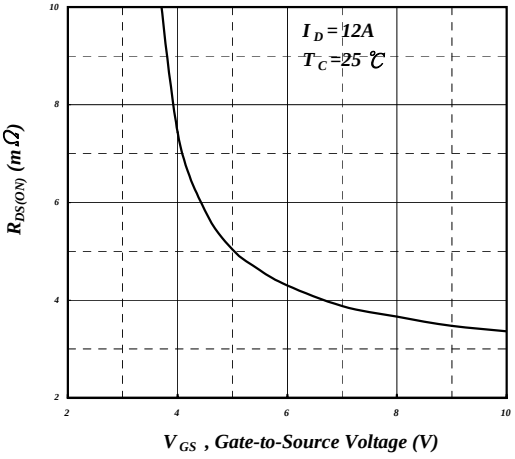


Fig 3. On-Resistance v.s. Gate Voltage

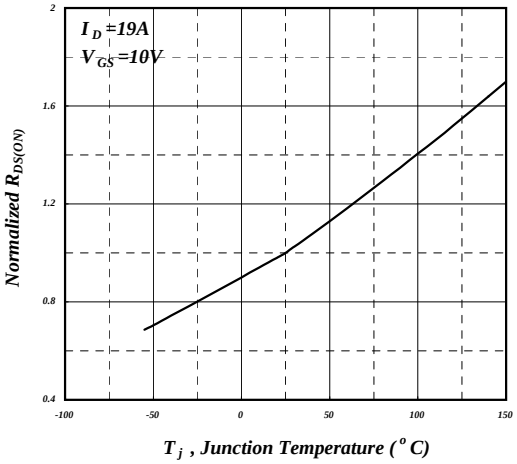


Fig 4. Normalized On-Resistance v.s. Junction Temperature

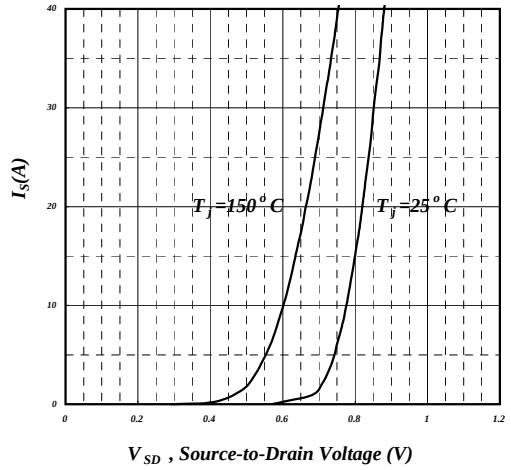


Fig 5. Forward Characteristic of Reverse Diode

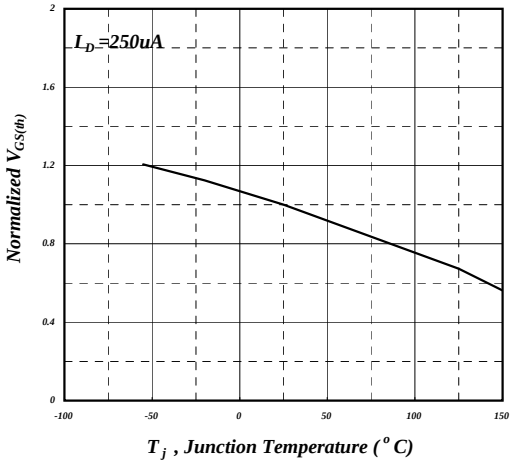


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

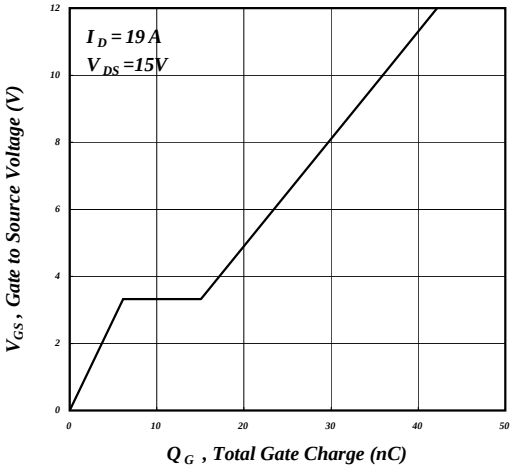


Fig 7. Gate Charge Characteristics

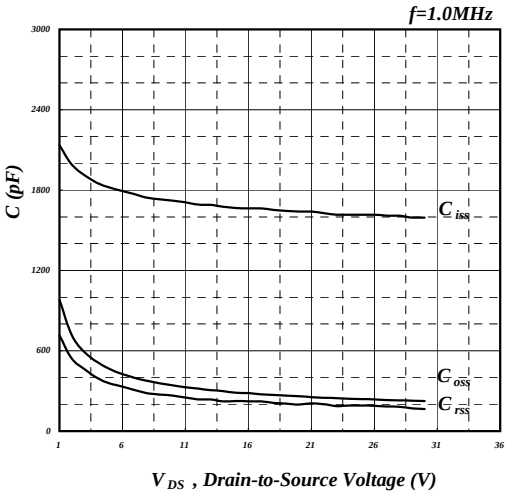


Fig 8. Typical Capacitance Characteristics

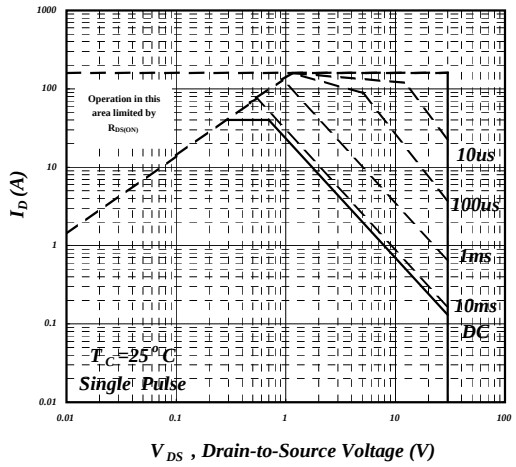


Fig 9. Maximum Safe Operating Area

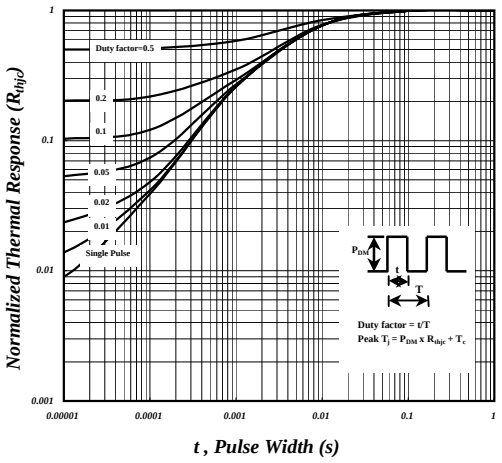


Fig 10. Effective Transient Thermal Impedance

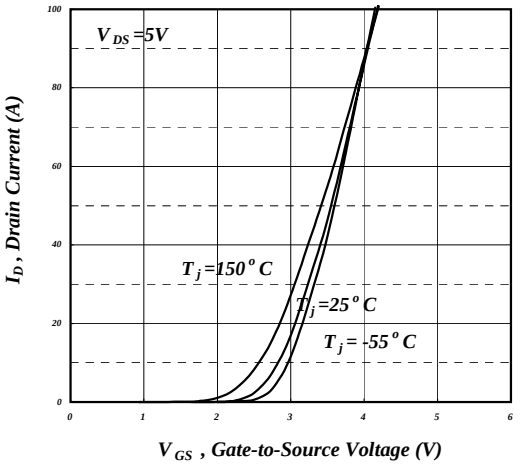


Fig 11. Transfer Characteristics

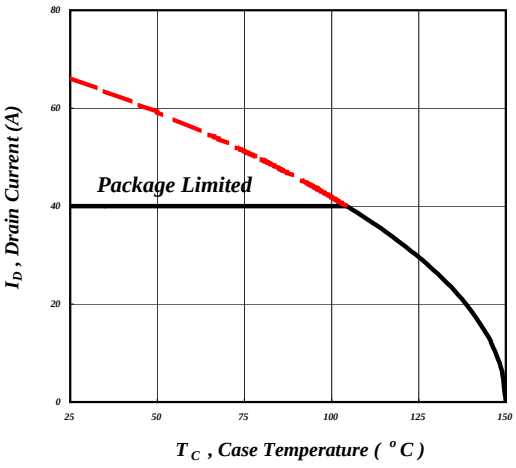


Fig 12. Drain Current v.s. Case Temperature

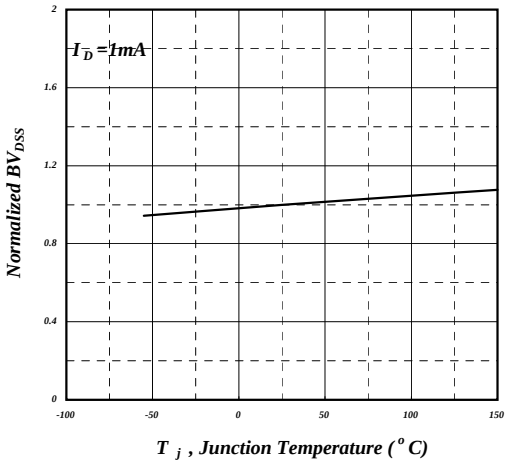


Fig 13. Normalized BV_{DSS} v.s. Junction Temperature

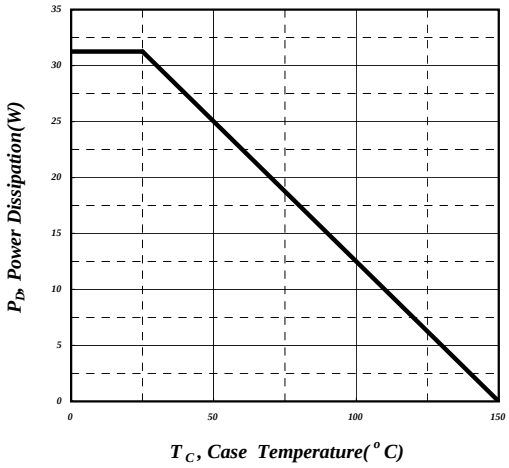


Fig 14. Total Power Dissipation

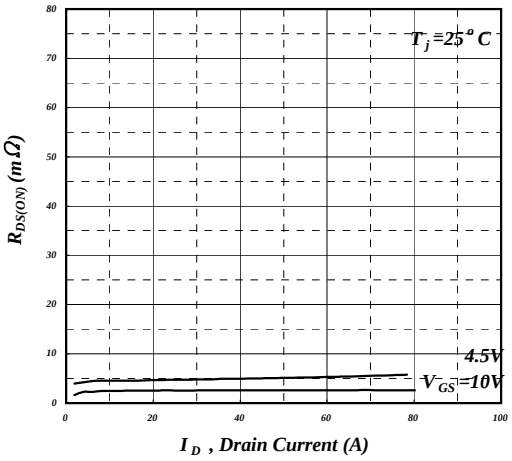


Fig 15. Typ. Drain-Source on State Resistance

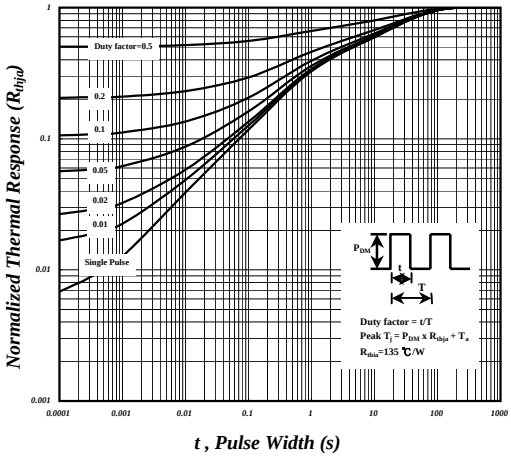
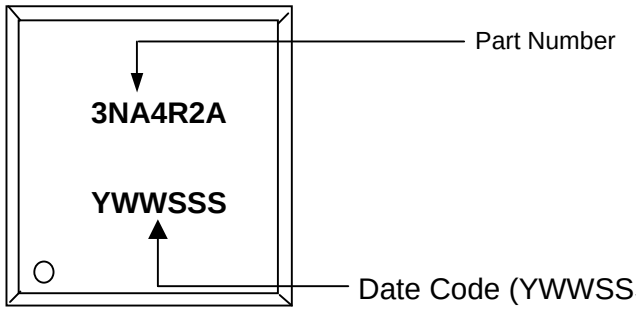
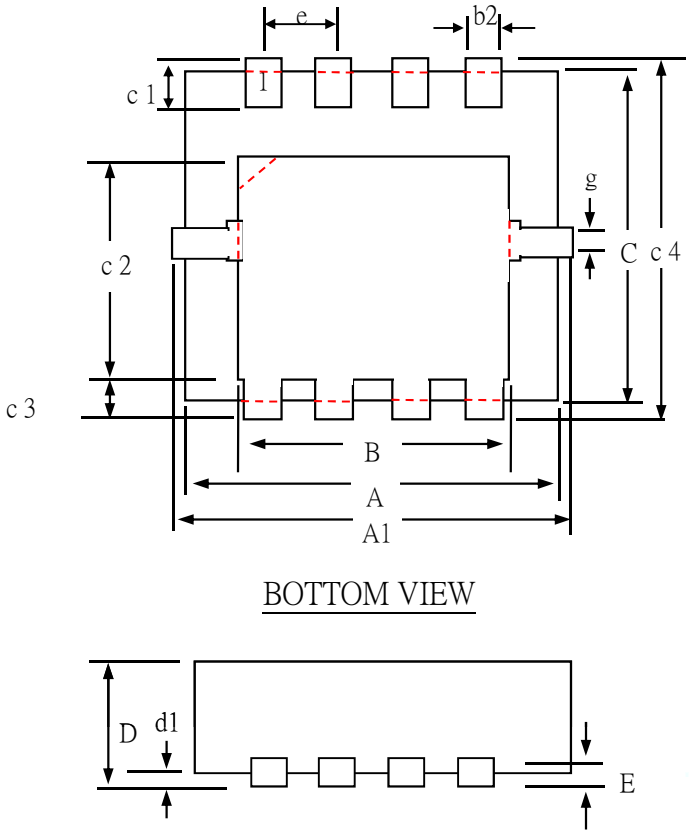


Fig 16. Effective Transient Thermal Impedance

MARKING INFORMATION



Package Outline : PMPAK 3x3



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	2.90	3.10	3.40
B	2.20	2.45	2.80
e	0.60	0.65	0.70
b2	0.20	0.30	0.40
C	2.90	3.10	3.40
c1	0.10	0.30	0.50
c2	1.20	1.70	2.20
c3	0.10	0.38	0.65
D	0.65	0.80	1.05
d1	0.00	0.10	0.20
E	0.10	0.18	0.25
A1	2.900	3.30	3.600
c4	2.900	3.30	3.600
g	0.20 (ref)		

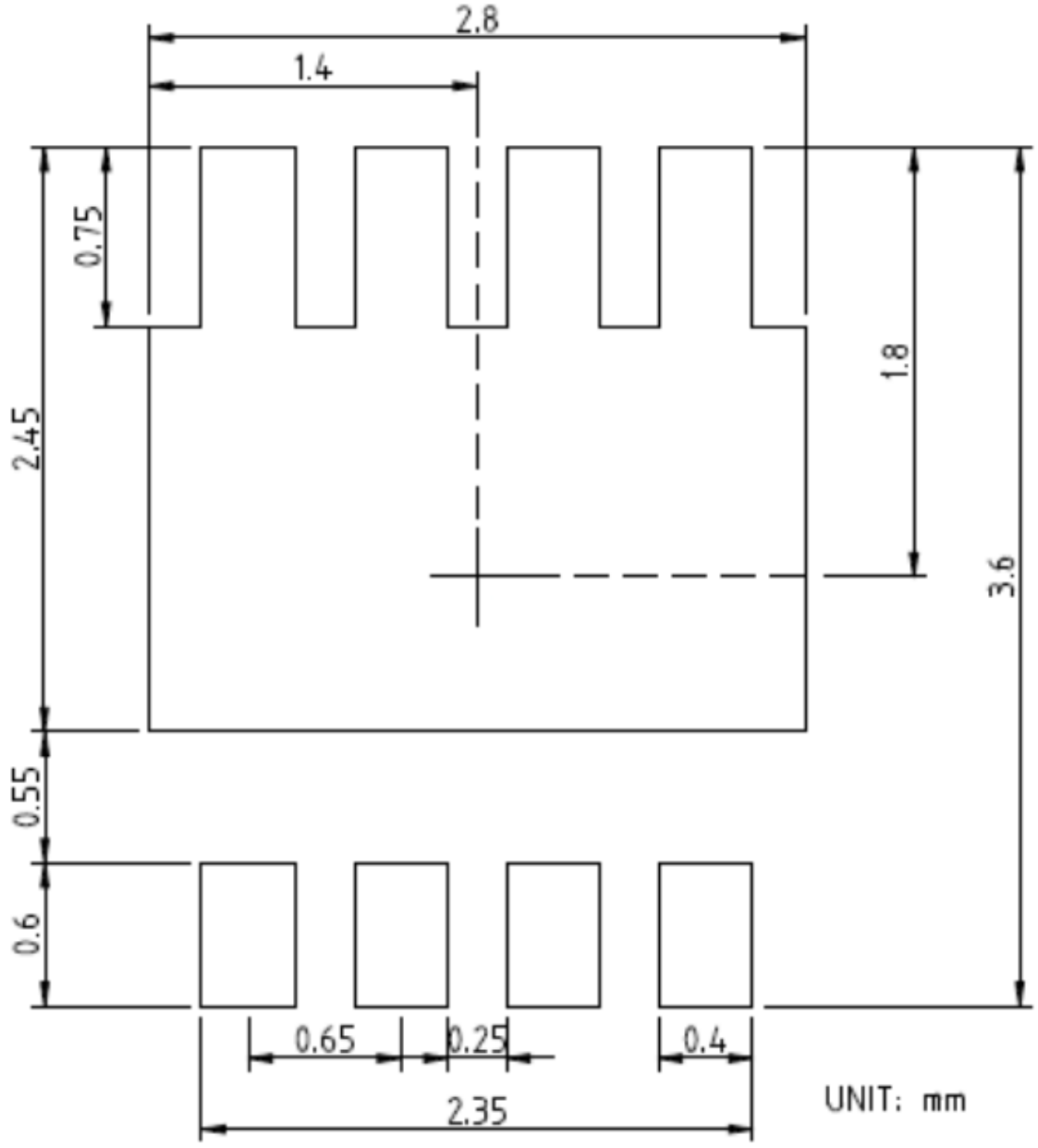
1.All Dimension Are In Millimeters.

2.Dimension Does Not Include Mold Protrusions.

3. Thermal PAD and Pin contour is for reference, it may has little difference by option.

Draw No. M1-YT8-G-v06

PMPAK3X3 FOOTPRINT：



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