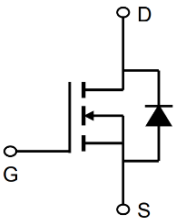
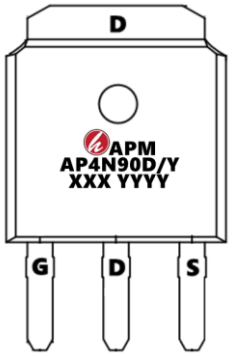
AP4N90D/Y

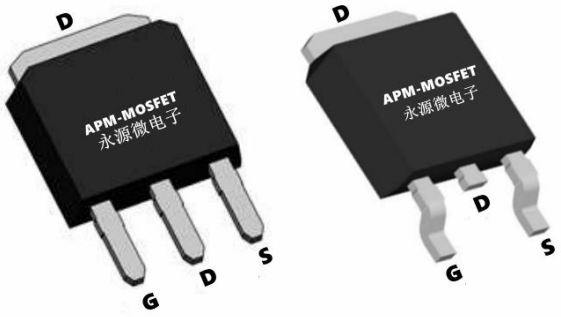
900V N-Channel Enhancement Mode MOSFET

Description

The AP4N90D/Y 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 I_D =4.0A

$R_{DS(ON)}$ < 3500mΩ @ V_{GS}=10V （**Type：3000mΩ**）

Application

Uninterruptible Power Supply(UPS)

Power Factor Correction (PFC)

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP4N90D	TO-252-3L	AP4N90D XXX YYYY	2500
AP4N90Y	TO-251S-3L	AP4N90Y XXX YYYY	4000

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	4.0	A
I_D@T_C=100℃	Drain Current, V_{GS} @ 10V	2.1	A
IDM	Drain Current - Pulsed	16	A
EAS	Single Pulsed Avalanche Energy	125	mJ
IAS	Avalanche Current	6	A
EAR	Repetitive Avalanche Energy	0.72	mJ
P_D	Power Dissipation	25	W
Tj ,Tstg	Operating and Storage Temperature Range	-55 to +150	oC
RθJC	Thermal Resistance, Junction-to-Case	5.0	°C/W
RθJA	Thermal Resistance, Junction-to-Ambient	62.5	°C/W

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	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}=900V, V_{GS}=0V			1	μA
IDSS	Zero Gate Voltage Drain Current	V_{DS}=720V, TC=125°C			10	μA
IGSSF	Gate-Body Leakage Current, Forward	V_{GS}=30V, V_{DS}=0V			100	nA
IGSSR	Gate-Body Leakage Current, Reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
VGS(TH)	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D =250 uA	2.0	3.0	4.5	V
RDS(On)	Drain-Source On-state Resistance	V_{GS}=10V, I_D =2.0A,		3000	3500	mΩ
C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V f=1.0MHz		674		pF
C_{oss}	Output Capacitance			71		pF
C_{rss}	Reverse Transfer Capacitance			13		pF
td(on)	Turn On Delay Time	V_{DD}=720V, ID=4A, R_G=25Ω		37		ns
t_r	Rising Time			15		ns
td(off)	Turn Off Delay Time			144		ns
t_f	Fall Time			36		ns
Q_g	Total Gate Charge	V_{DS}=450V, ID=4A, V_{GS}=10V		27		nC
Q_{gs}	Gate-Source Charge			3.5		nC
Q_{gd}	Gate-Drain Charge			14		nC
ISM	Maximum Pulsed Drain-Source Diode Forward Current				4	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V, I_S =2A			1.4	V
trr	Reverse Recovery Time	V_{GS}=0V, I_S=4A, dI_F/dt=100 A/μs Note4)		1018		ns
Q_{rr}	Reverse Recovery Charge			2.2		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=10mH IAS=6A, 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

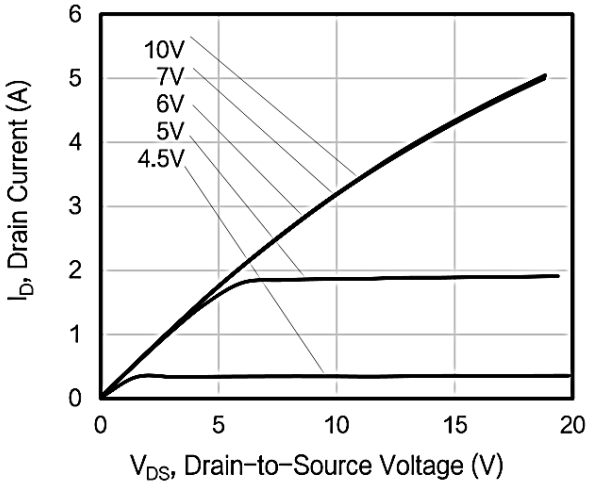


Figure 1. Output Characteristics

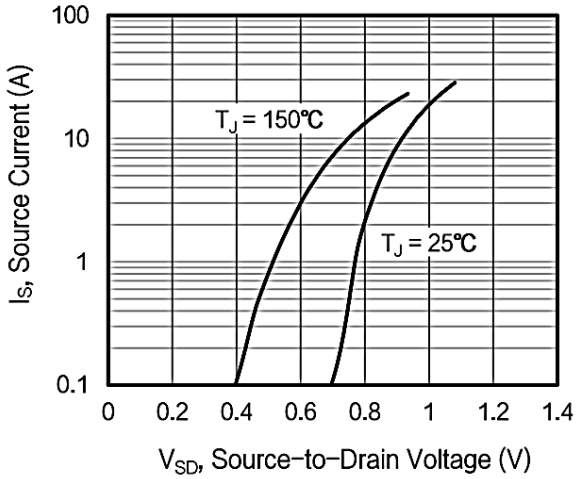


Figure 2. Body Diode Forward Voltage

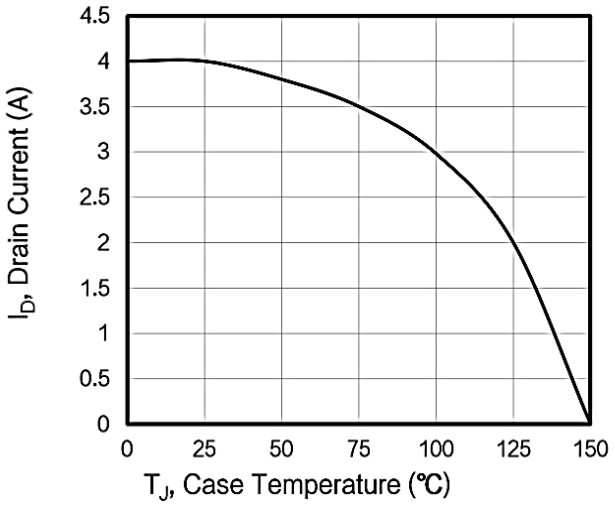


Figure3. Drain Current vs. Temperature

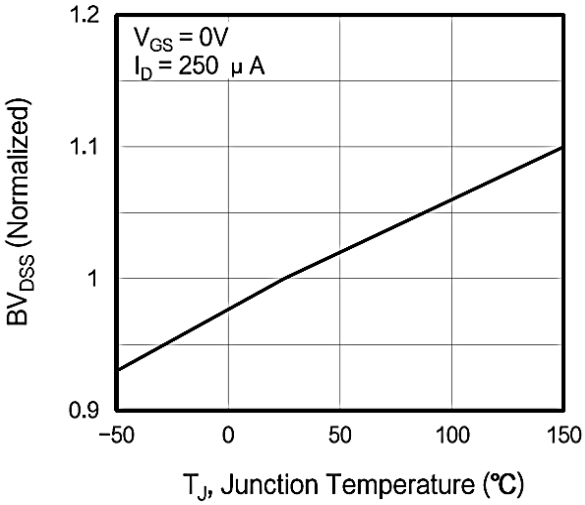


Figure4. BVDSS Variation vs. Temperature

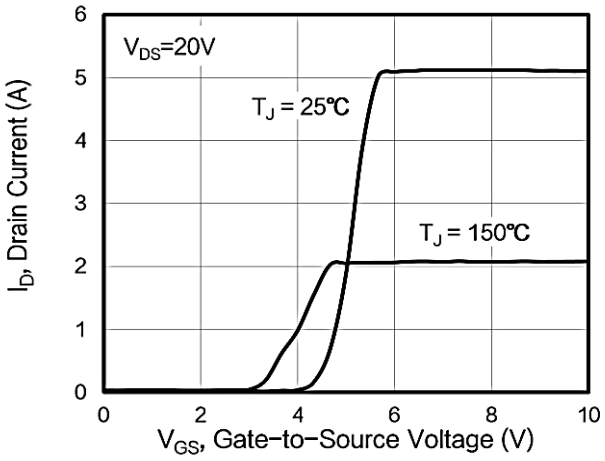


Figure 5. Transfer Characteristics

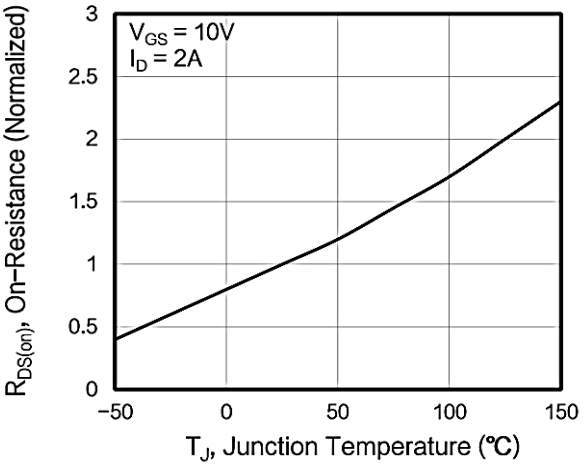


Figure 6. On-Resistance vs. Temperature

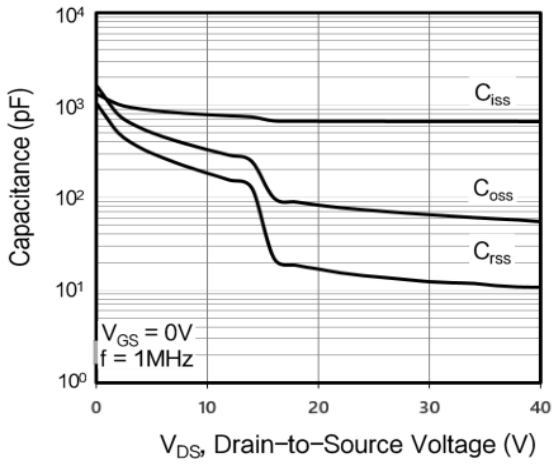


Figure 7. Capacitance

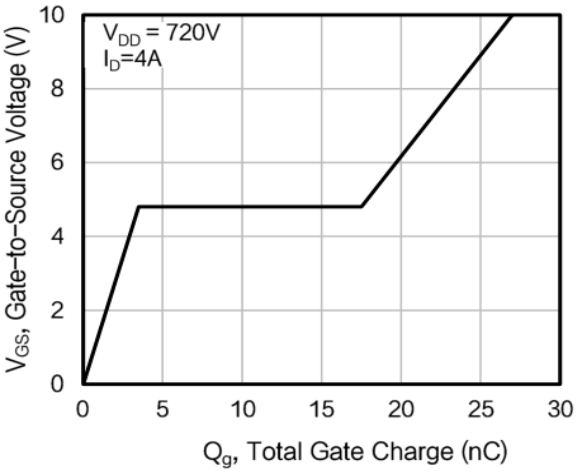


Figure 8. Gate Charge

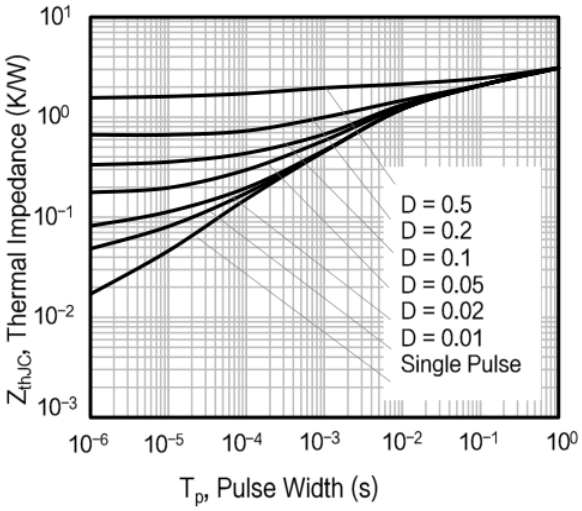
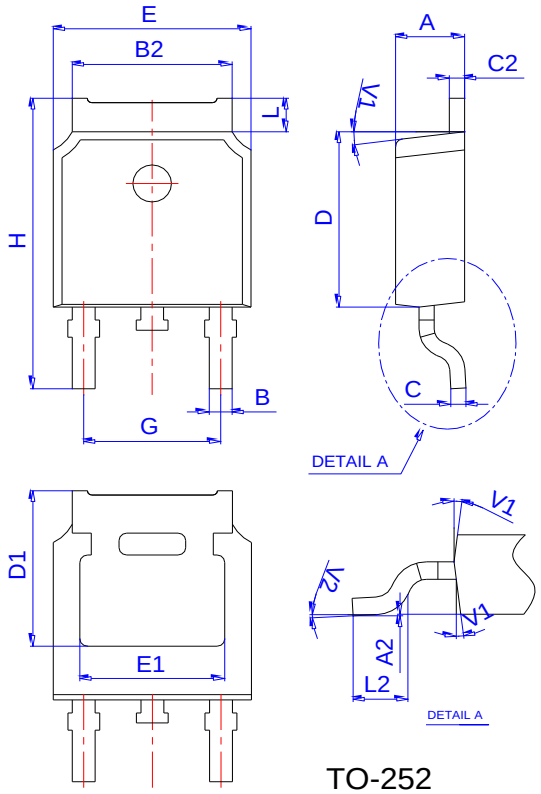


Figure 9. Transient Thermal Impedance

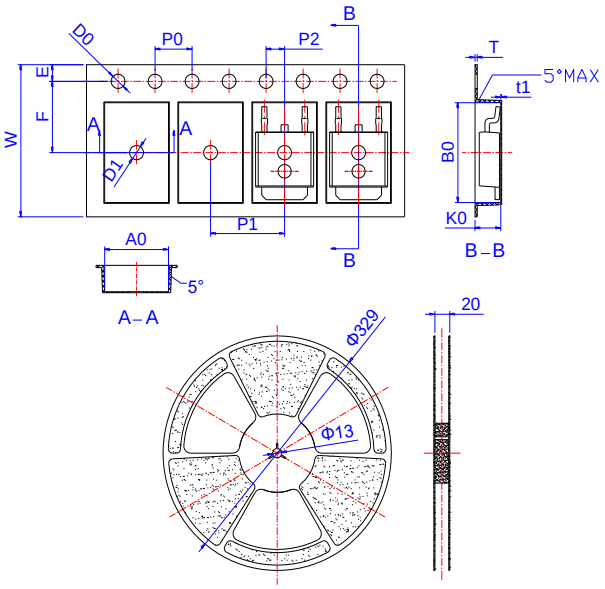
Package Mechanical Data:TO-252-3L



TO-252

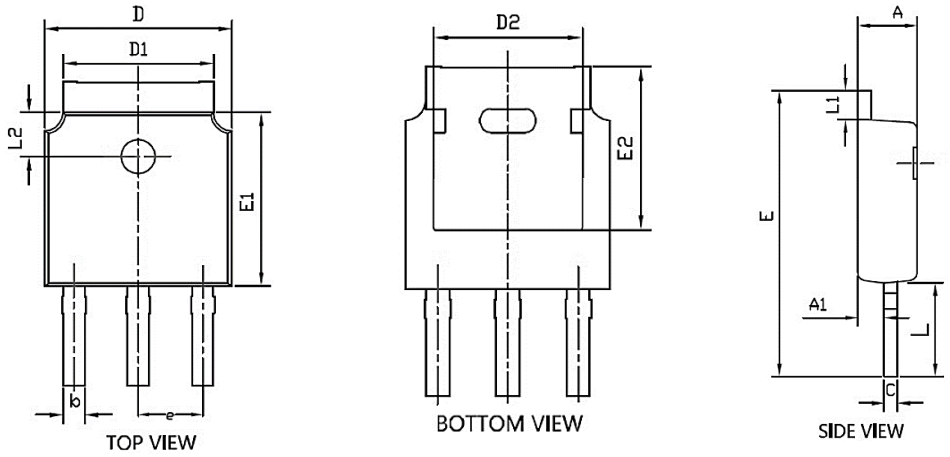
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Specification-TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583

Package Mechanical Data-TO-251S-3L



Symbol	Common		
	mm		
	Mim	Nom	Max
A	2.2	2.3	2.4
A1	0.9	1.0	1.1
b	0.66	0.76	0.86
C	0.46	0.52	0.58
D	6.50	6.6	6.7
D1	5.15	5.3	5.45
D2	4.6	4.8	4.95
E	10.4	----	11.5
E1	6.0	6.1	6.2
E2	5.400REF		
e	2.286BSC		
L	3.5	4.0	4.3
L1	0.9	---	1.27
L2	1.4	---	1.9

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900V N-Channel Enhancement Mode MOSFET

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