AP9P20D

200V P-Channel Enhancement Mode MOSFET

Description

The AP9P20D is silicon P-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

VDS =-200V,ID =-9A

RDS(ON) <0.75Ω@ VGS=10V

Application

Power amplifier

motor drive

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP9P20D	TO-252-3L	AP9P20D XXX YYYY	2500

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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	- 200	V
VGS	Gate-Source Voltage	± 20	V
ID	Continuous Drain Current T_C = 25 °C	-8.7	A
	Continuous Drain Current T_C = 100 °C	-3.6	A
IDM	Pulsed Drain Current[a]	- 22.8	A
EAS	Single Pulse Avalanche Energy[b]	570	mJ
IAR	Repetitive Avalanche Current[a]	-8.7	A
EAR	Repetitive Avalanche Energy[a]	5.5	mJ
P_D	Maximum Power Dissipation T_C = 25 °C	55	W
	Maximum Power Dissipation (PCB Mount)[e] T_A = 25 °C	2.5	W
dV/dt	Peak Diode Recovery dV/dt[c]	- 5.5	V/ns
TJ, Tstg	Operating Junction and Storage Temperature Range	- 55 to + 150	°C
RthJA	Maximum Junction-to-Ambient	110	°C/W
RthJA	Maximum Junction-to-Ambient (PCB Mount)[a]	50	°C/W
RthJC	Maximum Junction-to-Case (Drain)	2.2	°C/W

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
VDS	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = - 250 μA	- 200	-	-	V
ΔVDS/TJ	V_{DS} Temperature Coefficient	Reference to 25 °C, I_D =-250uA	-	- 0.1	-	V/°C
VGS(th)	Gate-Source Threshold Voltage	V_{DS} = V_{GS}, I_D = - 250 μA	- 2.0	-3.5	- 4.0	V
RDS(on)	Drain-Source On-State Resistance	V_{GS} = - 10 V I_D = - 4 A[b]	-	0.625	0.75	Ω
IGSS	Gate-Source Leakage	V_{GS} = ± 20 V	-	-	± 100	nA
IDSS	Zero Gate Voltage Drain Current	V_{DS} = - 200 V, V_{GS} = 0 V	-	-	- 100	μA
		V_{DS} = - 160 V, V_{GS} = 0 V, T_J = 125 °C	-	-	- 500	
gfs	Forward Transconductance	V_{DS} = - 50 V, I_D = - 2.2 A	1.1	-	-	S
Ciss	Input Capacitance	V_{GS} = 0 V, V_{DS} = - 25 V, f = 1.0 MHz,	-	590	770	pF
Coss	Output Capacitance		-	140	180	
Crss	Reverse Transfer Capacitance		-	25	35	
Q_g	Total Gate Charge	I_D = - 7.3 A, V_{DS} = - 160 V V_{GS} = - 10 V	-	-	20	nC
Q_{gs}	Gate-Source Charge		-	-	3.3	
Q_{gd}	Gate-Drain Charge		-	-	11	
td(on)	Turn-On Delay Time	V_{DD} = - 100 V, I_D = - 7.3A, R_G = 18 Ω, R_D = 25Ω,	-	8.8	-	ns
tr	Rise Time		-	27	-	
td(off)	Turn-Off Delay Time		-	7.3	-	
t_f	Fall Time		-	19	-	
IS	Continuous Source-Drain Diode Current	MOSFET symbol showing the integral reversep - n junction diode	-	-	- 3.6	A
ISM	Pulsed Diode Forward Current[a]		-	-	- 14	
VSD	Body Diode Voltage	T_J = 25 °C, I_S = - 5.7A, V_{GS} = 0 V[b]	-	-	- 6.3	V
trr	Body Diode Reverse Recovery Time	T_J = 25 °C, I_F = - 7.3A, dI/dt = 100 A/μs[b]	-	150	300	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	0.97	2.0	μC
ton	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L_S and L_D)				

Notes:
1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L = 26.3mH, I_{AS} = -5.7A, V_{DD} = -50V, R_G = 25 Ω, Starting T_J = 25°C
3. I_{SD} ≤ -7.3A, di/dt ≤ 300A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C
4. Pulse Test : Pulse width ≤ 300μs, Duty cycle ≤ 2%
5. Essentially independent of operating temperature

Typical Characteristics

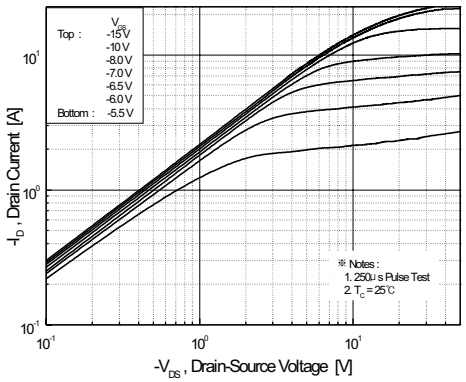


Figure 1. On-Region Characteristics

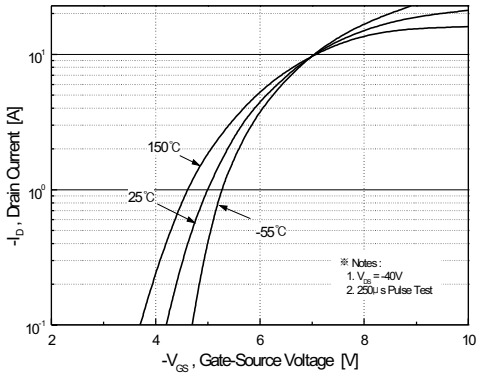


Figure 2. Transfer Characteristics

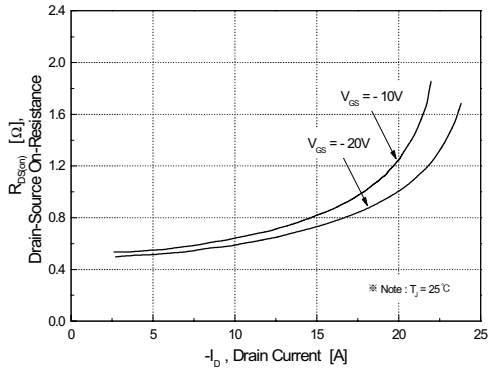


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

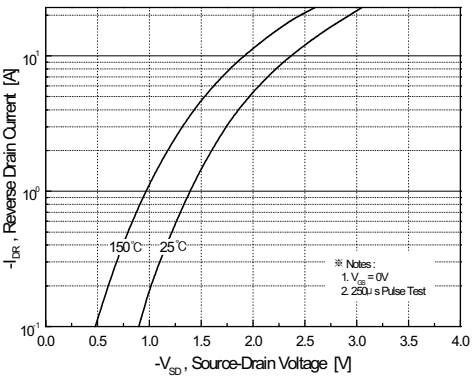


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

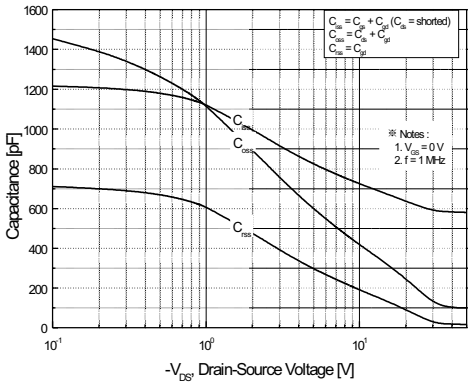


Figure 5. Capacitance Characteristics

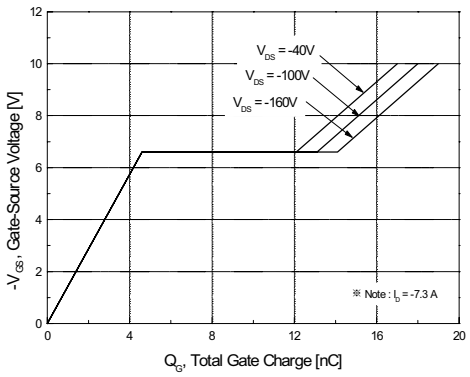


Figure 6. Gate Charge Characteristics

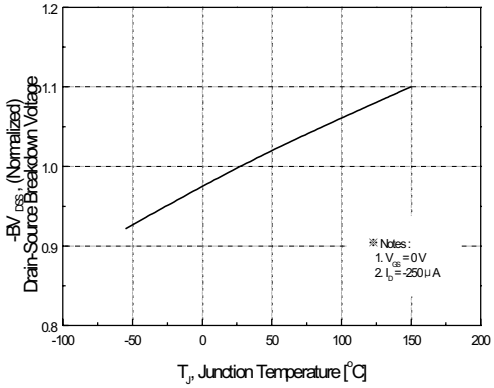


Figure 7. Breakdown Voltage Variation vs. Temperature

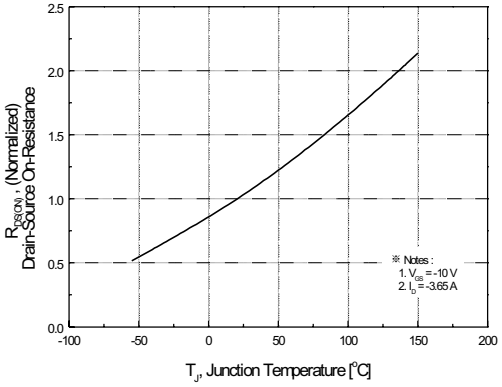


Figure 8. On-Resistance Variation vs. Temperature

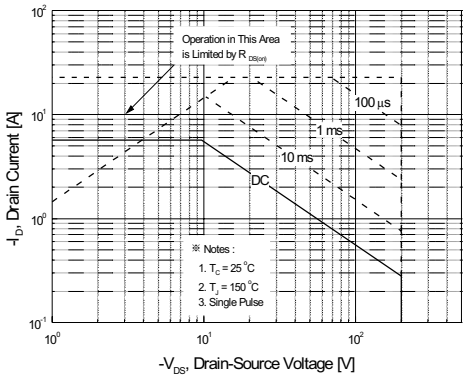


Figure 9. Maximum Safe Operating Area

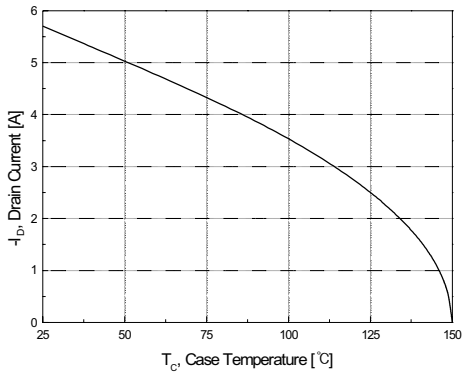


Figure 10. Maximum Drain Current vs. Case Temperature

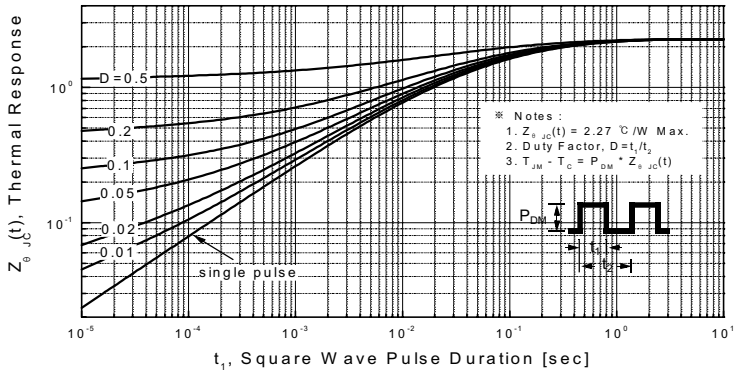
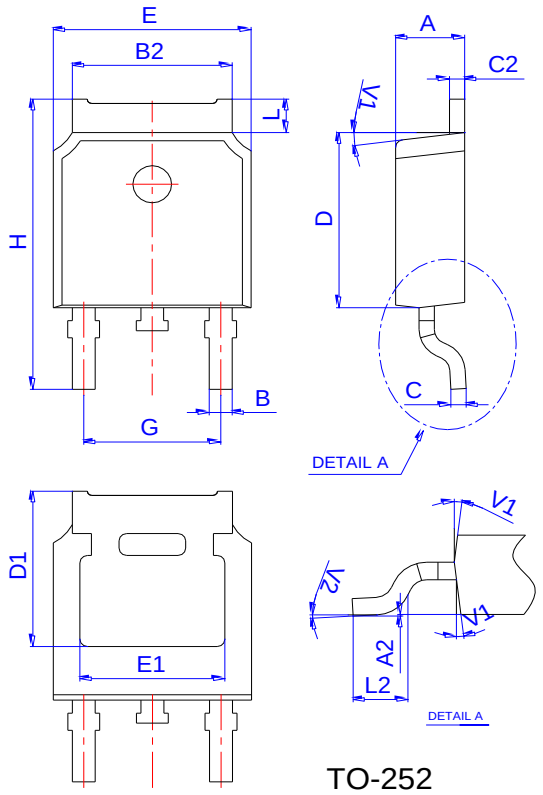


Figure 11. Transient Thermal Response Curve

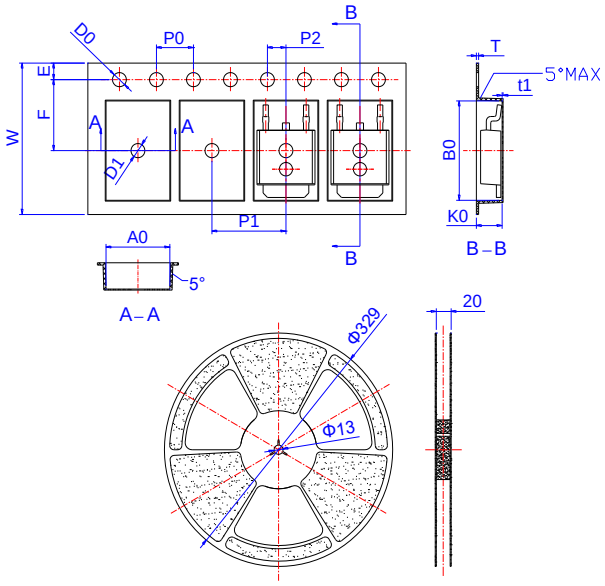
Package Mechanical Data：TO-252-3L



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

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Edition	Date	Change
Rve1.0	2019/1/31	Initial release