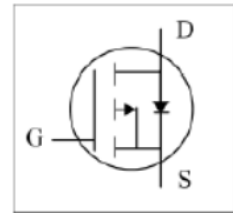## -100V P-Channel Enhancement Mode MOSFET

Description

The AP50P10D uses advanced trench technology

and design to provide excellent $R_{DS(ON)}$ with low gat

e charge. It can be used in a wide variety of applications.

 It is ESD protested.
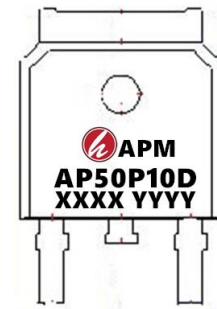
General Features

V_{DS} =-100V, I_D =-50A

$R_{DS(ON)}$ <50m @ V_{GS}=-10V (Typ:42m)

Super high dense cell design

Advanced trench process technology

Reliable and rugged

High density celldesign for ultra low on-resistance

Application

Power switch

DC/DC converters

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP50P10D	TO-252-3L	AP50P10D XXX YYYY	2500

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ -10V[1]	-50	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ -10V[1]	-23	A
I_{DM}	Pulsed Drain Current[2]	-100	A
EAS	Single Pulse Avalanche Energy[3]	345	mJ
I_{AS}	Avalanche Current	28	A
P_D@T_C=25℃	Total Power Dissipation[4]	104	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	1.2	℃/W

-100V P-Channel Enhancement Mode MOSFET

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-100	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-10V , I_D=-10A	---	42	50	mΩ
		V_{GS}=-4.5V , I_D=-8A	---	46	55	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-1.2	-1.8	-2.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-100V , V_{GS}=0V , T_J=25℃	---	---	-50	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=-10V , I_D=-10A	---	32	---	S
Q_g	Total Gate Charge	V_{DS}=-80V , V_{GS}=-10V , I_D=-14A	---	92	---	nC
Q_{gs}	Gate-Source Charge		---	17.5	---	
Q_{gd}	Gate-Drain Charge		---	14	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-50V , V_{GS}=-10V , R_G=3.3 , I_D=-14A	---	20.5	---	ns
T_r	Rise Time		---	32.2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	123	---	
T_f	Fall Time		---	63.7	---	
C_{iss}	Input Capacitance	V_{DS}=-25V , V_{GS}=0V , f=1MHz	---	6516	---	pF
C_{oss}	Output Capacitance		---	223	---	
C_{rss}	Reverse Transfer Capacitance		---	125	---	
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	-35	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time	I_F=-14A , di/dt=-100A/μs , T_J=25℃	---	31.2	---	nS
Q_{rr}	Reverse Recovery Charge		---	31.97	---	nC

Note :

1.The data tested by surface mounted on a 1 inch FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3.The EAS data shows Max. rating . The test condition is V^{DD}=-25V,V^{GS}=-10V,L=0.88mH,I^{AS}=-28A

4.The power dissipation is limited by 150℃ junction temperature

5 .The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.
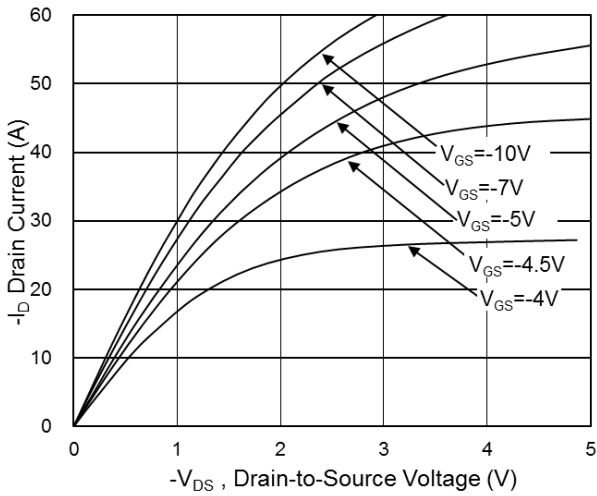
Typical Characteristics

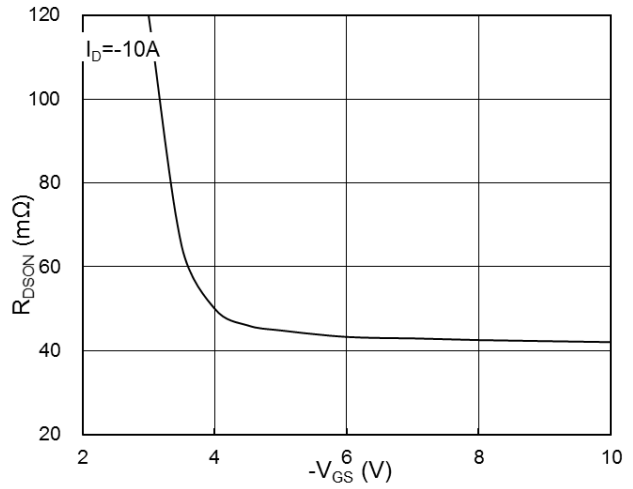**Fig.1 Typical Output Characteristics**
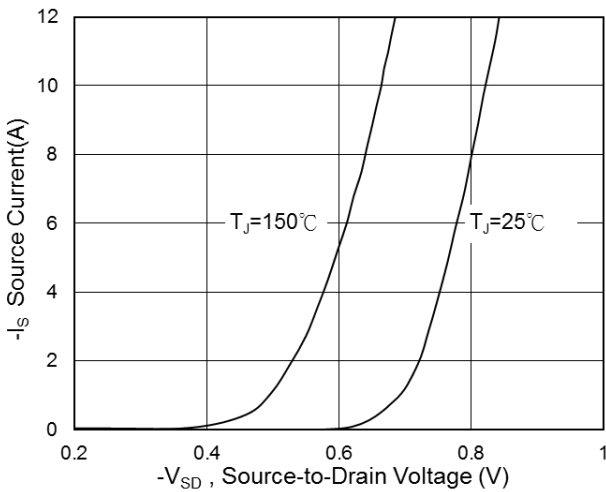

Fig.2 On-Resistance vs. G-S Voltage

Fig.3 Typical S-D Diode Forward Voltage
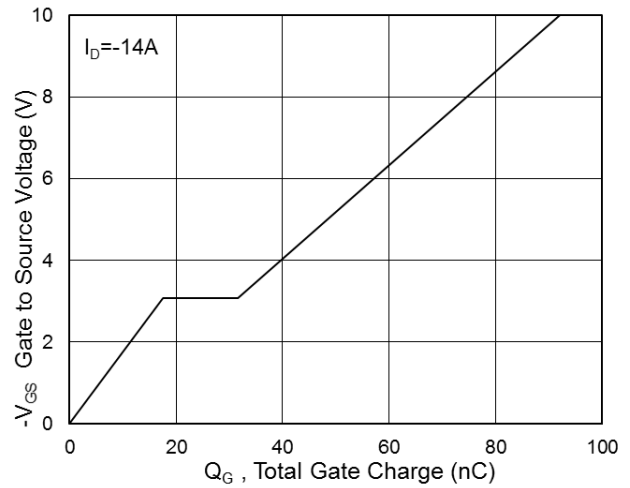
Fig.4 Gate-Charge Characteristics
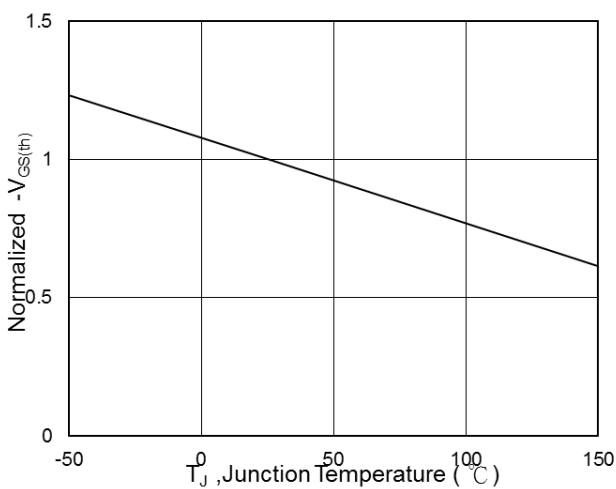
Fig.5 Normalized $V_{GS(th)}$ vs. T_J
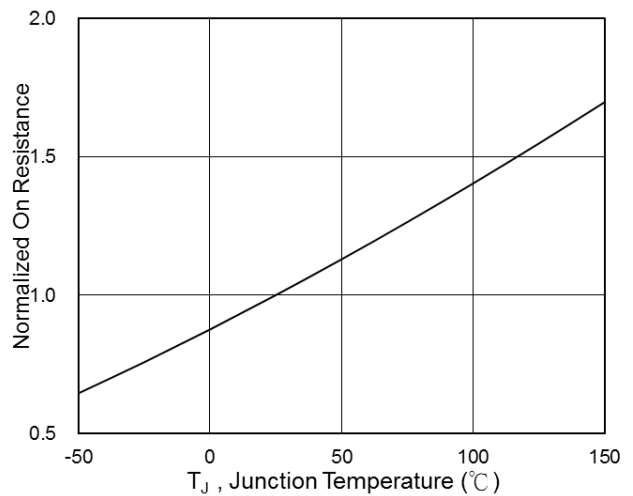
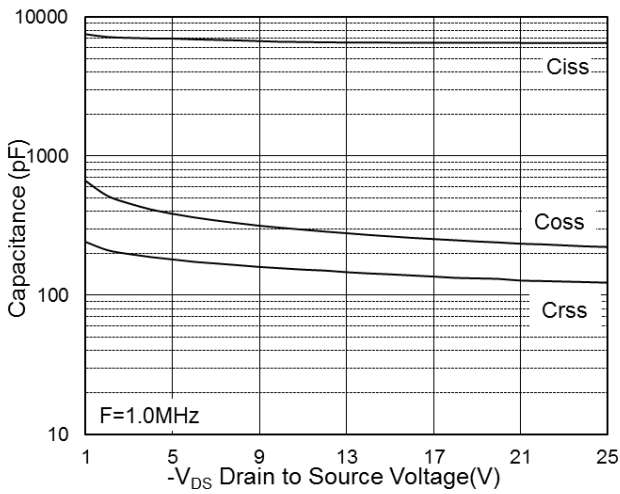**Fig.6 Normalized R_{DSON} vs. T_J**
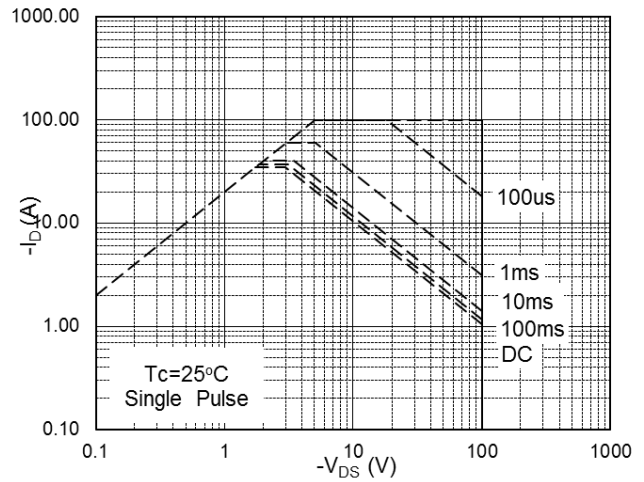
Fig.7 Capacitance
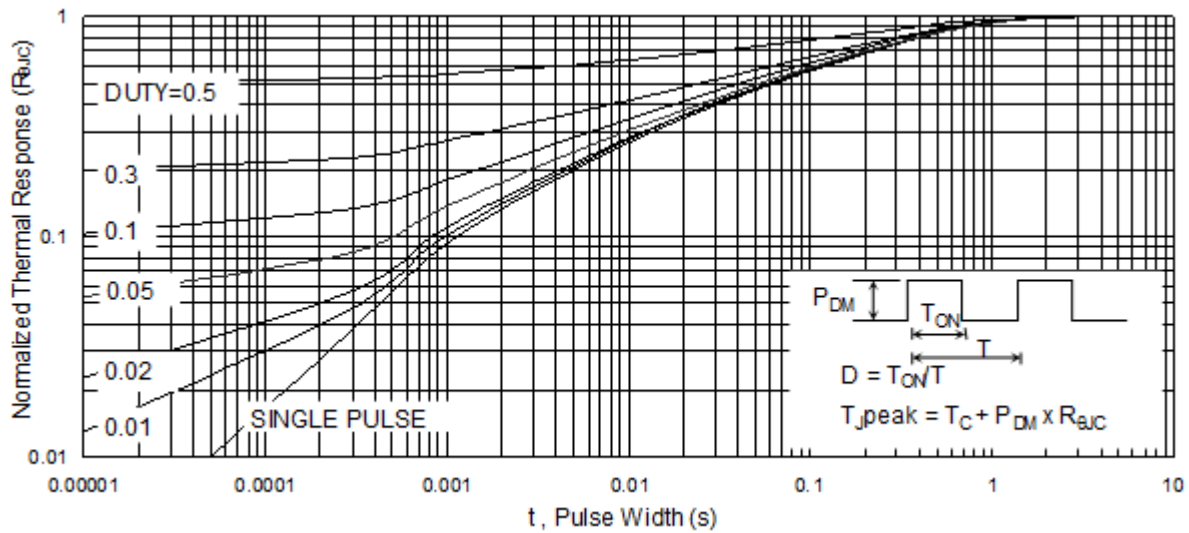

Fig.8 Safe Operating Area
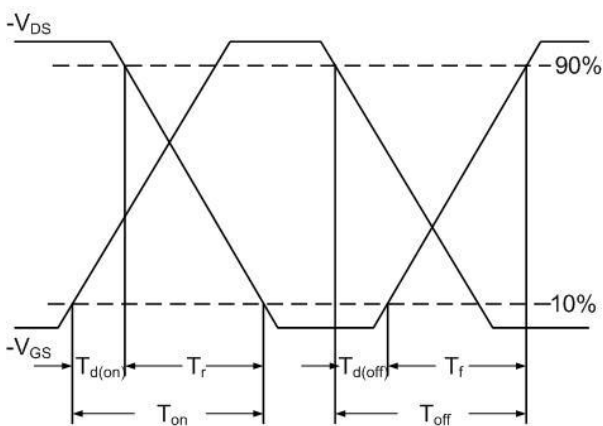

Fig.9 Normalized Maximum Transient Thermal Impedance

Fig.10 Switching Time Waveform
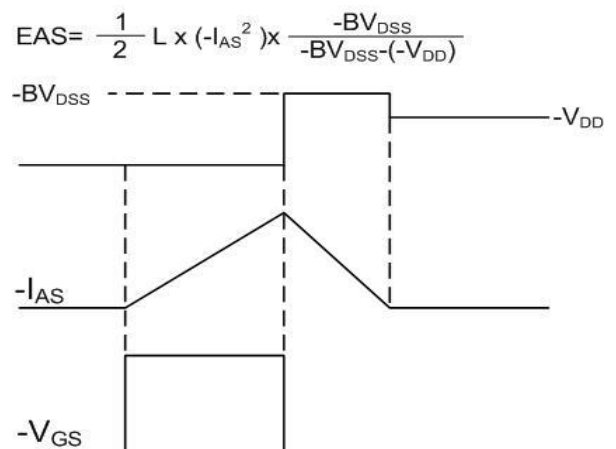
Fig.11 Unclamped Inductive Waveform

4

Package Mechanical Data

TO-252
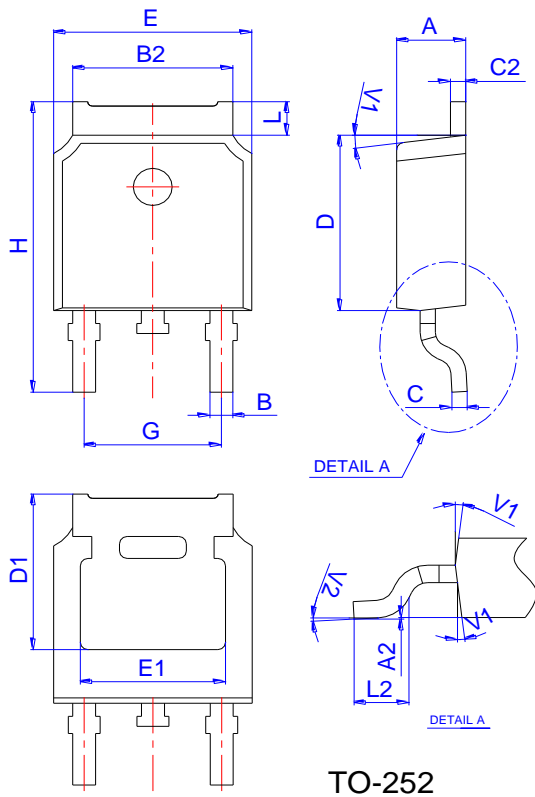
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
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
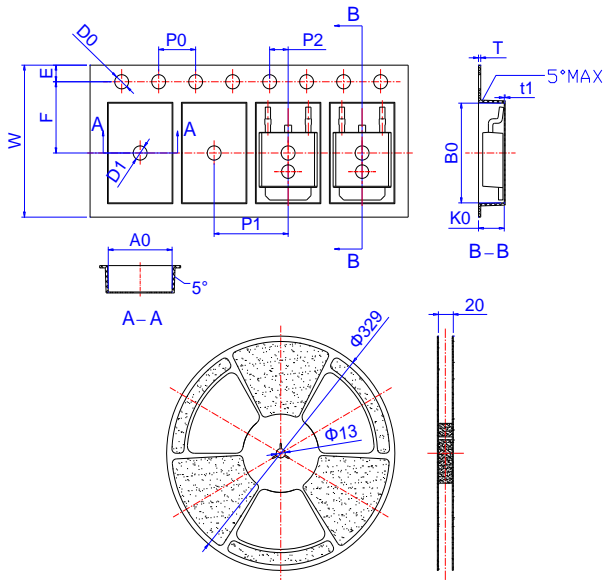
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	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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