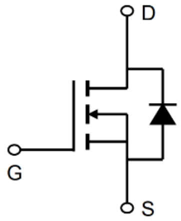
AP9N90MP

900V N-Channel Enhancement Mode MOSFET

Description

The AP9N90MP is silicon N-channel Enhanced VDMOSFETs, is obtained by the self-aligned planar Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor can be used in various power switching circuit for system miniaturization and higher efficiency.



General Features

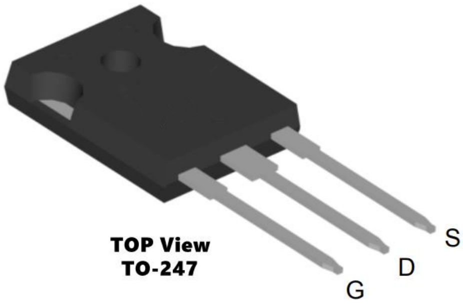
V_{DS} = 900V （Type：1000V） I_D =9A

$R_{DS(ON)}$ < 1000mΩ @ V_{GS}=10V （Type：920mΩ）

Application

Uninterruptible Power Supply(UPS)

Power Factor Correction (PFC)



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP9N90MP	TO-247-3L	AP9N90MP XXX YYYY	1000

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

Symbol	Parameter	Value	Units
VDSS	Drain-Source Voltage	900	V
VGS	Gate-Source Voltage	± 30	V
I_D@T_C=25℃	Drain Current, V_{GS} @ 10V	9	A
I_D@T_C=100℃	Drain Current, V_{GS} @ 10V	5.8	A
IDM	Drain Current - Pulsed	36	A
EAS	Single Pulsed Avalanche Energy	576	mJ
IAR	Avalanche Current	9	A
EAR	Repetitive Avalanche Energy	53	mJ
dv/dt	Peak Diode Recovery dv/dt	5	V/ns
P_D	Power Dissipation	31.2	W
Tj ,Tstg	Operating and Storage Temperature Range	-55 to +150	oC
RθJC	Thermal Resistance, Junction-to-Case	4.0	°C/W
RθJA	Thermal Resistance, Junction-to-Ambient	48.0	°C/W

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Electrical Characteristics (T_J=25℃, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA	900	1000		V
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage TemperatureCoefficient	I_D=250μA, Referenced to25°C		0.74		V/°C
IDSS	Zero Gate Voltage Drain Current	V_{DS} = 900 V, V_{GS} = 0 V			1	μA
IDSS	Zero Gate Voltage Drain Current	V_{DS} = 720 V, TC = 125°C			10	μA
IGSSF	Gate-Body Leakage Current, Forward	V_{GS} = 30 V, V_{DS} = 0 V			100	nA
IGSSR	Gate-Body Leakage Current, Reverse	V_{GS} = -30 V, V_{DS} = 0 V			-100	nA
VGS(TH)	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D =250 uA	2.0		4.0	V
RDS(On)	Drain-Source On-state Resistance	V_{GS}=10 V, I_D =4.5 A,		975	1200	mΩ
gFS	Forward Transconductance	V_{DS} = 40 V, I_D = 4.5 A		11		S
C_{iss}	Input Capacitance	V_{DS}=25 V, V_{GS}=0V, f=1.0 MHz		2752		pF
C_{oss}	Output Capacitance			206		pF
C_{rss}	Reverse Transfer Capacitance			36		pF
td(on)	Turn On Delay Time	V_{DD}=450 V, ID=9A, R_G=25Ω		33		ns
t_r	Rising Time			57		ns
td(off)	Turn Off Delay Time			270		ns
t_f	Fall Time			91		ns
Q_g	Total Gate Charge	V_{DS}=450V, ID=9A, V_{GS}=10V		80		nC
Q_{gs}	Gate-Source Charge			12		nC
Q_{gd}	Gate-Drain Charge			38		nC
ISM	Maximum Pulsed Drain-Source Diode Forward Current				36	A
V_{SD}	Diode Forward Voltage	V_{GS}= 0 V, I_S = 9 A			1.4	V
trr	Reverse Recovery Time	V_{GS}=0V, I_S=9A, dI_F/dt=100 A/μs Note4)		533		ns
Q_{rr}	Reverse Recovery Charge			6.2		μC

Note :

1、The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.

2、The EAS data shows Max. rating . L=4.1Mh IAS=18A, VDD=50V, RG=25Ω, Starting TJ = 25 ºC

3、The test condition is Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

4、The power dissipation is limited by 150℃ junction temperature

5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

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Typical Characteristics

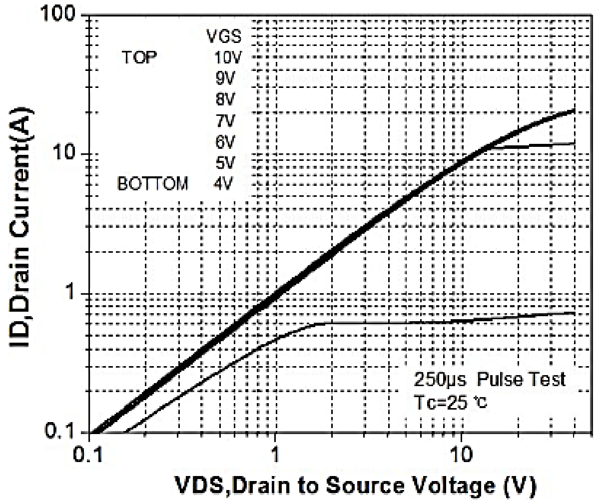


Figure 1. On-Region Characteristics

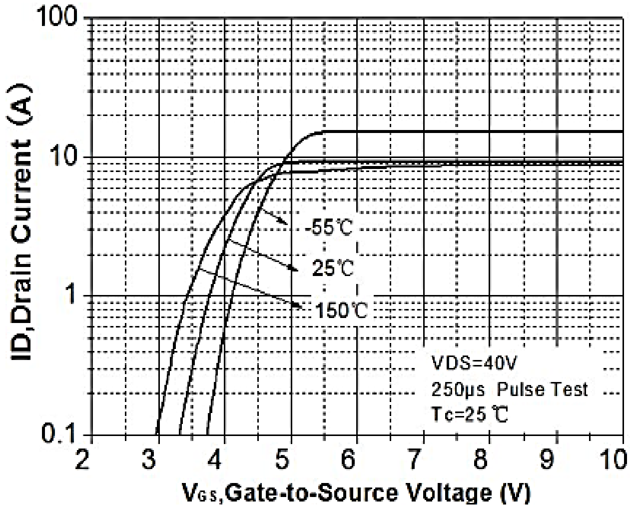


Figure 2. Transfer Characteristics

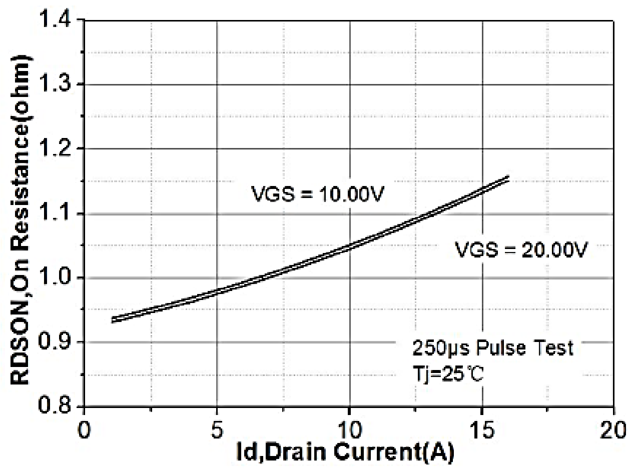


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

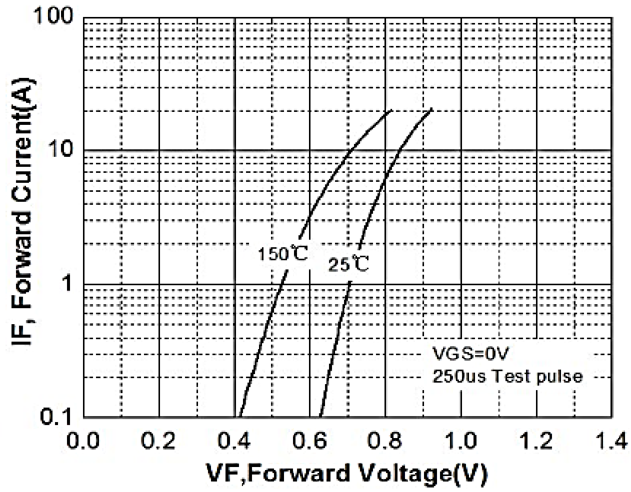


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

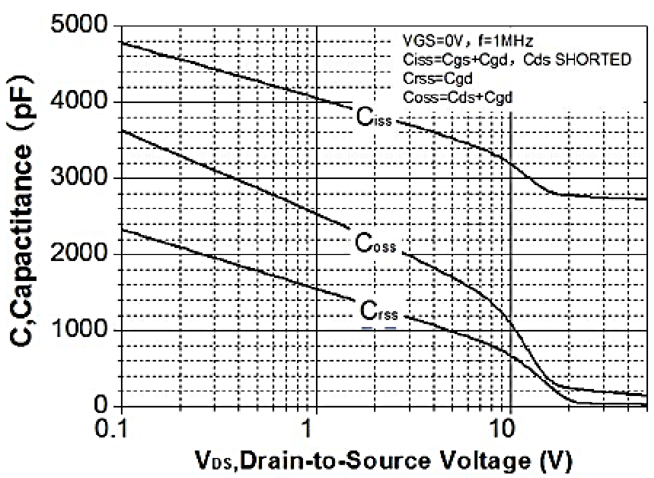


Figure 5. Capacitance Characteristics

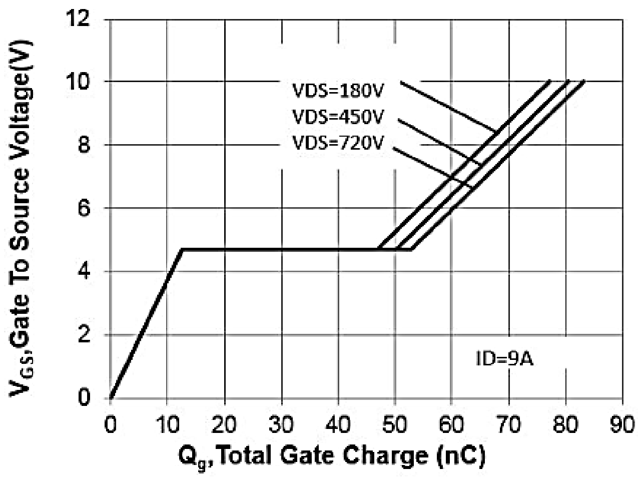


Figure 6. Gate Charge Characteristics

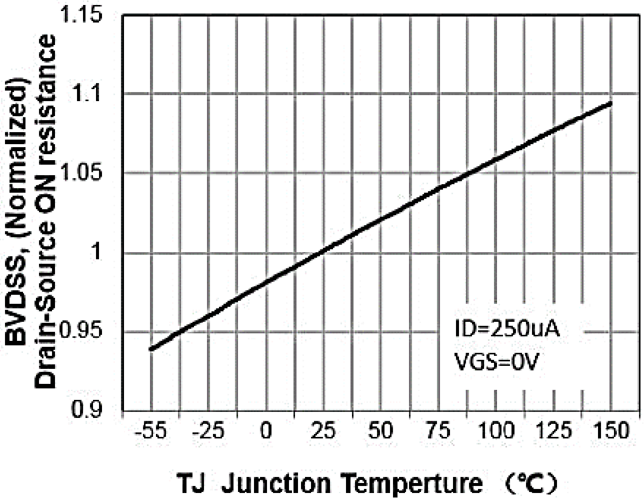


Figure 7. Breakdown Voltage Variation vs Temperature

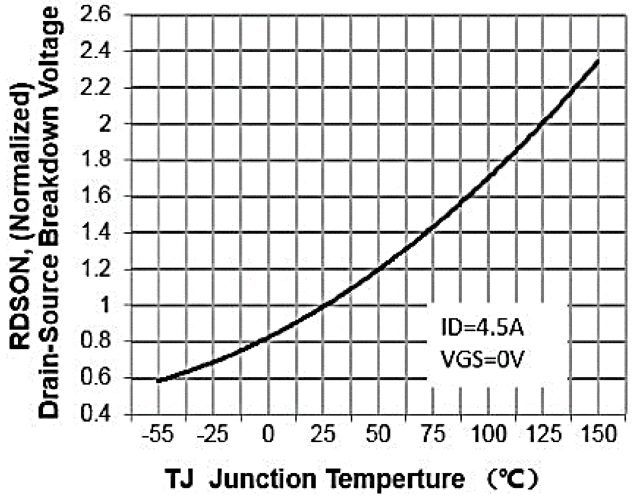


Figure 8. On-Resistance Variation vs Temperature

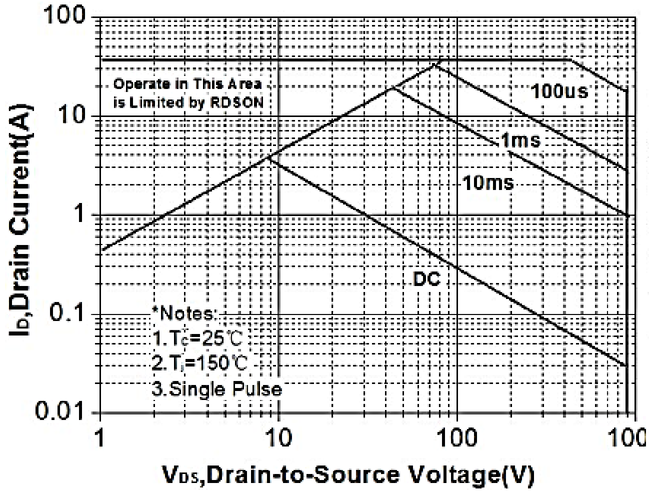


Figure 9. Maximum Safe Operating Area

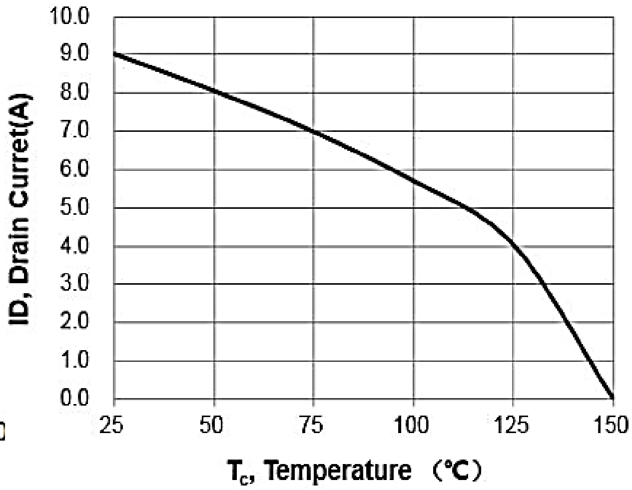


Figure 10. Maximum Drain Current vs Case Temperature

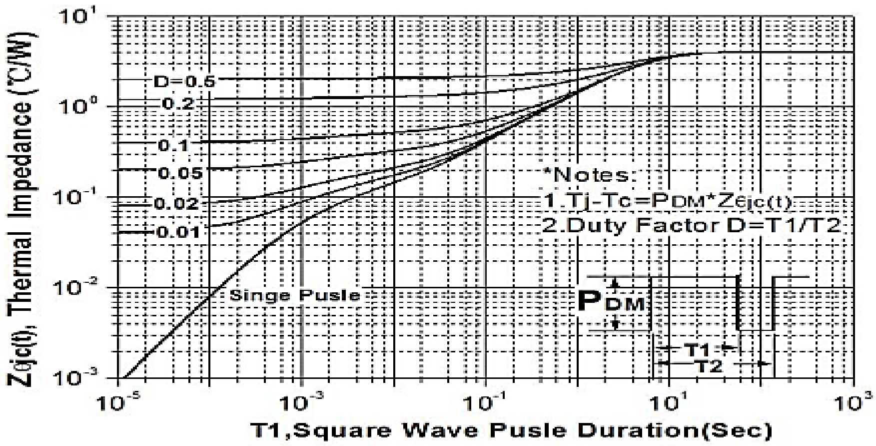
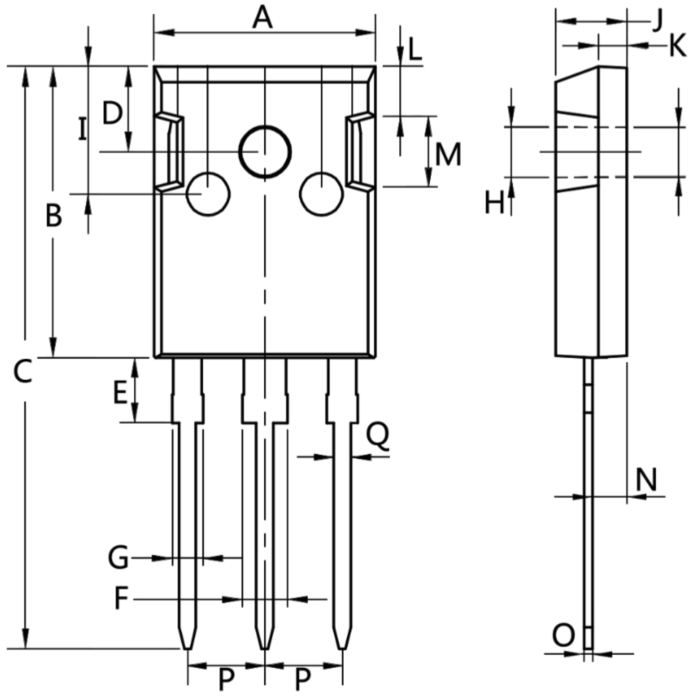


Figure 11. Transient Thermal Response Curve

Package Mechanical Data-TO-247-3L



Dim.	Min.	Max.
A	15.0	16. 0
B	20.0	21.0
C	41.0	42.0
D	5.0	6.0
E	4.0	5.0
F	2.5	3.5
G	1.75	2.5
H	3.0	3.5
I	8.0	10.0
J	4.9	5.1
K	1.9	2.1
L	3.5	4.0
M	4.75	5.25
N	2.0	3.0
O	0.55	0.75
P	Typ 5.08	
Q	1.2	1.3