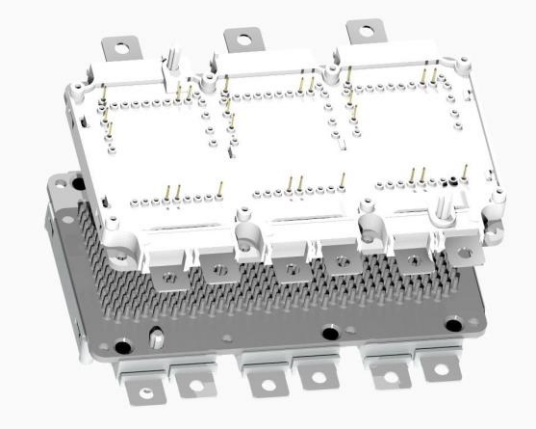
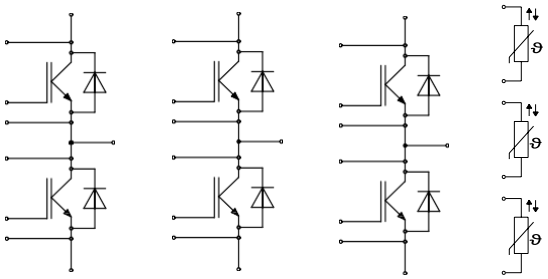
HP600FS12 采用沟槽栅极/场截止结构 IGBT 和温度检测 NTC

HP600FS12 with Trench Gate/Field Stop IGBT and NTC





V_{CES} = 1200V

$I_{C\ nom}$ = 600A

典型应用	Typical Application
· 交流马达控制	· AC Motor Control
· 逆变器	· Inverters
· 电机传动	· Motor Drives
· 太阳能发电	· Solar Power
电气特性	**Electrical Characteristics**
· 低导通和开关损耗	· Ultra Low Conduction and Switching Loss
· 高短路能力	· High Short Circuit Capability
· 反并联超快速软恢复二极管	· Including Ultra Fast & Soft Recovery Anti-parallel FWD
机械特性	**Mechanical Properties**
· 铜基板	· Cu Substrate
· 标准封装	· Standard Package

Module Label Code

Barcode Code 128:



Data Matrix Code:



Content of the Code	Digit
Sample or Mass Production	1
Module Serial Number	2 – 5
Datecode (Production Year)	6 – 7
Datecode (Production Week)	8 – 9
Production Batch Number	10 – 11
Production Serial Number	12 – 13

Prepared by : LJP	**Date of publication : 2024-02**
Approved by : WH	**Revision : V1.0**

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IGBT，逆变器/ IGBT, Inverter

最大额定值/ Maximum rated Values

参数/ Parameter	符号/ Symbol	条件/ Conditions	值/ Values	单位/ Unit
集电极-发射极电压/ Collector-emitter voltage	V_{CES}	T_{vj} = 25°C	1200	V
连续集电极直流电流/ Continuous DC collector current	$I_{C\ nom}$	T_F = 65°C, $T_{vj\ max}$ = 175°C	600	A
集电极重复峰值电流/ Repetitive peak collector current	I_{CRM}	t_P = 1 ms	1200	A
总功率损耗/ Total power dissipation	P_{tot}	T_F = 25°C, $T_{vj\ max}$ = 175°C	1875	W
栅极-发射极峰值电压/ Gate-emitter peak voltage	V_{GES}		±20	V

特征值/ Characteristic Values

参数/ Parameter	符号/ Symbol	条件/ Conditions		值/ Values			单位/ Unit
				最小/ Min.	典型/ Typ.	最大/ Max.	
集电极-发射极饱和电压/ Collector-emitter saturation voltage	$V_{CE(SAT)}$	V_{GE} = 15 V, I_C = 600 A	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	- - -	1.75 2.05 2.13	2.4 - -	V
栅极阈值电压/ Gate threshold voltage	$V_{GE(th)}$	I_C = 15 mA, V_{CE} = V_{GE} , T_{vj} = 25°C		4.0	6.02	7.0	V
集电极-发射极截止电流/ Collector-emitter cut-off current	I_{CES}	V_{CE} = 1200 V ,V_{GE} = 0 V, T_{vj} = 25°C		-	-	1	mA
栅极-发射极漏电流/ Gate-emitter leakage current	I_{GES}	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		-	-	400	nA
栅极电荷/ Gate charge	Q_G	V_{CC} = 600 V, I_C = 600 A, V_{GE} = 15 V		-	4835	-	nC
开通延迟时间（电感负载）/ Turn-on delay time	$t_{d(on)}$	V_{CE} = 600 V, I_C = 600 A, V_{GE} = ±15 V, R_G = 10.0 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	- - -	0.89 0.84 0.80	- - -	µs
上升时间（电感负载）/ Rise time, inductive load	t_r		T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	- - -	0.36 0.36 0.36	- - -	
关断延迟时间（电感负载）/ Turn-off delay time, inductive load	$t_{d(off)}$		T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	- - -	1.10 1.19 1.21	- - -	
下降时间（电感负载）/ Fall time, inductive load	t_f		T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	- - -	0.45 0.41 0.40	- - -	
开通损耗能量（每脉冲）/ Turn-on energy loss per pulse	E_{on}		T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	- - -	186 203 211	- - -	mJ
关断损耗能量（每脉冲）/ Turn-off energy loss per pulse	E_{off}		T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	- - -	148 150 152	- - -	
短路数据/ SC data	I_{SC}	V_{GE} = 15 V,V_{CC} = 600 V t_P = 6 µs, T_{vj} = 150°C		-	3000	-	A
结-冷却液热阻/ Thermal resistance, junction-cooling fluid	R_{thJF}	每个IGBT/ per IGBT		-	-	0.085	K/W
在开关状态下的温度/ Temperatureunder switching conditions	$T_{vj\ op}$			-40	-	150	°C

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二极管，逆变器/ Diode, Inverter

最大额定值/ Maximum ratings Values

参数/ Parameter	符号/ Symbol	条件/ Conditions	值/ Values	单位/ Unit
反复重复峰值电压/ Repetitive peak reverse voltage	V_{RRM}	T_{vj} = 25°C	1200	V
连续正向电流/ Continuous DC forward current	I_F		600	A
正向重复峰值电流/ Repetitive peak forward current	I_{FRM}	t_P = 1 ms	1200	A

特征值/ Characteristic Values

参数/ Parameter	符号/ Symbol	条件/ Conditions		值/ Values			单位/ Unit
				最小/ Min.	典型/ Typ.	最大/ Max.	
正向电压/ Forward voltage	V_F	V_{GE} = 0 V, I_F = 600A	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	1.0 - -	1.88 1.91 1.89	2.5 - -	V
反向恢复峰值电流/ Peak reverse recovery current	I_{RM}	V_R = 600 V, I_F = 600 A, V_{GE} = -15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	- - -	170 223 238	- - -	A
恢复电荷/ Recovery charge	Q_r		T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	- - -	8.15 8.45 8.45	- - -	µC
反向恢复损耗（每脉冲）/ Reverse recovery energy per pulse	E_{rec}		T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	- - -	9.50 17.1 23.0	- - -	mJ
结-冷却液热阻/ Thermal resistance, junction-cooling fluid	R_{thJF}	每个二极管/ per diode		-	-	0.110	K/W
在开关状态下的温度/ Temperature under switching conditions	$T_{vj\ op}$			-40	-	150	℃

负温度系数热敏电阻/ NTC-Thermistor

特征值/ Characteristic Values

参数/ Parameter	符号/ Symbol	条件/ Conditions	值/ Value	单位/ Unit
额定电阻值/ Rated resistance	R_{25}	T_{NTC} = 25°C	5.00	kΩ
R100 偏差/ Deviation of R100	$\|\Delta R\|/R$	T_{NTC} = 100°C, R_{100} = 493 Ω	5	%
B-值/ B-value	$B_{25/50}$	25 和 50°C电阻值计算得到/ Calculated from resistance value at 25°C and 50°C	3375	K
B-值/ B-value	$B_{25/80}$	25 和 80°C电阻值计算得到/ Calculated from resistance value at 25°C and 80°C	3411	K
B-值/ B-value	$B_{25/100}$	25 和 100°C电阻值计算得到/ Calculated from resistance value at 25°C and 100°C	3433	K

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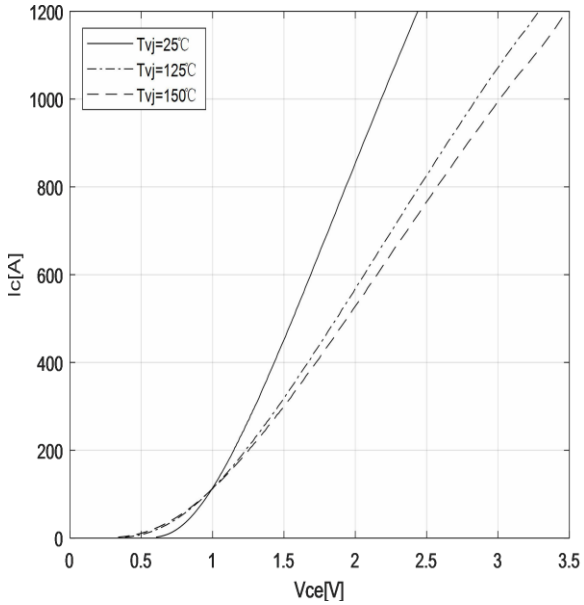
模块/ Module

参数/ Parameter	符号/ Symbol	条件/ Conditions	值/ Values	单位/ Unit
绝缘测试电压/ Isolation test voltage	V_{ISOL}	RMS, f = 0 Hz, t = 1.2 sec	4.7	kV
模块基板材料/ Material of Module baseplate			Cu	
内部绝缘材料/ Material of Internal Isolation			Si_3N_4	
爬电距离/ Creepage distance		端子-散热器/ Terminal to heatsink 端子- 端子 / terminal to terminal	9.0 9.0	mm
电气间隙/Clearance		端子- 散热器 / terminal to heatsink 端子- 端子 / terminal to terminal	4.5 4.5	mm
存储温度/ Storage temperature	T_{stg}		-40 ~ 125	℃
模块安装扭矩/ Mounting torque for modul mounting	M	安装紧固用 - M4 / Mounting – M4	1.8 ~ 2.2	N·m
端子联接扭矩/ Terminal connection torque	M	安装紧固用 - M5 / Mounting – M5	3.6 ~ 4.4	N·m
重量/ Weight	G		730	g

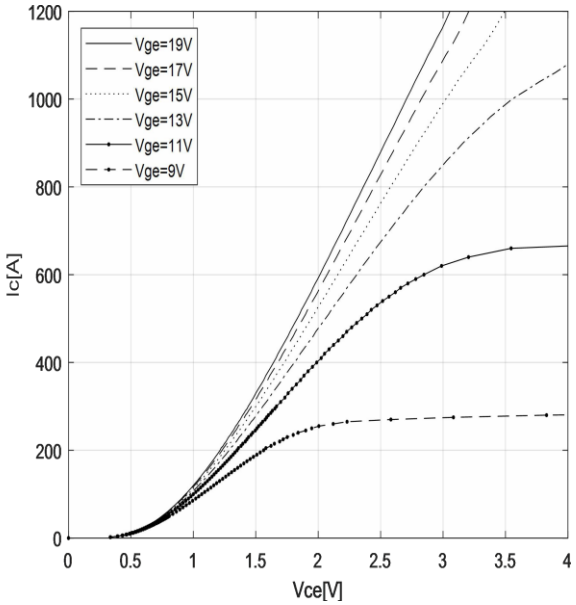
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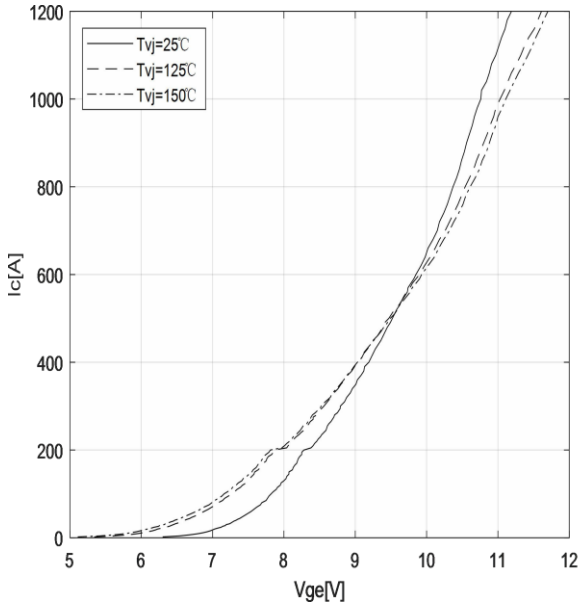
输出特性 IGBT，逆变器（典型）
Output characteristic IGBT, Inverter (typical)
$I_C = f(V_{CE})$
V_{GE} = 15 V



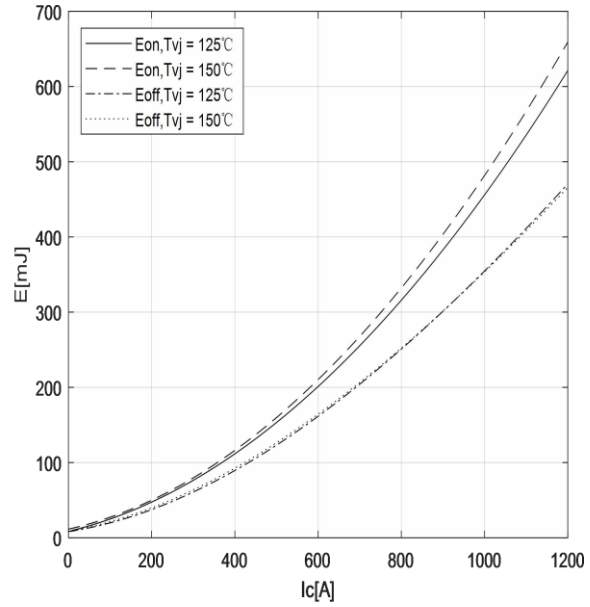
输出特性 IGBT，逆变器（典型）
Output characteristic IGBT, Inverter (typical)
$I_C = f(V_{CE})$
T_{vj} = 150°C



传输特性 IGBT,逆变器（典型）
Transfer characteristic IGBT, Inverter (typical)
$I_C = f(V_{GE})$
V_{CE} = 20 V

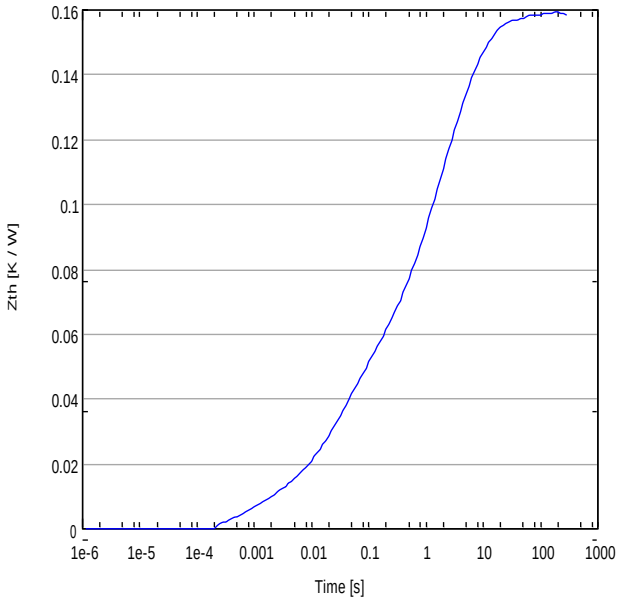


开关损耗 IGBT,逆变器（典型）
Switching losses IGBT, Inverter (typical)
$E_{on} = f(I_C)$, $E_{off} = f(I_C)$,
V_{GE} = ±15 V, R_G = 10Ω, V_{CE} = 600 V

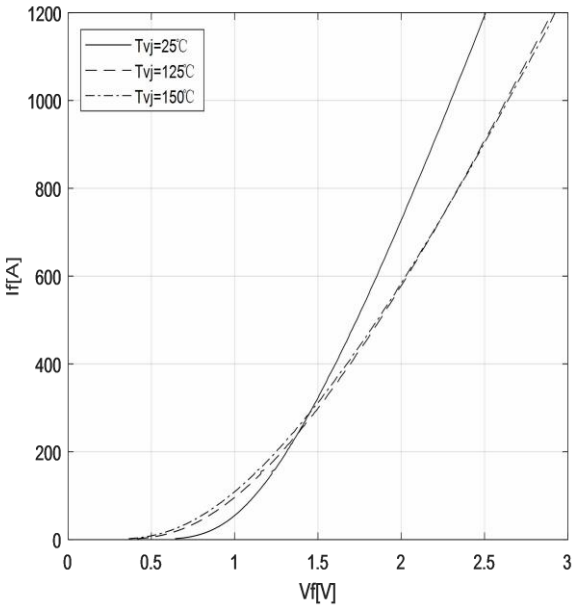


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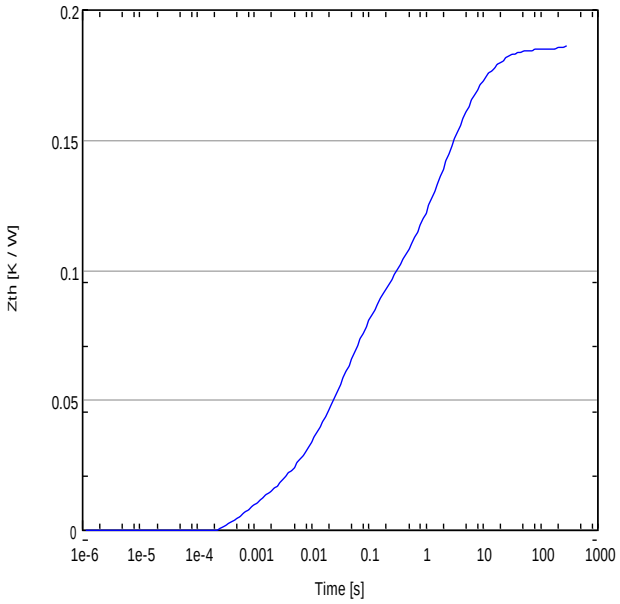
瞬态热阻抗 IGBT，逆变器（典型）
Transient thermal impedance IGBT, Inverter (typical)
$Z_{thJC} = f(t)$



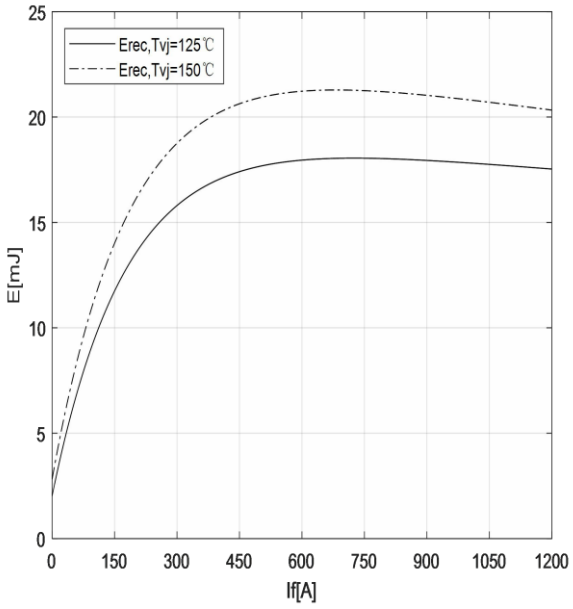
正向偏压特性 二极管，逆变器（典型）
Forward characteristic of Diode, Inverter (typical)
$I_F = f(V_F)$



瞬态热阻抗 二极管，逆变器（典型）
Transient thermal impedance Diode, Inverter (typical)
$Z_{thJC} = f(t)$

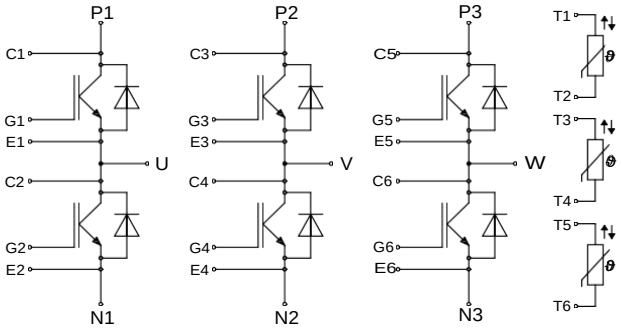


开关损耗 二极管，逆变器（典型）
Switching losses Diode, Inverter (typical)
$E_{rec} = f(I_F)$, $R_{Gon} = 10\ \Omega$, $V_{CE} = 600$ V

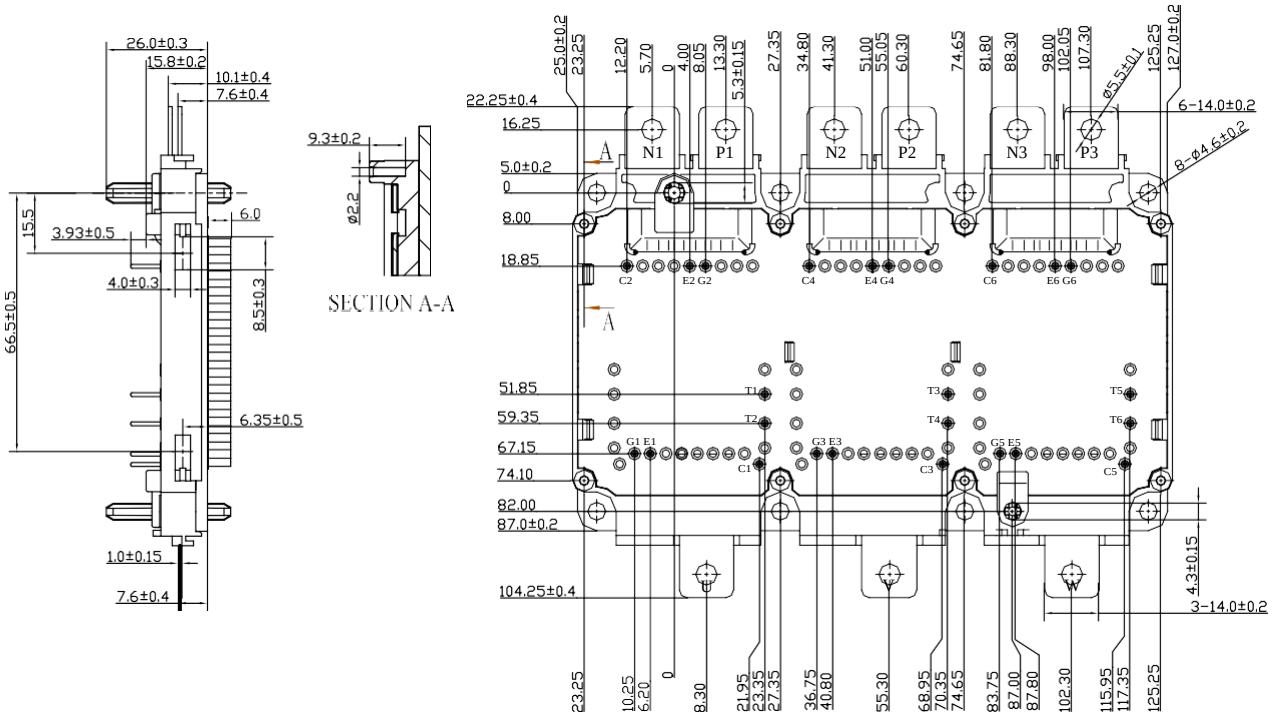


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接线图 / Circuit_diagram_headline



封装尺寸/Package outlines



单位：mm

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版本履历 / Revision History

Page or Reference	Description of change
V1.0	Initial Datasheet.

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