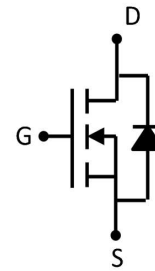


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N-Channel Enhancement Mosfet

Feature

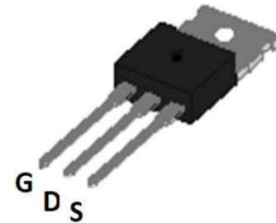
- 200V,9A
 $R_{DS(ON)} < 300m\Omega @ V_{GS}=10V$ TYP:200 m Ω
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



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)
9N20	AP9N20L	TO-220	-	-	1000

ABSOLUTE MAXIMUM RATINGS ($T_J=25^{\circ}C$ 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	9	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	36	A
Single Pulsed Avalanche Energy ⁽²⁾	E_{AS}	125	mJ
Avalanche Current ⁽¹⁾	I_{AS}	5	A
Repetitive Avalanche Energy ⁽¹⁾	E_{AR}	69	mJ
Power Dissipation ($T_c = 25^{\circ}C$)	P_D	74	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.7	$^{\circ}C/W$
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	60	$^{\circ}C/W$
Junction Temperature	T_J	150	$^{\circ}C$
Storage Temperature	T_{STG}	-55~ +150	$^{\circ}C$

MOSFET ELECTRICAL CHARACTERISTICS(T_J=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	1	1.5	2.5	V
Drain-source on-resistance ⁽³⁾	R _{DS(on)}	V _{GS} =10V, I _D =4.5A	-	200	300	mΩ
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f =100kHz	-	605	-	pF
Output Capacitance	C _{oss}		-	87	-	
Reverse Transfer Capacitance	C _{rss}		-	37	-	
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} =100V, I _D =9A, R _G =25Ω	-	35	-	ns
Turn-on rise time	t _r		-	7	-	
Turn-off delay time	t _{d(off)}		-	98	-	
Turn-off fall time	t _f		-	32	-	
Total Gate Charge	Q _g	V _{DS} =160V, I _D =9A, V _{GS} =10V	-	19	-	nC
Gate-Source Charge	Q _{gs}		-	3	-	
Gate-Drain Charge	Q _{gd}		-	8	-	
Source-Drain Diode characteristics						
Diode Forward voltage ⁽³⁾	V _{DS}	V _{GS} =0V, I _S =4.5A, V _{GS} =10V	-	-	1.4	V
Diode Forward current ⁽⁴⁾	I _S	T _c =25°C	-	-	9	A
Body Diode Reverse Recovery Time	t _{rr}	T _J =25°C, I _F =9A, di/dt=100A/us		145		ns
Body Diode Reverse Recovery Charge	Q _{rr}	T _J =25°C, I _F =9A, di/dt=100A/us		0.82		uc

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. L=10mH, 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 ($T_J = 25\text{ }^\circ\text{C}$)

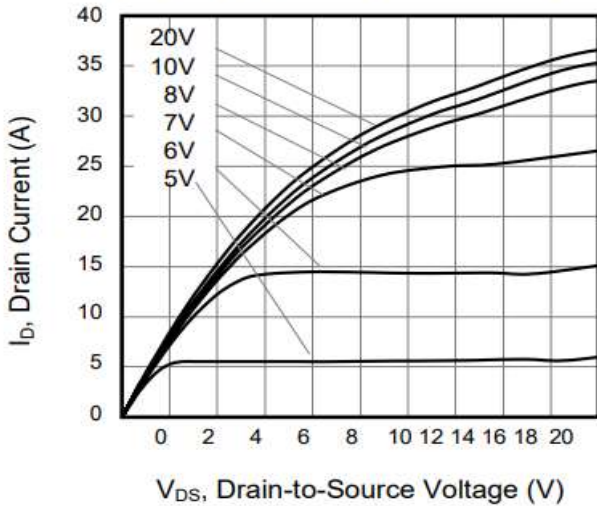


Figure 2. Body Diode Forward Voltage

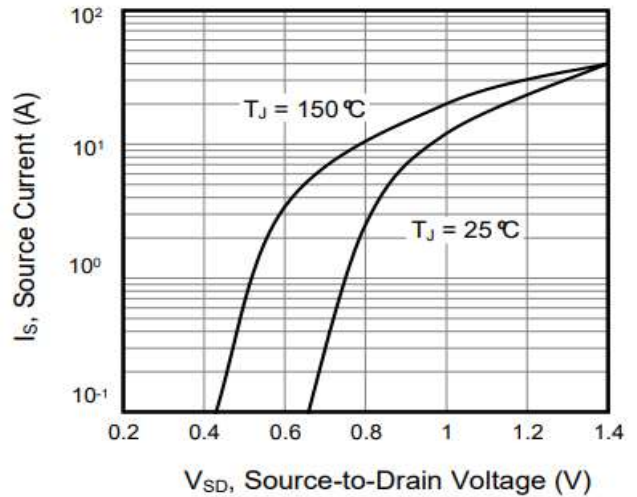


Figure 3. Drain Current vs. Temperature

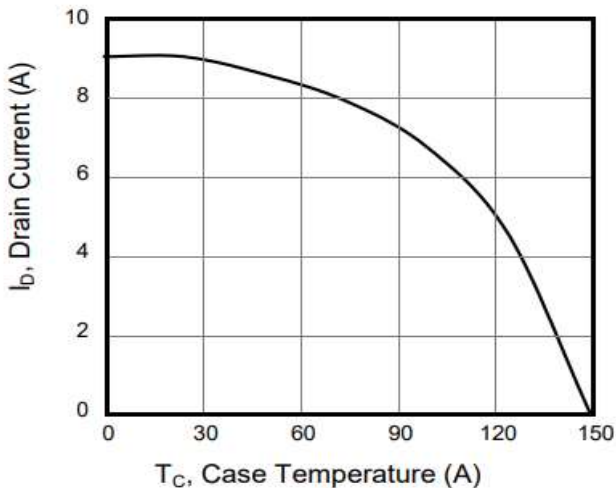


Figure 4. BV_{DSS} Variation vs. Temperature

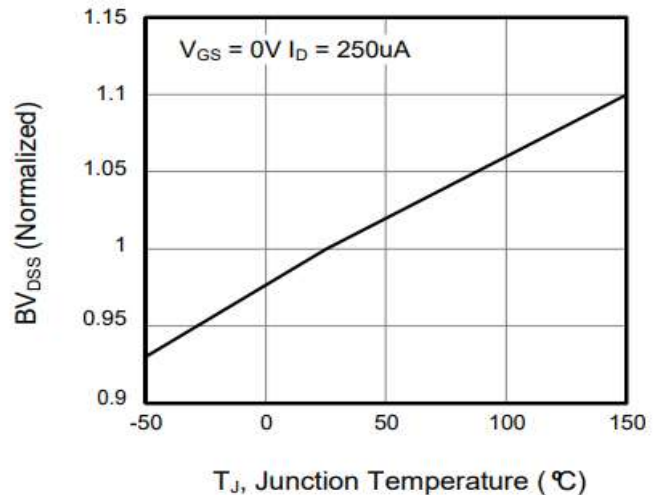


Figure 5. Transfer Characteristics

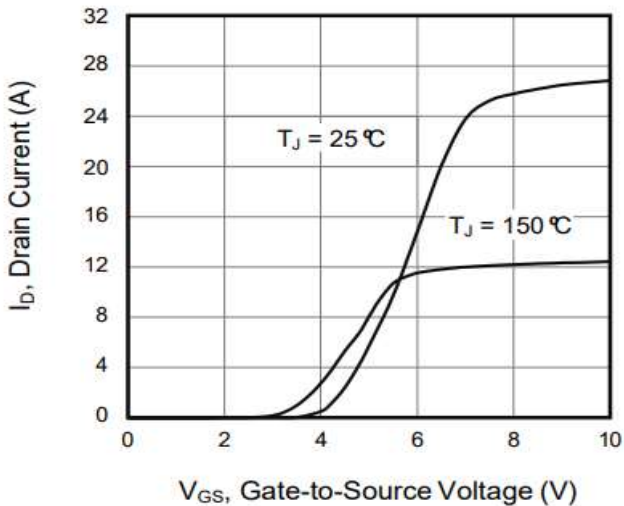
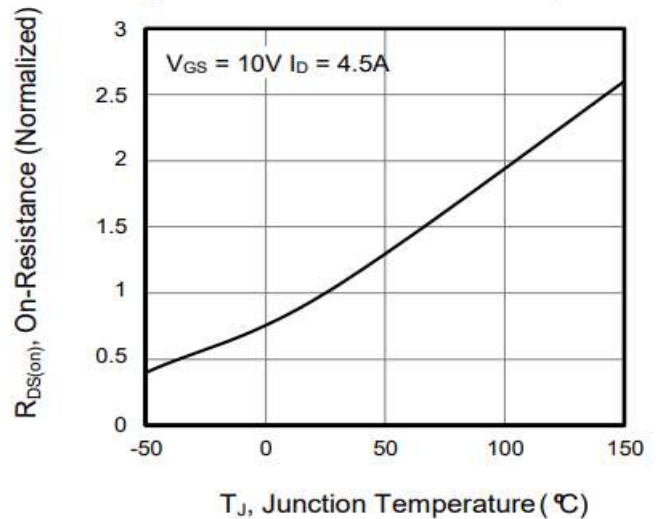


Figure 6. On-Resistance vs. Temperature



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

Figure 7. Capacitance

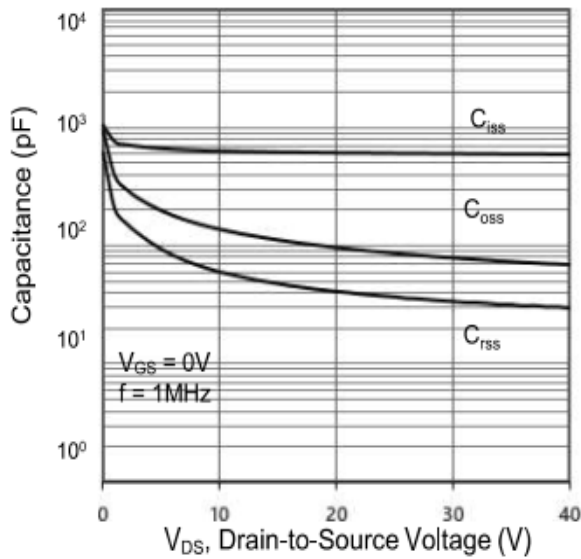


Figure 8. Gate Charge

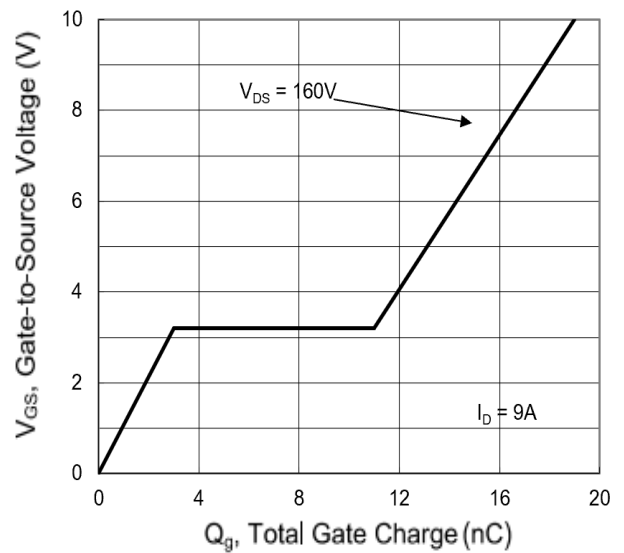
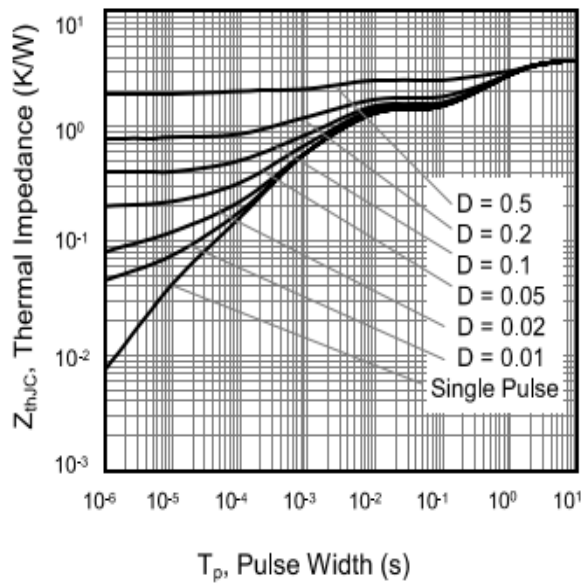


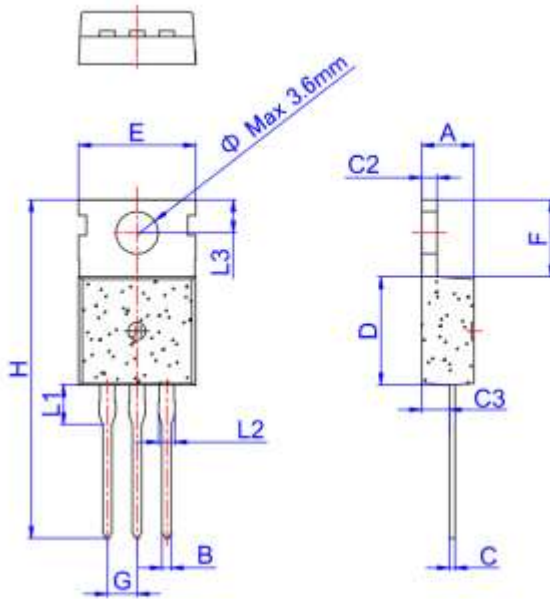
Figure 9. Transient Thermal Impedance TO-220



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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	

Revision History

Revision	Release	Remark
V1.0	2023/06/26	Initial Release

Disclaimer

The information given in this document describes the independent performance of the product, but similar performance is not guaranteed under other working conditions, and cannot be guaranteed when installed with other products or equipment. To achieve the required performance of the product in actual scenarios, the customer should conduct a complete application test to assess the functionality of the product.

Allpower assumes no responsibility for equipment failures result from using products at values that exceed the ratings, operating conditions, or other parameters listed in the product specifications.

The product described in this specification is not applicable for aerospace or other applications which requires high reliability. Customers using or selling these products for use in medical, life-saving, or life-sustaining applications do so at their own risk and agree to fully indemnify.

Due to product or technical improvements, the information described or contained herein may be changed without prior notice.