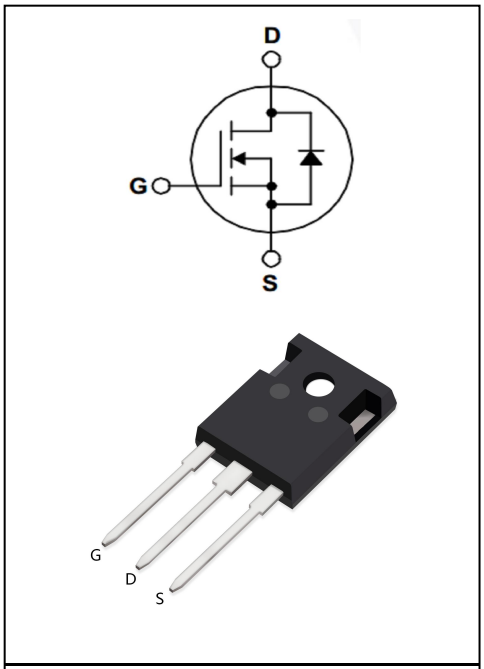
Thunder High Power Products

Silicon N-Channel Planar Power MOSFET

Description

The TH90N20PK 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-247

General Features

- V_{DS}=200V,I_D=90A
- Low ON Resistance,$R_{DS(ON)}$ =25mΩ@V_{GS}=10V,I_D=45A
- 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}	200V
$R_{DS(on)}$	25mΩ
I_D	90A

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	200	V
Continuous drain current T_C = 25°C (Silicon limit)	I_D	90	A
Pulsed drain current (T_C = 25°C, t_p limited by T_{jmax})	I_{DM}	360	A
Avalanche energy, single pulse (L=10mH, Rg=25Ω)	E_{AS}	2488	mJ
Gate-Source voltage	V_{GS}	±30	V
Power dissipation (T_C = 25°C)	P_D	695	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}	0.18	℃/W
Thermal resistance, junction – ambient(min. footprint)	R_{thJA}	40	

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}	200	-	-	V	V_{GS}=0V, I_D=250uA
Gate threshold voltage	$V_{GS(th)}$	2.0	-	4.0	V	V_{DS}=V_{GS}, I_D=250uA
Zero gate voltage drain current	I_{DSS}	-	-	1	μA	V_{DS}=200V, V_{GS}=0V T_j=25℃
		-	-	10	μA	V_{DS}=160V, 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	$R_{DS(on)}$	-	25	30	mΩ	V_{GS}=10V, I_D=45A
Transconductance	g_{fs}	39	-	-	S	V_{DS}=40V, I_D=45A
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	6920	-	pF	V_{GS}=0V, V_{DS}=25V, f=1MHz
Output Capacitance	C_{oss}	-	727	-		
Reverse Transfer Capacitance	C_{rss}	-	51	-		
Gate Total Charge	Q_g	-	185	-	nC	V_{GS}=10V, V_{DS}=160V, I_D=90A
Gate-Source charge	Q_{gs}	-	50	-		
Gate-Drain charge	Q_{gd}	-	85	-		
Turn-on delay time	$t_{d(on)}$	-	25	-	ns	V_{DD}=100V, I_D=90A, R_G=25Ω
Rise time	t_r	-	155	-		
Turn-off delay time	$t_{d(off)}$	-	40	-		
Fall time	t_f	-	75	-		
Gate resistance	R_G	-	387	-	mΩ	V_{GS}=0V, V_{DS}=0V, f=1MHz

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}=90A
Body Diode Continuous Forward Current	I_S	-	-	90	A	T_C=25°C
Body Diode Reverse Recovery Time	t_{rr}	-	225	-	ns	T_C=25°C, I_S=90A, di/dt=100A/us
Body Diode Reverse Recovery Charge	Q_{rr}	-	1.8	-	μC	

Typical Performance Characteristics

Fig 1: Typical Output Characteristics

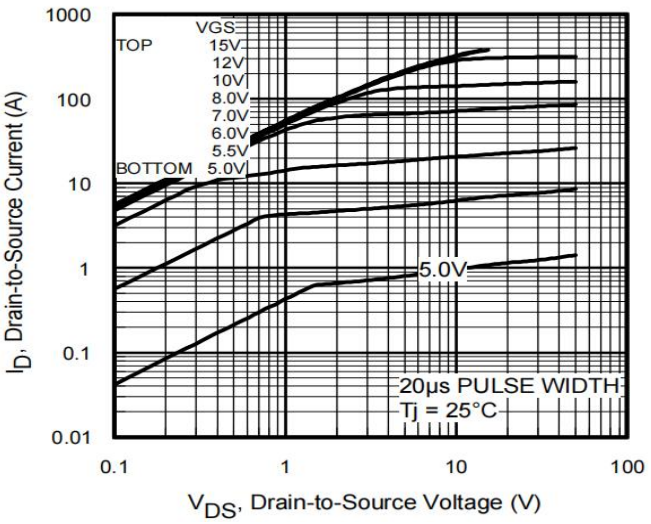


Fig 2: Typical Output Characteristics

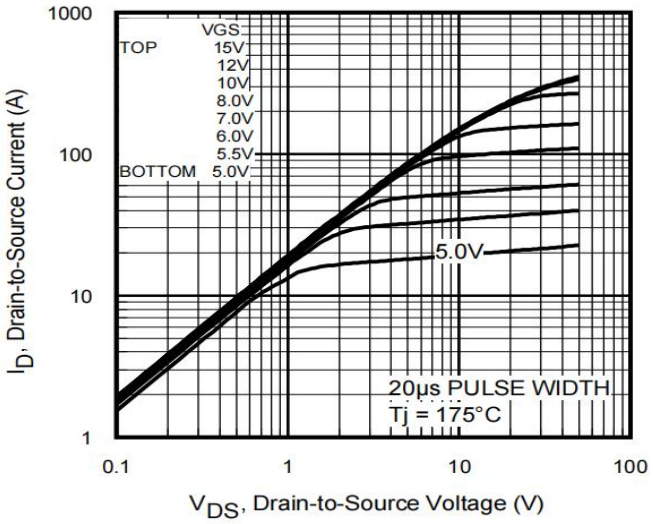


Fig 3: Typical Transfer Characteristics

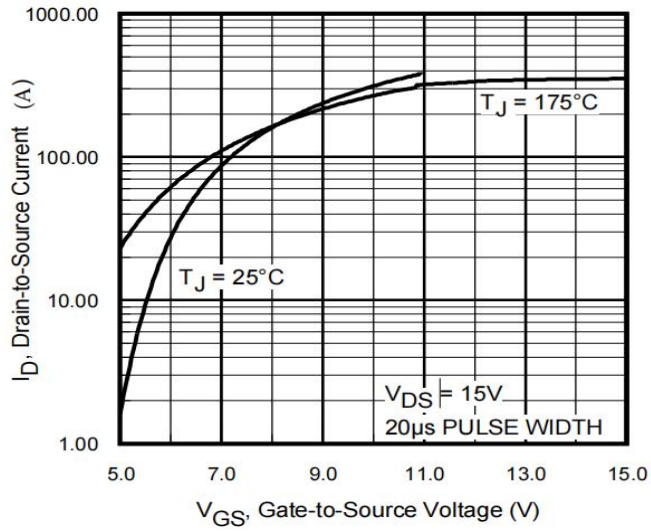


Fig 4: Normalized On-Resistance vs. Temperature

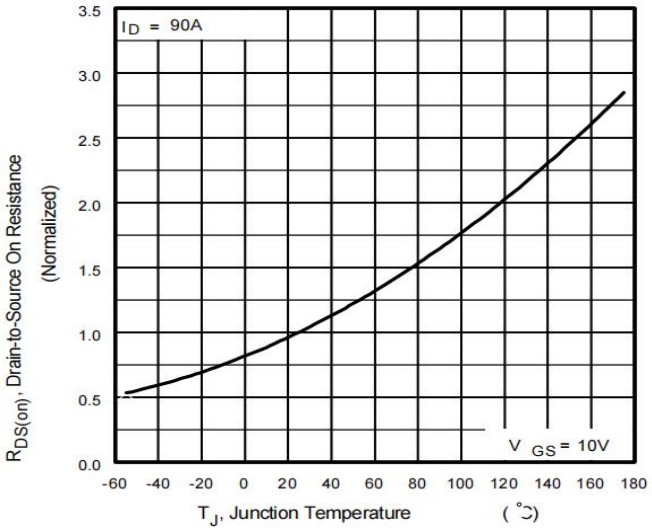


Fig 5: Typical Gate Charge vs. Gate-to-Source Voltage

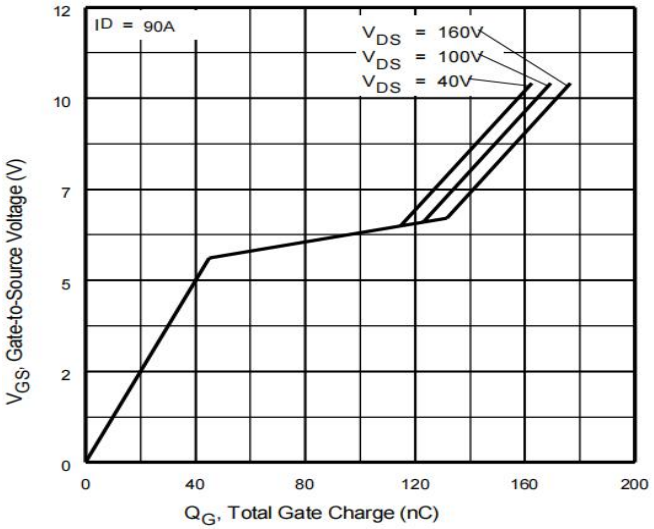


Fig 6: Capacitance Characteristics

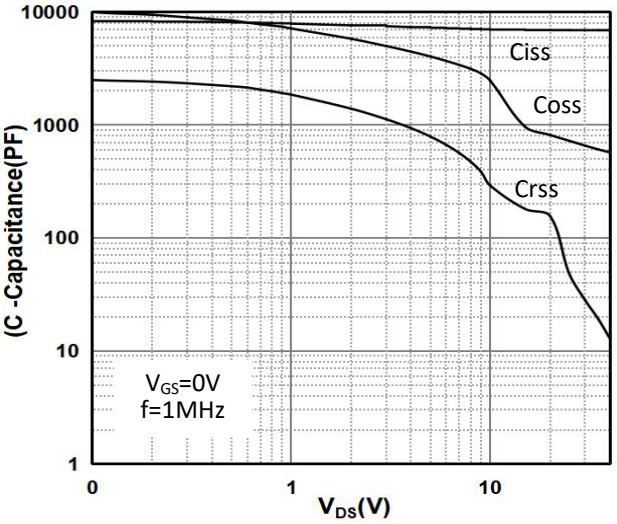


Fig 7: Power Dissipation

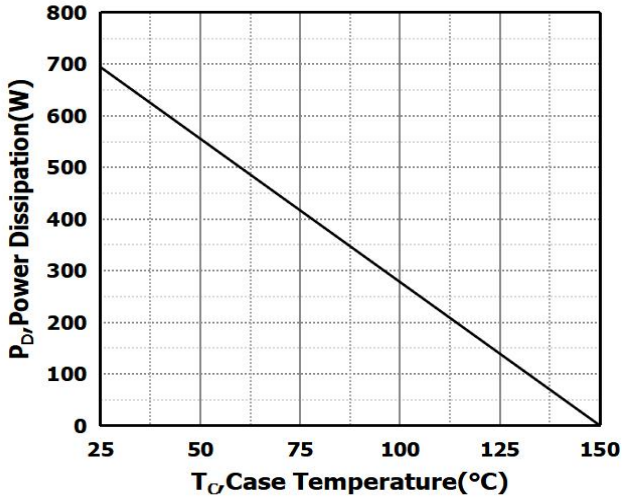


Fig 8: Drain Current Derating

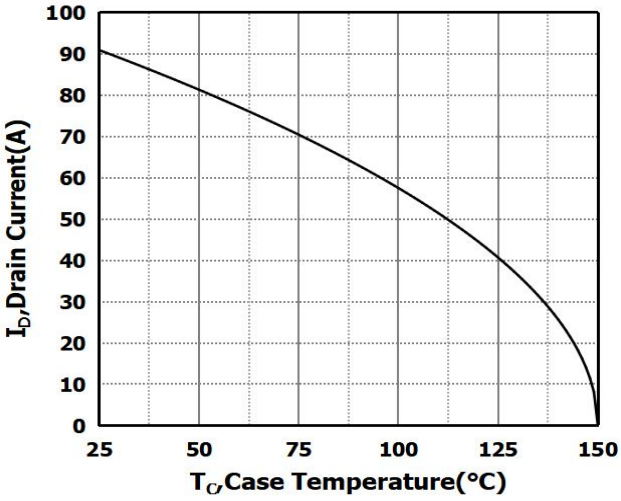


Fig 9: Typical Source-Drain Diode Forward Voltage

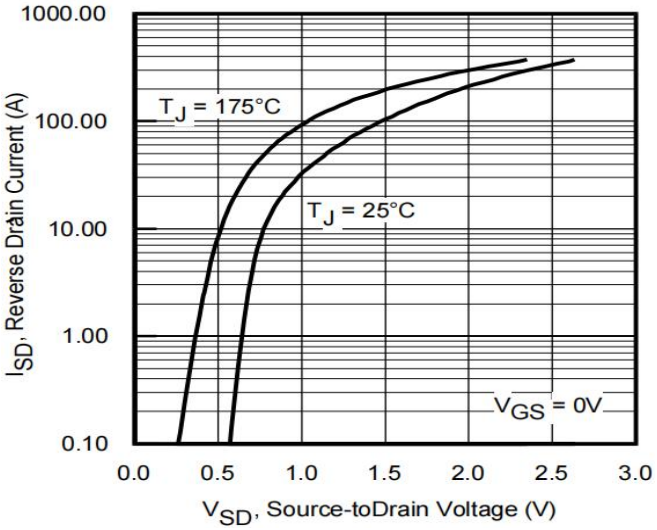


Fig 10: Safe Operating Area

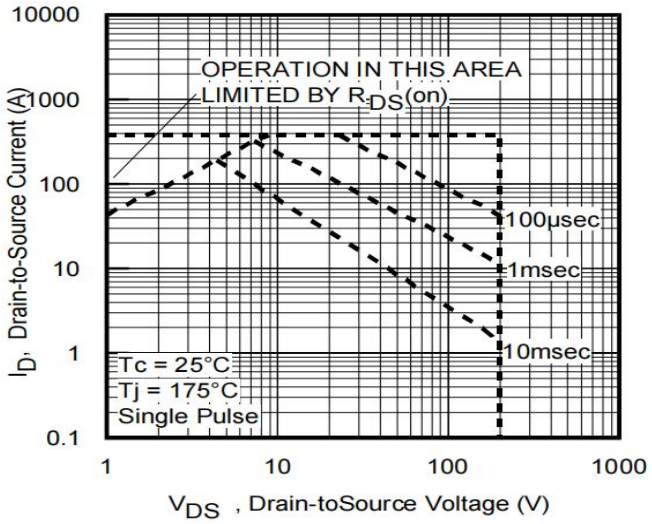
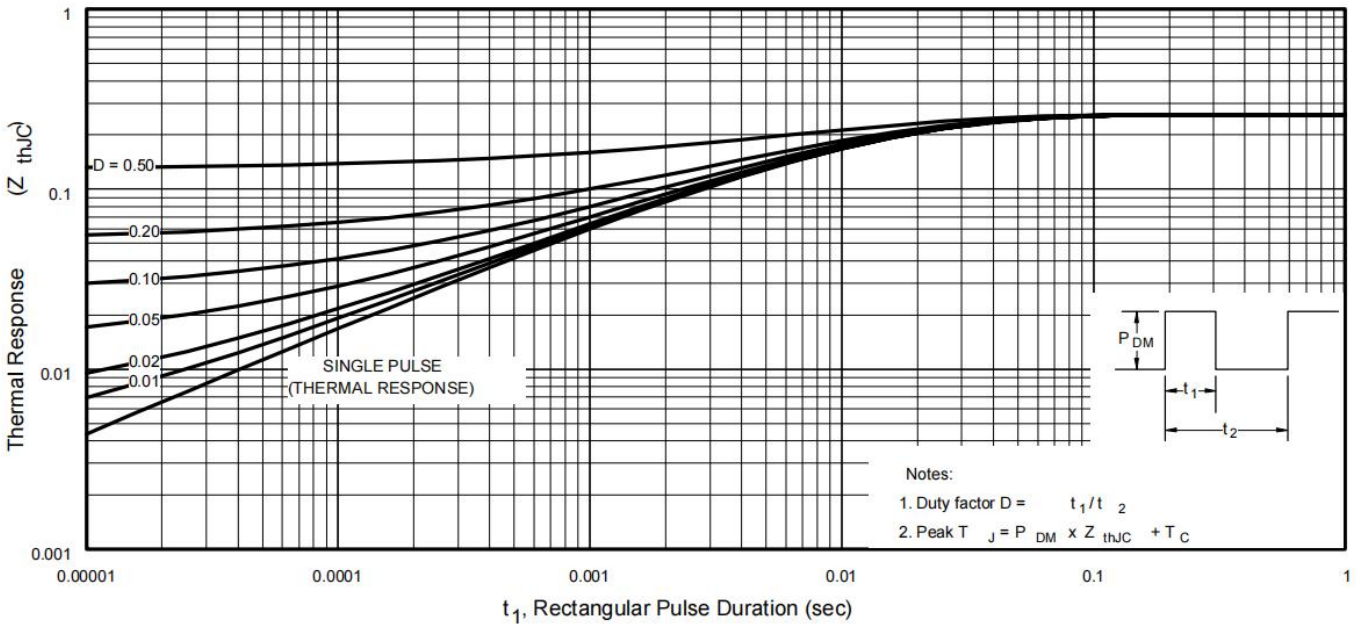
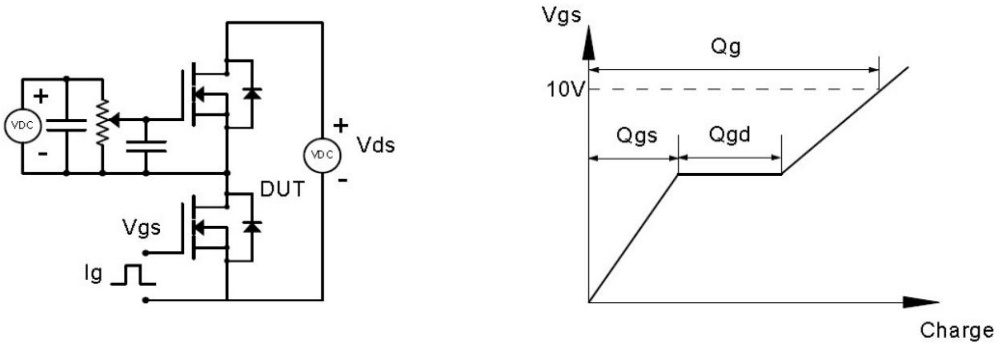


Fig 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

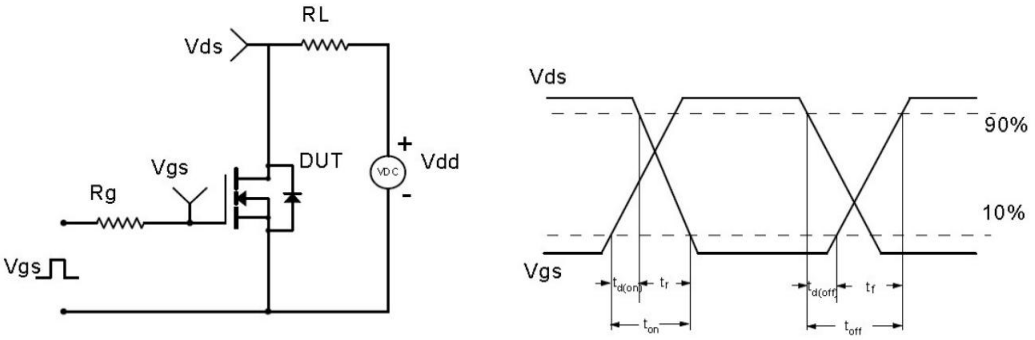


Test Circuit & Waveform

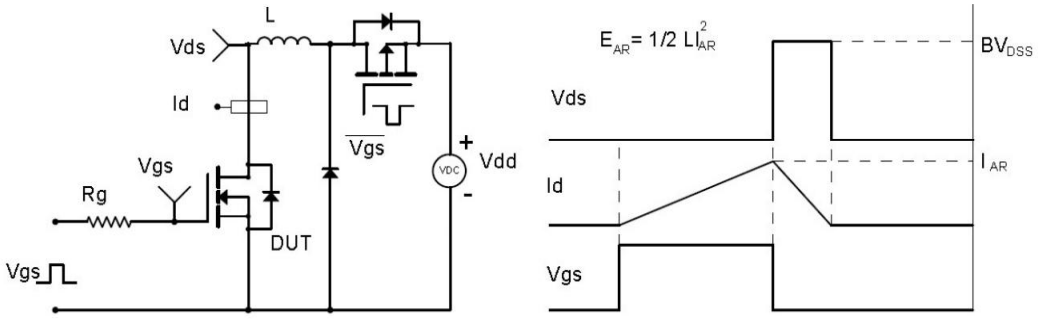
Gate Charge Test Circuit & Waveform



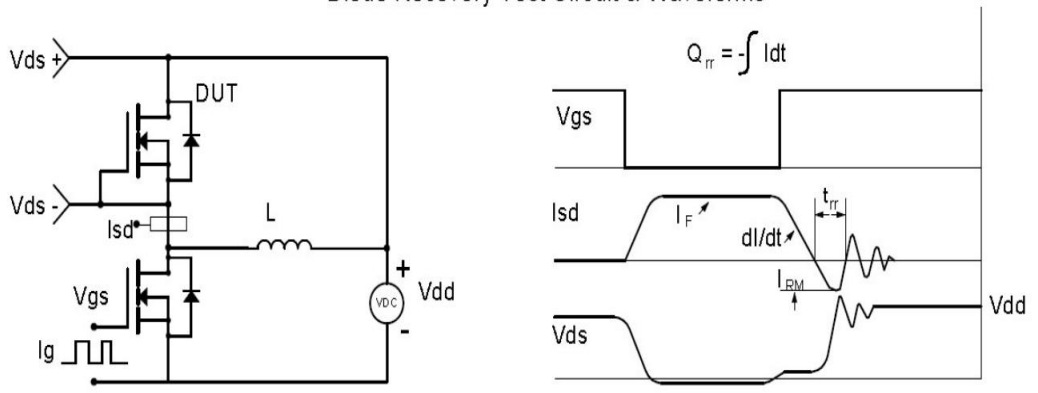
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

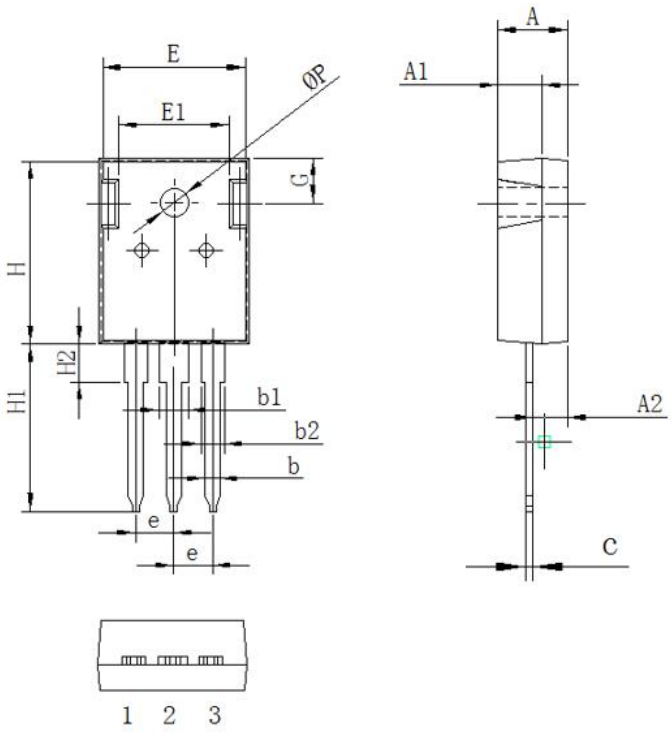


Diode Recovery Test Circuit & Waveforms



Package Information

TO-247 PACKAGE



基本尺寸

Symbol	单位 mm		
	Min	Nom	Max
A	4.8	5.00	5.20
A1	3.3	3.5	3.7
A2	2.20	2.40	2.60
b	1.00	1.2	1.40
b1	2.90	3.10	3.30
b2	1.90	2.10	2.30
c	0.50	0.60	0.70
e	5.25	5.45	5.65
E	15.2	15.7	16.2
E1	10.2	10.7	11.2
H	20.8	21	21.2
H1	19.5	20.0	20.5
H2	4.00	4.20	4.40
G	5.60	5.80	600
ΦP	3.50	3.70	3.90

Notice

Thunder Microelectronics Incorporated Limited reserves the right to make changes without further notice to any products or specifications herein. When use the product, be sure to obtain the latest specification.

Thunder Microelectronics Incorporated Limited does not assume any liability arising out of the application or any product described herein. When using Thunder Microelectronics Incorporated Limited products in your equipment, you are requested to take adequate safety measures to prevent the equipment from causing a physical injury ,fire or other problem if any of the products become faulty.

-Headquarters

WuXi Thunder Microelectronics Incorporated Limited

Building E1-901, No.200 LingHu Road, XinWu district,WuXi,China 214135

Tel:+86-510-85160109 Fax:+86-510-85160109