

20V N+N-Channel Enhancement Mode MOSFET

Description

The AP20H02S 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

$V_{DS} = 20V$ $I_D = 20A$

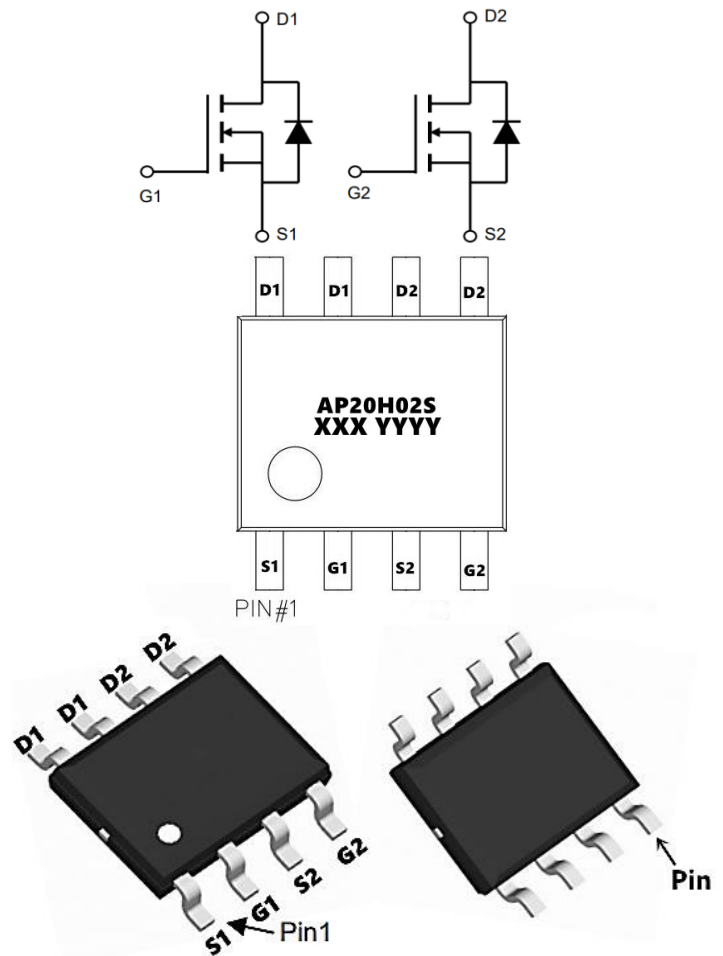
$R_{DS(ON)} < 8.5m\Omega$ @ $V_{GS}=4.5V$ (Type: **6.2m Ω**)

Application

3.3V MCU Drive

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP20H02S	SOP-8L	AP20H02S XXX YYYY	3000

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

Symbol	Parameter	Max.	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D@T_A=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 4.5V$	20	A
$I_D@T_A=70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 4.5V$	13	A
I_{DM}	Pulsed Drain Current <small>note1</small>	60	A
E_{AS}	Single Pulsed Avalanche Energy <small>note2</small>	147.6	mJ
$PD@T_A=25^\circ\text{C}$	Power Dissipation	3	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +175	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	85	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	4	$^\circ\text{C/W}$

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Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	20	24	-	V
IDSS	Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V,	-	-	1.0	μA
IGSS	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} =±12V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.4	0.7	1.1	V
RDS(on)	Static Drain-Source on-Resistance note3	V _{GS} =4.5V, I _D =25A	-	6.2	8.5	mΩ
		V _{GS} =2.5V, I _D =10A	-	8.8	13	
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=1.0MHz	-	1458	-	pF
C _{oss}	Output Capacitance		-	238	-	pF
C _{rss}	Reverse Transfer Capacitance		-	212	-	pF
Q _g	Total Gate Charge	V _{DS} =10V, I _D =25A, V _{GS} =4.5V	-	19	-	nC
Q _{gs}	Gate-Source Charge		-	3	-	nC
Q _{gd}	Gate-Drain("Miller") Charge		-	6.4	-	nC
td(on)	Turn-on Delay Time	V _{DS} =10V, I _D =10A, R _{GEN} =3Ω, V _{GS} =4.5V	-	10	-	ns
t _r	Turn-on Rise Time		-	21	-	ns
td(off)	Turn-off Delay Time		-	39	-	ns
t _f	Turn-off Fall Time		-	19	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	50	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	200	A
VSD	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S =30A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	IF=20A, di/dt=100A/μs	-	25	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	20	-	nC

Note :

- 1、The data tested by surface mounted on a 1 inch² 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 ID and IDM , in real applications , should be limited by total power dissipation.

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Typical Characteristics

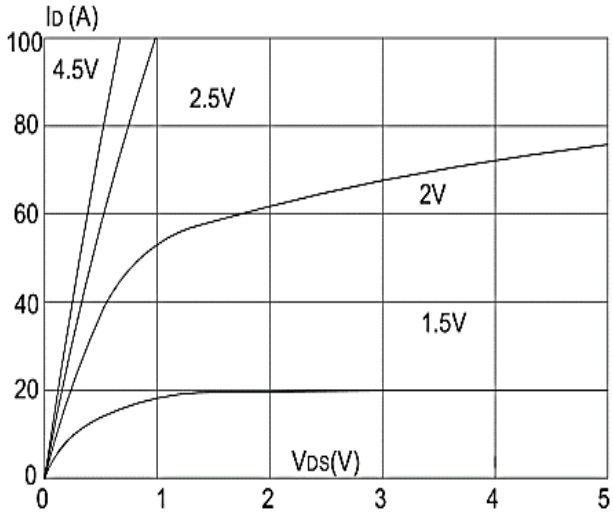


Figure 1: Output Characteristics

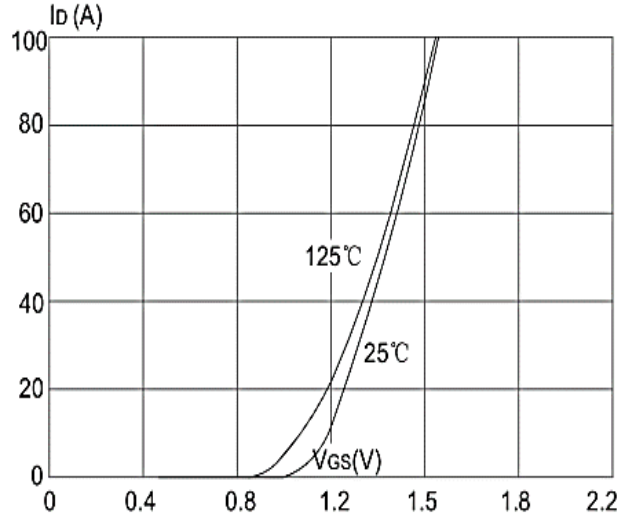


Figure 2: Typical Transfer Characteristics

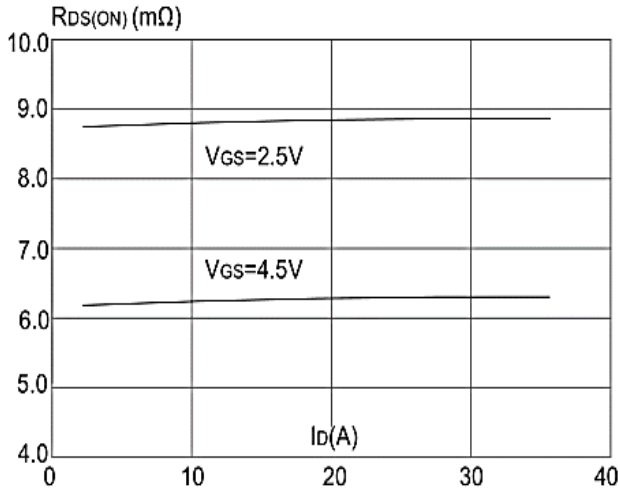


Figure 3: On-resistance vs. Drain Current

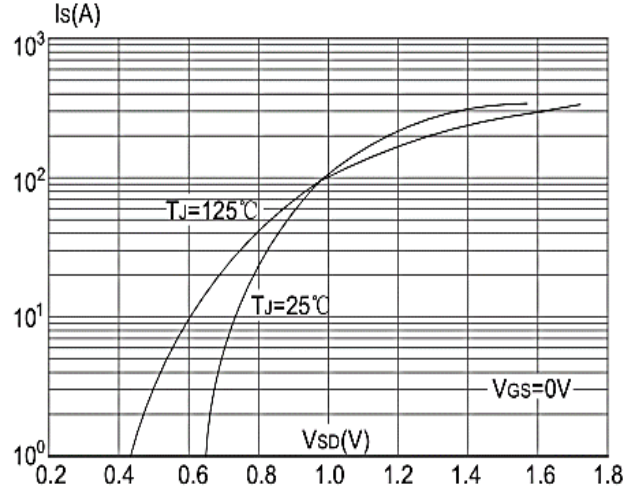


Figure 4: Body Diode Characteristics

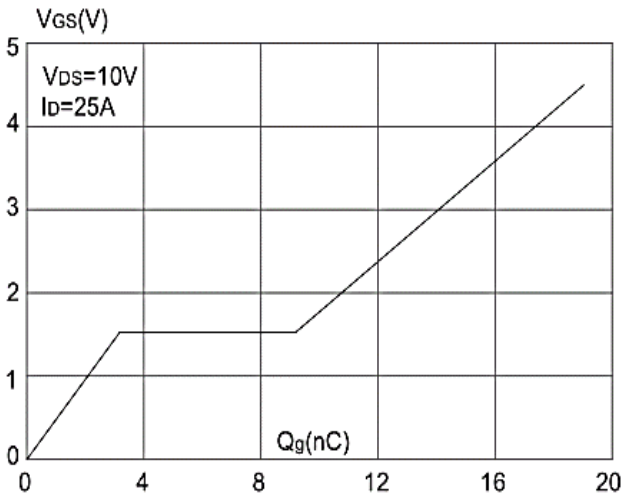


Figure 5: Gate Charge Characteristics

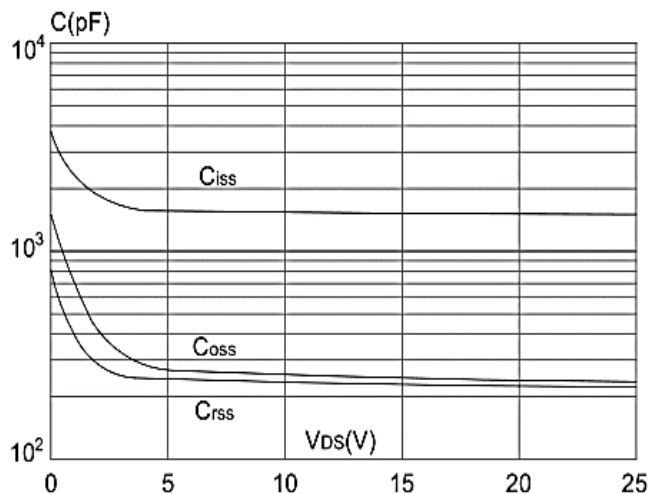


Figure 6: Capacitance Characteristics

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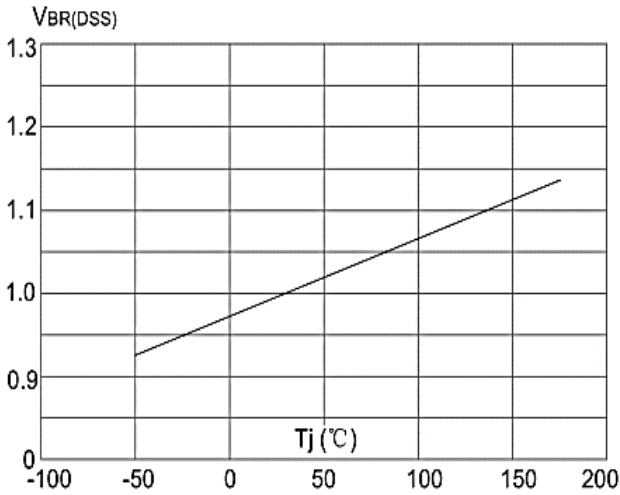


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

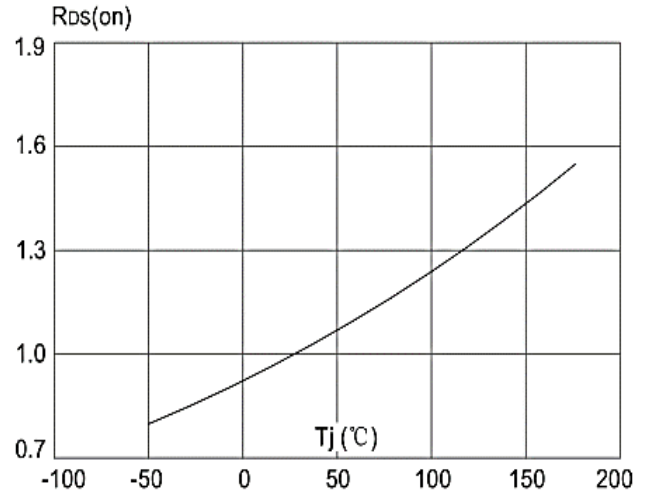


Figure 8: Normalized on Resistance vs. Junction Temperature

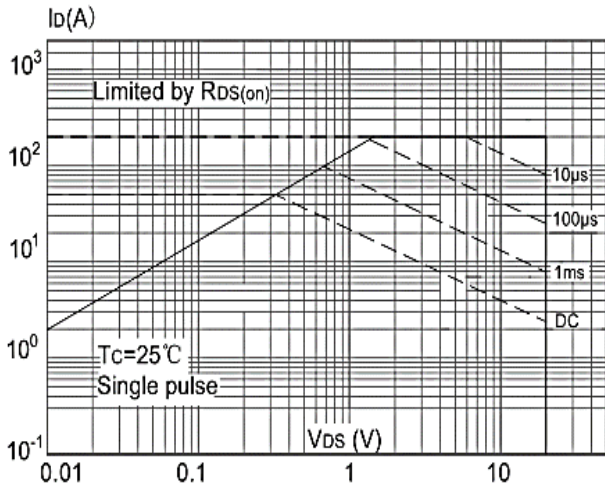


Figure 9: Maximum Safe Operating Area vs. Case Temperature

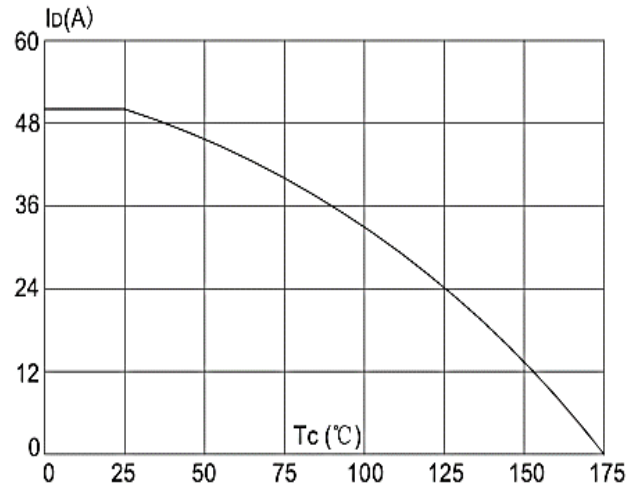


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

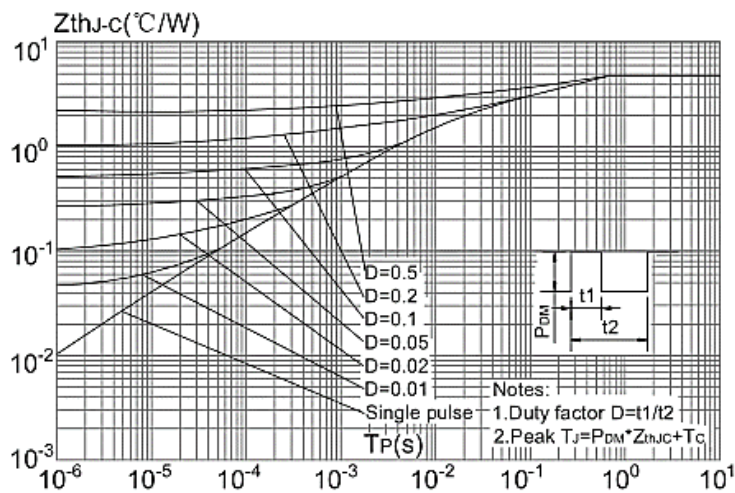
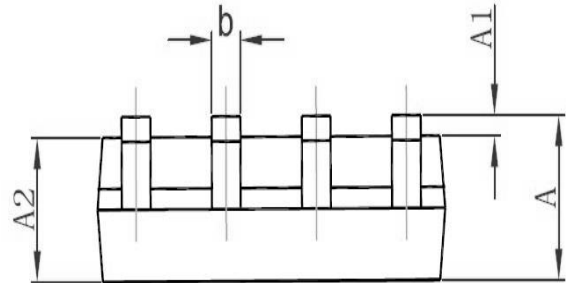
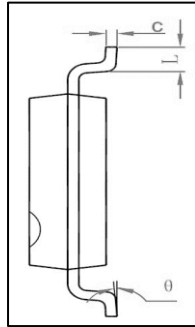
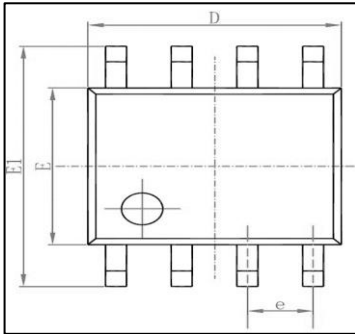
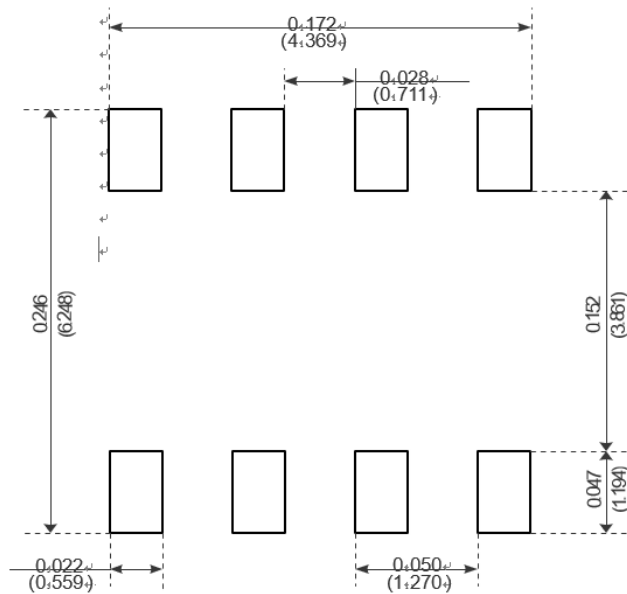


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

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