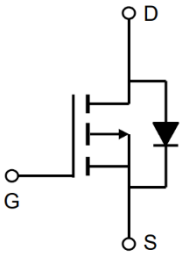
AP20P02BF

-20V P-Channel Enhancement Mode MOSFET

Description

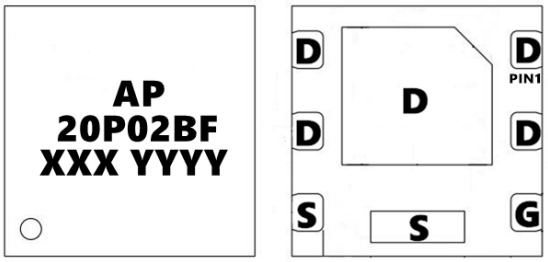
The AP20P02BF uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

V_{DS} = -20V I_D =-20A

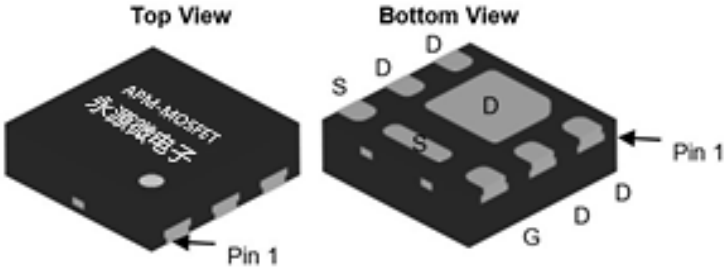
$R_{DS(ON)}$ < 18mΩ @ V_{GS}=-4.5V （Type：12mΩ）



Application

electronic cigarette

Load switch



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP20P02BF	QFN2*2-6L	AP20P02BF XXX YYYY	3000

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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	-20	V
VGS	Gate-Source Voltage	±12	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-20	A
I_D@T_C=70℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-11.4	A
IDM	Pulsed Drain Current[2]	-60	A
P_D@T_C=25℃	Total Power Dissipation[3]	2.4	W
P_D@T_C=70℃	Total Power Dissipation[3]	19	W
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta}JA$	Thermal Resistance Junction-Ambient [1]	52	℃/W
$R_{\theta}JC$	Thermal Resistance Junction-Case[1]	6.9	℃/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-to-Source breakdown voltage	V_{GS} = 0V, ID = 250μA	-20	-22	—	V
$R_{DS(on)}$	Static Drain-to-Source on-resistance	V_{GS} =-4.5V, I_D =-10A	—	12	18	mΩ
		V_{GS} =-2.5V, I_D =-8.9A	—	18	22	
		V_{GS} =-1.8V, I_D =-4.5A	—	24	38	
VGS(th)	Gate threshold voltage	V_{DS} = V_{GS}, I_D = 250μA	-0.4	-0.6	-1	V
IDSS	Drain-to-Source leakage current	V_{DS} = -12V,V_{GS} = 0V	—	—	-1	μA
IGSS	Gate-to-Source forward leakage	V_{GS} = 8V	—	—	100	nA
		V_{GS} = -8V	—	—	-100	
gFS	Forward Transconductance	V_{DS} = -5V, I_D =-10A	-3	—	—	S
Q_g	Total gate charge	I_D = -10A, V_{DD}=-6V, V_{GS} = -4.5V	—	21	—	nC
Q_{gs}	Gate-to-Source charge		—	2.5	—	
Q_{gd}	Gate-to-Drain("Miller") charge		—	6	—	
$t_{d(on)}$	Turn-on delay time	V_{GS}=-4.5V, V_{DD}=-6V, I_D = -10A, R_{GEN}=6Ω	—	30	—	ns
t_r	Rise time		—	48	—	
$t_{d(off)}$	Turn-Off delay time		—	97	—	
t_f	Fall time		—	65	—	
C_{iss}	Input capacitance	V_{GS} = 0V V_{DS} = -6V f = 1MHz	—	2138	—	pF
Coss	Output capacitance		—	685	—	
C_{rss}	Reverse transfer capacitance		—	650	—	
I_S	Continuous Source Current (Body Diode)	MOSFET symbol showing the integral reverse p-n junction diode.	—	—	-12	A
ISM	Pulsed Source Current (Body Diode)		—	—	-28	A
V_{SD}	Diode Forward Voltage	I_S=-2A, V_{GS}=0V	—	-0.77	-1.2	V
t_{rr}	Reverse Recovery Time	T_J = 25°C, I_F =-10A, di/dt = 100A/μs	—	16	—	ns
Q_{rr}	Reverse Recovery Charge		—	5.9	—	uC

Notes:

1、The maximum current rating is limited by bond-wires.

2、Repetitive rating; pulse width limited by max. junction temperature.

3、The power dissipation PD is based on max. junction temperature, using junction-to-ambient thermal resistance.

4、The value of $R_{\theta JA}$ is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with TA =25°C

5、These curves are based on the junction-to-case thermal impedence which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=150°C.

Typical Characteristics

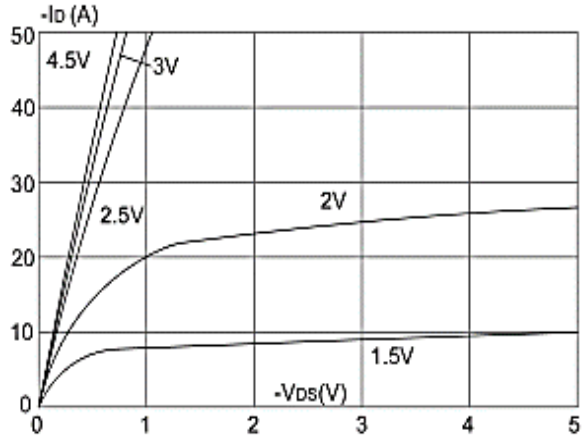


Figure1: Output Characteristics

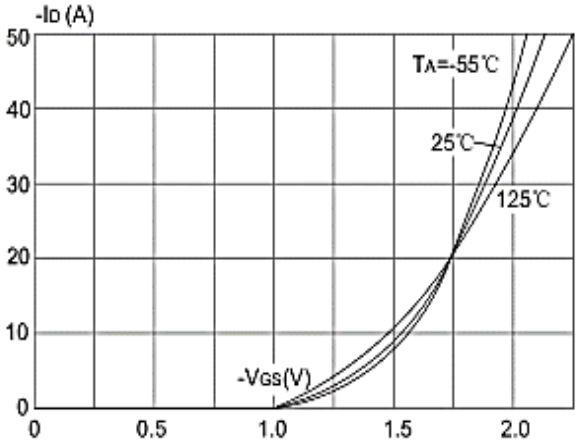


Figure 2: Typical Transfer Characteristics

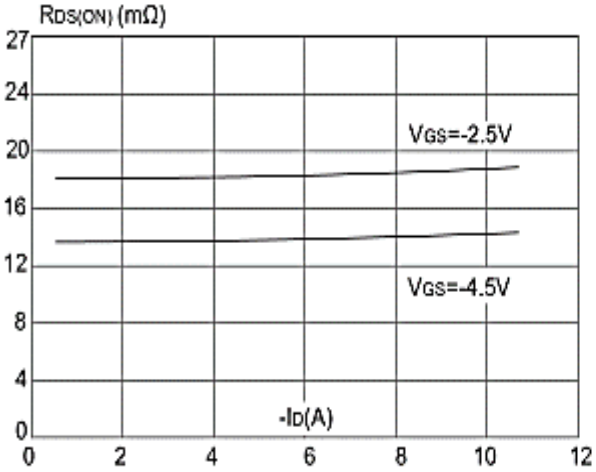


Figure 3:On-resistance vs. Drain Current

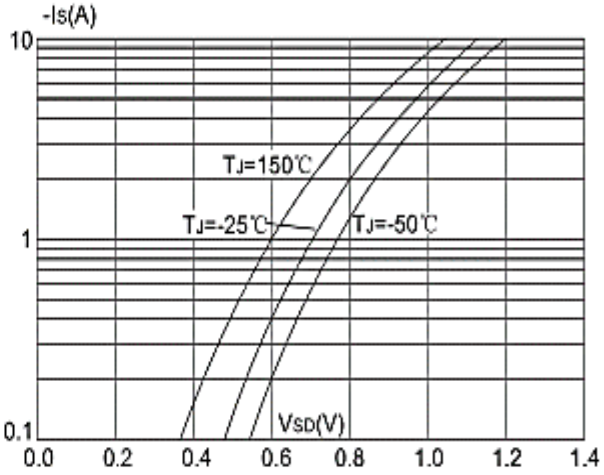


Figure 4: Body Diode Characteristics

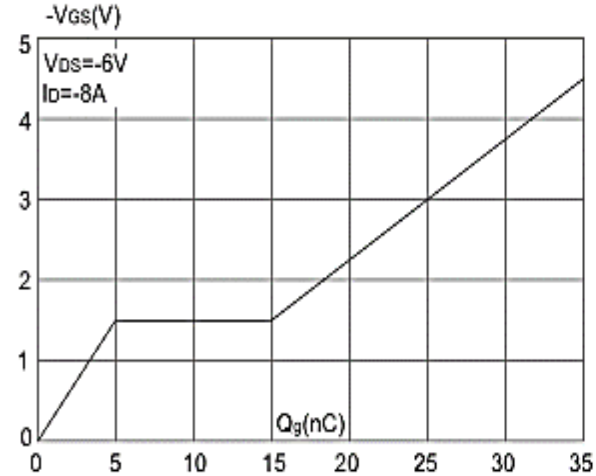


Figure 5: Gate Charge Characteristics

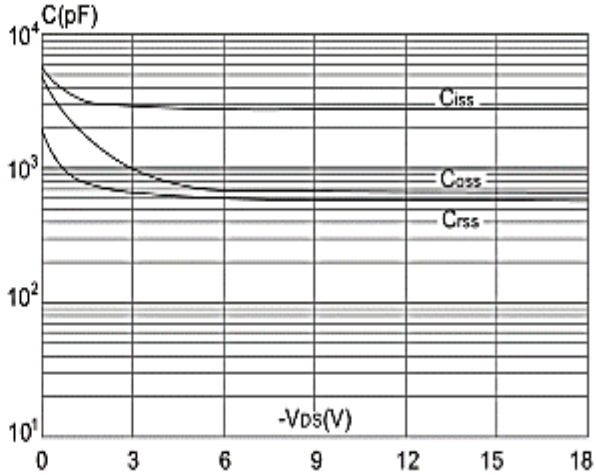


Figure 6: Capacitance Characteristics

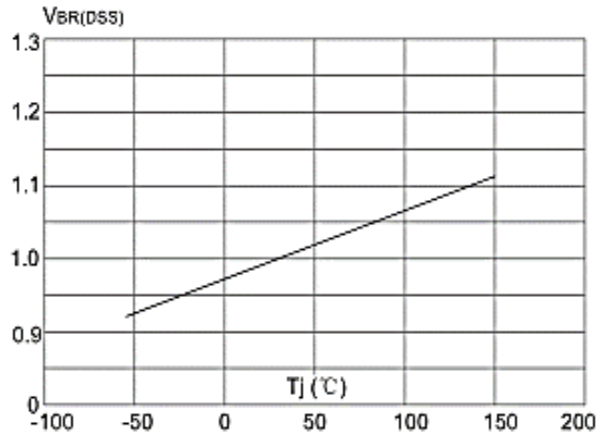


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

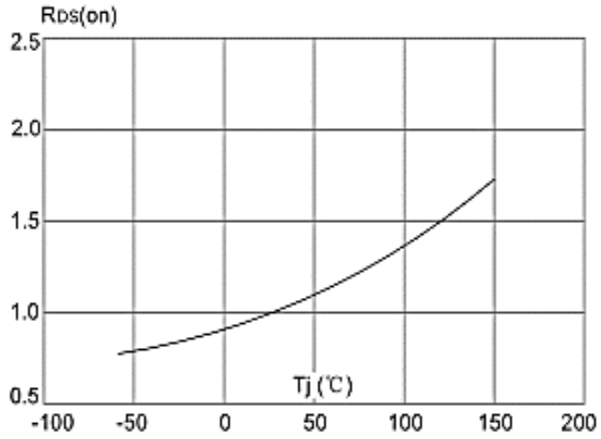


Figure 8: Normalized on Resistance vs Junction Temperature

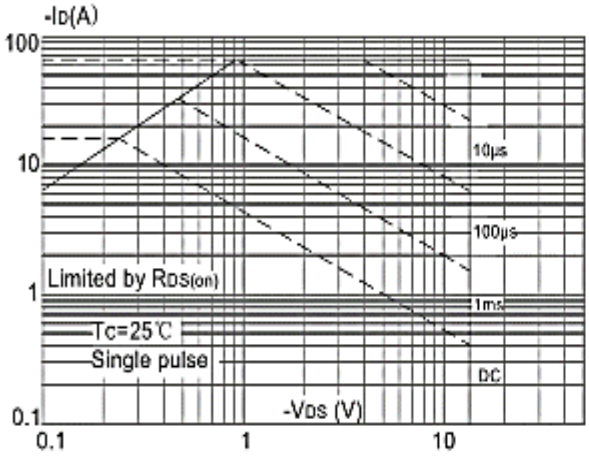


Figure 9: Maximum Safe Operating Area vs. Case Temperature

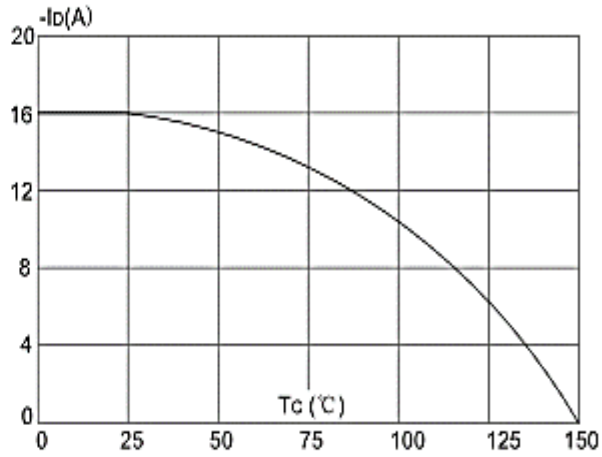


Figure 10: Maximum Continuous Drain Current

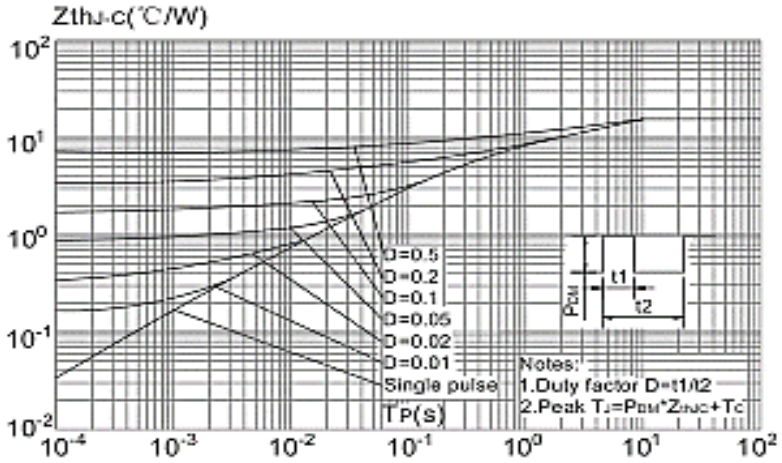
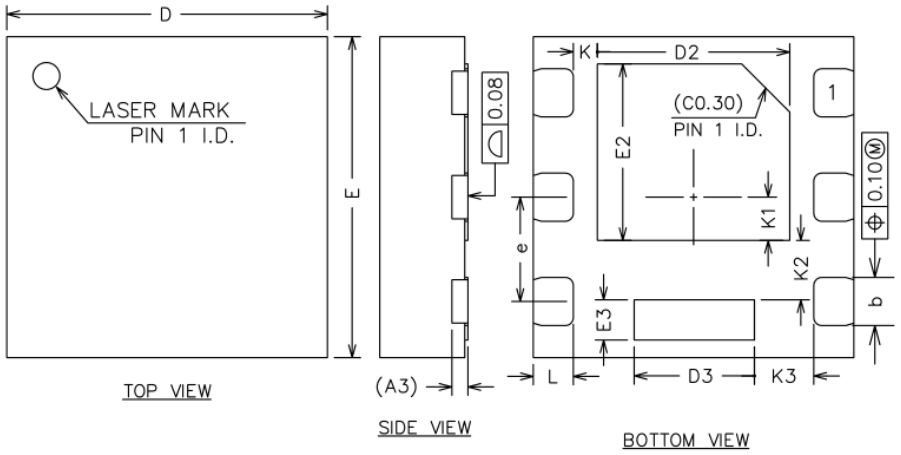


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

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	2021/8/31	Initial release