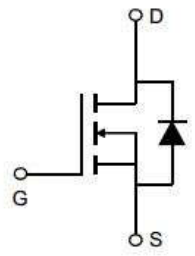
迈诺斯科技

P50N20-MNS

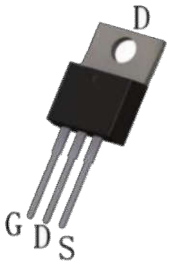
200V N-Channel MOSFET

Description

P50N20-MNS, 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



Schematic diagram



TO-220

FEATURES

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

APPLICATIONS

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
P50N20-MNS	TO-220	P50N20	Tube

Absolute Maximum Ratings T_C = 25℃, unless otherwise noted

Parameter	Symbol	Value		Unit
		TO-220		
Drain-Source Voltage	V_{DSS}	200		V
Continuous Drain Current	I_D	50		A
Pulsed Drain Current (note1)	I_{DM}	180		A
Gate-Source Voltage	V_{GSS}	±20		V
Single Pulse Avalanche Energy (note1)	E_{AS}	191		mJ
Avalanche Current (note1)	I_{AS}	31		A
Repetitive Avalanche Energy (note1)	E_{AR}	124		mJ
Power Dissipation (TC = 25ºC)	P_D	63.7	104	W

Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+150	℃

Thermal Resistance

Parameter	Symbol	Value	Unit
		TO-220	
Thermal Resistance, Junction-to-Case	R_{thJC}	1.2	°C/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	60	

Specifications TJ = 25°C, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min	Typ	Max	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	200	230	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=200V, V_{GS} = 0V, T_J= 25℃	--	--	1	μA
		V_{DS}=200V, V_{GS}=0V, T_J= 125℃	--	--	100	
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V， V_{DS} = 0V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2.0	--	4.0	V
Drain-Source On-Resistance (Note4)	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A	--	47	52	mΩ
Forward Transconductance (Note4)	g_{fs}	V_{DS} = 25V, I_D = 20A	--	16	--	S
Dynamic						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz	--	2800	--	pF
Output Capacitance	C_{oss}		--	355	--	
Reverse Transfer Capacitance	C_{rss}		--	101	--	
Total Gate Charge	Q_g	V_{DD} = 160V, I_D = 52A,	--	154		nC
Gate-Source Charge	Q_{gs}		--	13	--	
Gate-Drain Charge	Q_{gd}		--	58	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=160V, I_D=52A, V_{GS} =15V. R_G=25Ω	--	46	--	ns
Turn-on Rise Time	t_r		--	54	--	
Turn-off Delay Time	$t_{d(off)}$		--	360	--	
Turn-off Fall Time	t_f		--	96	--	
Drain-Source Body Diode Characteristics						
Continuous Source Current	I_{SD}	Integral PN-diode in MOSFET	--	--	50	A
Pulsed Source Current	I_{SM}		--	--	180	

Body Forward Voltage	V_{SD}	I_S = 20A, V_{GS} = 0V	--	--	1.4	V
Reverse Recovery Time	t_{rr}	V_{GS} = 0V,I_F = 10A, diF/dt =100A /μs	--	152	--	ns
Reverse Recovery Charge	Q_{rr}		--	1	--	μC

Notes：

1.Repetitive Rating: Pulse width limited by maximum junction temperature

2.L=1mH, V_{DD}=30V, R_G=25Ω, Starting TJ=25℃

3.Pulse Test: Pulse width≤300μs, Duty Cycle≤1

Figure 1 Safe Operating Area

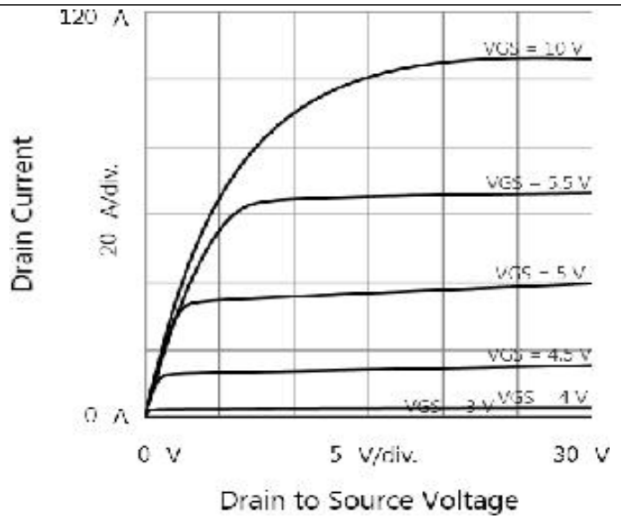


Figure 2 Max Thermal Impendance

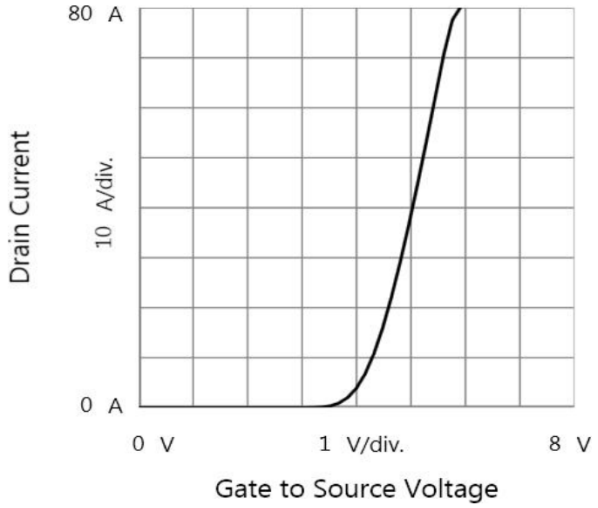


Figure 3. Drain to Source Resistance vs.Drain Current

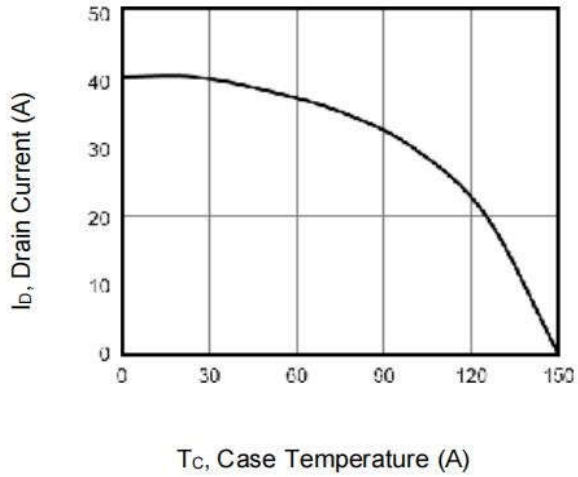


Figure4.BVDSS Variationvs.Temperature

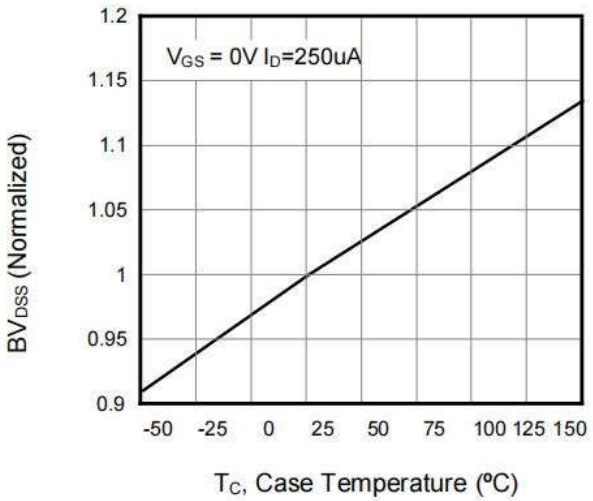


Figure 5. Drain to Source Voltage vs. Gate toSource Voltage

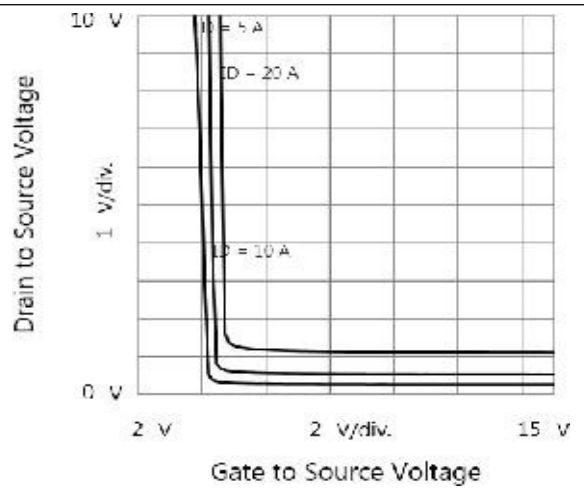


Figure 6. Body Diode Forward Characteristics

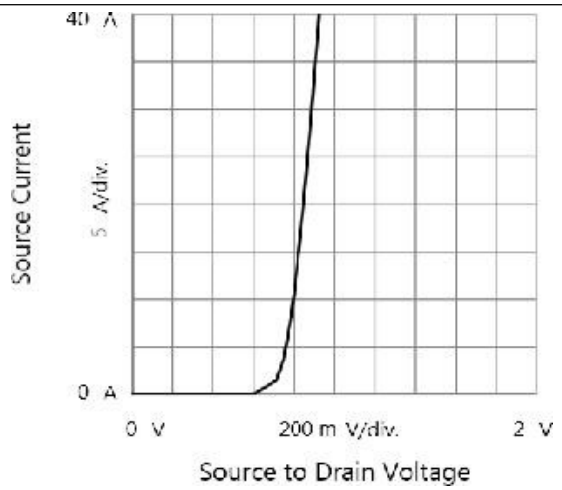


Figure 7. Capacitance

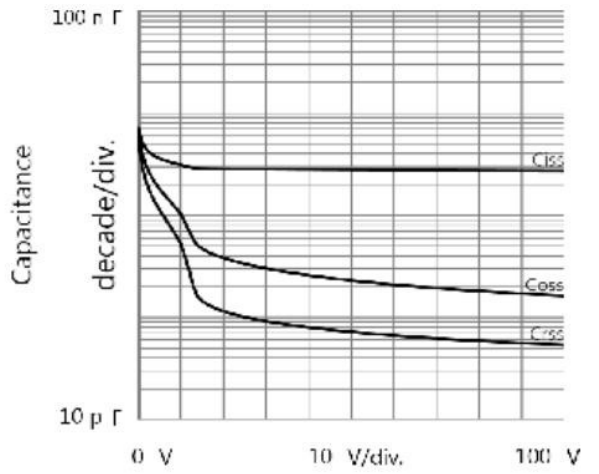


Figure 8. Gate Charge

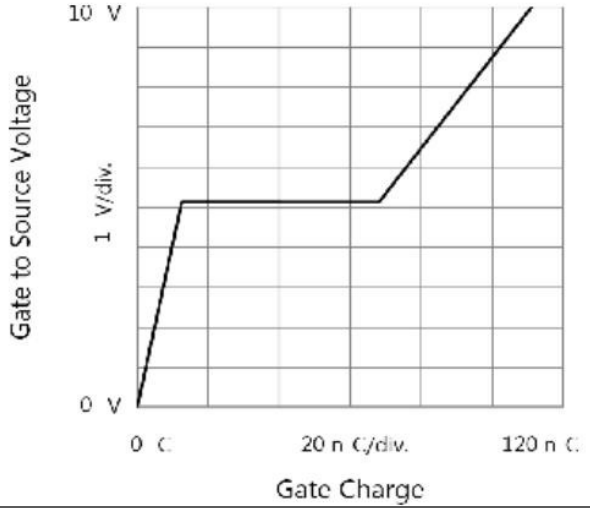


Figure 9. Transient Thermal Impedance （TO-220F）

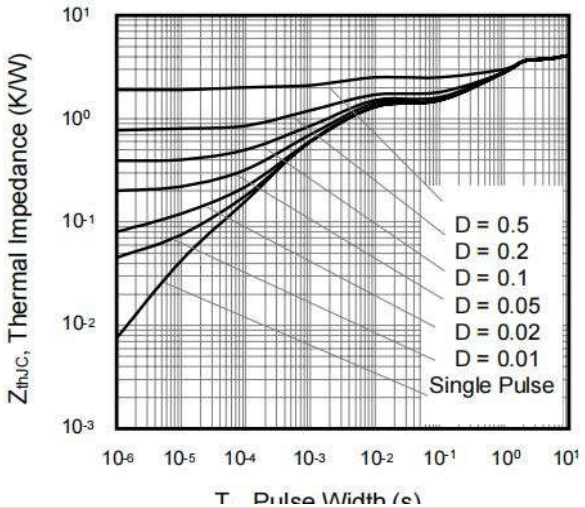


Figure 10. Transient Thermal Impedance （ TO-220）

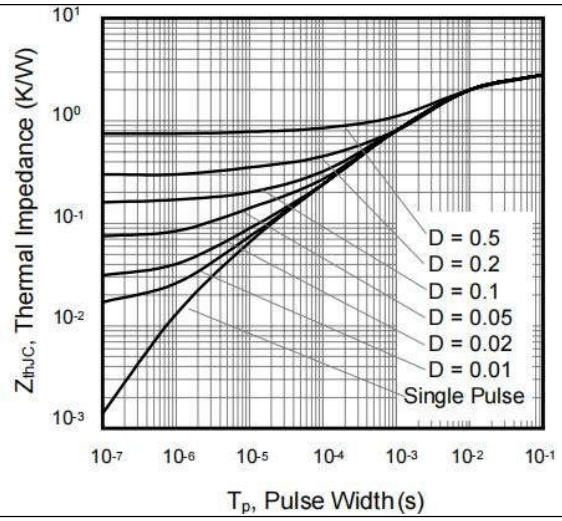


Figure A： Gate Charge Test Circuit and Waveform

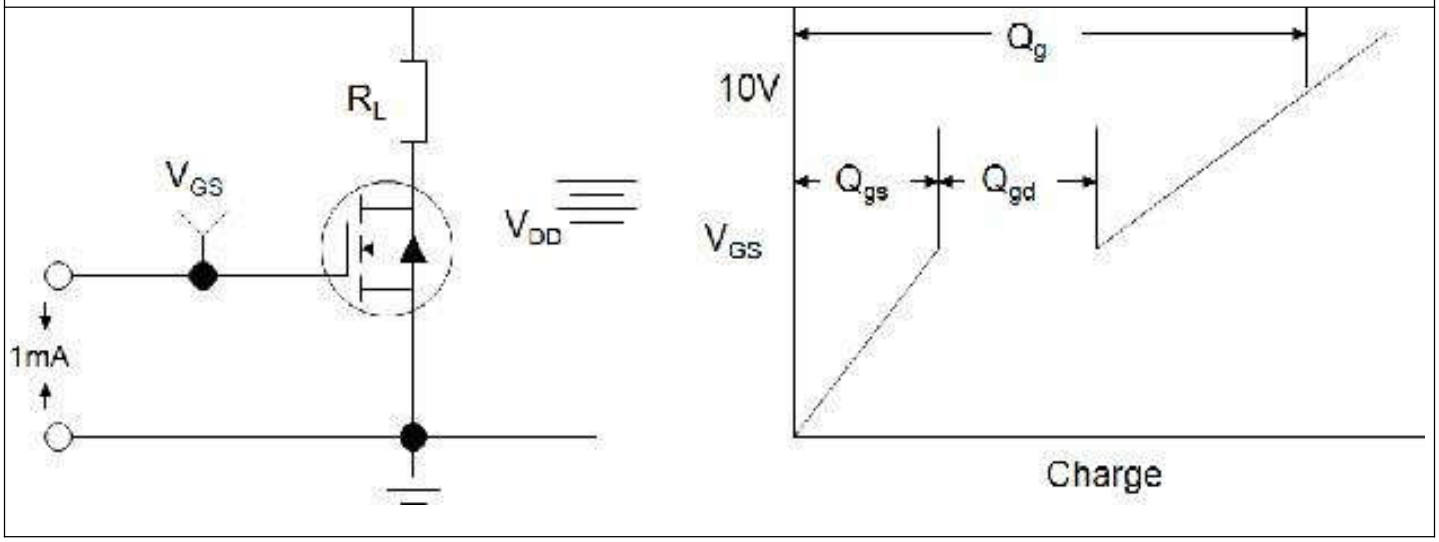


Figure B： Resistive Switching Test Circuit and Waveform

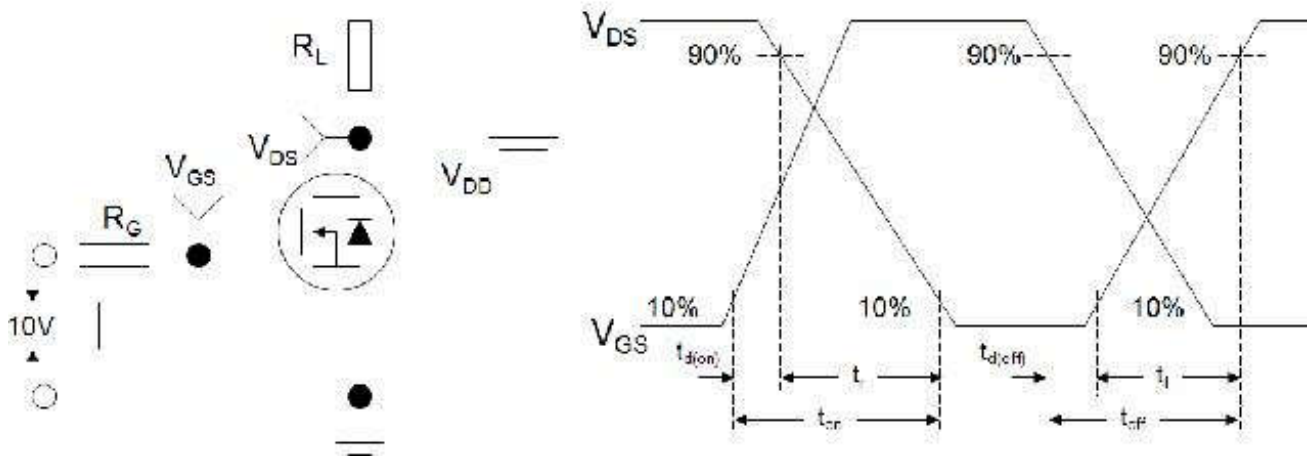
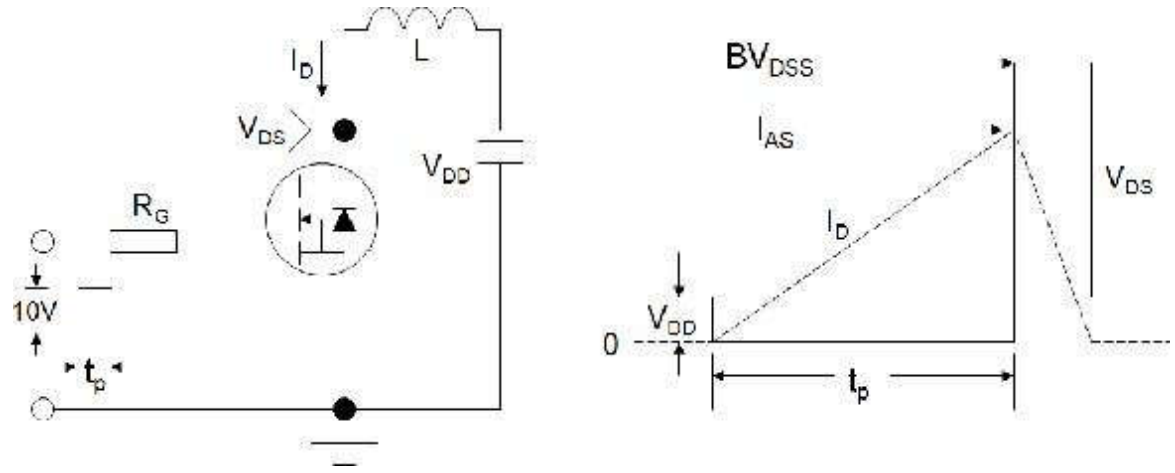


Figure C： Unclamped Inductive Switching Test Circuit and Waveform



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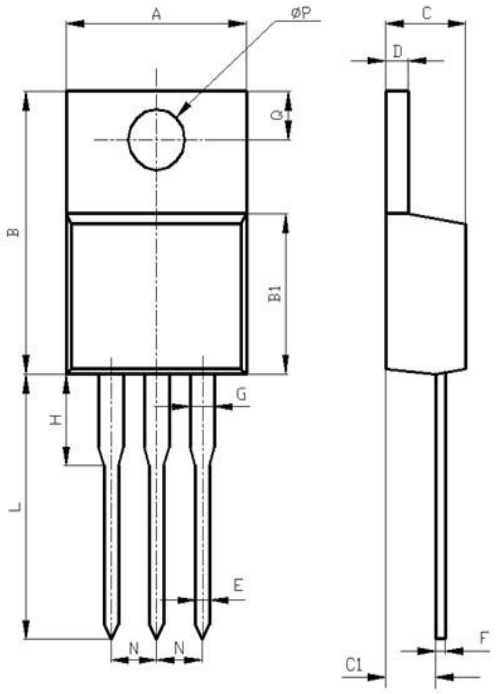
Package Description



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
ϕp	3.50	3.90

TO-220 Package

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 withoutprior notice.

CONTACT:

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