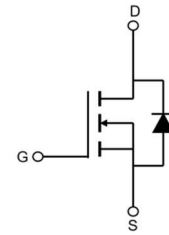


# AP18N20L

## N-Channel Enhancement Mosfet

### Feature

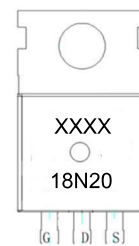
- 200V,18A  
 $R_{DS(ON)} < 170m\Omega @ V_{GS}=10V$  TYP:130 m $\Omega$
- Advanced Planar stripe DMOS Technology
- Lead free product is acquired
- Excellent  $R_{DS(ON)}$  and Low Gate Charge



Schematic Diagram

### Application

- PWM applications
- Load Switch
- Power management



Marking and pin assignment

### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
18N20	AP18N20L	TO-220C	-	-	50

### ABSOLUTE MAXIMUM RATINGS ( $T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	200	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Continuous Drain Current ( $T_a=25^\circ\text{C}$ )	$I_D$	18	A
Continuous Drain Current ( $T_a=100^\circ\text{C}$ )	$I_D$	9	A
Pulsed Drain Current <sup>(1)</sup>	$I_{DM}$	72	A
Singel Pulsed Avalanche Energy <sup>(2)</sup>	$E_{AS}$	450	mJ
Power Dissipation	$P_D$	125	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.75	$^\circ\text{C}/\text{W}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55~ +150	$^\circ\text{C}$

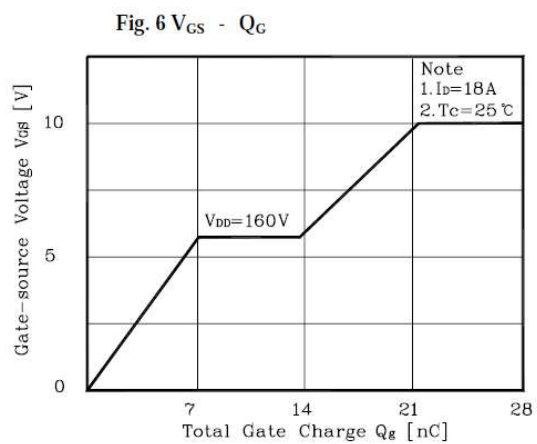
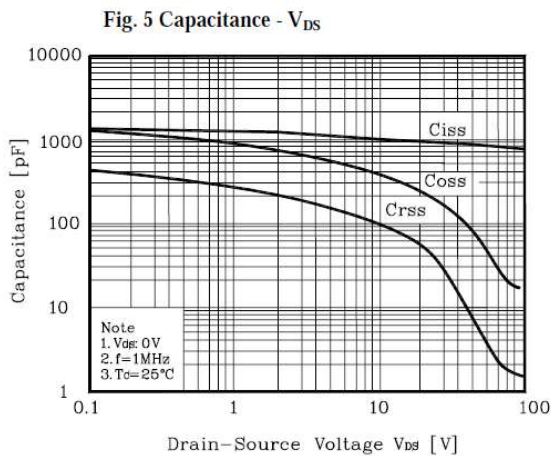
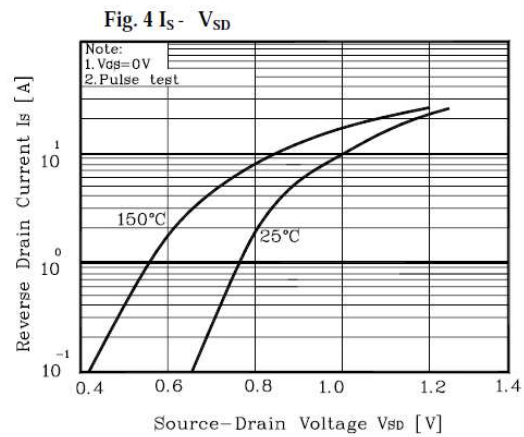
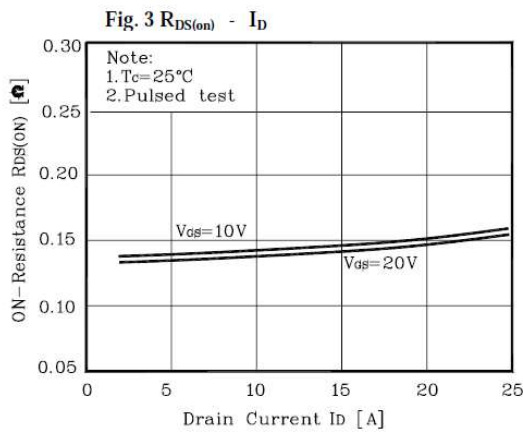
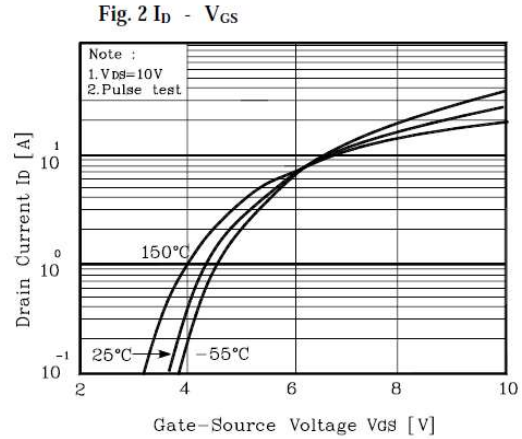
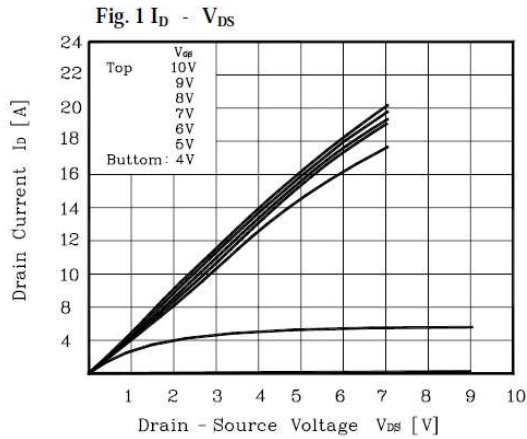
MOSFET ELECTRICAL CHARACTERISTICS( $T_a=25^{\circ}\text{C}$  unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	200	-	-	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 200V, V_{GS} = 0V$	-	-	1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 30V, V_{DS} = 0V$	-	-	$\pm 100$	nA
Gate threshold voltage <sup>(3)</sup>	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1	1.8	2.5	V
Drain-source on-resistance <sup>(3)</sup>	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 9A$	-	130	170	m $\Omega$
Forward tranconductance <sup>(3)</sup>	$g_{FS}$	$V_{DS} = 10V, I_D = 9A$	-	10.5	-	S
<b>Dynamic characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 25V, V_{GS} = 0V, f = 100kHz$	-	940	-	pF
Output Capacitance	$C_{oss}$		-	225	-	
Reverse Transfer Capacitance	$C_{rss}$		-	55	-	
<b>Switching characteristics</b>						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 125V, I_D = 18A, V_{GS} = 10V,$ $R_G = 25\Omega$	-	15	-	ns
Turn-on rise time	$t_r$		-	130	-	
Turn-off delay time	$t_{d(off)}$		-	135	-	
Turn-off fall time	$t_f$		-	105	-	
Total Gate Charge	$Q_g$	$V_{DS} = 160V, I_D = 18A,$ $V_{GS} = 10V$	-	22	-	nC
Gate-Source Charge	$Q_{gs}$		-	6.6	-	
Gate-Drain Charge	$Q_{gd}$		-	7.2	-	
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(3)</sup>	$V_{DS}$	$V_{GS} = 0V, I_S = 9A$	-	-	1.4	V
Diode Forward current <sup>(4)</sup>	$I_S$		-	-	18	A
Body Diode Reverse Recovery Time	$t_{rr}$	$T_J = 25^{\circ}, I_F = 18A, di/dt = 100A/\mu s$		207		ns
Body Diode Reverse Recovery Charge	$Q_{rr}$	$T_J = 25^{\circ}, I_F = 18A, di/dt = 100A/\mu s$		1.63		uc

**Notes:**

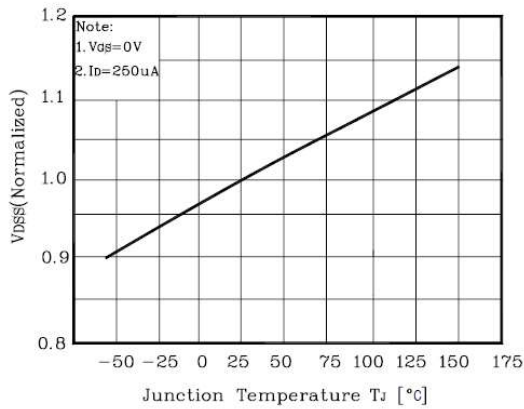
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition:  $T_J = 25^{\circ}\text{C}, V_{DD} = 50V, R_G = 50\Omega, L = 0.5\text{mH}$
3. Pulse Test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
4. Surface Mounted on FR4 Board,  $t \leq 10\text{ sec}$

**Typical Characteristics**

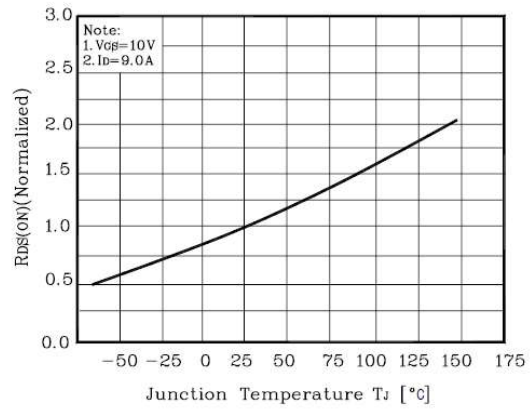


**Typical Characteristics**

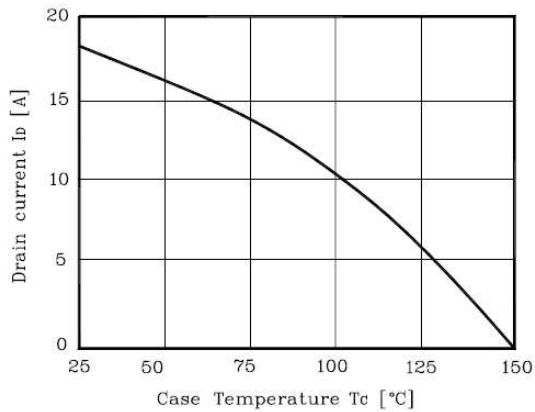
**Fig. 7  $V_{DSS} - T_J$**



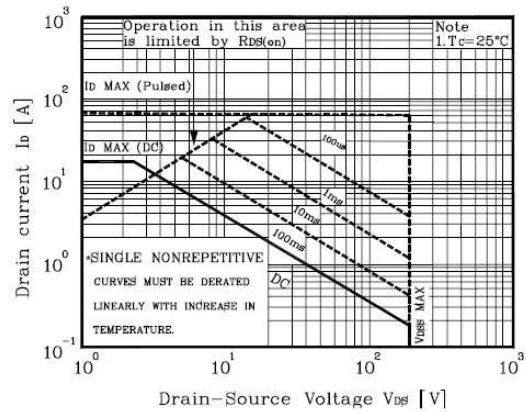
**Fig. 8  $R_{DS(on)} - T_J$**



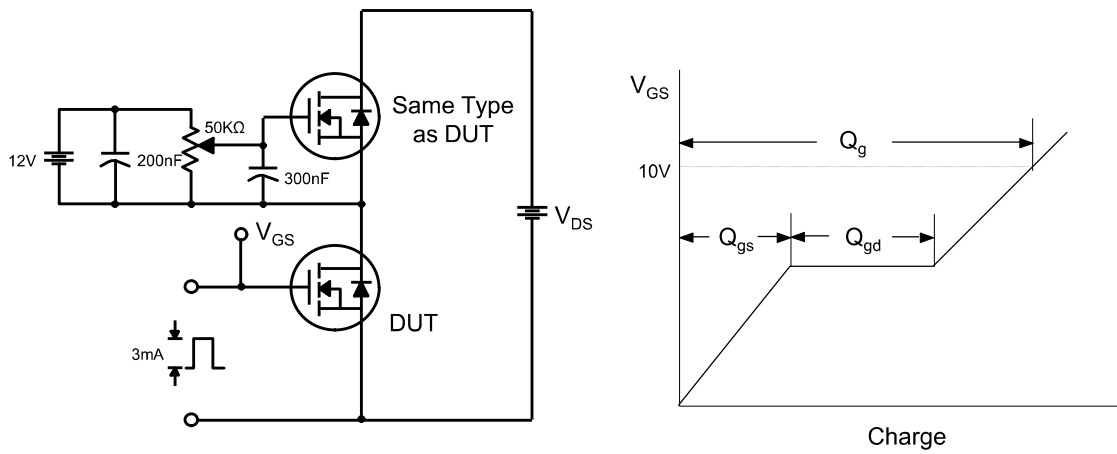
**Fig. 9  $I_D - T_C$**



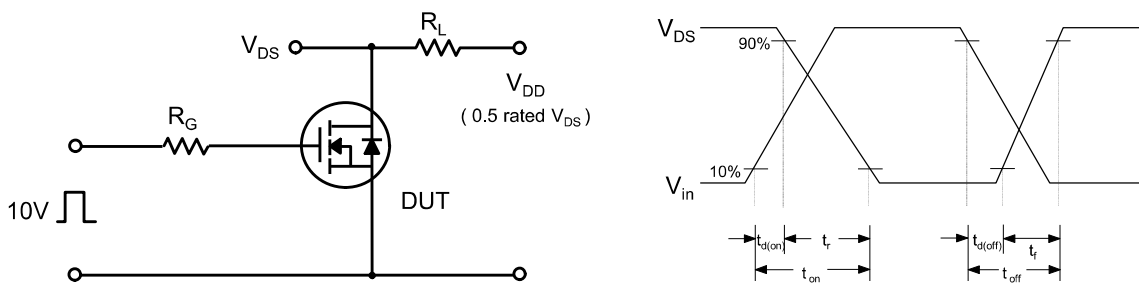
**Fig. 10 Safe Operating Area**



**Fig 11. Gate Charge Test Circuit & Waveform**



**Fig 12. Resistive Switching Test Circuit & Waveforms**



**Fig 13. Unclamped Inductive Switching Test Circuit & Waveforms**

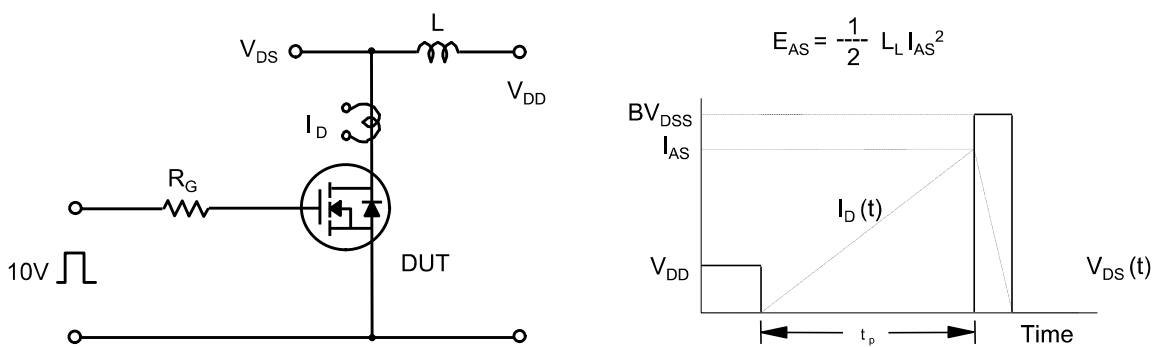
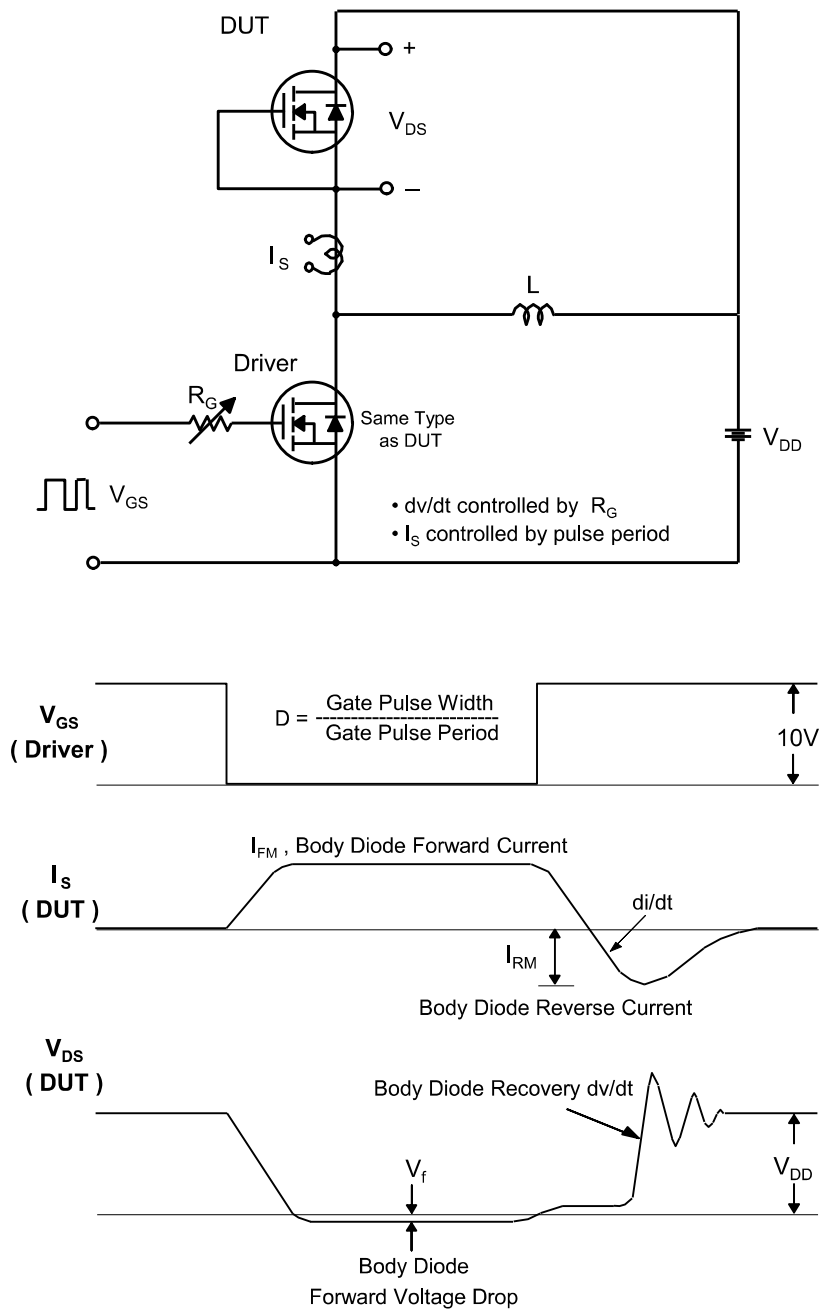
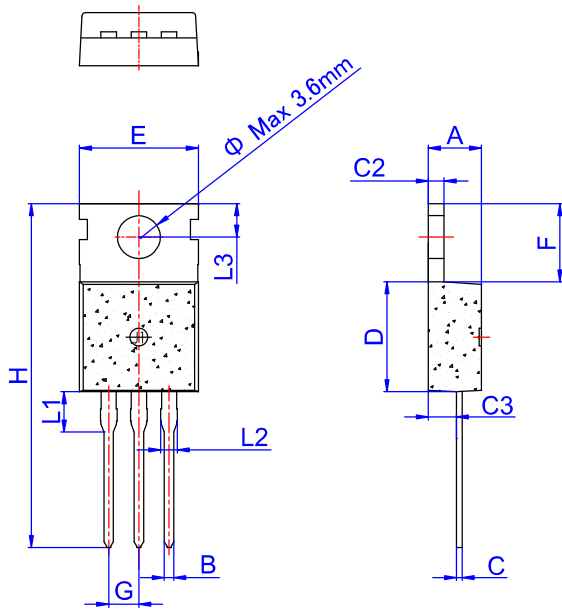


Fig 14. Peak Diode Recovery dv/dt Test Circuit & Waveforms



**AP18N20L**  
N-Channel Enhancement Mosfet

**TO-220C Package Information**



TO-220C

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
$\Phi$		3.6			0.142	