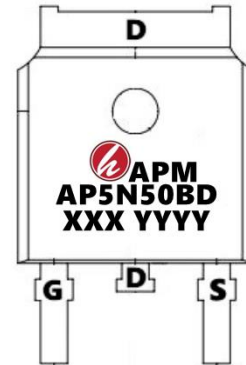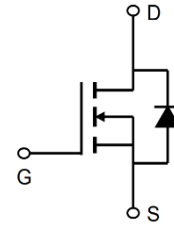# AP5N50BD

500V N-Channel Enhancement Mode MOSFET

Description

The AP5N50BD 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

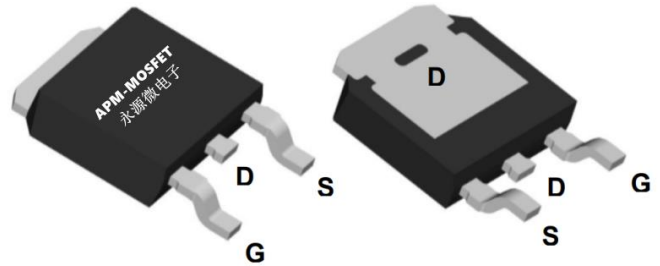miniaturization and higher efficiency.

General Features

V_{DS} = 500V I_D =5A

$R_{DS(ON)}$ < 3.0Ω @ V_{GS}=10V （**Type：2.4Ω**）

Application

Uninterruptible Power Supply(UPS)

Power Factor Correction (PFC)

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP5N50BD	TO-252-3L	AP5N50BD XXX YYYY	2500

Absolute Maximum Ratings (T$_C$=25℃unless otherwise noted)

Symbol	Parameter	Value	Unit
VDSS	Drain-Source Voltage (V_{GS} = 0V)	500	V
ID	Continuous Drain Current	5	A
IDM	Pulsed Drain Current (note1)	15	A
VGS	Gate-Source Voltage	±30	V
E$_{AS}$	Single Pulse Avalanche Energy (note2)	57	mJ
IAR	Avalanche Current (note1)	2.4	A
E$_{AR}$	Repetitive Avalanche Energy note1)	6.4	mJ
P$_D$	Power Dissipation (T$_C$ = 25ºC)	32.9	W
TJ, Tstg	Operating Junction and Storage Temperature Range	-55~+150	ºC
RthJC	Thermal Resistance, Junction-to-Case	6.25	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$_{DS}$= 650V, 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	3.0	4.0	V
RDS(on)	Drain-Source On-Resistance (Note3)	V$_{GS}$ = 10V, I$_D$ = 3.5A	--	2.4	3.0	Ω
C$_{iss}$	Input Capacitance	V$_{GS}$ = 0V, V$_{DS}$ = 25V, f = 1.0MHz	--	310	--	pF
C$_{oss}$	Output Capacitance		--	39	--	
C$_{rss}$	Reverse Transfer Capacitance		--	6	--	
Q$_g$	Total Gate Charge	V$_{DD}$=400V, I$_D$ = 3A, V$_{GS}$ = 10V	--	8	--	nC
Q$_{gs}$	Gate-Source Charge		--	1.2	--	
Q$_{gd}$	Gate-Drain Charge		--	5	--	
td(on)	Turn-on Delay Time	V$_{DD}$=250V, I$_D$ = 3A, R$_G$ = 25Ω	--	7.8	--	ns
t$_r$	Turn-on Rise Time		--	33	--	
td(off)	Turn-off Delay Time		--	23	--	
t$_f$	Turn-off Fall Time		--	59	--	
IS	Continuous Body Diode Current	T$_C$ = 25 ºC	--	--	3.0	A
ISM	Pulsed Diode Forward Current		--	--	12	A
V$_{SD}$	Body Diode Voltage	T$_J$ = 25ºC, I$_{SD}$ = 3A, V$_{GS}$ = 0V	--	--	1.4	V
trr	Reverse Recovery Time	V$_{GS}$ = 0V, I$_S$ = 3A, di$_F$/dt =100A /µs	--	80	--	ns
Q$_{rr}$	Reverse Recovery Charge		--	1.8	--	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 . IAS = 2.4A, VDD = 50V, RG = 25 Ω, 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.
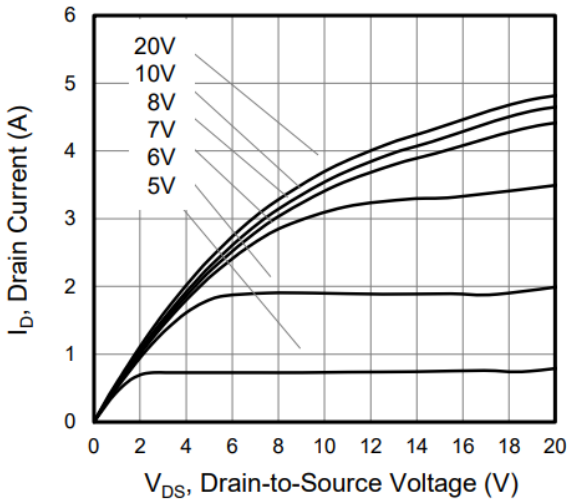
2

Typical Characteristics

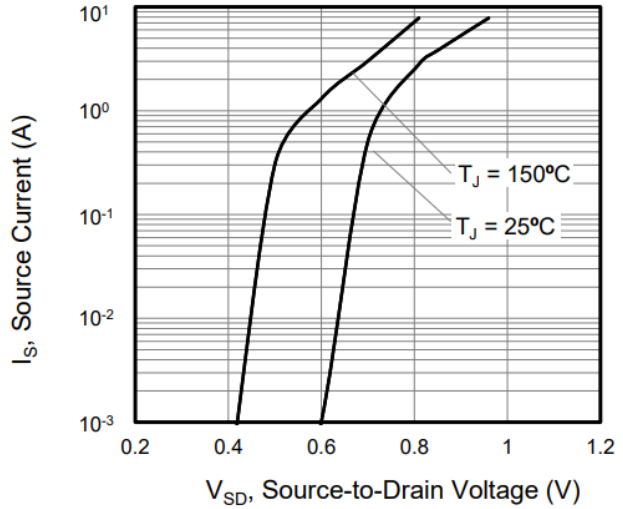Figure 1. Output Characteristics (T J = 25ºC)
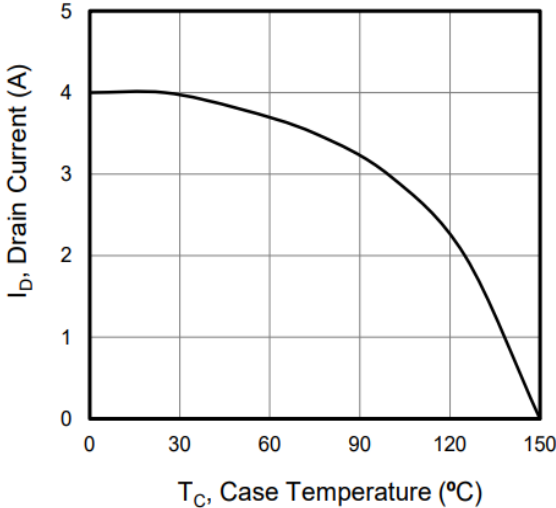
Figure 2. Body Diode Forward Voltage

Figure 3. Drain Current vs. Temperature

Figure 4. BV DSS Variation vs. Temperature
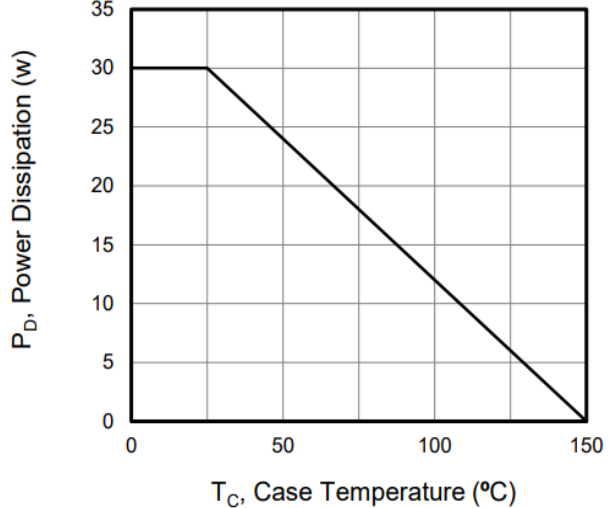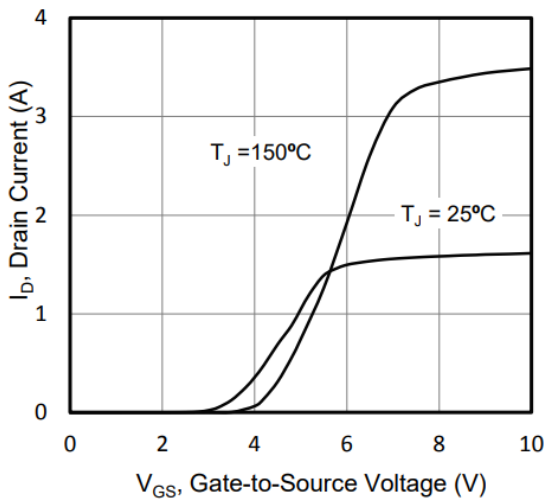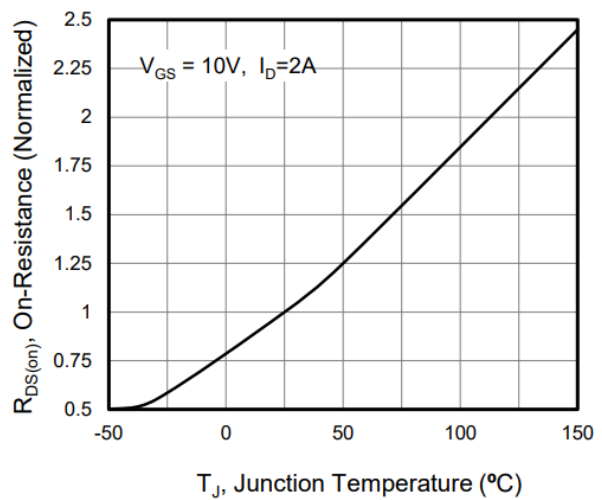
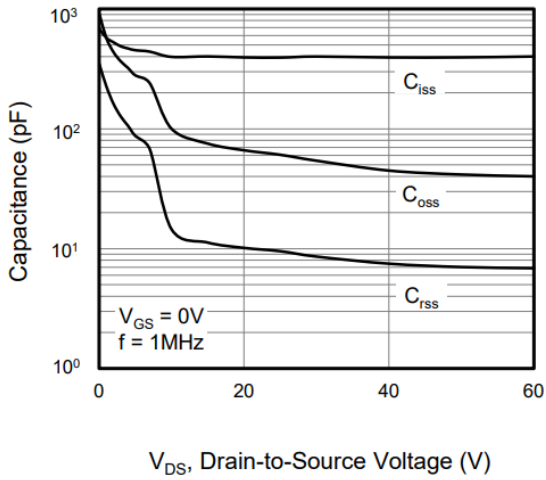Figure 5. Transfer Characteristics

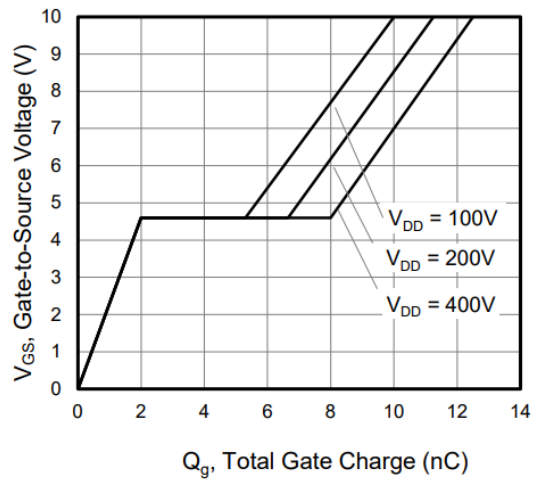Figure 6. On-Resistance vs. Temperature

Figure 7. Capacitance


Figure 8. Gate Charge
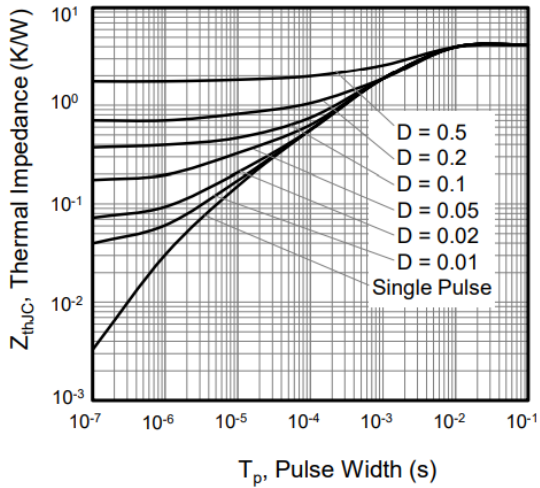
Figure 9. Transient Thermal Impedance

Package Mechanical Data
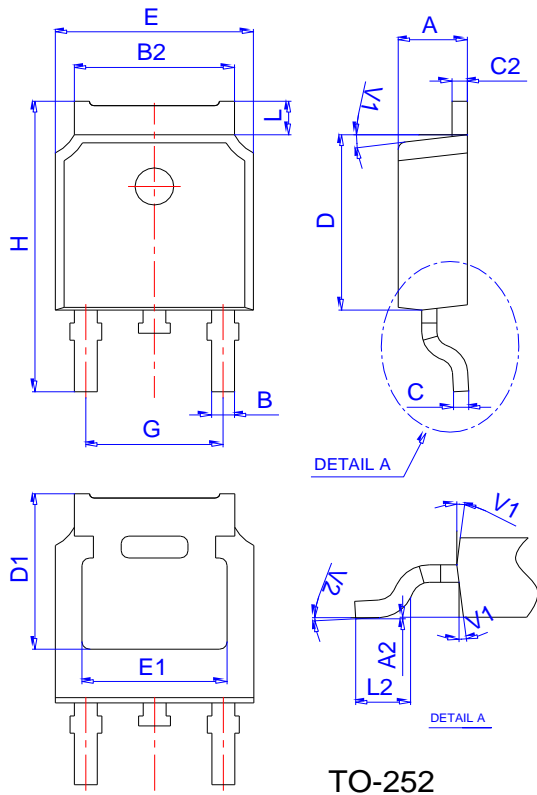
TO-252

| 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 Spectification-TO-252
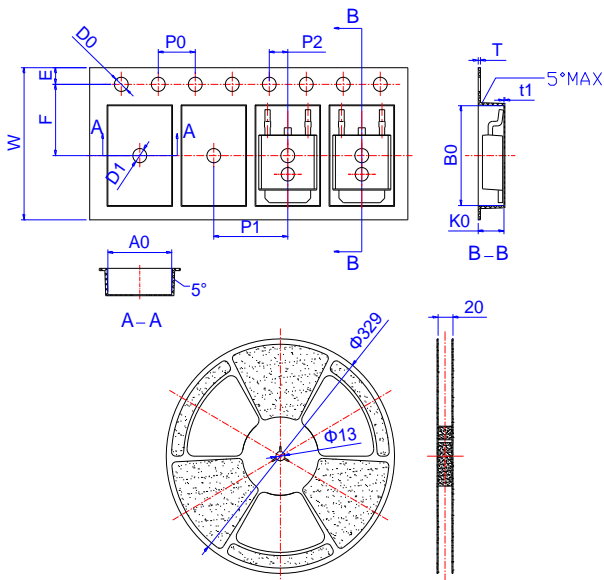
| Ref. | Dimensions | | | | | |
| | Millimeters | | | Inches | | |
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	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

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Edition	Date	Change
Rve1.0	2021/4/31	Initial release

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