

200V N-Channel Enhancement Mode MOSFET

Description

The AP4N20S 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.

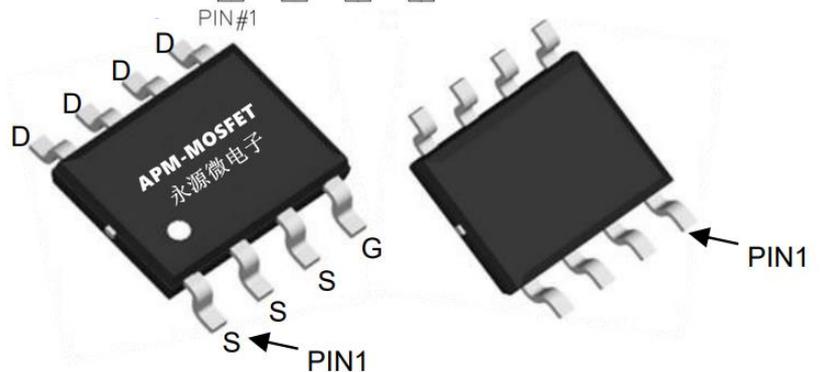
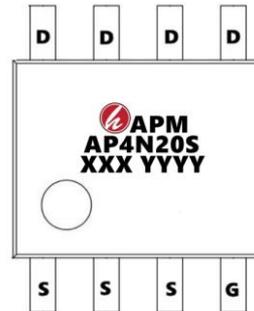
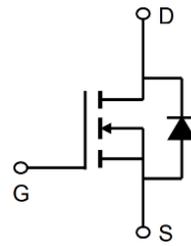
General Features

$V_{DS} = 200V$ $I_D = 4.2A$

$R_{DS(ON)} < 680m\Omega @ V_{GS}=10V$ (Type: 500m Ω)

Application

- Automotive lighting
- Load switch
- Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP4N20S	SOP-8L	AP4N20S XXX YYYY	3000

Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C=25^\circ C$	Drain Current, $V_{GS} @ 10V$	4.2	A
$I_D @ T_C=100^\circ C$	Drain Current, $V_{GS} @ 10V$	2.8	A
IDM	Pulsed Drain Current ¹	10	A
$P_D @ T_C=25^\circ C$	Total Power Dissipation	2	W
$P_D @ T_A=25^\circ C$	Total Power Dissipation ³	1.1	W
TSTG	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C
$R_{\theta JA}$	Maximum Thermal Resistance, Junction-ambient	85	°C/W
$R_{\theta JC}$	Maximum Thermal Resistance, Junction-case	3.9	°C/W

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Electrical Characteristics@T_J=25°C(unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	200	230	---	V
R _{Ds(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V , I _D =1A	---	500	680	mΩ
		V _{GS} =4.5V , I _D =1A	---	680	850	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	2	2.5	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =200V , V _{GS} =0V , T _J =25°C	---	---	1	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 20V , V _{DS} =0V	---	---	± 100	nA
g _{fs}	Forward Transconductance	V _{DS} =10V , I _D =1A	---	10	---	S
Q _g	Total Gate Charge (10V)	V _{DS} =160V , V _{GS} =10V , I _D =1A	---	15		nC
Q _{gs}	Gate-Source Charge		---	3.0		
Q _{gd}	Gate-Drain Charge		---	5.2		
T _{d(on)}	Turn-On Delay Time	V _{DD} =100V , V _{GS} =10V , R _G =3 , I _D =1A	---	22		ns
T _r	Rise Time		---	34		
T _{d(off)}	Turn-Off Delay Time		---	45		
T _f	Fall Time		---	11		
C _{iss}	Input Capacitance	V _{DS} =25V , V _{GS} =0V , F=1MHz	---	900		pF
C _{oss}	Output Capacitance		---	130		
C _{rss}	Reverse Transfer Capacitance		---	4.6		
I _s	Continuous Source Current ^{1,6}	V _G =V _D =0V , Force Current	---	---	1	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V , I _s =1A , T _J =25°C	---	---	1	V
t _{rr}	Reverse Recovery Time	I _F =1A , di/dt=100A/μs , T _J =25°C	---	85	---	nS
Q _{rr}	Reverse Recovery Charge		---	257	---	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 ≤ 300us , duty cycle ≤ 2%
- 3、 The power dissipation is limited by 150°C 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.

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Typical Characteristics

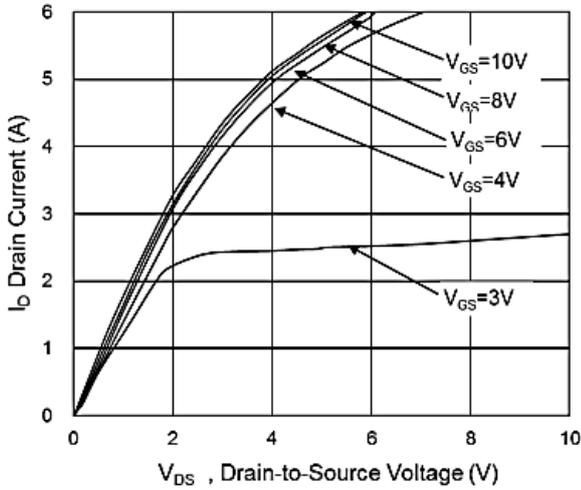


Fig.1 Typical Output Characteristics

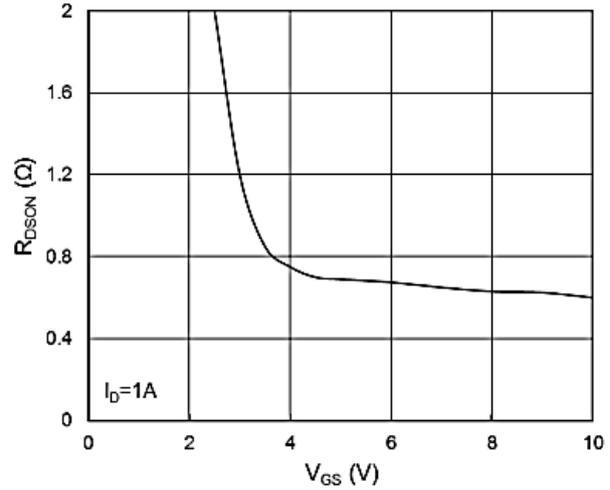


Fig.2 On-Resistance vs. G-S Voltage

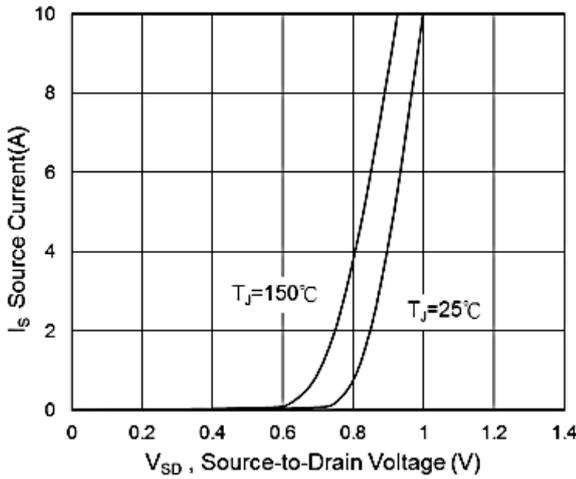


Fig.3 Forward Characteristics of Reverse

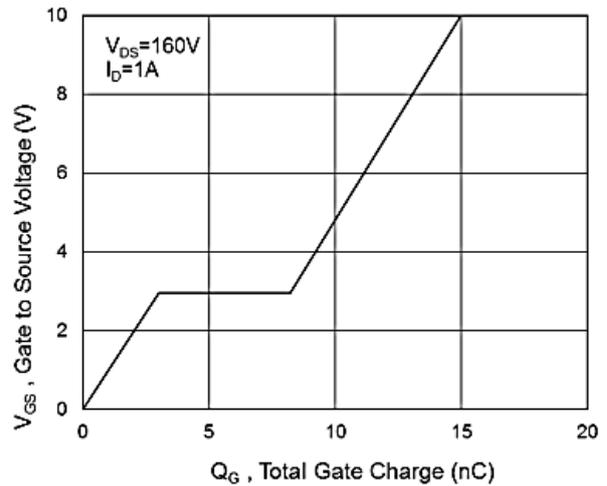


Fig.4 Gate-Charge Characteristics

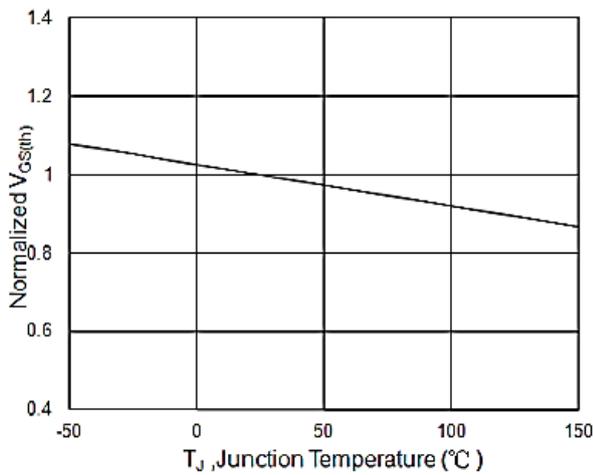


Fig.5 $V_{GS(th)}$ vs. T_J

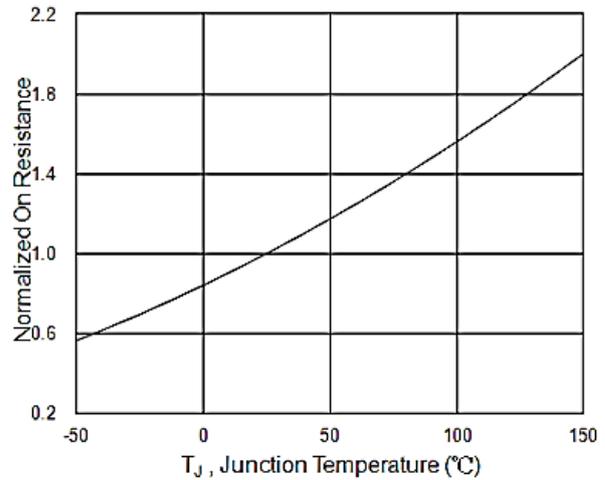


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

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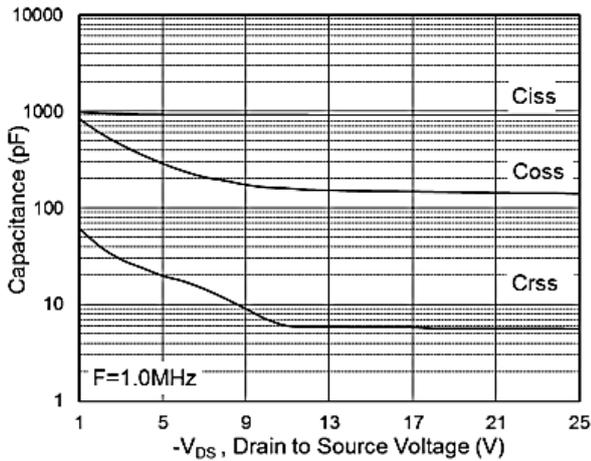


Fig.7 Capacitance

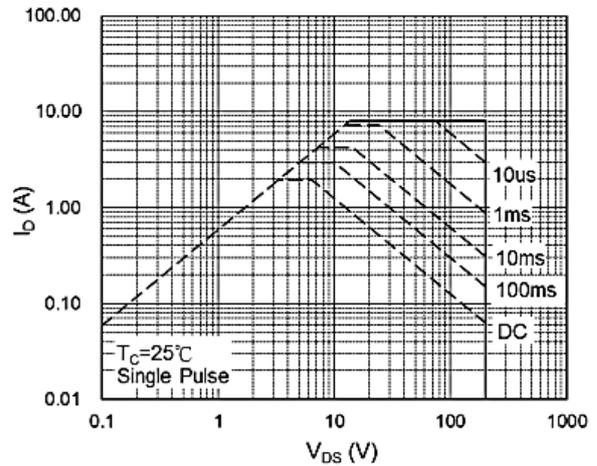


Fig.8 Safe Operating Area

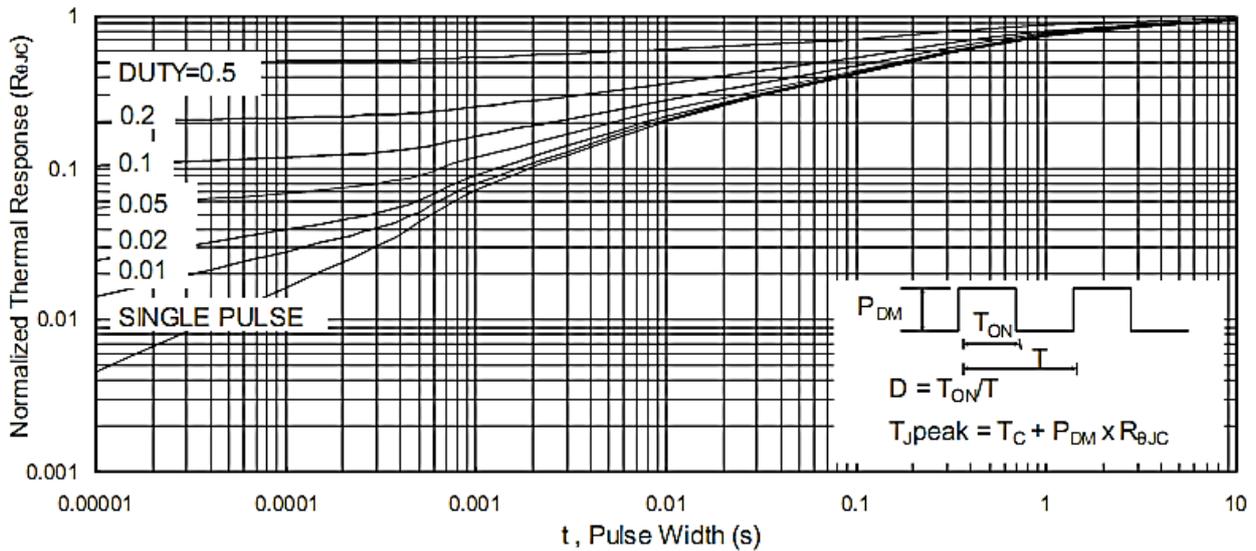


Fig.9 Normalized Maximum Transient Thermal Impedance

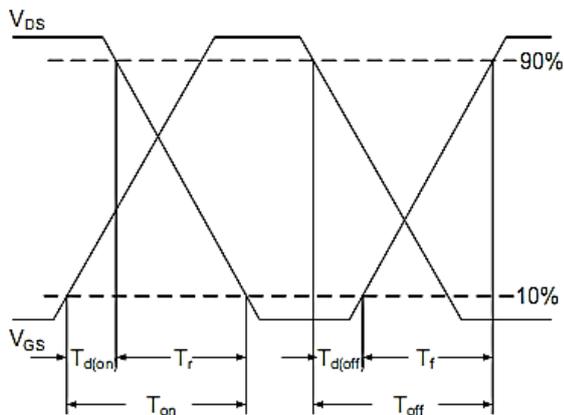


Fig.10 Switching Time Waveform

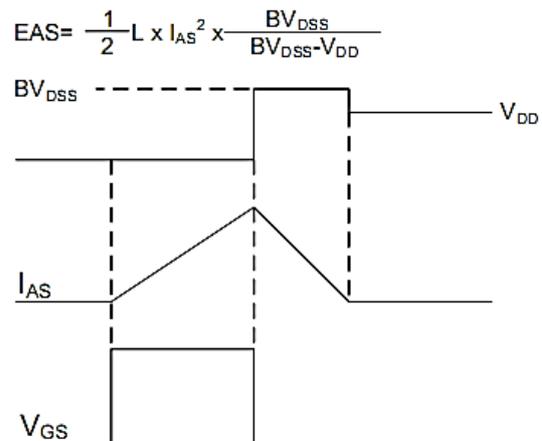
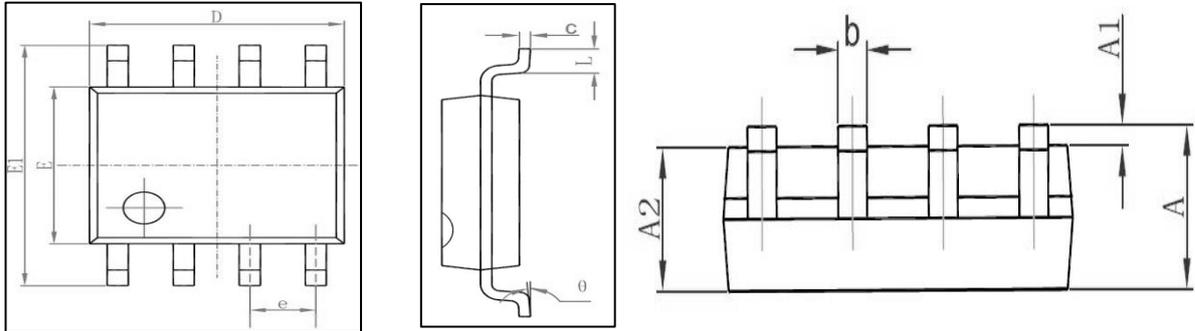


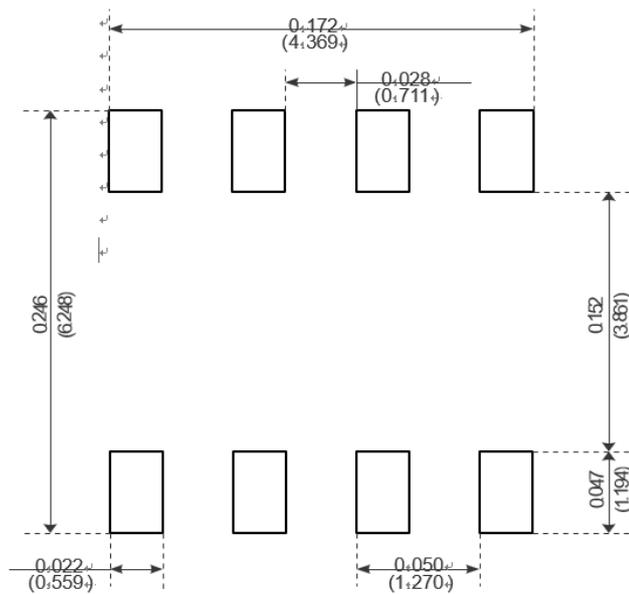
Fig.11 Unclamped Inductive Switching Waveform

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Package Mechanical Data-SOP-8L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



Recommended Minimum Pads

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Edition	Date	Change
REV1.0	2023/7/29	Initial release

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