

## 85V N-Channel Enhancement Mode MOSFET

### Description

The AP90N08NF uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 10V.

This device is suitable for use as a Battery protection or in other Switching application.

### General Features

$V_{DS} = 85V$   $I_D = 95A$

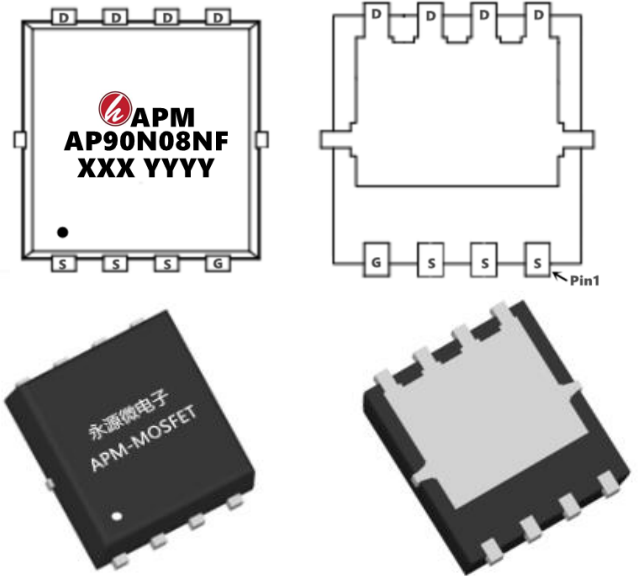
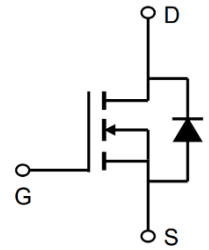
$R_{DS(ON)} < 5.2m\Omega$   $V_{GS}=10V$  (Type: 4.5m $\Omega$ )

### Application

Battery protection

Load switch

Uninterruptible power supply



### Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP90N08NF	PDFN5*6-8L	AP90N08NF XXX YYYY	5000

### Absolute Maximum Ratings ( $T_C=25^{\circ}C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	85	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_{D@TC=25^{\circ}C}$	Continuous Drain Current, $V_{GS} @ 10V$	95	A
$I_{D@TC=100^{\circ}C}$	Continuous Drain Current, $V_{GS} @ 10V$	75	A
$I_{DM}$	Pulsed Drain Current	480	A
$E_{AS}$	Single Pulse Avalanche Energy	560	mJ
$I_{AS}$	Avalanche Current	43.4	A
$P_{D@TC=25^{\circ}C}$	Total Power Dissipation <sup>4</sup>	180	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^{\circ}C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	0.70	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case	62	$^{\circ}C/W$

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### Electrical Characteristics (T<sub>J</sub>=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V(BR)DSS	Drain-source breakdown voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	85	92		V
VGS(th)	Gate threshold voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA T <sub>J</sub> =25°C	2.0	3.0	4.0	V
IDSS	Zero gate voltage drain current	V <sub>DS</sub> =80V, V <sub>GS</sub> =0V T <sub>J</sub> =25°C	-		1	μA
IDSS	Zero gate voltage drain current	V <sub>DS</sub> =80V, V <sub>GS</sub> =0V T <sub>J</sub> =125°C		- 5		μA
IGSS	Gate-source leakage current	V <sub>GS</sub> =20V, V <sub>DS</sub> =0V	-	-	100	nA
RDS(on)	Drain-source on-state resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =50A, T <sub>J</sub> =25°C	-	4.5	5.2	mΩ
gfs	Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =50A	-	80	-	S
Ciss	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =40V, f=1MHz	-	4032	-	pF
Coss	Output Capacitance		-	546	-	pF
Crss	Reverse Transfer Capacitance	V <sub>GS</sub> =10V, V <sub>DS</sub> =40V, I <sub>D</sub> =25A	-	35	-	pF
Q <sub>G</sub>	Gate Total Charge		-	65.7	-	nC
Q <sub>gs</sub>	Gate-Source charge		-	24.9	-	nC
Q <sub>gd</sub>	Gate-Drain charge		-	13.9	-	nC
td(on)	Turn-on delay time	T <sub>J</sub> =25°C, V <sub>GS</sub> =10V, V <sub>DS</sub> =40V, R <sub>L</sub> =3Ω	-	20.1	-	ns
t <sub>r</sub>	Rise time		-	38	-	ns
td(off)	Turn-off delay time		-	45.1	-	ns
t <sub>f</sub>	Fall time		-	21	-	ns
R <sub>G</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	-	2	-	Ω
VSD	Body Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>SD</sub> =50A	-	0.9	1.2	V
trr	Body Diode Reverse Recovery Time	I <sub>F</sub> =20A, dI/dt=500A/μs	-	61	-	ns
Qrr	Body Diode Reverse Recovery Charge	I <sub>F</sub> =20A, dI/dt=500A/μs	-	340	-	nC

#### Note :

- 1、The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z 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 V<sub>DD</sub>=64V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=53.8A
- 4、The power dissipation is limited by 175°C 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

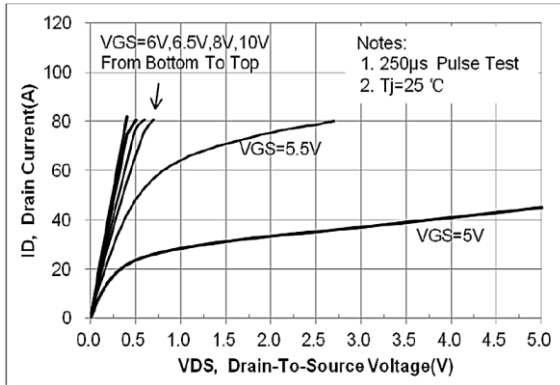


Figure 1. Typ. Output Characteristics (Tj=25 °C)

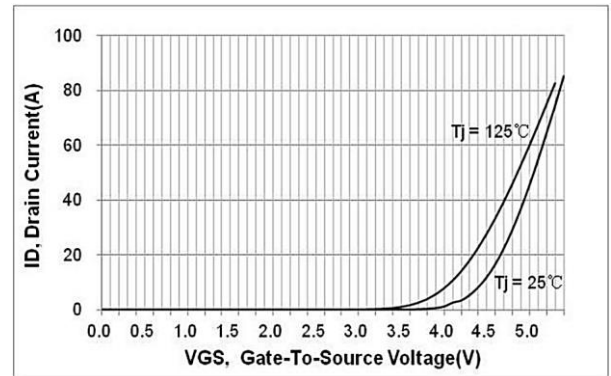


Figure 2. Transfer Characteristics

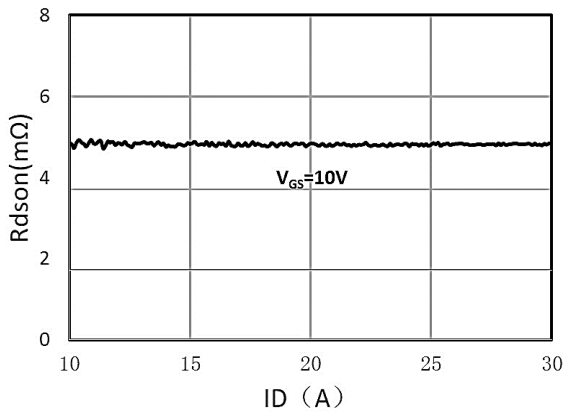


Figure 3. On-Resistance vs. Drain Current and Gate Voltage Figure

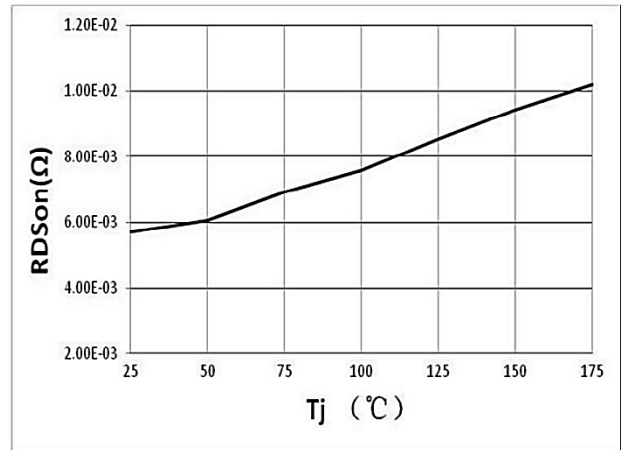


Figure 4. On-Resistance vs. Junction Temperature

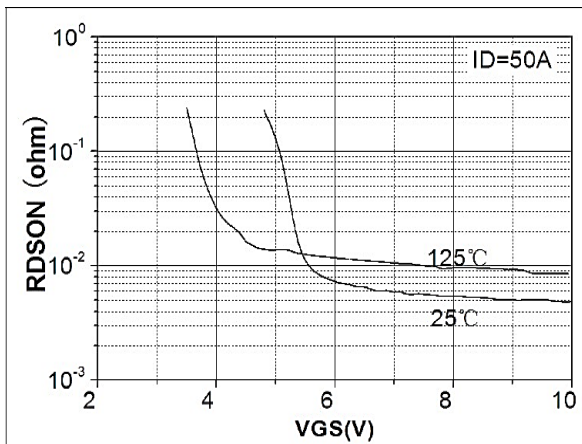


Figure 5. On-Resistance vs. Gate-Source Voltage

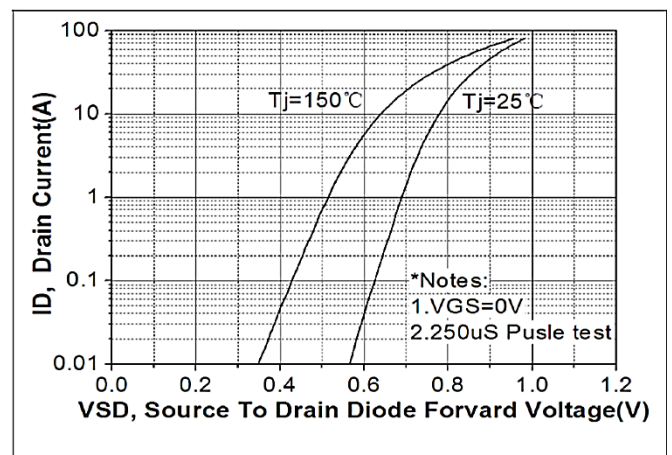


Figure 6 . Body-Diode Characteristics



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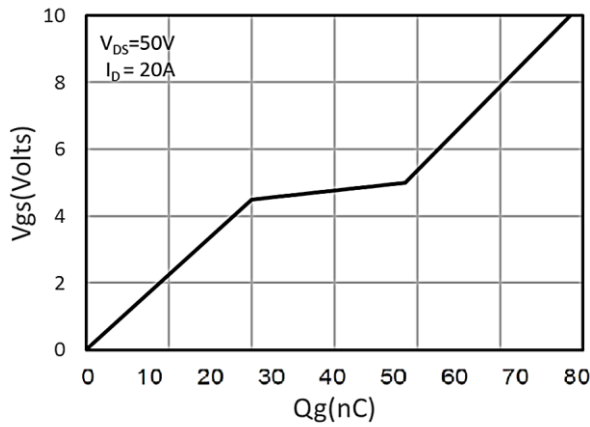


Figure 7. Gate-Charge Characteristics

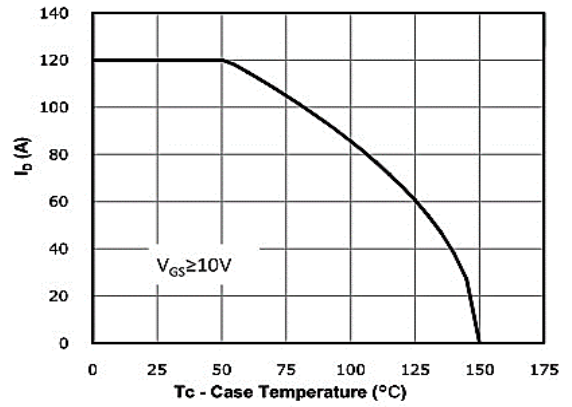


Figure 8. Drain Current Derating

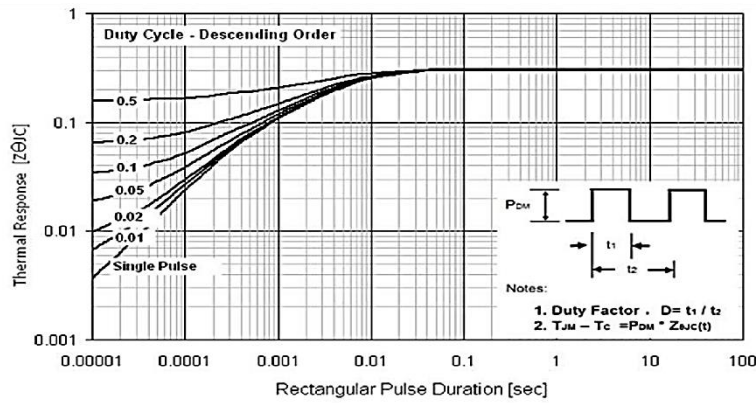


Figure 9: Normalized Maximum Transient Thermal Impedance

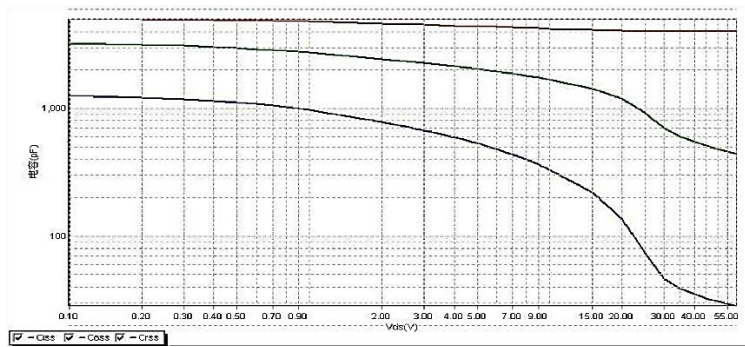
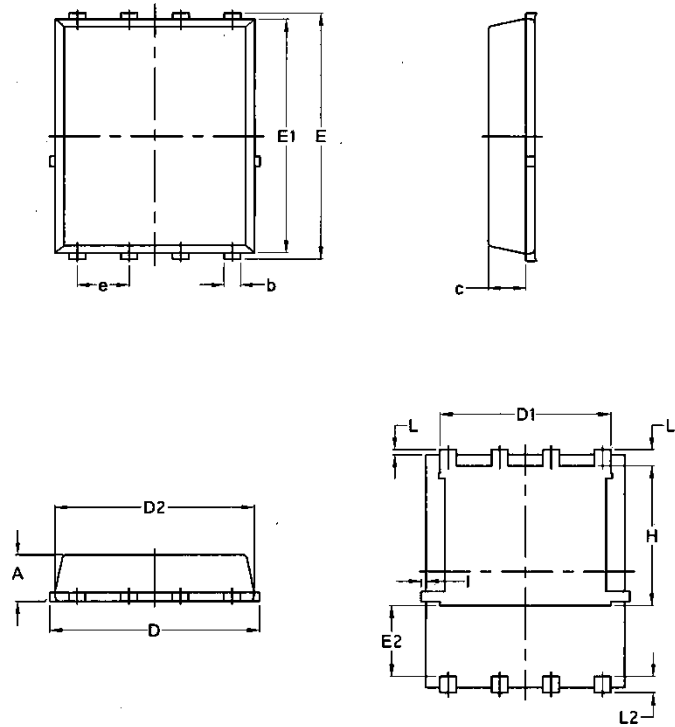


Figure 10. Capacitance Characteristics

**Package Mechanical Data-DFN5\*6-8L-JQ Single**



Symbol	Common			
	mm		Inch	
	Mim	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070

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Edition	Date	Change
Rve1.0	2020/12/1	Initial release

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