

# AP20N06T

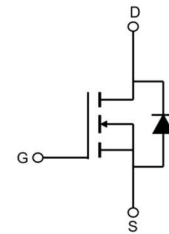
## N-Channel Enhancement Mosfet

# AIIPOWER

## DATA SHEET

### Feature

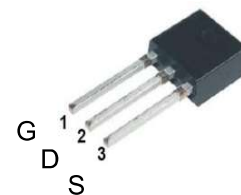
- 60V,20A  
 $R_{DS(ON)} < 32m\Omega @ V_{GS}=10V$  TYP:28 m $\Omega$   
 $R_{DS(ON)} < 40m\Omega @ V_{GS}=4.5V$  TYP:34 m $\Omega$
- Advanced Trench Technology
- Lead free product is acquired
- Excellent  $R_{DS(ON)}$  and Low Gate Charge



Schematic Diagram

### Application

- PWM applications
- Load Switch
- Power management



pin assignment

### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
20N06T	AP20N06T	TO-251	-	-	-

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_a=25^\circ\text{C}$ )	$I_D$	20	A
Continuous Drain Current ( $T_a=100^\circ\text{C}$ )	$I_D$	13	A
Pulsed Drain Current <sup>(1)</sup>	$I_{DM}$	70	A
Singel Pulsed Avalanche Energy <sup>(2)</sup>	$E_{AS}$	100	mJ
Power Dissipation	$P_D$	45	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	3.0	$^\circ\text{C/W}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55~ +150	$^\circ\text{C}$

**MOSFET ELECTRICAL CHARACTERISTICS(T<sub>a</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA	60	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V	-	-	1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	-	-	±100	nA
Gate threshold voltage <sup>(3)</sup>	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1	1.6	2.5	V
Drain-source on-resistance <sup>(3)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 15A	-	28	32	mΩ
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 10A	-	34	40	
Forward tranconductance <sup>(3)</sup>	g <sub>FS</sub>	V <sub>DS</sub> = 5V, I <sub>D</sub> = 4.5A	11	-	-	S
<b>Dynamic characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V, f = 1MHz	-	1890	-	pF
Output Capacitance	C <sub>oss</sub>		-	168	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	132	-	
<b>Switching characteristics</b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = 30V, I <sub>D</sub> = 10A, R <sub>L</sub> = 6.7Ω V <sub>GS</sub> = 10V, R <sub>G</sub> = 3Ω	-	7	-	ns
Turn-on rise time	t <sub>r</sub>		-	3.2	-	
Turn-off delay time	t <sub>d(off)</sub>		-	19.2	-	
Turn-off fall time	t <sub>f</sub>		-	3.2	-	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 48V, I <sub>D</sub> = 10A, V <sub>GS</sub> = 10V	-	49	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	8	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	16	-	
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(3)</sup>	V <sub>DS</sub>	V <sub>GS</sub> = 0V, I <sub>S</sub> = 20A	-	-	1.2	V
Diode Forward current <sup>(4)</sup>	I <sub>S</sub>		-	-	20	A
Body Diode Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> = 25° , I <sub>F</sub> = 10A, di/dt = 100A/us		35		ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	T <sub>J</sub> = 25° , I <sub>F</sub> = 10A, di/dt = 100A/us		43		nc

**Notes:**

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: T<sub>J</sub> = 25°C, V<sub>DD</sub> = 30V, R<sub>G</sub> = 25 Ω, L = 0.5mH
3. Pulse Test: pulse width ≤ 300μs, duty cycle ≤ 2%
4. Surface Mounted on FR4 Board, t ≤ 10 sec

**Test Circuit**

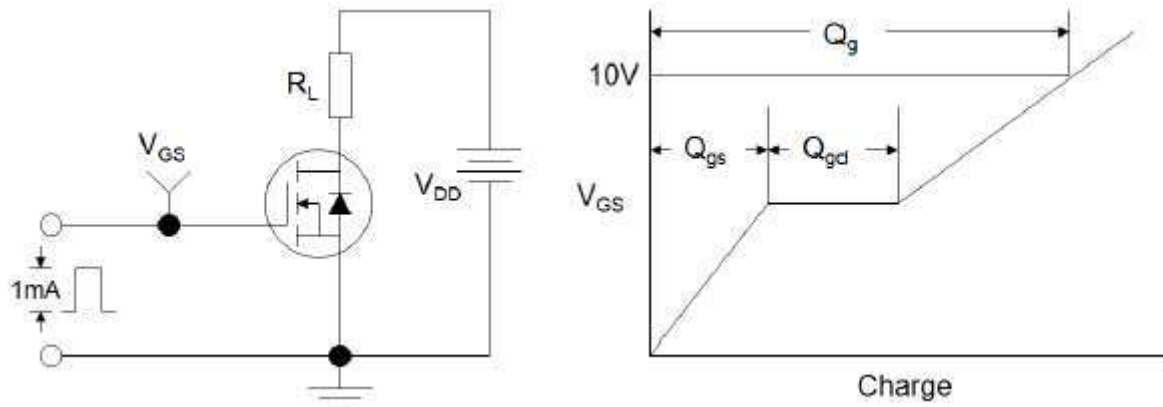


Figure1:Gate Charge Test Circuit & Waveform

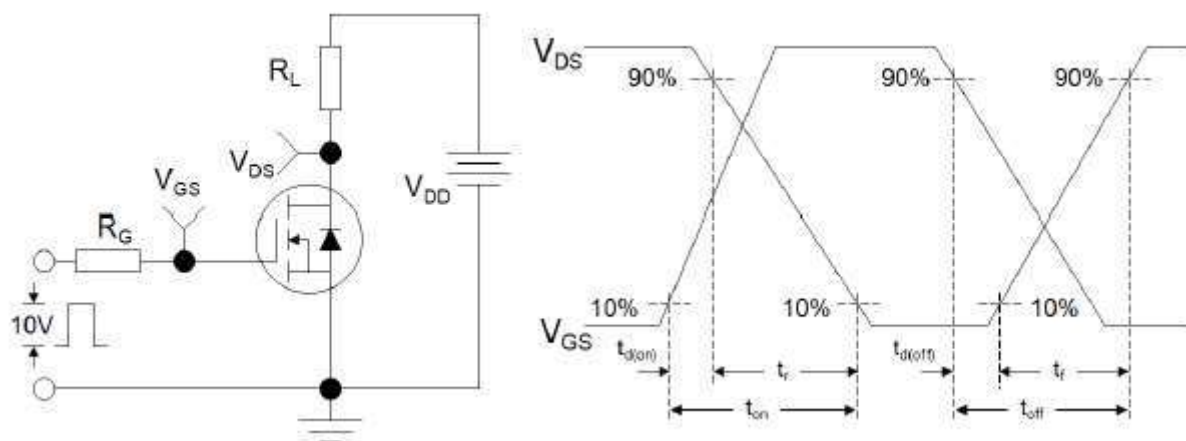


Figure 2: Resistive Switching Test Circuit & Waveforms

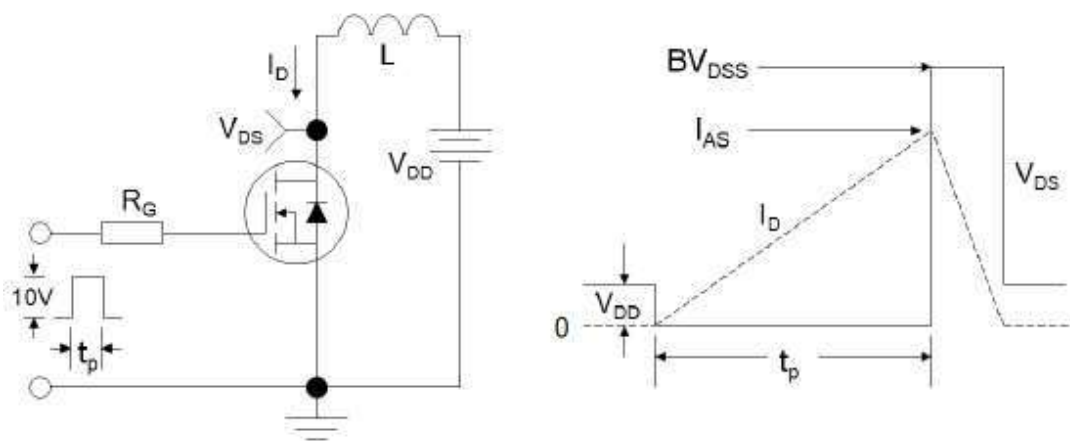
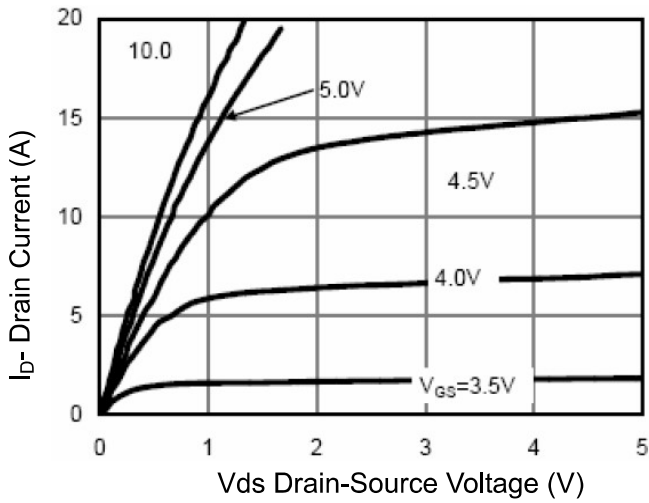
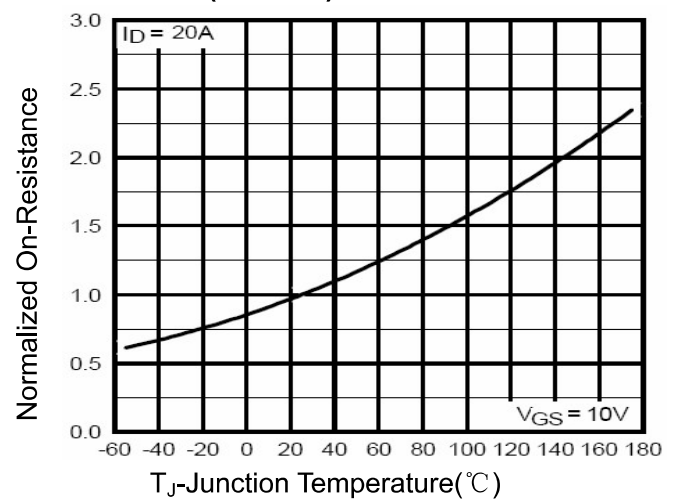


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

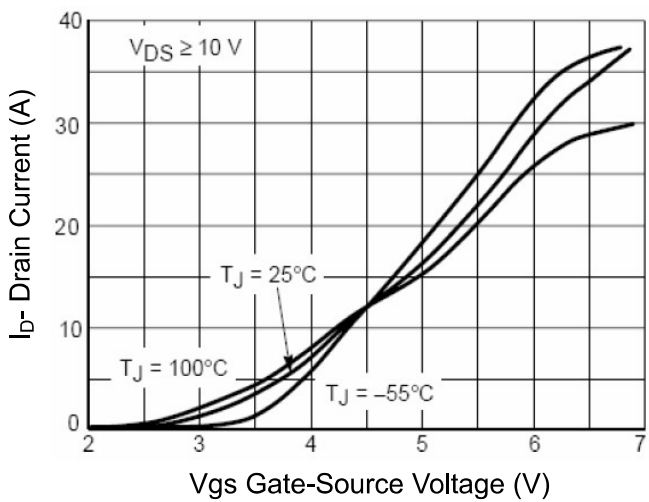
**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)**



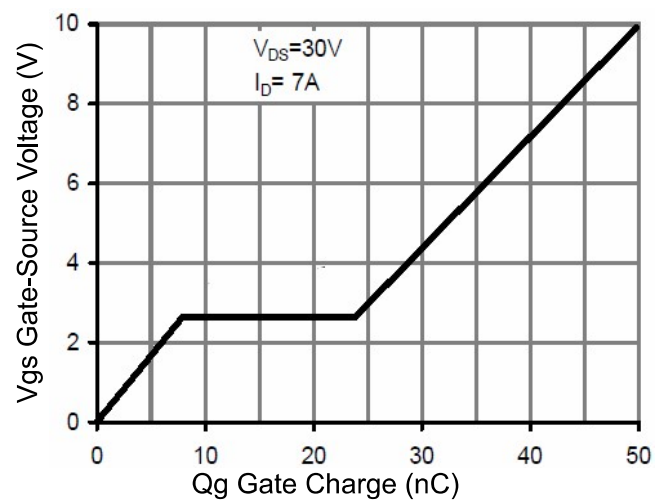
**Figure 1 Output Characteristics**



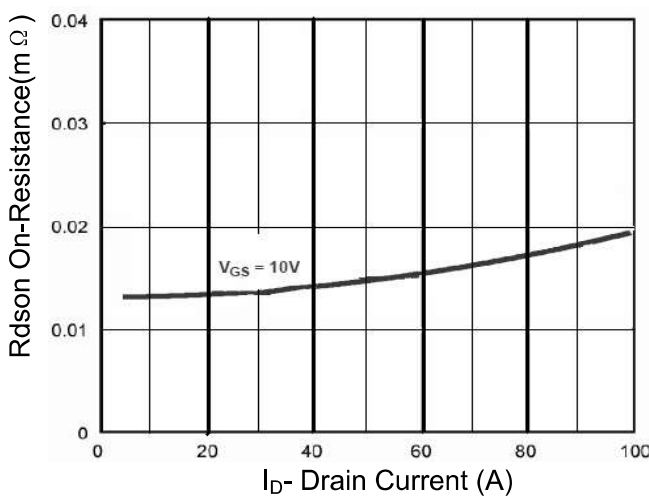
**Figure 4 Rdson-Junction Temperature**



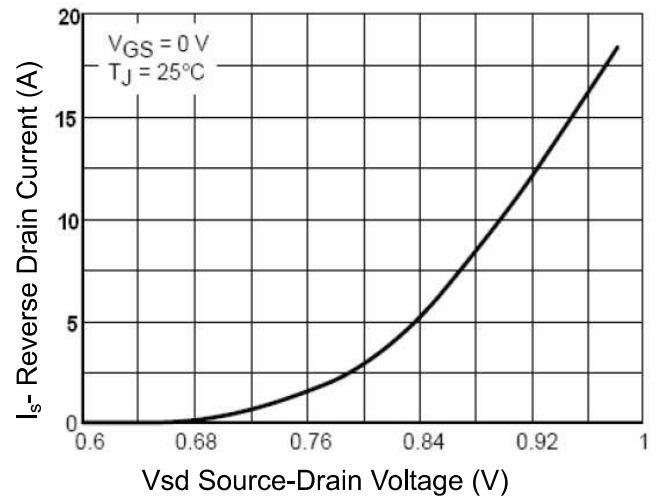
**Figure 2 Transfer Characteristics**



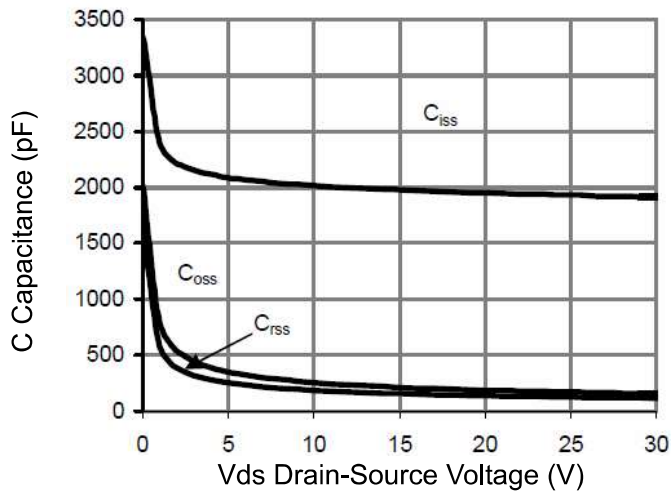
**Figure 5 Gate Charge**



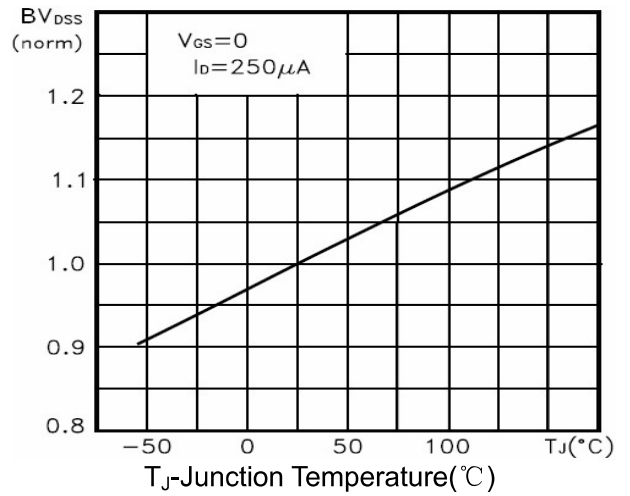
**Figure 3 Rdson- Drain Current**



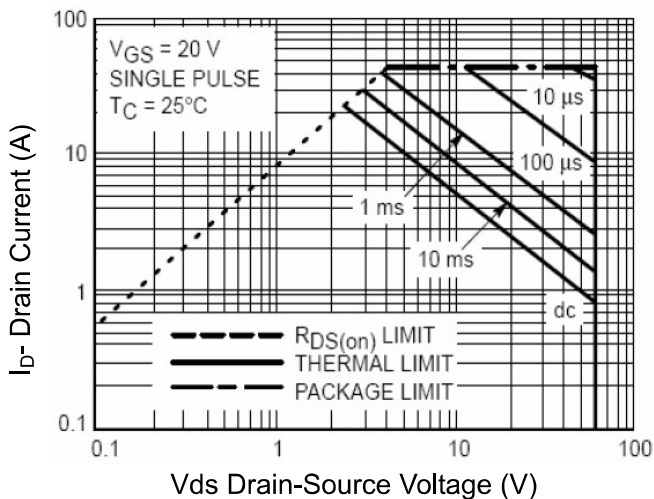
**Figure 6 Source- Drain Diode Forward**



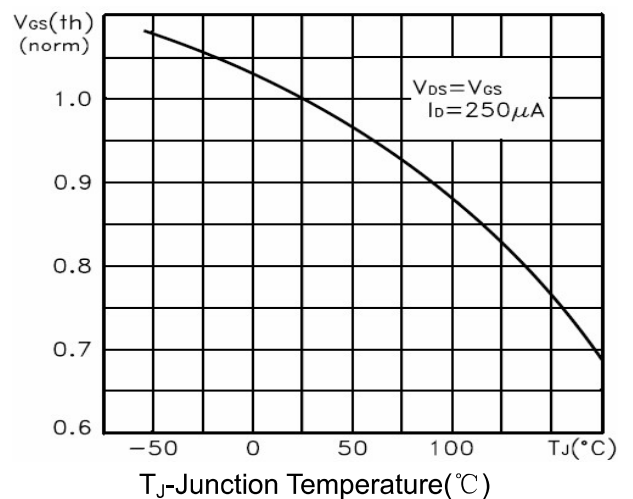
**Figure 7 Capacitance vs Vds**



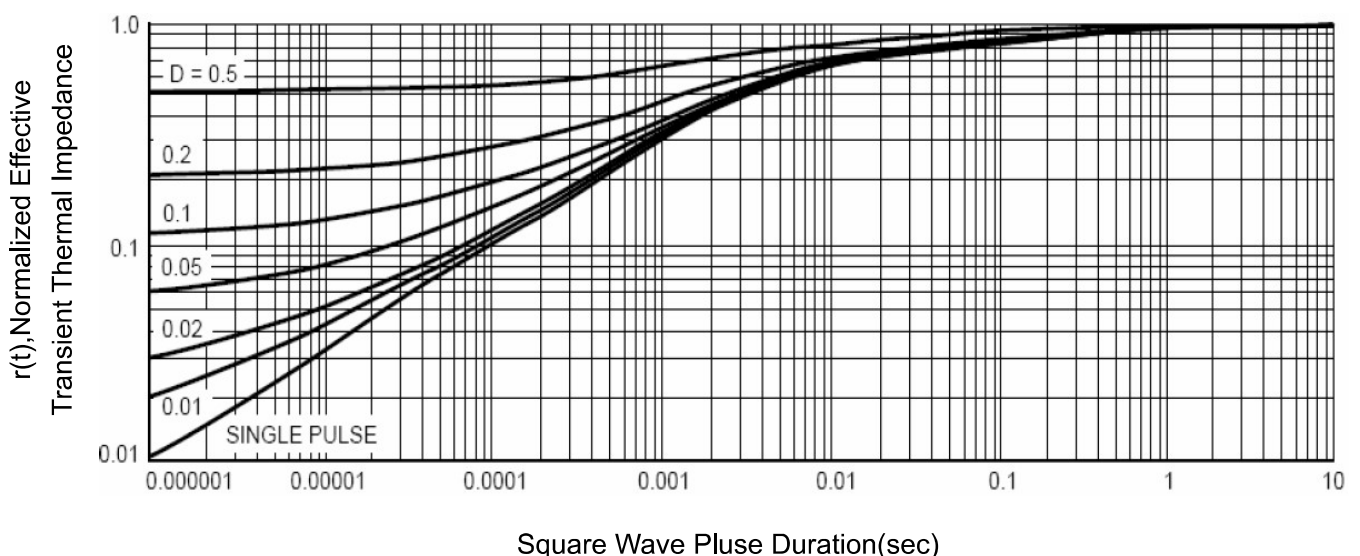
**Figure 9  $BV_{DSS}$  vs Junction Temperature**



**Figure 8 Safe Operation Area**



**Figure 10  $V_{GS(th)}$  vs Junction Temperature**



**Figure 11 Normalized Maximum Transient Thermal Impedance**

**TO-251 Package Information**

