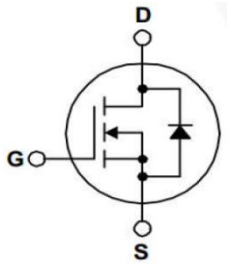
迈诺斯科技

MP50N25

Description

MP50N25, 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 **TO-220F**

General Features

① V_{DS}=250V,I_D=50A,R_{dson} ≦ 60mΩ@V_{GS}=10V(Typ:55mΩ)
② Fast Switching
③ Low Crss
④ 100%avalanche tested
⑤ Improved dv/dt capability
⑥ ROHS product

APPLICATIONS

① High frequency switching mode power supply

Package Marking And Ordering Information：

Ordering Codes	Package	Product Code	Packing
MPF50N25	TO-220F	MPF50N25	Tube
MP50N25	TO-220	MP50N25	Tube

Absolute Maximum Ratings (at T_C = 25°C, unless otherwise specified)

Symbol	Parameter	Value	Units
V_{DSS}	Drain-to-Source Voltage	250	V
I_D	Continuous Drain Current	50	A
	Continuous Drain Current T_C= 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

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Junction-to-Case	0.36	℃/W
$R_{\theta JA}$	Junction-to-Ambient	62.5	℃/W

Electrical Characteristics (at T_C = 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)	--	55	60	mΩ
$V_{GS(TH)}$	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=50A,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=50A,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)	T_C=25 °C	--	--	50	A
I_{SM}	Maximum Pulsed Current (Body Diode)		--	--	160	A
V_{SD}	Diode Forward Voltage	I_S=50A, V_{GS}=0V(Note4)	--	--	1.2	V
T_{rr}	Reverse Recovery Time	I_S=50A, 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, V_{DS}=50V, Start TJ=25℃
Note3: I_{SD} =50A,di/dt ≤100A/us,V_{DD}≤B_{VDS}, Start TJ=25℃
Note4: Pulse width tp≤300μs, δ≤2%

Characteristics Curves

Figure 1 Safe Operating Area

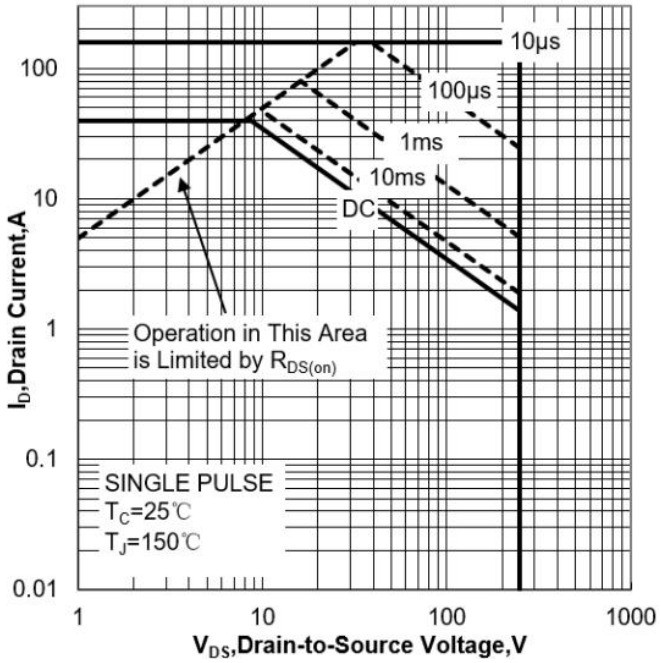


Figure 2 Power Dissipation

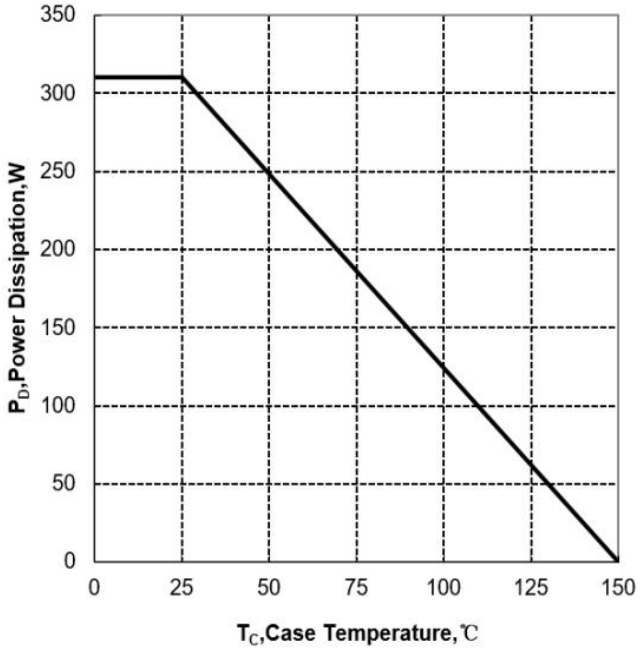


Figure 3 Max Thermal Impendance

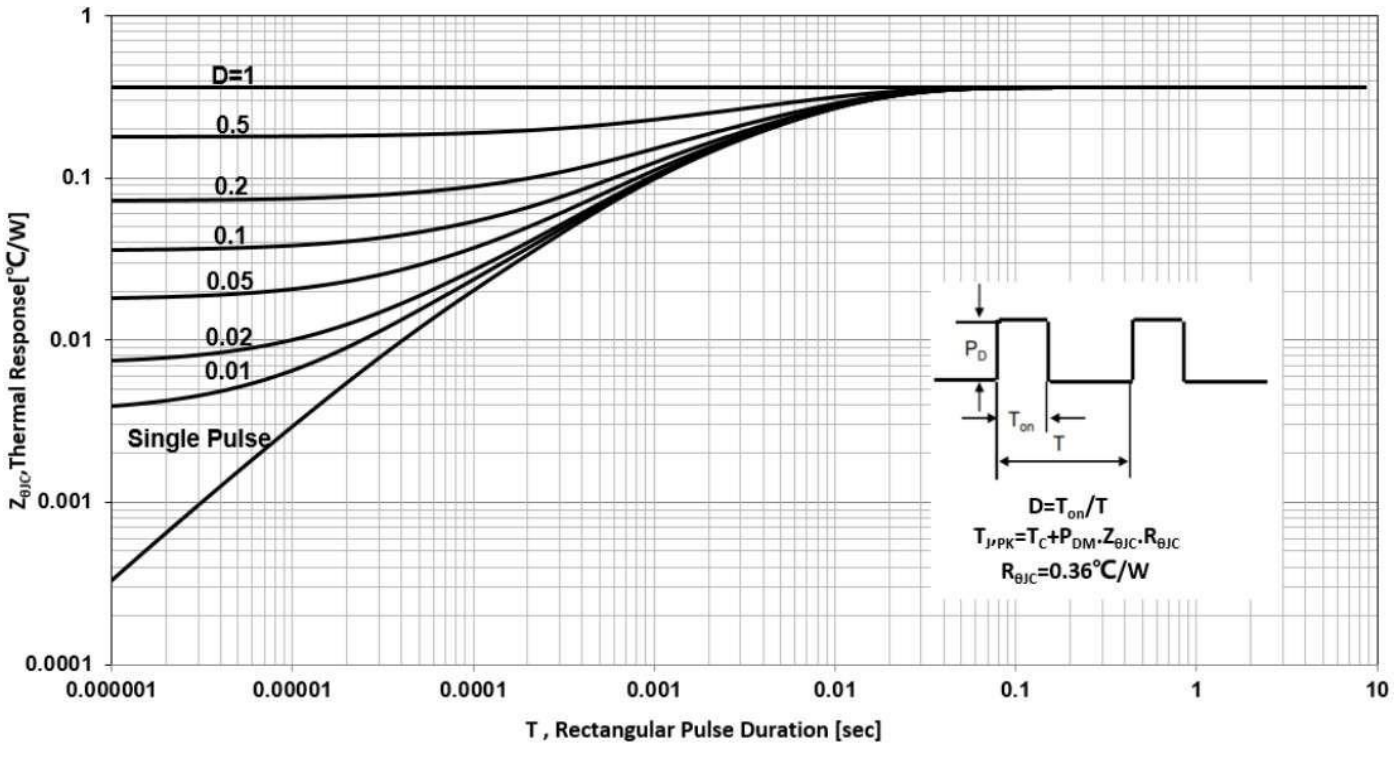


Figure 4 Typical Output Characteristics

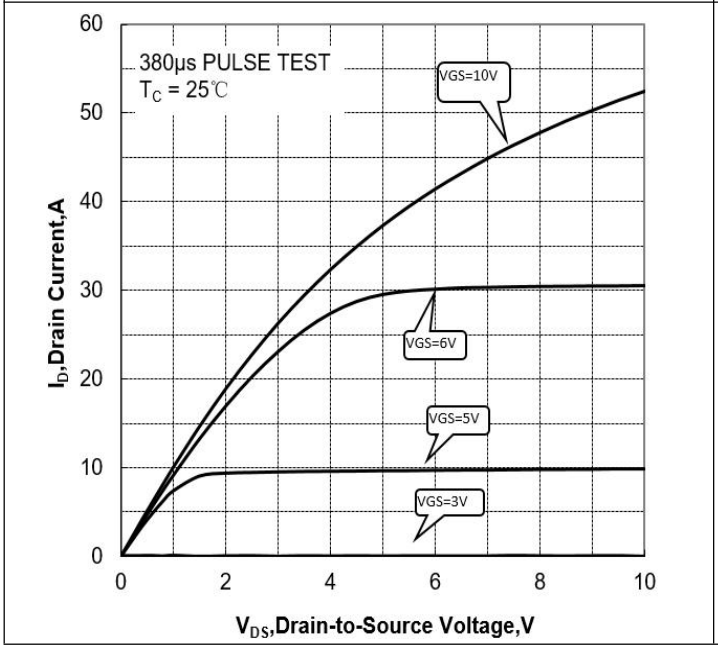


Figure 5 Typical Transfer Characteristics

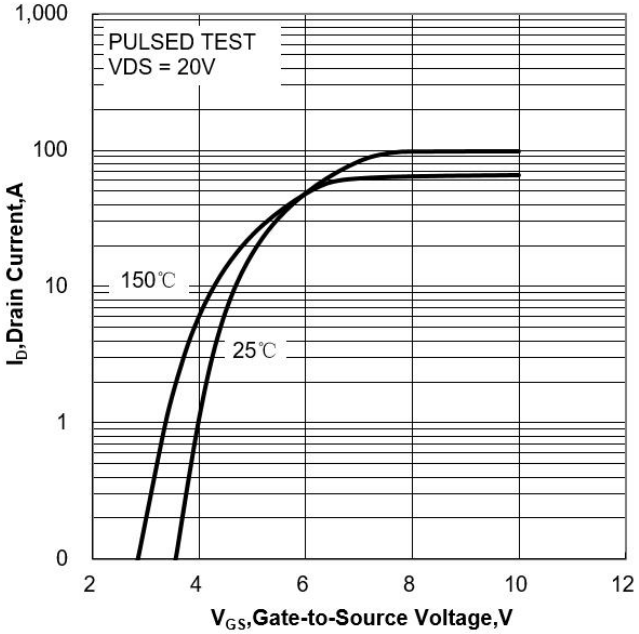


Figure 6 Typical Drain to Source ON Resistance vs Drain Current

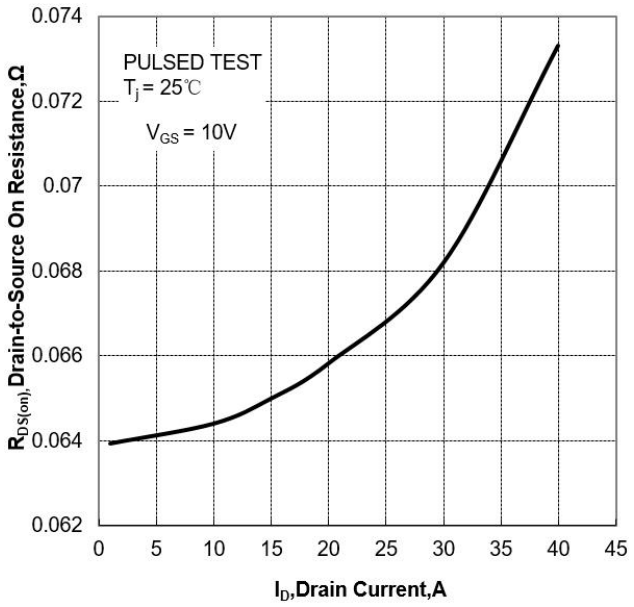


Figure 7 Typical Drian to Source on Resistance vs Junction Temperature

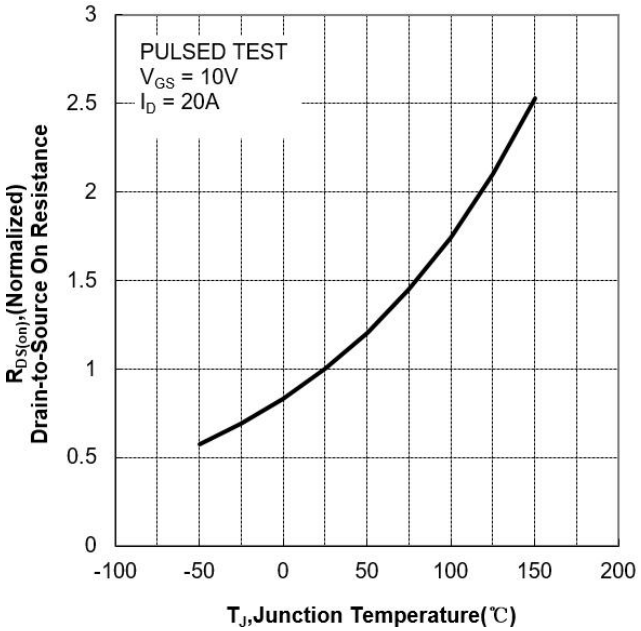


Figure 8 Typical Theshold Voltage vs Junction Temperature

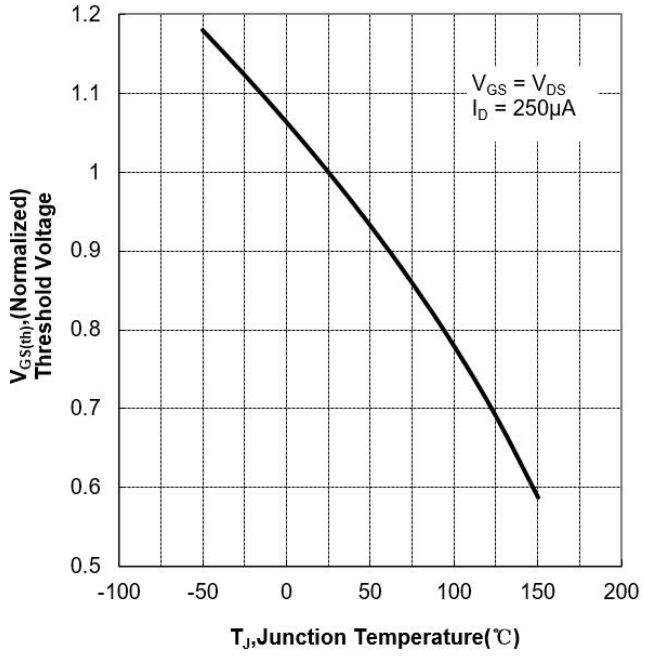


Figure 9 Typical Breakdown Voltage vs Junction Temperature

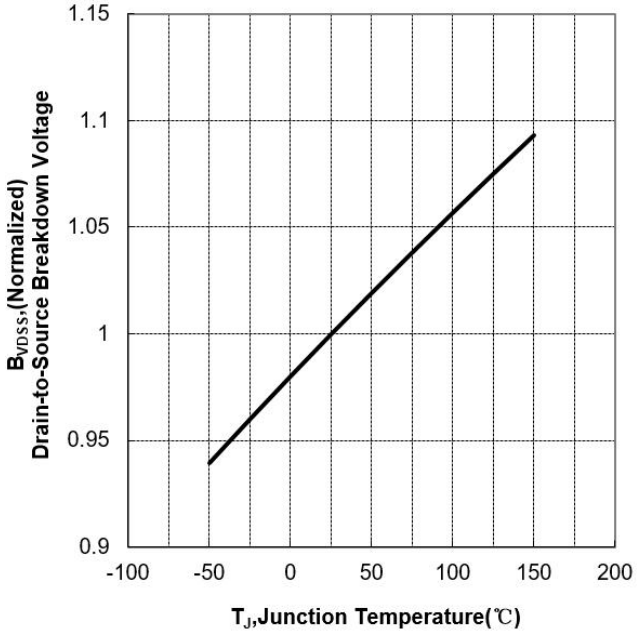


Figure 10 Typical Capacitance vs Drain to Source Voltage

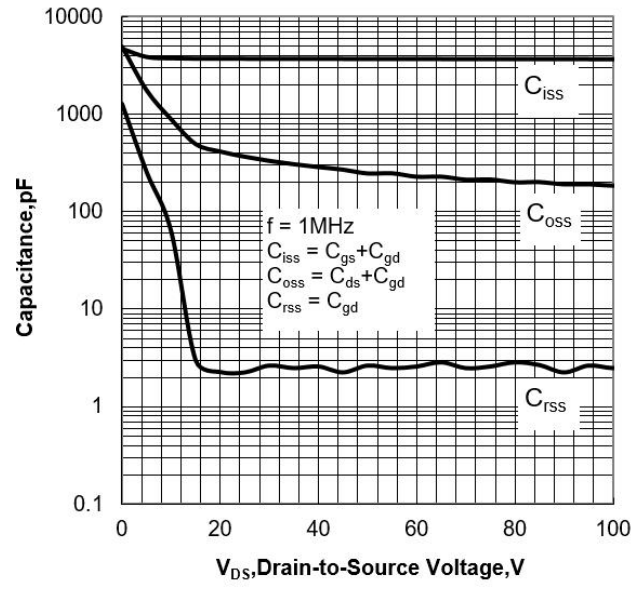
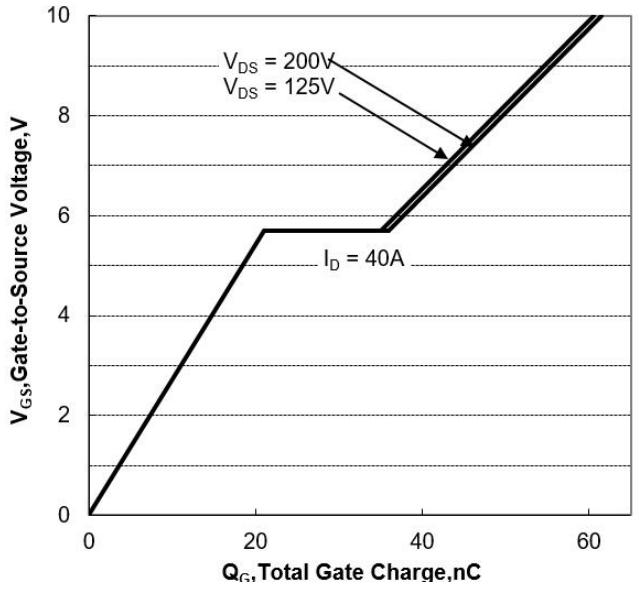
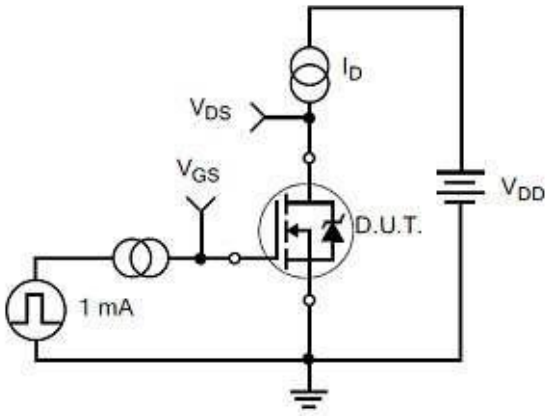
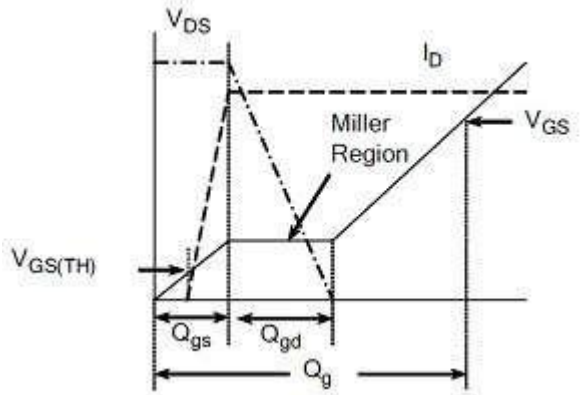
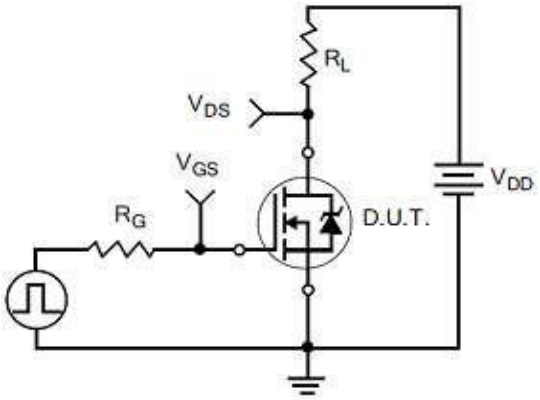
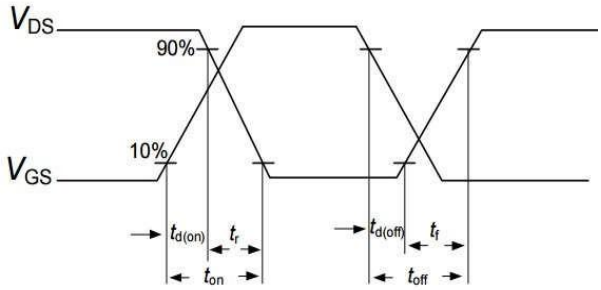


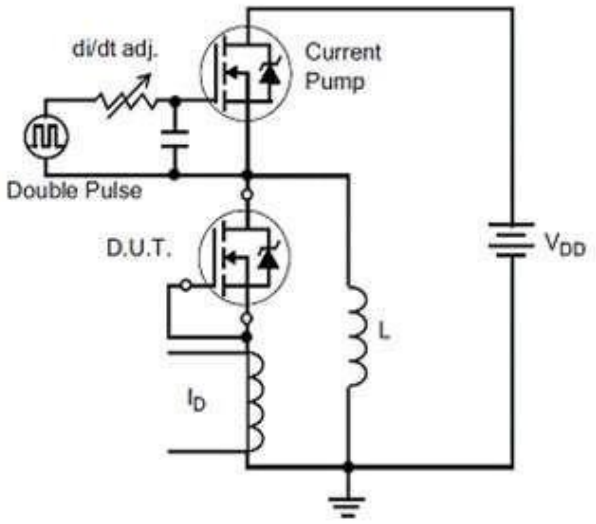
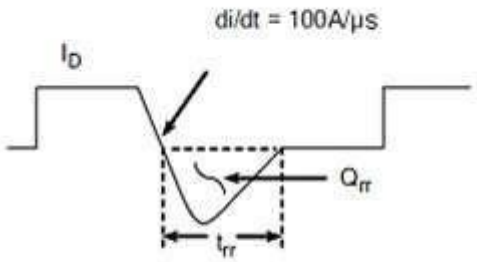
Figure 11 Typical Gate Charge vs Gate to Source Voltage

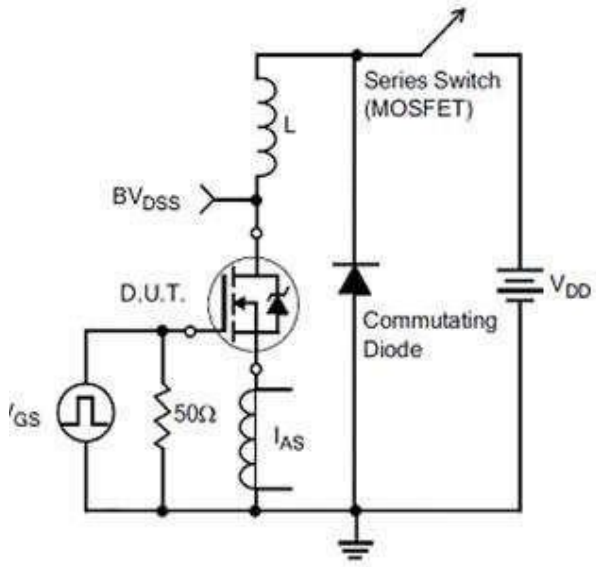
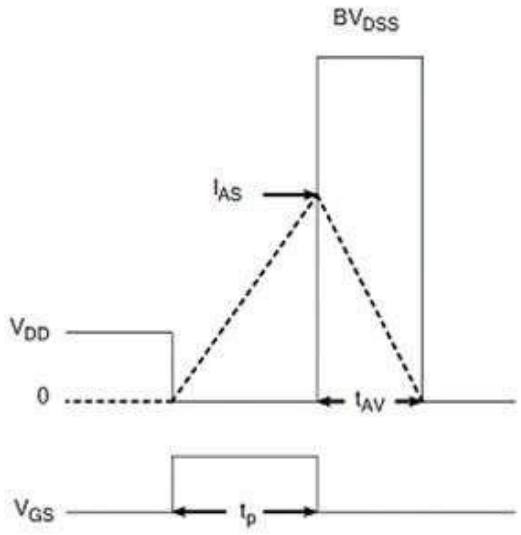


Test Circuit and Waveform

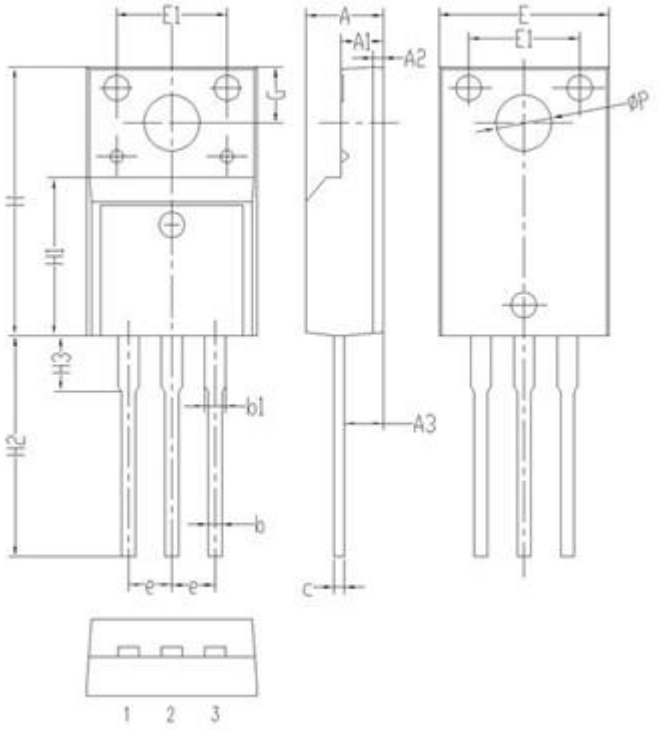
Gate Charge Test Circuit	Gate Charge Waveforms
	

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
	

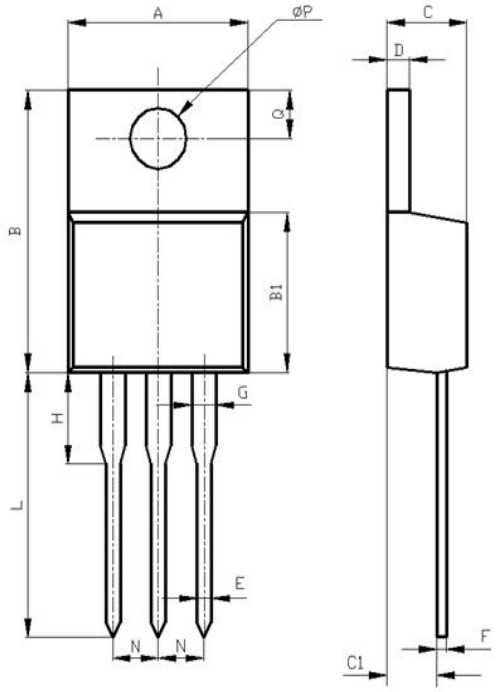
Package Information



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 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 without prior notice.

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