

1. 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

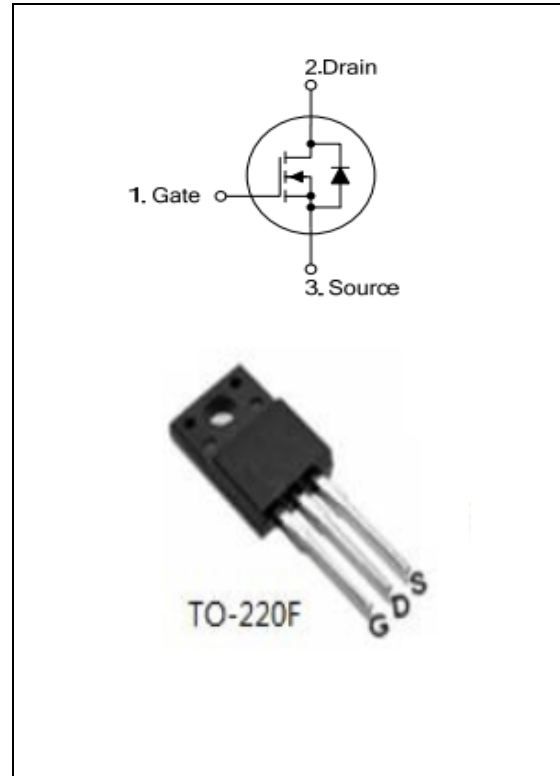
Parameter	Value	Unit
V _{DS}	250	V
I _D	50	A
R _{DS(ON).Typ}	0.055	Ω

FEATURES

- Fast Switching
- Low Crss
- 100% avalanche tested
- Improved dv/dt capability
- RoHS product

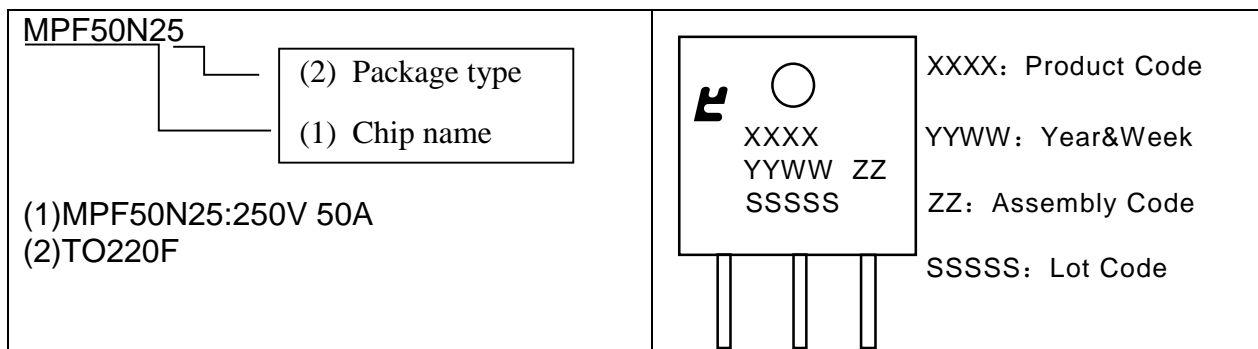
APPLICATIONS

- High frequency switching mode power supply



ORDERING INFORMATION

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



2. ABSOLUTE RATINGS

at $T_c = 25^\circ\text{C}$, 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 $T_c = 100^\circ\text{C}$	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
dv/dt	Peak Diode Recovery dv/dt (Note3)	5.0	V/ns
PD	Power Dissipation	310	W
	Derating Factor above 25°C	2.78	W/ $^\circ\text{C}$
T_J, T_{stg}	Operating Junction and Storage Temperature Range	150, -55 to 150	$^\circ\text{C}$
T_L	Maximum Temperature for Soldering	300	$^\circ\text{C}$

3. Thermal characteristics

Thermal characteristics TO-220

Symbol	Parameter	RATINGS	Units
$R_{\theta JC}$	Junction-to-Case	0.36	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Junction-to-Ambient	62.5	$^\circ\text{C}/\text{W}$

4. Electrical Characteristics

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

OFF Characteristics						
Symbol	Parameter	Test Conditions	Values			Units
			Min.	Typ.	Max.	
V_{DSS}	Drain to Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	250	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Bvdss Temperature Coefficient	$I_D=250\mu A$, Reference 25°C	--	0.18	--	$V/^\circ\text{C}$
I_{DSS}	Drain to Source Leakage Current	$V_{DS}=250V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	--	--	1	μA
		$V_{DS}=200V$, $V_{GS}=0V$, $T_J=125^\circ\text{C}$	--	--	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	$V_{DS}=V_{GS}$, $I_D=250\mu A$ (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	$f=1.0\text{MHz}$	--	1.8	--	Ω
C_{iss}	Input Capacitance	$V_{GS}=0V$ $V_{DS}=25V$ $f=1.0\text{MHz}$	--	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	ID =40A VDD = 125V VGS = 10V RG =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	ID =40A VDD =200V VGS = 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	IS=40A, VGS=0V(Note4)	--	--	1.2	V
T_{rr}	Reverse Recovery Time	IS=40A, Tj = 25°C dIF/dt=100A/us, VGS=0V	--	230	--	ns
Q_{rr}	Reverse Recovery Charge		--	2150	--	nC

Note1: Pulse width limited by maximum junction temperature

Note2: L=10mH, VD_s=50V, Start T_J=25°C

Note3: ISD =40A, di/dt ≤100A/us, VDD≤BVDS, Start T_J=25°C

Note4: Pulse width tp≤300μs, δ≤2%

5. Characteristics Curves

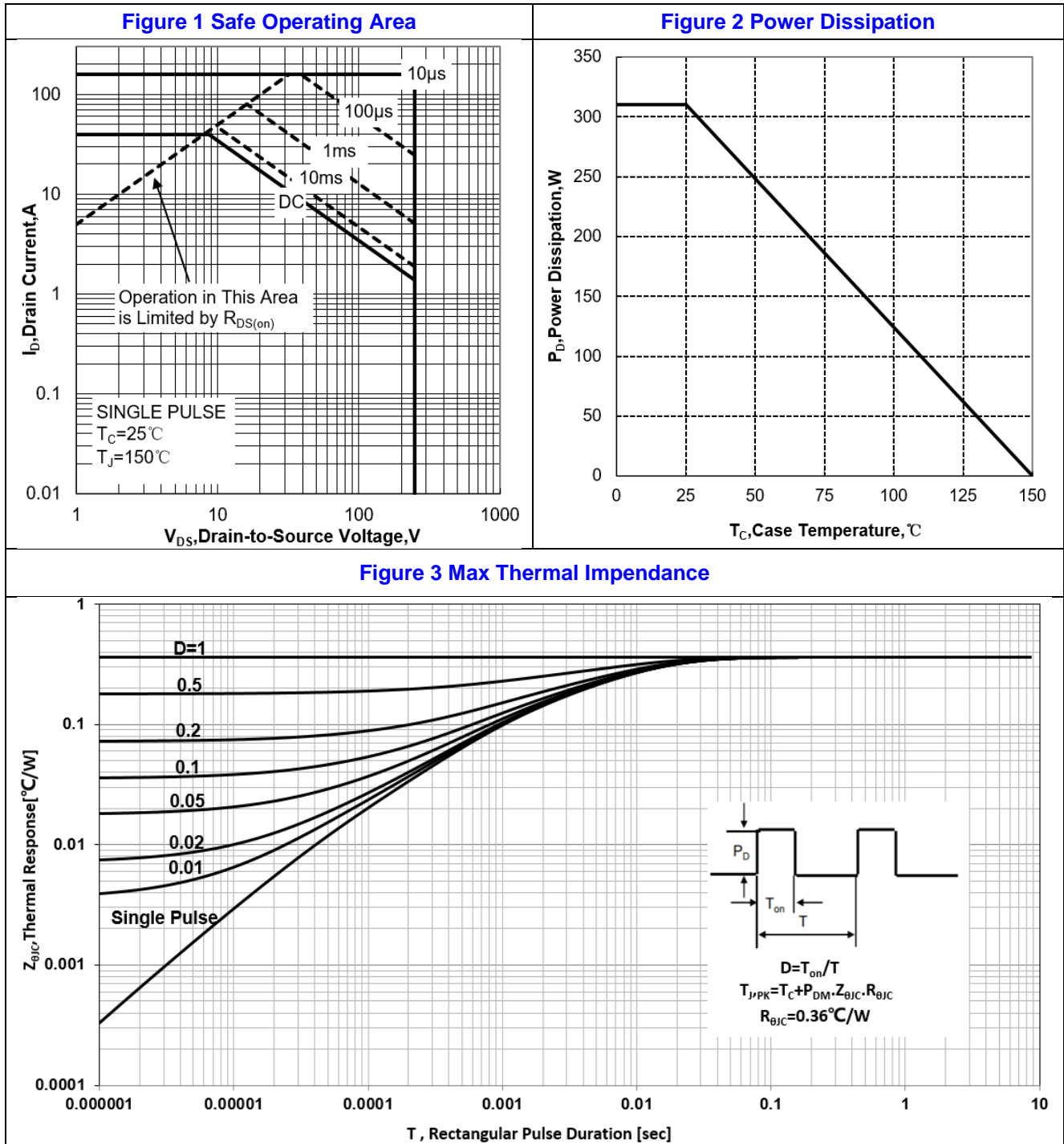


Figure 4 Typical Output Characteristics

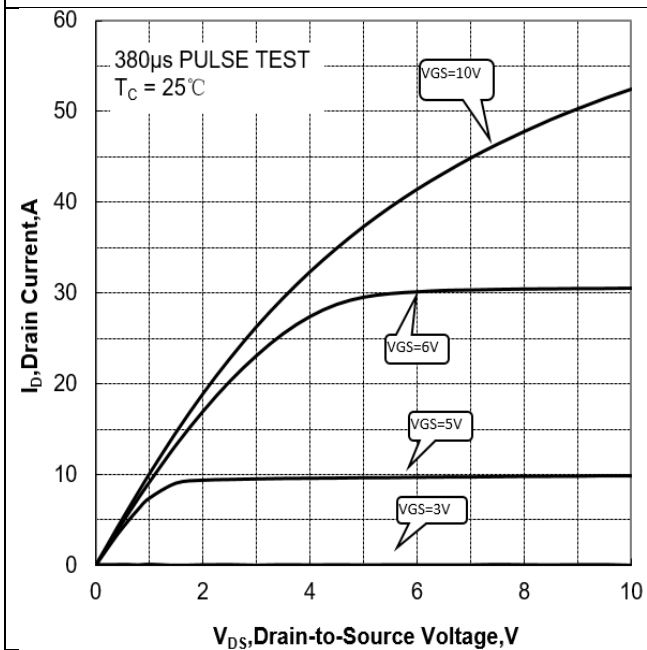


Figure 5 Typical Transfer Characteristics

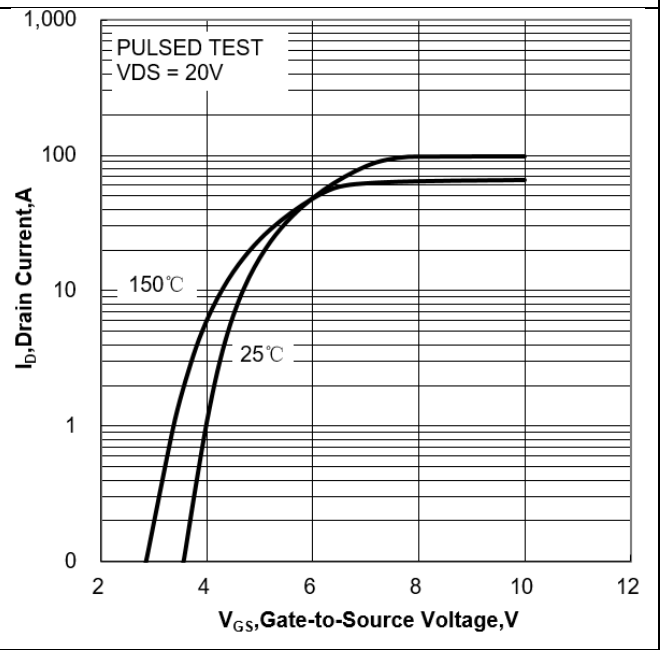


Figure 6 Typical Drain to Source ON Resistance vs Drain Current

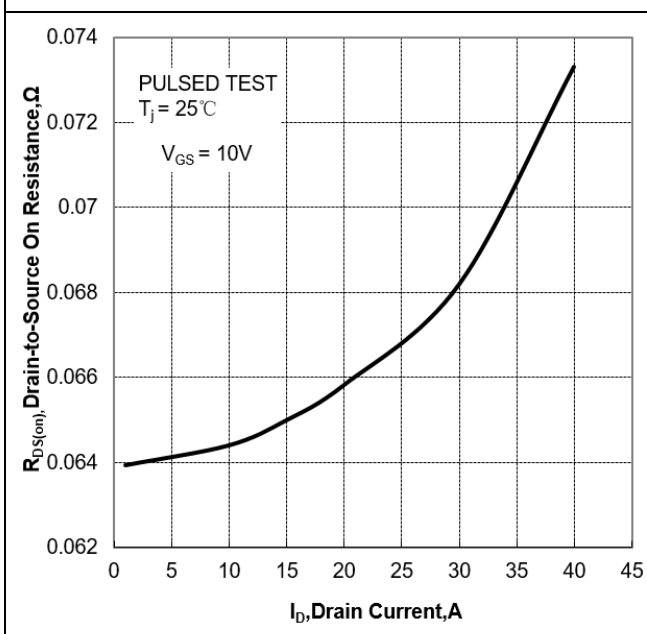


Figure 7 Typical Drain to Source on Resistance vs Junction Temperature

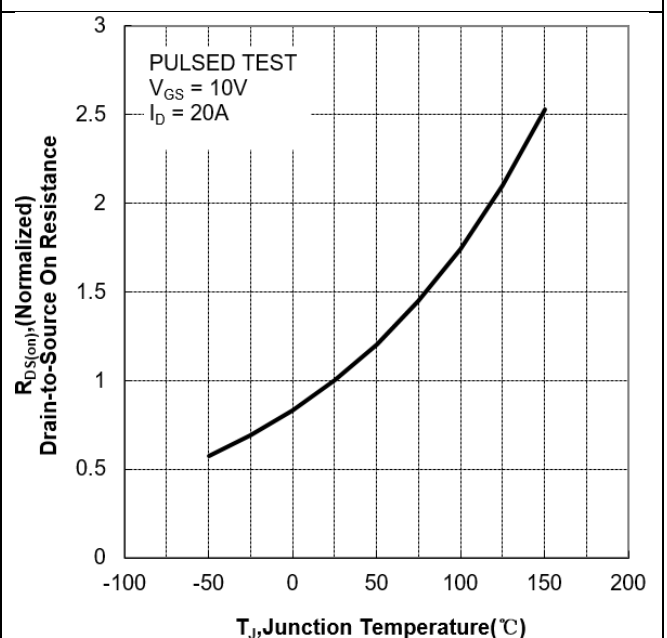


Figure 8 Typical Theshold Voltage vs Junction Temperature

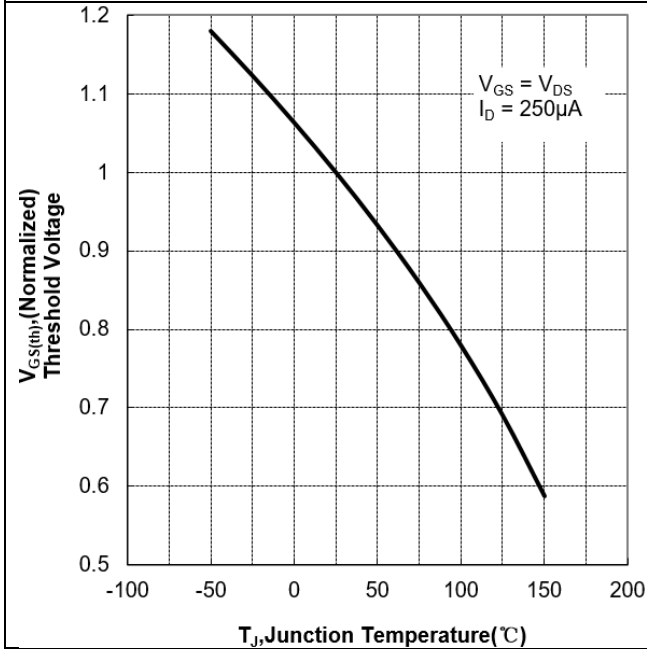


Figure 9 Typical Breakdown Voltage vs Junction Temperature

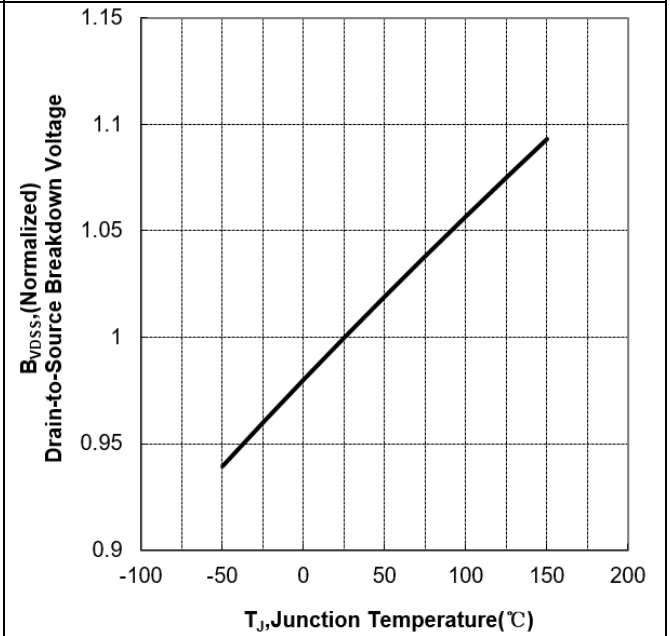


Figure 10 Typical Capacitance vs Drain to Source Voltage

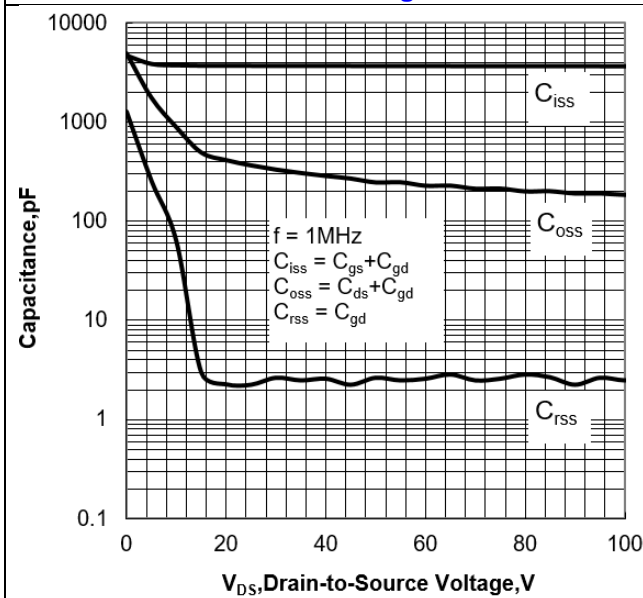
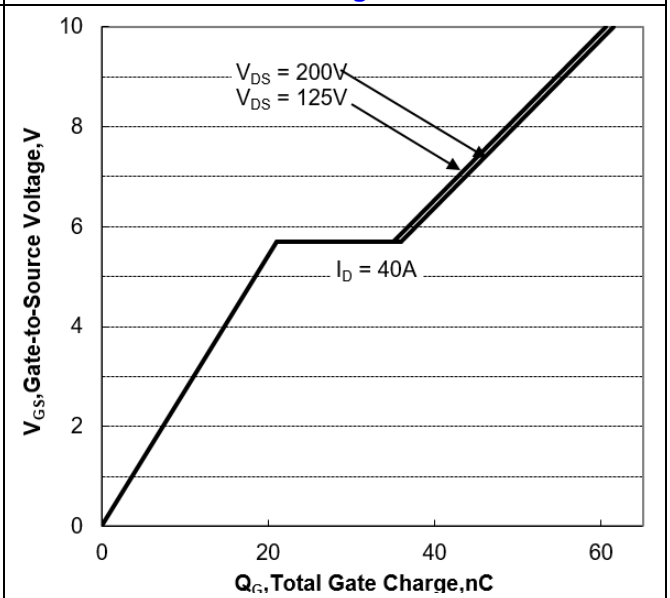
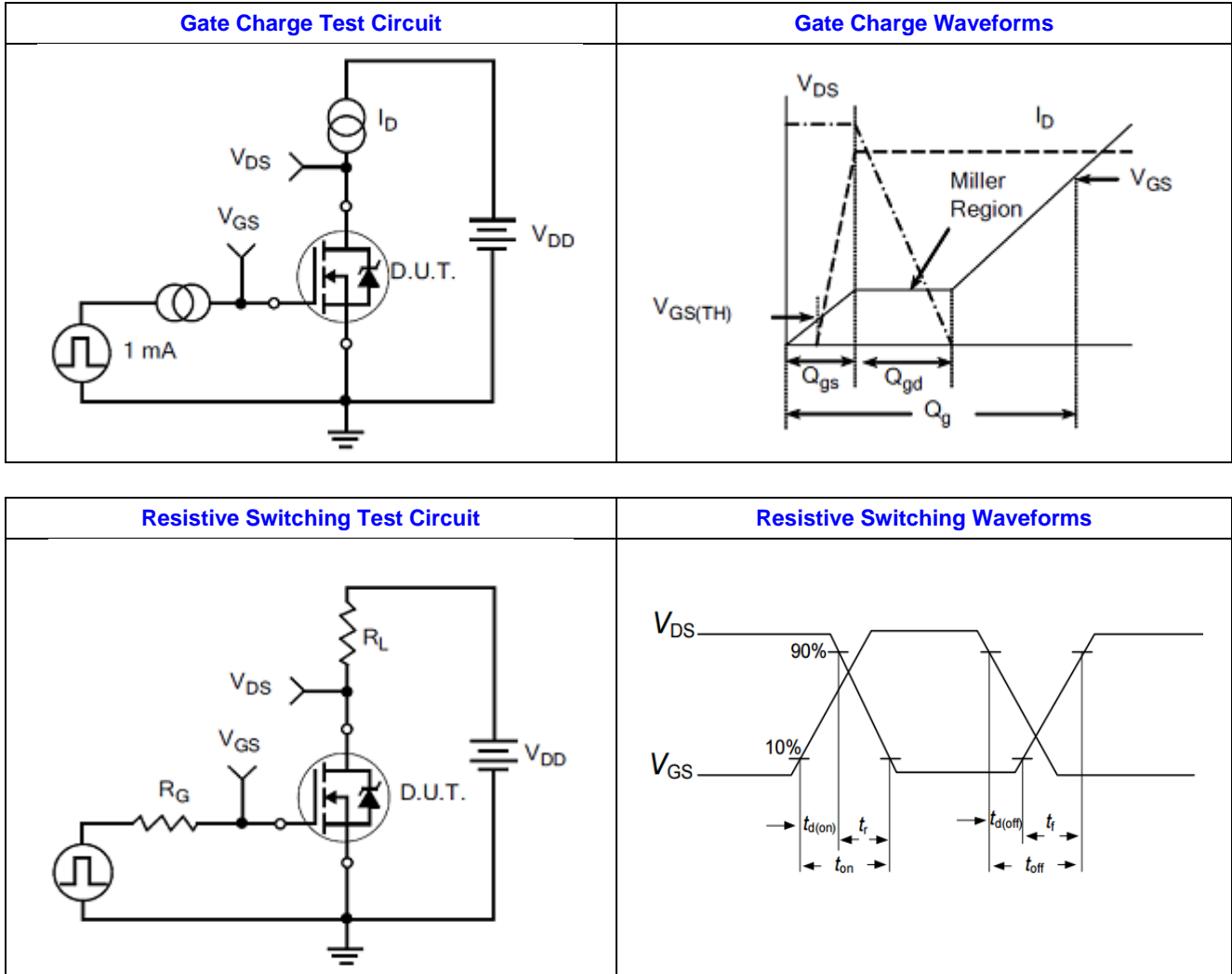
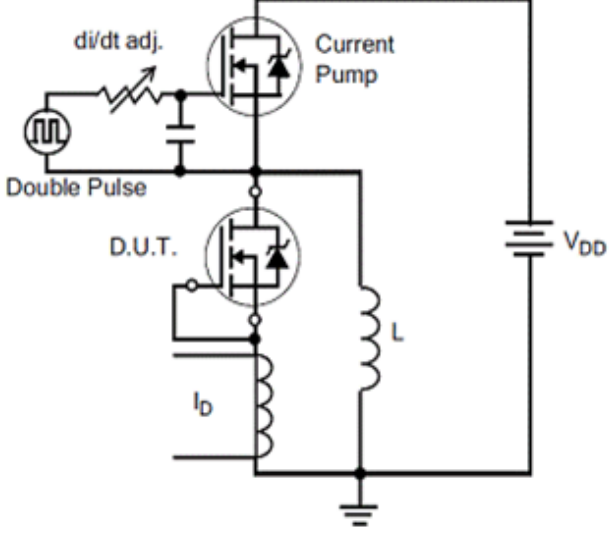
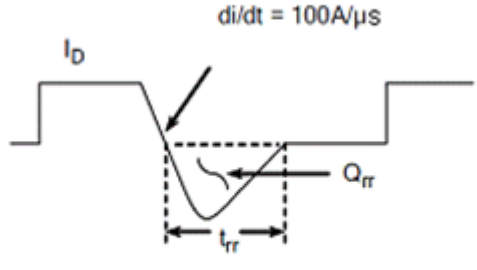
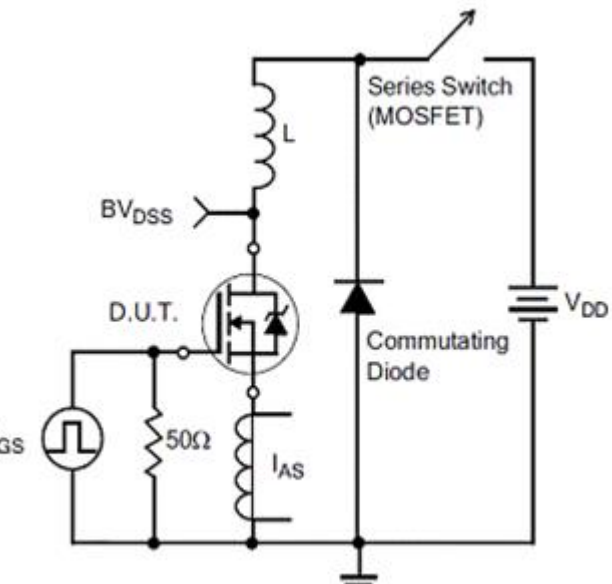
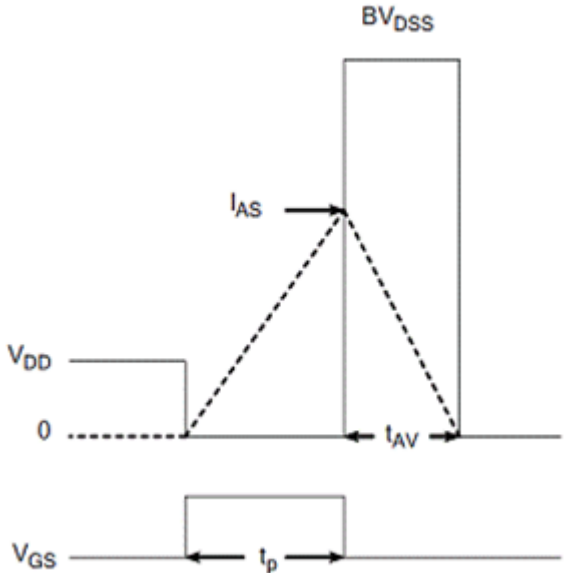


Figure 11 Typical Gate Charge vs Gate to Source Voltage



6. Test Circuit and Waveform



Diode Reverse Recovery Test Circuit	Diode Reverse Recovery Waveform
	
Unclamped Inductive Switching Test Circuit	Unclamped Inductive Switching Waveform
	



迈诺斯科技

MPF50N25

Power MOSFET

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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