

100V N-Channel Enhancement Mode MOSFET

Description

The AP70N10P/T 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.

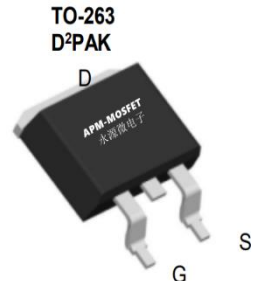
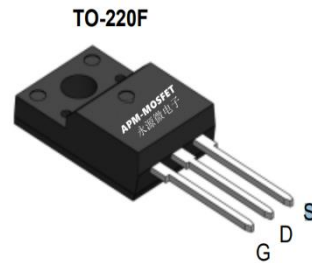
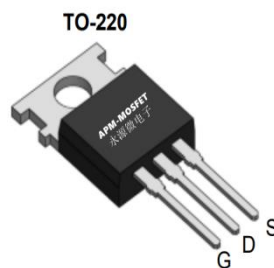
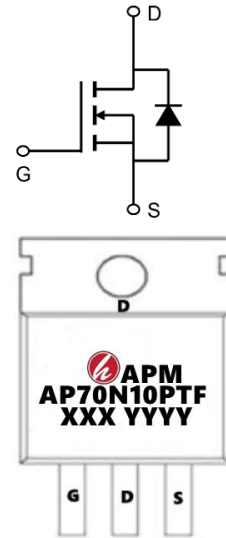
General Features

$V_{DS} = 100V$ $I_D = 70A$

$R_{DS(ON)} < 25m\Omega @ V_{GS}=10V$ (Type: 18m Ω)

Application

Automotive lighting
Load switch
Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP70N10F	TO-220F-3L	AP70N10F XXX YYYY	1000
AP70N10P	TO-220-3L	AP70N10P XXX YYYY	1000
AP70N10T	TO-263-3L	AP70N10T XXX YYYY	800

Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C=25^\circ C$	Drain Current, $V_{GS} @ 10V$	70	A
$I_D @ T_C=100^\circ C$	Drain Current, $V_{GS} @ 10V$	56	A
IDM	Pulsed Drain Current ¹	210	A
E_{AS}	Single Pulse Avalanche Energy	110	mJ
$P_D @ T_C=25^\circ C$	Total Power Dissipation	90	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C
$R_{\theta JA}$	Maximum Thermal Resistance, Junction-ambient	62.5	°C/W
$R_{\theta JC}$	Maximum Thermal Resistance, Junction-case	1.4	°C/W

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Electrical Characteristics@T_J=25°C(unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	100	110	---	V
RDS(ON)	Static Drain-Source On-Resistance ²	V _{GS} =10V , I _D =30A	---	18	25	mΩ
VGS(th)	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	2.0	3.0	4.0	V
IDSS	Drain-Source Leakage Current	V _{DS} =80V , V _{GS} =0V , T _J =25°C	---	---	1	uA
		V _{DS} =80V , V _{GS} =0V , T _J =55°C	---	---	5	
IGSS	Gate-Source Leakage Current	V _{GS} =±20V , V _{DS} =0V	---	---	±100	nA
gfs	Forward Transconductance	V _{DS} =5V , I _D =30A	---	31	---	S
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	---	1.9	3.8	Ω
Q _g	Total Gate Charge (10V)	V _{DS} =80V , V _{GS} =10V , I _D =30A	---	27.6	---	nC
Q _{gs}	Gate-Source Charge		---	11.4	---	
Q _{gd}	Gate-Drain Charge		---	7.9	---	
Td(on)	Turn-On Delay Time	V _{DD} =50V , V _{GS} =10V , R _G =3.3Ω, I _D =30A	---	16.5	---	ns
T _r	Rise Time		---	35	---	
Td(off)	Turn-Off Delay Time		---	17.5	---	
T _f	Fall Time		---	12	---	
Ciss	Input Capacitance	V _{DS} =15V , V _{GS} =0V , f=1MHz	---	1890	---	pF
Coss	Output Capacitance		---	268	---	
Crss	Reverse Transfer Capacitance		---	67	---	
IS	Continuous Source Current ^{1,5}	V _G =V _D =0V , Force Current	---	---	58	A
ISM	Pulsed Source Current ^{2,5}		---	---	130	A
VSD	Diode Forward Voltage ²	V _{GS} =0V , I _S =1A , T _J =25°C	---	---	1.2	V
trr	Reverse Recovery Time	IF=30A , dI/dt=100A/μs , T _J =25°C	---	22	---	nS
Q _{rr}	Reverse Recovery Charge		---	20	---	nC

Note :

- 1、The data tested by surface mounted on a 1 inch 2 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 VDD=72V,VGS=10V,L=0.1mH,IAS=40A
- 4、The power dissipation is limited by 150°C 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.

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Typical Characteristics

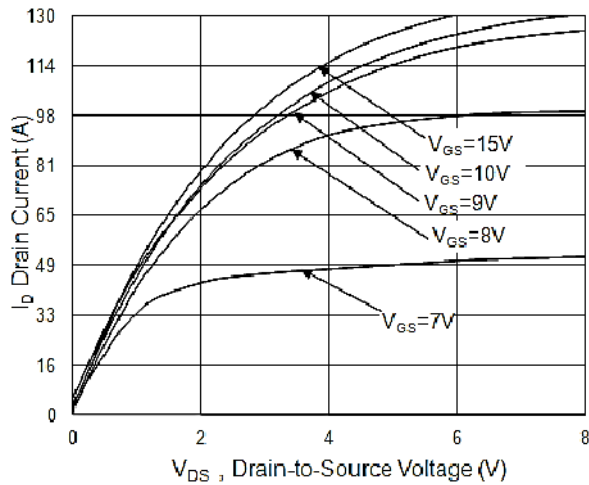


Fig.1 Typical Output Characteristics

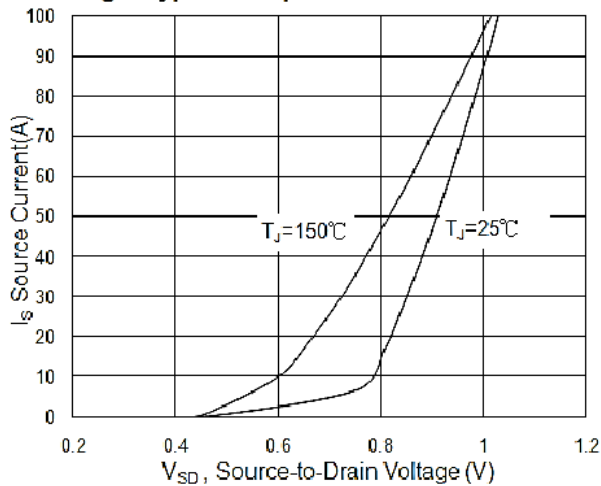


Fig.3 Forward Characteristics of Reverse

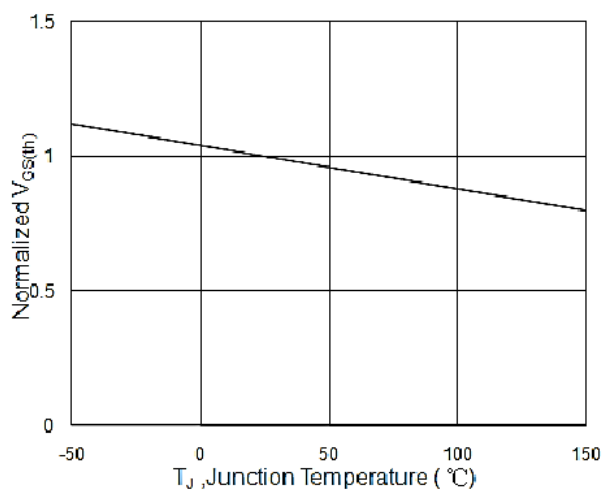


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

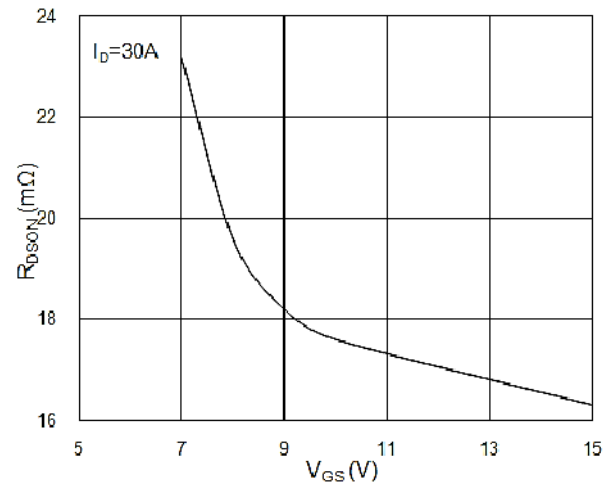


Fig.2 On-Resistance v.s Gate-Source

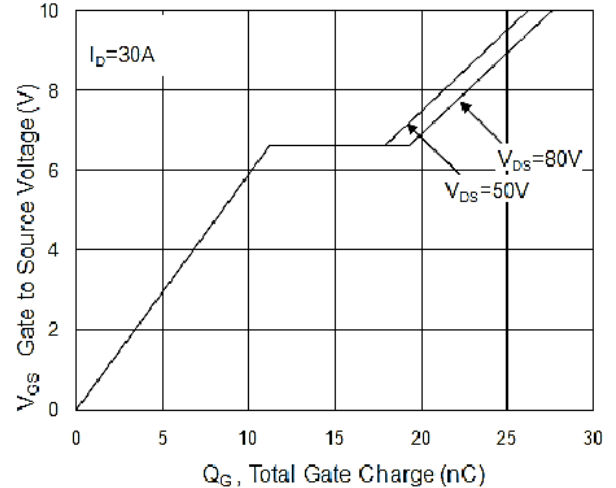


Fig.4 Gate-Charge Characteristics

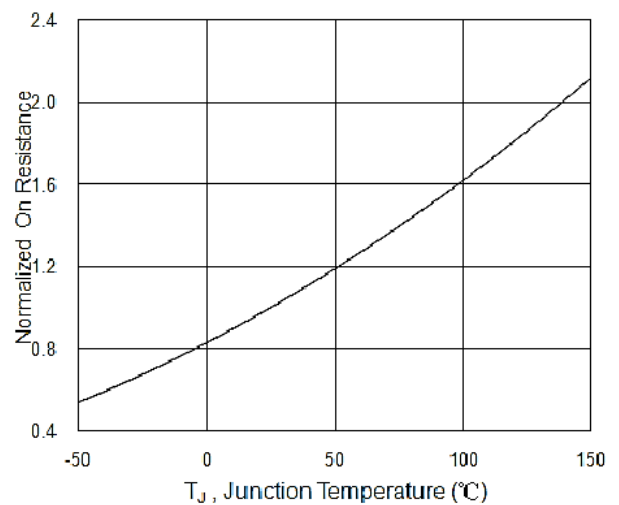


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

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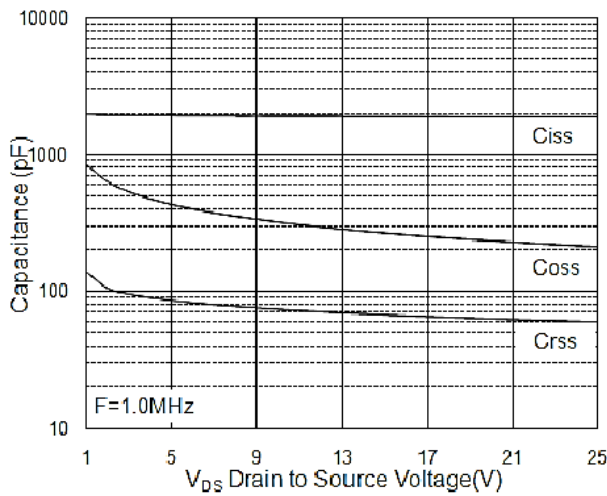


Fig.7 Capacitance

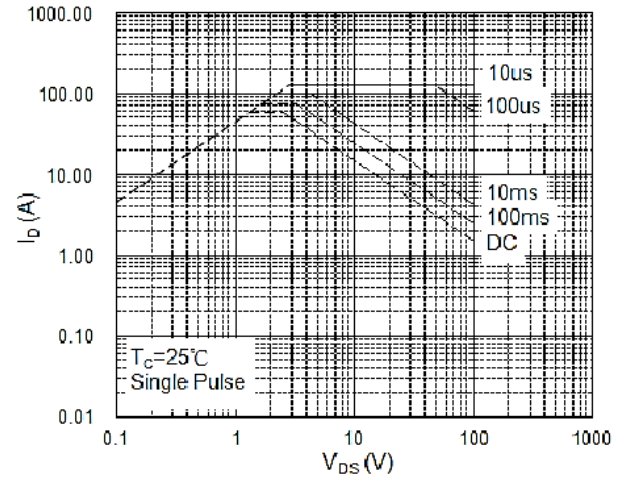


Fig.8 Safe Operating Area

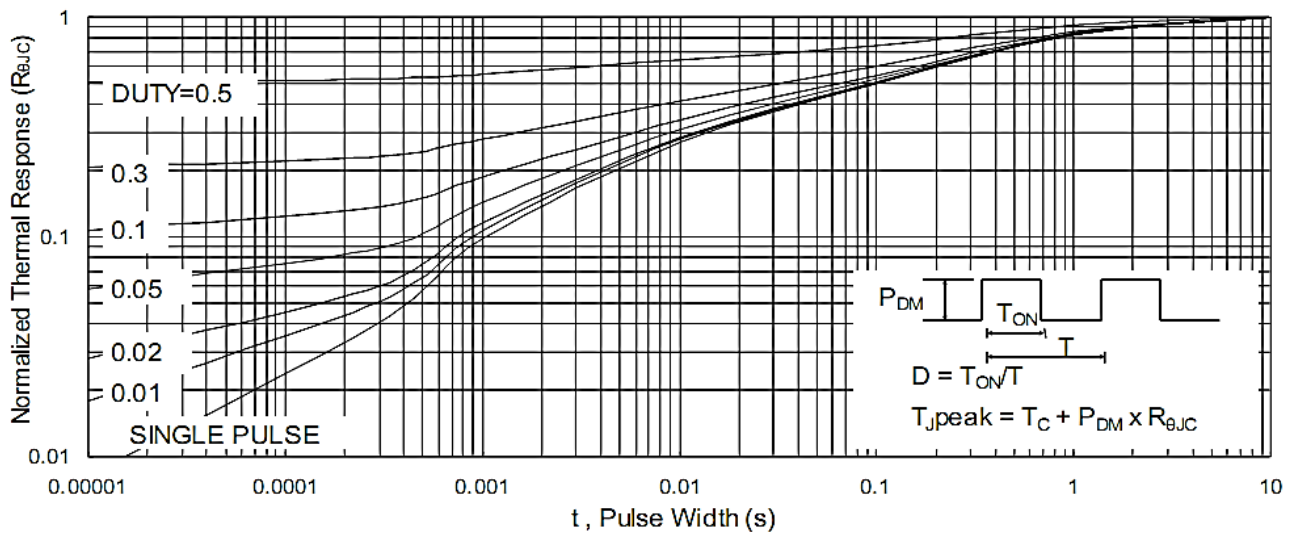


Fig.9 Normalized Maximum Transient Thermal Impedance

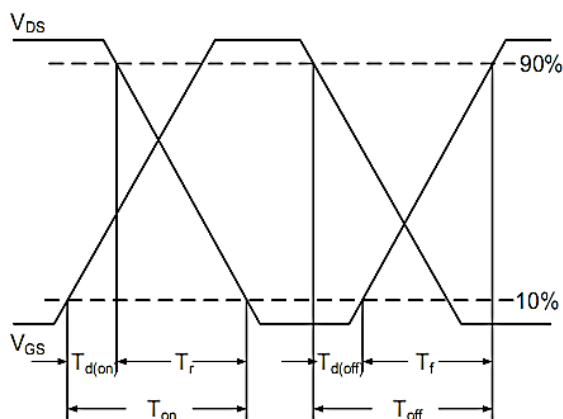


Fig.10 Switching Time Waveform

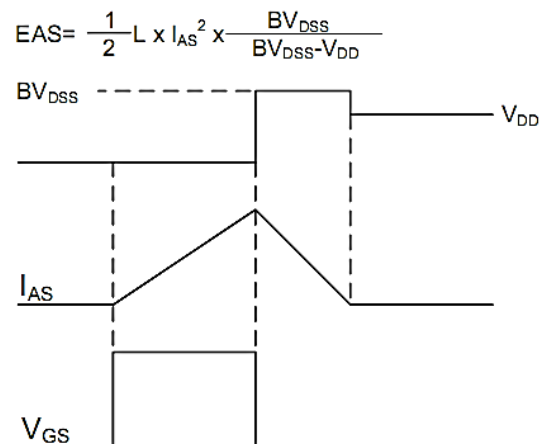
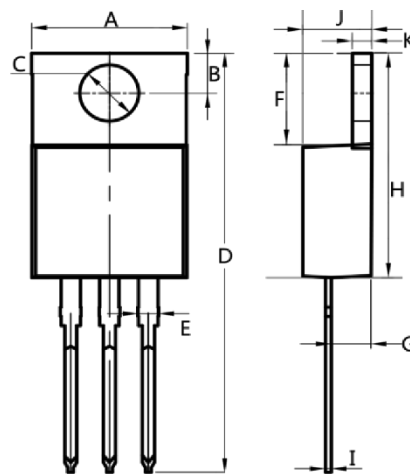


Fig.11 Unclamped Inductive Switching Waveform

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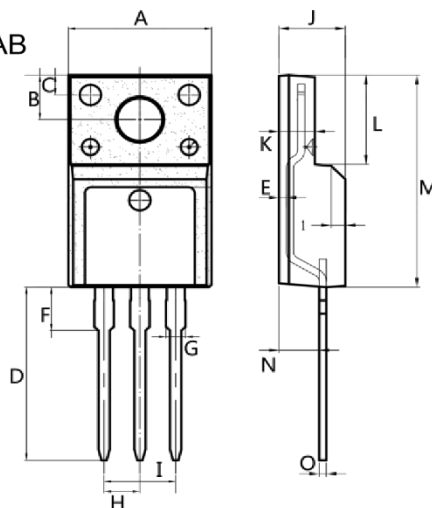
TO-220AB



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

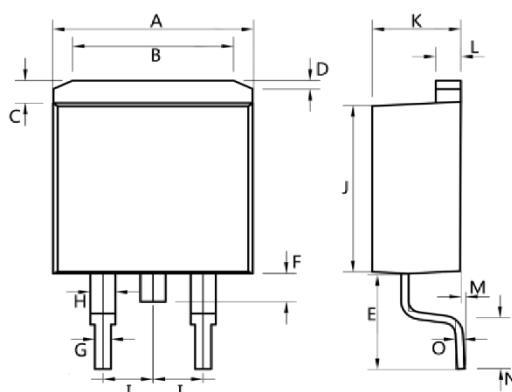
ITO-220AB



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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Edition	Date	Change
Rve1.0	2021/10/29	Initial release

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