

Silicon N-Channel Planar Power MOSFET

Description

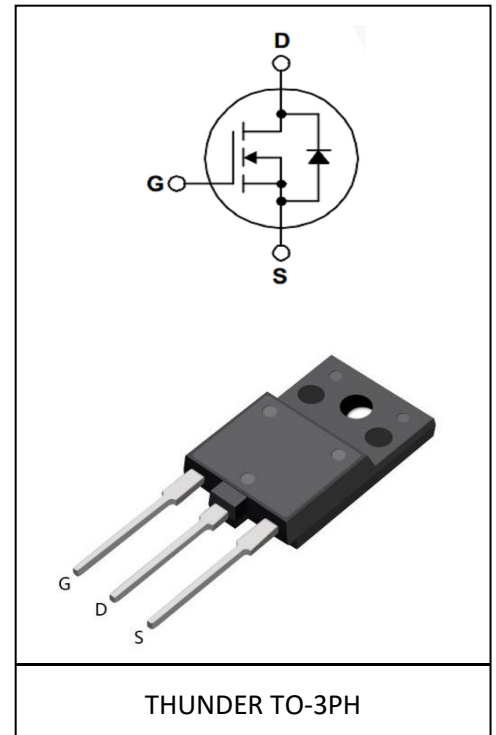
The TH7N80PH utilizes the latest processing techniques to achieve low on-resistance per silicon area. Additional features of this MOSFET are 150°C operating junction temperature and high repetitive peak current capability. These features combine to make this MOSFET a highly efficient, robust and reliable device for PDP driving applications. It can be used in a wide variety of applications.

General Features

- $V_{DS}=800V, I_D=7A$
- Low ON Resistance, $R_{DS(on), typ.}=1.4\Omega @ V_{GS}=10V, I_D=3.5A$
- Low reverse transfer capacitance
- Low Qg for fast response
- Short fall & rise times for fast switching
- 100% single pulse avalanche energy Test

Application

- Adaptor
- Charger
- SMPS Standby Power



Product Summary

V_{DS}	800V
$R_{DS(on), typ.}$	1.4Ω
I_D	7A

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	800	V
Continuous drain current $T_C = 25^\circ C$ (Silicon limit)	I_D	7	A
Pulsed drain current ($T_C = 25^\circ C$, t_p limited by T_{jmax})	I_{DM}	28	A
Avalanche energy, single pulse ($L=10mH$, $R_g=25\Omega$)	E_{AS}	825	mJ
Gate-Source voltage	V_{GS}	±30	V
Power dissipation ($T_C = 25^\circ C$)	P_D	187	W
Operating junction and storage temperature	T_j, T_{stg}	-55...+150	°C

Thermal Resistance

Parameter	Symbol	Max	Unit
Thermal resistance, junction – case.	R_{thJC}	0.67	°C/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	100	

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

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		

Static Characteristic

Drain-source breakdown voltage	BV_{DSS}	800	-	-	V	$V_{GS}=0V, I_D=250\mu A$
Gate threshold voltage	$V_{GS(th)}$	2.5	-	4.5	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	$V_{DS}=800V, V_{GS}=0V$ $T_j=25^{\circ}\text{C}$
		-	-	10	μA	$V_{DS}=640V, V_{GS}=0V$ $T_j=125^{\circ}\text{C}$
Gate-source leakage current	I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 30V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	1.4	1.7	Ω	$V_{GS}=10V, I_D=3.5A$

Dynamic Characteristic

Input Capacitance	C_{iss}	-	1242	-	pF	$V_{GS}=0V, V_{DS}=25V,$ $f=1\text{MHz}$
Output Capacitance	C_{oss}	-	137	-		
Reverse Transfer Capacitance	C_{rss}	-	15	-		
Gate Total Charge	Q_g	-	25.5	-	nC	$V_{GS}=10V, V_{DS}=640V,$ $I_D=7A$
Gate-Source charge	Q_{gs}	-	7.20	-		
Gate-Drain charge	Q_{gd}	-	8.8	-		
Turn-on delay time	$t_{d(on)}$	-	30	-	ns	$V_{DD}=400V, I_D=7A,$ $R_G=25\Omega$
Rise time	t_r	-	65	-		
Turn-off delay time	$t_{d(off)}$	-	56	-		
Fall time	t_f	-	39	-		
Gate resistance	R_G	-	1.374	-	Ω	$V_{GS}=0V, V_{DS}=0V,$ $f=1\text{MHz}$

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	-	1.4	V	$V_{GS}=0V, I_{DS}=7A$
Body Diode Continuous Forward Current	I_S	-	-	7	A	$T_C=25^{\circ}C$
Body Diode Reverse Recovery Time	t_{rr}	-	315	-	ns	$T_C=25^{\circ}C, I_S=7A,$ $di/dt=100A/us$
Body Diode Reverse Recovery Charge	Q_{rr}	-	0.55	-	μC	

Typical Performance Characteristics

图1. 输出特性

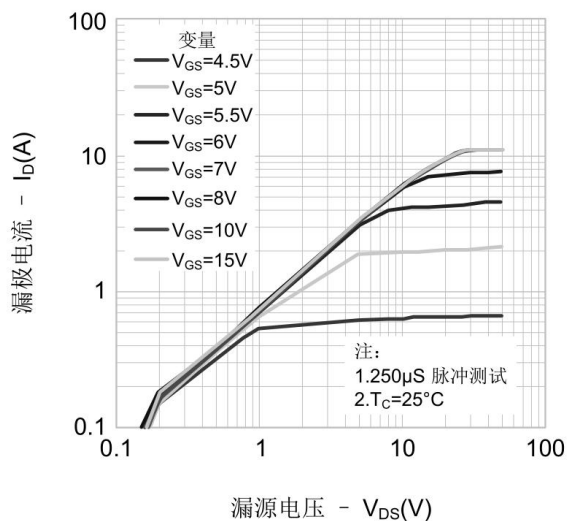


图2. 传输特性

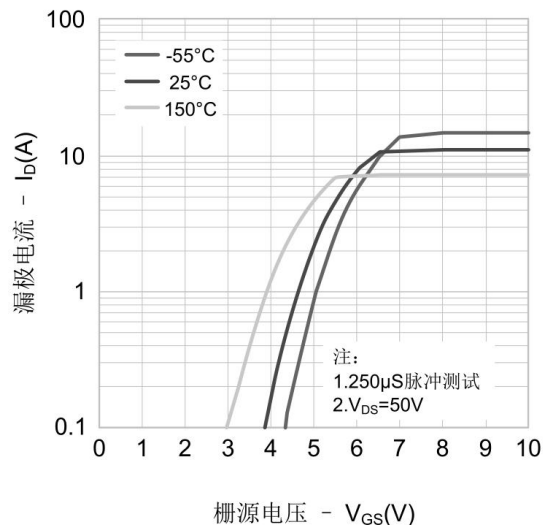


图3. 导通电阻vs.漏极电流和栅极电压

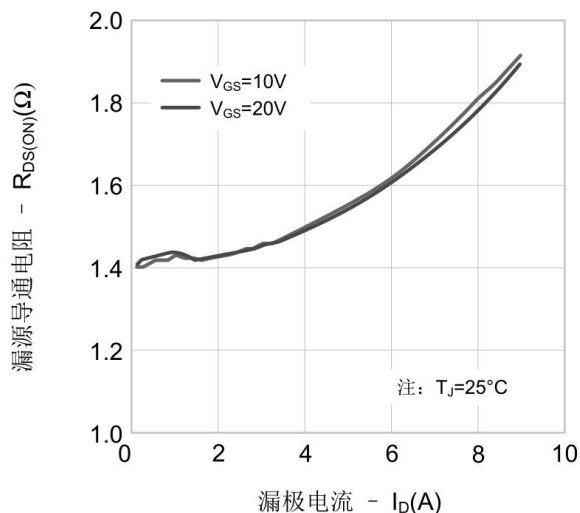


图4. 体二极管正向压降vs.漏极电流、温度

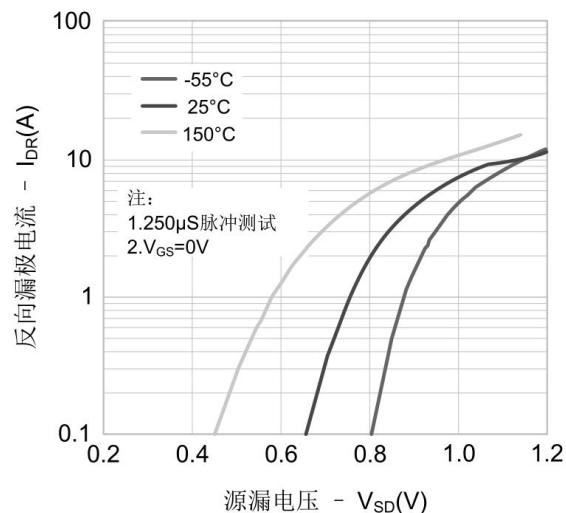


图5. 电容特性

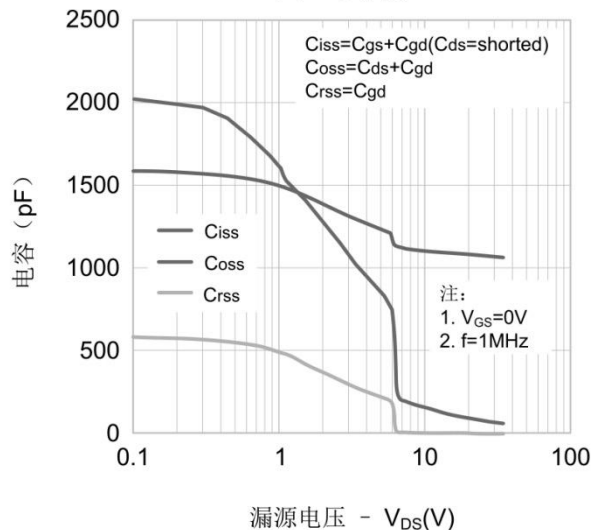


图6. 电荷量特性

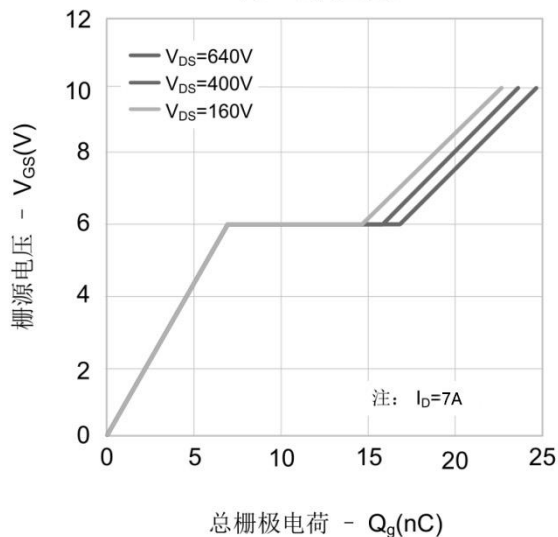


图7. 击穿电压vs.温度特性

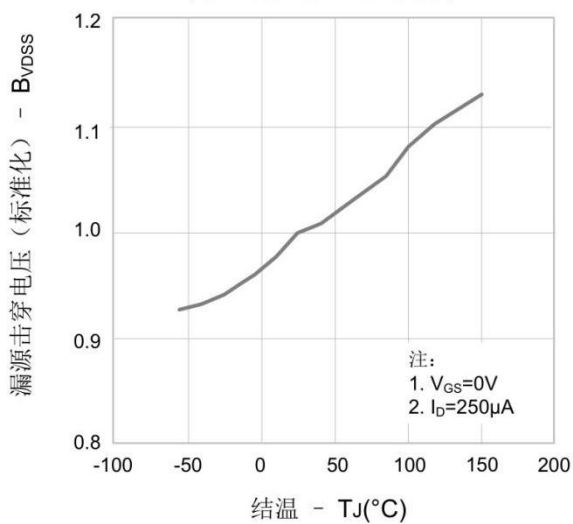


图8. 导通电阻vs.温度特性

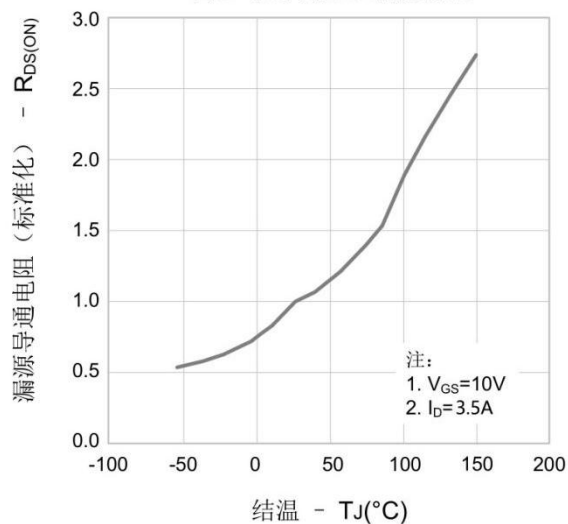


图9. 最大安全工作区域

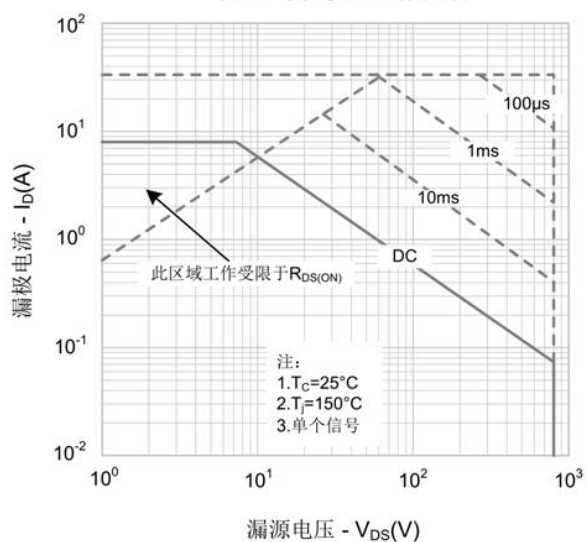
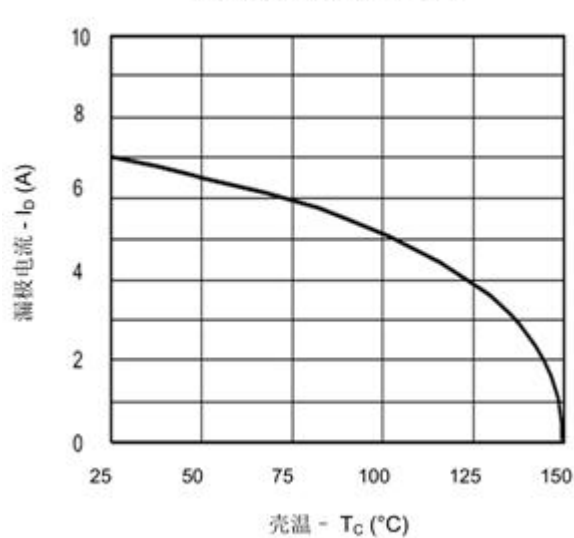


图10. 最大漏极电流vs. 壳温



Test Circuits and Waveforms

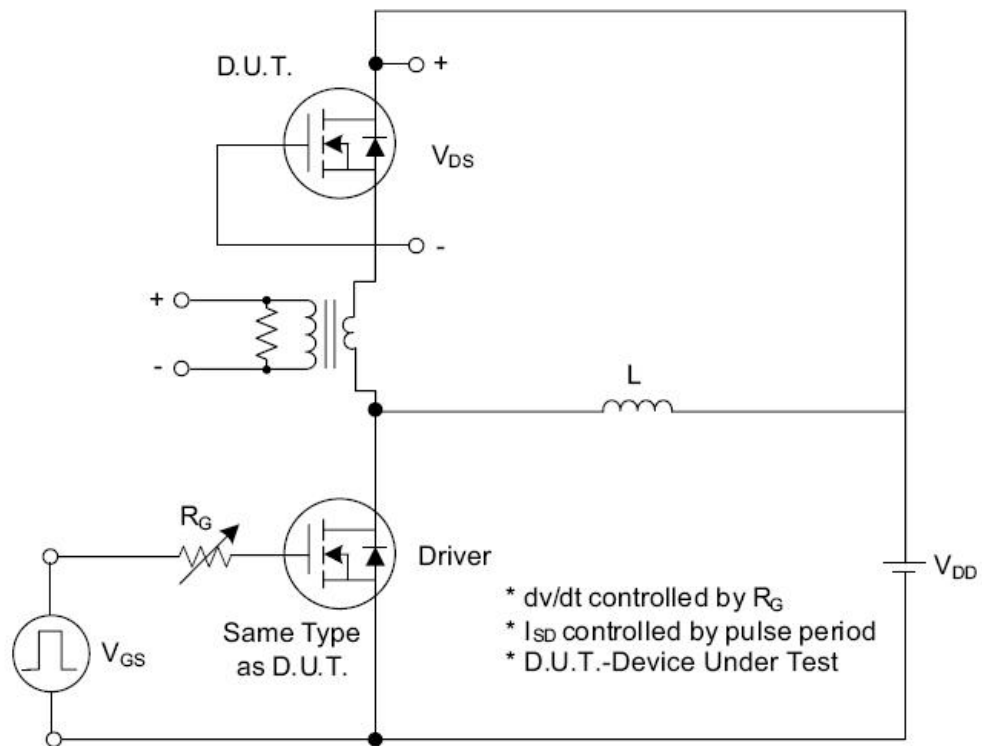


Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit

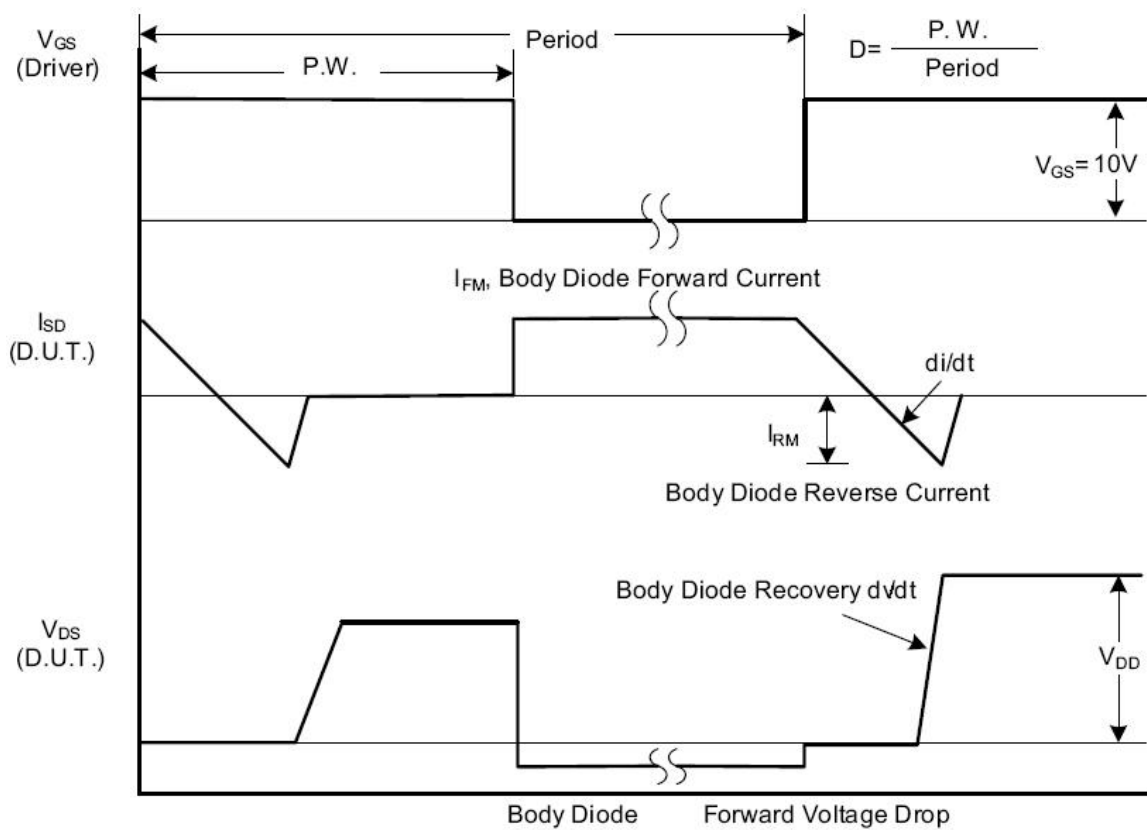


Fig. 1.2 Peak Diode Recovery dv/dt Waveforms

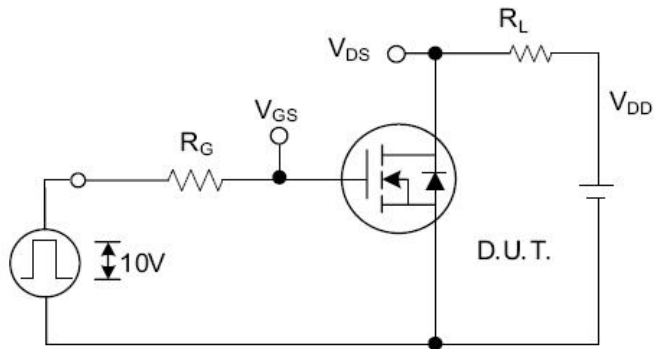


Fig. 2.1 Switching Test Circuit

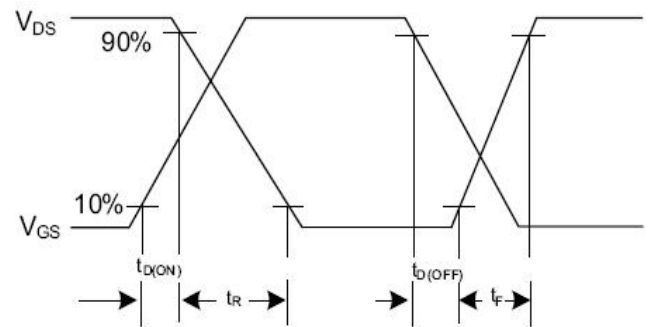


Fig. 2.2 Switching Waveforms

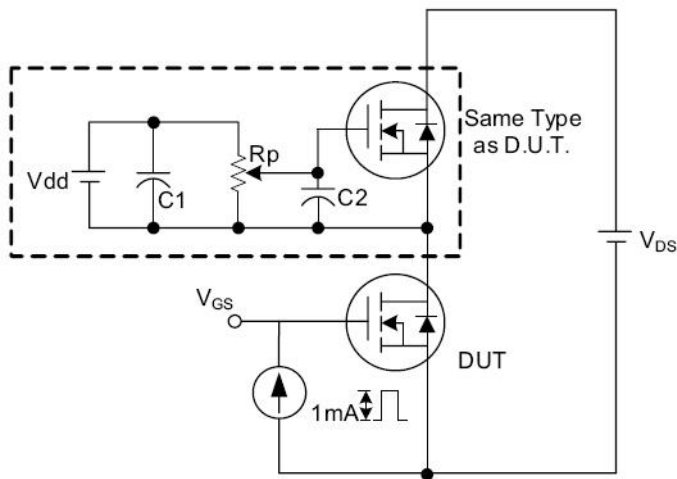


Fig. 3.1 Gate Charge Test Circuit

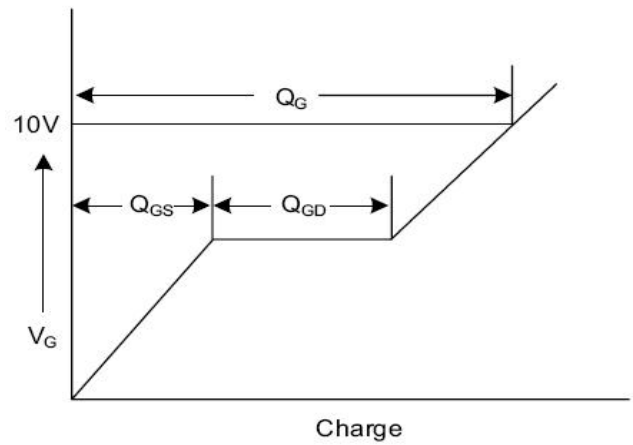


Fig. 3.2 Gate Charge Waveform

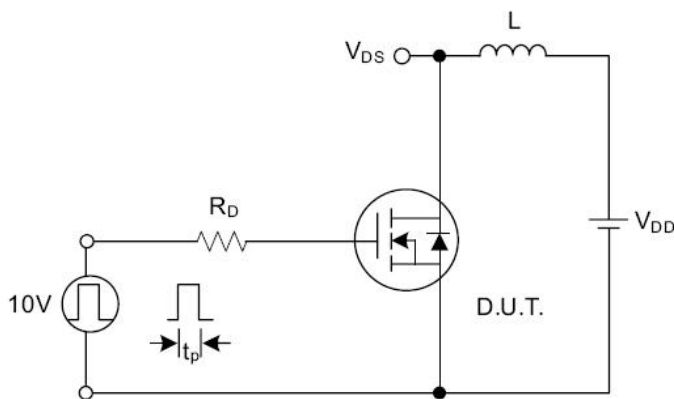


Fig. 4.1 Unclamped Inductive Switching Test Circuit

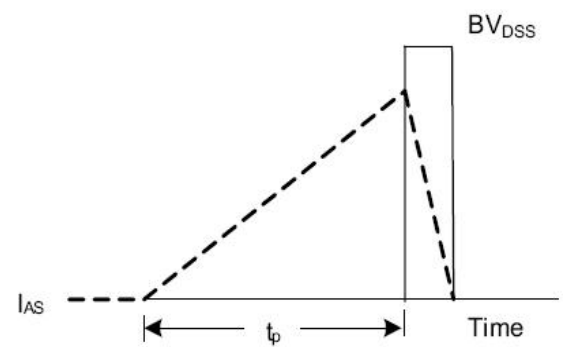
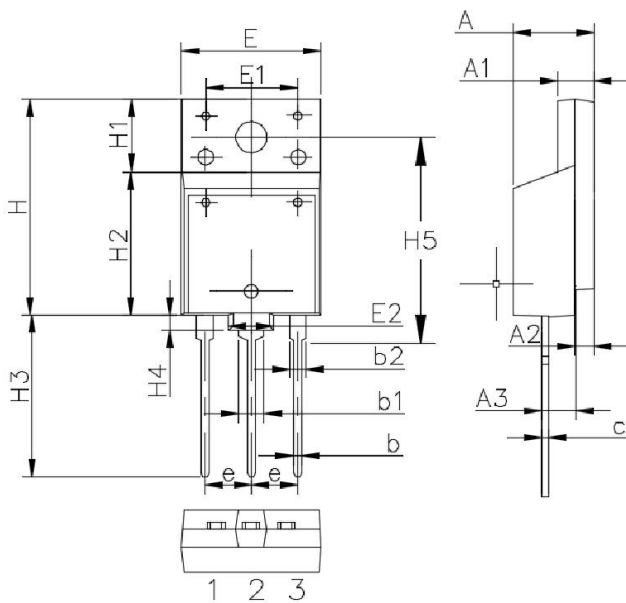


Fig. 4.2 Unclamped Inductive Switching Waveforms

Package Information

TO-3PH PACKAGE

基本尺寸



Symbol	单位 mm		
	Min	Nom	Max
A	5.35	5.55	5.75
A1	2.80	3.00	3.20
A2	1.90	2.10	2.30
A3	1.00	1.20	1.40
b	0.80	0.90	1.00
b1	1.80	2.00	2.20
b2	1.80	2.00	2.20
c	0.70	0.90	1.10
e	5.25	5.45	5.65
E	15.2	15.4	15.6
E1	9.80	10.0	10.2
E2	3.80	4.00	4.20
H	24.3	24.5	24.7
H1	9.80	10.0	10.2
H2	14.3	14.5	14.7
H3	18.5	19.0	19.5
H4	2.00	2.20	2.40
H5	24.0	24.5	25.0
G	4.3	4.5	4.7
ΦP	3.30	3.50	3.70

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