

30V N-Channel Power MOSFET

Description

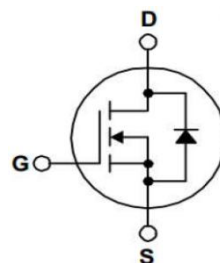
The MPG180N03P uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

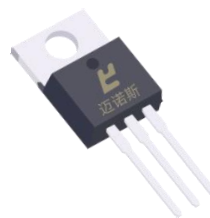
- ① $V_{DS}=30V$, $R_{dson}<2.8m\Omega$ @ $V_{GS}=10V$, $I_D=180A$ (Typ:2.0m Ω)
- ② Fast Switching
- ③ Low On-Resistance Low Gate Charge
- ④ Low Reverse transfer capacitances
- ⑤ High avalanche ruggedness
- ⑥ RoHS product

Application

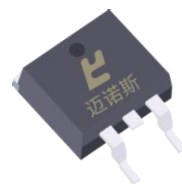
- ① Battery protection
- ② Load switch
- ③ Uninterruptible power supply



Schematic diagram



TO-220



TO-263

Package Marking And Ordering Information:

Ordering Codes	Package	Product Code	Packing
MPG180N03-P	TO-220	MPG180N03P	Tube
MPG180N03-S	TO-263	MPG180N03S	Tube/Reel

Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^{1,6}$	180	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^{1,6}$	145	A
I_{DM}	Pulsed Drain Current ²	500	A
E_{AS}	Single Pulse Avalanche Energy ³	246	mJ
I_{AS}	Avalanche Current	70.2	A
$P_D@T_C=25^\circ C$	Total Power Dissipation ⁴	187	W
T_{STG}	Storage Temperature Range	-55 to 175	°C
T_J	Operating Junction Temperature Range	-55 to 175	°C
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	0.8	°C/W

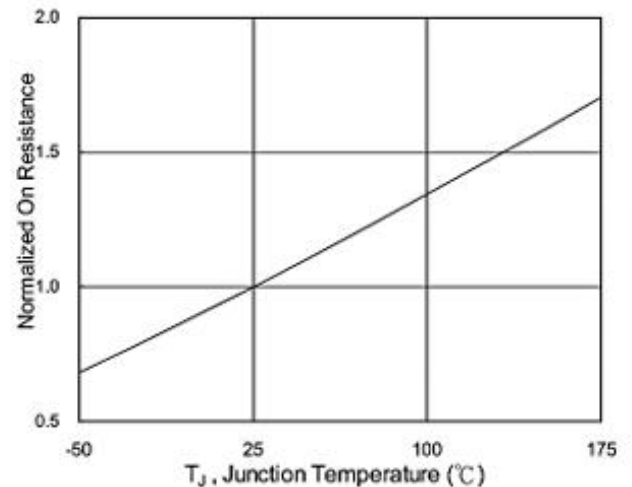
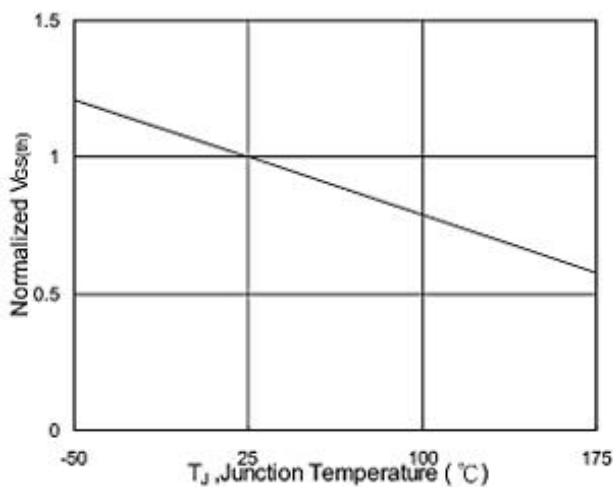
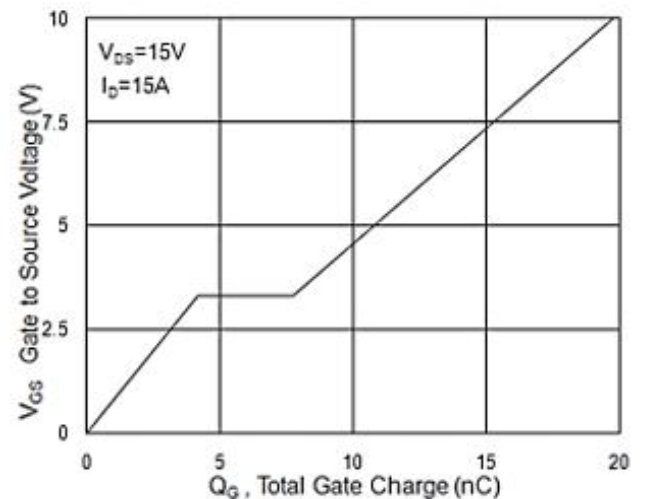
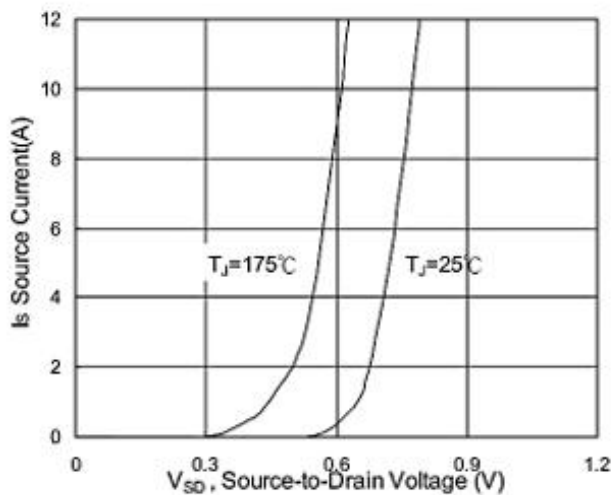
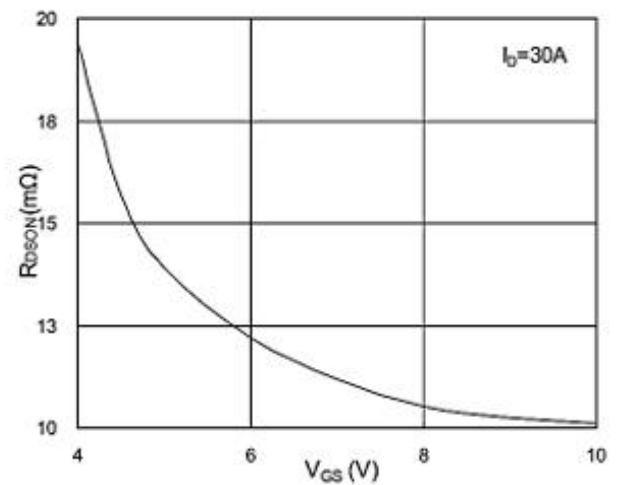
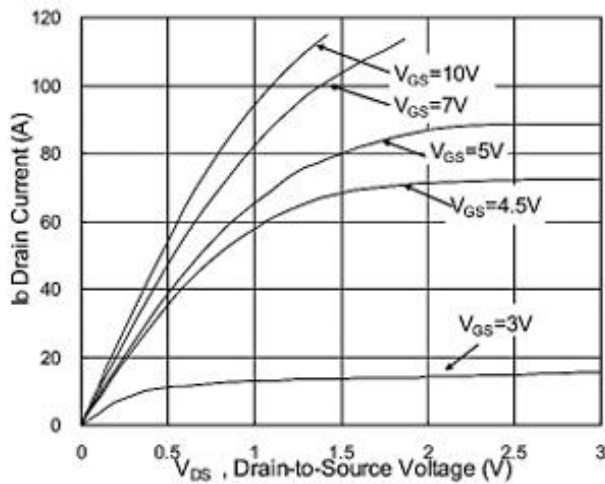
Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
B _{VDS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	30	--	--	V
ΔB _{VDS} /ΔT _J	B _{VDS} Temperature Coefficient	Reference to 25 °C, I _D =1mA	--	0.014	--	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =30A	--	2.0	2.8	mΩ
		V _{GS} =4.5V, I _D =15A	--	2.8	3.5	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.0	1.5	3.0	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		--	-4	--	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =24V, V _{GS} =0V, T _J =25°C	--	--	1	uA
		V _{DS} =24V, V _{GS} =0V, T _J =55°C	--	--	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	--	--	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =30A	--	50	--	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	--	1.7	--	Ω
Q _g	Total Gate Charge (4.5V)	V _{DS} =15V, V _{GS} =10V, I _D =15A	--	56.9	--	nC
Q _{gs}	Gate-Source Charge		--	13.8	--	
Q _{gd}	Gate-Drain Charge		--	23.5	--	
T _{d(on)}	Turn-On Delay Time	V _{DD} =15V, V _{GS} =10V R _G =3.3Ω, I _D =1A	--	20.1	--	ns
T _r	Rise Time		--	6.3	--	
T _{d(off)}	Turn-Off Delay Time		--	124.6	--	
T _f	Fall Time		--	15.8	--	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V f=1MHz	--	5850	--	pF
C _{oss}	Output Capacitance		--	720	--	
C _{rss}	Reverse Transfer Capacitance		--	525	--	
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	--	--	205	A
I _{SM}	Pulsed Source Current ^{2,5}		--	--	500	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25°C	--	--	1.2	V

Note :

- 1、The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2、The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
- 3、The EAS data shows Max. rating. The test condition is VDD=25V, VGS=10V, L=0.1Mh, IAS=22A
- 4、The power dissipation is limited by 175°C junction temperature
- 5、The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation

Characteristics Curves



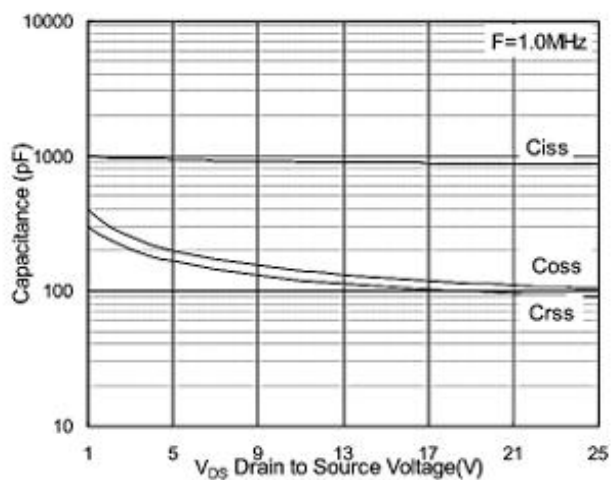


Fig.7 Capacitance

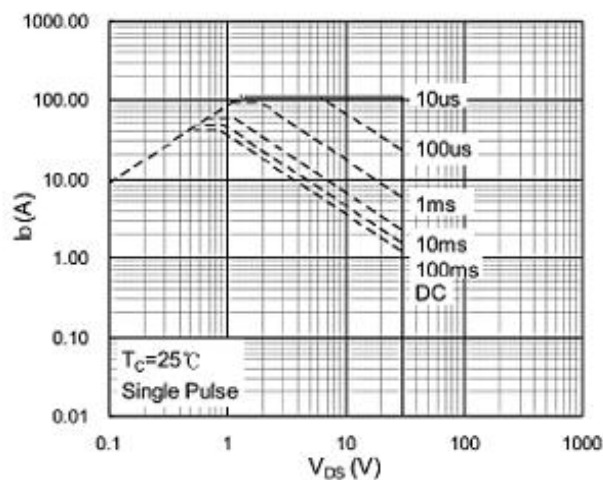


Fig.8 Safe Operating Area

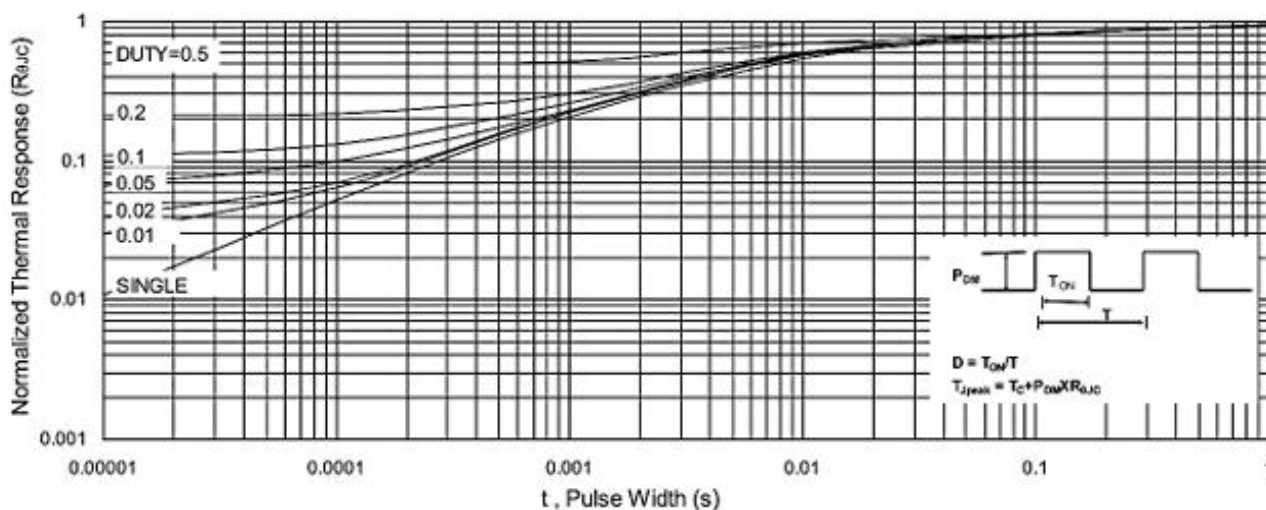


Fig.9 Normalized Maximum Transient Thermal Impedance

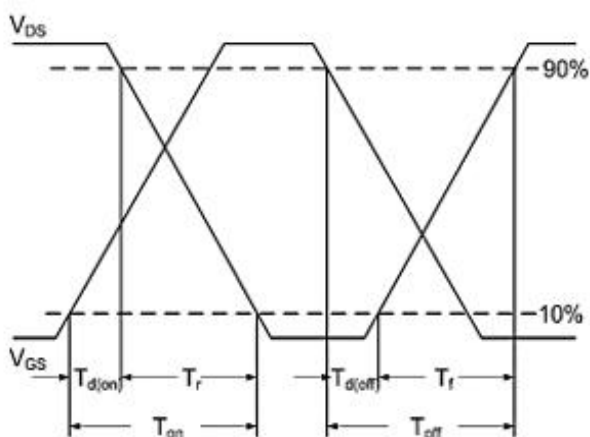


Fig.10 Switching Time Waveform

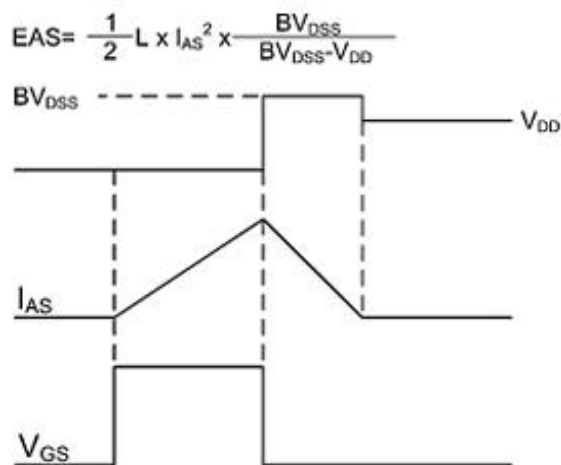
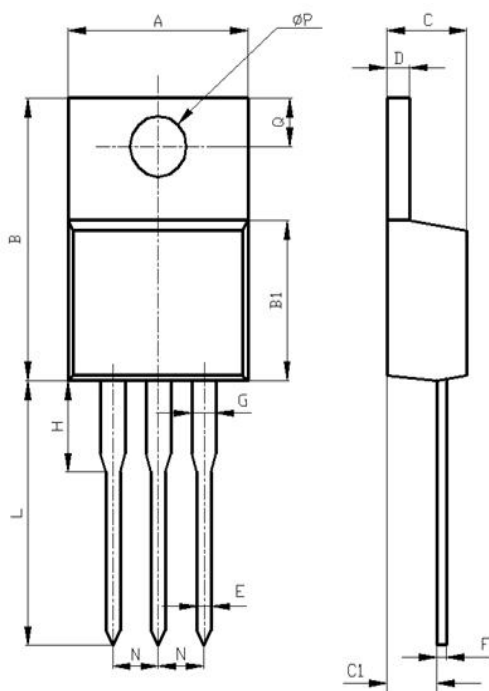


Fig.11 Unclamped Inductive Switching Waveform

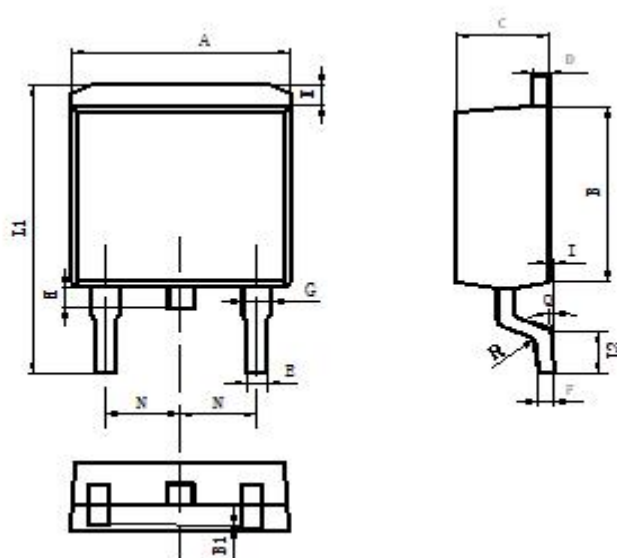
Package Description



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

Package Description



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



迈诺斯科技

MPG180N03P

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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