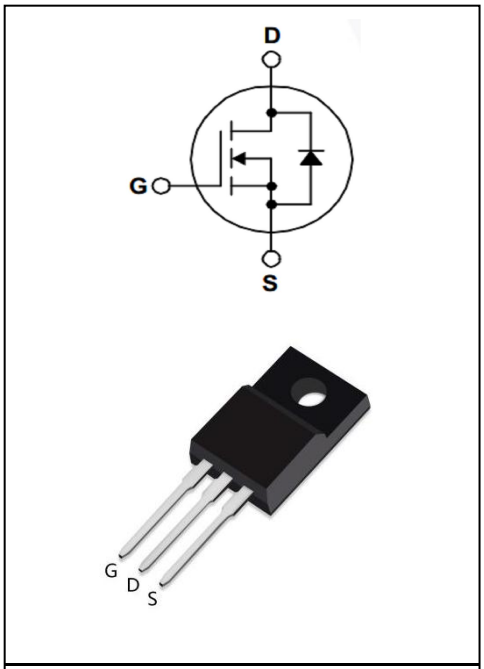
Thunder High Power Products

Silicon N-Channel Planar Power MOSFET

Description

The TH5N100PF utilizes the latest processing techniques to achieve low on-resistance per silicon area. Additional features of this MOSFET are 150℃ 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.



THUNDER TO-220F

General Features

- V_{DS}=1000V,I_D=5A
- Low ON Resistance,$R_{DS(ON)}$ =2.2Ω@V_{GS}=10V,I_D=2.5A
- Low reverse transfer capacitance
- Low Qg for fast response
- Short fall & rise times for fast switching
- 100% single pulse avalanche energy Test

Application

- Power switching application
- Digital amplifier
- Adapter and charger

Product Summary

V_{DS}	1000V
$R_{DS(on)}$	2.2Ω
I_D	5A

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	1000	V
Continuous drain current T_C = 25°C (Silicon limit)	I_D	5	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	I_{DM}	20	A
Avalanche energy, single pulse (L=10mH, Rg=25Ω)	E_{AS}	450	mJ
Gate-Source voltage	V_{GS}	±30	V
Power dissipation (T_C = 25°C)	P_D	125	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}	1.0	℃/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	62	

Electrical Characteristic (at Tj = 25 °C, unless otherwise specified)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Static Characteristic						
Drain-source breakdown voltage	BV_{DSS}	1000	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	3.0	-	5.0	V	V_{DS}=V_{GS}, I_D=250uA
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	V_{DS}=1000V, V_{GS}=0V T_j=25℃
		-	-	10	μA	V_{DS}=800V, V_{GS}=0V T_j=125℃
Gate-source leakage current	I_{GSS}	-	-	±100	nA	V_{GS}=±30V, V_{DS}=0V
Drain-source on-state resistance	$R_{DS(on)}$	-	2.2	2.5	mΩ	V_{GS}=10V, I_D=2.5A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	1470	-	pF	V_{GS}=0V, V_{DS}=25V f=1MHz
Output Capacitance	C_{oss}	-	21	-		
Reverse Transfer Capacitance	C_{rss}	-	115	-		
Gate Total Charge	Q_g	-	36	-	nC	V_{GS}=10V, V_{DS}=800V I_D=5A
Gate-Source charge	Q_{gs}	-	7.5	-		
Gate-Drain charge	Q_{gd}	-	14	-		
Turn-on delay time	$t_{d(on)}$	-	20	-	ns	V_{DD}=500V, I_D=5A R_G=25Ω
Rise time	t_r	-	23	-		
Turn-off delay time	$t_{d(off)}$	-	28	-		
Fall time	t_f	-	26	-		

Body Diode Characteristic

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	-	1.5	V	V_{GS}=0V, I_{DS}=5A
Body Diode Continuous Forward Current	I_S	-	-	5	A	T_C=25°C
Body Diode Reverse Recovery Time	t_{rr}	-	320	-	ns	T_C=25°C, I_S=5A di/dt=100A/us
Body Diode Reverse Recovery Charge	Q_{rr}	-	1	-	μC	

Typical Performance Characteristics

Fig 1: Output Characteristics

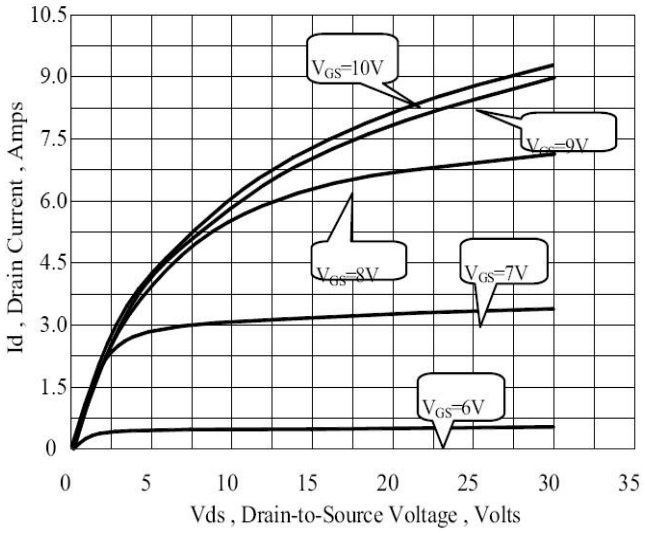


Fig 2: Transfer Characteristics

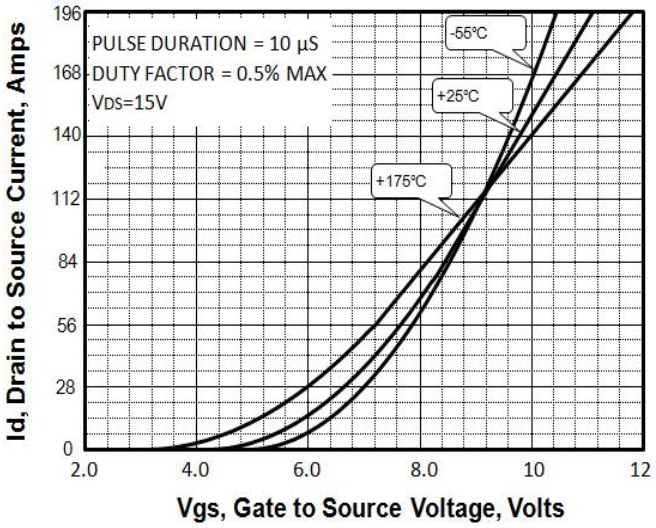


Fig 3: Rds(on) vs. Temperature

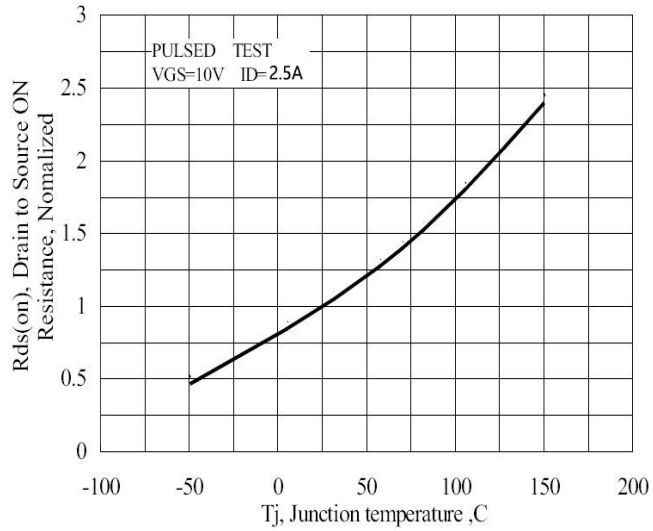


Fig 4: Capacitance Characteristics

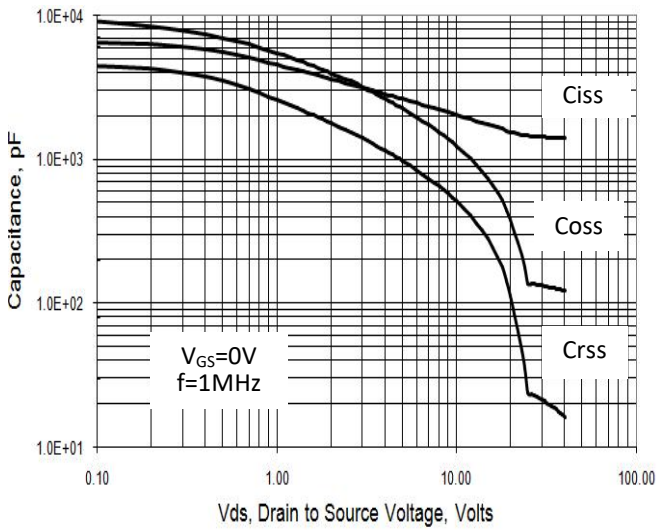


Fig 5: Gate Charge Characteristics

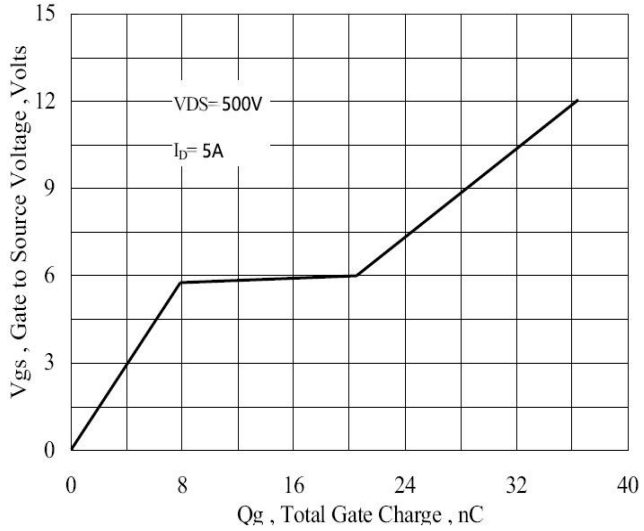


Fig 6: Body Diode Transfer Characteristics

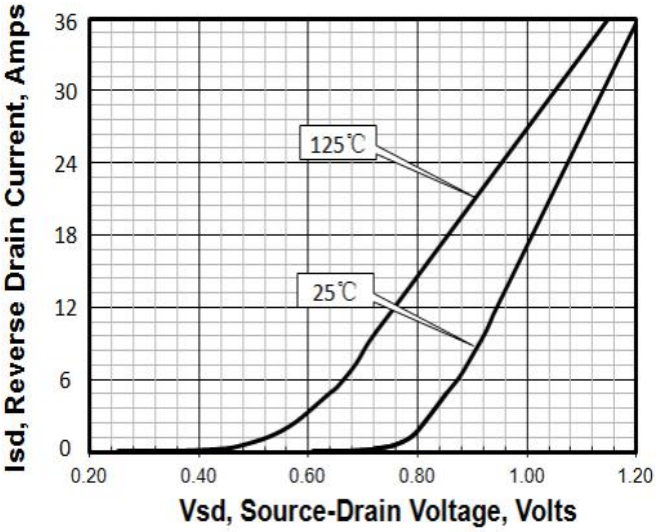


Fig 7: Power Dissipation

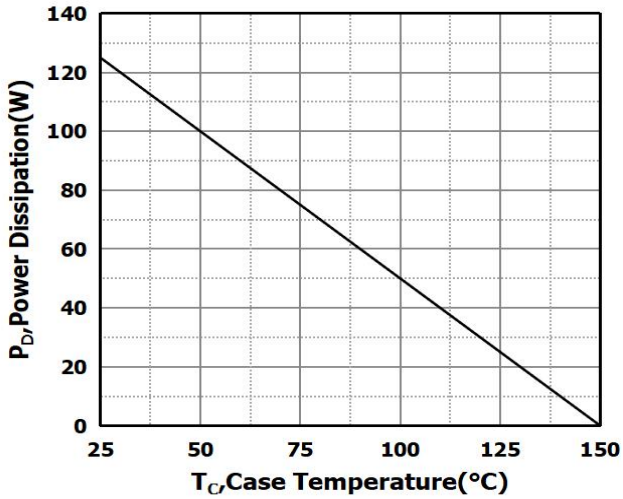


Fig 8: Drain Current Derating

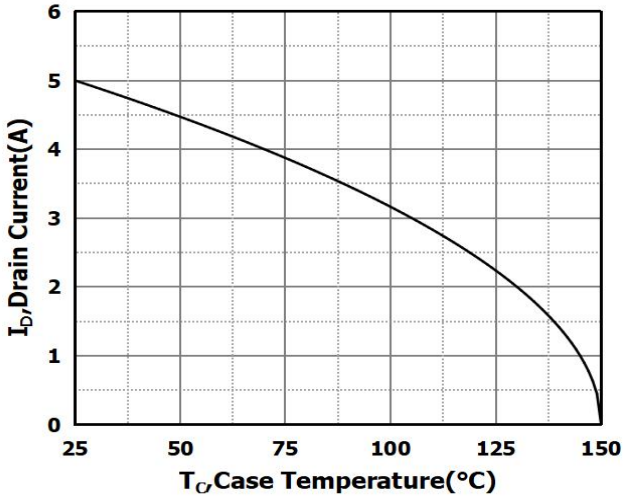


Fig 9: Safe Operating Area

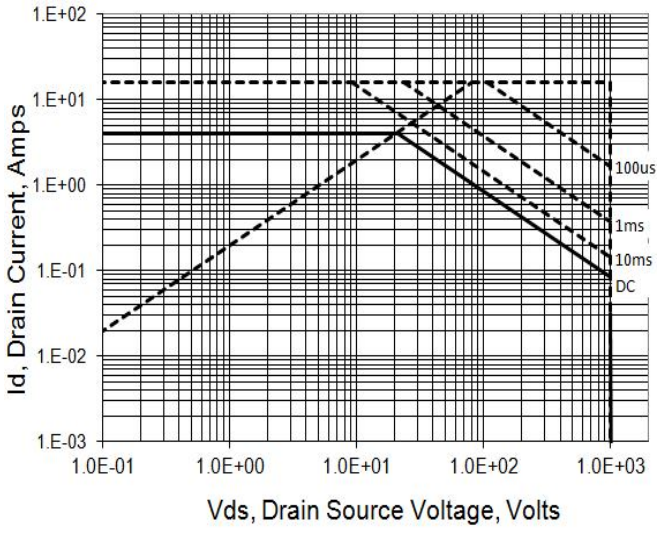


Fig 10: Drain to Source ON Resistance vs Drain Current

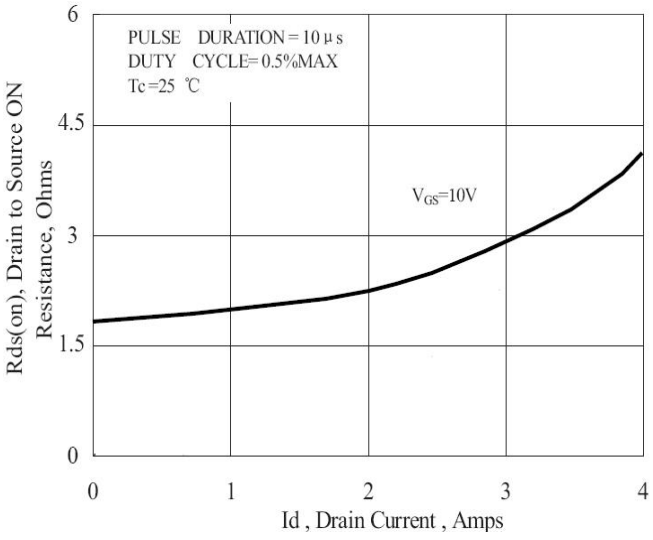
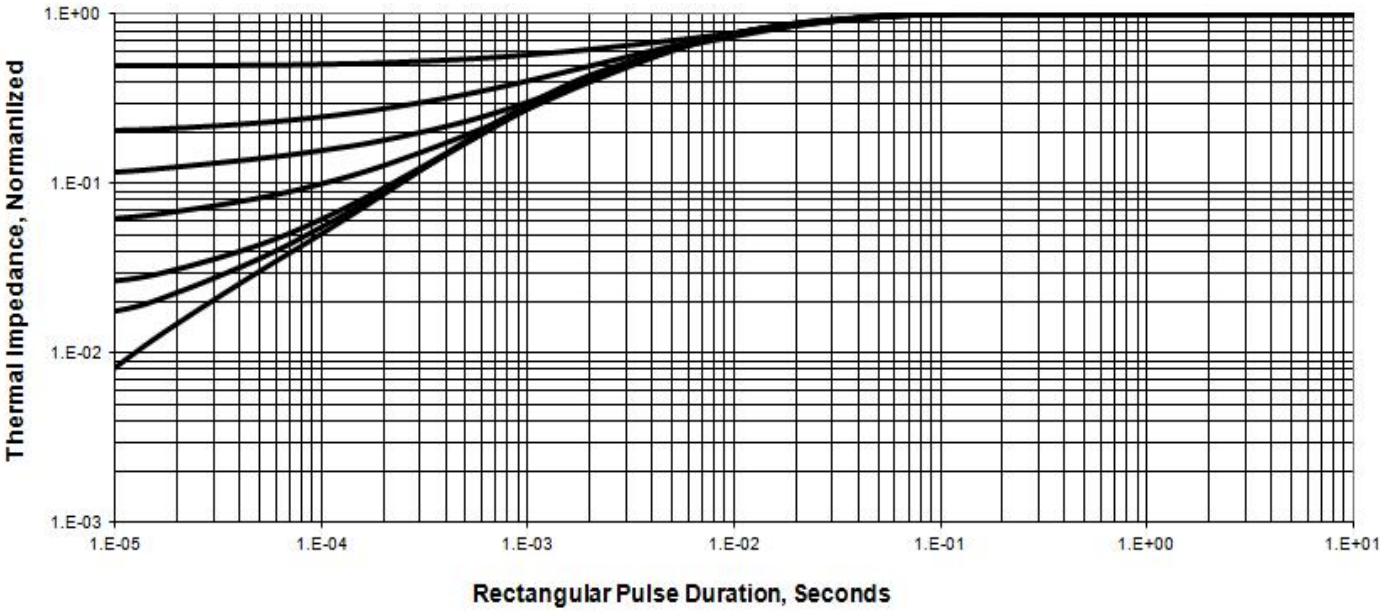
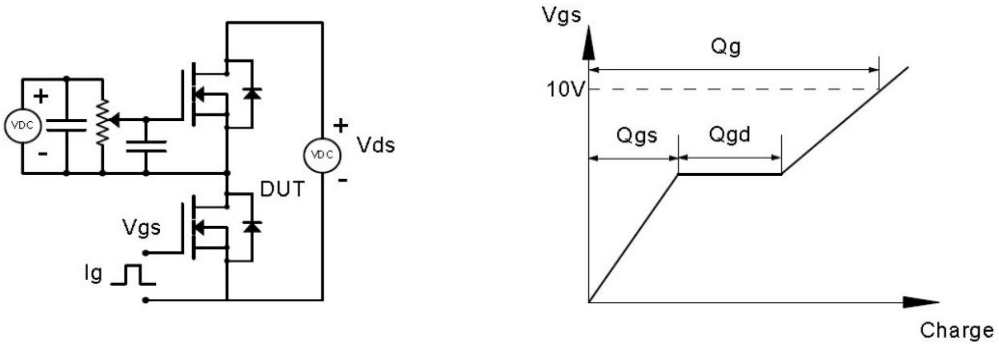


Fig 11:Transient Thermal Response Curve

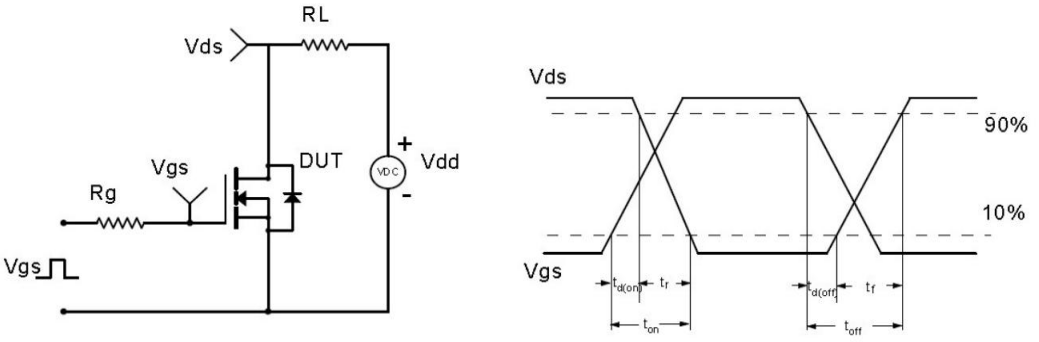


Test Circuit & Waveform

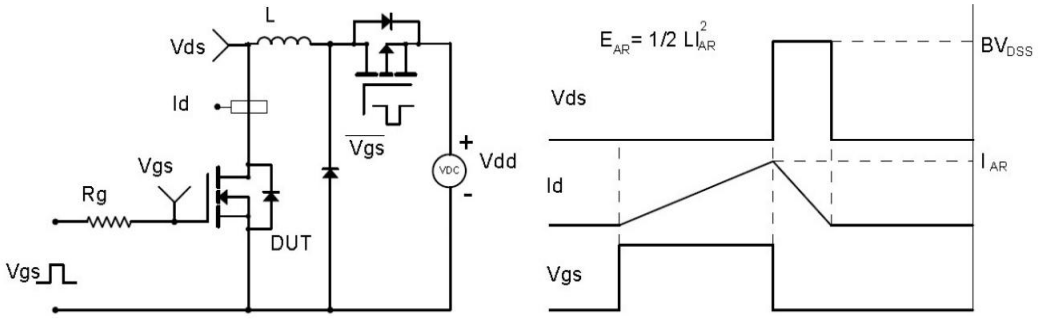
Gate Charge Test Circuit & Waveform



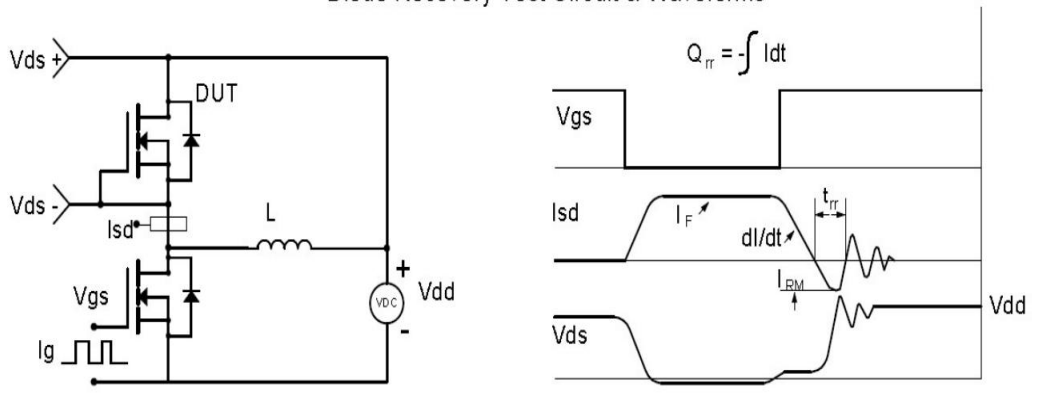
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

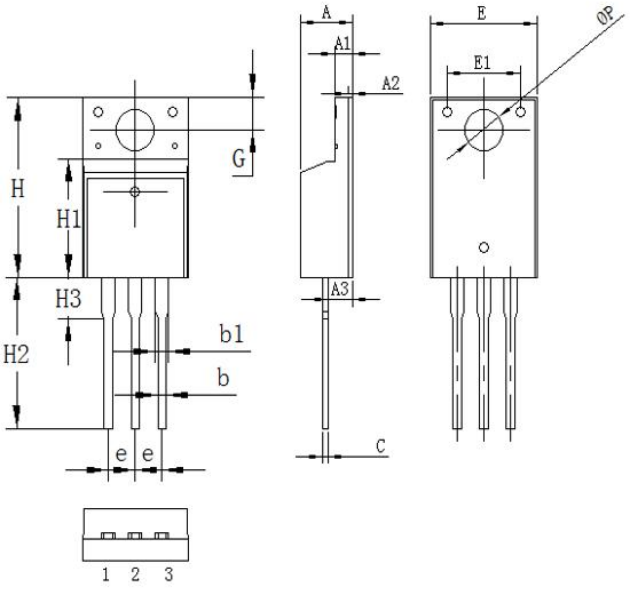


Diode Recovery Test Circuit & Waveforms



Package Information

TO-220F PACKAGE



基本尺寸

Symbol	单位 mm		
	Min	Nom	Max
A	4.55	4.75	4.95
A1	2.40	2.60	2.80
A2	0.40	0.60	0.80
A3	2.10	2.30	2.50
b1	1.10	1.30	1.50
b	0.60	0.80	1.00
c	0.42	0.50	0.58
e	2.30	2.50	2.70
E	9.9	10.1	10.3
E1	6.8	7	7.2
H	15.8	16.0	16.2
H1	9.10	9.30	9.50
H2	12.5	13.0	13.5
H3	3.10	3.30	3.50
G	3.00	3.20	3.40
ΦP	3.00	3.20	3.40

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