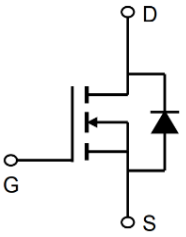
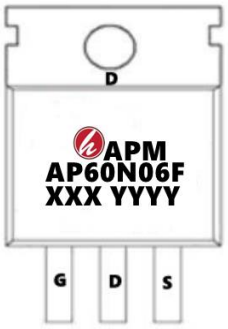
AP60N06F

60V N-Channel Enhancement Mode MOSFET

Description

The AP60N06F 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} = 60V I_D =60A

$R_{DS(ON)}$ < 15mΩ @ V_{GS}=10V **(Type:11mΩ)**

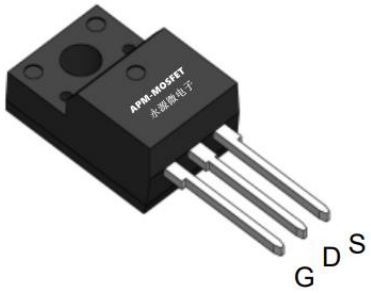
Application

Battery protection

Load switch

Uninterruptible power supply

TO-220F



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP60N06F	TO-220F-3L	AP60N06F XXXX YYYY	1000

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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	60	V
VGS	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	60	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	35	A
IDM	Pulsed Drain Current[2]	180	A
EAS	Single Pulse Avalanche Energy[3]	39.2	mJ
IAS	Avalanche Current	38	A
P_D@T_C=25℃	Total Power Dissipation[4]	45	W
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
RθJA	Thermal Resistance Junction-Ambient [1]	62.5	℃/W
RθJC	Thermal Resistance Junction-Case[1]	2.8	℃/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	60	65	---	V
△BVDSS/△TJ	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.057	---	V/℃
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=20A	---	11	15	mΩ
		V_{GS}=4.5V , I_D=10A	---	16	20	
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.8	2.5	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-5.68	---	mV/℃
IDSS	Drain-Source Leakage Current	V_{DS}=48V , V_{GS}=0V , T_J=25℃	---	---	1	uA
			---	---	5	
IGSS	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=15A	---	45	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.7	---	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=48V , V_{GS}=4.5V , I_D=15A	---	19.3	---	nC
Q_{gs}	Gate-Source Charge		---	7.1	---	
Q_{gd}	Gate-Drain Charge		---	7.6	---	
Td(on)	Turn-On Delay Time	V_{DD}=30V , V_{GS}=10V , R_G=3.3Ω, I_D=15A	---	7.2	---	ns
T_r	Rise Time		---	50	---	
Td(off)	Turn-Off Delay Time		---	36.4	---	
T_f	Fall Time		---	7.6	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	2423	---	pF
Coss	Output Capacitance		---	145	---	
Crss	Reverse Transfer Capacitance		---	97	---	
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	35	A
ISM	Pulsed Source Current[2,5]		---	---	80	A
VSD	Diode Forward Voltage[2]	V_{GS}=0V , I_S=A , T_J=25℃	---	---	1	V
t_{rr}	Reverse Recovery Time	IF=15A,dI/dt=100A/μs ,T_J=25℃	---	16.3	---	nS
Q_{rr}	Reverse Recovery Charge		---	11	---	nC

Note :

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 VDD=25V,VGS=10V,L=0.1mH,IAS=38A

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

5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation

Typical Characteristics

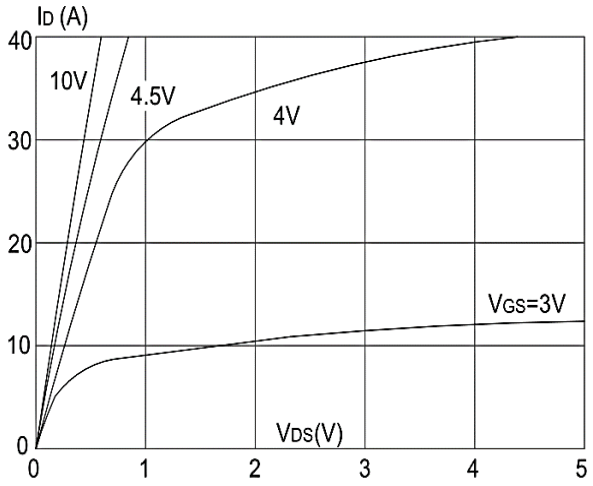


Figure1: Output Characteristics

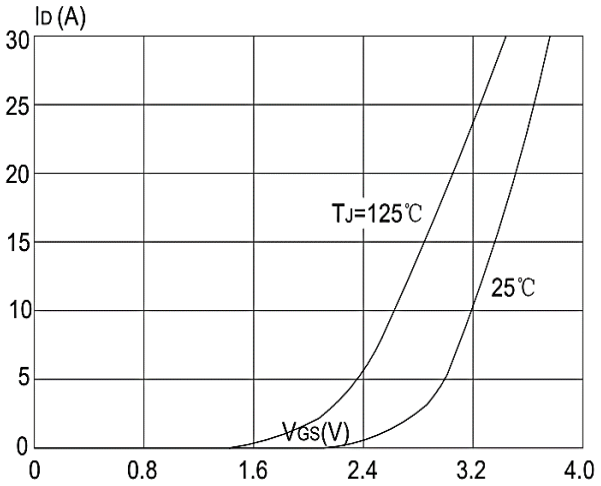


Figure 2: Typical Transfer Characteristics

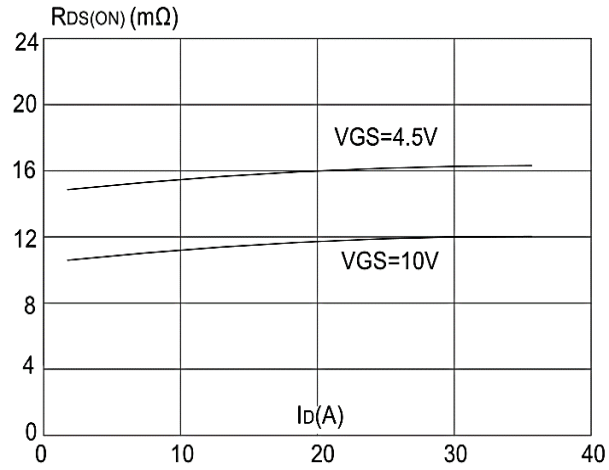


Figure 3:On-resistance vs. Drain Current

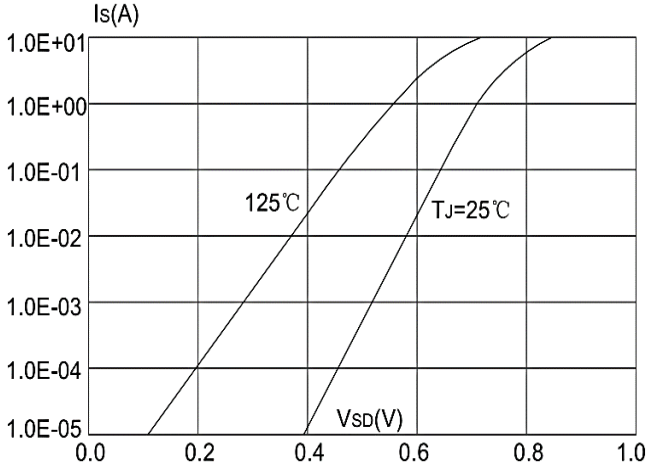


Figure 4: Body Diode Characteristics

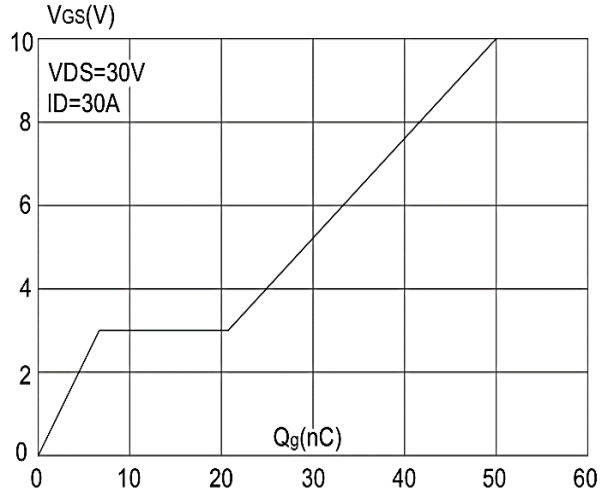


Figure 5: Gate Charge Characteristics

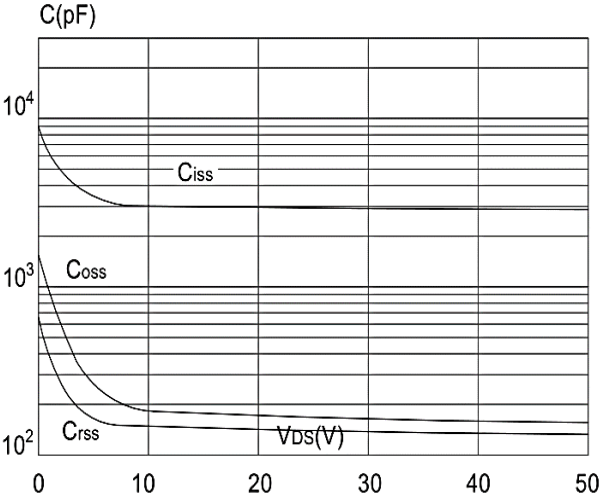


Figure 6: Capacitance Characteristics

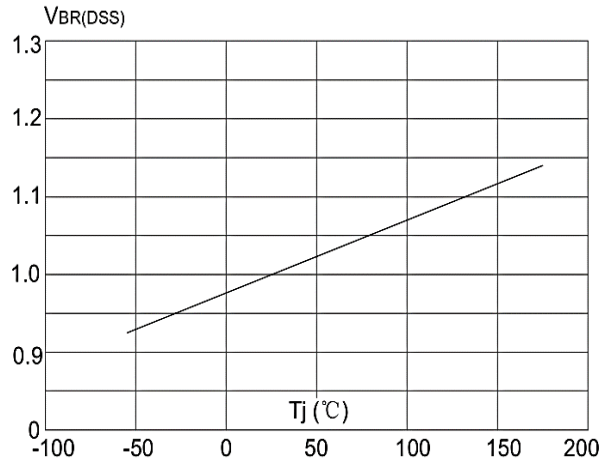


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

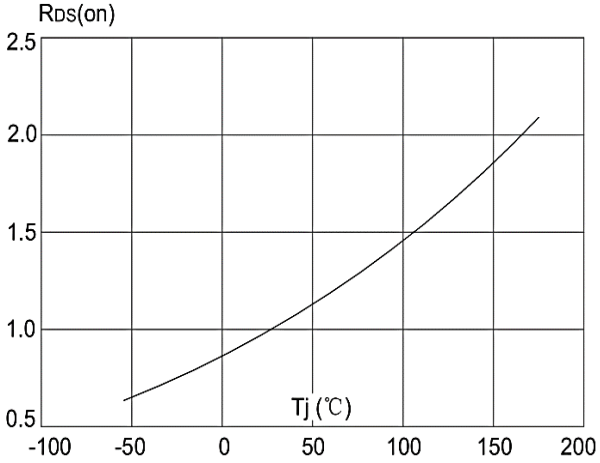


Figure 8: Normalized on Resistance vs. Junction Temperature

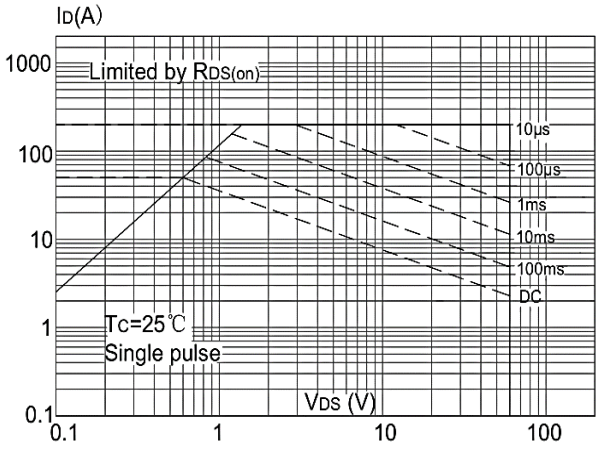


Figure 9: Maximum Safe Operating Area

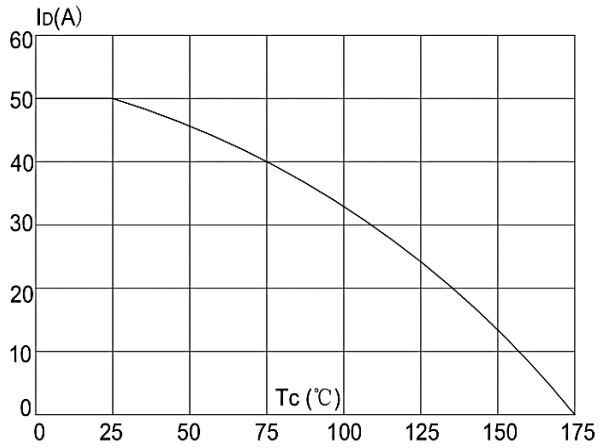


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

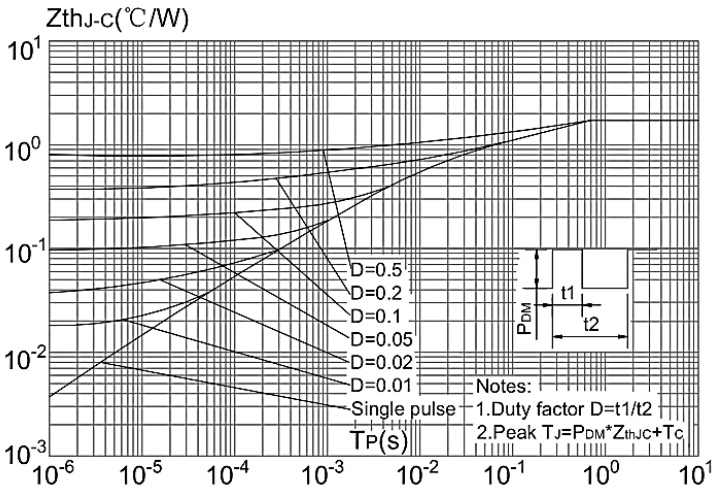
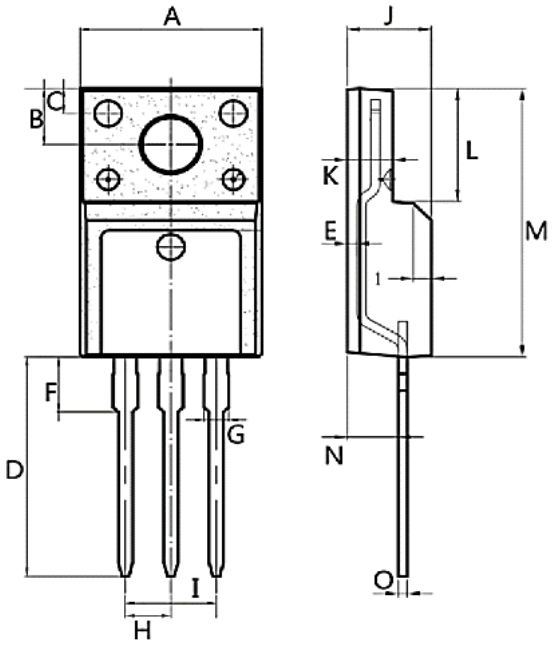


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

Package Mechanical Data-TO-220F-3L-



Symbol	Common	
	mm	
	Mim	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	2.54	
I	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

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Edition	Date	Change
Rve1.0	2021/10/23	Initial release