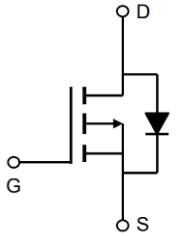
AP50P10P

-100V P-Channel Enhancement Mode MOSFET

Description

The AP50P10P uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

V_{DS} = −100V I_D =−50 A

$R_{DS(ON)}$ < 50mΩ @ V_{GS}=10V

Application

Battery protection

Load switch

Uninterruptible power supply

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP50P10D	TO-220-3L	AP50P10P XXX YYYY	1000

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

Electrical Characteristics (at T_j=25 ℃ unless otherwise specified)

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.

-100V P-Channel Enhancement Mode MOSFET

Typical Characteristics

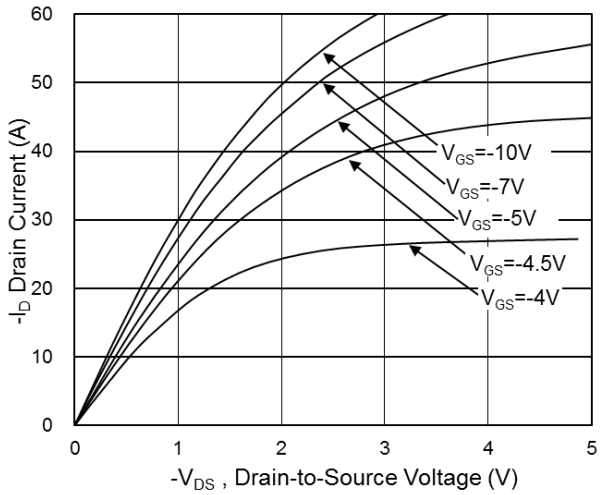


Fig.1 Typical Output Characteristics

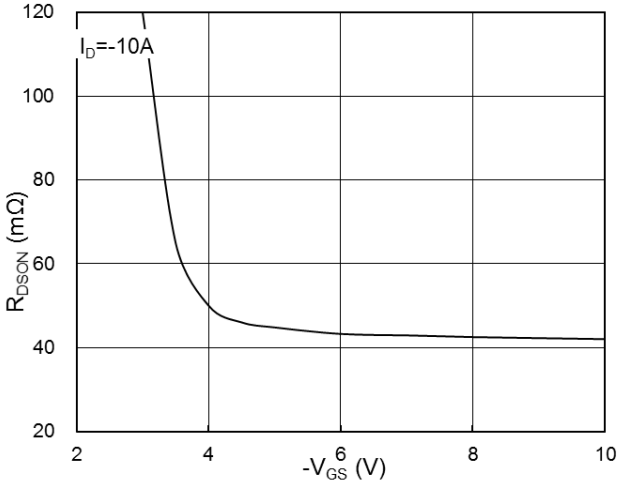


Fig.2 On-Resistance vs. G-S Voltage

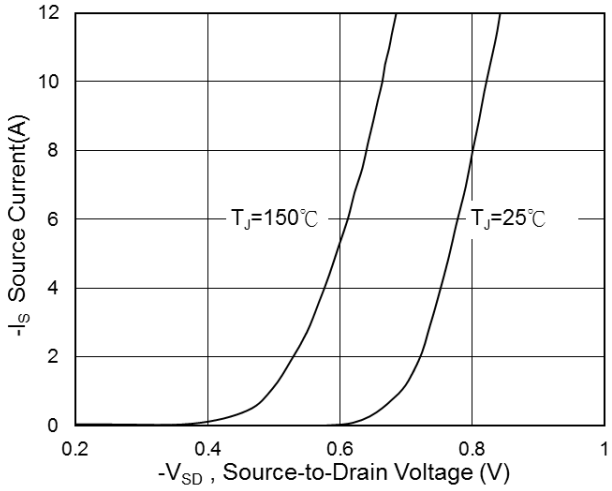


Fig.3 Typical S-D Diode Forward Voltage

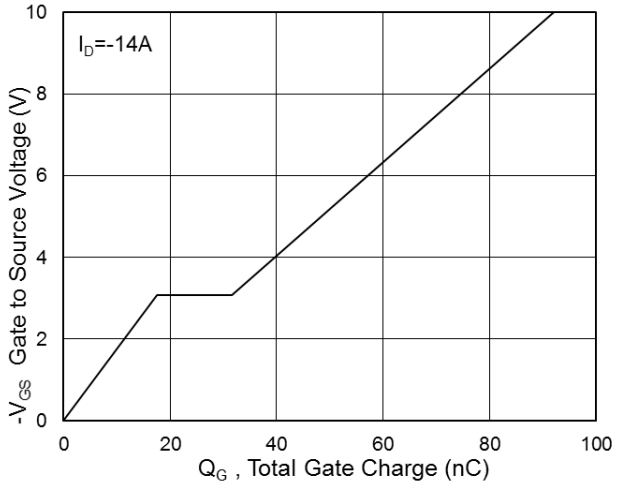


Fig.4 Gate-Charge Characteristics

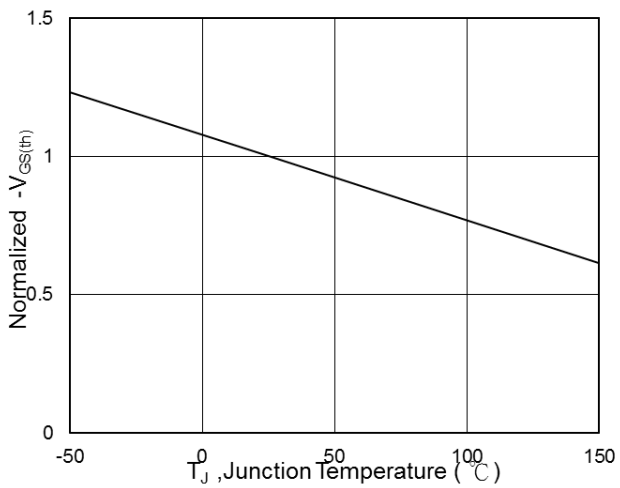


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

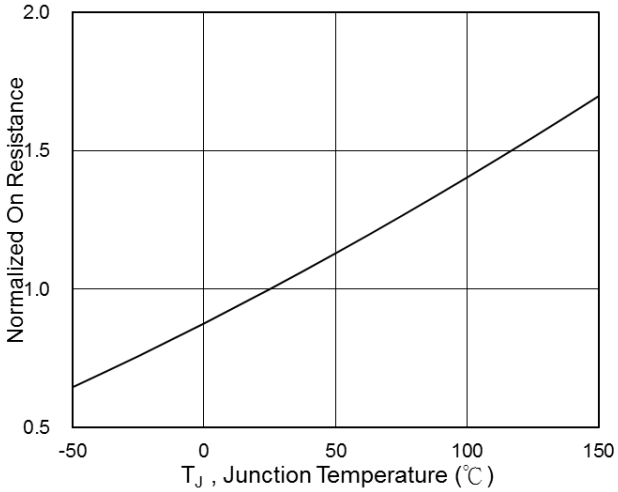


Fig.6 Normalized R_{DSON} vs. T_J

-100V P-Channel Enhancement Mode MOSFET

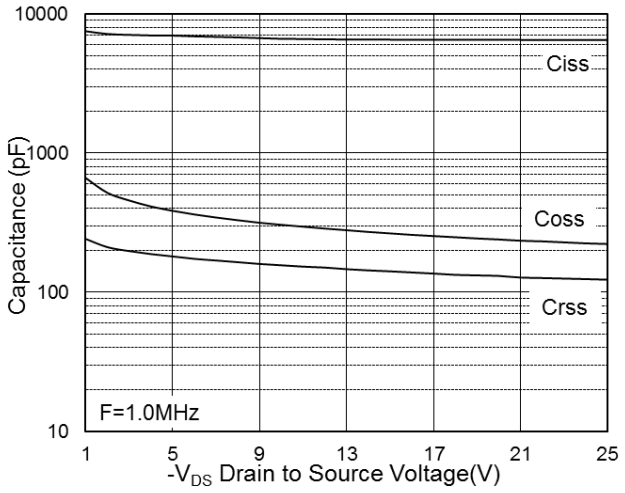


Fig.7 Capacitance

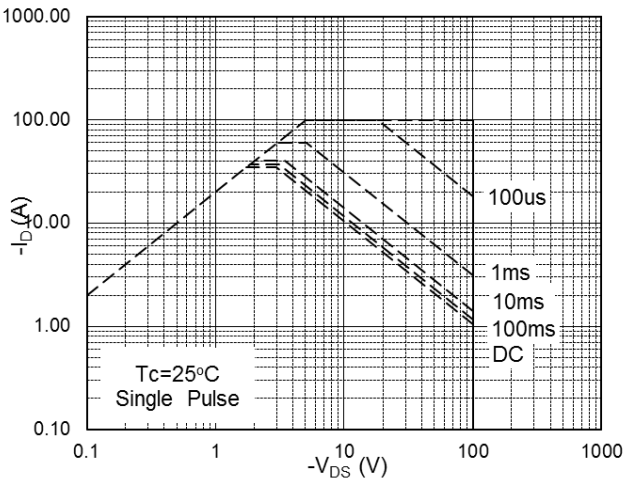


Fig.8 Safe Operating Area

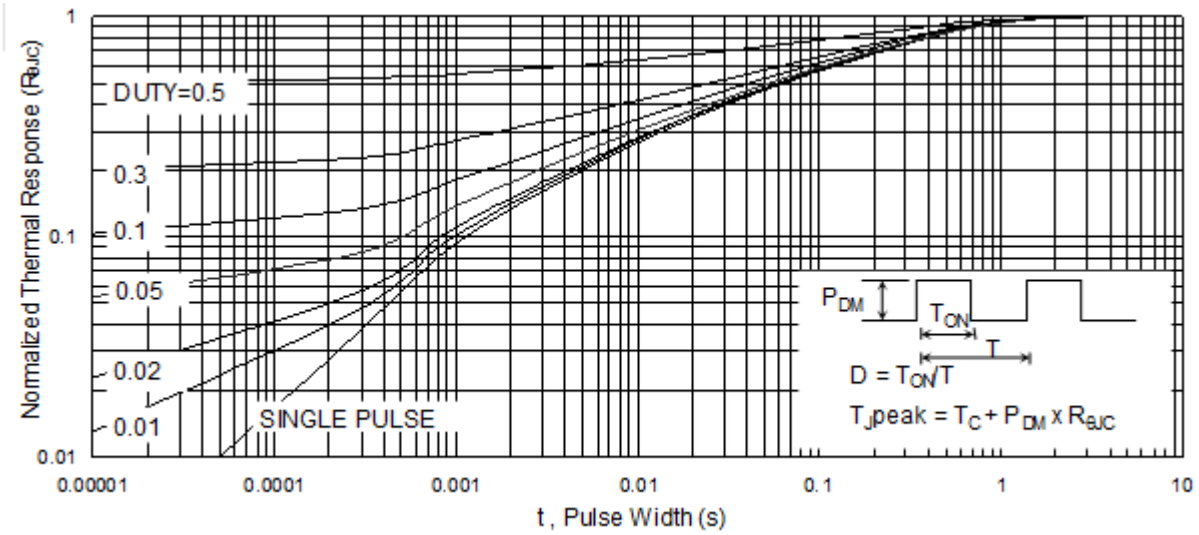


Fig.9 Normalized Maximum Transient Thermal Impedance

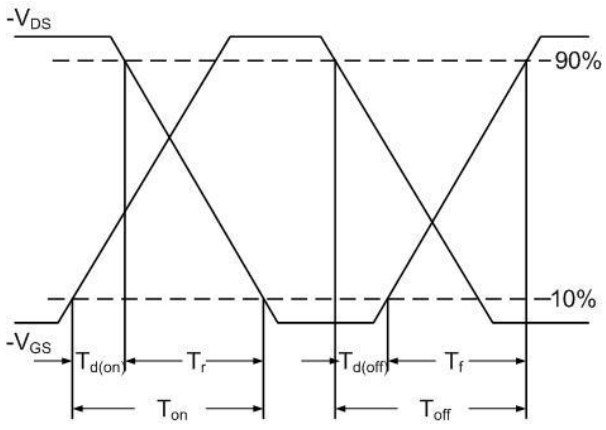


Fig.10 Switching Time Waveform

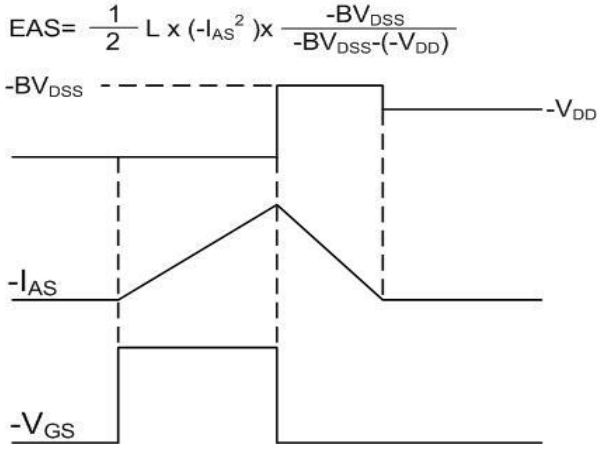


Fig.11 Unclamped Inductive Waveform

-100V P-Channel Enhancement Mode MOSFET

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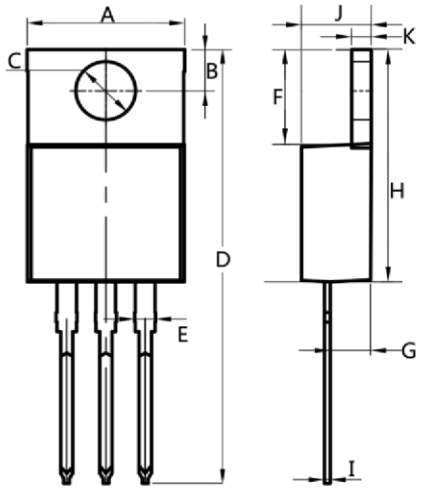
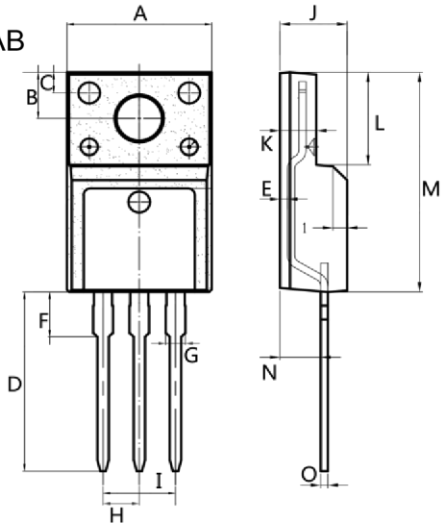


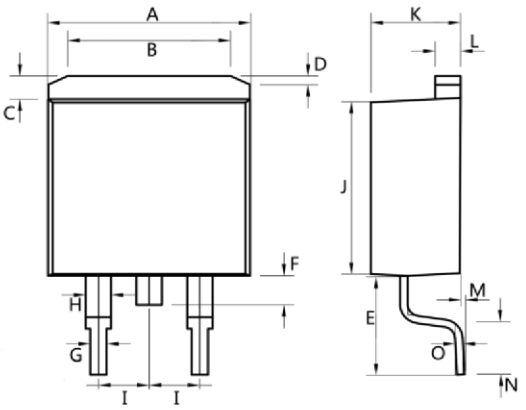
Dim.	Min.	Max.
A	10.0	10.4
B	2.5	3.0
C	3.5	4.0
D	28.0	30.0
E	1.1	1.5
F	6.2	6.6
G	2.9	3.3
H	15.0	16.0
I	0.35	0.45
J	4.3	4.7
K	1.2	1.4
All Dimensions in millimeter		

ITO-220AB



Dim.	Min.	Max.
A	9.9	10.3
B	2.9	3.5
C	1.15	1.45
D	12.75	13.25
E	0.55	0.75
F	3.1	3.5
G	1.25	1.45
H	Typ 2.54	
I	Typ 5.08	
J	4.55	4.75
K	2.4	2. 7
L	6.35	6.75
M	15.0	16.0
N	2.75	3.15
O	0.45	0.60
All Dimensions in millimeter		

TO-263



Dim.	Min.	Max.
A	10.0	10. 5
B	7.25	7.75
C	1.3	1.5
D	0.55	0.75
E	5.0	6.0
F	1.4	1.6
G	0.75	0.95
H	1.15	1.35
I	Typ 2.54	
J	8.4	8.6
K	4.4	4.6
L	1.25	1.45
M	0.02	0.1
N	2.4	2.8
O	0.35	0.45
All Dimensions in millimeter		

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