AP20N02BF

20V N-Channel Enhancement Mode MOSFET

Description

The AP20N02BF uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

V_{DS} = 20V I_D =20A

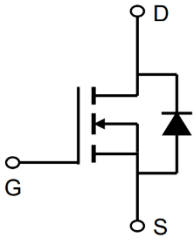
$R_{DS(ON)}$ < 15mΩ@ V_{GS}=4.5V （**Type：11mΩ**）

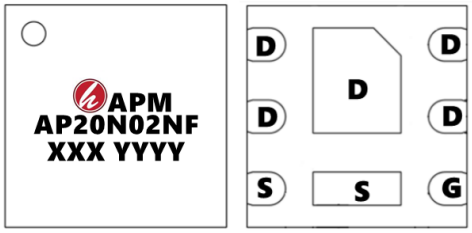
Application

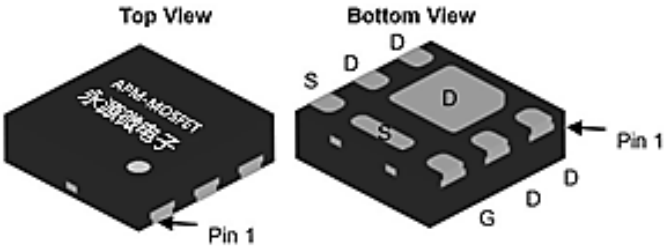
solar road lights

Load switch

Uninterruptible power supply







Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP20N02BF	QFN2*2-6L	AP20N02BF XXX YYYY	3000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	20	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	13	A
I_{DM}	Pulsed Drain Current[2]	50	A
EAS	Single Pulse Avalanche Energy[3]	8.1	mJ
I_{AS}	Avalanche Current	12.7	A
P_D@T_C=25℃	Total Power Dissipation[4]	20.8	W
P_D@T_A=25℃	Total Power Dissipation[4]	2	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]	125	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	6	℃/W

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	20	22		V
△BVDSS/△TJ	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.018	---	V/℃
VGS(th)	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250μA	0.50	0.65	1.0	V
RDS(ON)	Static Drain-Source On-Resistance	V_{GS}=4.5V, I_D=7.6A		11	15	mΩ
RDS(ON)	Static Drain-Source On-Resistance	V_{GS}=2.5V, I_D=3.5A		15.5	20	
RDS(ON)	Static Drain-Source On-Resistance	V_{GS}=1.8V, I_D=2.5A		20.5	35	
IDSS	Zero Gate Voltage Drain Current	V_{DS}=20V,V_{GS}=0V			1	μA
IGSS	Gate-Body Leakage Current	V_{GS}=±10V, V_{DS}=0V			±100	nA
C_{iss}	Input Capacitance	V_{DS}=10V,V_{GS}=0V,f=1MHZ		888		pF
C_{oss}	Output Capacitance			133		
C_{rss}	Reverse Transfer Capacitance			117		
Q_g	Total Gate Charge	V_{GS}=4.5V,V_{DS}=10V,I_D=6.8A		11.05		nC
Q_{gs}	Gate-Source Charge			1.73		
Q_{gd}	Gate-Drain Charge			3.1		
tD(on)	Turn-on Delay Time	V_{GS}=4.5V, V_{DS}=10V, I_D=6.8A R_{GEN}=3Ω		7		ns
t_r	Turn-on Rise Time			46		
tD(off)	Turn-off Delay Time			30		
t_f	Turn-off fall Time			52		
V_{SD}	Diode Forward Voltage	I_S=7.6A,V_{GS}=0V			1.2	V

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 power dissipation is limited by 150℃ junction temperature
4、The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

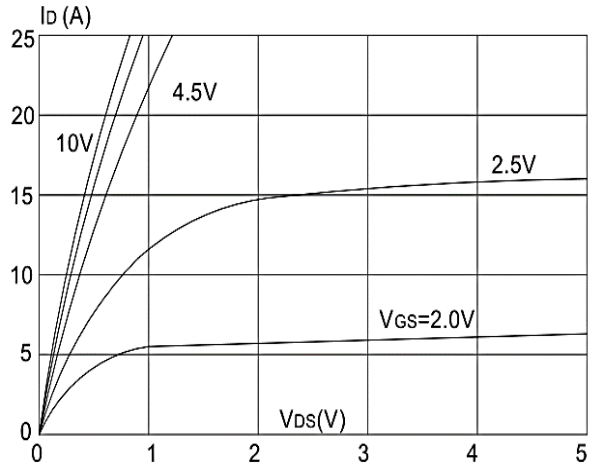


Figure1: Output Characteristics

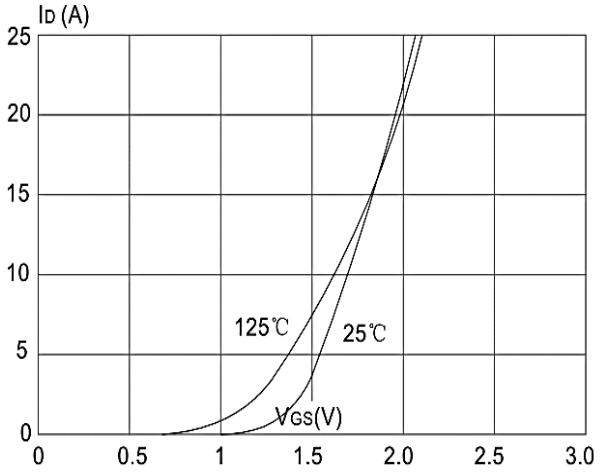


Figure 2: Typical Transfer Characteristics

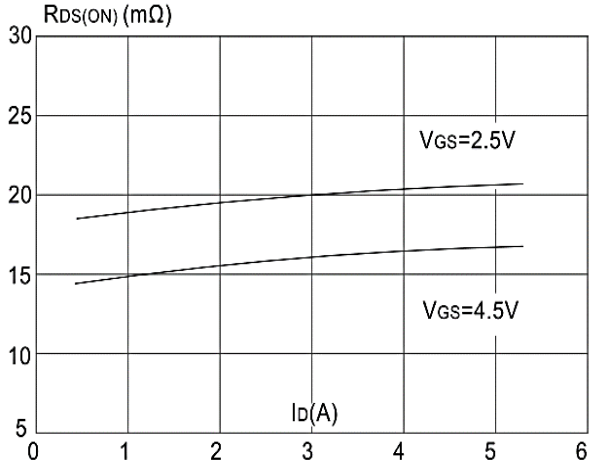


Figure 3:On-resistance vs. Drain Current

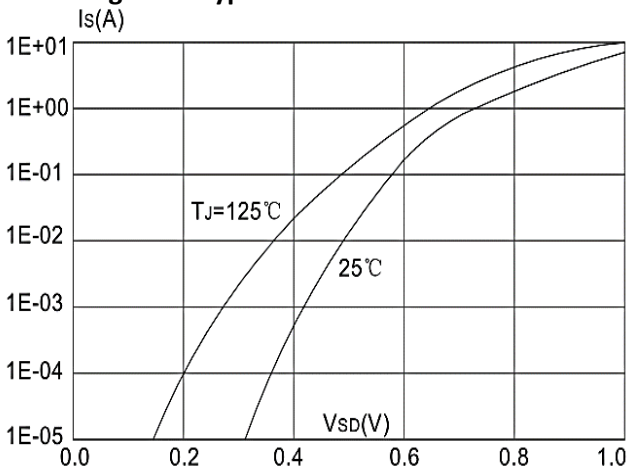


Figure 4: Body Diode Characteristics

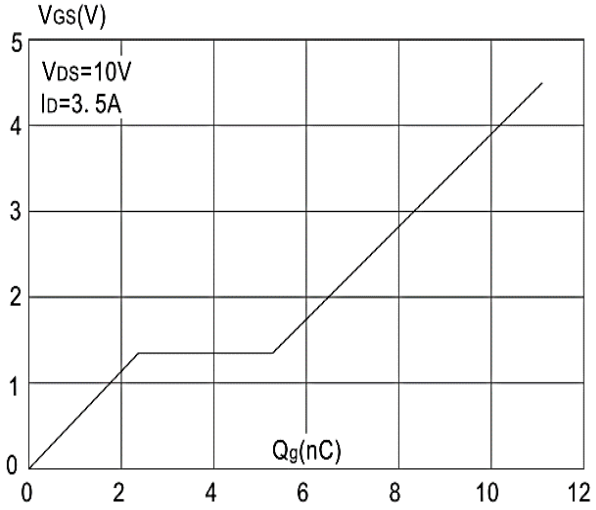


Figure 5: Gate Charge Characteristics

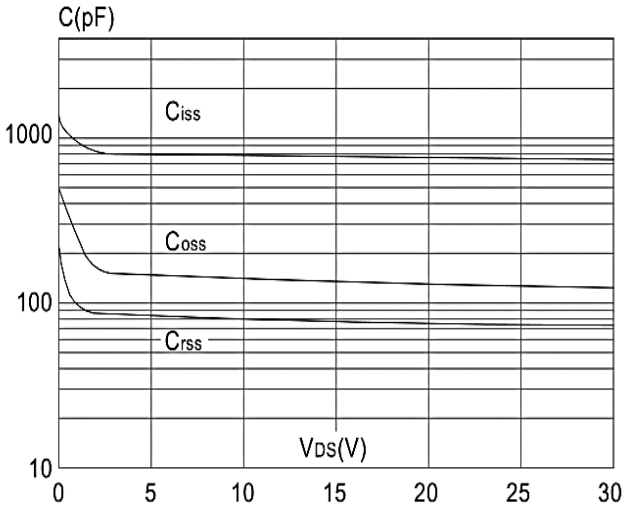


Figure 6: Capacitance Characteristics

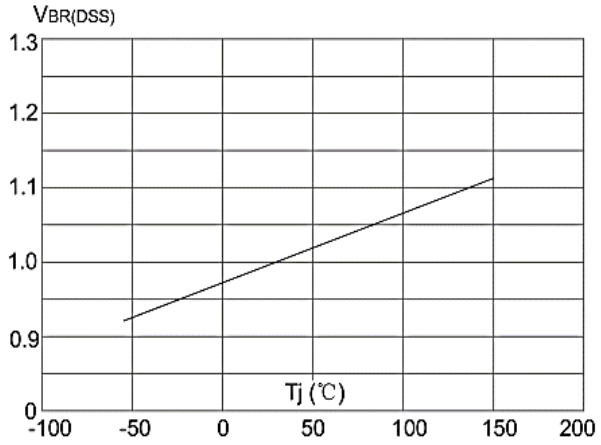


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

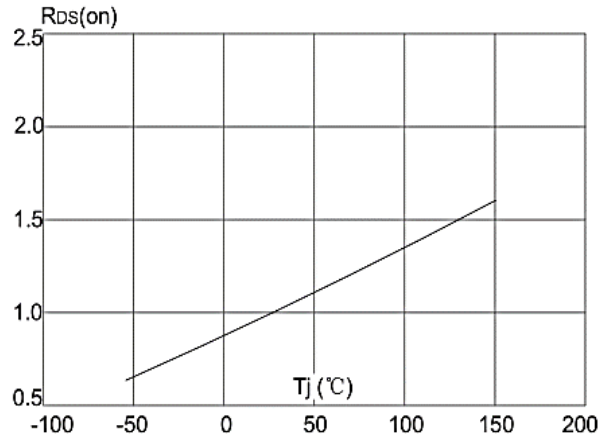


Figure 8: Normalized on Resistance vs Junction Temperature

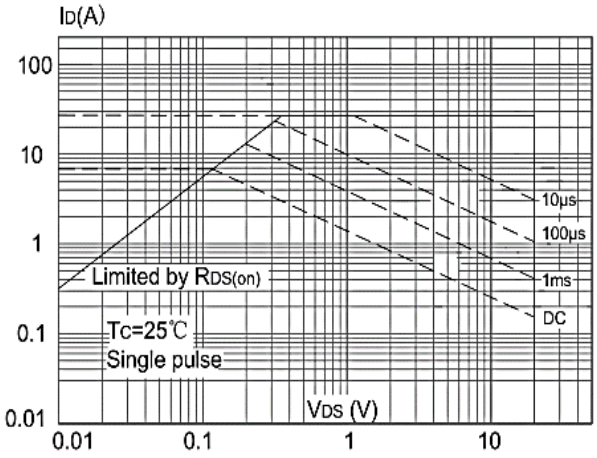


Figure 9: Maximum Safe Operating Area vs. Case Temperature

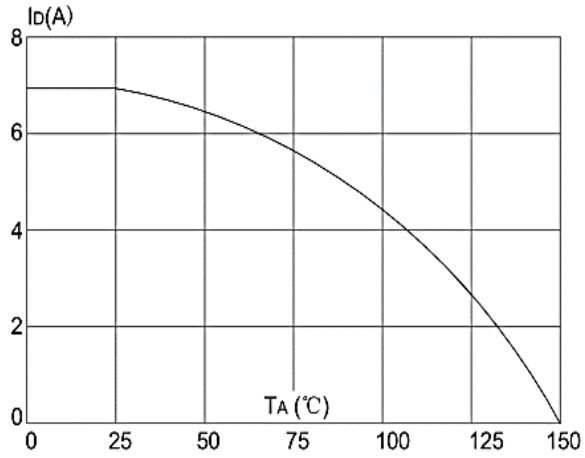


Figure 10: Maximum Continuous Drain Current

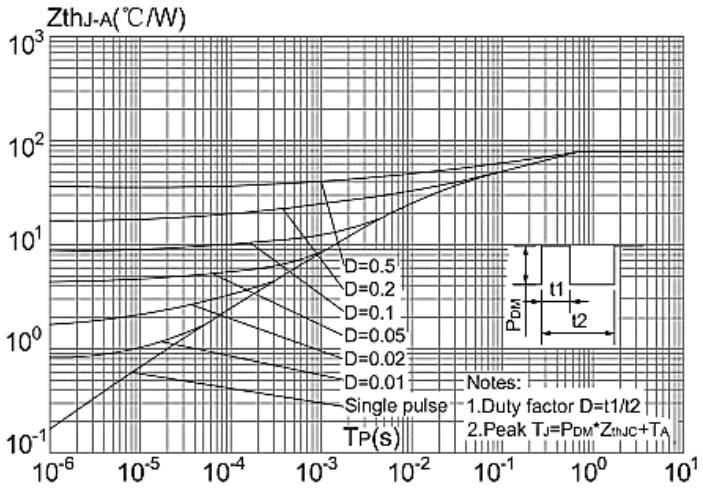
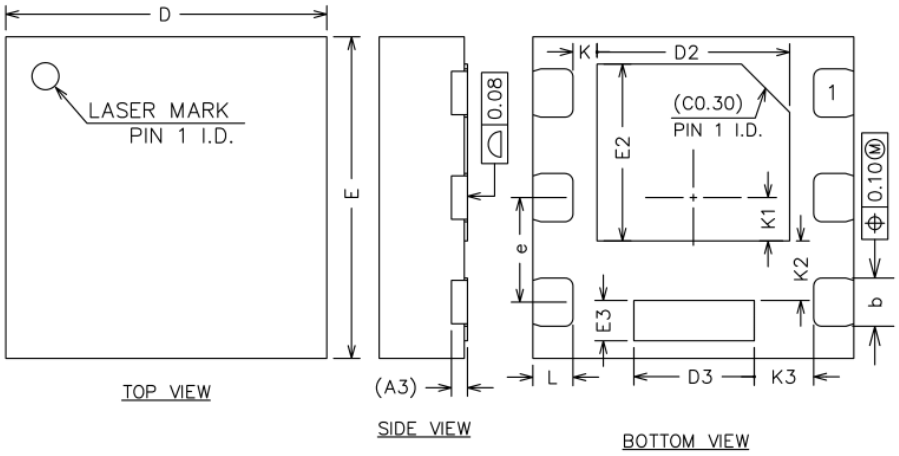


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

P Package Mechanical Data：QFN2*2-6L



Symbol			
	Min	Nom	Max
A	0.50	--	0.54
A1	0.00	0.02	0.05
A3		0.10REF	
b	0.25	0.30	0.35
D	1.90	2.00	2.10
E	1.90	2.00	2.10
D2	1.10	1.20	1.30
E2	1.00	1.10	1.20
D3	0.65	0.75	0.85
E3	0.15	0.25	0.35
e	0.55	0.65	0.75
K	0.05	--	--
K1	0.17	--	--
K2	0.27	--	--
K3	0.28	--	--
L	0.20	0.25	0.30

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Edition	Date	Change
Rve1.0	2019/9/31	Initial release