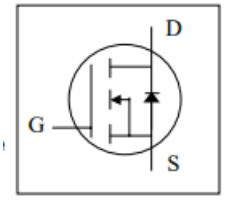
AP10N04S

40V N-Channel Enhancement Mode MOSFET

Description

The AP10N04S 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} = 40V I_D =10 A

$R_{DS(ON)}$ < 17mΩ @ V_{GS}=10V

Application

Battery protection

Load switch

Uninterruptible power supply

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP10N04S	SOP-8	AP10N04S XXX YYYY	3000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_A=25℃	Continuous Drain Current[1]	10	A
I_D@T_A=70℃	Continuous Drain Current[1]	6.7	A
I_{DM}	Pulsed Drain Current[2]	50	A
EAS	Single Pulse Avalanche Energy[3]	31	mJ
I_{AS}	Avalanche Current	25	A
P_D@T_A=25℃	Total Power Dissipation[4]	1.9	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta JA}$	Thermal Resistance Junction-ambient[1](t≤10s)	40	℃/W
	Thermal Resistance Junction-ambient[1]	65	℃/W

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Electrical Characteristics (T_C=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	40	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.032	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=7A	---	14.5	17	mΩ
		V_{GS}=4.5V , I_D=6A	---	18	22	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	---	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.8	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=32V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=32V , V_{GS}=0V , T_J=55℃	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=7A	---	32	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2.1	---	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=32V , V_{GS}=4.5V , I_D=7A	---	9.8	---	nC
Q_{gs}	Gate-Source Charge		---	2.8	---	
Q_{gd}	Gate-Drain Charge		---	3.9	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=20V , V_{GS}=10V , R_G=3.3 I_D=7A	---	2.8	---	ns
T_r	Rise Time		---	40.4	---	
$T_{d(off)}$	Turn-Off Delay Time		---	22.8	---	
T_f	Fall Time		---	6.4	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	1013	---	pF
C_{oss}	Output Capacitance		---	107	---	
C_{rss}	Reverse Transfer Capacitance		---	76	---	
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	8.4	A
I_{SM}	Pulsed Source Current[2,5]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	50	A
V_{SD}	Diode Forward Voltage[2]		---	---	1	V
t_{rr}	Reverse Recovery Time	I_F=7A , dI/dt=100A/μs , T_J=25℃	---	10	---	nS
Q_{rr}	Reverse Recovery Charge		---	3.3	---	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 EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=25A

45.The po.The data is theoretically the same as Iwer dissipation is limited by 150℃ and I junction temperature$_{DM}$, in real applications , should be limited by total power dissipation.

Typical Characteristics

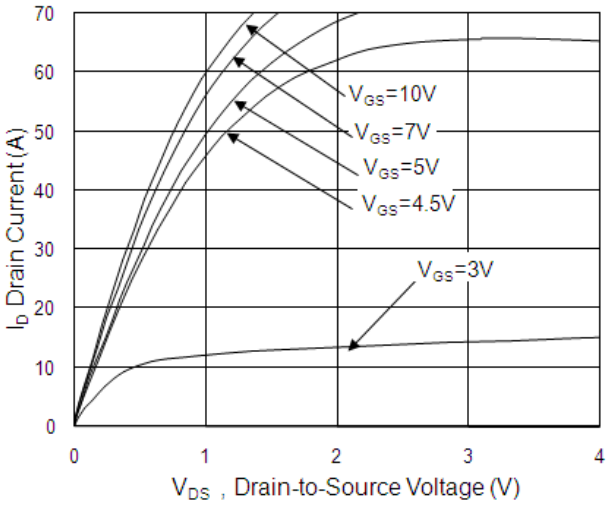

Fig.1 Typical Output Characteristics

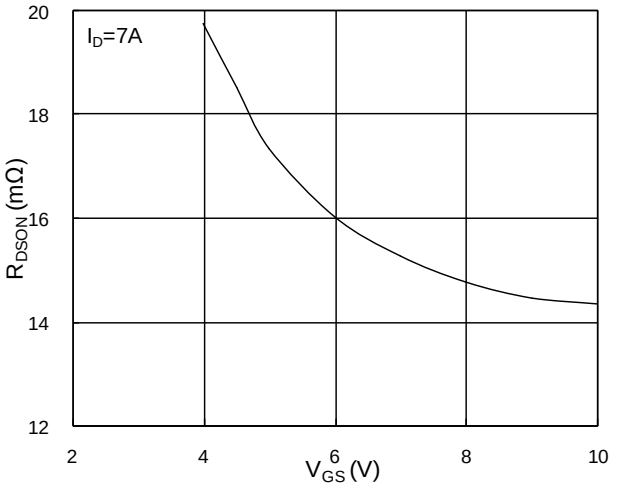

Fig.2 On-Resistance vs. G-S Voltage

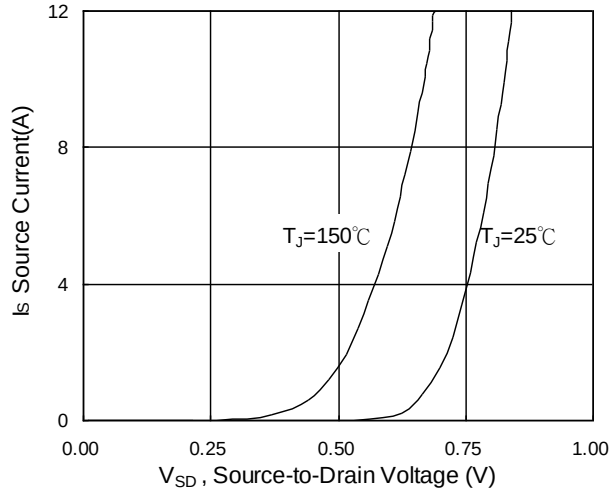

Fig.3 Forward Characteristics of Reverse

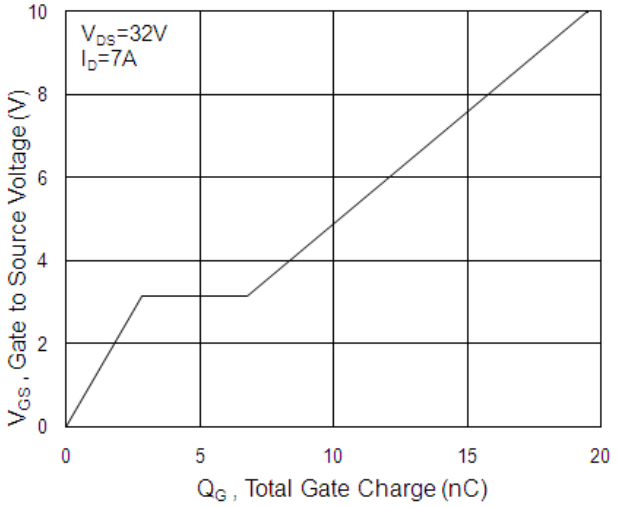

Fig.4 Gate-Charge Characteristics

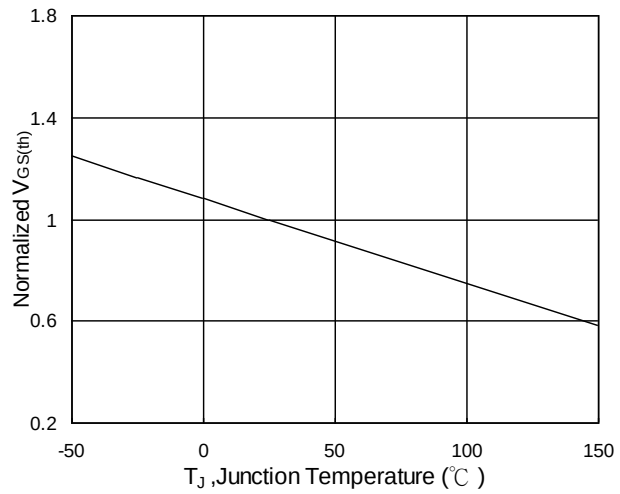

Fig.5 Normalized $V_{GS(th)}$ vs. T_J

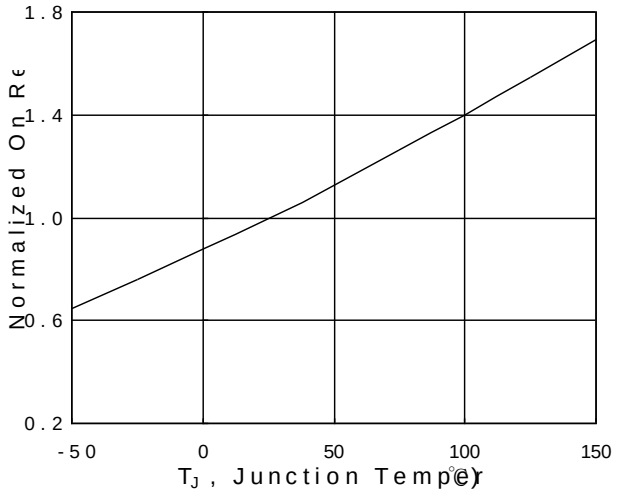

Fig.6 Normalized R_{DSON} vs. T_J

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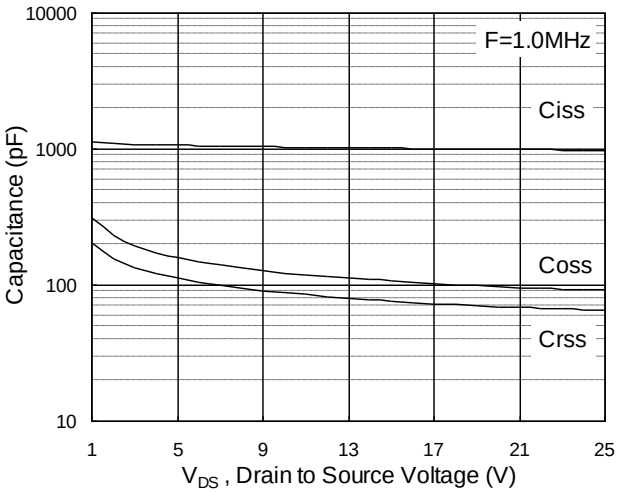

Fig.7 Capacitance

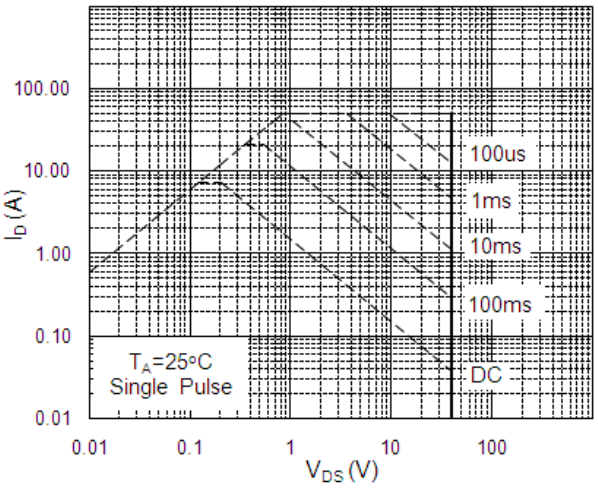

Fig.8 Safe Operating Area

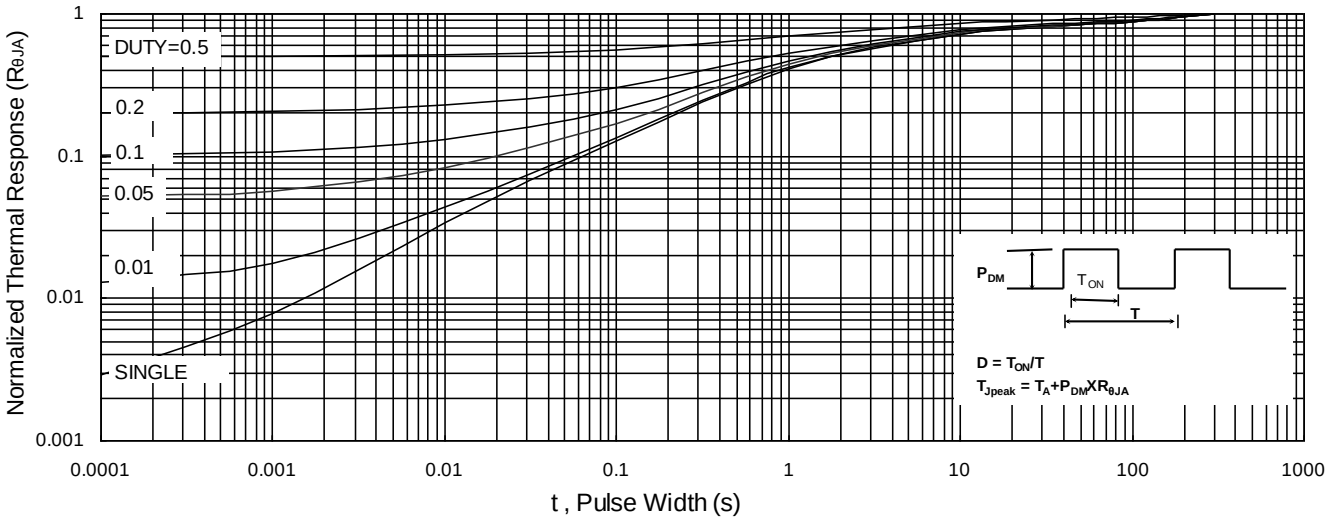

Fig.9 Normalized Maximum Transient Thermal Impedance

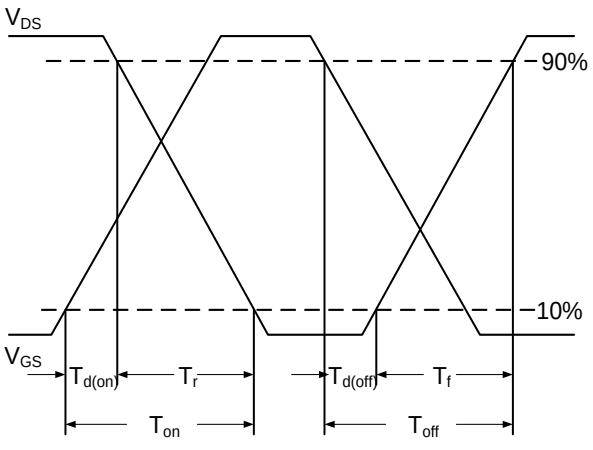

Fig.10 Switching Time Waveform

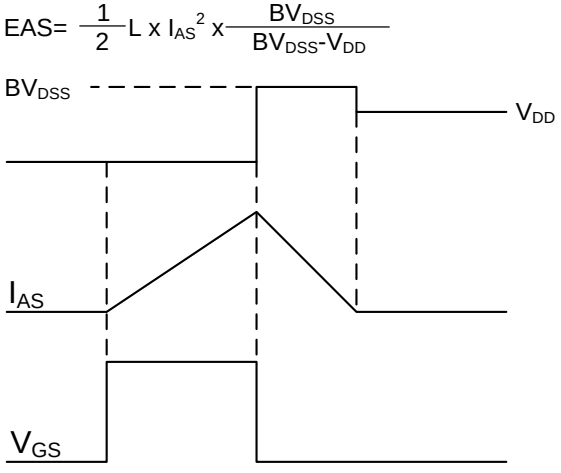

Fig.11 Unclamped Inductive Switching Waveform

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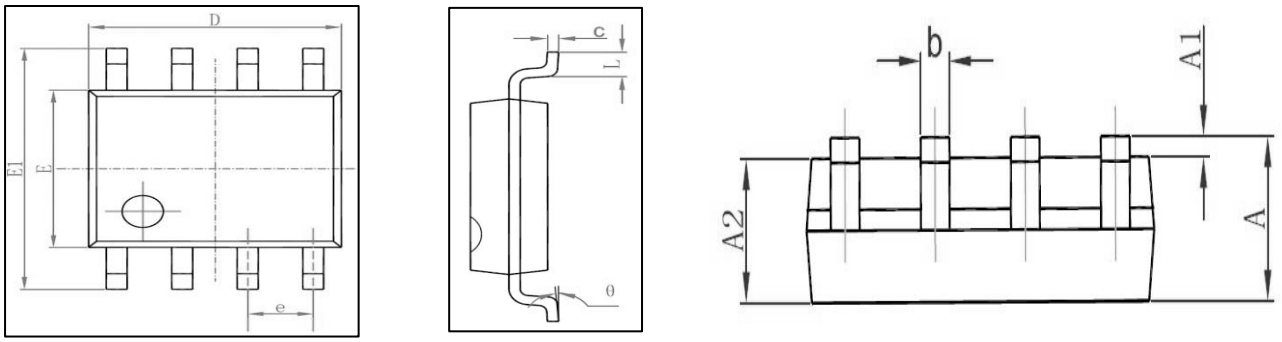
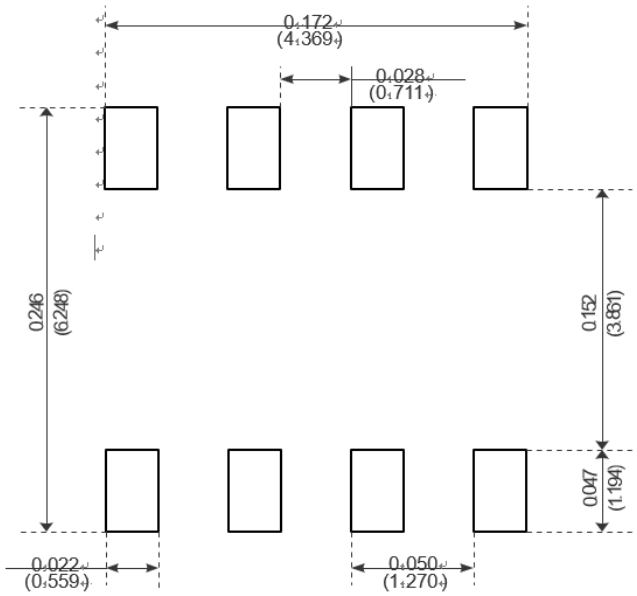
Package Mechanical Data-SOP-8



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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