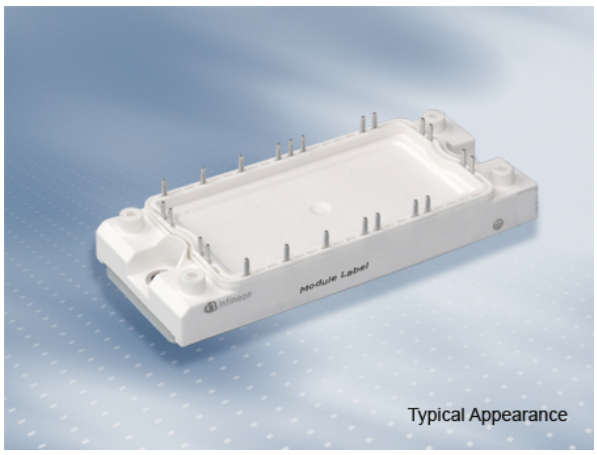
技术信息 / Technical Information

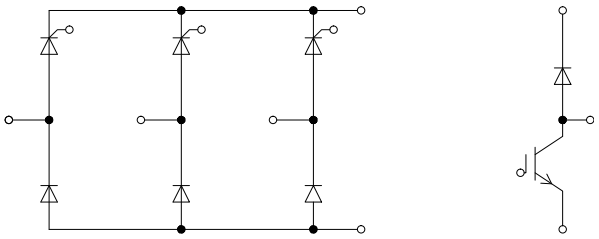
IGBT-模块
IGBT-modules

TDB6HK180N16RR

EconoPACK™2 模块
EconoPACK™2 module

初步数据 / Preliminary Data





V_{CES} = 1200V
$I_{C\ nom}$ = 180A / I_{CRM} = 360A

典型应用
- 有源整流器
- 三相半控整流桥

Typical Applications
- Active Rectifier
- Half Controlled B6-bridge

机械特性
- 2.5 kV 交流 1分钟 绝缘
- 低热阻的三氧化二铝 (Al_2O_3 衬底
- 高功率密度
- 高机械坚固性
- 绝缘的基板
- 紧凑型设计
- 铜基板
- 焊接技术
- 符合RoHS
- 标封装

Mechanical Features
- 2.5 kV AC 1min Insulation
- Al_2O_3 Substrate with Low Thermal Resistance
- High Power Density
- High mechanical robustness
- Isolated Base Plate
- Compact design
- Copper Base Plate
- Solder Contact Technology
- RoHS compliant
- Standard Housing

Module Label Code

Barcode Code 128

Sample
00000123456000000000000

DMX - Code

Content of the Code	Digit
Module Serial Number	1 - 5
Module Material Number	6 - 11
Production Order Number	12 - 19
Datecode (Production Year)	20 - 21
Datecode (Production Week)	22 - 23

prepared by: NK	date of publication: 2013-08-19	
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初步数据
Preliminary Data

二极管,整流器 / Diode, Rectifier

最大额定值 / Maximum Rated Values

反向重复峰值电压 Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1600	V
最大正向均方根电流(每芯片) Maximum RMS forward current per chip	T_C = 80°C	I_{FRMSM}	150	A
最大整流器输出均方根电流 Maximum RMS current at rectifier output	T_C = 80°C	I_{RMSM}	180	A
正向浪涌电流 Surge forward current	t_p = 10 ms, T_{vj} = 25°C t_p = 10 ms, T_{vj} = 150°C	I_{FSM}	1600 1400	A A
I2t-值 I^2t - value	t_p = 10 ms, T_{vj} = 25°C t_p = 10 ms, T_{vj} = 150°C	I^2t	13000 9500	A^2s A^2s

特征值 / Characteristic Values

			min.	typ.	max.	
正向电压 Forward voltage	T_{vj} = 150°C, I_F = 150 A	V_F		1,20		V
阈值电压 Threshold voltage	T_{vj} = 150°C	V_{TO}		0,83		V
斜率电阻 Slope resistance	T_{vj} = 150°C	r_T		2,30		mΩ
反向电流 Reverse current	T_{vj} = 150°C, V_R = 1600 V	I_R		1,00		mA
结 - 外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode	R_{thJC}			0,35	K/W
外壳 - 散热器热阻 Thermal resistance, case to heatsink	每个二极管 / per diode λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)	R_{thCH}		0,165		K/W

初步数据
Preliminary Data

晶闸管,整流器 / Thyristor-rectifier

最大额定值 / Maximum Rated Values

反向重复峰值电压 Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1600	V
最大正向均方根电流(每芯片) Maximum RMS forward current per chip	T_C = 80°C	I_{FRMSM}	150	A
最大整流器输出均方根电流 Maximum RMS current at rectifier output	T_C = 80°C	I_{RMSmax}	180	A
正向浪涌电流 Surge forward current	t_P = 10ms, T_{vj} = 25°C t_P = 10ms, T_{vj} = 130°C	I_{FSM}	1550 1300	A
I2t-值 I²t - value	t_P = 10ms, T_{vj} = 25°C t_P = 10ms, T_{vj} = 130°C	I²t	12000 8450	A²s
通态电流临界上升率 Critical rate of rise of on-state current	DIN IEC 60 754-6 f = 50Hz, iGM = 0,6A, diG/dt = 0,6A/µs	$(di/dt)_{cr}$	100	A/µs
通态电压临界上升率 Critical rate of rise of on-state voltage	T_{vj} = 130, vD = 0,67 VDRM	$(dv/dt)_{cr}$	1000	V/µs

特征值 / Characteristic Values

			min.	typ.	max.	
正向电压 Forward voltage	T_{vj} = 130°C, I_F = 150 A	V_F		1,30		V
阈值电压 Threshold voltage	T_{vj} = 130°C	$V_{(TO)}$	-	0,85		V
斜率电阻 Slope resistance	T_{vj} = 130°C	r_T	-	3,20		mΩ
门极触发电流 Gate trigger current	T_{vj} = 25°C, v_D = 6 V	I_{GT}			100	mA
门极触发电压 Gate trigger voltage	T_{vj} = 25°C, v_D = 6 V	V_{GT}			2,0	V
门极不触发电流 Gate non-trigger current	T_{vj} = 130°C, v_D = 6 V T_{vj} = 130°C, v_D = 0,5 V_{DRM}	I_{GD}			6,0 3,0	mA
门极不触发电压 Gate non-trigger voltage	T_{vj} = 130°C, v_D = 0,5 V_{DRM}	V_{GD}			0,3	V
维持电流 Holding current	T_{vj} = 25°C, v_D = 6 V, R_A = 5 Ω	I_H			220	mA
擎住电流 Latching current	T_{vj} = 25°C, v_D = 6 V, R_{GK} ≥ 20 Ω i_{GM} = 0,6 A, di_G/dt = 0,6 A/µs, t_g = 10 µs	I_L			550	mA
门极控制延迟时间 Gate controlled delay time	DIN IEC 747-6 T_{vj} = 25°C, i_{GM} = 0,6 A, di_G/dt = 0,6 A/µs	t_{gd}			1,2	µs
换流关断时间 Circuit commutated turn-off time	T_{vj} = 130°C, i_{TM} = 50 A v_{RM} = 100 V, V_{DM} = 0,67 V_{DRM} d_{VD}/dt = 20 V/µs, $-di_T/dt$ = 10 A/µs	t_q		150		µs
反向电流 Reverse current	T_{vj} = 130°C, V_R = 1600 V	I_R I_D	-	5,00		mA
结 - 外壳热阻 Thermal resistance, junction to case	每个晶闸管 / per Thyristor	R_{thJC}			0,30	K/W
外壳 - 散热器热阻 Thermal resistance, case to heatsink	每个晶闸管 / per Thyristor λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)	R_{thCH}		0,14		K/W

初步数据
Preliminary Data

IGBT, 制动-斩波器 / IGBT, Brake-Chopper

最大额定值 / Maximum Rated Values

集电极 - 发射极电压 Collector-emitter voltage	T_{vj} = 25°C	V_{CES}	1200	V
连续集电极直流电流 Continuous DC collector current	T_C = 80°C, T_{vj} = 175°C T_C = 25°C, T_{vj} = 175°C	$I_{C\,nom}$ I_C	100 140	A A
集电极重复峰值电流 Repetitive peak collector current	t_P = 1 ms	I_{CRM}	200	A
总功率损耗 Total power dissipation	T_C = 25°C, T_{vj} = 175°C	P_{tot}	515	W
栅极 - 发射极峰值电压 Gate-emitter peak voltage		V_{GES}	+/-20	V

特征值 / Characteristic Values

			min.	typ.	max.	
集电极 - 发射极饱和电压 Collector-emitter saturation voltage	I_C = 100 A, V_{GE} = 15 V I_C = 100 A, V_{GE} = 15 V I_C = 100 A, V_{GE} = 15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$V_{CE\,sat}$		1,75 2,05 2,10	2,20	V V V
栅极阈值电压 Gate threshold voltage	I_C = 3,55 mA, V_{CE} = V_{GE}, T_{vj} = 25°C		V_{GEth}	5,0	5,8	6,5	V
栅极电荷 Gate charge	V_{GE} = -15 V ... +15 V		Q_G		0,80		µC
内部栅极电阻 Internal gate resistor	T_{vj} = 25°C		R_{Gint}		7,5		Ω
输入电容 Input capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{ies}		6,30		nF
反向传输电容 Reverse transfer capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{res}		0,27		nF
集电极-发射极截止电流 Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			1,0	mA
栅极-发射极漏电流 Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			100	nA
开通延迟时间(电感负载) Turn-on delay time, inductive load	I_C = 100 A, V_{CE} = 600 V V_{GE} = ±15 V R_{Gon} = 1,6 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\,on}$		0,16 0,17 0,17		µs µs µs
上升时间(电感负载) Rise time, inductive load	I_C = 100 A, V_{CE} = 600 V V_{GE} = ±15 V R_{Gon} = 1,6 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_r		0,03 0,04 0,04		µs µs µs
关断延迟时间(电感负载) Turn-off delay time, inductive load	I_C = 100 A, V_{CE} = 600 V V_{GE} = ±15 V R_{Goff} = 1,6 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\,off}$		0,33 0,43 0,45		µs µs µs
下降时间(电感负载) Fall time, inductive load	I_C = 100 A, V_{CE} = 600 V V_{GE} = ±15 V R_{Goff} = 1,6 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_f		0,08 0,145 0,17		µs µs µs
开通损耗能量 (每脉冲) Turn-on energy loss per pulse	I_C = 100 A, V_{CE} = 600 V, L_S = 30 nH V_{GE} = ±15 V R_{Gon} = 1,6 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{on}		5,50 8,50 9,50		mJ mJ mJ
关断损耗能量 (每脉冲) Turn-off energy loss per pulse	I_C = 100 A, V_{CE} = 600 V, L_S = 30 nH V_{GE} = ±15 V R_{Goff} = 1,6 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{off}		5,50 8,50 9,50		mJ mJ mJ
短路数据 SC data	V_{GE} ≤ 15 V, V_{CC} = 800 V V_{CEmax} = V_{CES} -L_{sCE} ·di/dt	t_P ≤ 10 µs, T_{vj} = 150°C	I_{SC}		360		A
结 - 外壳热阻 Thermal resistance, junction to case	每个 IGBT / per IGBT		R_{thJC}			0,29	K/W
外壳 - 散热器热阻 Thermal resistance, case to heatsink	每个 IGBT / per IGBT λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)		R_{thCH}		0,135		K/W

初步数据
Preliminary Data

二极管，制动-斩波器 / Diode, Brake-Chopper

最大额定值 / Maximum Rated Values

反向重复峰值电压 Repetitive peak reverse voltage	T_{vj} = 25°C	V_{RRM}	1200	V
连续正向直流电流 Continuous DC forward current		I_F	50	A
正向重复峰值电流 Repetitive peak forward current	t_P = 1 ms	I_{FRM}	100	A
I2t-值 I²t - value	V_R = 0 V, t_P = 10 ms, T_{vj} = 125°C	I²t	510	A²s

特征值 / Characteristic Values

			min.	typ.	max.	
正向电压 Forward voltage	I_F = 50 A, V_{GE} = 0 V I_F = 50 A, V_{GE} = 0 V I_F = 50 A, V_{GE} = 0 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	V_F		1,70 1,65 1,65	2,15	V V V
反向恢复峰值电流 Peak reverse recovery current	I_F = 50 A, - di_F/dt = 3000 A/µs (T_{vj}=150°C) V_R = 600 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	I_{RM}		54,0 60,0 63,0		A A A
恢复电荷 Recovered charge	I_F = 50 A, - di_F/dt = 3000 A/µs (T_{vj}=150°C) V_R = 600 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	Q_r		5,50 8,80 10,0		µC µC µC
反向恢复损耗（每脉冲） Reverse recovery energy	I_F = 50 A, - di_F/dt = 3000 A/µs (T_{vj}=150°C) V_R = 600 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{rec}		1,70 3,00 3,70		mJ mJ mJ
结 - 外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode		R_{thJC}			0,81	K/W
外壳 - 散热器热阻 Thermal resistance, case to heatsink	每个二极管 / per diode λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)		R_{thCH}		0,375		K/W

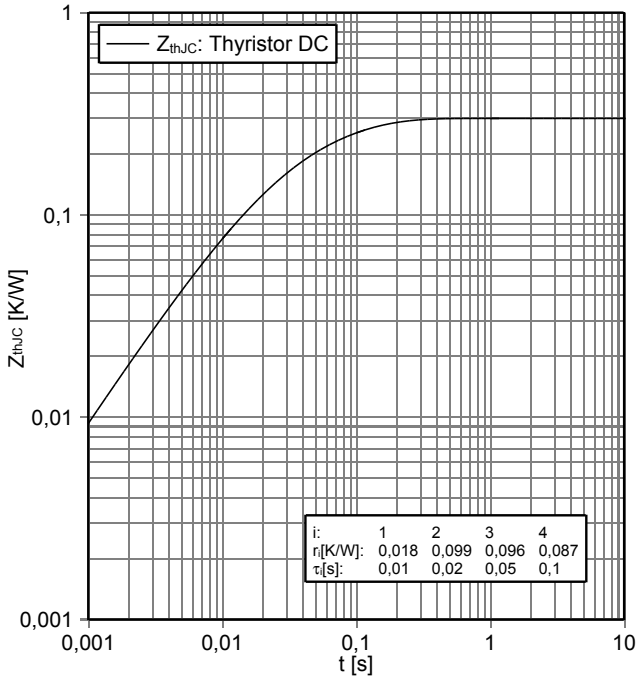
初步数据
Preliminary Data

模块 / Module

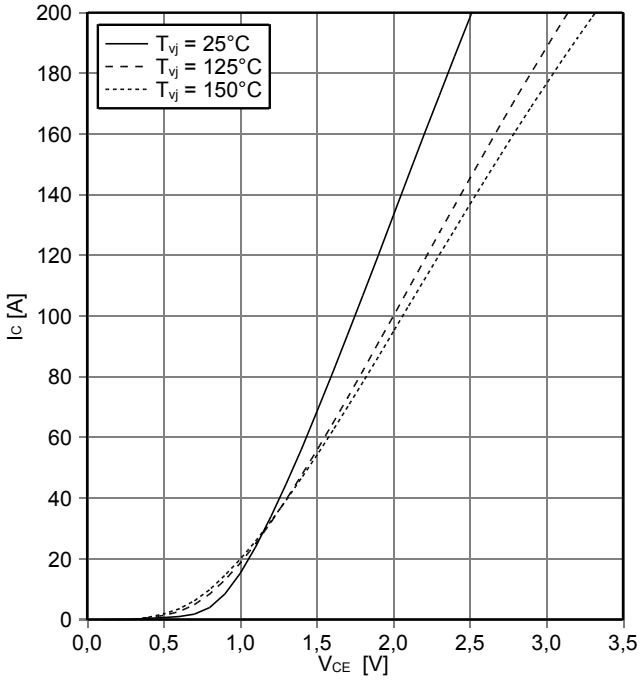
绝缘测试电压 Isolation test voltage	RMS, f = 50 Hz, t = 1 min.	V_{ISOL}		2,5		kV
模块基板材料 Material of module baseplate				Cu		
内部绝缘 Internal isolation	基本绝缘 (class 1, IEC 61140) basic insulation (class 1, IEC 61140)			Al_2O_3		
爬电距离 Creepage distance	端子- 散热片 / terminal to heatsink 端子- 端子 / terminal to terminal			10,0		mm
电气间隙 Clearance	端子- 散热片 / terminal to heatsink 端子- 端子 / terminal to terminal			7,5		mm
相对电痕指数 Comperative tracking index		CTI		> 200		
			min.	typ.	max.	
外壳 - 散热器热阻 Thermal resistance, case to heatsink	每个模块 / per module λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)	R_{thCH}		0,02		K/W
杂散电感,模块 Stray inductance module		L_{sCE}		50		nH
最大结温 Maximum junction temperature	逆变器,制动-斩波器 / inverter, brake-chopper 整流器 / rectifier	$T_{vj\ max}$			175 130	°C °C
在开关状态下温度 Temperature under switching conditions	逆变器,制动-斩波器 / inverter, brake-chopper 整流器 / rectifier	$T_{vj\ op}$	-40 -40		150 130	°C °C
储存温度 Storage temperature		T_{stg}	-40		125	°C
模块安装的安装扭距 Mounting torque for modul mounting	螺丝 M5 根据相应的应用手册进行安装 Screw M5 - Mounting according to valid application note	M	3,00	-	6,00	Nm
重量 Weight		G		180		g

初步数据
Preliminary Data

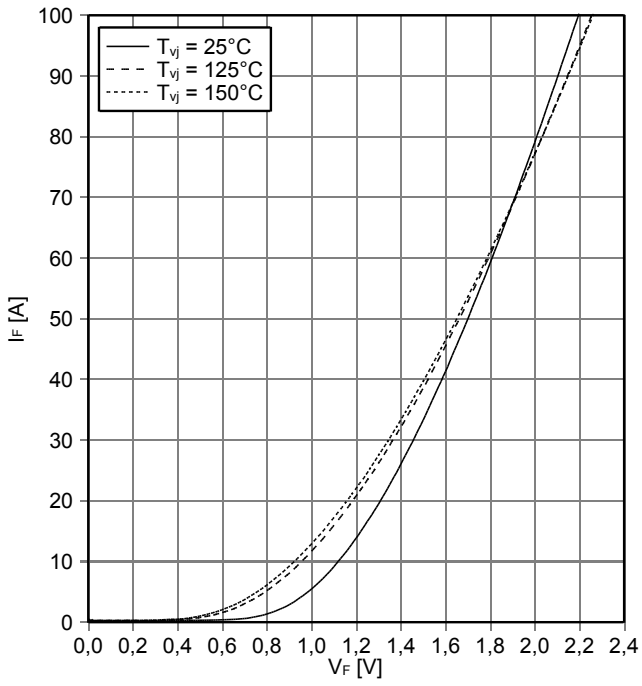
瞬态热阻抗 晶闸管,整流器
transient thermal impedance Thyristor-rectifier
$Z_{thJC} = f(t)$



输出特性 IGBT, 制动-斩波器 (典型)
output characteristic IGBT, Brake-Chopper (typical)
$I_C = f(V_{CE})$
$V_{GE} = 15\ V$



正向偏压特性 二极管 , 制动-斩波器 (典型)
forward characteristic of Diode, Brake-Chopper (typical)
$I_F = f(V_F)$



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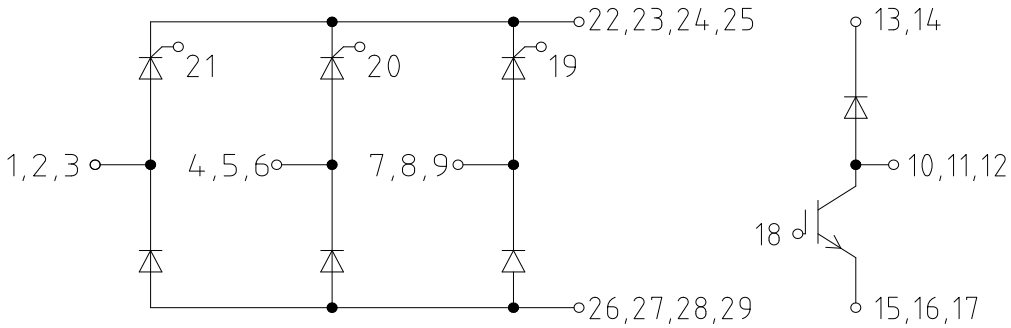
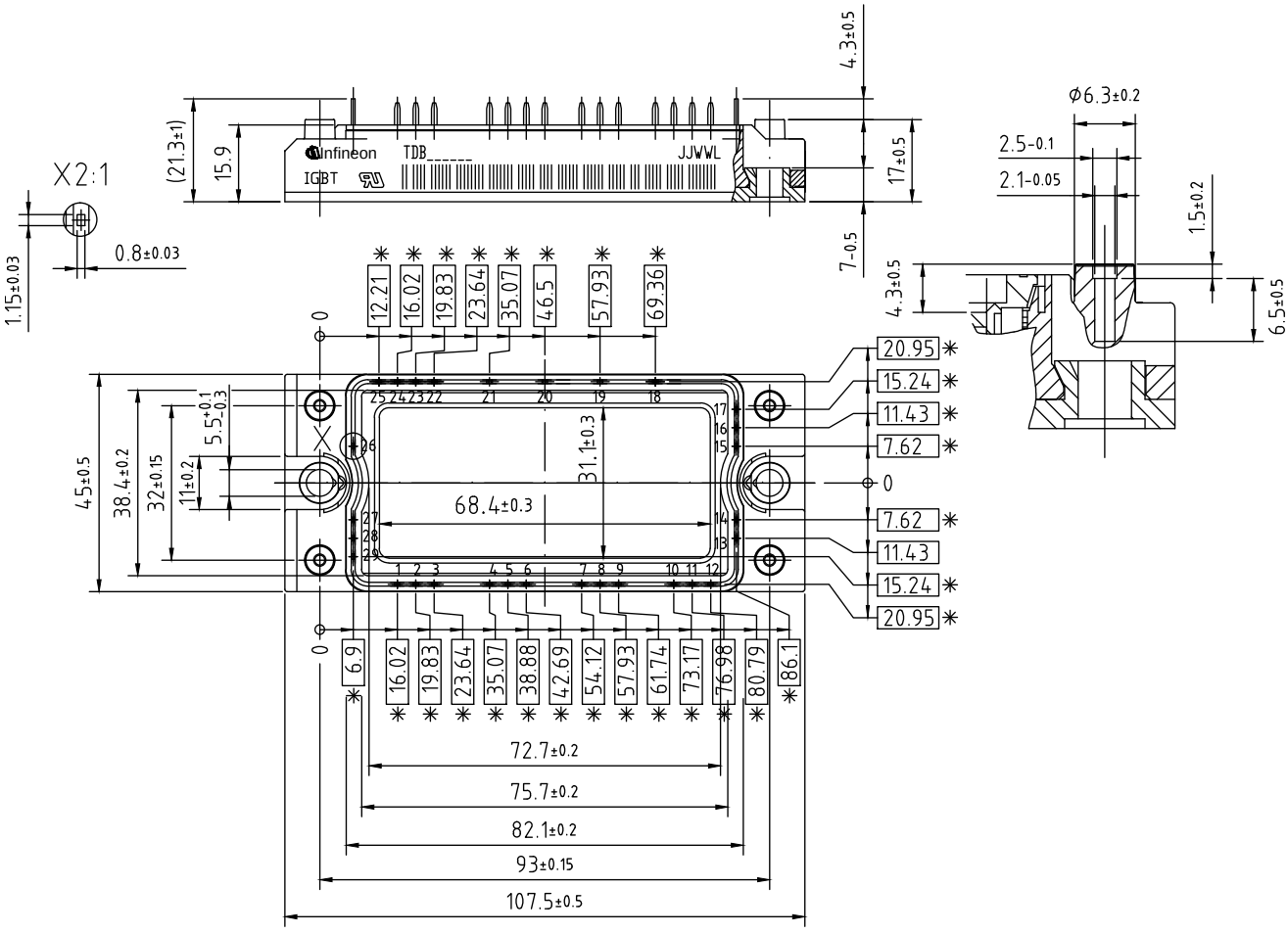
初步数据
Preliminary Data

接线图 / circuit_diagram_headline



封装尺寸 / package outlines



∗ = alle Maße mit einer Toleranz von
∗ = all dimensions with tolerance of

⌖ Ø0.4

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初步数据
Preliminary Data

使用条件和条款

使用条件和条款
产品规格书中的数据是专门为技术人员提供的，您和您的技术部门应该针对您的应用来评估产品及产品的所有参数是否适合

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-得到质量协议的结论
- 建立联合的测试和出厂产品检查， 我们可以根据测试的实际情况供货
如果有必要，请根据实际需要将类似的说明给你的客户
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Terms & Conditions of usage

The data contained in this product data sheet is exclusively intended for technically trained staff. You and your technical departments will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to such application.

This product data sheet is describing the characteristics of this product for which a warranty is granted. Any such warranty is granted exclusively pursuant the terms and conditions of the supply agreement. There will be no guarantee of any kind for the product and its characteristics. The information in the valid application- and assembly notes of the module must be considered.

Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of our product, please contact the sales office, which is responsible for you (see www.infineon.com). For those that are specifically interested we may provide application notes.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact the sales office, which is responsible for you.

Should you intend to use the Product in aviation applications, in health or live endangering or life support applications, please notify. Please note, that for any such applications we urgently recommend
- to perform joint Risk and Quality Assessments;
- the conclusion of Quality Agreements;
- to establish joint measures of an ongoing product survey, and that we may make delivery depended on the realization of any such measures.

If and to the extent necessary, please forward equivalent notices to your customers.

Changes of this product data sheet are reserved.

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