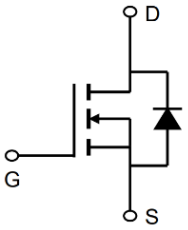
AP20N06S

60V N-Channel Enhancement Mode MOSFET

Description

The AP20N06S 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} = 60V I_D =20A

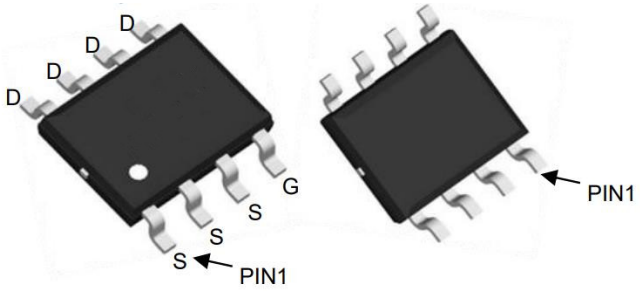
$R_{DS(ON)}$ < 10mΩ @ V_{GS}=10V (Type: 7.8mΩ)

Application

Battery protection

Load switch

synchronous rectification



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP20N06S	SOP-8L	AP20N06S XXX YYYY	3000

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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	60	V
VGS	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	20	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	13	A
IDM	Pulsed Drain Current[2]	80	A
EAS	Single Pulse Avalanche Energy[3]	140	mJ
P_D@T_C=25℃	Total Power Dissipation[4]	116	W
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta}JA$	Thermal Resistance Junction-ambient [1]	46	℃/W
$R_{\theta}JC$	Thermal Resistance Junction-Case[1]	0.85	℃/W

AP20N06S

60V N-Channel Enhancement Mode MOSFET

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	68	72	---	V
△BVDSS/△TJ	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.023	---	V/℃
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=10A	---	7.8	10	mΩ
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	2.0	3.0	4.0	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.2	---	mV/℃
IDSS	Drain-Source Leakage Current	V_{DS}=24V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=24V , V_{GS}=0V , T_J=55℃	---	---	5	
IGSS	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=10A	---	5.5	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2.3	---	Ω
Q_g	Total Gate Charge (4.5V)	VDS =30V, ID =20A, VGS =10V	---	35	---	nC
Qgs	Gate-Source Charge		---	11	---	
Qgd	Gate-Drain Charge		---	9	---	
Td(on)	Turn-On Delay Time	V DS =30V,I D =20A, RGEN =6Ω, V GS =10V	---	15	---	ns
T_r	Rise Time		---	94	---	
Td(off)	Turn-Off Delay Time		---	46	---	
T_f	Fall Time		---	32	---	
Ciss	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	4062	---	pF
Coss	Output Capacitance		---	261	---	
Crss	Reverse Transfer Capacitance		---	231	---	
IS	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	80	A
ISM	Pulsed Source Current[2,5]		---	---	320	A
VSD	Diode Forward Voltage[2]	V GS =0V, I S =80A	---	---	1.2	V
trr	Reverse Recovery Time	T J =25℃ I F =20A,dI/dt=100A/μs	---	78	---	nS
Q_{rr}	Reverse Recovery Charge		---	51	---	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 power dissipation is limited by 175℃ junction temperature
4、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

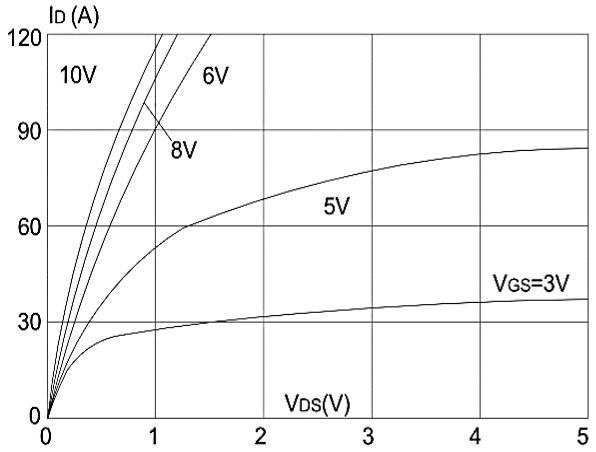


Figure1: Output Characteristics

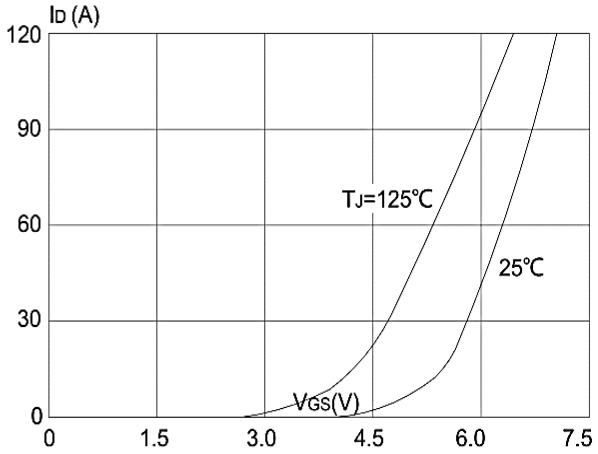


Figure 2: Typical Transfer Characteristics

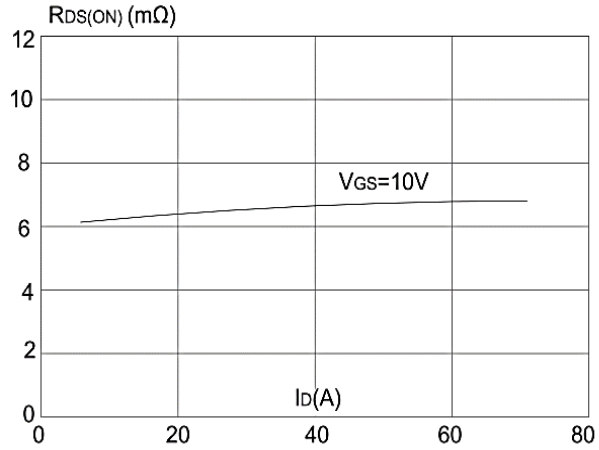


Figure 3:On-resistance vs. Drain Current

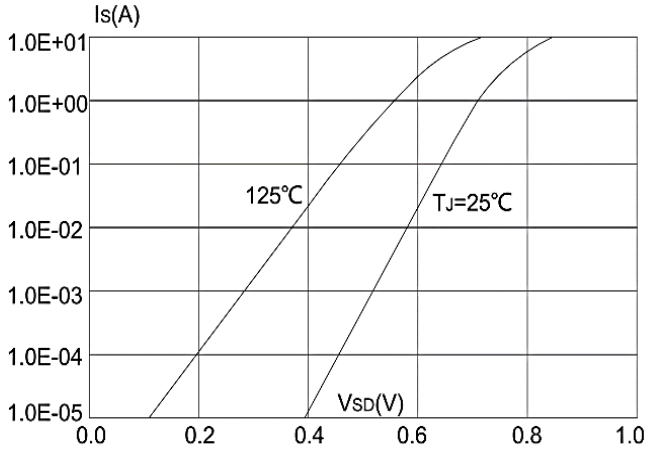


Figure 4: Body Diode Characteristics

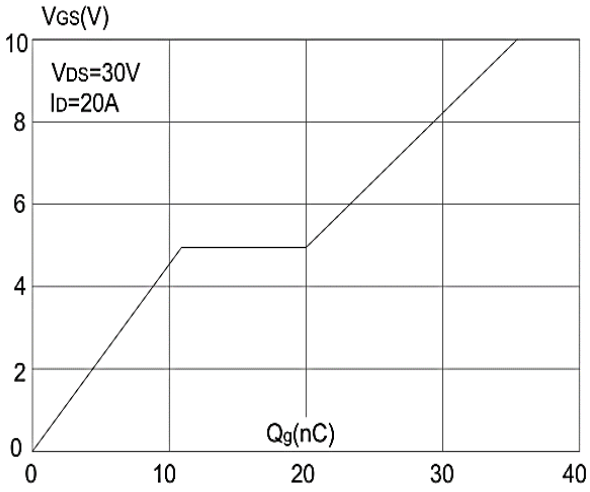


Figure 5: Gate Charge Characteristics

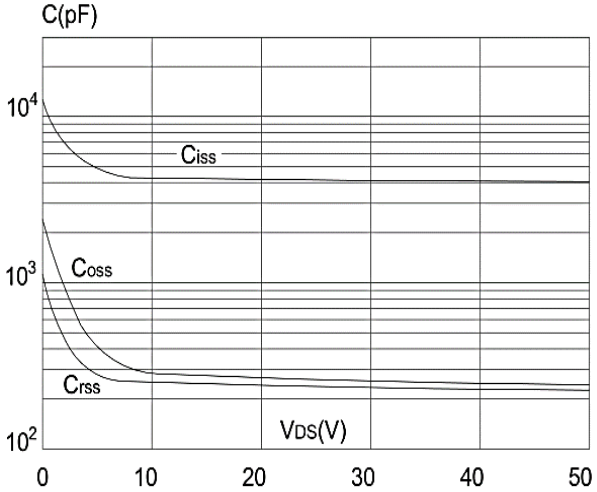


Figure 6: Capacitance Characteristics

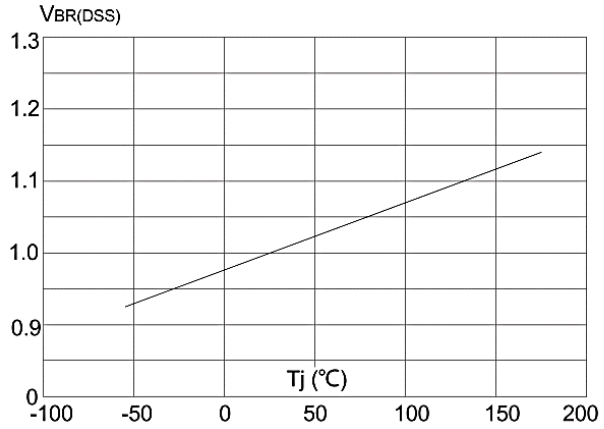


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

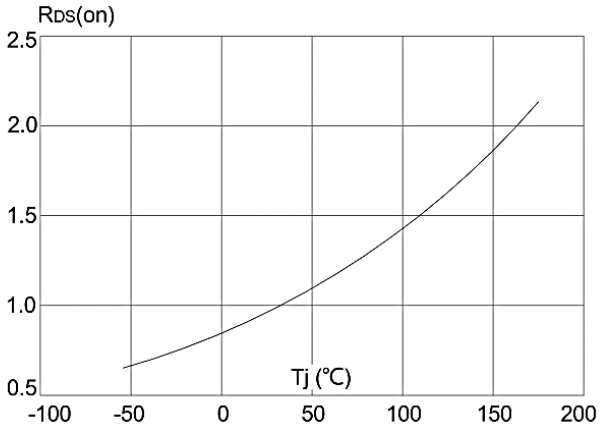


Figure 8: Normalized on Resistance vs. Junction Temperature

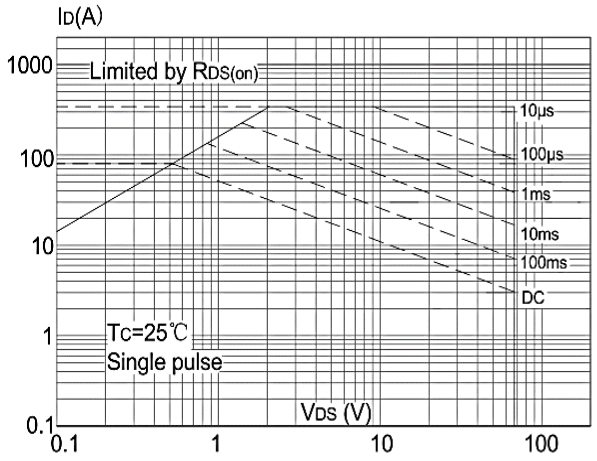


Figure 9: Maximum Safe Operating Area

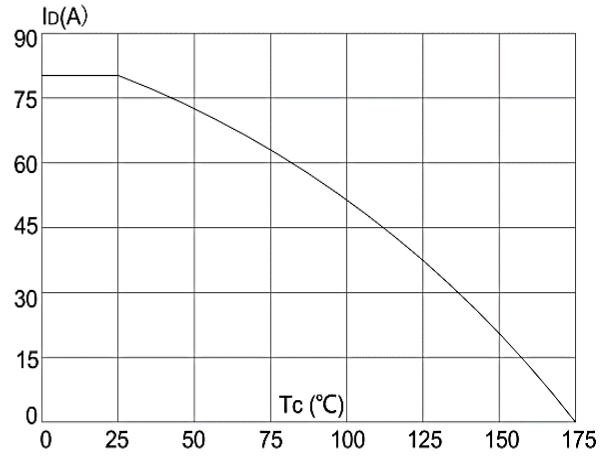


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

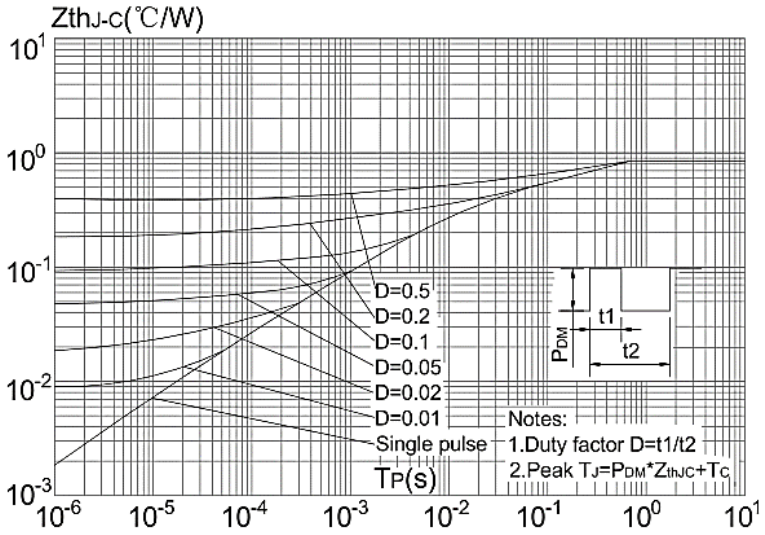
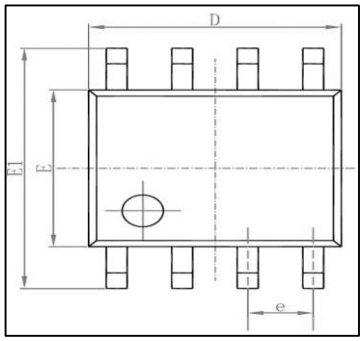
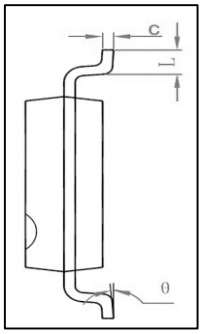
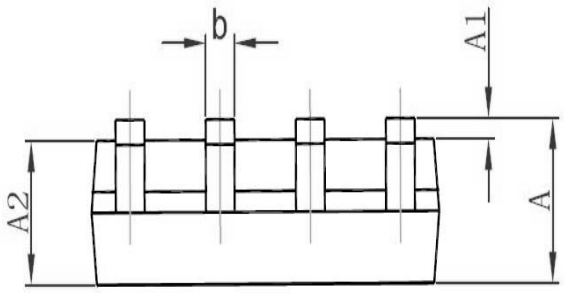


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

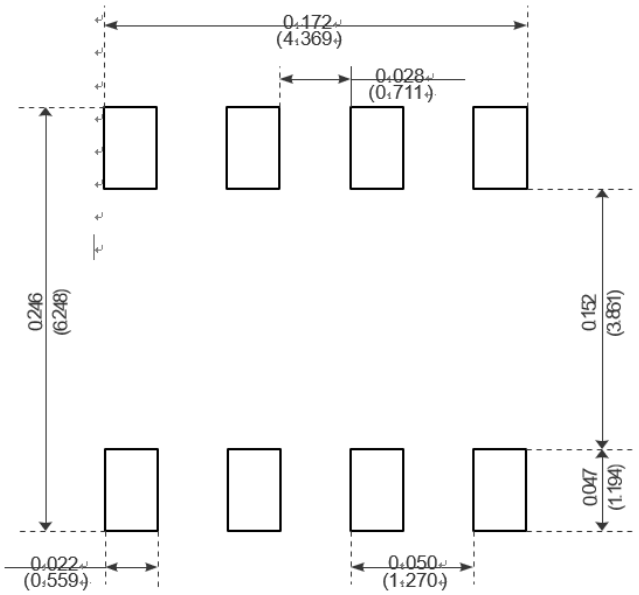
Package Mechanical Data-SOP-8L







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