

Silicon N-Channel Power MOSFET

Description

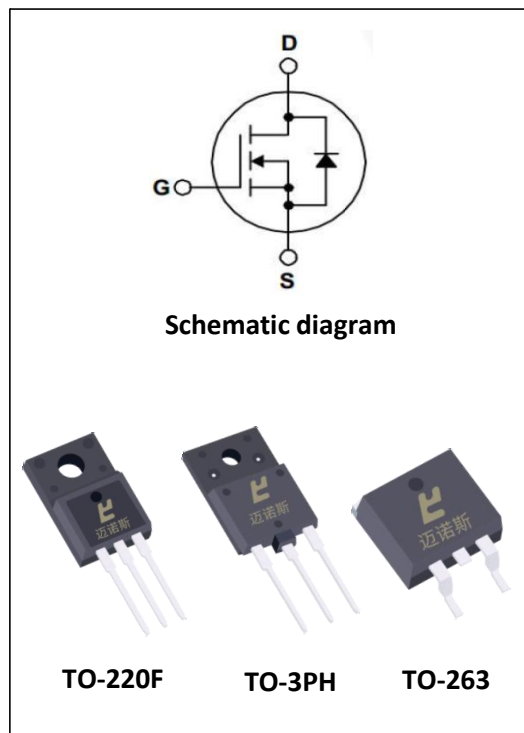
The MD3N150 uses advanced technology and design to provide excellent $R_{DS(ON)}$. It can be used in a wide variety of applications.

General Features

- ① $V_{DS}=1500V$, $R_{ds(on)}<9.0\Omega$ @ $V_{GS}=10V$, $I_D=3A$
- ② Low ON Resistance
- ③ Low Reverse transfer capacitances
- ④ 100% Single Pulse avalanche energy Test

Application

- ① Power switching application
- ② Adapter and charger



Package Marking And Ordering Information:

Ordering Codes	Package	Product Code	Packing
MP3N150-S	TO-263	MP3N150S	Reel
MPF3N150-F	TO-220F	MPF3N150	Tube
MD3N150	TO-3PH	MD3N150	Tube

Absolute Maximum Ratings (at $T_c = 25^\circ C$, unless otherwise specified)

Symbol	Parameter	Value	Units
V_{DSS}	Drain-to-Source Breakdown Voltage	1500	V
I_D	Drain Current (continuous) at $T_c=25^\circ C$	3	A
I_{DM}	Drain Current (pulsed)	12	A
V_{GS}	Gate to Source Voltage	+/-30	V
P_{tot}	Total Dissipation at $T_c=25^\circ C$	250	W
T_j	Max. Operating Junction Temperature	175	$^\circ C$
E_{AS}	Single Pulse Avalanche Energy	125	mJ

Thermal characteristics

Symbol	Parameter	Typ	Units
$R_{\theta JC}$	Junction-to-Case	1.7	$^\circ C/W$

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{DS}	Drain-source Voltage	$V_{GS}=0\text{V}$, $I_D=250\mu\text{A}$	1500	--	--	V
$R_{DS(on)}$	Static Drain-to-Source on-Resistance	$V_{GS}=10\text{V}$, $I_D=1.5\text{A}$	--	5.2	9.0	Ω
$V_{GS(th)}$	Gated Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	3.0	4.1	5.0	V
I_{DSS}	Drain to Source leakage Current	$V_{DS}=1500\text{V}$, $V_{GS}=0\text{V}$	--	--	1	μA
$I_{GSS(F)}$	Gated to Source Foward Leakage	$V_{GS}=+30\text{V}$	--	--	100	nA
$I_{GSS(R)}$	Gated to Source Reverse Leakage	$V_{GS}=-30\text{V}$	--	--	-100	nA
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1.0\text{MHz}$	--	1938	--	pF
C_{oss}	Output Capacitance		--	104	--	pF
C_{rss}	Reverse Transfer Capacitance		--	10.2	--	pF

Switching Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=750\text{V}$, $I_D=3\text{A}$, $R_G=10\Omega$	--	33.8	--	nS
t_r	Turn-on Rise Time		--	16.7	--	nS
$t_{d(off)}$	Turn-off Delay Time		--	56	--	nS
t_f	Turn-off Fall Time		--	27.6	--	nS
Q_g	Total Gate Charge	$V_{DS}=750\text{V}$, $I_D=3\text{A}$, $V_{GS}=10\text{V}$	--	9.3	--	nC
Q_{gs}	Gate-Source Charge		--	174.9	--	nC
Q_{gd}	Gate-Drain Charge		--	5.3	--	nC

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I _{SD}	S-D Current(Body Diode)		--	--	3	A
I _{SDM}	Pulsed S-D Current(Body Diode)		--	--	12	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _{DS} =3.0A	--	--	1.5	V
t _{rr}	Reverse Recovery Time	T _J =25℃, I _F =3.0A di/dt=100A/us	--	302.3	--	nS
Q _{rr}	Reverse Recovery Charge		--	9.9	--	nC
	*Pulse Test: Pulse Width <= 300μs, Duty Cycle< =2%					

Typical Performance Characteristics

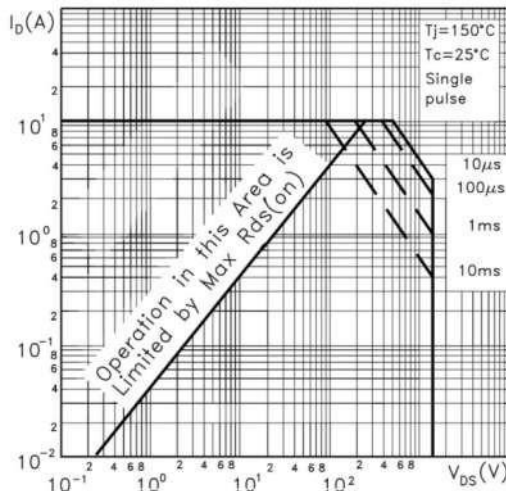


Fig.1 Safe operation area

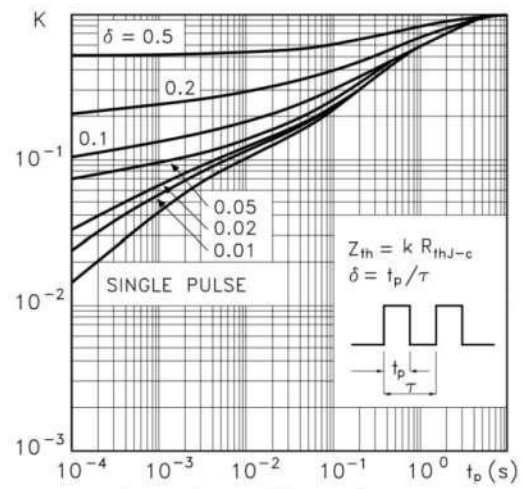


Fig.2 Thermal impedance

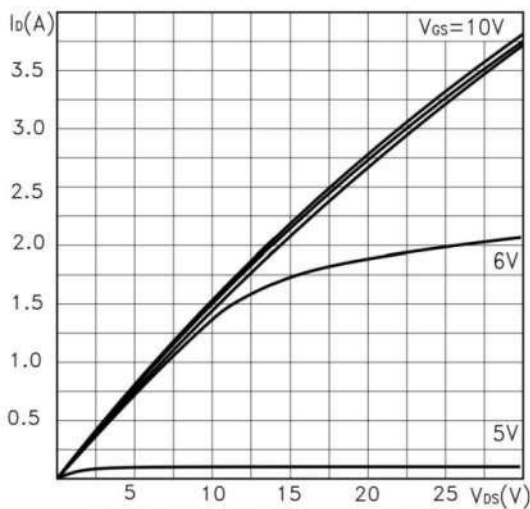


Fig.3 Output characteristics

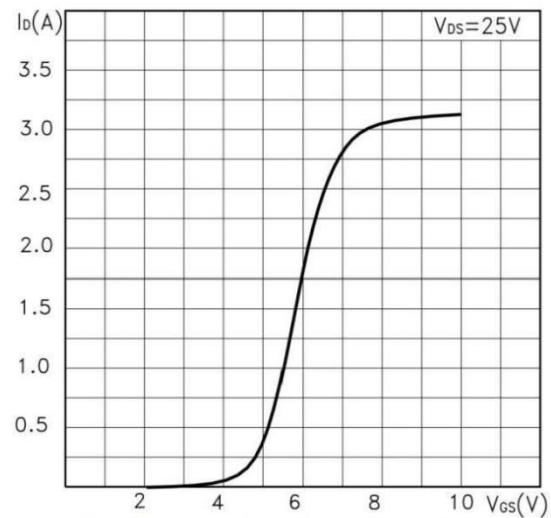


Fig.4 Transfer characteristics

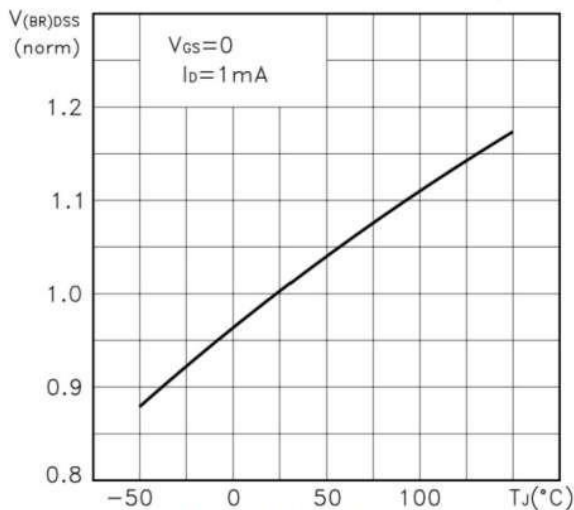


Fig.5 Normalized BVDSS vs. temperature

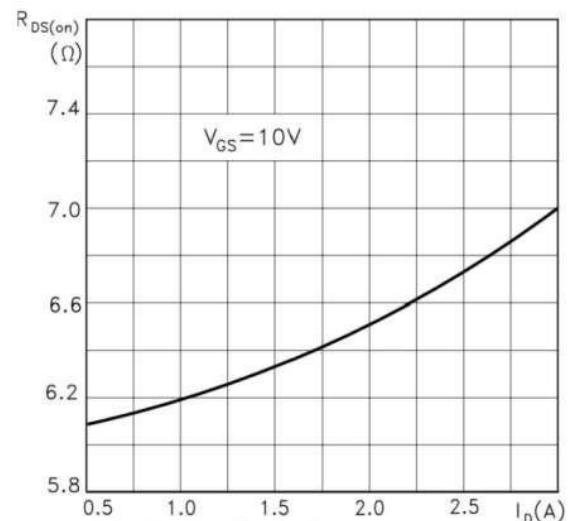


Fig.6 Static drain-source on resistance

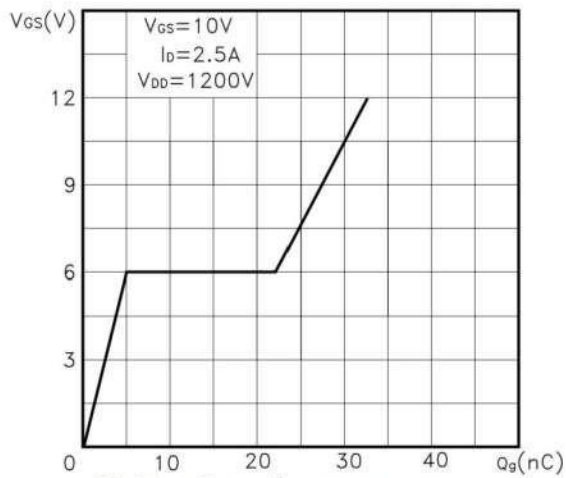


Fig.7 Gate charge vs. gate-source voltage

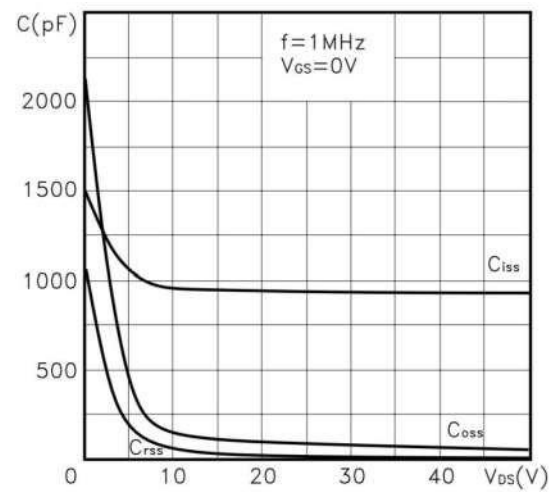


Fig.8 Capacitance variations

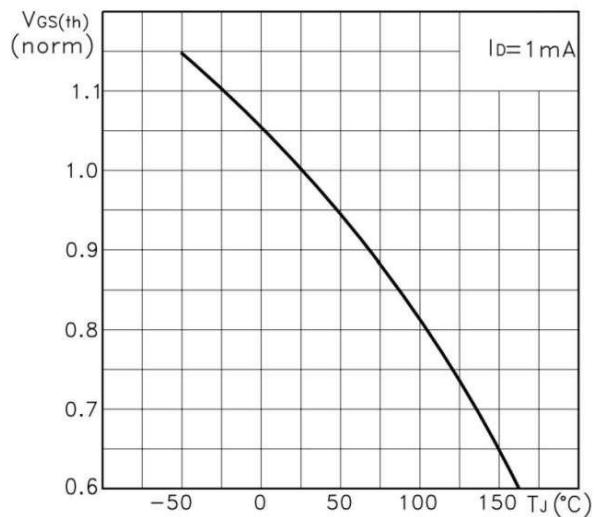


Fig.9 Normalized gate threshold voltage vs. temperature

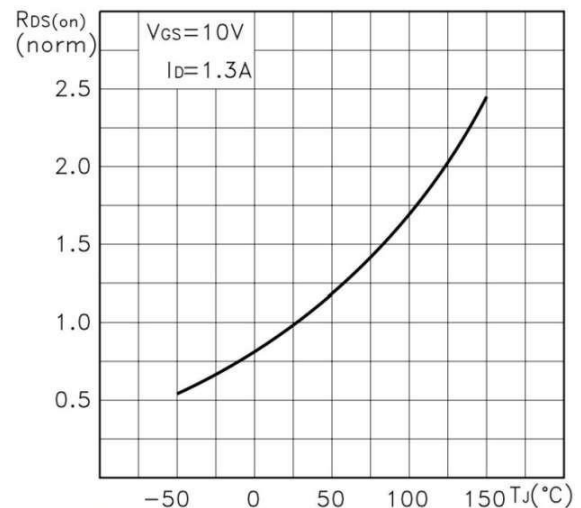


Fig.10 Normalized on resistance vs. temperature

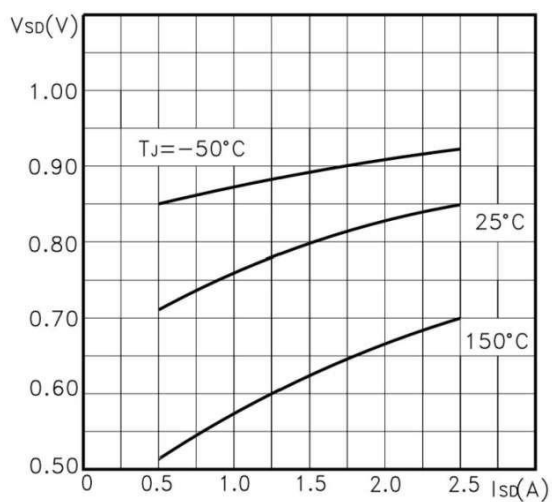


Fig.11 Source-drain diode forward characteristics

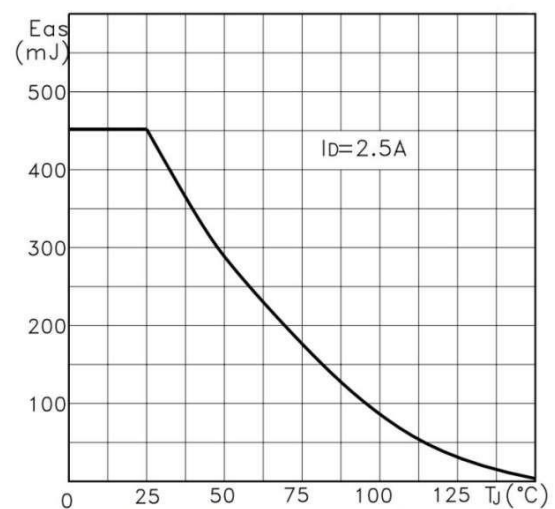
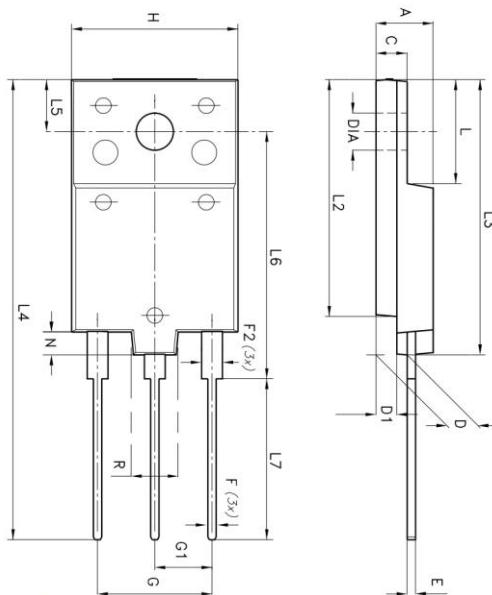


Fig.12 Maximum avalanche energy vs Tj

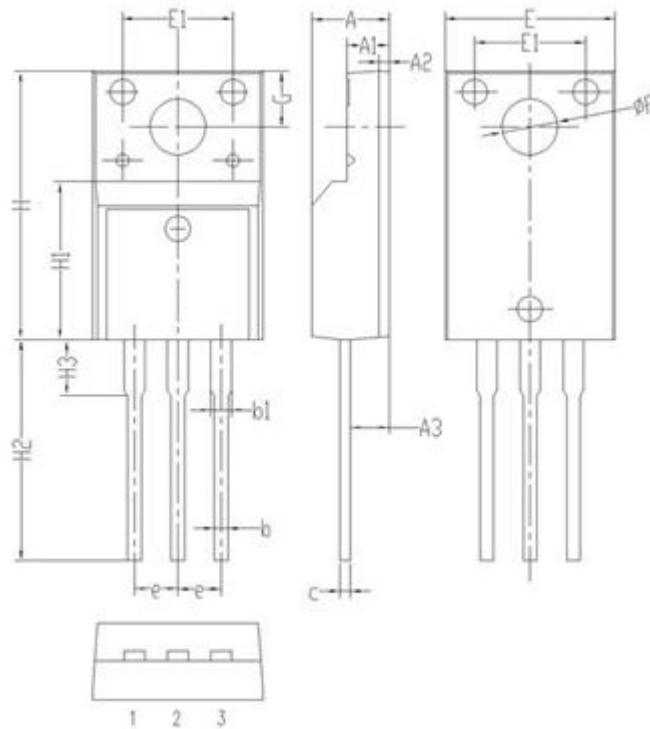
Package Information



Symbol	Values(mm)	
	MIN	MAX
A	5.30	5.70
C	2.80	3.20
D	3.10	3.50
D1	1.80	2.20
E	0.80	1.10
F	0.65	0.95
F2	1.80	2.20
G	10.30	11.50
G1	5.45	
H	15.30	15.70
L	9.80	10.20
L2	22.80	23.20
L3	26.30	26.70
L4	43.20	44.40
L5	4.3	4.70
L6	24.3	24.70
L7	14.6	15
N	1.8	2.2
R	3.8	4.2
Dia	3.4	3.8

TO-3PF package

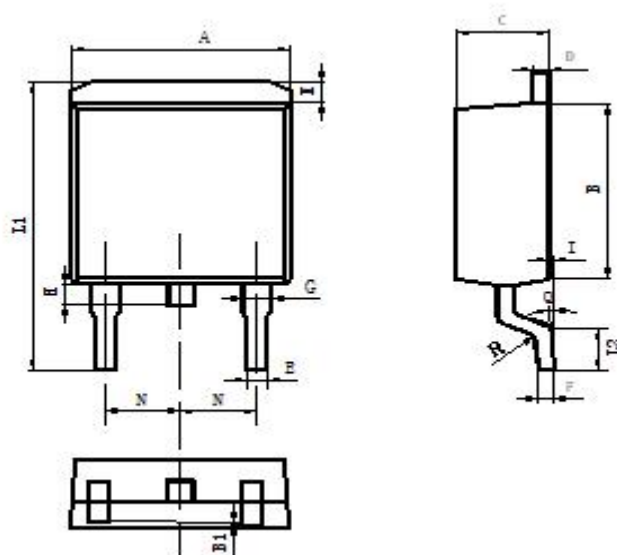
Package Information



Symbol	Values(mm)	
	MIN	MAX
A	4.35	4.75
A1	2.30	2.70
A2	0.40	0.80
A3	2.10	2.50
b	0.60	1.00
b1	1.00	1.40
c	0.30	0.70
e	2.30	2.70
E	9.80	10.2
E1	6.30	6.70
H	15.6	16.0
H1	8.80	9.20
H2	12.9	13.5
H3	3.10	3.50
G	3.10	3.50
ϕp	3.10	3.50

TO-220F Package

Package Information



Items	Values (mm)	
	MIN	MAX
A	9.80	10.40
B	8.90	9.50
B1	0	0.10
C	4.40	4.80
D	1.16	1.37
E	0.70	0.95
F	0.30	0.60
G	1.07	1.47
H	1.30	1.80
K	0.95	1.37
L1	14.50	16.50
L2	1.60	2.30
I	0	0.2
Q	0°	8°
R	0.4	0.4
N	2.39	2.69

TO-263 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 without prior notice.

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