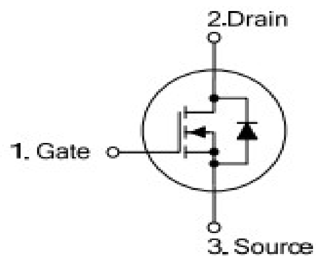
迈诺斯科技

MPF50N25

Description

MPF50N25, 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.



KEY CHARACTERISTICS

Parameter	Value	Unit
V_{DS}	250	V
I_D	50	A
$R_{DS(ON).Typ}$	0.055	Ω

FEATURES

① Fast Switching
② Low Crss
③ 100% avalanche tested
④ Improved dv/dt capability
⑤ RoHS product

APPLICATIONS

High frequency switching mode power supply

ORDERING INFORMATION

Ordering Codes	Package	Product Code	Packing
MPF50N25	TO-220F	50N25	Tube

ABSOLUTE RATINGS

at TC = 25°C, unless otherwise specified

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-to-Source Voltage	250	V
I_D	Continuous Drain Current	50	A
	Continuous Drain Current TC = 100°C	26	A
I_{DM}	Pulsed Drain Current(Note1)	160	A
V_{GS}	Gate-to-Source Voltage	±30	V
E_{AS}	Single Pulse Avalanche Energy(Note2)	2000	mJ
$d_{v/dt}$	Peak Diode Recovery dv/dt(Note3)	5.0	V/ns
P_D	Power Dissipation	310	W
	Derating Factor above 25°C	2.78	W/℃
T_J，T_{stg}	Operating Junction and Storage Temperature Range	150，–55 to 150	℃
T_L	Maximum Temperature for Soldering	300	℃

Thermal characteristics
Thermal characteristics TO-220F

Symbol	Parameter	RATINGS	Units
$R_{θJC}$	Junction-to-Case	0.36	℃/W
$R_{θJA}$	Junction-to-Ambient	62.5	℃/W

Electrical Characteristics

at TC = 25°C, unless otherwise specified

OFF Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	250	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	I_D=250uA, Reference25℃	--	0.18	--	V/℃
I_{DSS}	Drain to Source Leakage Current	V_{DS} =250V, V_{GS}= 0V, Tj = 25℃	--	--	1	μA
		V_{DS} =200V, V_{GS}= 0V, T_j = 125℃	--	--	10	μA
$I_{GSS(F)}$	Gate to Source Forward Leakage	V_{GS} =+30V	--	--	100	nA
$I_{GSS(R)}$	Gate to Source Reverse Leakage	V_{GS} =-30V	--	--	-100	nA

ON Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$R_{DS(ON)}$	Drain-to-Source On- Resistance	V_{GS}=10V, I_D=20A(Note4)	--	0.055	0.07	Ω
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS} = VGS, I_D = 250μA(Note4)	2.0	--	4.0	V
g_{fs}	Forward Transconductance	V_{DS}=40V, I_D =20A(Note4)	--	27	--	S

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
R_g	Gate resistance	f = 1.0MHz	--	1.8	--	Ω
C_{iss}	Input Capacitance	V_{GS} = 0V V_{DS} = 25V f = 1.0MHz	--	3700	--	PF
C_{oss}	Output Capacitance		--	360	--	
C_{rss}	Reverse Transfer Capacitance		--	2.5	--	

Switching Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
$t_{d(ON)}$	Turn-on Delay Time	I_D =40A V_{DD} = 125V V_{GS} = 10V R_G =15Ω	--	80	--	ns
t_r	Rise Time		--	620	--	
$t_{d(OFF)}$	Turn-Off Delay Time		--	140	--	
t_f	Fall Time		--	183	--	
Q_g	Total Gate Charge	I_D =40A V_{DD} =200V V_{GS} = 10V	--	40	--	nC
Q_{gs}	Gate to Source Charge		--	14	--	
Q_{gd}	Gate to Drain ("Miller")Charge		--	11	--	

Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
I_S	Continuous Source Current (Body Diode)	TC=25 °C	--	--	40	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	160	A
V_{SD}	Diode Forward Voltage	I_S=40A, V_{GS}=0V(Note4)	--	--	1.2	V
T_{rr}	Reverse Recovery Time	I_S=40A, T_j = 25°C $d_{IF/dt}$=100A/us,	--	230	--	ns
Q_{rr}	Reverse Recovery Charge		--	2150	--	nC

Note1: Pulse width limited by maximum junction temperature
Note2: L=10mH, VDs=50V, Start TJ=25℃
Note3: ISD =40A,di/dt ≤100A/us,VDD≤BVDS, Start TJ=25℃
Note4: Pulse width tp≤300μs, δ≤2%

Characteristics Curves

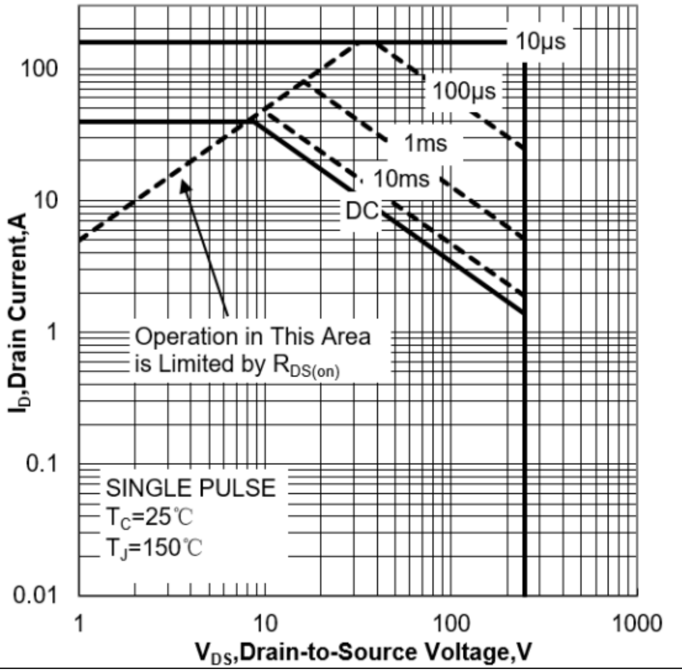
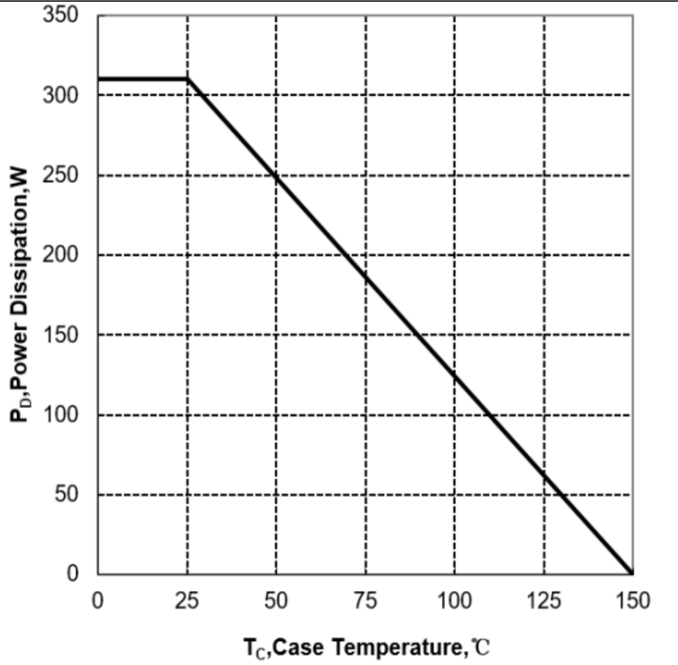
Figure 1 Safe Operating Area	Figure 2 Power Dissipation
	

Figure 3 Max Thermal Impendance

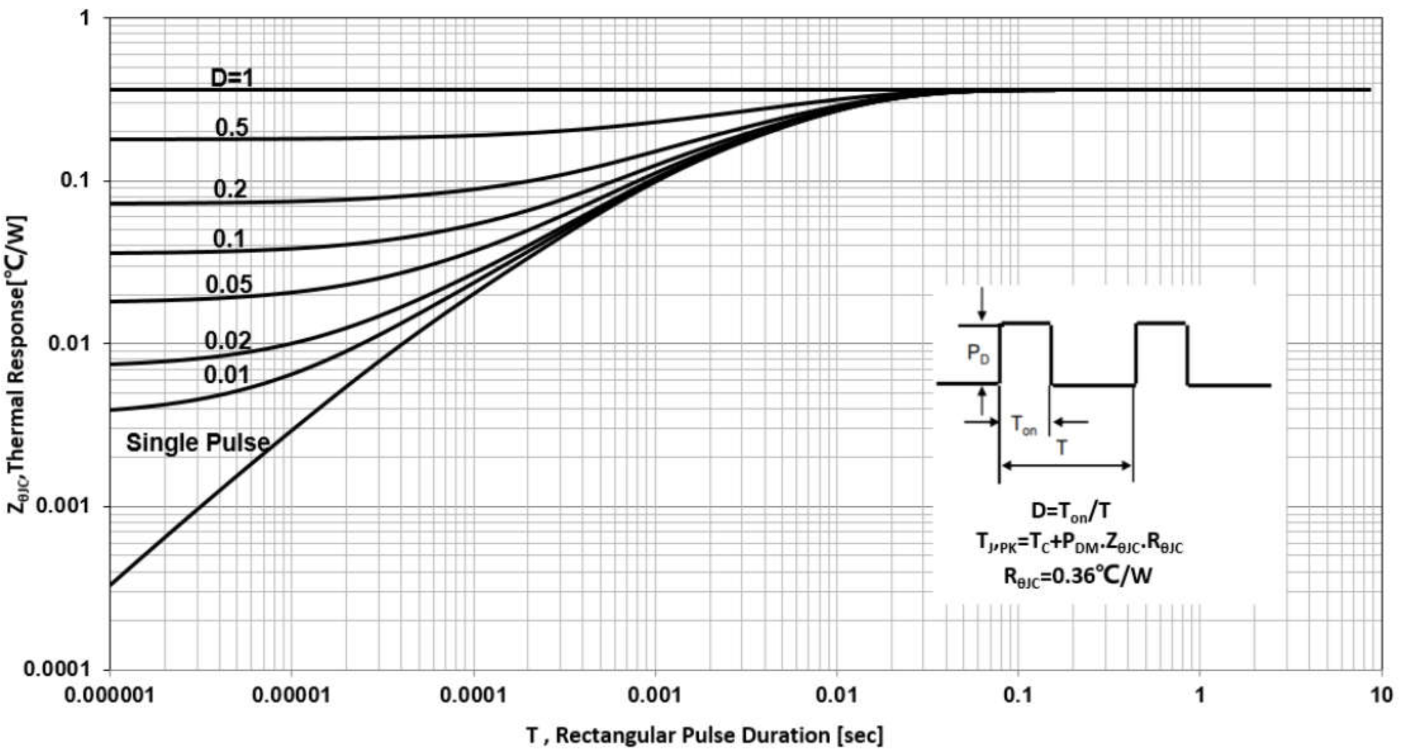


Figure 4 Typical Output Characteristics

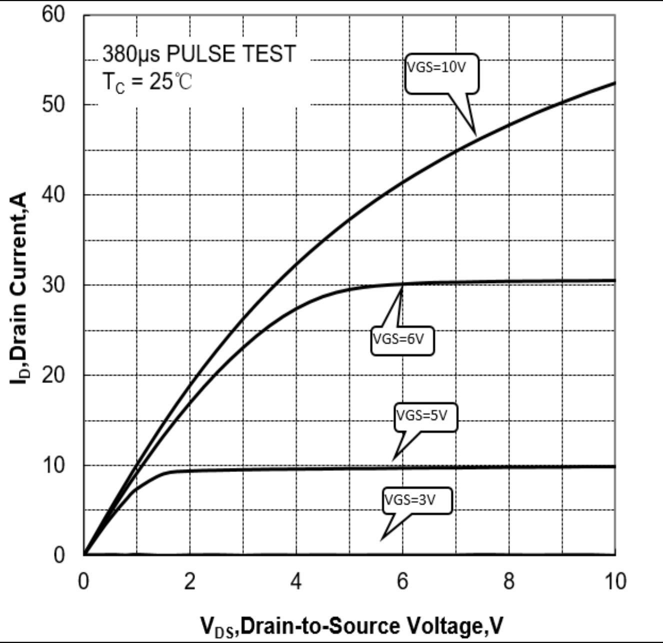


Figure 5 Typical Transfer Characteristics

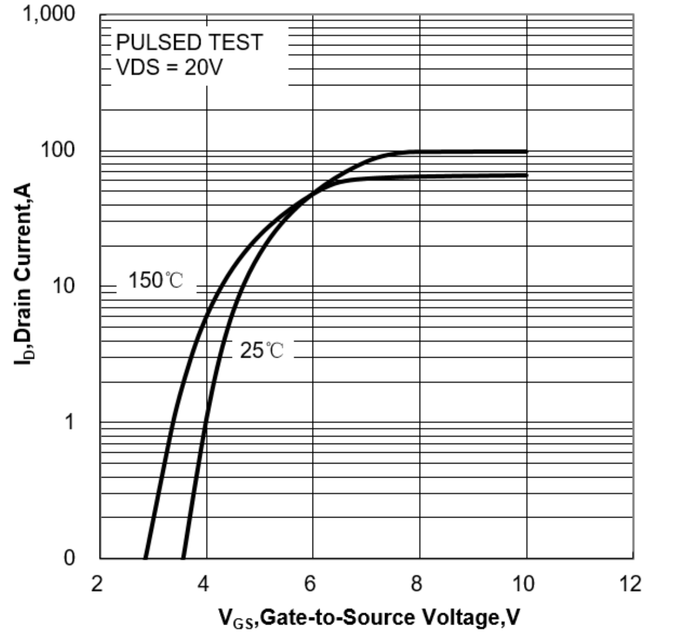


Figure 6 Typical Drain to Source ON Resistance vs Drain Current

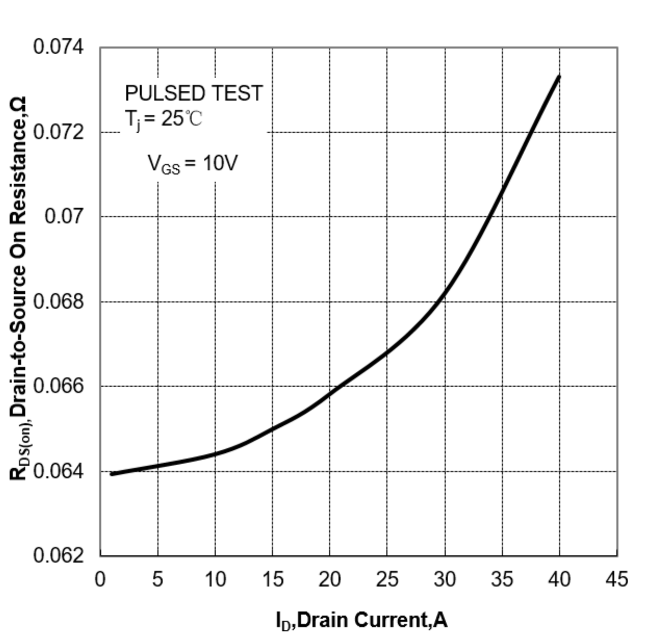


Figure 7 Typical Drian to Source on Resistance vs Junction Temperature

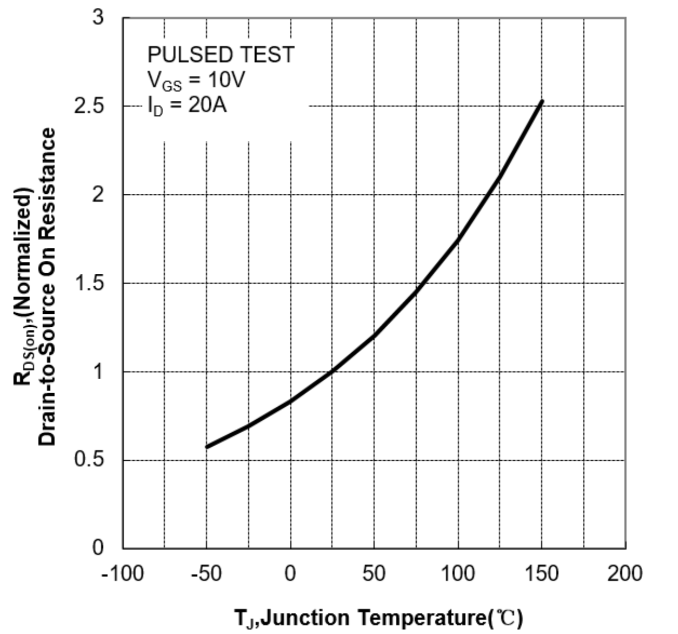


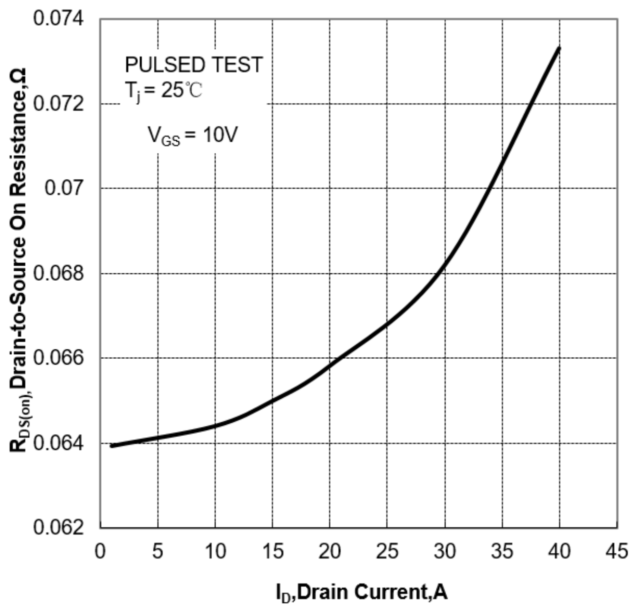
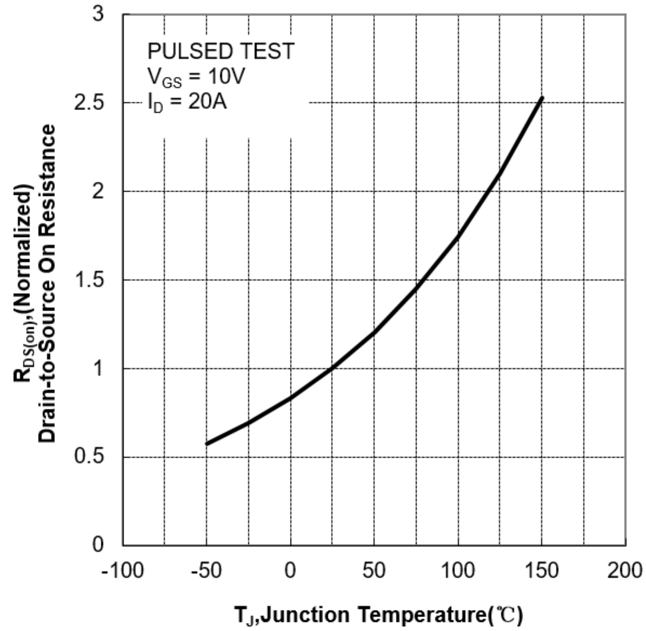
Figure 6 Typical Drain to Source ON Resistance vs Drain Current	Figure 7 Typical Drian to Source on Resistance vs Junction Temperature
	

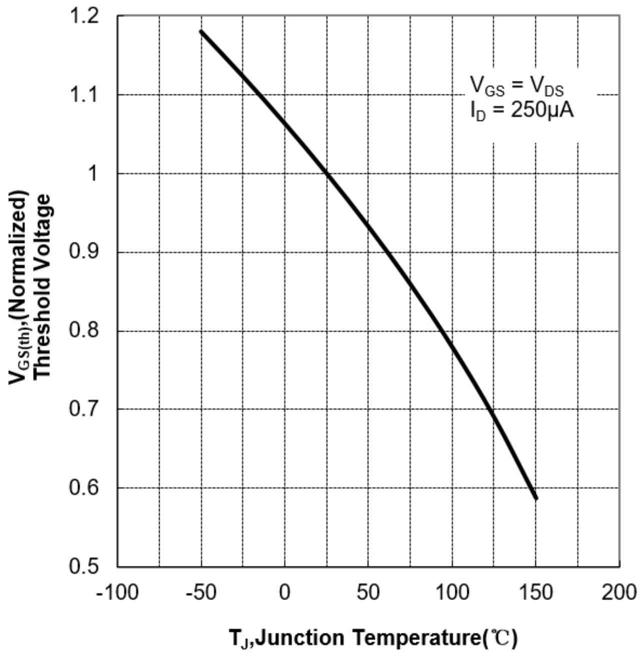
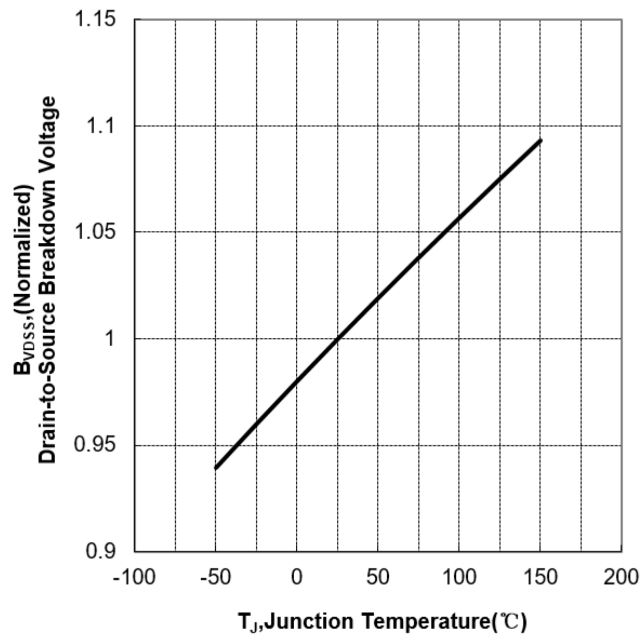
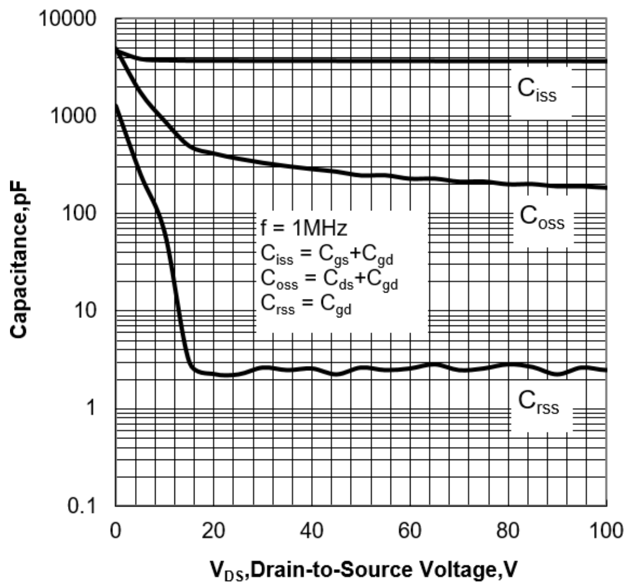
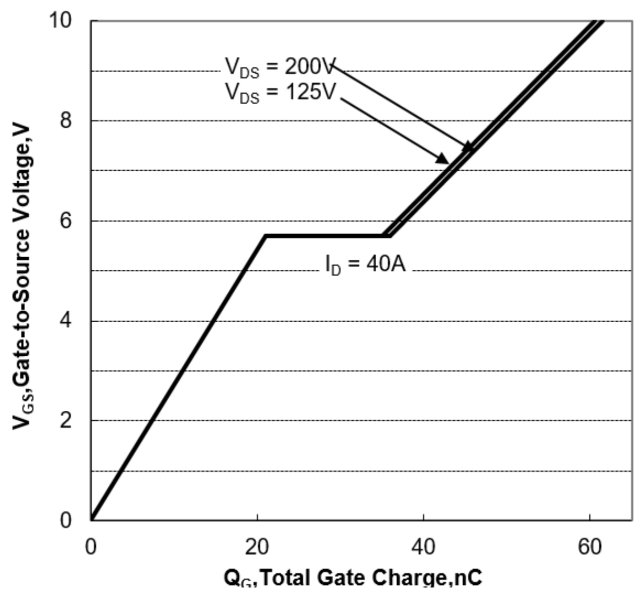
Figure 8 Typical Theshold Voltage vs Junction Temperature	Figure 9 Typical Breakdown Voltage vs Junction Temperature
	

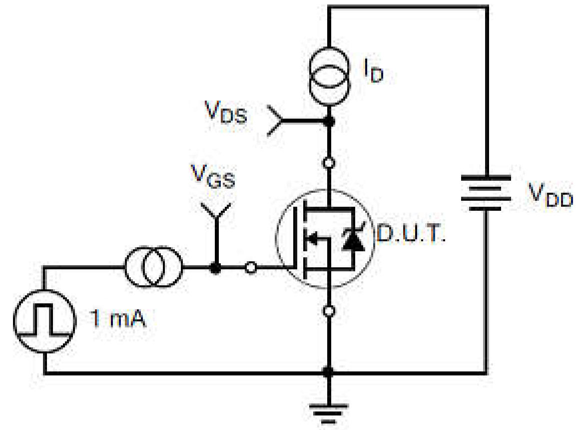
Figure 10 Typical Capacitance vs Drain to Source Voltage	Figure 11 Typical Gate Charge vs Gate to Source Voltage

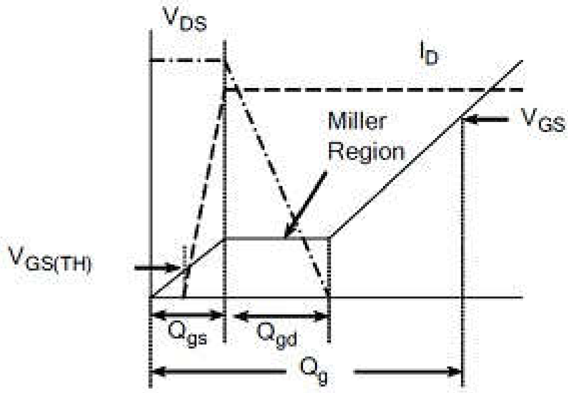




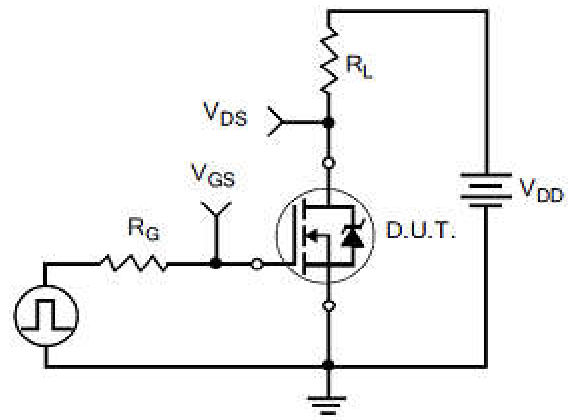
Test Circuit and Waveform

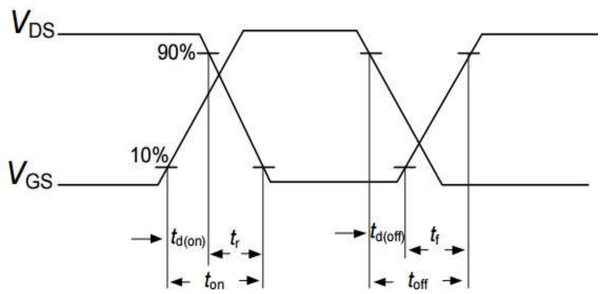
Gate Charge Test Circuit	Gate Charge Waveforms

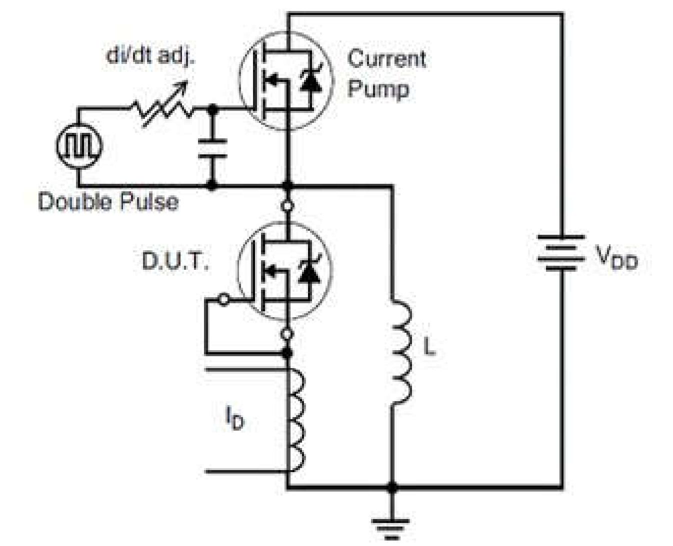
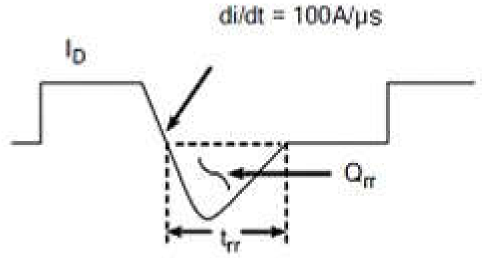


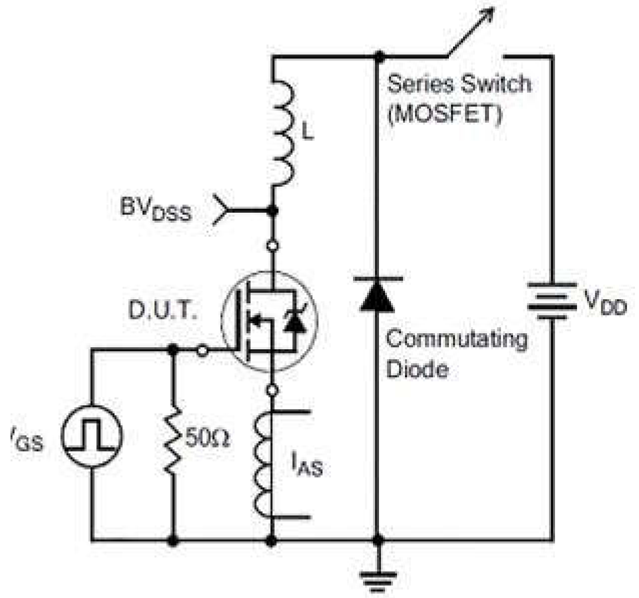
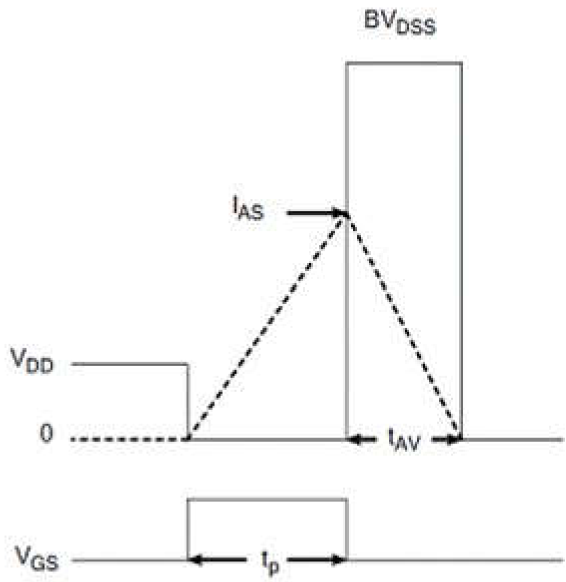


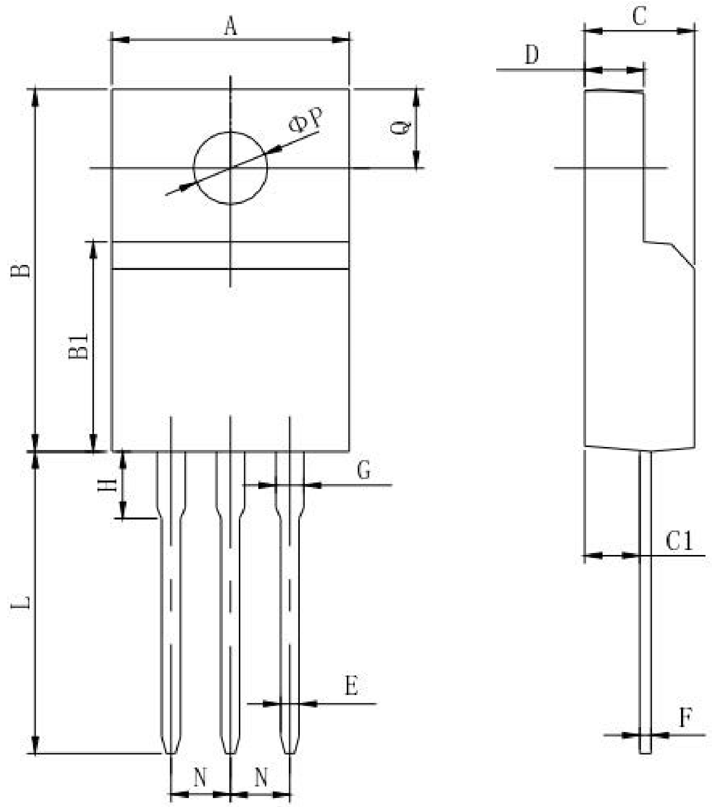
Resistive Switching Test Circuit	Resistive Switching Waveforms





Diode Reverse Recovery Test Circuit	Diode Reverse Recovery Waveform
	

Unclamped Inductive Switching Test Circuit	Unclamped Inductive Switching Waveform
	



Items	Values(mm)	
	MIN	MAX
A	9.60	10.4
B	15.4	16.2
B1	8.90	9.50
C	4.30	4.90
C1	2.10	3.00
D	2.40	3.00
E	0.60	1.00
F	0.30	0.60
G	1.12	1.42
H	3.40	3.80
	1.60	2.90
L	12.0	14.0
N	2.34	2.74
Q	3.15	3.55

TO-220F 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:

深圳市迈诺斯科技有限公司（总部）

地址：深圳市福田区华富街道田面社区深南中路4026号田面城市大厦22B-22C

邮编：518025

电话：0755-83273777