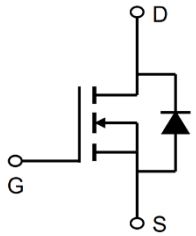
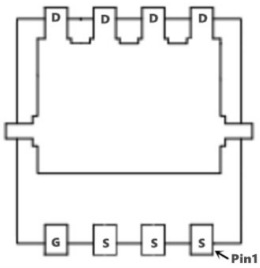
AP5N10DF

100V N-Channel Enhancement Mode MOSFET

Description

The AP5N10DF 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} = 100V I_D = 5A

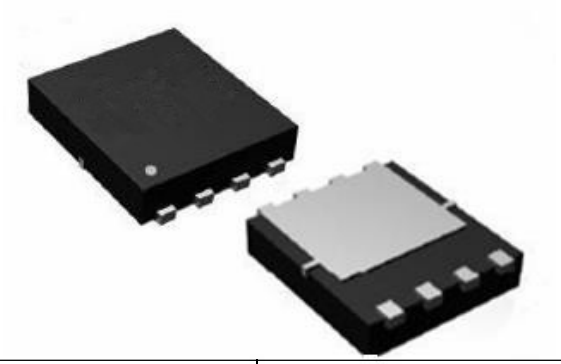
$R_{DS(ON)}$ < 140mΩ @ V_{GS}=10V

Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP5N10DF	PDFN3*3-8L	AP5N10DF	5000

Absolute Maximum Ratings at T_j=25℃ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain source voltage	V_{DS}	100	V
Gate source voltage	V_{GS}	±20	V
Continuous drain current[1], T_C=25 ℃	I_D	5	A
Pulsed drain current[2], T_C=25 ℃	$I_{D, pulse}$	15	A
Power dissipation[3], T_C=25 ℃	P_D	17	W
Single pulsed avalanche energy[5]	E_{AS}	1.2	mJ
Operation and storage temperature	T_{stg}, T_j	-55 to 150	℃
Thermal resistance, junction-case	$R_{\theta JC}$	7.4	℃/W
Thermal resistance, junction-ambient[4]	$R_{\theta JA}$	62	℃/W

Electrical Characteristics at T_j=25 ℃ unless otherwise specified

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-source breakdown voltage	V_{GS}=0 V, I_D=250 μA	100			V
$V_{GS(th)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250 μA	1.2	2.0	2.5	V
$R_{DS(ON)}$	Drain-source on-state resistance	V_{GS}=10 V, I_D=5 A		110	140	mΩ
$R_{DS(ON)}$	Drain-source on-state resistance	V_{GS}=4.5 V, I_D=3 A		160	180	mΩ
I_{GSS}	Gate-source leakage current	V_{GS}=20 V			100	nA
		V_{GS}=-20 V			-100	
I_{DSS}	Drain-source leakage current	V_{DS}=100 V, V_{GS}=0 V			1	uA
C_{iss}	Input capacitance	V_{GS}=0 V, V_{DS}=50 V, f=100 kHz		206.1		pF
C_{oss}	Output capacitance			28.9		pF
C_{rss}	Reverse transfer capacitance			1.4		pF
$t_{d(on)}$	Turn-on delay time	V_{GS}=10 V, V_{DS}=50 V, R_G=2 Ω, I_D=5 A		14.7		ns
t_r	Rise time			3.5		ns
$t_{d(off)}$	Turn-off delay time			20.9		ns
t_f	Fall time			2.7		ns
Q_g	Total gate charge	I_D=5 A, V_{DS}=50 V, V_{GS}=10 V		4.3		nC
Q_{gs}	Gate-source charge			1.5		nC
Q_{gd}	Gate-drain charge			1.1		nC
$V_{plateau}$	Gate plateau voltage			5.0		V
I_S	Diode forward current	V_{GS}<V_{th}			7	A
I_{SP}	Pulsed source current				21	
V_{SD}	Diode forward voltage	I_S=7 A, V_{GS}=0 V			1.0	V
t_{rr}	Reverse recovery time	I_S=5 A, di/dt=100 A/μs		32.1		ns
Q_{rr}	Reverse recovery charge			39.4		nC
I_{rrm}	Peak reverse recovery current			2.1		A

Note

1) Calculated continuous current based on maximum allowable junction temperature.
2) Repetitive rating; pulse width limited by max. junction temperature.
3) Pd is based on max. junction temperature, using junction-case thermal resistance.
4) The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 °C.
5) V_{DD}=50 V, R_G=50 Ω, L=0.3 mH, starting T_j=25 °C.

Electrical Characteristics Diagrams

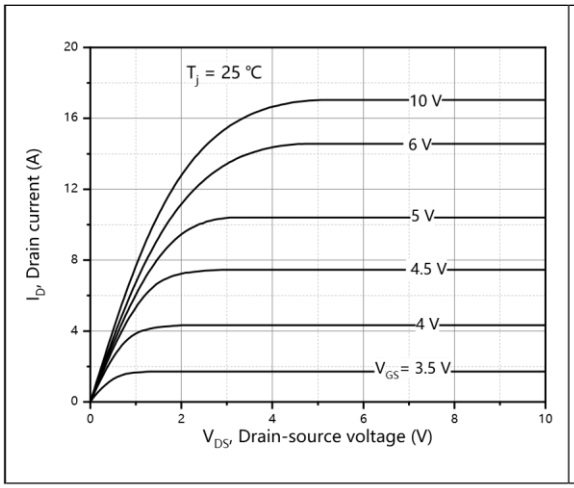


Figure 1, Typ. output characteristics

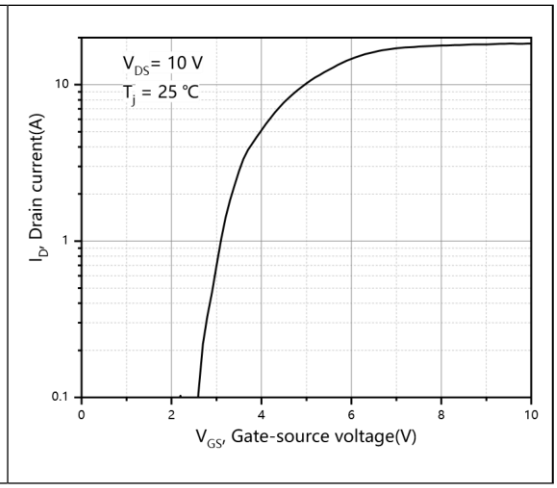


Figure 2, Typ. transfer characteristics

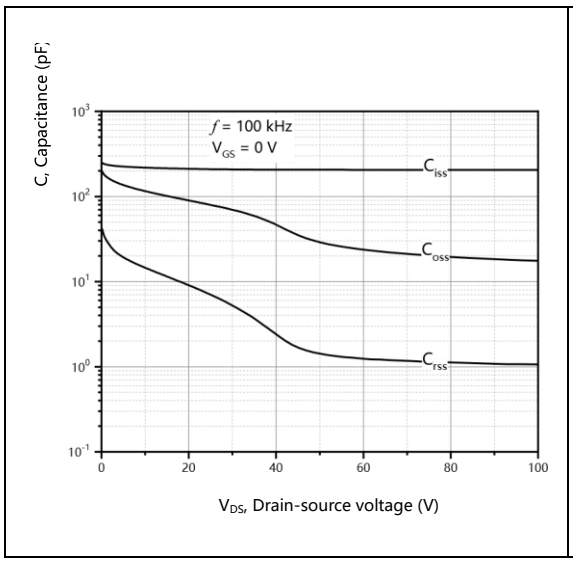


Figure 3, Typ. capacitances

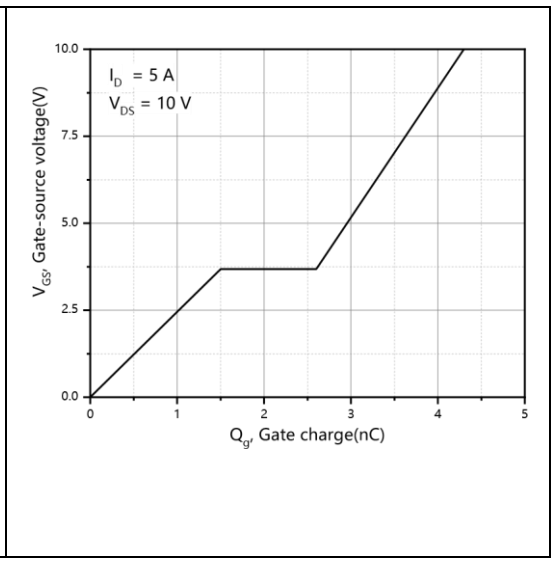


Figure 4, Typ. gate charge

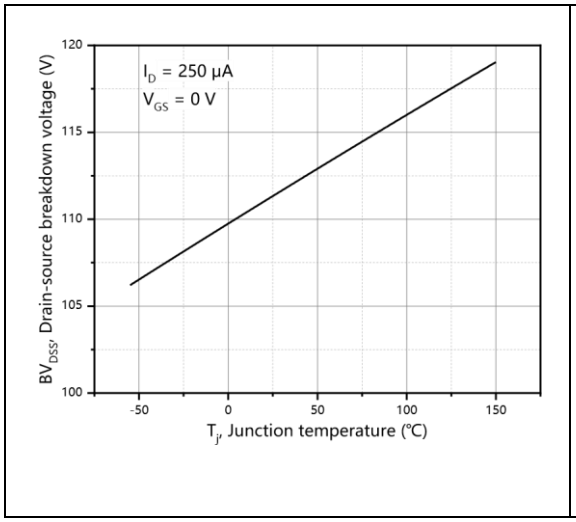


Figure 5, Drain-source breakdown voltage

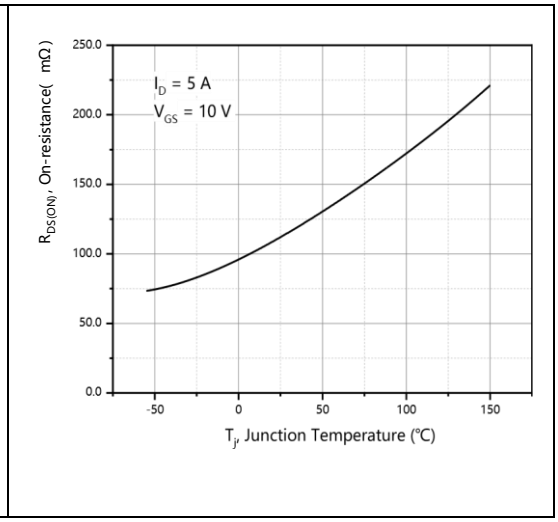


Figure 6, Drain-source on-state resistance

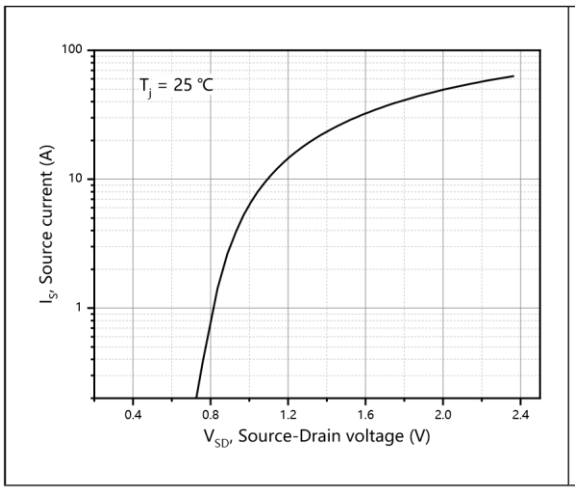


Figure 7, Forward characteristic of body diode

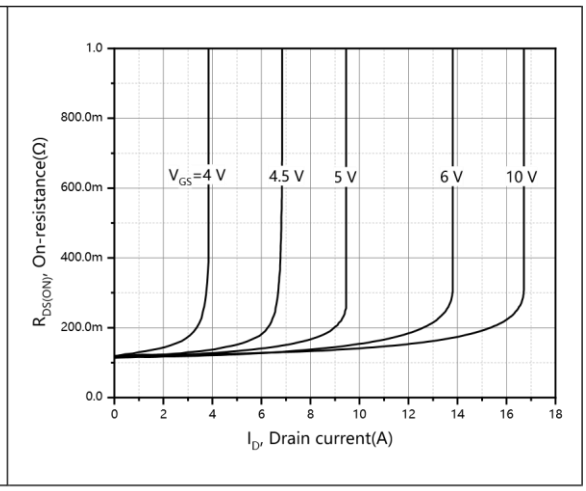


Figure 8, Drain-source on-state resistance

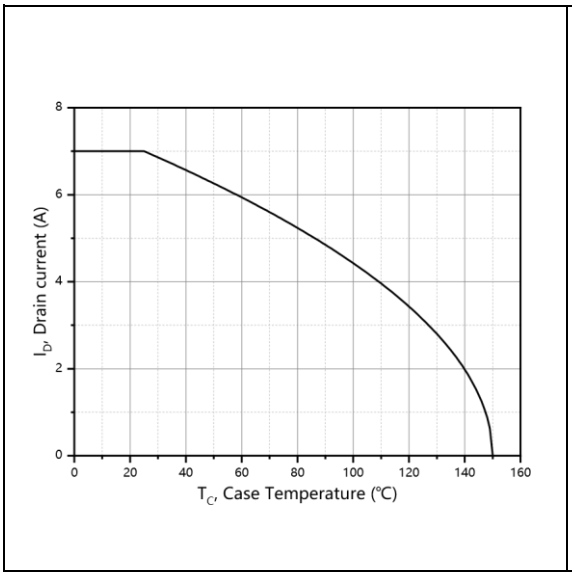


Figure 9, Drain current

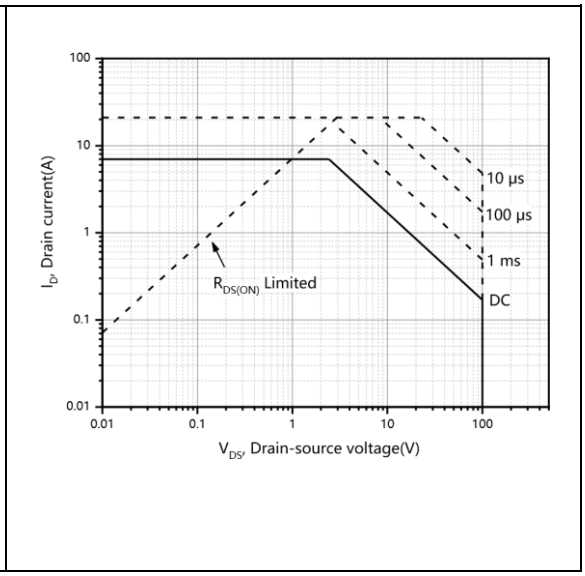


Figure 10, Safe operation area T_C=25 ℃

Test circuits and waveforms

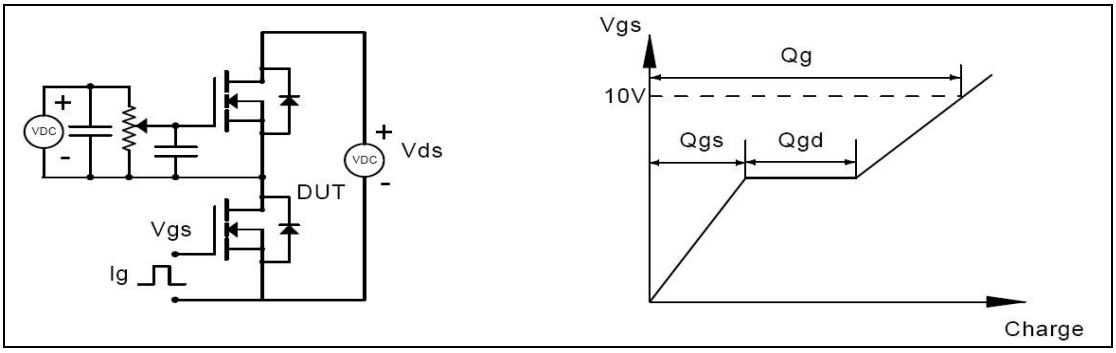


Figure 1, Gate charge test circuit & waveform

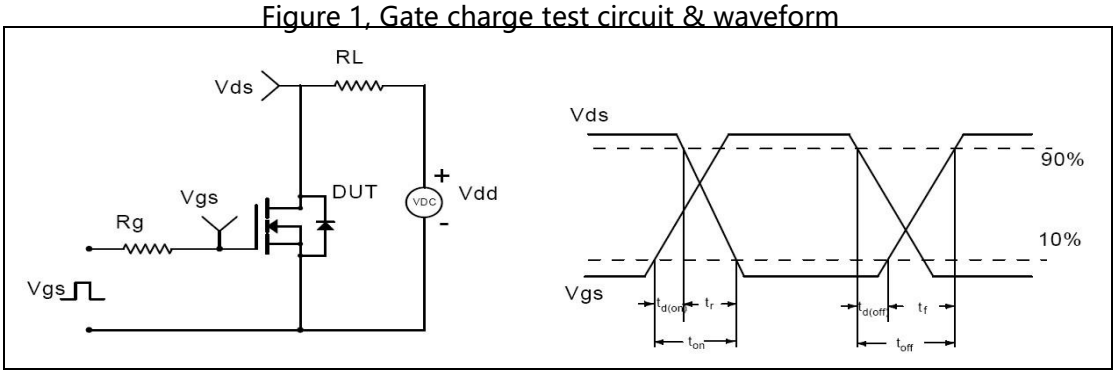


Figure 2, Switching time test circuit & waveforms

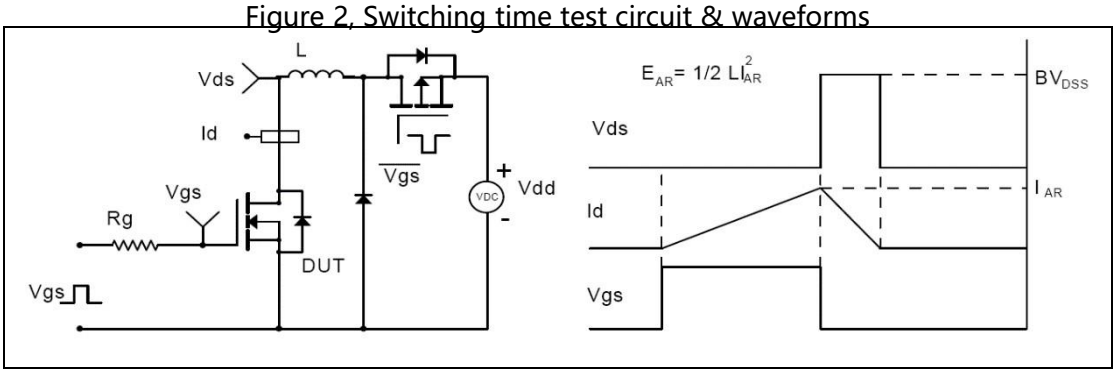


Figure 3, Unclamped inductive switching (UIS) test circuit & waveforms

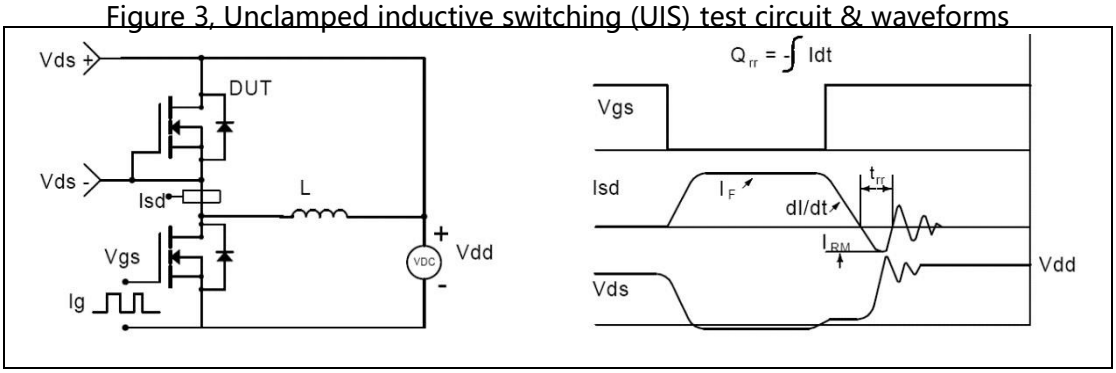
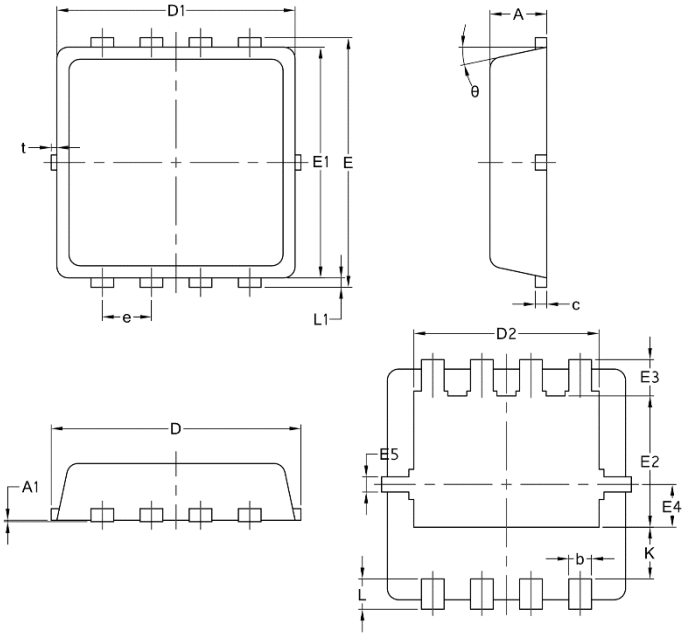


Figure 4, Diode reverse recovery test circuit & waveforms

100V N-Channel Enhancement Mode MOSFET

Package Mechanical Data-DFN3*3-8L-JQ Single



Symbol	Common		
	mm		
	Mim	Nom	Max
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.20	0.30	0.40
c	0.10	0.152	0.25
D	3.15	3.30	3.45
D1	3.00	3.15	3.25
D2	2.29	2.45	2.65
E	3.15	3.30	3.45
E1	2.90	3.05	3.20
E2	1.54	1.74	1.94
E3	0.28	0.48	0.65
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.59	0.69	0.89
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
t	0	0.075	0.13
Φ	10	12	14