XP3N5R0AYT

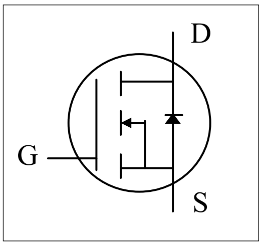
Halogen-Free Product

XSEMI

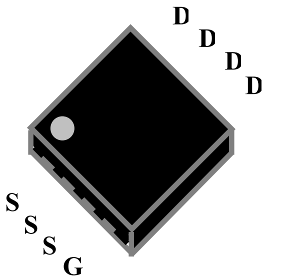
N-CHANNEL ENHANCEMENT MODE

POWER MOSFET

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



BV_{DSS}	30V
$R_{DS(ON)}$	5mΩ



PMPAK® 3 x 3

Description

XP3N5R0A series are innovative 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]	63.5	A
I_D@T_A=25℃	Drain Current, V_{GS} @ 10V[3]	20	A
I_D@T_A=70℃	Drain Current, V_{GS} @ 10V[3]	16	A
I_{DM}	Pulsed Drain Current[1]	120	A
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	-	-	5	mΩ
		V_{GS}=4.5V, I_D=12A	-	-	9	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	-	58	-	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(10V)	Total Gate Charge	I_D=19A	-	40	64	nC
Q_g(4.5V)	Total Gate Charge	V_{DS}=15V		21	33.6	nC
Q_{gs}	Gate-Source Charge		-	7	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge		-	10	-	nC
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=15V	-	11	-	ns
t_r	Rise Time	I_D=19A	-	56	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=1.6Ω	-	28	-	ns
t_f	Fall Time	V_{GS}=10V	-	8	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	1750	2800	pF
C_{oss}	Output Capacitance	V_{DS}=15V	-	300	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	250	-	pF
R_g	Gate Resistance	f=1.0MHz	-	1.6	3.2	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	I_S=20A, V_{GS}=0V,	-	12	-	ns
Q_{rr}	Reverse Recovery Charge	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.Maximum current limited by package.

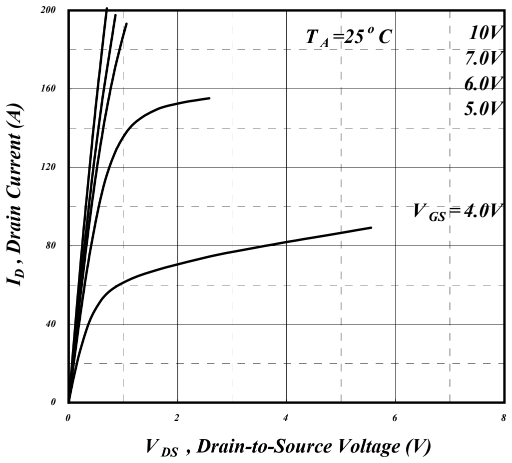


Fig 1. Typical Output Characteristics

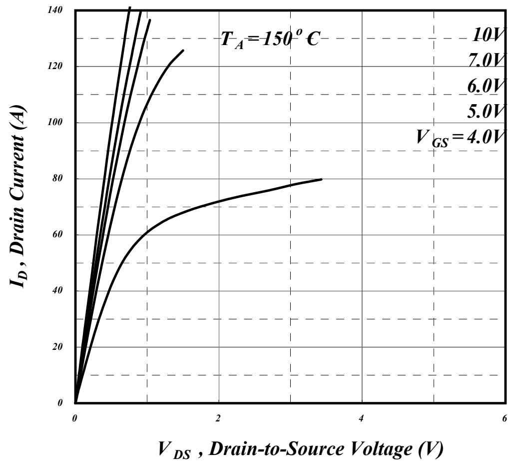


Fig 2. Typical Output Characteristics

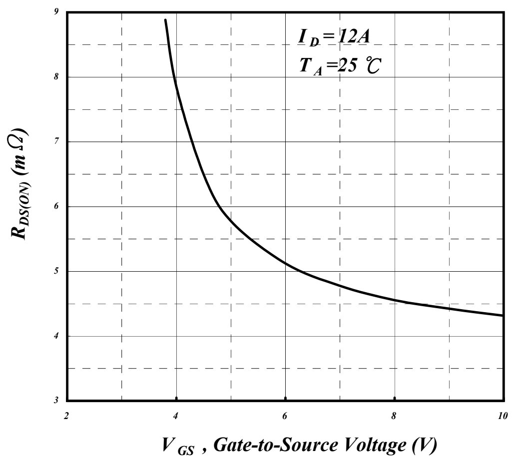


Fig 3. On-Resistance v.s. Gate Voltage

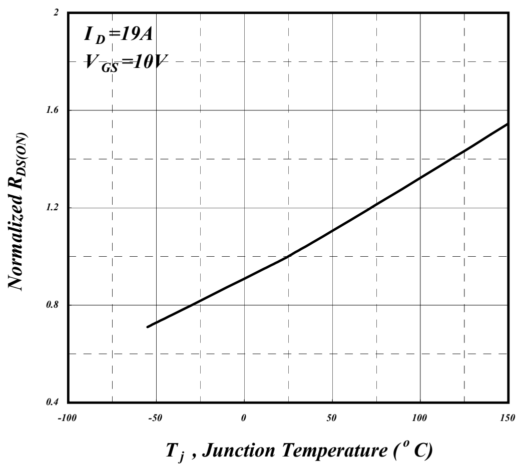


Fig 4. Normalized On-Resistance v.s. Junction Temperature

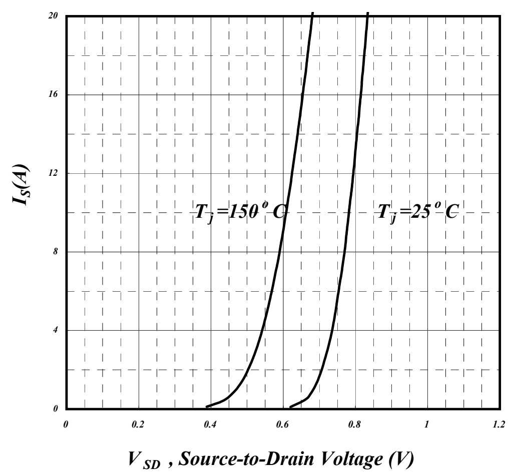


Fig 5. Forward Characteristic of Reverse Diode

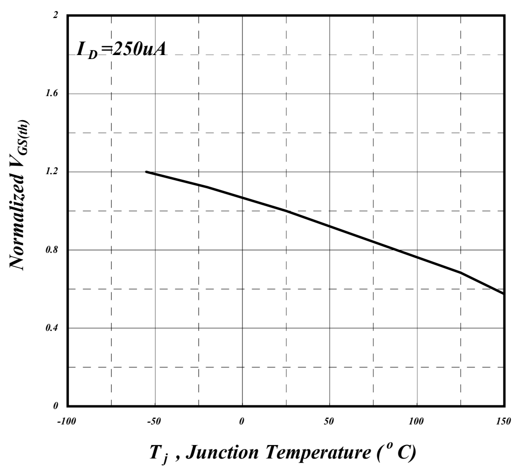


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

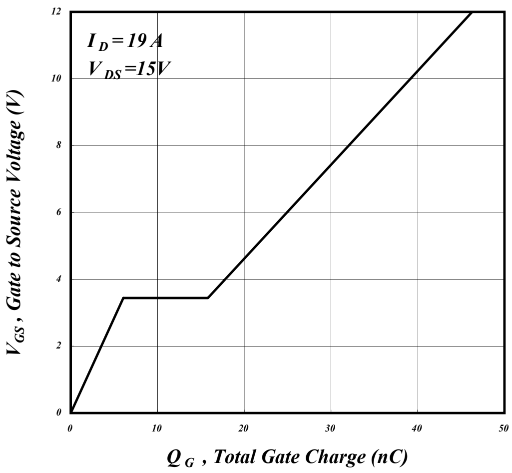


Fig 7. Gate Charge Characteristics

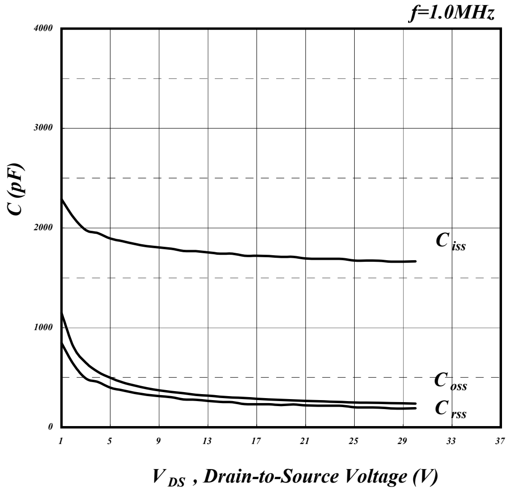


Fig 8. Typical Capacitance Characteristics

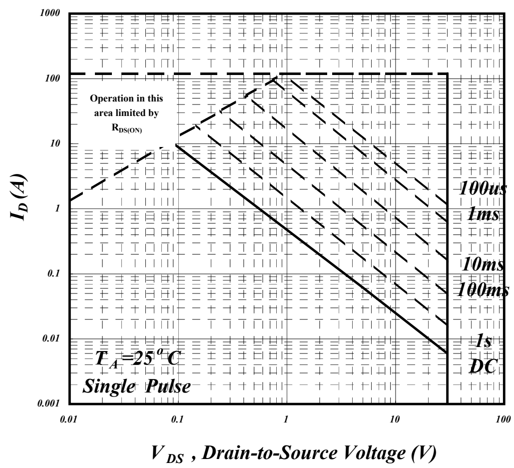


Fig 9. Maximum Safe Operating Area

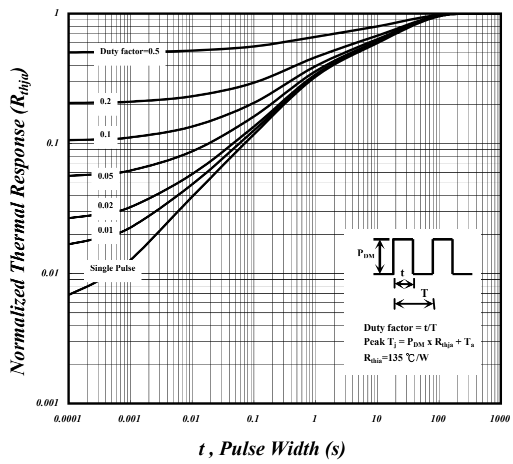


Fig 10. Effective Transient Thermal Impedance

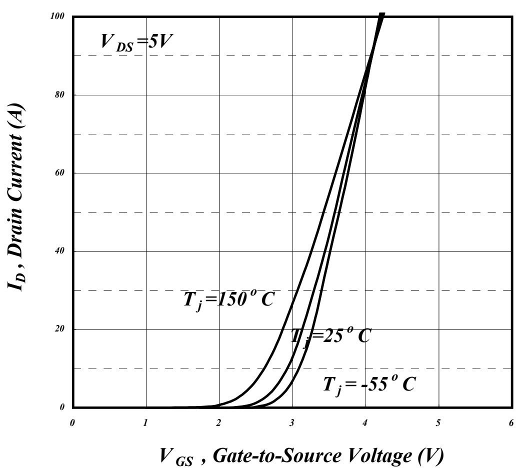


Fig 11. Transfer Characteristics

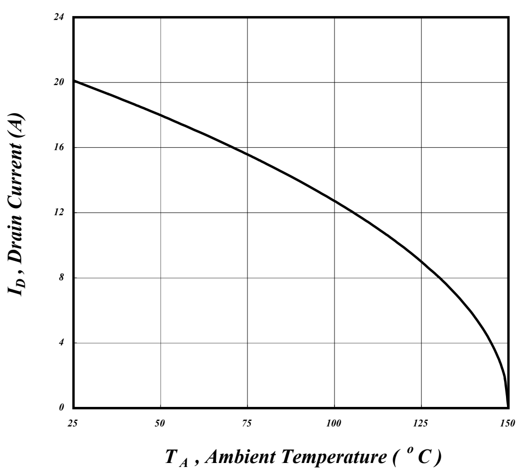


Fig 12. Drain Current v.s. Ambient Temperature

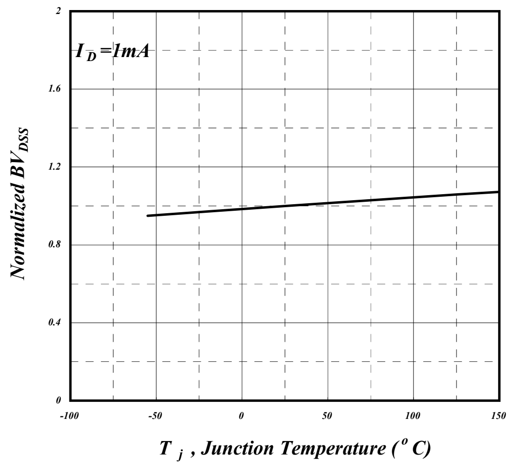


Fig 13. Normalized BV_{DSS} v.s. Junction

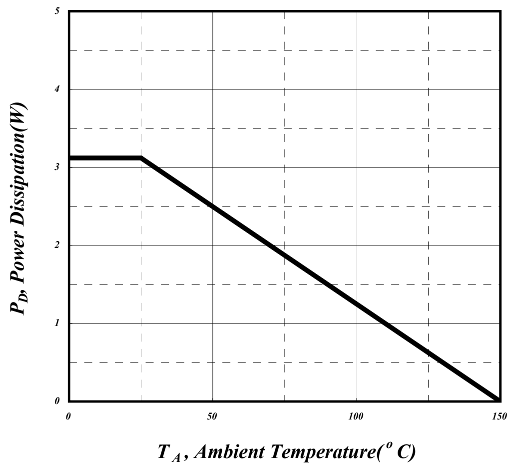


Fig 14. Total Power Dissipation

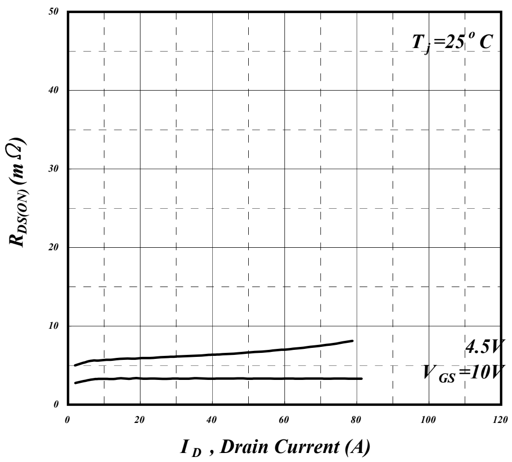


Fig 15. Typ. Drain-Source on State Resistance