

500V N-Channel Enhancement Mode MOSFE

Description

The AP5N50D 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.

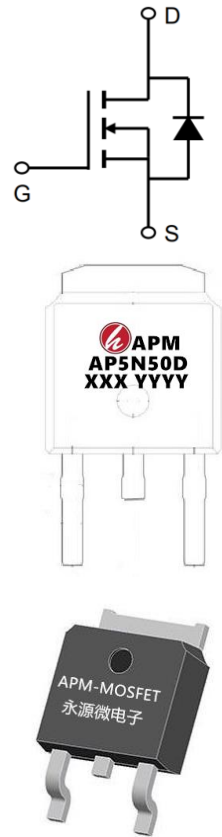
General Features

$V_{DS} = 500V, I_D = 5A$

$R_{DS(ON)} < 2.0\Omega @ V_{GS} = 10V$

Application

HID



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP5N50D	TO-252-3L	AP5N50D XXX YYYY	2500

Absolute Maximum Ratings $T_C = 25^\circ C$, unless otherwise noted

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage ($V_{GS} = 0V$)	500	V
I_D	Continuous Drain Current	5	A
I_{DM}	Pulsed Drain Current	20	A
V_{GSS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulse Avalanche Energy	90	mJ
I_{AS}	Avalanche Current	3	A
E_{AR}	Repetitive Avalanche Energy	10	mJ
P_D	Power Dissipation ($T_C = 25^\circ C$)	45	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	$-55 \sim +150$	$^\circ C$
R_{thJC}	Thermal Resistance, Junction-to-Case	4.1	$^\circ C/W$
R_{thJA}	Thermal Resistance, Junction-to-Ambient	60	

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Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	500	570	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 500V, V_{GS} = 0V, T_J = 25^{\circ}\text{C}$	--	--	1	μA
I_{GSS}	Gate-Source Leakage	$V_{GS} = \pm 30V$	--	--	± 100	nA
$V_{GS(th)}$	Gate-Source Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	3.0	--	4.0	V
$R_{DS(on)}$	Drain-Source On-Resistance (Note3)	$V_{GS} = 10V, I_D = 2.5A$	--	1.7	2	Ω
C_{iss}	Input Capacitance	$V_{GS} = 0V,$ $V_{DS} = 25V, f = 1.0\text{MHz}$	--	462	--	pF
C_{oss}	Output Capacitance		--	54.2	--	
C_{riss}	Reverse Transfer Capacitance		--	8.8	--	
Q_g	Total Gate Charge	$V_{DD} = 400V, I_D = 5A,$ $V_{GS} = 10V$	--	13.5	--	nC
Q_{gs}	Gate-Source Charge		--	2	--	
Q_{gd}	Gate-Drain Charge		--	6	--	
$t_{d(on)}$	Turn-on Delay Time	$V_{DD} = 250V, I_D = 5A, R_G = 25\Omega$	--	10	--	ns
t_r	Turn-on Rise Time		--	25	--	
$t_{d(off)}$	Turn-off Delay Time		--	40	--	
t_f	Turn-off Fall Time		--	52	--	
I_S	Continuous Body Diode Current	$T_C = 25^{\circ}\text{C}$	--	--	5	A
I_{SM}	Pulsed Diode Forward Current		--	--	20	
V_{SD}	Body Diode Voltage	$T_J = 25^{\circ}\text{C}, I_{SD} = 5.0A, V_{GS} = 0V$	--	--	1.4	V
t_{rr}	Reverse Recovery Time	$V_{GS} = 0V, I_S = 5.0A,$ $di_F/dt = 100A/\mu s$	--	220	--	ns
Q_{rr}	Reverse Recovery Charge		--	3	--	μC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $I_{AS} = 3A, V_{DD} = 50V, R_G = 25\Omega, \text{Starting } T_J = 25^{\circ}\text{C}$
3. Pulse Test: Pulse width $\leq 300\mu s$, Duty Cycle $\leq 1\%$

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Typical Characteristics

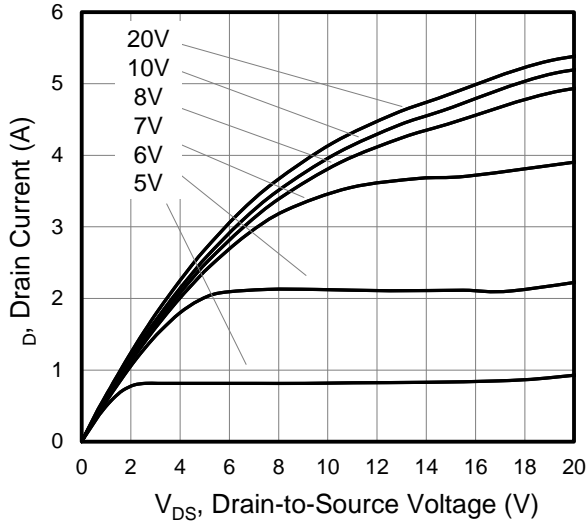


Figure 1. Output Characteristics ($T_J = 25^\circ\text{C}$)

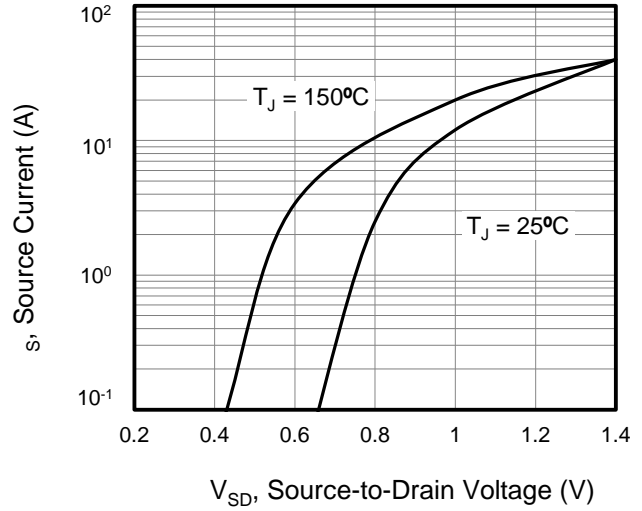


Figure 2. Body Diode Forward Voltage

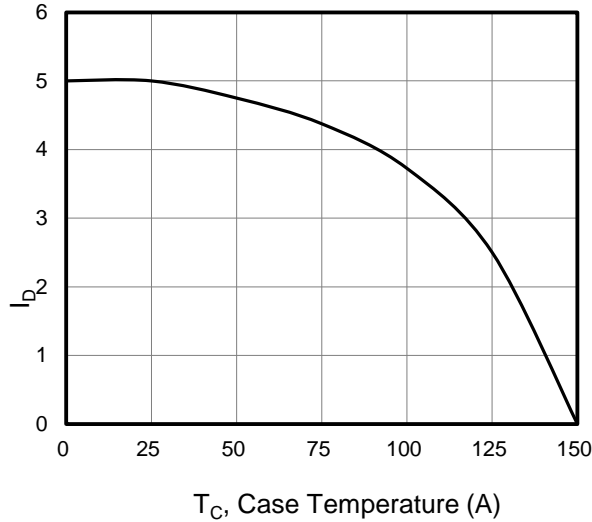


Figure 3. Drain Current vs. Temperature

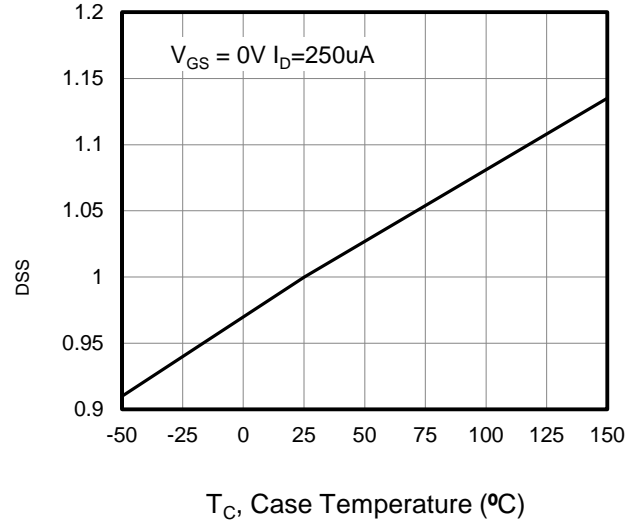


Figure 4. BV_{DSS} Variation vs. Temperature

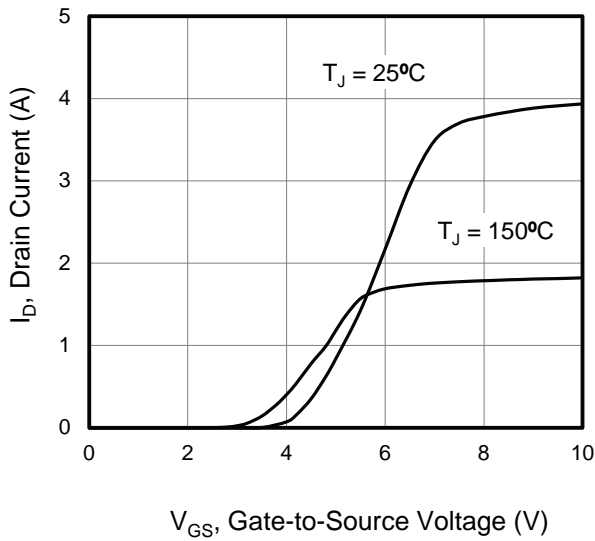


Figure 5. Transfer Characteristics

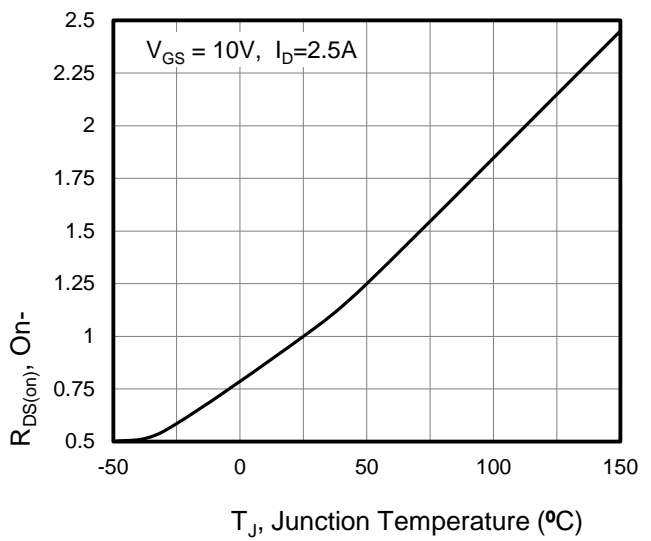


Figure 6. On-Resistance vs. Temperature



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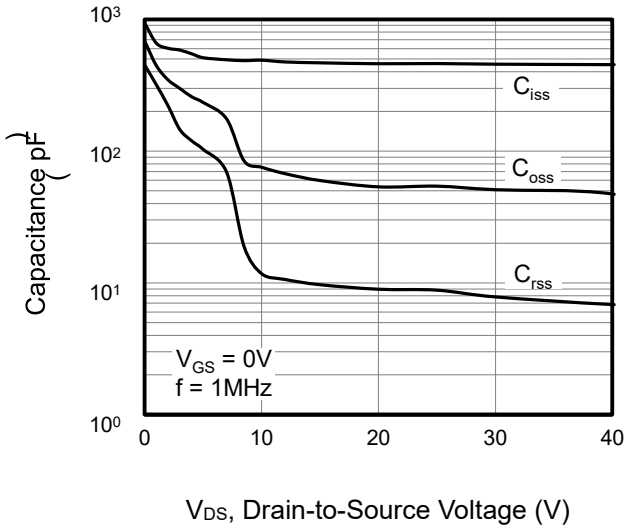


Figure 7. Capacitance

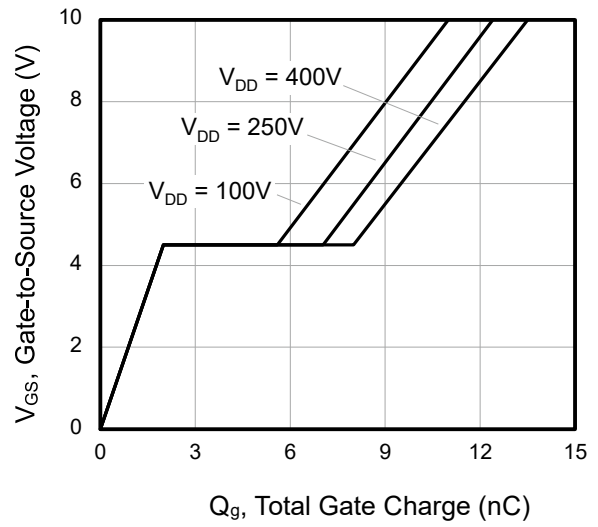


Figure 8. Gate Charge

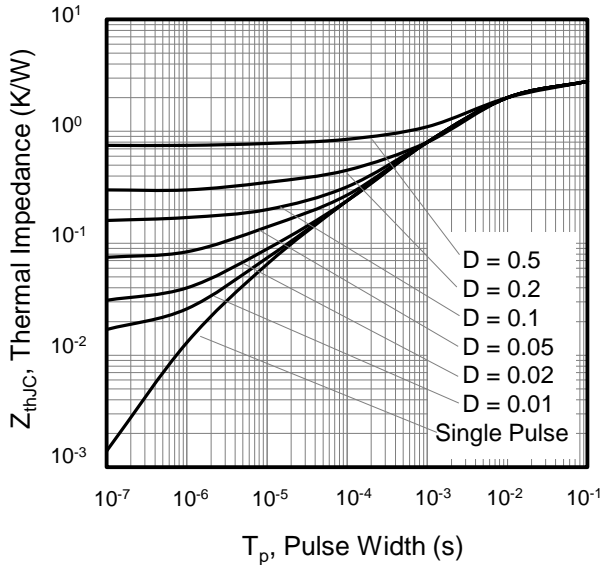
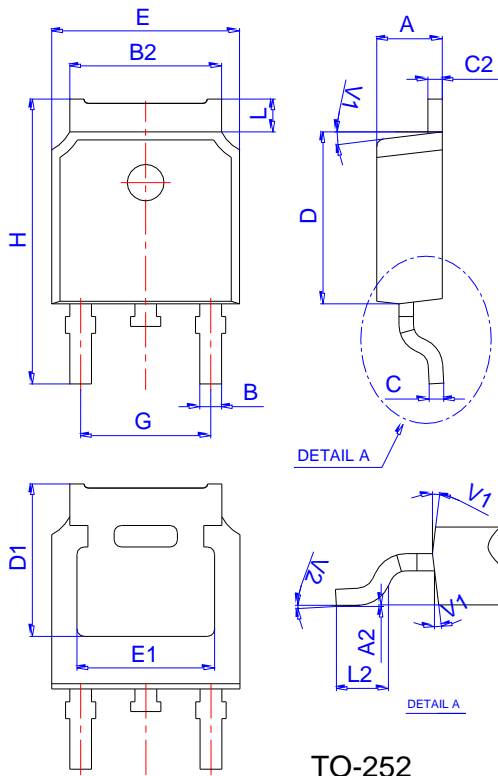


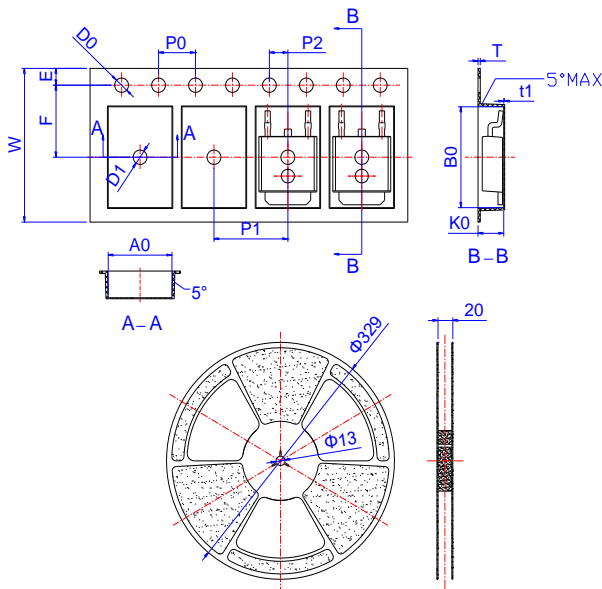
Figure 9. Transient Thermal Impedance

500V N-Channel Enhancement Mode MOSFET Package Mechanical Data-TO-252-3L



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

OUTLINE	REEL (PCS)	PER CARTON (PCS)	TAPE & REEL
TAPING	2,500	25,000	13inch

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