

200V N-Channel MOSFET

Description

MP52N20, the silicon N-channel Enhanced MOSFETs, is obtained by advanced MOSFET technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor is suitable device for SMPS, high speed switching and general purpose applications

General Features

- ① Proprietary New Planar Technology
- ② $R_{DS(ON),typ.}=47m\Omega@V_{GS}=10V$
- ③ Low Gate Charge Minimize Switching Loss
- ④ Fast Recovery Body Diode

Application

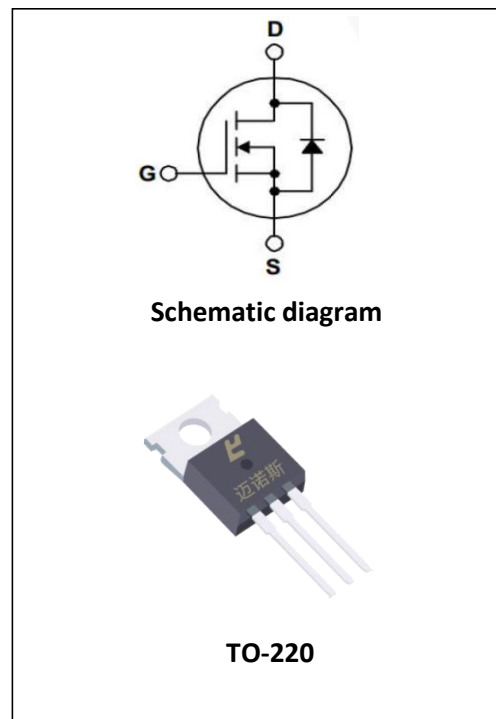
- ① DC-DC Converters
- ② DC-AC Inverters for UPS
- ③ SMPS and Motor controls

Package Marking And Ordering Information:

Ordering Codes	Package	Product Code	Packing
MP52N20	TO-220	MP52N20	Tube

ABSOLUTE RATINGS (at TC = 25°C, unless otherwise specified)

Symbol	Parameter	Value		Units
		TO-220		
V _{DSS}	Drain-Source Voltage	200		V
I _D	Continuous Drain Current	52		A
I _{DM}	Pulsed Drain Current(note1)	180		A
V _{GSS}	Gate-Source Voltage	±20		V
E _{AS}	Single Pulse Avalanche Energy(note1)	191		mJ
I _{AS}	Avalanche Current(note1)	31		A
E _{AR}	Repetitive Avalanche Energy(note1)	124		mJ
P _D	Power Dissipation (TC = 25°C)	63.7	104	W
T _J ,T _{stg}	Operating Junction and Storage Temperature Range	-55~+150		°C



Thermal characteristics

Symbol	Parameter	Value	Units
		TO-220	
R_{thJC}	Thermal Resistance, Junction-to-Case	1.2	$^{\circ}C/W$
R_{thJA}	Thermal Resistance, Junction-to-Ambient	60	

Electrical Characteristics (at $T_c = 25^{\circ}C$, unless otherwise specified)

Symbol	Parameter	Test Conditions	Value			Units
			Min	Typ	Max	
Static						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	200	230	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =200V, V _{GS} = 0V, T _J = 25℃	--	--	1	μA
		V _{DS} =200V, V _{GS} =0V, T _J = 125℃	--	--	100	
I _{GSS}	Gate-Source Leakage	V _{GS} = ±20V, V _{DS} = 0V	--	--	±100	nA
V _{GS(th)}	Gate-Source Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2.0	--	4.0	V
R _{DS(on)}	Drain-Source On-Resistance (Note4)	V _{GS} = 10V, I _D = 20A	--	47	50	mΩ
g _{fs}	Forward Transconductance (Note4)	V _{DS} = 25V, I _D = 20A	--	16	--	S
Dynamic						
C _{iss}	Input Capacitance	V _{GS} =0V,V _{DS} =25V, f=1.0MHz	--	2800	--	pF
C _{oss}	Output Capacitance		--	355	--	
C _{rss}	Reverse Transfer Capacitance		--	101	--	
Q _g	Total Gate Charge	V _{DD} = 160V, I _D = 52A,	--	154		nC
Q _{gs}	Gate-Source Charge		--	13	--	
Q _{gd}	Gate-Drain Charge		--	58	--	
t _{d(on)}	Turn-on Delay Time	V _{DD} =160V, I _D =52A, V _{GS} =15V.R _G =25Ω	--	46	--	ns
t _r	Turn-on Rise Time		--	54	--	
t _{d(off)}	Turn-off Delay Time		--	360	--	
t _f	Turn-off Fall Time		--	96	--	

Drain-Source Body Diode Characteristics						
I_{SD}	Continuous Source Current	Integral PN-diode in MOSFET	--	--	52	A
I_{SM}	Pulsed Source Current		--	--	180	
V_{SD}	Body Forward Voltage	$I_S = 20A, V_{GS} = 0V$	--	--	1.4	V
t_{rr}	Reverse Recovery Time	$V_{GS} = 0V, I_F = 10A,$ $diF/dt = 100A/\mu s$	--	152	--	ns
Q_{rr}	Reverse Recovery Charge		--	1	--	μC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $L=1mH, V_{DD}=30V, R_G=25\Omega$, Starting $T_J=25^\circ C$
3. Pulse Test: Pulse width $\leq 300\mu s$, Duty Cycle $\leq 1\%$

Typical Characteristics (T_J = 25°C, unless otherwise noted)

Figure 1 Safe Operating Area

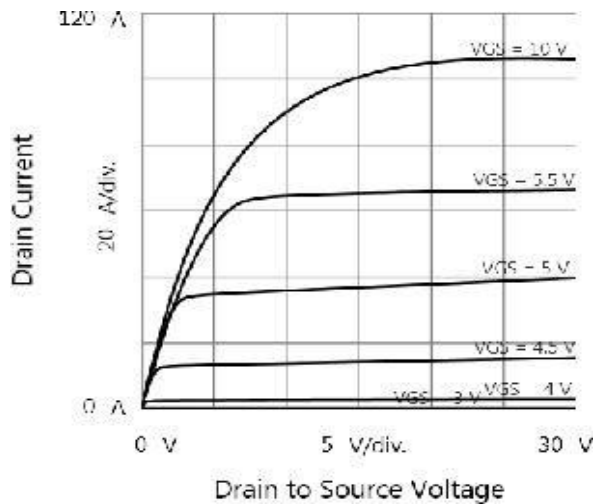


Figure 2 Max Thermal Impedance

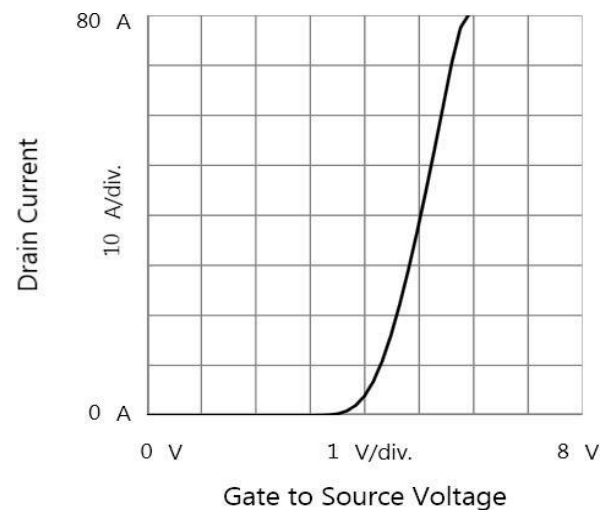


Figure 3. Drain to Source Resistance vs. Drain Current

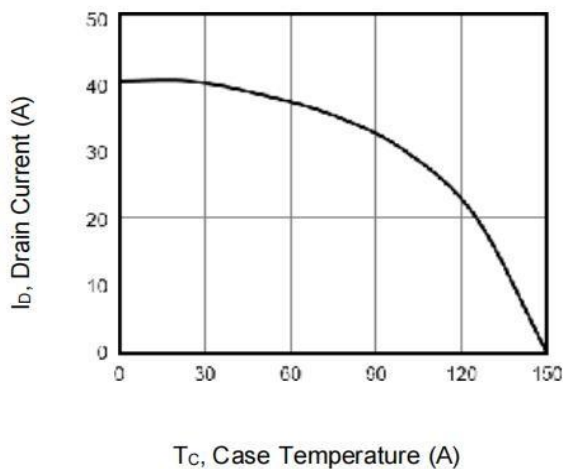


Figure4.BVDSS Variationvs.Temperature

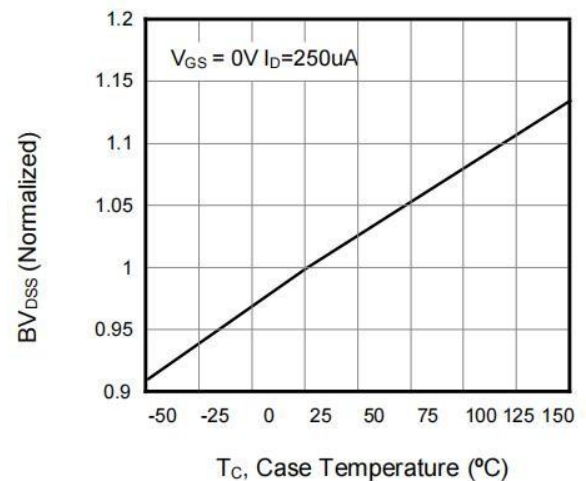


Figure 5. Drain to Source Voltage vs. Gate to Source Voltage

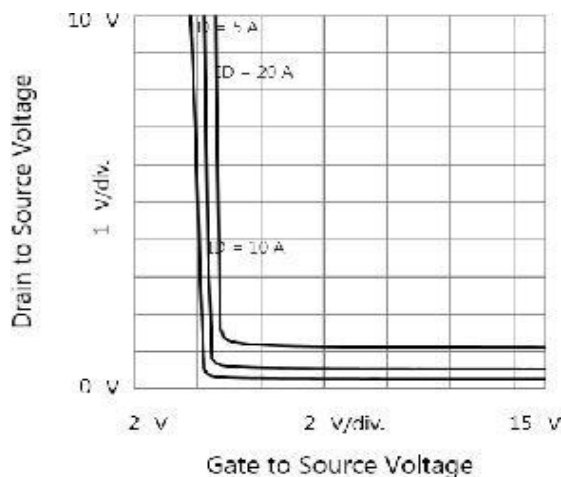


Figure 6. Body Diode Forward Characteristics

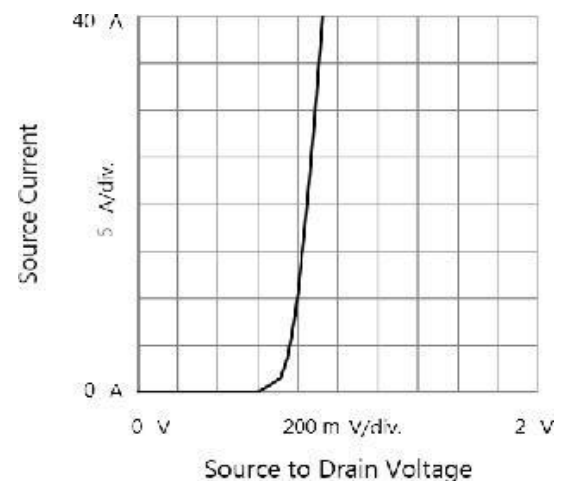


Figure 7. Capacitance

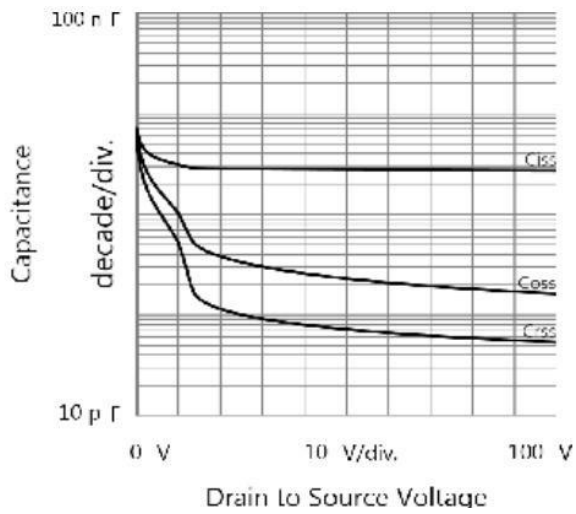


Figure 8. Gate Charge

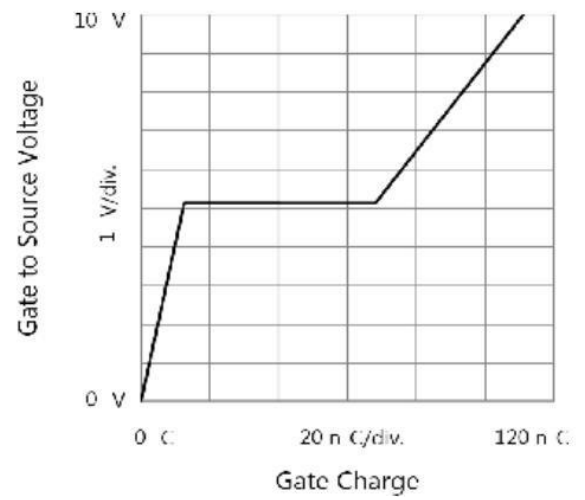
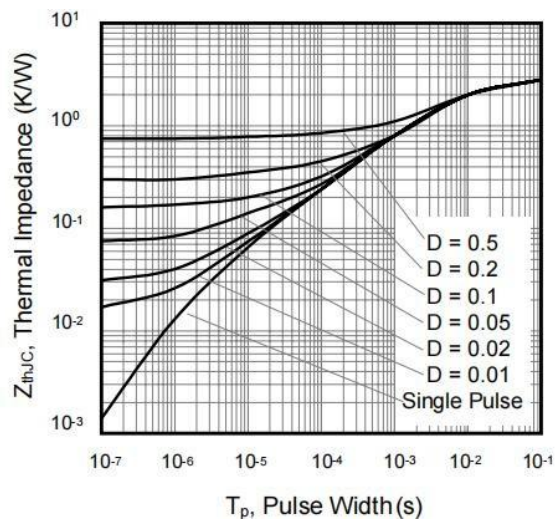


Figure 9. Transient Thermal Impedance (TO-220)



Test Circuit and Waveform

Figure A: Gate Charge Test Circuit and Waveform

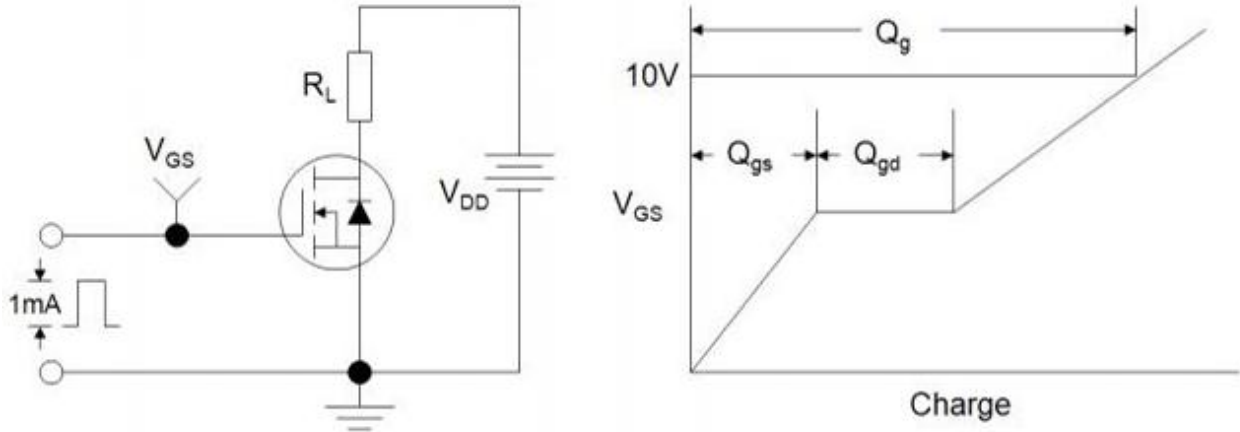


Figure B: Resistive Switching Test Circuit and Waveform

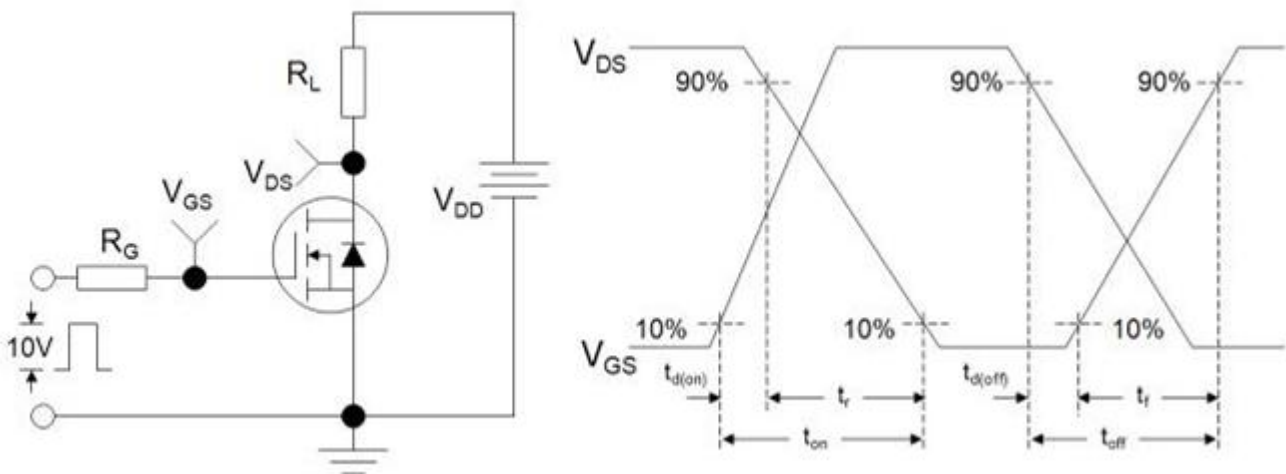
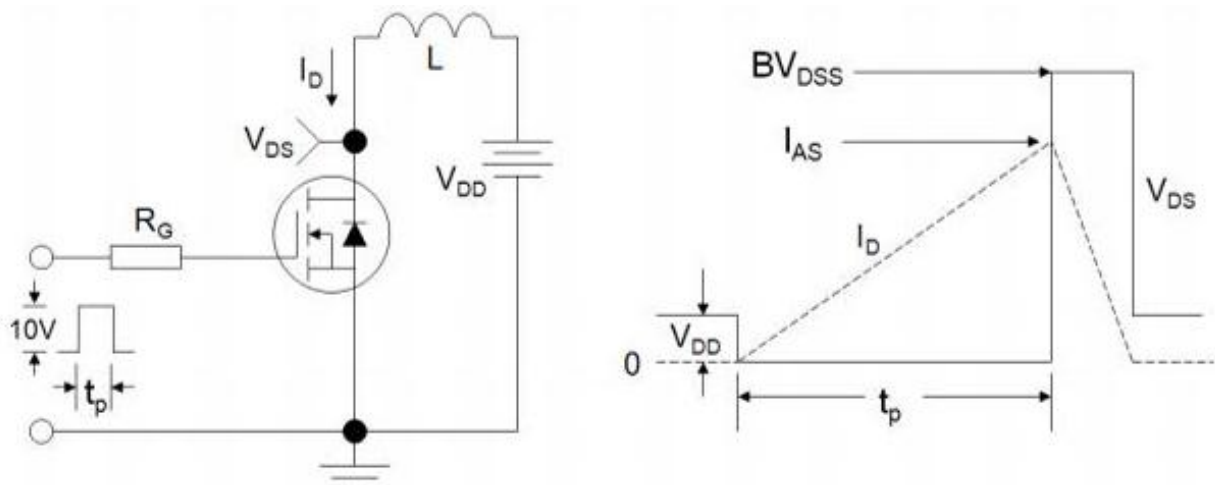
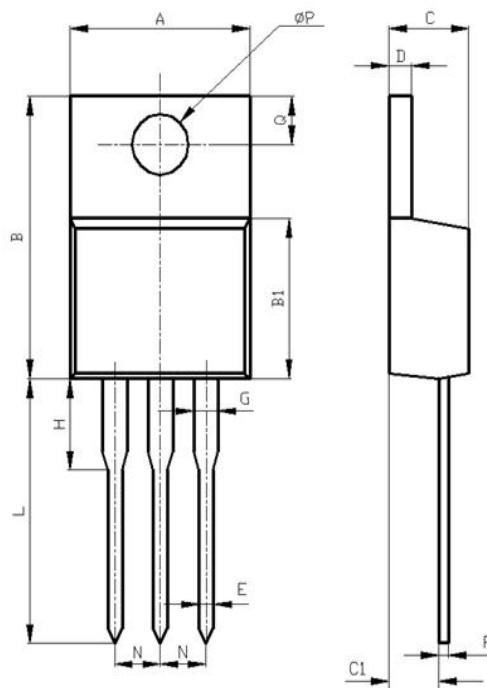


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



Package Description



Items	Values(mm)	
	MIN	MAX
A	9.60	10.6
B	15.0	16.0
B1	8.90	9.50
C	4.30	4.80
C1	2.30	3.10
D	1.20	1.40
E	0.70	0.90
F	0.30	0.60
G	1.17	1.37
H	2.70	3.80
L	12.6	14.8
N	2.34	2.74
Q	2.40	3.00
Ø P	3.50	3.90

TO-220 Package



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MP52N20

NOTE:

1. Exceeding the maximum ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. Please do not exceed the absolute maximum ratings of the device when circuit designing.
2. When installing the heat sink, please pay attention to the torsional moment and the smoothness of the heat sink.
3. MOSFETs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.
4. Shenzhen Minos reserves the right to make changes in this specification sheet and is subject to change without prior notice.

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