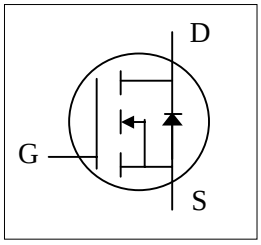
XP15NA9R3CXT

Halogen-Free Product

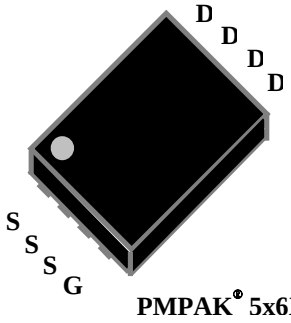
N-CHANNEL ENHANCEMENT MODE

POWER MOSFET

- **100% R_g & UIS Test**
- **Simple Drive Requirement**
- **Low On-resistance**
- **RoHS Compliant & Halogen-Free**



BV_{DSS}	150V
$R_{DS(ON)}$	9.3mΩ



PMPAK® 5x6X

Description

XP15NA9R3C 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® 5x6X package is special for DC-DC converters application and the foot print is compatible with SO-8 with backside heat sink and lower profile.

Absolute Maximum Ratings@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	150	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Drain Current, V_{GS} @ 10V	96	A
I_D@T_C=100℃	Drain Current, V_{GS} @ 10V	68	A
I_D@T_A=25℃	Drain Current, V_{GS} @ 10V[3]	16.1	A
I_D@T_A=70℃	Drain Current, V_{GS} @ 10V[3]	13.4	A
I_{DM}	Pulsed Drain Current[1]	300	A
P_D@T_C=25℃	Total Power Dissipation	214.2	W
P_D@T_A=25℃	Total Power Dissipation[3]	6	W
E_{AS}	Single Pulse Avalanche Energy[4]	288	mJ
T_{STG}	Storage Temperature Range	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	℃

Thermal Data

Symbol	Parameter	Value	Unit
Rthj-c	Maximum Thermal Resistance, Junction-case	0.7	℃/W
Rthj-a	Maximum Thermal Resistance, Junction-ambient[3]	25	℃/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	150	-	-	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V, I_D=20A	-	-	9.3	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	2	-	4	V
g_{fs}	Forward Transconductance	V_{DS}=5V, I_D=20A	-	55	-	S
I_{DSS}	Drain-Source Leakage Current	V_{DS}=120V, V_{GS}=0V	-	-	25	uA
I_{GSS}	Gate-Source Leakage	V_{GS}=±20V, V_{DS}=0V	-	-	±0.1	uA
Q_g	Total Gate Charge[5]	I_D=20A	-	68	109	nC
Q_{gs}	Gate-Source Charge[5]	V_{DS}=75V	-	17	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge[5]	V_{GS}=10V	-	22	-	nC
$t_{d(on)}$	Turn-on Delay Time[5]	V_{DS}=75V	-	18	-	ns
t_r	Rise Time[5]	I_D=20A	-	46	-	ns
$t_{d(off)}$	Turn-off Delay Time[5]	R_G=1.6Ω	-	37	-	ns
t_f	Fall Time[5]	V_{GS}=10V	-	9	-	ns
C_{iss}	Input Capacitance[5]	V_{GS}=0V	-	3300	5280	pF
C_{oss}	Output Capacitance[5]	V_{DS}=75V	-	290	-	pF
C_{rss}	Reverse Transfer Capacitance[5]	f=1.0MHz	-	25	-	pF
R_g	Gate Resistance	f=1.0MHz	-	0.7	1.4	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[2]	I_S=20A, V_{GS}=0V	-	-	1.3	V
t_{rr}	Reverse Recovery Time[5]	I_S=20A, V_{GS}=0V,	-	71	-	ns
Q_{rr}	Reverse Recovery Charge[5]	dI/dt=100A/μs	-	210	-	nC

Notes:

1.Pulse width limited by Max. junction temperature.

2.Pulse test

3.Surface mounted on 1 in^2 copper pad of FR4 board, t ≤10sec; 60°C/W at steady state.

4.Starting T_j=25°C , V_{DD}=50V , L=1mH , R_G=25Ω, V_{GS}=10V

5.Guaranteed by design.

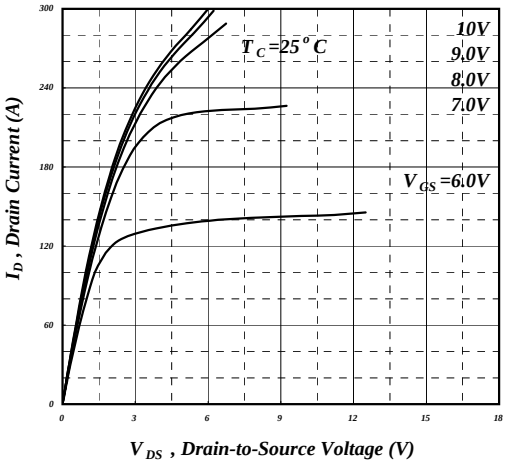


Fig 1. Typical Output Characteristics

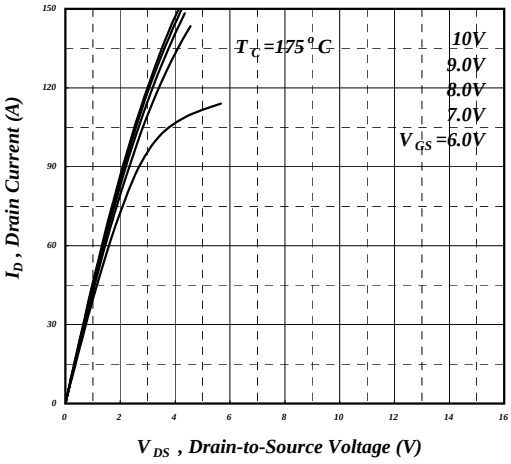


Fig 2. Typical Output Characteristics

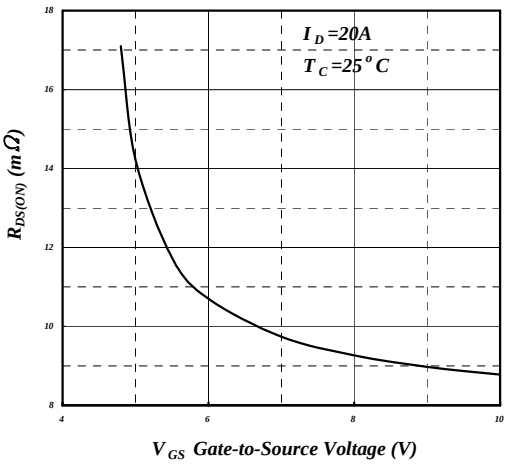


Fig 3. On-Resistance v.s. Gate Voltage

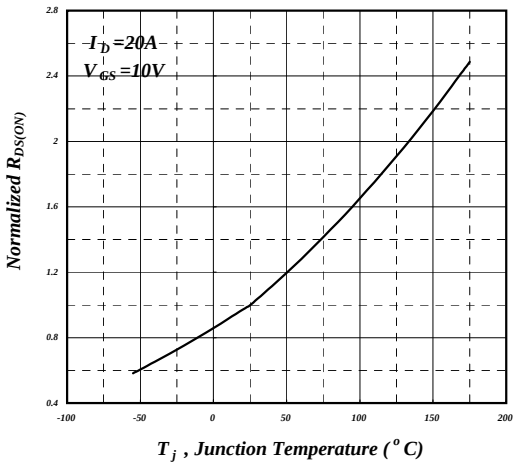


Fig 4. Normalized On-Resistance v.s. Junction Temperature

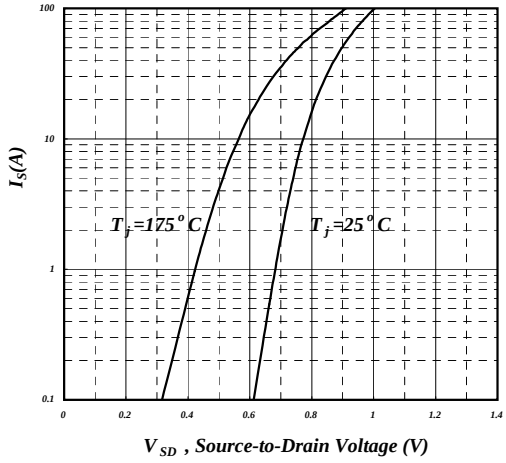


Fig 5. Forward Characteristic of Reverse Diode

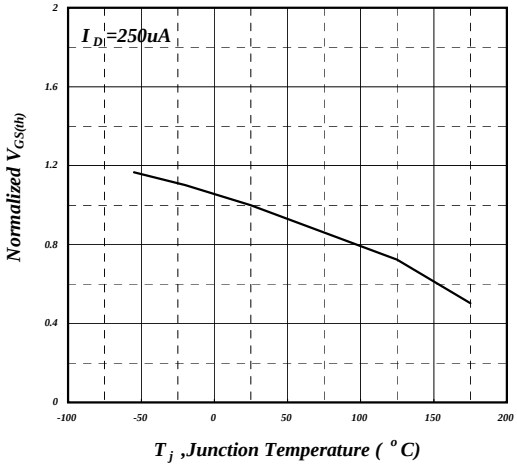


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

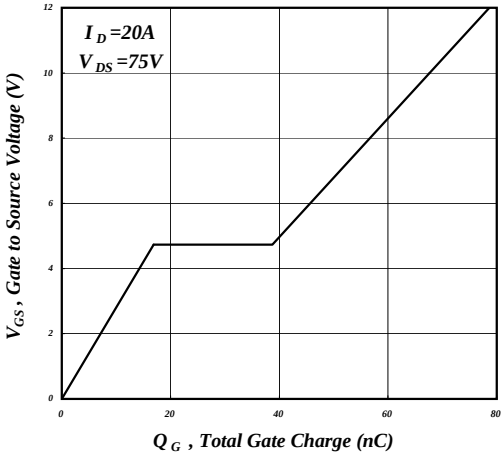


Fig 7. Gate Charge Characteristics

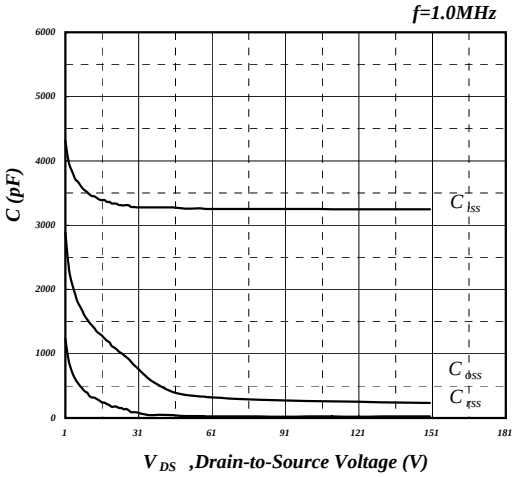


Fig 8. Typical Capacitance Characteristics

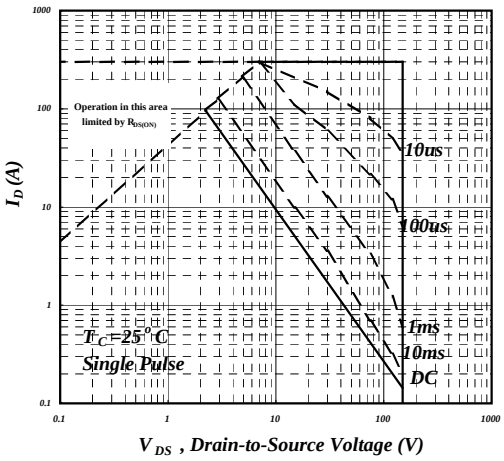


Fig 9. Maximum Safe Operating Area

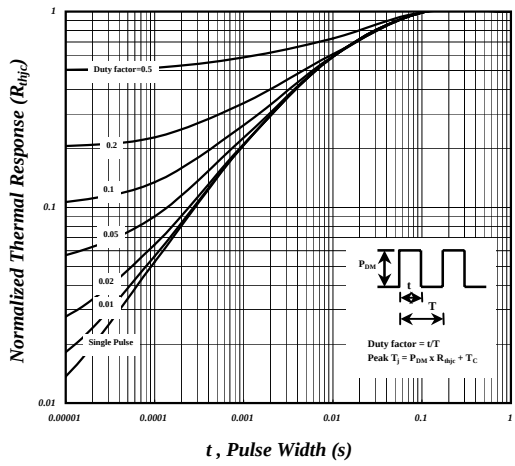


Fig 10. Effective Transient Thermal Impedance

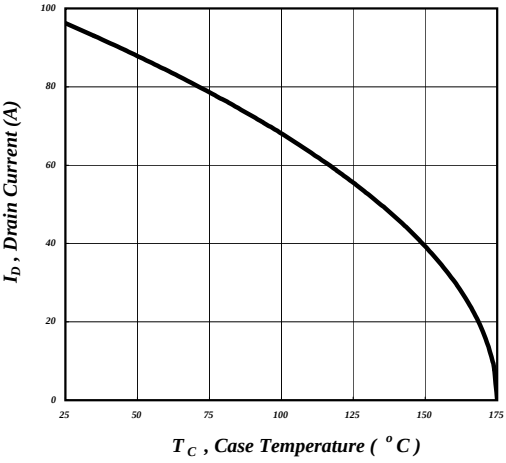


Fig 11. Drain Current v.s. Case Temperature

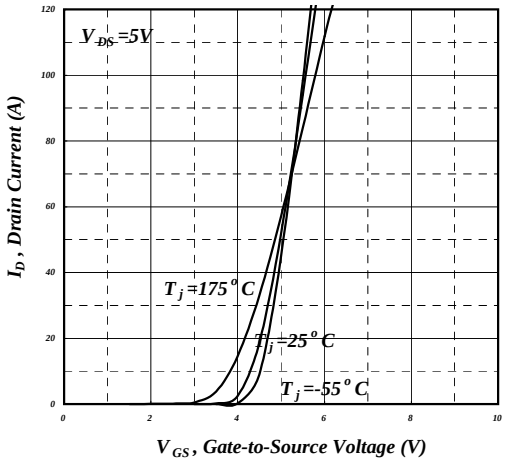


Fig 12. Transfer Characteristics

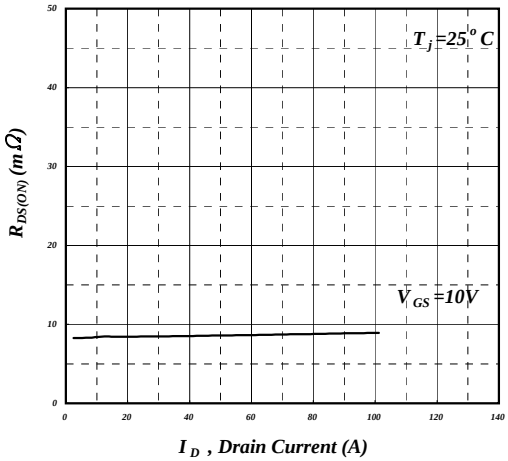


Fig 13. Typ. Drain-Source on State Resistance

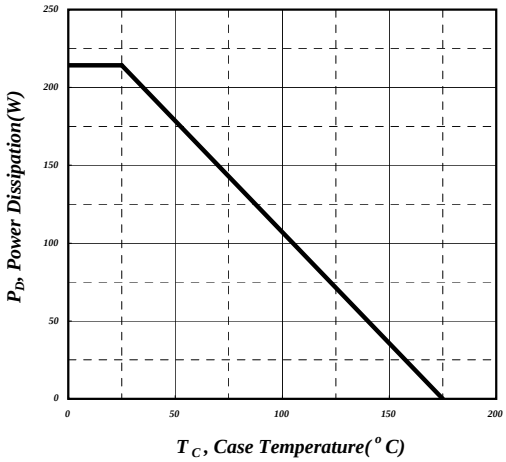


Fig 14. Total Power Dissipation

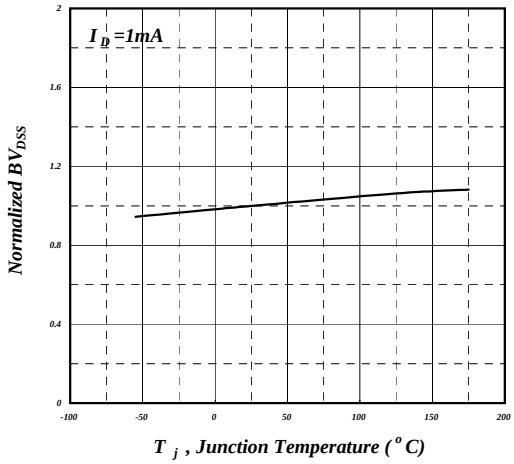
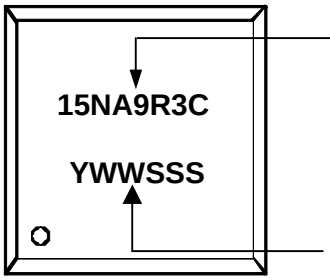


Fig 15. Normalized BV_{DSS} v.s. Junction Temperature

MARKING INFORMATION



Part Number

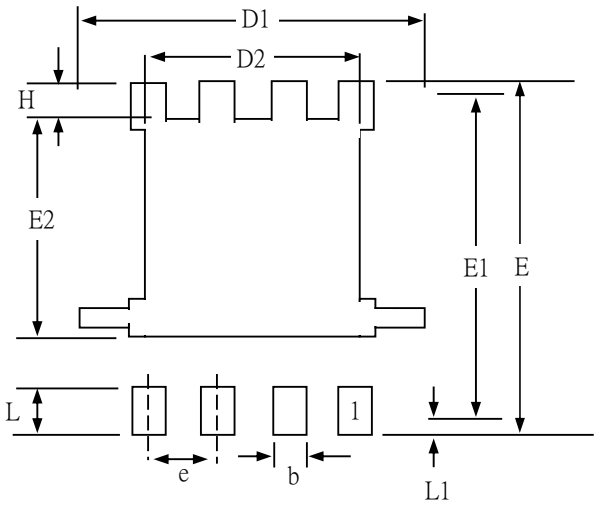
Date Code (YWWSSS)

Y：Last Digit Of The Year

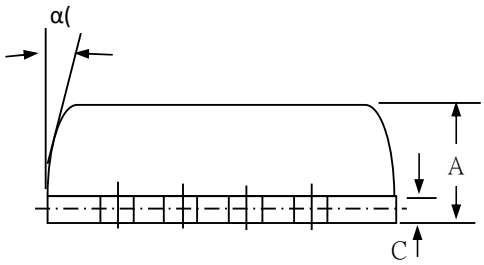
WW：Week

SSS：Sequence

Package Outline : PMPAK 5x6X



BACKSIDE VIEW



SYMBOLS	Millimeters		
	MIN	NOM	MAX
A	0.95	1.10	1.20
b	0.30	0.40	0.51
C	0.15	0.25	0.35
D1	4.90	5.20	5.40
D2	3.70	4.10	4.25
E	5.95	6.15	6.35
E1 (Ref.)	5.66	5.86	6.10
E2 (Ref.)	3.52	3.72	3.92
e	1.27BSC		
H	0.40	0.50	0.71
L	0.30	0.60	0.71
L1	0.03	-	0.22
α(Ref.)	0 ◦	-	12 ◦

1.All dimension are in millimeters.

2.Dimension does not include burrs and mold flash/protrusions.

3.The outline schematic is not to scale and slightly different from the actual product appearance.

Draw No. M1-XT-8-EFTI-G-v02

PMPAK 5x6X FOOTPRINT：