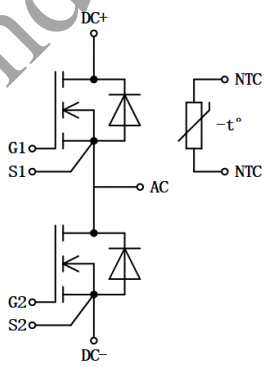
SiC Half-Bridge Module
PA220HB450HM

Features

- Silicon Carbide MOSFET
- Low RDSon
- Low Switching Losses

Applications



- EV Chargers
- Industrial Automation & Testing
- Solar

Standards Benefits

- Improve System Efficiency
- Increase Power Density
- Reduce Heat Sink Requirement
- Reduce System Cost

Order Information

Part Number	Package	Marking
PA220HB450HM	ED3	PA220HB450HM

PNJunction Semiconductor

Contents

Features 1
Applications 1
Standards Benefits 1
Order Information 1
Contents 2
1. Maximum Ratings 3
2. Electrical Characteristics 4
3. Typical Performance-Reverse Diode 6
4. NTC Thermistor Characteristics 7
5. Typical Performance 8
6. Package Outlines 10

PNJunction Semiconductor

1. Maximum Ratings

At T_J= 25℃, unless specified otherwise

Parameter	Symbol	Value	Unit	Test Conditions
Drain - Source Voltage	V_{DS}	2200	V	
Gate - Source Voltage (Dynamic)	V_{GSmax}	-8 / +21	V	AC (f >1Hz)
Gate - Source Voltage(static) turn-on gate voltage turn-off gate voltage	$V_{GS,on}$ $V_{GS,off}$	+15/+18 -3	V	Static
Continuous Drain Current	I_D	600 450	A	V_{GS} =18V T_c = 25℃ T_c = 60℃
Power Dissipation	P_D	1984	W	T_F = 25℃
Operating Junction Temperature	T_J	-55 To +150	℃	

PNJunction Semiconductor

2. Electrical Characteristics

At T_J= 25℃, unless specified otherwise (Per Position)

Parameter	Symbol	Value			Unit	Test Conditions
		Min.	Typ.	Max.		
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	2200	/	/	V	V_{GS}= -3V I_D= 8mA
Gate Threshold Voltage	$V_{GS(th)}$	/	3.2	/	V	V_{DS}= V_{GS} I_D= 100mA T_J= 25℃
Reverse Bias Drain Current	I_{DSS}	/	10	100	μA	V_{GS}= 0V V_{DS}= 2200V
Reverse Bias Drain Current	I_{DSS}	/	10	100	μA	V_{GS}= -3V V_{DS}= 2200V
Gate-Source Leakage Current	I_{GSS}	/	1	100	nA	V_{GS}= 18V V_{DS}= 0V
Drain-Source On-State Resistance	$R_{DS(on)}$	/	3.8	/	mΩ	V_{GS}= 18V I_D= 350A T_J= 25℃
		/	6.3	/		V_{GS}= 18V I_D= 350A T_J= 125℃
		/	8.4	10		V_{GS}= 18V I_D= 350A T_J= 150℃
Internal Gate Resistance	$R_{G(int)}$	/	1.4	/	Ω	f= 250kHz V_{AC}= 25mV
Input Capacitance	C_{iss}	/	58	/	nF	V_{GS}= 0V V_{DS}= 1500V f= 100kHz V_{AC}= 25mV
Output Capacitance	C_{oss}	/	3.3	/	nF	

PNJunction Semiconductor

Parameter	Symbol	Value			Unit	Test Conditions
		Min.	Typ.	Max.		
Reverse Transfer Capacitance	C_{rss}	/	185	/	pF	
Gate to Source Charge	Q_{gs}	/	784	/	nC	V_{DS}= 1500V I_{DS}= 450A V_{GS}= -3 to 18V
Gate to Drain Charge	Q_{gd}	/	398	/		
Total Gate Charge	Q_g	/	1876	/		
Coss Stored Energy	E_{oss}	/	1280	/	μJ	V_{DS}= 1500V f= 100kHz
Thermal Resistance from Junction to Heatsink	$R_{\theta J-S}$	/	0.063	/	℃/W	

PNJunction Semiconductor

3. Typical Performance-Reverse Diode

At T_J= 25℃, unless specified otherwise

Parameter	Symbol	Values			Unit	Test condition
		Min.	Typ.	Max.		
Forward Voltage	V_F	/	6.9	/	V	I_F= 300A, T_J= 25℃
			6.6	/		I_F= 300A, T_J= 150℃

PNJunction Semiconductor

4. NTC Thermistor Characteristics

Parameter	Symbol	Value			Unit	Test Conditions
		Min.	Typ.	Max.		
Rated Resistance	R_{NTC}	/	5	/	kΩ	T_{NTC}= 25℃
Resistance Tolerance	△R/R	-5	/	5	%	T_{NTC}= 25℃
B-value	$B_{25/50}$	/	3380	/	K	T_2= 50℃
B-value	$B_{25/85}$	/	3435	/	K	T_2= 80℃
B-value	$B_{25/100}$	/	3485	/	K	T_2= 100℃
Power Dissipation	P_{NTC}	/	/	10	mW	T_{NTC}= 25℃

PNJunction Semiconductor

5. Typical Performance

At T_J= 25℃, unless specified otherwise (Per Position)

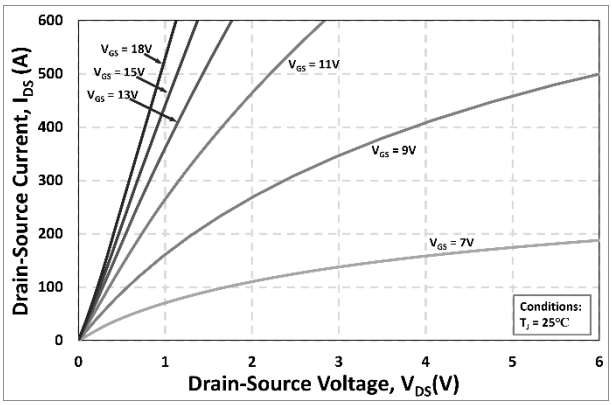


Figure 1. Output Characteristics T_J = 25℃

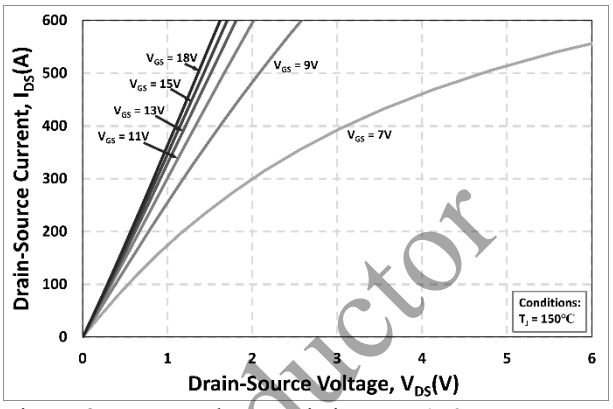


Figure 2. Output Characteristics T_J = 150℃

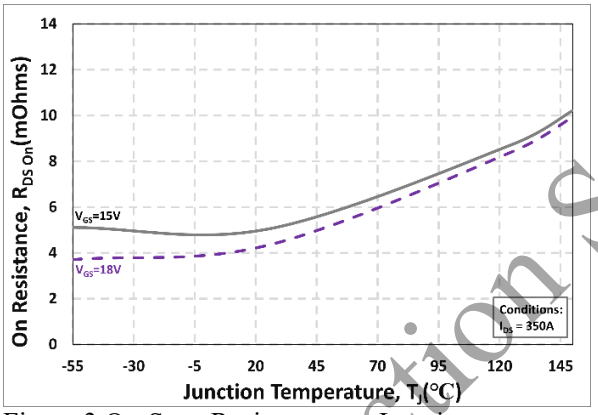


Figure 3.On-State Resistance vs. Junction Temperature

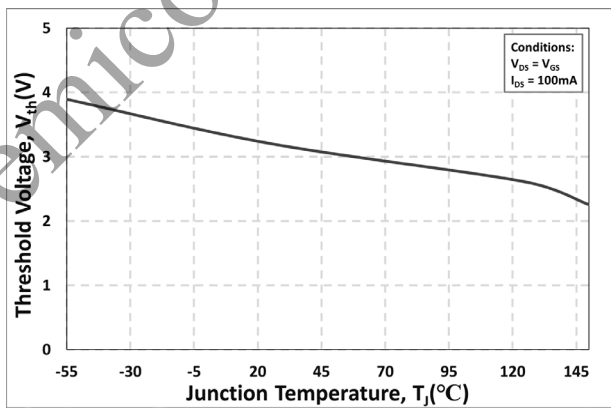


Figure 4. Threshold Voltage vs. Junction Temperature

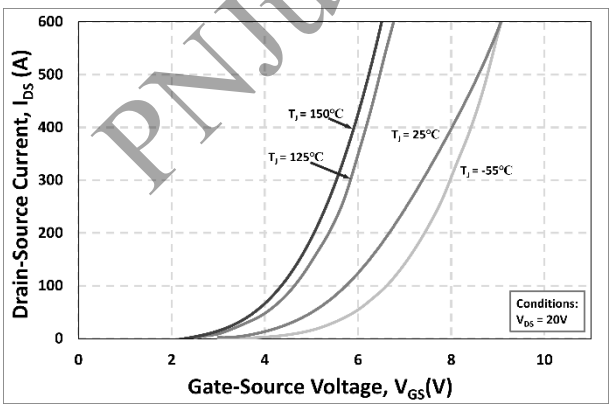


Figure 5. Transfer Characteristic for Various Junction Temperatures

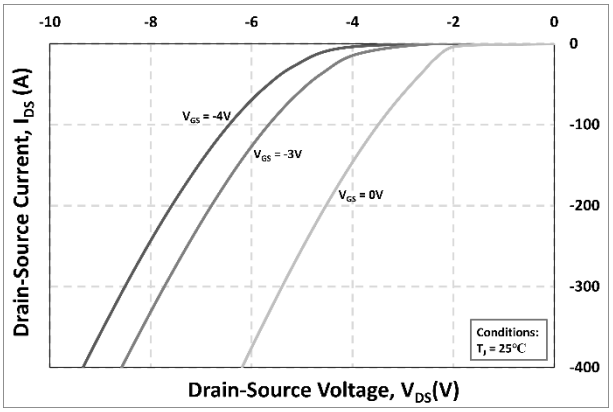


Figure 6. Body Diode Characteristic at 25°C

PNJunction Semiconductor

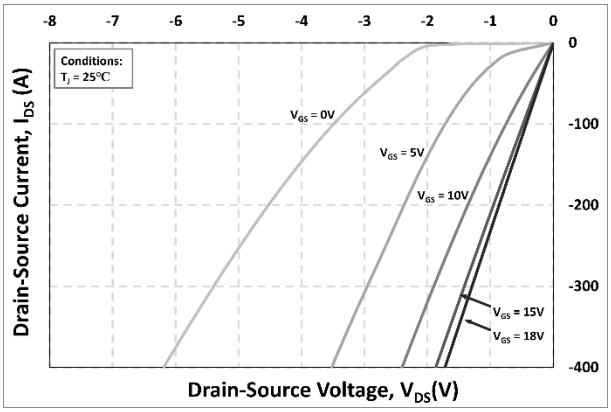


Figure 7. 3rd Quadrant Characteristic at 25°C

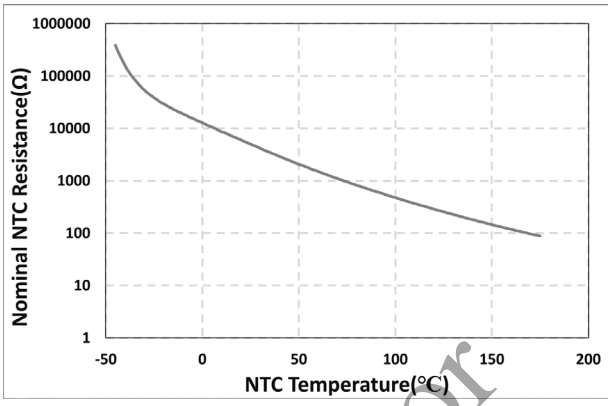


Figure 8. Nominal NTC Resistance vs. NTC Temperature

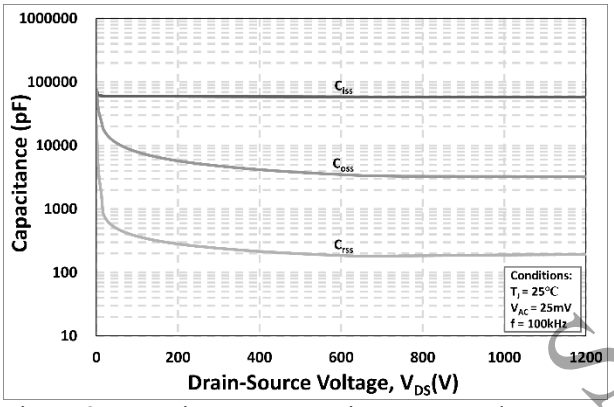


Figure 9. Capacitances vs. Drain-Source Voltage

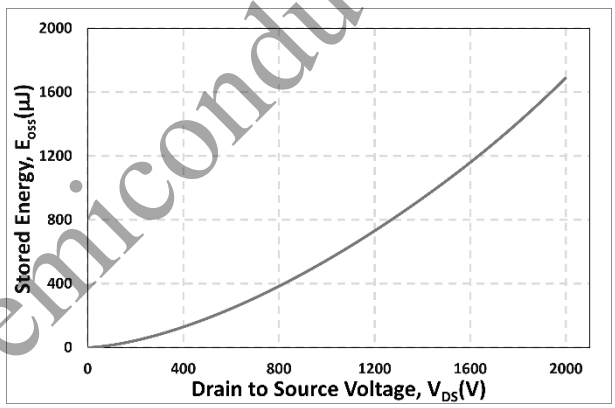
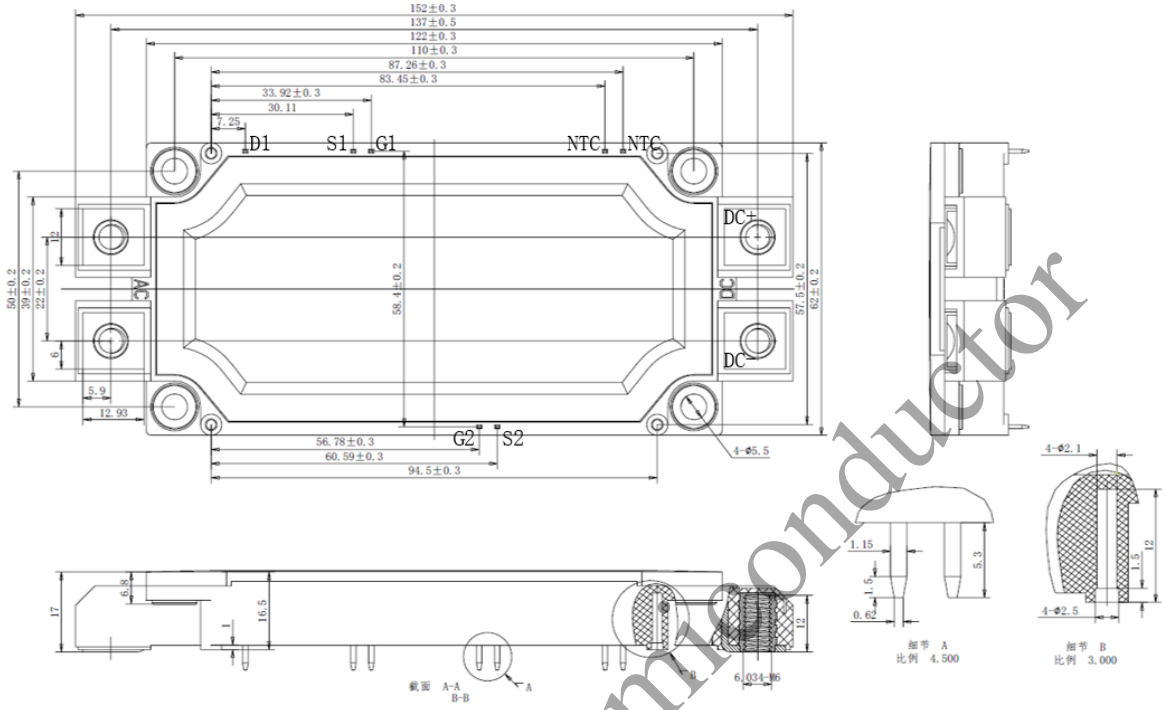


Figure 10. Output Capacitor Stored Energy

PNJunction Semiconductor

6. Package Outlines



Drawing and Dimensions

PNJunction Semiconductor

Important Notice

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, PN Junction hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

PN Junction reserves the right to make changes at any time to any products or information herein, without notice. “Typical” parameters which may be provided in PN Junction data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including “Typical” must be validated for each customer application by customer’s technical experts.

In addition, any information given in this document is subject to customer’s compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer’s products and any use of the product of PN Junction in customer’s applications. The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer’s technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

For further information on the product, technology, delivery terms and conditions and prices please contact your nearest PN Junction office (www.pnjsemi.com).

PN Junction Semiconductor

Warnings

Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest PN Junction office.

Except as otherwise explicitly approved by PN Junction in a written document signed by authorized representatives of PN Junction, PN Junction’s products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.

Copyright © PN Junction Semiconductor Co., Ltd.
All Rights Reserved.