



UNI-SEMICONDUCTOR CO., LTD

宇力半导体有限公司



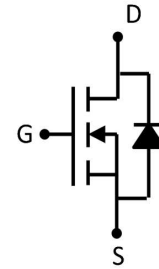
AP18N20 Data Sheet

V 1.1

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Feature

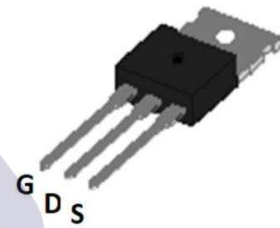
- 200V,18A
 $R_{DS(ON)} < 150m\Omega @ V_{GS}=10V$ TYP:120 m Ω
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



Schematic Diagram

Application

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)



TO-220

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
18N20	AP18N20	TO-220	-	-	1000

ABSOLUTE MAXIMUM RATINGS (T_a=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	200	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current	I _D	18	A
Pulsed Drain Current ⁽¹⁾	I _{DM}	72	A
Single Pulsed Avalanche Energy ⁽²⁾	E _{AS}	262.7	mJ
Avalanche Current ⁽¹⁾	I _{AS}	7.3	A
Repetitive Avalanche Energy ⁽¹⁾	E _{AR}	157.62	mJ
Power Dissipation (T _c =25°C)	P _D	104	W
Thermal Resistance from Junction to Case	R _{θJC}	1.2	°C/W
Thermal Resistance from Junction to Ambient	R _{θJA}	60	°C/W
Junction Temperature	T _J	150	°C
Storage Temperature	T _{STG}	-55~ +150	°C

MOSFET ELECTRICAL CHARACTERISTICS(T_a=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D =250μA	200	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =200V, V _{GS} = 0V	-	-	1	μA
Gate-body leakage current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V	-	-	±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2	--	4	V
Drain-source on-resistance ⁽³⁾	R _{DS(on)}	V _{GS} =10V, I _D =9A	-	120	150	mΩ
Dynamic characteristics						
Input Capacitance	C _{iSS}	V _{DS} =25V, V _{GS} =0V, f =100kHz	-	1200	-	pF
Output Capacitance	C _{oss}		-	161	-	
Reverse Transfer Capacitance	C _{rSS}		-	70	-	
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} =100V, I _D =18A, R _G =25Ω	-	40	-	ns
Turn-on rise time	t _r		-	33	-	
Turn-off delay time	t _{d(off)}		-	166	-	
Turn-off fall time	t _f		-	60	-	
Total Gate Charge	Q _g	V _{DS} =160V, I _D =18A, V _{GS} =10V	-	38	-	nC
Gate-Source Charge	Q _{gs}		-	6	-	
Gate-Drain Charge	Q _{gd}		-	16	-	
Source-Drain Diode characteristics						
Diode Forward voltage ⁽³⁾	V _{DS}	V _{GS} =0V, I _S =9A, V _{GS} =10V	-	-	1.4	V
Diode Forward current ⁽⁴⁾	I _S	T _C =25°C	-	-	18	A
Body Diode Reverse Recovery Time	t _{rr}	T _J =25°C, I _F =18A, di/dt=100A/us		182		ns
Body Diode Reverse Recovery Charge	Q _{rr}	T _J =25°C, I _F =18A, di/dt=100A/us		1.29		uc

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. I_{AS} = 15A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25 °C
3. Pulse Test: pulse width≤300μs, duty cycle≤1%

Typical Characteristics $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics ($T_J = 25\text{ }^\circ\text{C}$)

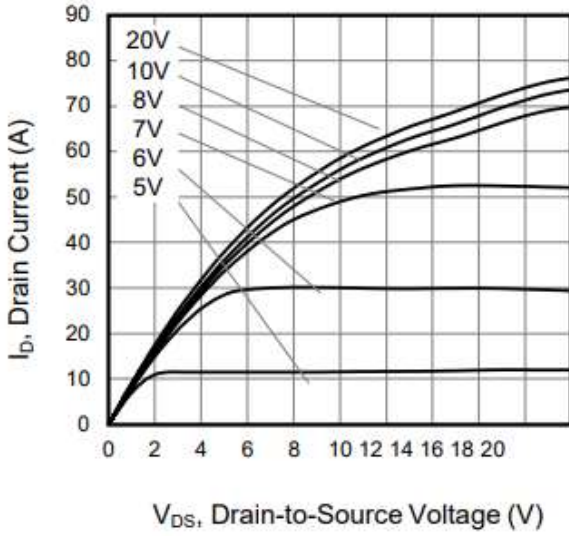


Figure 2. Body Diode Forward Voltage

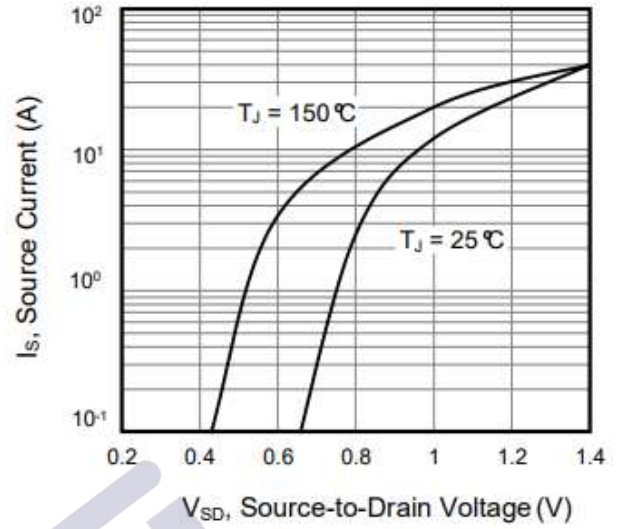


Figure 3. Drain Current vs. Temperature

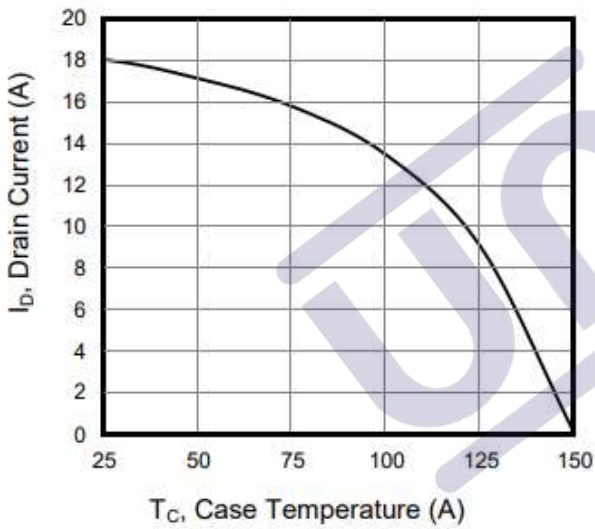


Figure 4. BV_{DSS} Variation vs. Temperature

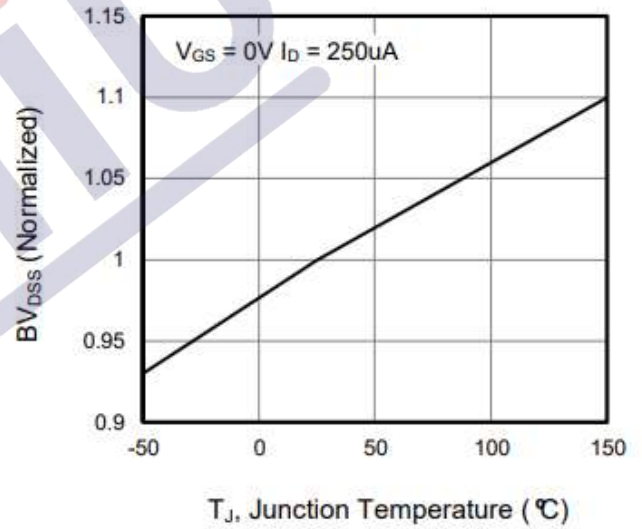


Figure 5. Transfer Characteristics

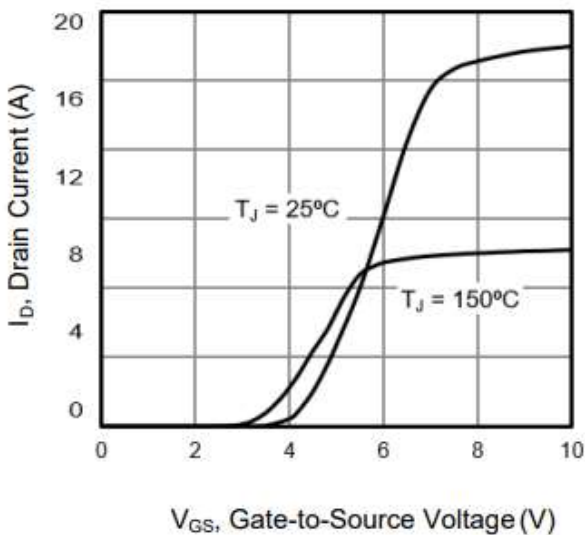
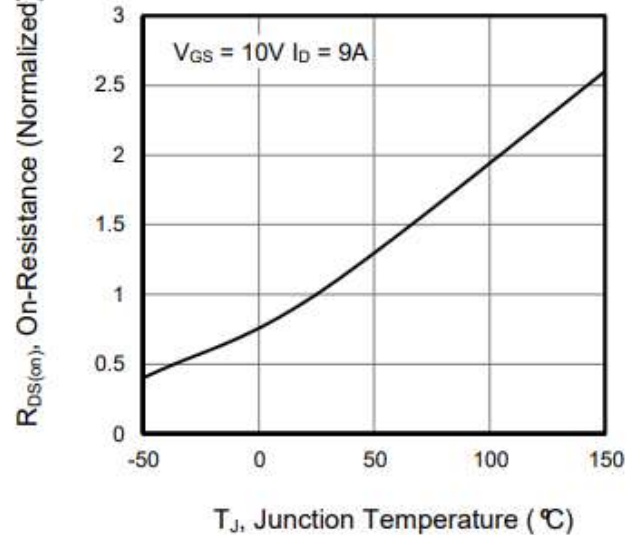


Figure 6. On-Resistance vs. Temperature



Typical Characteristics $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted

Figure 7. Capacitance

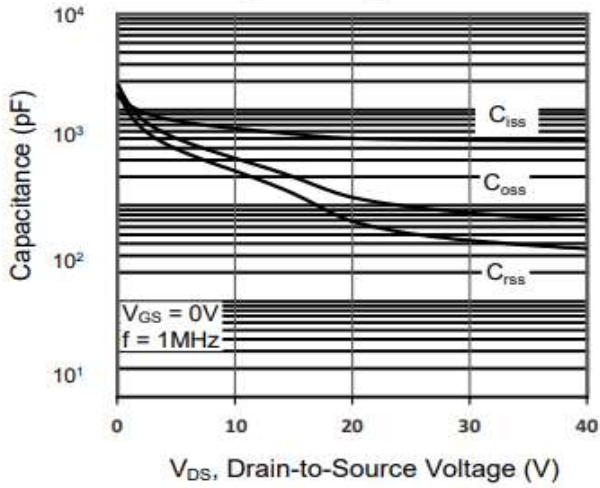


Figure 8. Gate Charge

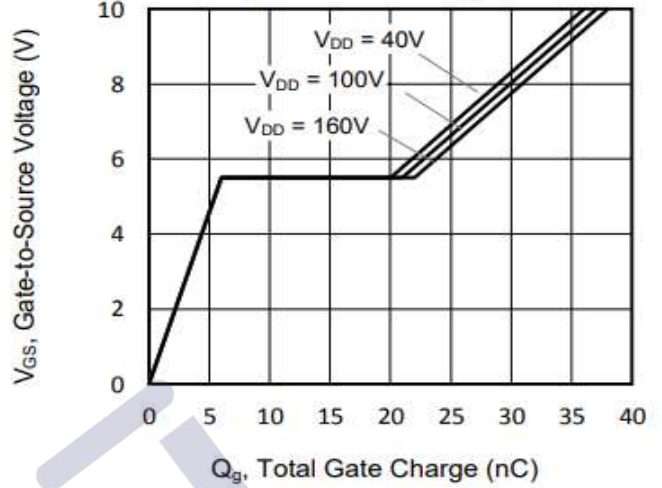


Figure 9. Transient Thermal Impedance TO-220F

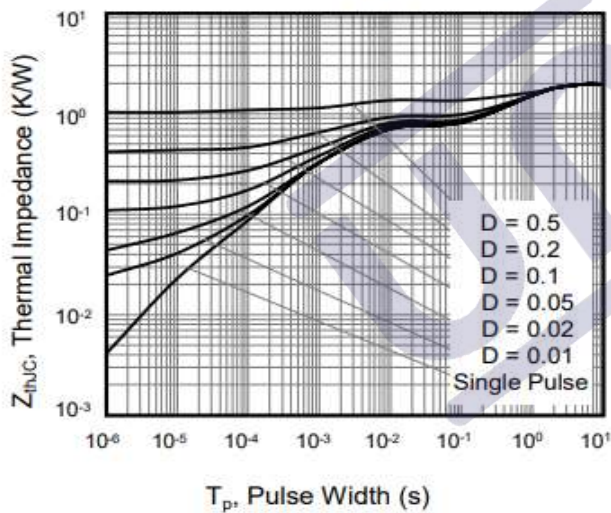
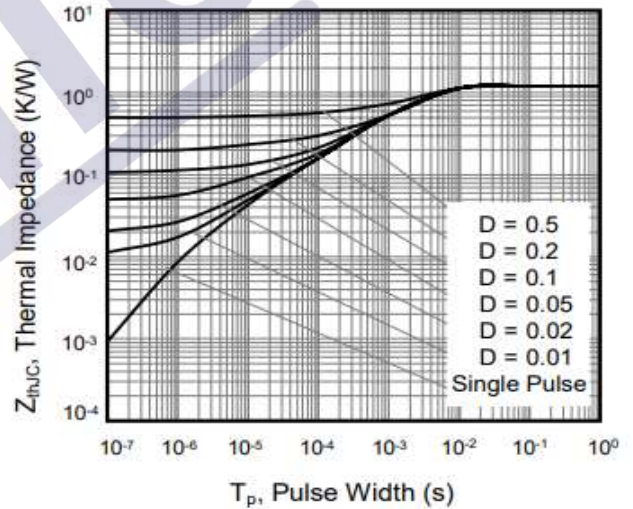
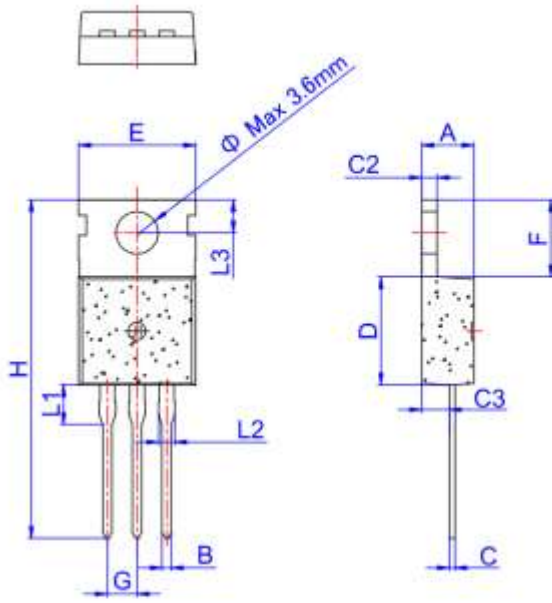


Figure 10. Transient Thermal Impedance TO-220



TO-220 Package Information



TO-220

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
B	0.70		0.90	0.028		0.035
C	0.45		0.60	0.018		0.024
C2	1.23		1.32	0.048		0.052
C3	2.20		2.60	0.087		0.102
D	8.90		9.90	0.350		0.390
E	9.90		10.3	0.390		0.406
F	6.30		6.90	0.248		0.272
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.39			0.133	
L2	1.14		1.70	0.045		0.067
L3	2.65		2.95	0.104		0.116
Φ		3.6			0.142	

1.版本记录

DATE	REV.	DESCRIPTION
2018/04/19	1.0	First Release
2021/11/10	1.1	Layout adjustment

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