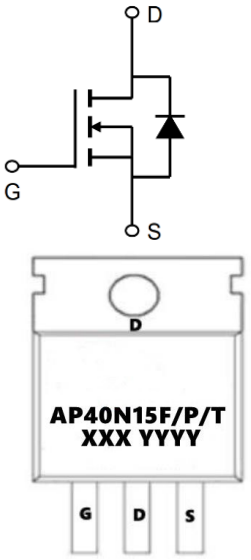
AP40N15F/T/P

150V N-Channel Enhancement Mode MOSFET

Description

The AP40N15F/P/T uses advanced trenh technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 10V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

V_{DS} = 150V I_D =40A

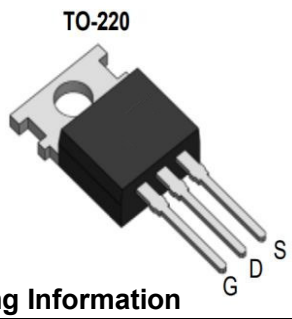
$R_{DS(ON)}$ < 46mΩ @ V_{GS}=10V **(Type：35mΩ)**

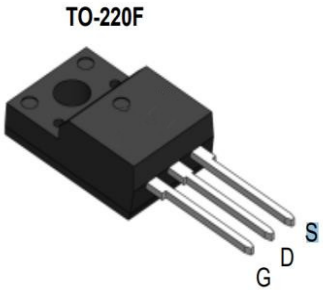
Application

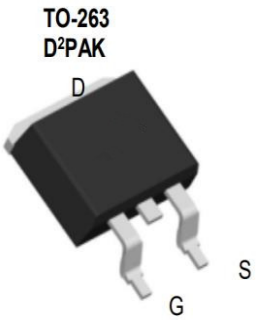
DC/DC Converter

LED Backlighting

Power Management Switches







Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP40N15F	TO-220F-3L	AP40N15F XXX YYYY	1000
AP40N15P	TO-220-3L	AP40N15P XXX YYYY	1000
AP40N15T	TO-263-3L	AP40N15T XXX YYYY	800

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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	150	V
VGS	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	40	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	28	A
IDM	Pulsed Drain Current[2]	120	A
EAS	Single Pulse Avalanche Energy[3]	216	mJ
IAS	Avalanche Current	38	A
P_D@T_C=25℃	Total Power Dissipation[3]	115	W
TSTG	Storage Temperature Range	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	℃
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	62.5	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	1.3	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	150	---	---	V
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=20A	---	35	46	mΩ
	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V , I_D=20A	---	37	50	mΩ
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	2.0	2.5	V
IDSS	Drain-Source Leakage Current	V_{DS}=120V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=120V , V_{GS}=0V , T_J=55℃	---	---	5	
IGSS	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=20A	---	55	---	S
Q_g	Total Gate Charge (4.5V)	V_{DS}=75V , V_{GS}=4.5V , I_D=10A	---	40	---	nC
Qgs	Gate-Source Charge		---	10	---	
Qgd	Gate-Drain Charge		---	21	---	
Td(on)	Turn-On Delay Time	V_{DD}=50V , V_{GS}=4.5V , R_G=3.3Ω I_D=10A	---	18	---	ns
T_r	Rise Time		---	20	---	
Td(off)	Turn-Off Delay Time		---	65	---	
T_f	Fall Time		---	15	---	
Ciss	Input Capacitance	V_{DS}=25V , V_{GS}=0V , f=1MHz	---	3755	---	pF
Coss	Output Capacitance		---	207	---	
Crss	Reverse Transfer Capacitance		---	160	---	
IS	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	30	A
VSD	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
trr	Reverse Recovery Time	IF=10A , dI/dt=100A/μs , T_J=25℃	---	35	---	nS
Q_{rr}	Reverse Recovery Charge		---	120	---	nC

Notes:

1、The data tested by surface mounted on a 1 inch2 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}=50V, V_{GS}=10V, L=0.5mH, I_{AS}=38A

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.

Typical Characteristics

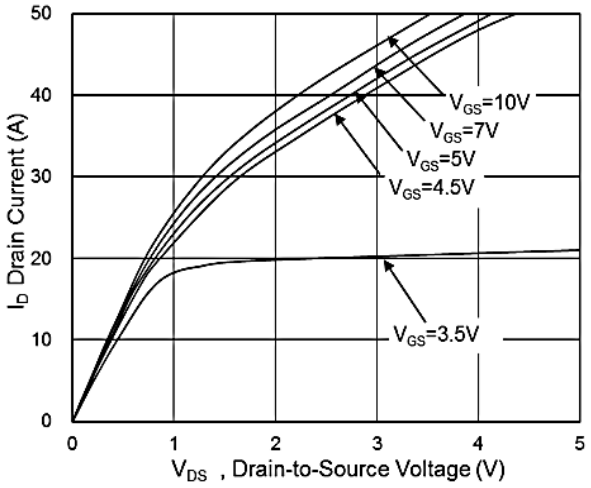


Fig.1 Typical Output Characteristics

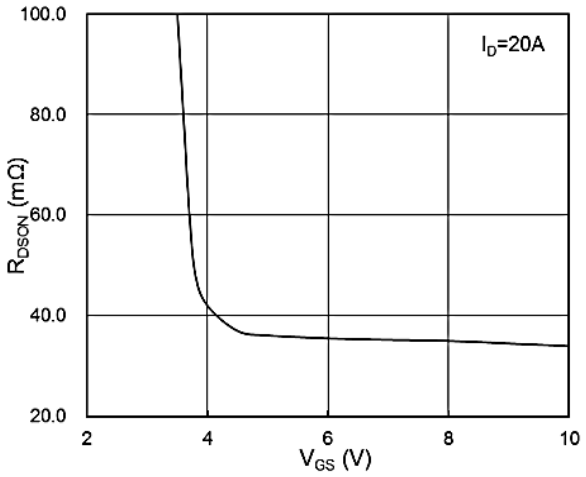


Fig.2 On-Resistance vs. Gate-Source

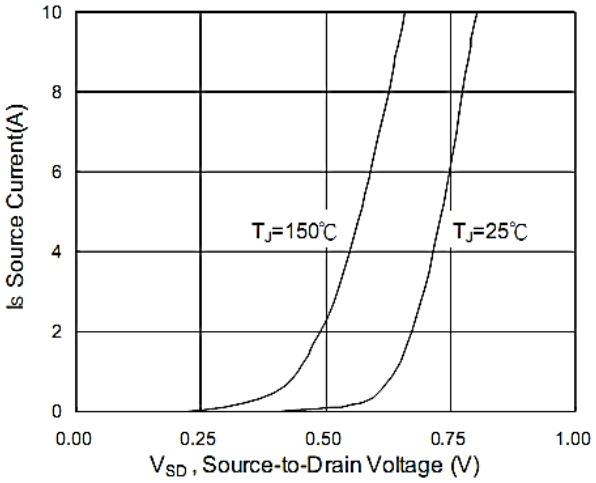


Fig.3 Forward Characteristics Of Reverse

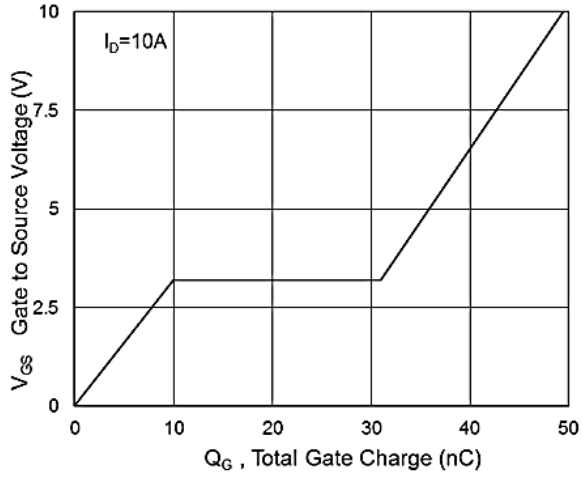


Fig.4 Gate-Charge Characteristics

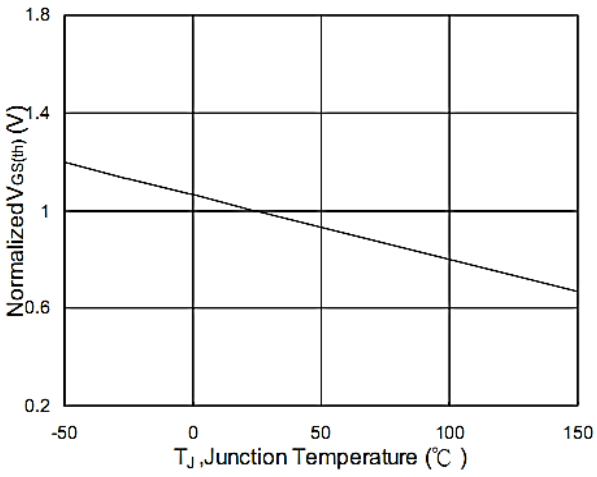


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

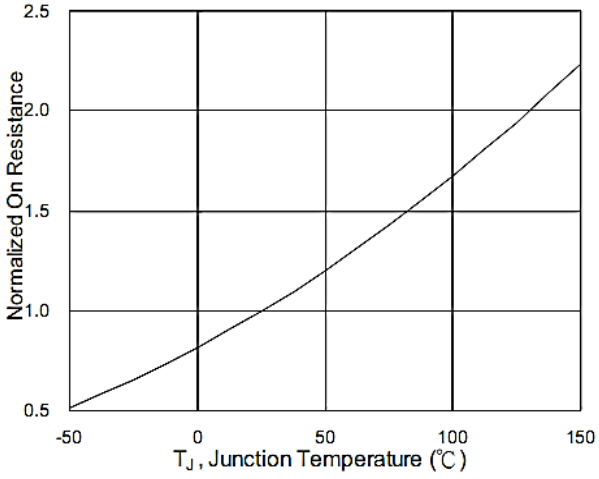


Fig.6 Normalized R_{DSON} vs. T_J

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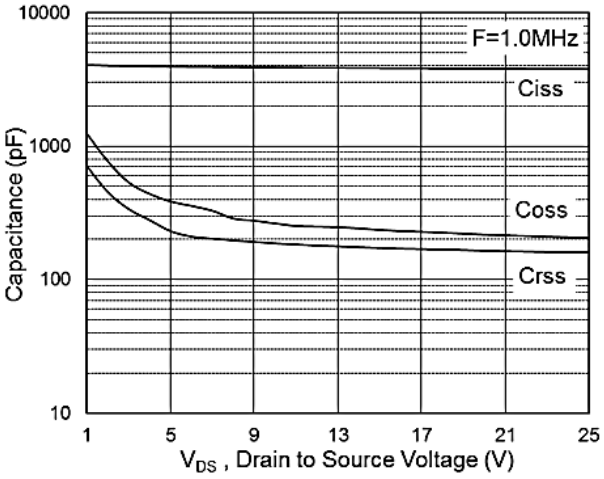

Fig.7 Capacitance

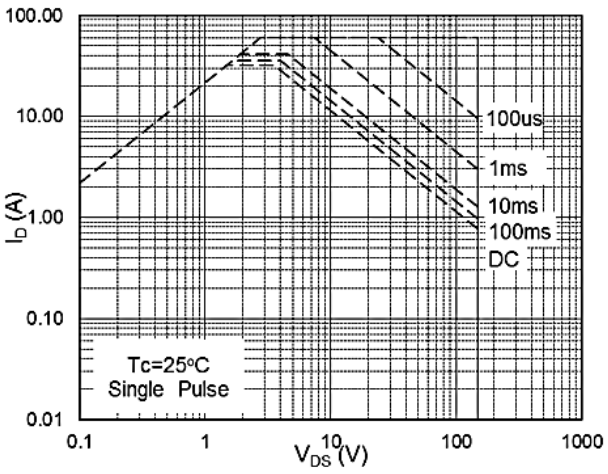

Fig.8 Safe Operating Area

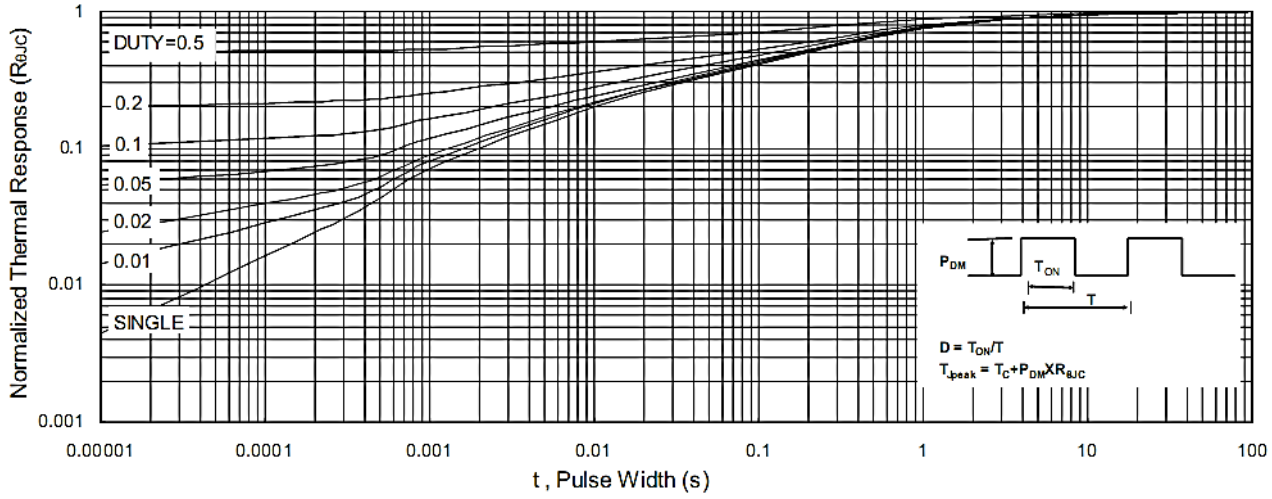

Fig.9 Normalized Maximum Transient Thermal Impedance

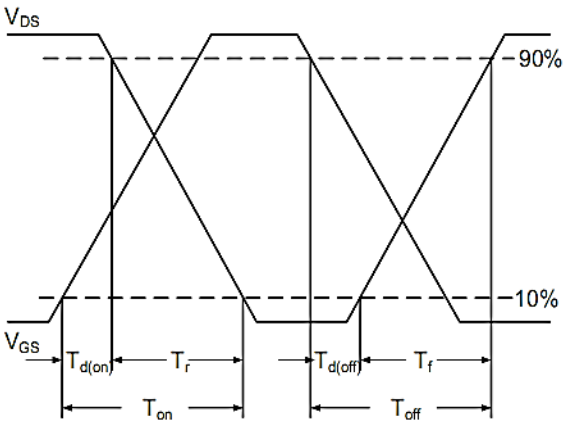

Fig.10 Switching Time Waveform

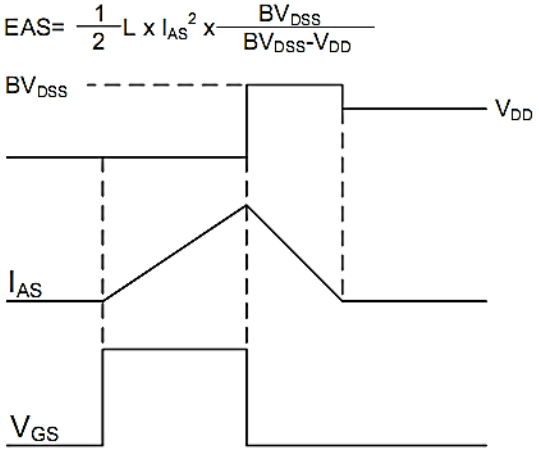

Fig.11 Unclamped Inductive Switching Waveform

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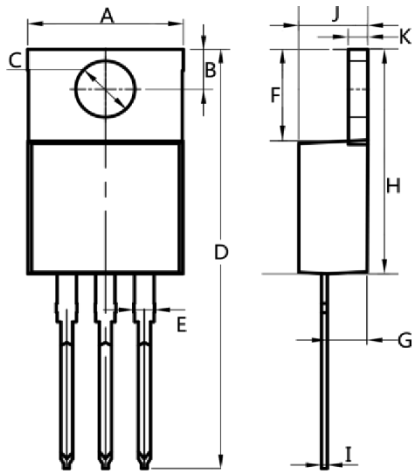
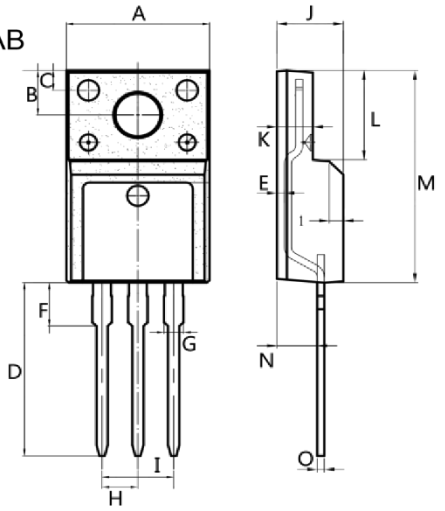
TO-220AB



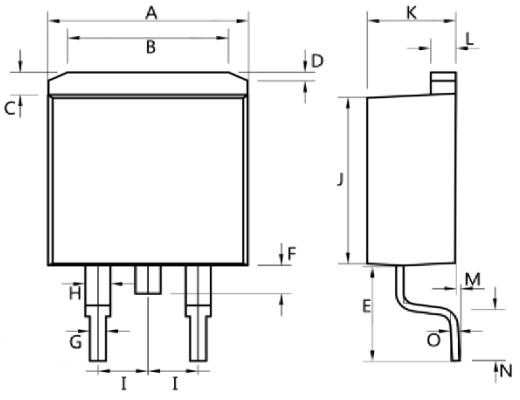
Dim.	Min.	Max.
A	10.0	10.4
B	2.5	3.0
C	3.5	4.0
D	28.0	30.0
E	1.1	1.5
F	6.2	6.6
G	2.9	3.3
H	15.0	16.0
I	0.35	0.45
J	4.3	4.7
K	1.2	1.4
All Dimensions in millimeter		

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		