APM A POWER MICROELECTRONICS

Description

The AP20N06DF 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
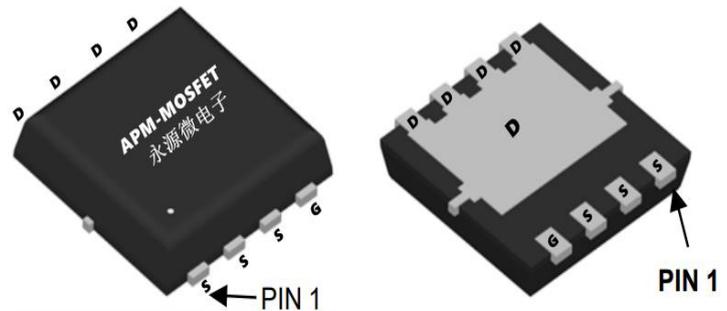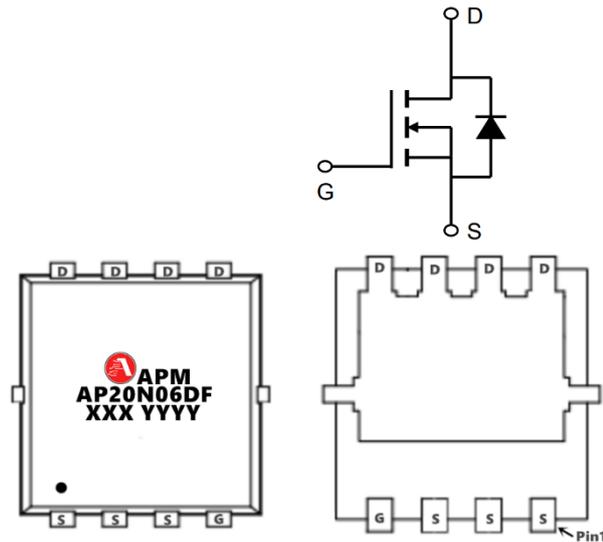
V_{DS} = 60V I_D =28A

$R_{DS(ON)}$ <35mΩ @ V_{GS}=10V **(Type：30mΩ)**

Application

LED lamp

Load switch

Uninterruptible power supply

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP20N06DF	PDFN3X3-8L	AP20N06DF XXX YYYY	5000

Absolute Maximum Ratings@T_j=25ºC(unless otherwise specified)

Symbol	Parameter	Max.	Units
VDSS	Drain-Source Voltage	60	V
VGSS	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	28	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	13	A
IDM	Pulsed Drain Current	74	A
IAS	Avalanche Current	13	A
EAS	Single Pulsed Avalanche Energy	22	mJ
P_D@T_C=25℃	Power Dissipation	37	W
TJ, TSTG	Operating and Storage Temperature Range	-55 to +175	℃
$R_\theta JA$	Thermal Resistance Junction-Ambient [1]	85	℃/W
$R_\theta JC$	Thermal Resistance Junction-Case[1]	4	℃/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V(BR)DSS	Drain-Source Breakdown Voltage	I_D = 250mA, V_{GS} = 0V	60	-	-	V
IDSS	Zero Gate Voltage Drain Current	V_{DS} = 60V, V_{GS} = 0V	-	-	1.0	mA
IGSS	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250mA	1.2	1.6	2.5	V
RDS(ON)	Static Drain-Source ON-Resistance[4]	V_{GS} = 10V, I_D = 10A	-	30	35	mΩ
		V_{GS} = 4.5V, I_D = 5A	-	32	45	mΩ
R_g	Gate Resistance	f = 1MHz	-	1.4	-	Ω
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 30V, f = 1MHz	-	1187	-	pF
Coss	Output Capacitance		-	56	-	pF
C_{rss}	Reverse Transfer Capacitance		-	47	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to 10V V_{DS} = 30V, I_D = 10A	-	24	-	nC
Q_{gs}	Gate Source Charge		-	4.5	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	4.5	-	nC
td(on)	Turn-On DelayTime	V_{GS} = 10V, V_{DD} = 30V I_D= 10A, R_{GEN} = 3Ω	-	6.7	-	ns
t_r	Turn-On Rise Time		-	15	-	ns
td(off)	Turn-Off DelayTime		-	24	-	ns
t_f	Turn-Off Fall Time		-	2.7	-	ns
IS	Maximum Continuous Body Diode Forward Current		-	-	28	A
ISM	Maximum Pulsed Body Diode Forward Current		-	-	79	A
VSD	Body Diode Forward Voltage	V_{GS} = 0V, I_S = 10A	-		1.2	V
trr	Body Diode Reverse Recovery Time	I_F = 10A, di/dt = 100A/us	13	19	25	ns
Qrr	Body Diode Reverse Recovery Charge		-	19	-	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 .The EAS data shows Max. rating .

3、The test cond≦ 300us duty cycle ≦ 2%, duty cycle ition is TJ =25℃, VDD =48V, VG =10V, RG =25Ω, L=0.1mH, IAS =13A

4、The power dissipation is limited by 175℃ junction temperature

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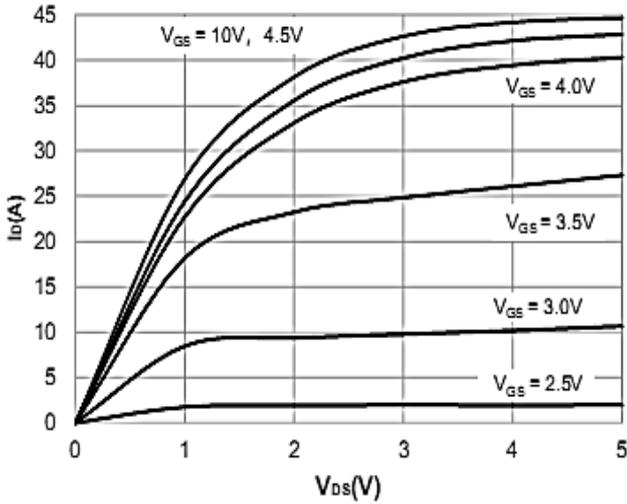
Typical Characteristics

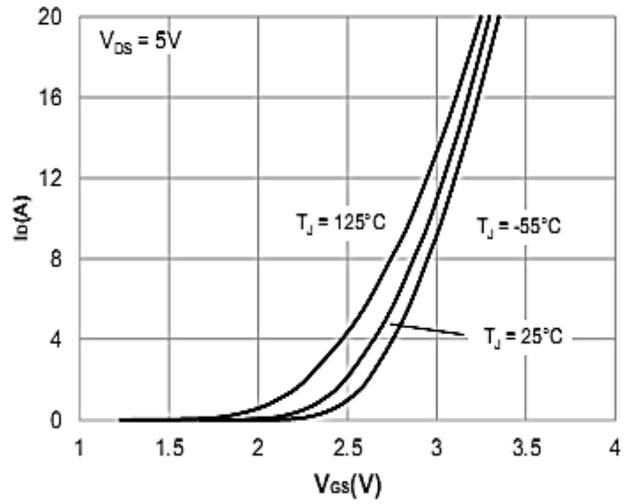
Figure 1: Output Characteristics
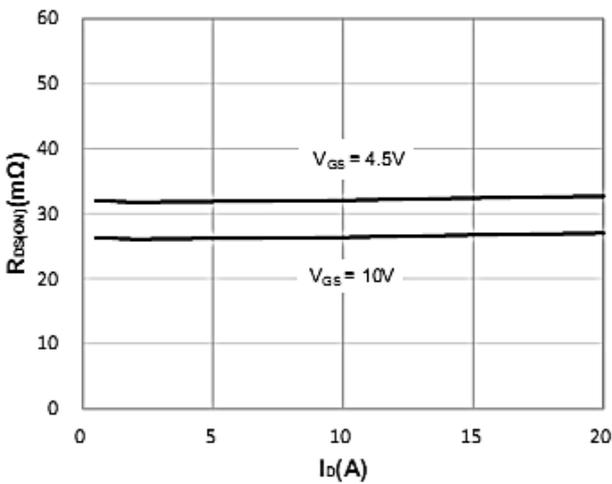

Figure 2: Typical Transfer Characteristics

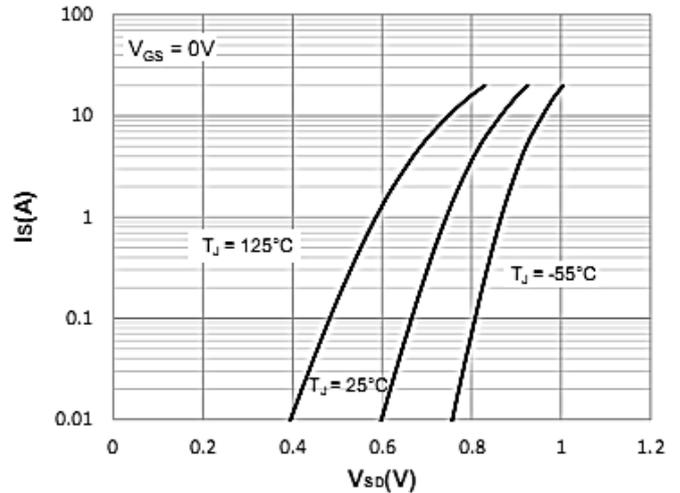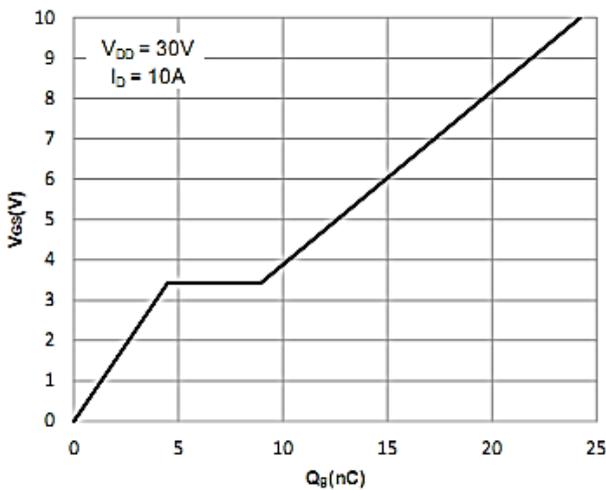
Figure 3: On-resistance vs. Drain Current

Figure 4: Body Diode Characteristics

Figure 5: Gate Charge Characteristics

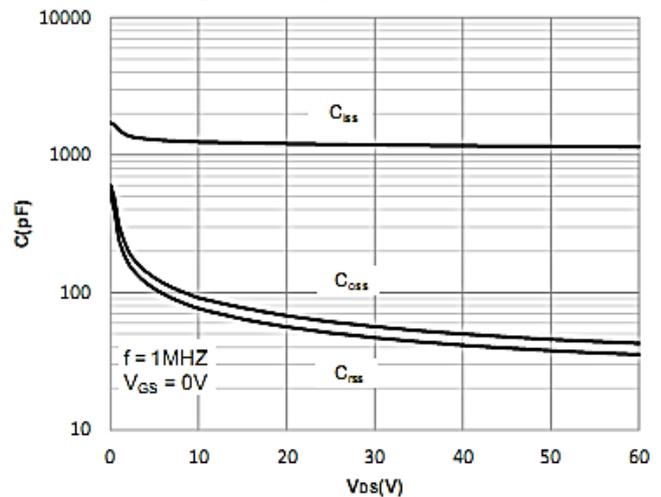**Figure 6: Capacitance Characteristics**
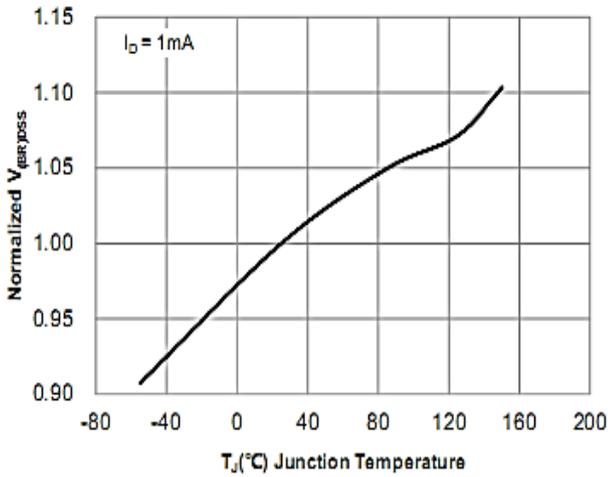
Figure 7: Normalized Breakdown voltage vs.

Junction Temperature
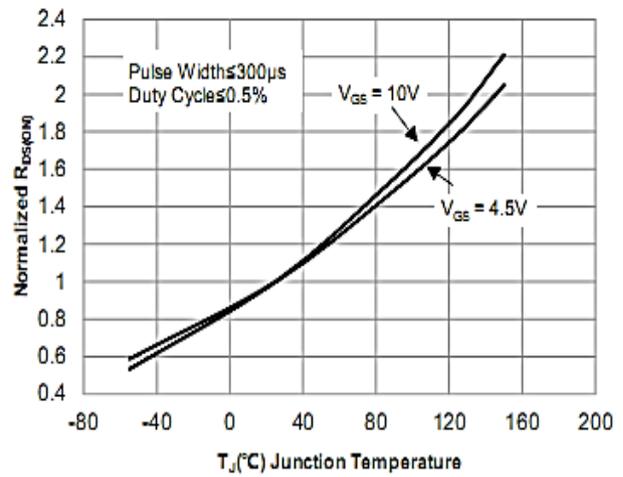
Figure 8: Normalized on Resistance vs.

Junction Temperature

Figure 9: Maximum Safe Operating Area

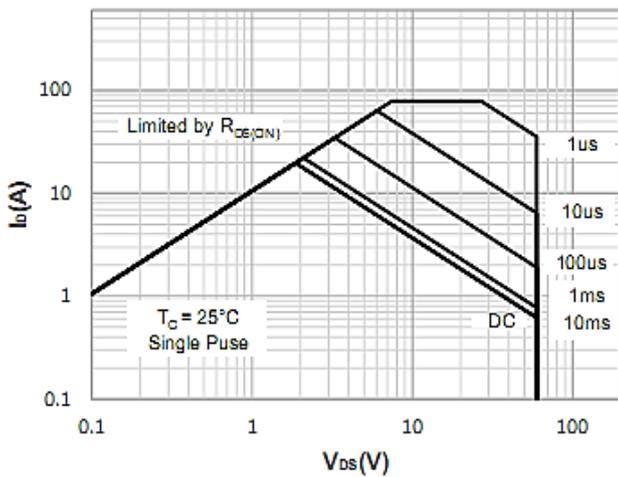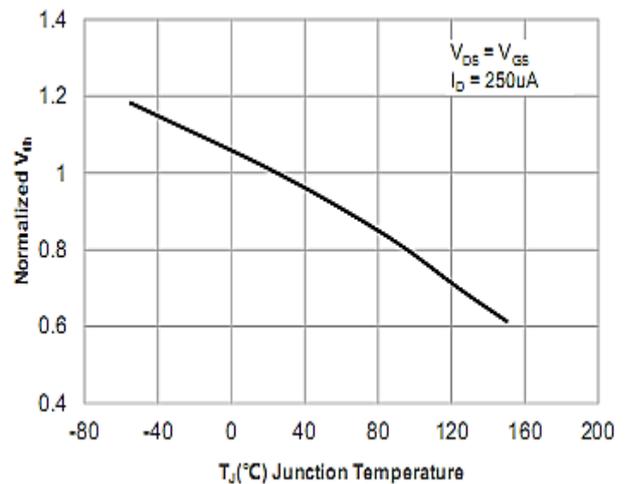**Figure 10: Normalized Threshold Voltage vs. Junction Temperature**
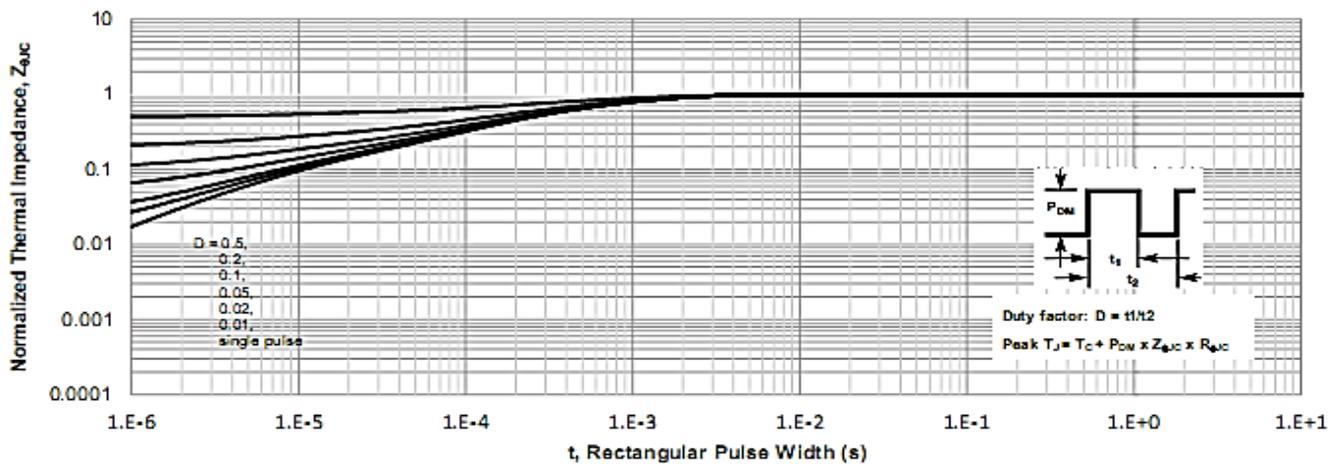
Figure 11: Normalized Maximum Transient Thermal Impedance

Package Mechanical Data-PDFN3X3-8L
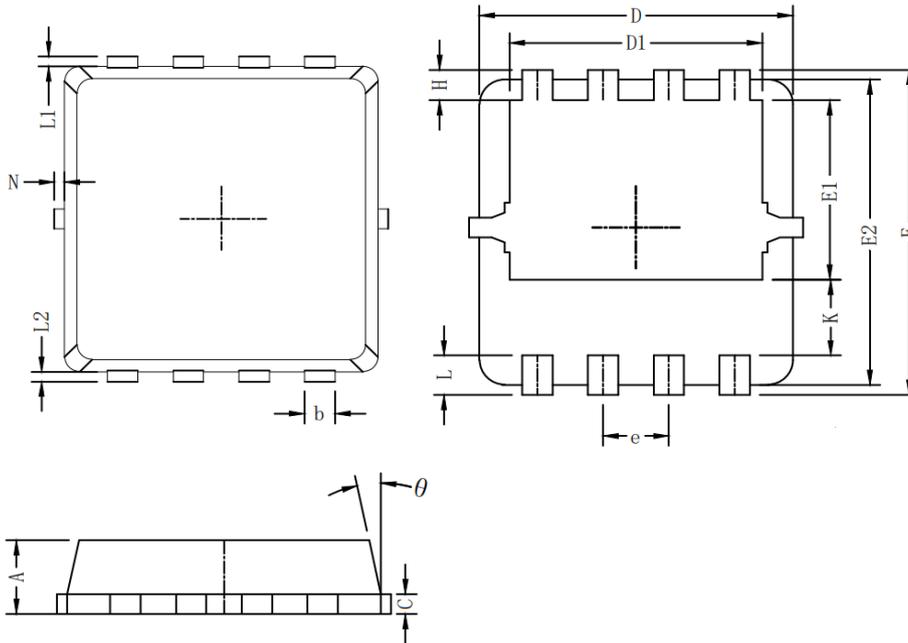
Symbol	Dim in mm		
	Min	Typ	Max
A	0.6	0.75	0.9
b	0.2	0.3	0.4
C	0.15	0.2	0.25
D	3	3.1	3.2
D1	2.3	2.45	2.6
E	3.15	3.3	3.45
E1	1.43	1.73	1.93
E2	2.9	3.05	3.2
e	0.65BSC		
H	0.2	0.35	0.5
K	0.57	0.77	0.87
L	0.3	0.4	0.5
L1/L2	0.1REF		
θ	8°	10°	13°
N	0		0.15

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Edition	Date	Change
REV1.0	2024/5/23	Initial release

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