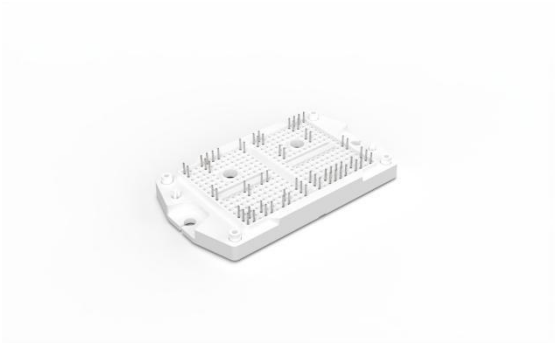
合肥中恒微半导体有限公司
HeFei Cpower Technology,Ltd.
TLW225M120S1P

➢ 产品外观 / Appearance

Preliminary



V_{CES} = 1200V

$I_{C\ nom}$ = 225A / I_{CRM} = 450A

➢ 特性 / Features

a) Neutral Point Clamped Three−Level Inverter Module

b) Low switching losses

c) Low Inductive Layout

d) Integrated NTC temperature sensor

➢ 用途 / Applications

a) Solar Inverters

b) Energy Storage System

c) 3-Level-Applications

➢ 相关信息 / Related Information

条形码 / Barcode Code

二维码 / DMX – Code

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IGBT (Q1, Q4)

最大额定值/Maximum Rated Values

集电极-发射极电压 Collector–Emitter voltage	T_J=25℃	V_{CES}	1200	V
连续集电极直流电流 Continuous DC collector current	T_C = 100℃, T_j max = 175℃	$I_{c\ nom}$	225	A
集电极重复峰值电流 Repetitive peak collector current	T_P=1ms	I_{CRM}	450	A
栅极-发射极峰值电压 Gate-emitter peak voltage		V_{GES}	+/-30	V

电特性/Electrical Characteristics (T_J = 25℃ unless otherwise noted)

Parameter	Test Conditions		Symbol	Min	Typ	Max	Unit
Outer IGBT (Q1, Q4)							
集电极-发射极饱和电压 Collector–Emitter Saturation Voltage	V_{GE} = 15 V, I_C = 225A	T_J = 25℃ T_J = 125℃ T_J = 150℃	$V_{CE(sat)}$		2.11 2.76 2.89		V
栅极-发射极阈值电压 Gate–Emitter Threshold Voltage	V_{GE} = V_{CE} , I_C = 7.8 mA		$V_{GE(th)}$		5.75		V
内部栅极电阻 Internal gate resistor	Tj = 25℃		R_{Gint}		NONE		Ω
输入电容 Input Capacitance	V_{CE} = 25 V V_{GE} = 0 V f = 1 MHz		C_{ies}		7700		pF
输出电容 Output Capacitance			C_{res}		130		
集电极-发射极截止电流 Collector–Emitter Cut-off Current	V_{GE} = 0 V, V_{CE} = 1200 V		I_{CES}			1.0	mA
栅极峰值电流 Gate Leakage Current	V_{GE} = 20 V, V_{CE} = 0 V		I_{GES}			500	nA
开通延迟时间 Turn–on Delay Time	V_{CE} = 600 V, I_C = 225 A, V_{GE} =±15 V, R_G= 10Ω	T_J = 25℃ T_J = 125℃ T_J = 150℃	$t_{d(on)}$		215 175 170		ns
上升时间 Rise Time		T_J = 25℃ T_J = 125℃ T_J = 150℃	t_r		180 180 185		
关断延迟时间 Turn–off Delay Time		T_J = 25℃ T_J = 125℃ T_J = 150℃	$t_{d(off)}$		435 460 460		
下降时间 Fall Time		T_J = 25℃ T_J = 125℃ T_J = 150℃	t_f		95 115 120		
开通损耗能量 Turn–on Switching Loss per Pulse		T_J = 25℃ T_J = 125℃ T_J = 150℃	E_{on}		27.5 31.5 33.0		mJ
关断损耗能量 Turn off Switching Loss per Pulse		T_J = 25℃ T_J = 125℃ T_J = 150℃	E_{off}		9.10 10.5 11.5		

IGBT (Q1, Q4)

总栅极电荷 Total Gate Charge	V_{CE} = 600 V, I_C = 225 A, V_{GE} = ±15 V	Q_g		1155		nC
芯片 – 外壳热阻 Thermal Resistance – chip–to–case	Thermal grease, Thickness = 2 Mil ±2%, λ= 2.8 W/mK	R_{thJC}		0.13		℃/W
开关状态下温度 Temperature under switching		$T_{j\,op}$	-40		150	℃

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二极管/Diode（D1,D4,D5,D6）

最大额定值/Maximum Rated Values

反向重复峰值电压 Repetitive peak reverse voltage	T_j = 25℃	V_{RRM}	1200	V
连续正向直流电流 Continuous DC forward current		I_F	300	A
正向重复峰值电流 Repetitive peak forward current	t_p= 1 ms	I_{FRM}	600	A

反向二极管 / Inverse Diodes (D1, D4, D5, D6)

				Min.	Typ.	Max.	
二极管正向电压 Diode Forward Voltage	I_F = 300 A	T_J = 25℃ T_J = 125℃ T_J = 150℃	V_F		1.70 1.95 2.00		V
反向恢复电流 Reverse Recovery Time	V_{CE} = 600 V, I_C = 300 A, V_{GE} = ±15 V, R_G = 10Ω	T_J = 25℃ T_J = 125℃ T_J = 150℃	t_{rr}		465 688 750		ns
反向恢复电荷 Reverse Recovery Charge		T_J = 25℃ T_J = 125℃ T_J = 150℃	Q_{rr}		25.7 45.1 51.7		μC
反向恢复峰值电流 Peak Reverse Recovery Current		T_J = 25℃ T_J = 125℃ T_J = 150℃	I_{RRM}		151 176 183		A
反向恢复能量 Reverse Recovery Energy		T_J = 25℃ T_J = 125℃ T_J = 150℃	E_{rr}		7.85 15.1 17.3		mJ
芯片 – 外壳热阻 Thermal Resistance – chip–to–case	Thermal grease, Thickness = 2 Mil ±2%, λ= 2.8 W/mK		R_{thJC}		0.13		℃/W
在开关状态下温度 Temperature under switching			$T_{j\,op}$	-40		150	℃

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IGBT （Q2,Q3）

最大额定值/Maximum Rated Values

集电极-发射极电压 Collector−Emitter voltage	T_J=25℃	V_{CES}	1200	V
连续集电极直流电流 Continuous DC collector current	T_C = 100℃, T_j max = 175℃	$I_{c\ nom}$	225	A
集电极重复峰值电流 Repetitive peak collector current	T_P=1ms	I_{CRM}	450	A
栅极-发射极峰值电压 Gate-emitter peak voltage		V_{GES}	+/-30	V

电气特性 / Electrical Characteristics (T_J = 25℃ unless otherwise noted)

Parameter	Test Conditions		Symbol	Min	Typ	Max	Unit
Inner IGBT (Q2, Q3)							
集电极-发射极饱和电压 Collector−Emitter Saturation Voltage	V_{GE} = 15 V, I_C = 225A	T_J = 25℃ T_J = 125℃ T_J = 150℃	$V_{CE(sat)}$		2.11 2.76 2.89		V
栅极-发射极阈值电压 Gate−Emitter Threshold Voltage	V_{GE} = V_{CE} , I_C = 7.8 mA		$V_{GE(th)}$		5.75		V
内部栅极电阻 Internal gate resistor	Tj = 25℃		R_{Gint}		NONE		Ω
输入电容 Input Capacitance	V_{CE} = 25 V V_{GE} = 0 V f = 1 MHz		C_{ies}		7700		pF
输出电容 Output Capacitance			C_{res}		130		
集电极-发射极截止电流 Collector−Emitter Cut-off Current	V_{GE} = 0 V, V_{CE} = 1200 V		I_{CES}			1.0	mA
栅极峰值电流 Gate Leakage Current	V_{GE} = 20 V, V_{CE} = 0 V		I_{GES}			500	nA
开通延迟时间 Turn−on Delay Time	V_{CE} = 600 V, I_C = 225 A, V_{GE} =±15 V, R_G= 10Ω	T_J = 25℃ T_J = 125℃ T_J = 150℃	$t_{d(on)}$		215 175 170		ns
上升时间 Rise Time		T_J = 25℃ T_J = 125℃ T_J = 150℃	t_r		180 180 185		
关断延迟时间 Turn−off Delay Time		T_J = 25℃ T_J = 125℃ T_J = 150℃	$t_{d(off)}$		435 460 460		
下降时间 Fall Time		T_J = 25℃ T_J = 125℃ T_J = 150℃	t_f		95 115 120		
开通损耗能量 Turn−on Switching Loss per Pulse		T_J = 25℃ T_J = 125℃ T_J = 150℃	E_{on}		27.5 31.5 33.0		mJ
关断损耗能量 Turn off Switching Loss per Pulse		T_J = 25℃ T_J = 125℃ T_J = 150℃	E_{off}		9.10 10.5 11.5		

IGBT （Q2,Q3）

总栅极电荷 Total Gate Charge	V_{CE} = 600 V, I_C = 225 A, V_{GE} = ±15 V	Q_g		1155		nC
芯片 – 外壳热阻 Thermal Resistance – chip–to–case	Thermal grease, Thickness = 2 Mil ±2%, λ= 2.8 W/mK	R_{thJC}		0.13		℃/W
开关状态下温度 Temperature under switching		$T_{j\,op}$	-40		150	℃

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二极管/Diodes（D2, D3）

最大额定值/Maximum Rated Values

反向重复峰值电压 Repetitive peak reverse voltage	T_j = 25℃	V_{RRM}	1200	V
连续正向直流电流 Continuous DC forward current		I_F	200	A
正向重复峰值电流 Repetitive peak forward current	t_p= 1 ms	I_{FRM}	400	A

反向二极管 / Inverse Diodes (D2, D3)

				Min.	Typ.	Max.	
二极管正向电压 Diode Forward Voltage	I_F = 200 A	T_J = 25℃ T_J = 125℃ T_J = 150℃	V_F		1.96 1.98 1.92		V
反向恢复时间 Reverse Recovery Time	V_{CE} = 600 V, I_C = 200 A V_{GE} = ±15 V, R_G = 10Ω	T_J = 25℃ T_J = 125℃ T_J = 150℃	t_{rr}		370 575 685		ns
反向恢复电荷 Reverse Recovery Charge		T_J = 25℃ T_J = 125℃ T_J = 150℃	Q_{rr}		14.2 27.1 33.2		μC
反向恢复峰值电流 Peak Reverse Recovery Current		T_J = 25℃ T_J = 125℃ T_J = 150℃	I_{RRM}		100 110 115		A
反向恢复能量 Reverse Recovery Energy		T_J = 25℃ T_J = 125℃ T_J = 150℃	E_{rr}		4.55 9.00 11.0		mJ
芯片-外壳热阻 Thermal Resistance – chip–to–case	Thermal grease, Thickness = 2 Mil ± 2%, λ= 2.8 W/mK		R_{thJC}		0.17		℃/W
开关状态下温度 Temperature under switching			$T_{j\,op}$	-40		150	℃

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负温度系数热敏电阻 / NTC-Thermistor

特征值 / Characteristic Values

			Min.	Typ.	Max.	
额定阻值 Rated resistance	T_C = 25℃	R25		5		kΩ
阻值误差 Deviation of R100	T_C = 100℃, R100 = 1468 Ω	ΔR/R	-5		5	%
功率损耗 Power dissipation	T_C = 25℃	P25			20	mW
B 值/B – value	R2=R25 exp [B25/50(1/T2 – 1/(298.15K))]	B25/50		3375		K
B 值/B – value	R2=R25 exp [B25/100(1/T2 – 1/(298.15K))]	B25/100		3411		K

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模块/Module

绝缘配置 / Insulation Coordination

隔离试验电压/Isolation test voltage	RMS, f = 50 Hz, t = 1 min	V_{ISOL}	4.2	kV
内部隔离/Internal Isolation	Basic insulation (class 1, IEC 61140)		Si_3N_4	
爬电距离/Creepage distance	Terminal to heatsink	dCreep	9.0	mm
爬电距离/Creepage distance	Terminal to terminal	dCreep	9.0	mm
间距/Clearance	Terminal to heatsink	dClear	4.5	mm
间距/Clearance	Terminal to terminal	dClear	4.5	mm
相对漏电起痕指数 Comparative tracking index		CTI	> 200	

特征值 / Characteristic Values

		Min.	Typ.	Max.	
杂散电感模块/Stray inductance module	LsCE	-40	8.5		nH
储存温度/Storage temperatu0re	Tstg	20		125	℃
夹具的安装力/Mounting force per clamp	F			50	N
重量/Weight	G		188		g

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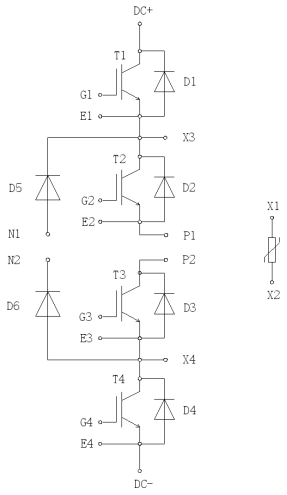
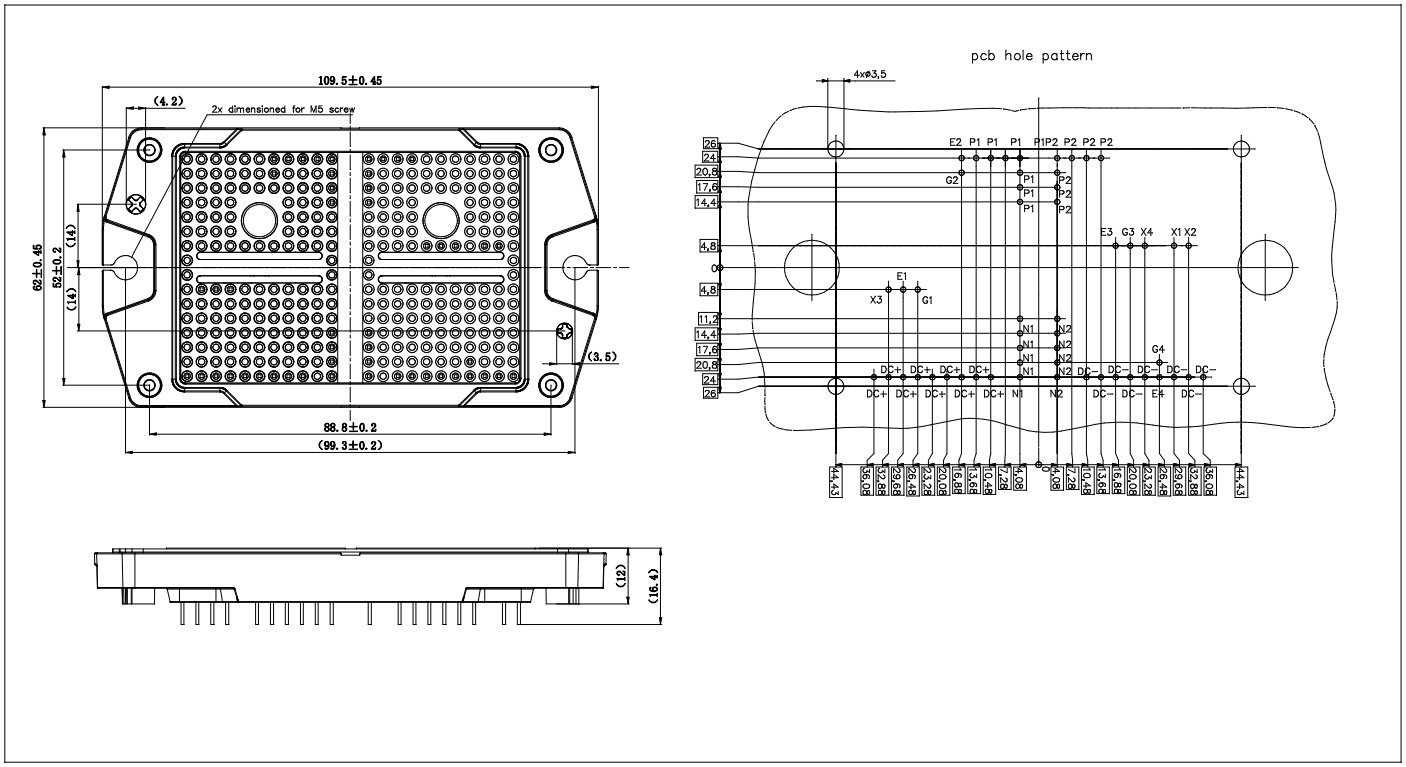
封装/Package

电路拓扑/Circuit Topology



封装尺寸 / Package outlines



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