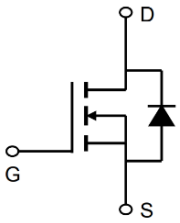
AP38N50MP

500V N-Channel Enhancement Mode MOSFET

Description

The AP38N50MP 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

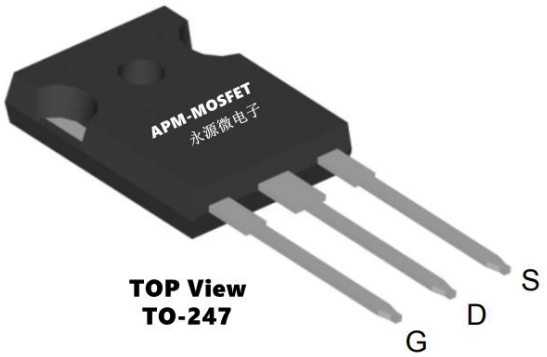
V_{DS} = 500V I_D =38A

$R_{DS(ON)}$ < 160mΩ @ V_{GS}=10V （**Type：130mΩ**）

Application

Uninterruptible Power Supply(UPS)

Power Factor Correction (PFC)



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP34N50MP	TO-247-3L	AP34N50MP XXX YYYY	360

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

Symbol	Parameter	Value	Unit
VDSS	Drain-Source Voltage (V_{GS} = 0V)	500	V
ID@TC=25°C	Continuous Drain Current	30	A
ID@TC=100°C	Continuous Drain Current	38	A
IDM	Pulsed Drain Current (note1)	120	A
VGS	Gate-Source Voltage	±30	V
E_{AS}	Single Pulse Avalanche Energy (note2)	3391	mJ
IAR	Avalanche Current (note1)	30	A
P_D	Power Dissipation (T_C = 25ºC)	695	W
TJ, Tstg	Operating Junction and Storage Temperature Range	-55~+150	ºC
RthJC	Thermal Resistance, Junction-to-Case	0.3	ºC/W
RthJA	Thermal Resistance, Junction-to-Ambient	62.5	ºC/W

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V(BR)DSS	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	500	550	--	V
IDSS	Zero Gate Voltage Drain Current	V_{DS} = 500V, V_{GS} = 0V, T_J = 25ºC	--	--	1	μA
IGSS	Gate-Source Leakage	V_{GS} = ±30V	--	--	±100	nA
VGS(th)	Gate-Source Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA	2.0	3.2	5.0	V
RDS(on)	Drain-Source On-Resistance (Note3)	V_{GS} = 10V, I_D = 18A	--	130	180	mΩ
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS}=25V, f =1.0MHz	--	3275	--	pF
C_{oss}	Output Capacitance		--	390	--	
C_{rss}	Reverse Transfer Capacitance		--	7.8	--	
Q_g	Total Gate Charge	V_{DS}=400V, ID=30A, V_{GS}=10V	--	60	--	nC
Q_{gs}	Gate-Source Charge		--	17	--	
Q_{gd}	Gate-Drain Charge		--	21	--	
td(on)	Turn-on Delay Time	V_{DD}=250V, ID =30A, R_G = 25 Ω	--	23	--	ns
t_r	Turn-on Rise Time		--	57	--	
td(off)	Turn-off Delay Time		--	40	--	
t_f	Turn-off Fall Time		--	9	--	
I_S	Continuous Body Diode Current	T_C = 25 ºC	--	--	38	A
ISM	Pulsed Diode Forward Current		--	--	136	
V_{SD}	Body Diode Voltage	T_J = 25ºC, I_{SD} = 30A, V_{GS} = 0V	--	--	1.4	V
trr	Reverse Recovery Time	V_{GS} = 0V,I_S = 30A, di_F/dt =100A /μs	--	240	--	ns
Q_{rr}	Reverse Recovery Charge		--	1.0	--	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=0.5 IAS=30A, 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.

Typical Characteristics

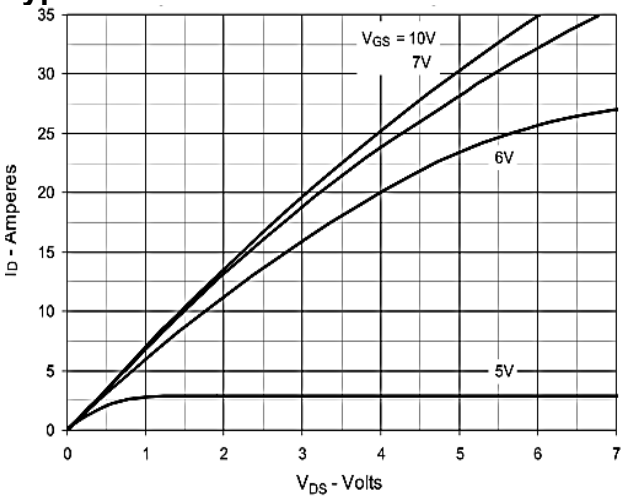


Figure 1. Output Characteristics

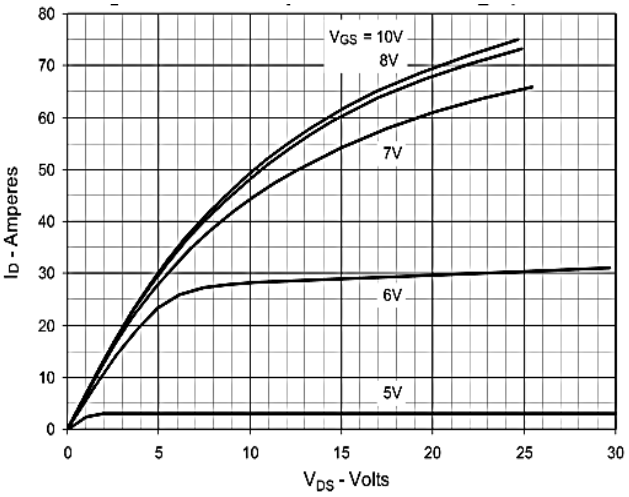


Figure 2. Extended Output Characteristics

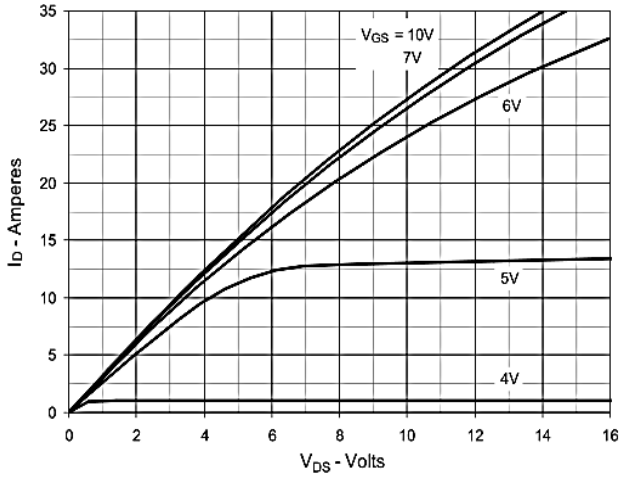


Figure 3. Output Characteristics

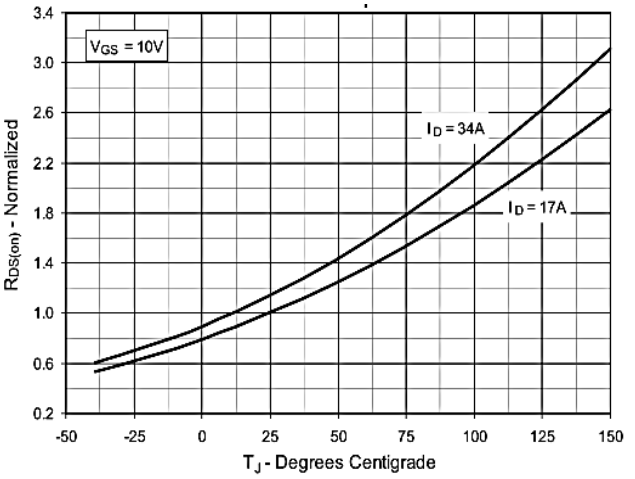


Figure 4. RDS(on) Normalized to ID=17A Value vs. Junction Temperature

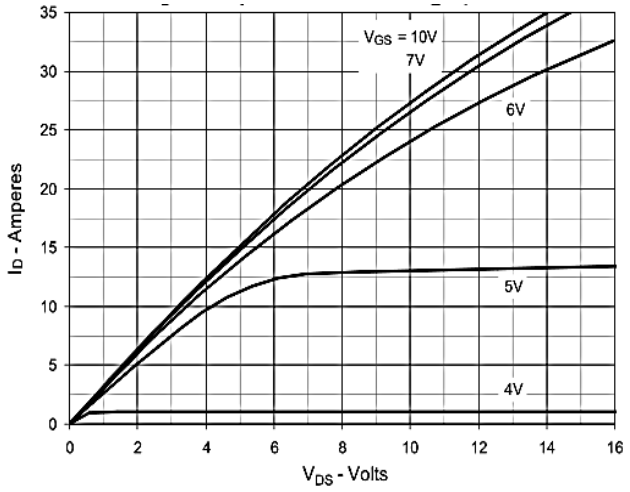


Figure 5. RDS(on) Normalized to I D = 17A Value vs. Current

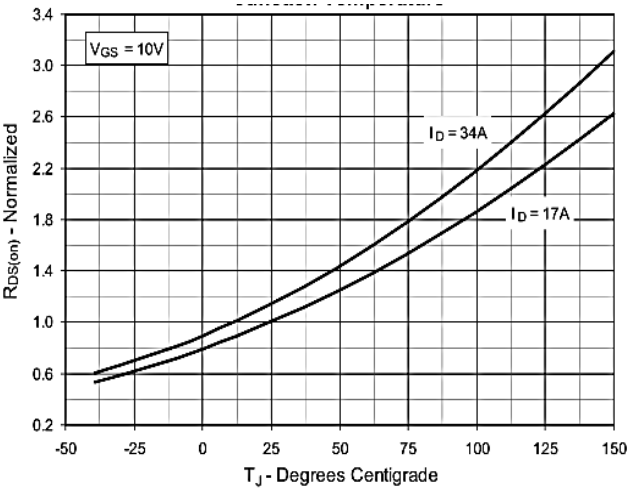


Figure 6. Maximum Drain Current vs. Case Drain Temperature

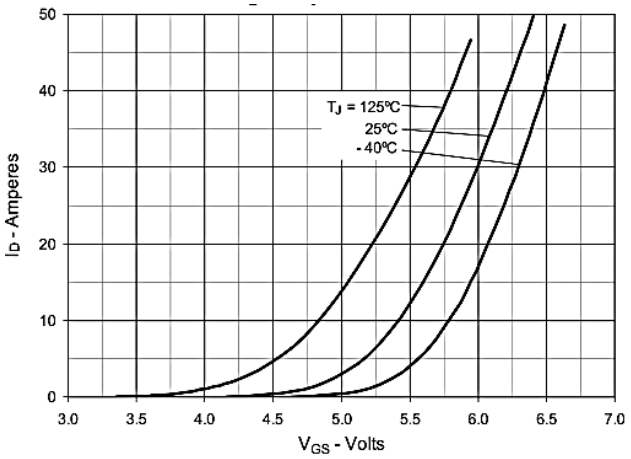


Figure 7. Input Admittance

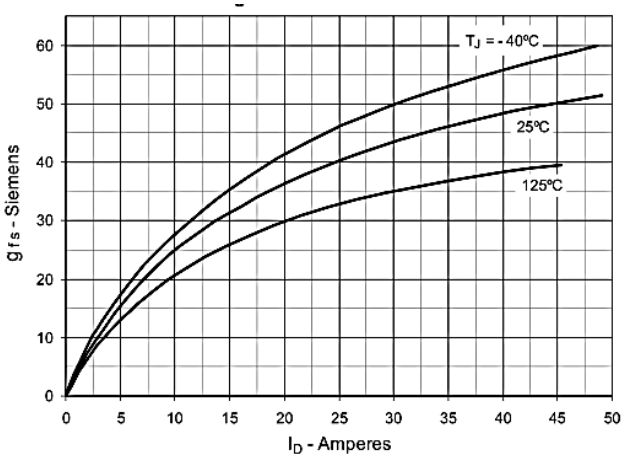


Figure8. Transconductance

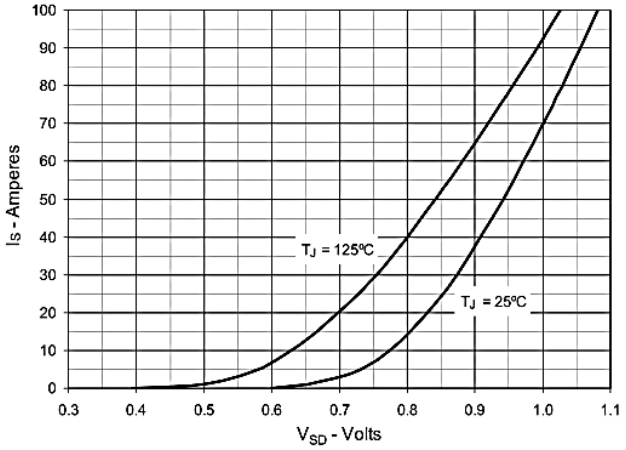


Figure 9. Forward Voltage Drop of Intrinsic Diode

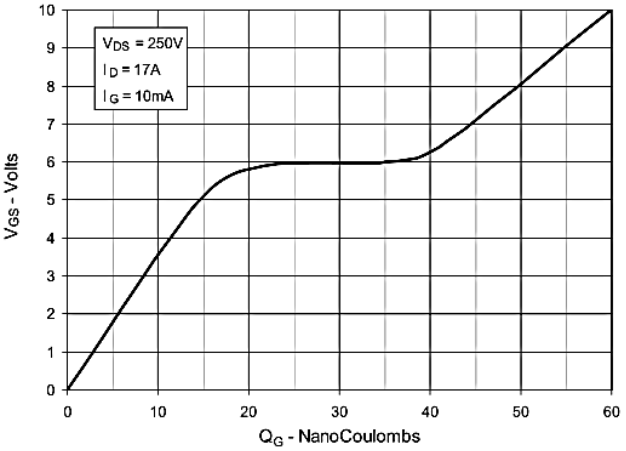


Figure 10. Gate Charge

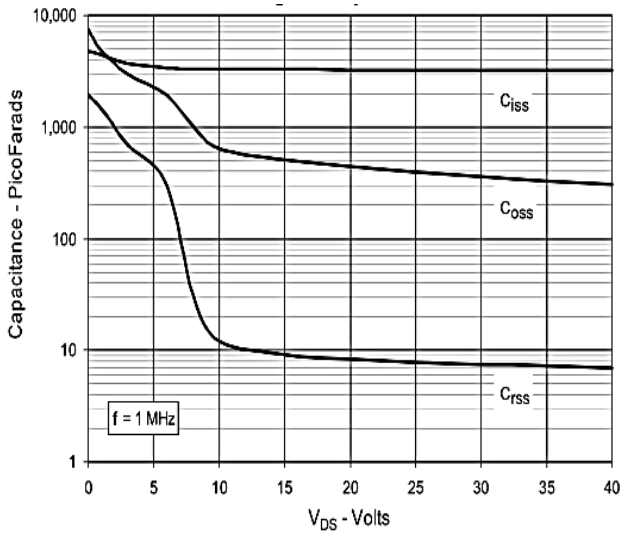


Figure 11 Capacitance

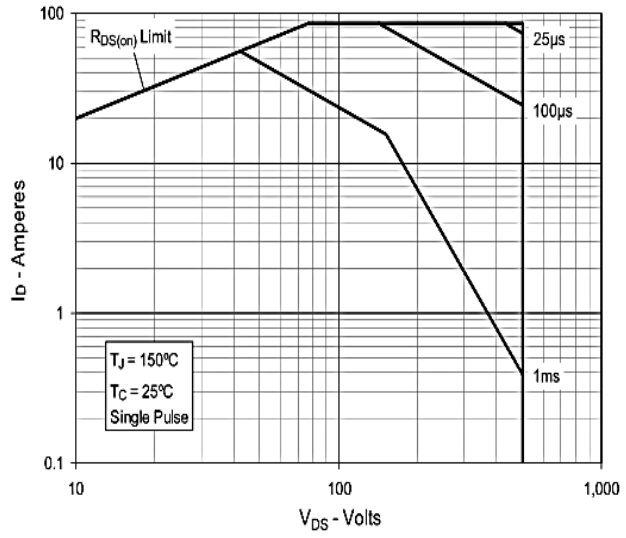


Figure 12. Forward-Bias Safe Operating Area

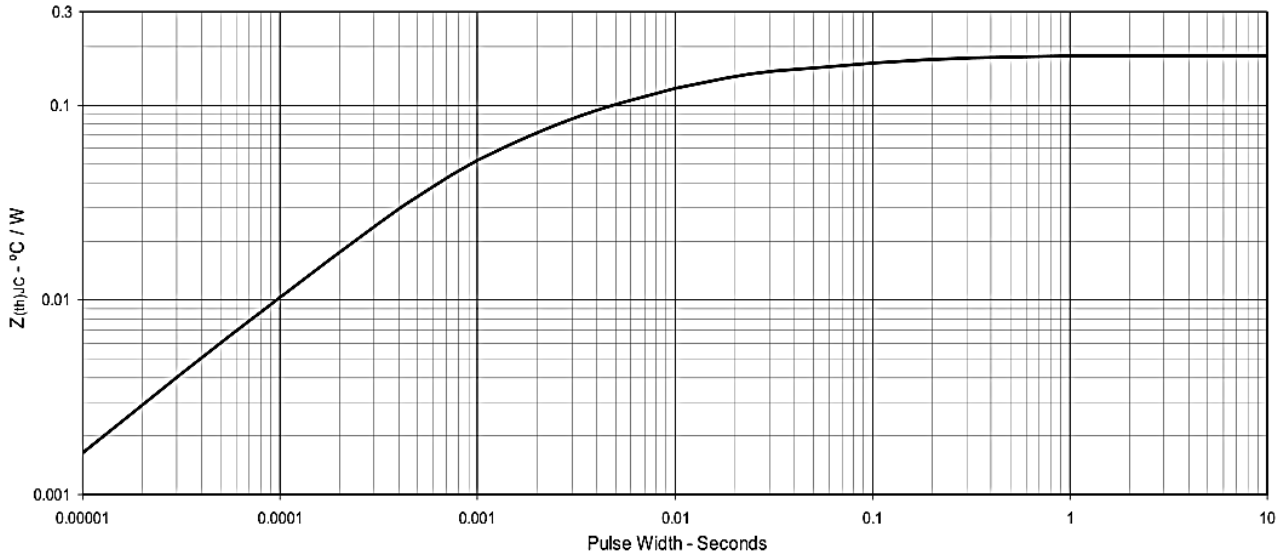
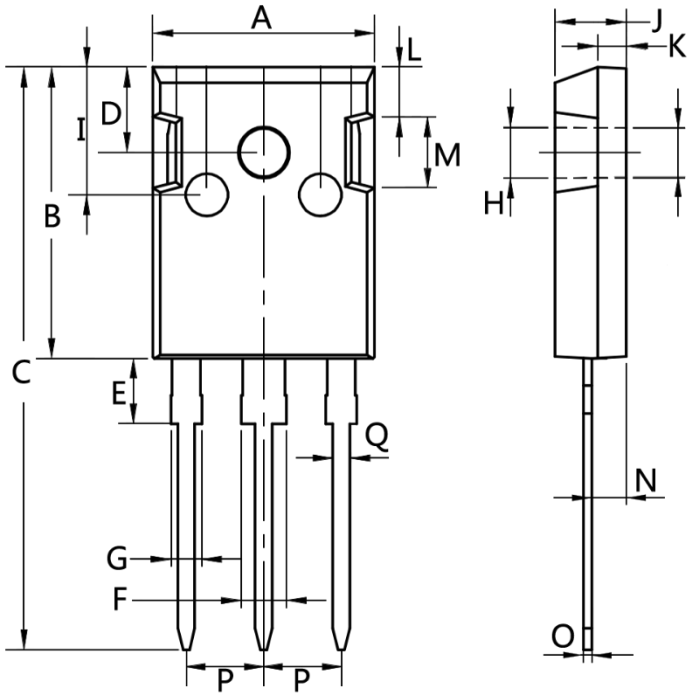


Figure 13, Maximum Transient Thermal Impedance

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

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Edition	Date	Change
REV1.0	2023/1/31	Initial release