

# AP20N06T

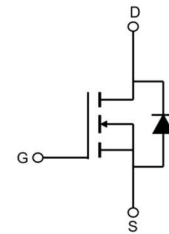
N-Channel Enhancement Mosfet

# AIPOWER

## DATA SHEET

### Feature

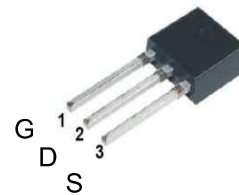
- 60V,20A  
 $R_{DS(ON)} < 32m\Omega @ V_{GS}=10V$  TYP:28 m $\Omega$   
 $R_{DS(ON)} < 40m\Omega @ V_{GS}=4.5V$  TYP:34 m $\Omega$
- Advanced Trench Technology
- Lead free product is acquired
- Excellent  $R_{DS(ON)}$  and Low Gate Charge



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 ( $T_a=25^{\circ}C$ 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 ( $T_a=25^{\circ}C$ )	$I_D$	20	A
Continuous Drain Current ( $T_a=100^{\circ}C$ )	$I_D$	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	$^{\circ}C/W$
Junction Temperature	$T_J$	150	$^{\circ}C$
Storage Temperature	$T_{STG}$	-55~ +150	$^{\circ}C$

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	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	60	-	-	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 60V, V_{GS} = 0V$	-	-	1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	$\pm 100$	nA
Gate threshold voltage <sup>(3)</sup>	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1	1.6	2.5	V
Drain-source on-resistance <sup>(3)</sup>	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 15A$	-	28	32	m $\Omega$
		$V_{GS} = 4.5V, I_D = 10A$	-	34	40	
Forward tranconductance <sup>(3)</sup>	$g_{FS}$	$V_{DS} = 5V, I_D = 4.5A$	11	-	-	S
<b>Dynamic characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 30V, V_{GS} = 0V, f = 1MHz$	-	1890	-	pF
Output Capacitance	$C_{oss}$		-	168	-	
Reverse Transfer Capacitance	$C_{rss}$		-	132	-	
<b>Switching characteristics</b>						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30V, I_D = 10A, R_L = 6.7\Omega$ $V_{GS} = 10V, R_G = 3\Omega$	-	7	-	ns
Turn-on rise time	$t_r$		-	3.2	-	
Turn-off delay time	$t_{d(off)}$		-	19.2	-	
Turn-off fall time	$t_f$		-	3.2	-	
Total Gate Charge	$Q_g$	$V_{DS} = 48V, I_D = 10A,$ $V_{GS} = 10V$	-	49	-	nC
Gate-Source Charge	$Q_{gs}$		-	8	-	
Gate-Drain Charge	$Q_{gd}$		-	16	-	
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(3)</sup>	$V_{DS}$	$V_{GS} = 0V, I_S = 20A$	-	-	1.2	V
Diode Forward current <sup>(4)</sup>	$I_S$		-	-	20	A
Body Diode Reverse Recovery Time	$t_{rr}$	$T_J = 25^{\circ}, I_F = 10A, di/dt = 100A/us$		35		ns
Body Diode Reverse Recovery Charge	$Q_{rr}$	$T_J = 25^{\circ}, I_F = 10A, di/dt = 100A/us$		43		nc

**Notes:**

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition:  $T_J = 25^{\circ}\text{C}, V_{DD} = 30V, R_G = 25\Omega, L = 0.5mH$
3. Pulse Test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
4. Surface Mounted on FR4 Board,  $t \leq 10$  sec

**Test Circuit**

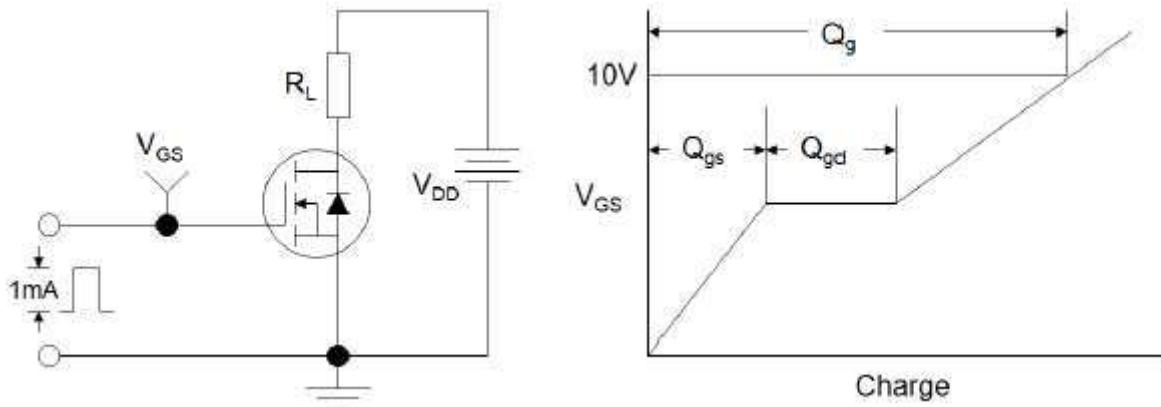


Figure1:Gate Charge Test Circuit & Waveform

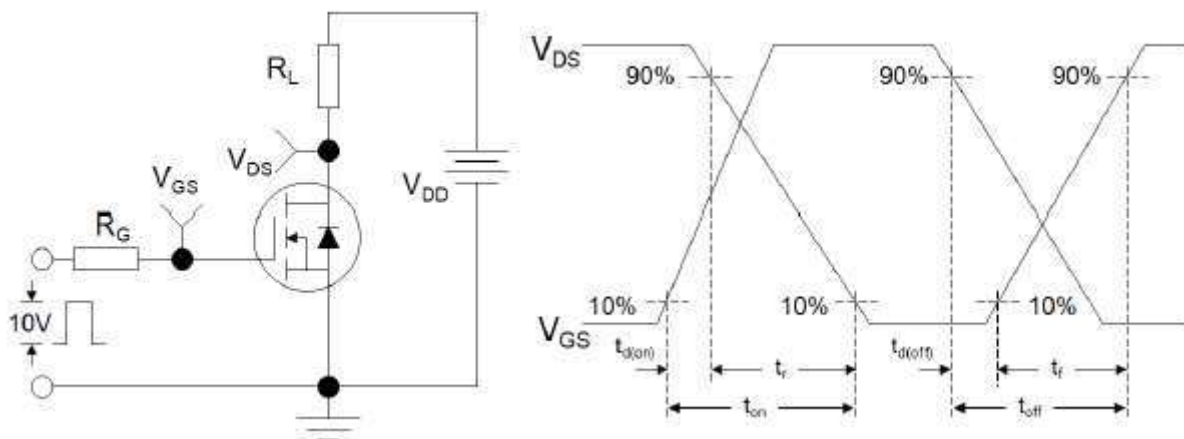


Figure 2: Resistive Switching Test Circuit & Waveforms

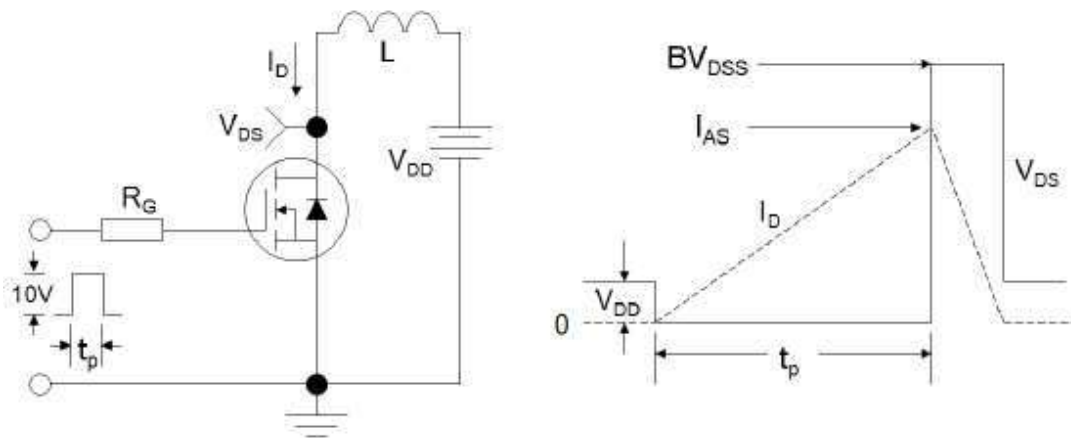
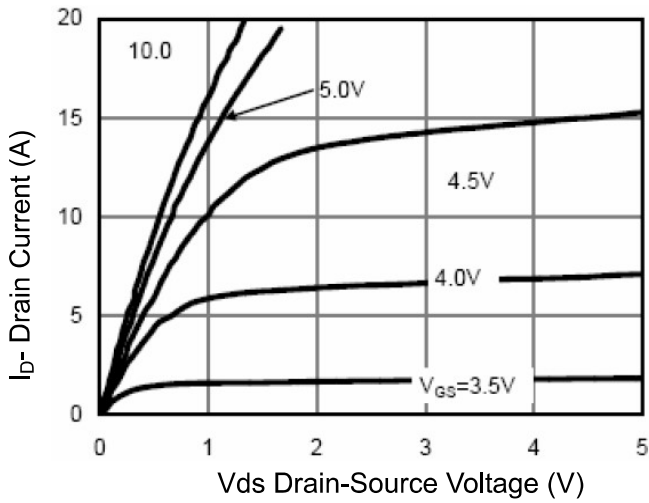
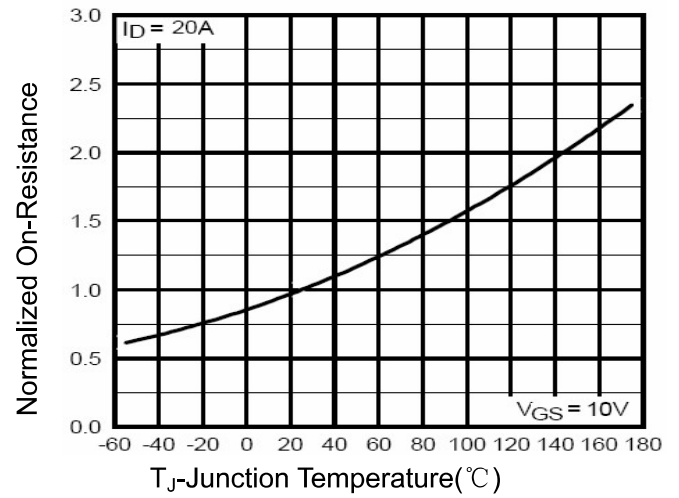


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

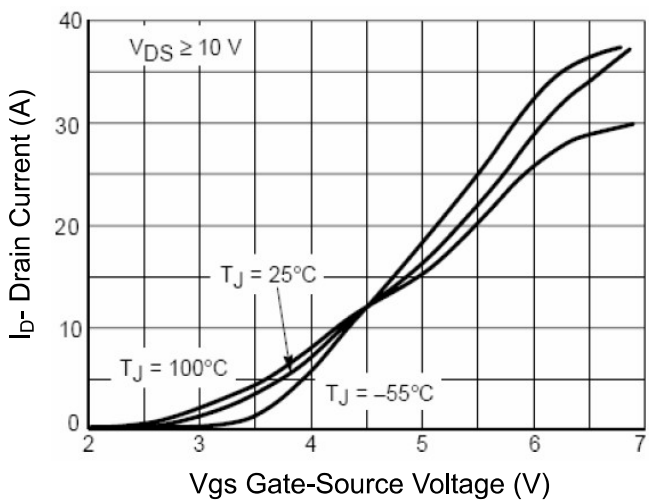
**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS (Curves)**



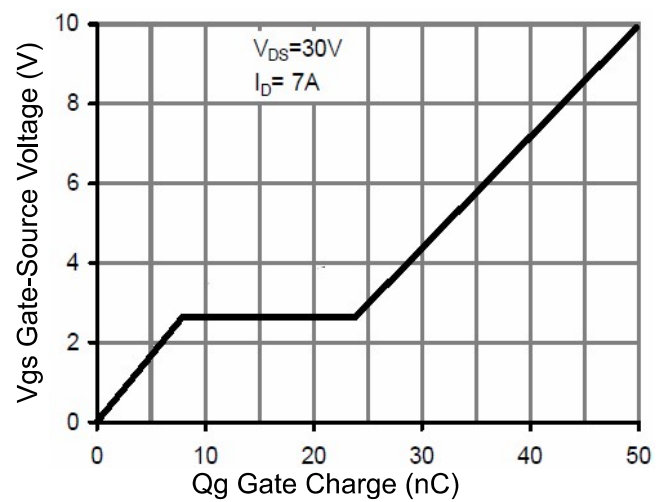
**Figure 1 Output Characteristics**



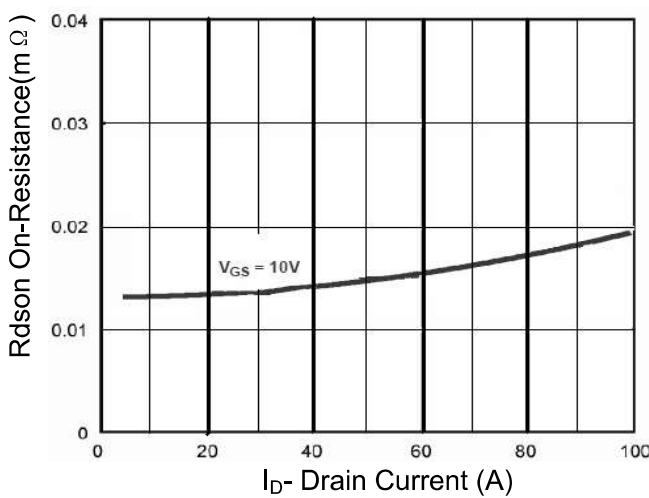
**Figure 4 Rdson-Junction Temperature**



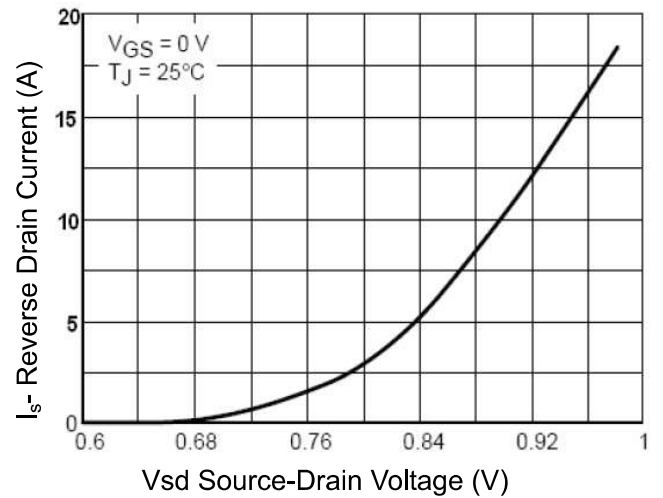
**Figure 2 Transfer Characteristics**



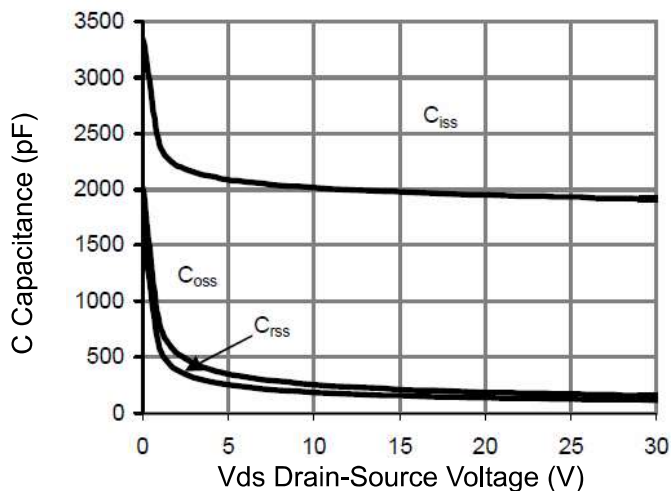
**Figure 5 Gate Charge**



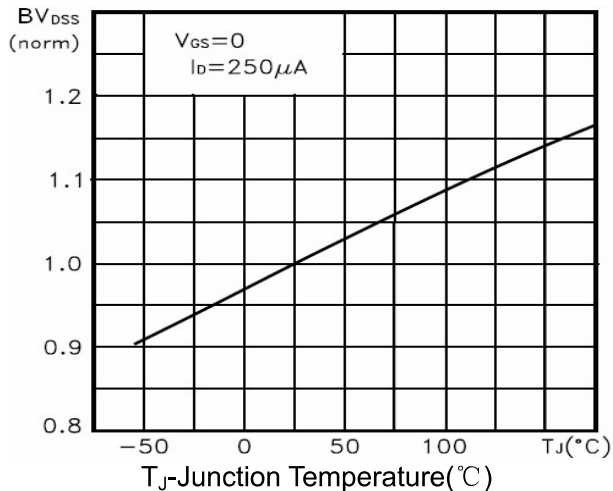
**Figure 3 Rdson- Drain Current**



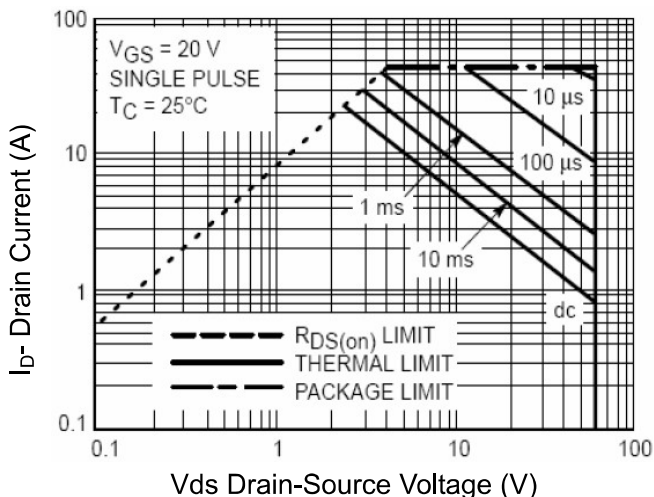
**Figure 6 Source- Drain Diode Forward**



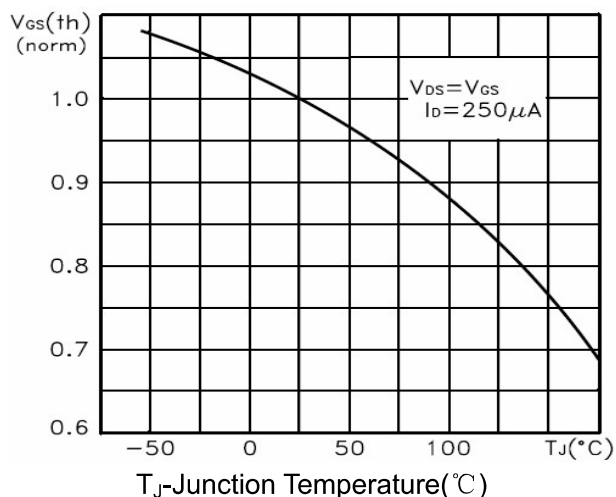
**Figure 7 Capacitance vs Vds**



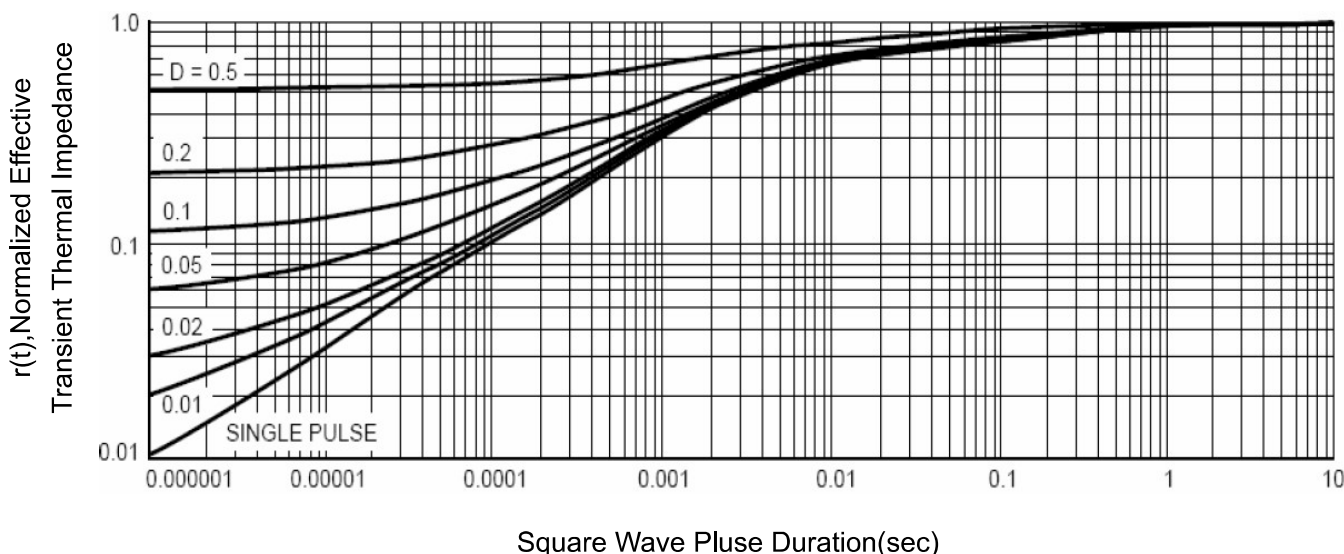
**Figure 9 BV<sub>DSS</sub> vs Junction Temperature**



**Figure 8 Safe Operation Area**

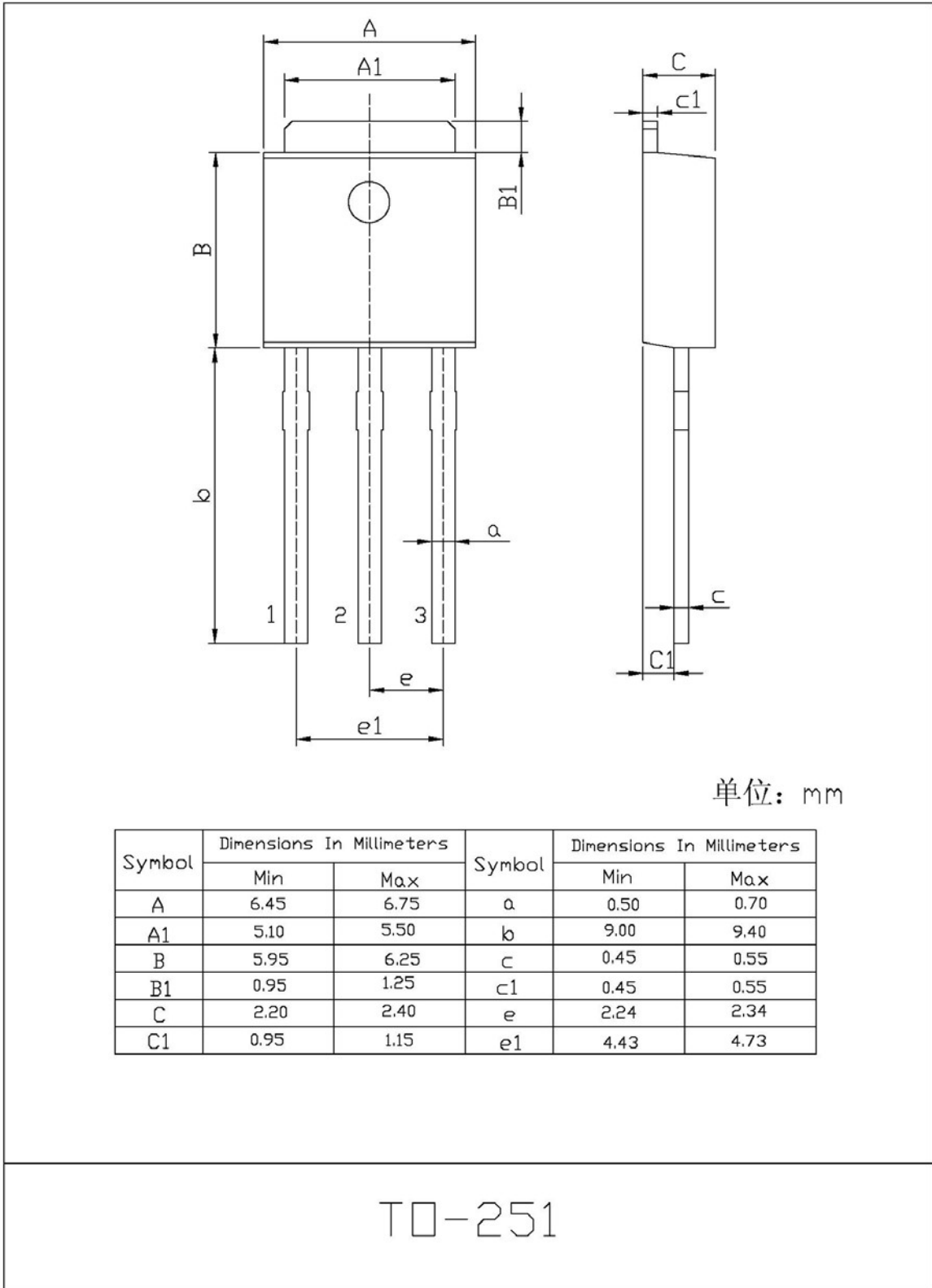


**Figure 10 V<sub>GS(th)</sub> vs Junction Temperature**



**Figure 11 Normalized Maximum Transient Thermal Impedance**

**TO-251 Package Information**



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