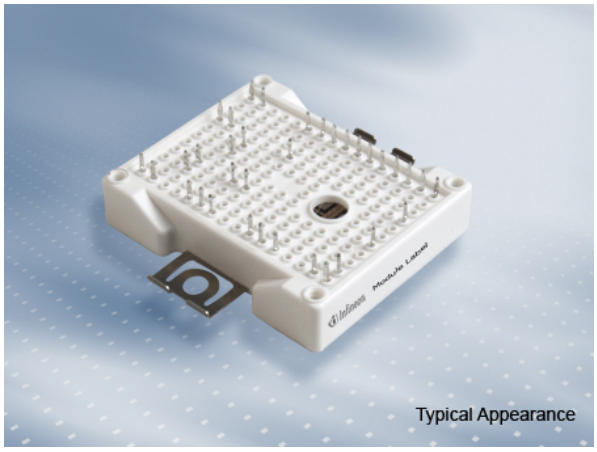
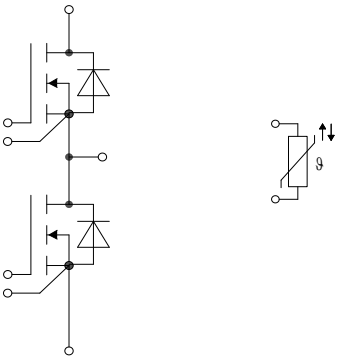
EasyDUAL 模块 采用 CoolSiC™ Trench MOSFET 带有pressfit压接管脚和温度检测NTC
EasyDUAL module with CoolSiC™ Trench MOSFET and PressFIT / NTC

初步数据 / Preliminary Data





V_{DSS} = 1200V
$I_{D\ nom}$ = 200A / I_{DRM} = 400A

潜在应用
- DC/DC 变换器
- UPS系统
- 太阳能应用
- 高频开关应用

Potential Applications
- DC/DC converter
- UPS systems
- Solar applications
- High Frequency Switching application

电气特性
- 低开关损耗
- 低电感设计
- 高电流密度

Electrical Features
- Low switching losses
- Low inductive design
- High current density

机械特性
- PressFIT 压接技术
- 集成NTC温度传感器
- 集成的安装夹使安装坚固

Mechanical Features
- PressFIT contact technology
- Integrated NTC temperature sensor
- Rugged mounting due to integrated mounting clamps

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

初步数据
Preliminary Data

MOSFET / MOSFET

最大额定值 / Maximum Rated Values

漏源极电压 Drain-source voltage		T_{vj} = 25°C	V_{DSS}	1200	V
直流漏极电流 DC drain current	T_{vj} = 175°C, V_{GS} = 15 V	T_H = 10°C	$I_{D\ nom}$	200	A
脉冲漏极电流 Pulsed drain current	经设计验证，tp由Tvjmax限定 verified by design, t_p limited by T_{vjmax}		$I_{D\ pulse}$	400	A
栅源峰值电压 Gate-source voltage			V_{GSS}	-10 / 20	V

特征值 / Characteristic Values

				min.	typ.	max.	
漏源通态电阻 Drain-source on resistance	I_D = 200 A V_{GS} = 15 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$R_{DS\ on}$		5,63 7,38 8,25		mΩ
栅极阈值电压 Gate threshold voltage	I_D = 80,0 mA, V_{DS} = V_{GS}, T_{vj} = 25°C (tested after 1ms pulse at V_{GS} = +20 V)		$V_{GS(th)}$	3,45	4,50	5,55	V
总的栅极电荷 Total gate charge	V_{GS} = -5 V / 15 V, V_{DS} = 800 V		Q_G		0,496		µC
内部栅极电阻 Internal gate resistor	T_{vj} = 25°C		R_{Gint}		0,5		Ω
输入电容 Input capacitance	f = 1 MHz, T_{vj} = 25°C V_{DS} = 800 V, V_{GS} = 0 V, V_{AC} = 25 mV		C_{iss}		14,7		nF
输出电容 Output capacitance	f = 1 MHz, T_{vj} = 25°C V_{DS} = 800 V, V_{GS} = 0 V, V_{AC} = 25 mV		C_{oss}		0,88		nF
反向传输电容 Reverse transfer capacitance	f = 1 MHz, T_{vj} = 25°C V_{DS} = 800 V, V_{GS} = 0 V, V_{AC} = 25 mV		C_{rss}		0,112		nF
C_{OSS} stored energy	T_{vj} = 25°C V_{DS} = 800 V, V_{GS} = -5 V / 15 V		E_{oss}		352		µJ
零栅电压漏极电流 Zero gate voltage drain current	V_{DS} = 1200 V, V_{GS} = -5 V	T_{vj} = 25°C	I_{DSS}		0,80	660	µA
栅极漏电流 Gate-source leakage current	V_{DS} = 0 V T_{vj} = 25°C	V_{GS} = 20 V V_{GS} = -10 V	I_{GSS}			400	nA
开通延迟时间(电感负载) Turn on delay time, inductive load	I_D = 200 A, V_{DS} = 600 V V_{GS} = -5 V / 15 V R_{Gon} = 1,80 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\ on}$		20,4 19,3 18,8		ns
上升时间(电感负载) Rise time, inductive load	I_D = 200 A, V_{DS} = 600 V V_{GS} = -5 V / 15 V R_{Gon} = 1,80 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_r		18,7 18,0 18,0		ns
关断延迟时间(电感负载) Turn off delay time, inductive load	I_D = 200 A, V_{DS} = 600 V V_{GS} = -5 V / 15 V R_{Goff} = 1,80 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	$t_{d\ off}$		62,6 66,0 66,0		ns
下降时间(电感负载) Fall time, inductive load	I_D = 200 A, V_{DS} = 600 V V_{GS} = -5 V / 15 V R_{Goff} = 1,80 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	t_f		30,0 30,5 30,5		ns
开通损耗 (每脉冲) Turn-on energy loss per pulse	I_D = 200 A, V_{DS} = 600 V, Lσ = 35 nH di/dt = 13,0 kA/µs (T_{vj} = 150°C) V_{GS} = -5 V / 15 V, R_{Gon} = 1,80 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{on}		2,50 2,70 2,90		mJ
关断损耗 (每脉冲) Turn-off energy loss per pulse	I_D = 200 A, V_{DS} = 600 V, Lσ = 35 nH du/dt = 24,0 kV/µs (T_{vj} = 150°C) V_{GS} = -5 V / 15 V, R_{Goff} = 1,80 Ω	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	E_{off}		1,20 1,30 1,30		mJ
短路数据 SC data	V_{GS} = -5 V / 15 V, V_{DD} = 800 V V_{DSmax} = V_{DSS} -L_{sDS} ·di/dt R_G = 10,0 Ω	$t_P \leq$ 2 µs, T_{vj} = 25°C $t_P \leq$ 2 µs, T_{vj} = 150°C	I_{SC}		1680 1640		A A
结 - 散热器热阻 Thermal resistance, junction to heatsink	每个MOSFET / per MOSFET		R_{thJH}		0,328		K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\ op}$	-40		150	°C

Body diode

最大额定值 / Maximum Rated Values

DC body diode forward current	T_{vj} = 175°C, V_{GS} = -5 V	T_H = 10°C	I_{SD}	64		A

特征值 / Characteristic Values

				min.	typ.	max.	
正向电压 Forward voltage	I_{SD} = 200 A, V_{GS} = -5 V I_{SD} = 200 A, V_{GS} = -5 V I_{SD} = 200 A, V_{GS} = -5 V	T_{vj} = 25°C T_{vj} = 125°C T_{vj} = 150°C	V_{SD}		4,60 4,35 4,30	5,65	V

初步数据
Preliminary Data

负温度系数热敏电阻 / NTC-Thermistor

特征值 / Characteristic Values

			min.	typ.	max.	
额定电阻值 Rated resistance	T_{NTC} = 25°C	R_{25}		5,00		kΩ
R100 偏差 Deviation of R100	T_{NTC} = 100°C, R_{100} = 493 Ω	ΔR/R	-5		5	%
耗散功率 Power dissipation	T_{NTC} = 25°C	P_{25}			20,0	mW
B-值 B-value	$R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298,15\ K))]$	$B_{25/50}$		3375		K
B-值 B-value	$R_2 = R_{25} \exp [B_{25/80}(1/T_2 - 1/(298,15\ K))]$	$B_{25/80}$		3411		K
B-值 B-value	$R_2 = R_{25} \exp [B_{25/100}(1/T_2 - 1/(298,15\ K))]$	$B_{25/100}$		3433		K

根据应用手册标定
Specification according to the valid application note.

模块 / Module

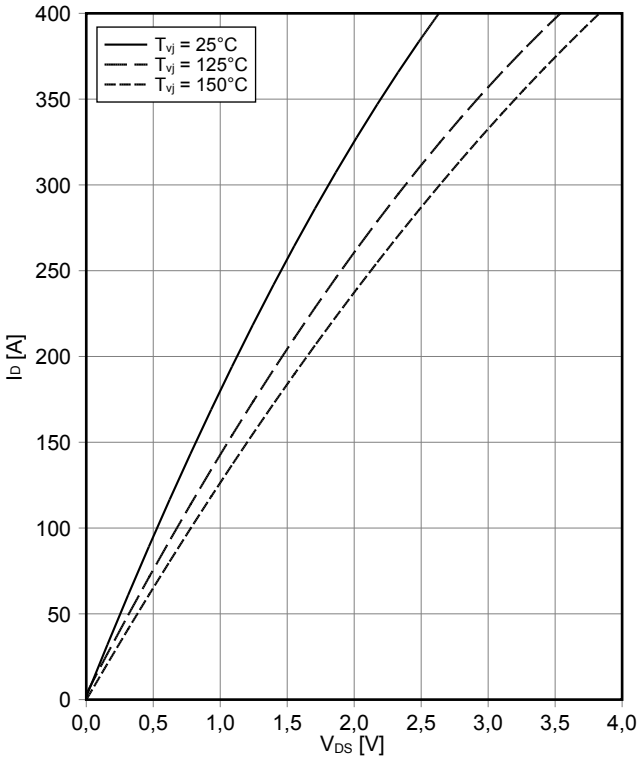
绝缘测试电压 Isolation test voltage	RMS, f = 50 Hz, t = 1 min.	V_{ISOL}	3,0		kV
内部绝缘 Internal isolation	基本绝缘 (class 1, IEC 61140) basic insulation (class 1, IEC 61140)		Al_2O_3		
爬电距离 Creepage distance	端子至散热器 / terminal to heatsink 端子至端子 / terminal to terminal		11,5 6,3		mm
电气间隙 Clearance	端子至散热器 / terminal to heatsink 端子至端子 / terminal to terminal		10,0 5,0		mm
相对电痕指数 Comperative tracking index		CTI	> 200		
相对温度指数 (电) RTI Elec.	住房 housing	RTI	140		°C

			min.	typ.	max.	
杂散电感,模块 Stray inductance module		L_{sCE}		8,0		nH
模块引线电阻,端子-芯片 Module lead resistance, terminals - chip	T_H = 25°C, 每个开关 / per switch	$R_{CC'+EE'}$		0,50		mΩ
储存温度 Storage temperature		T_{stg}	-40		125	°C
Anpresskraft für mech. Bef. pro Feder mountig force per clamp		F	40	-	80	N
重量 Weight		G		39		g

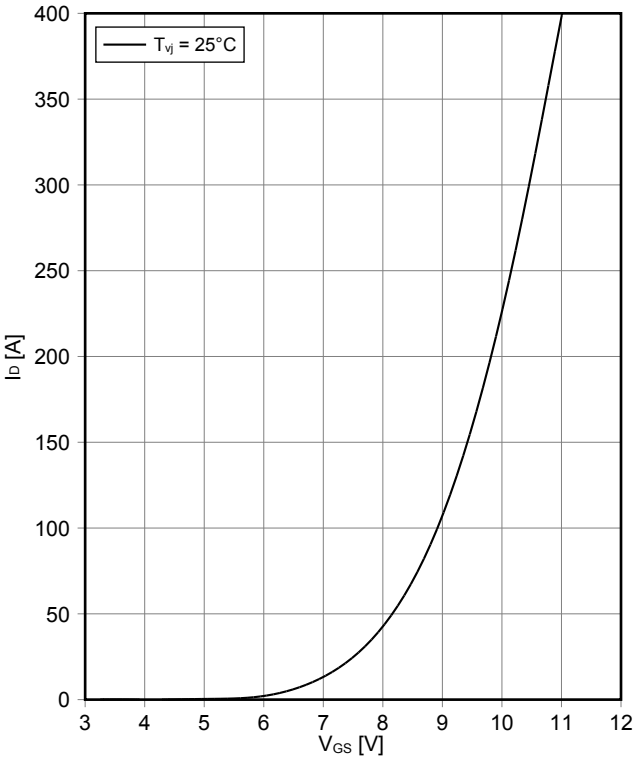
The current under continuous operation is limited to 25 A rms per connector pin.
Important note: The selection of positive and negative gate-source voltages impacts the long-term behavior of the device. The design guidlines described in AN 2018-09 must be considered to ensure sound operation of the device over the planned lifetime.

初步数据
Preliminary Data

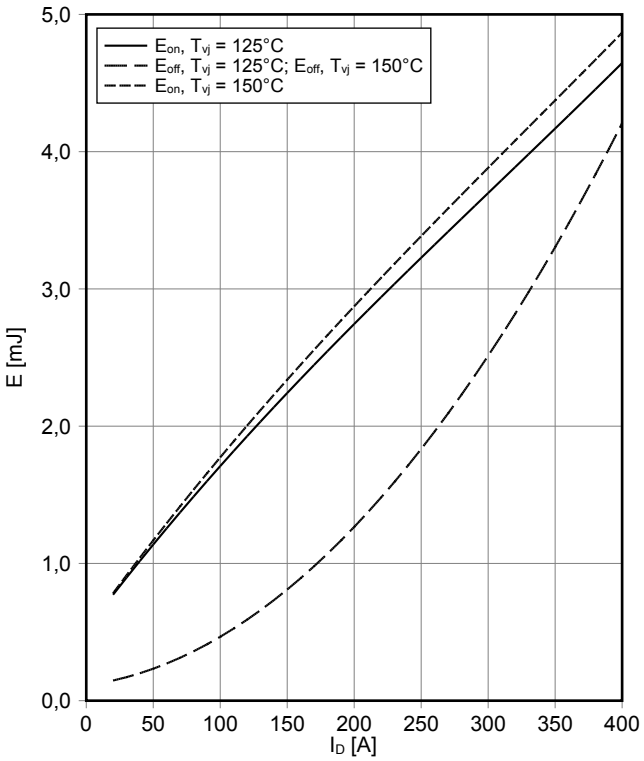
输出特性 MOSFET （典型）
output characteristic MOSFET (typical)
$I_D = f(V_{DS})$
V_{GS} = 15 V



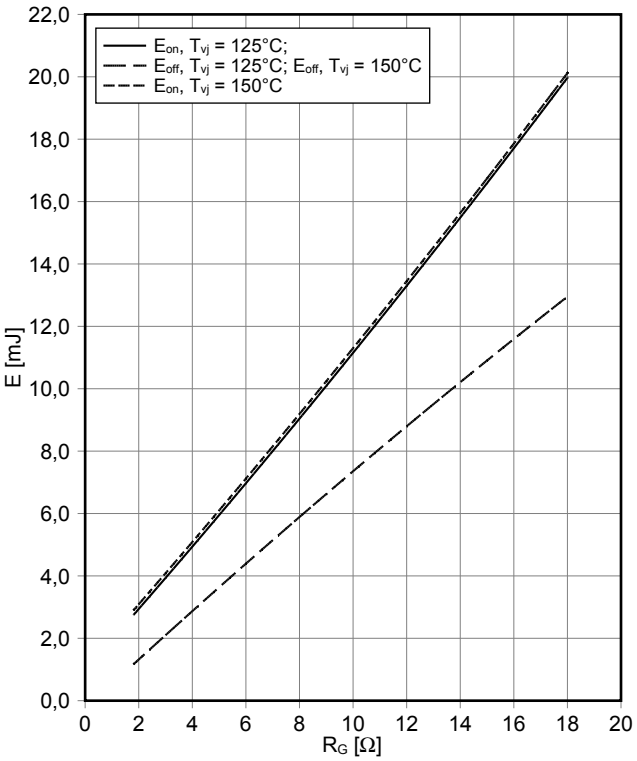
传输特性 MOSFET （典型）
transfer characteristic MOSFET (typical)
$I_D = f(V_{GS})$
V_{DS} = 20 V



开关损耗 MOSFET （典型）
switching losses MOSFET (typical)
$E_{on} = f(I_D)$, $E_{off} = f(I_D)$
V_{GS} = -5 V / 15 V , R_{Gon} = 1,8 Ω, R_{Goff} = 1,8 Ω, V_{DS} = 600 V

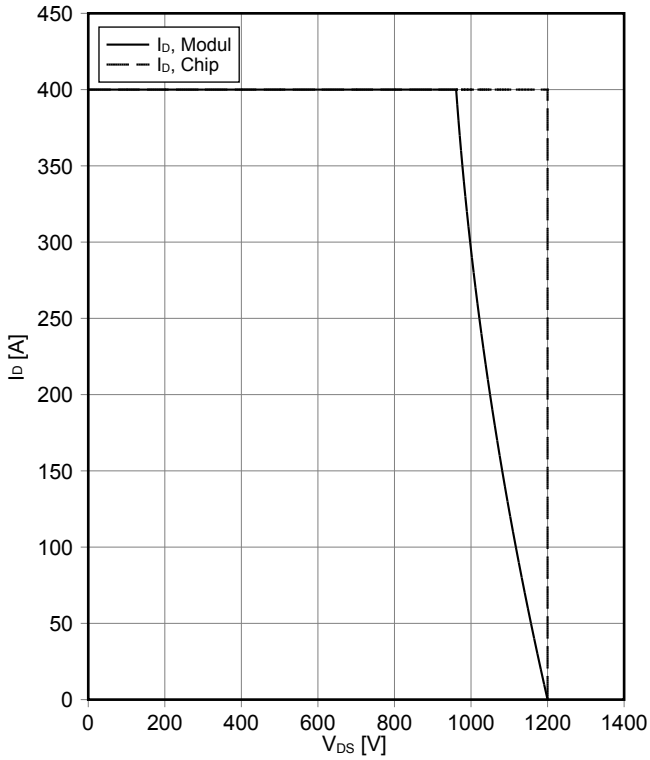


开关损耗 MOSFET （典型）
switching losses MOSFET (typical)
$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
V_{GS} = -5 V / 15 V, I_D = 200 A, V_{DS} = 600 V

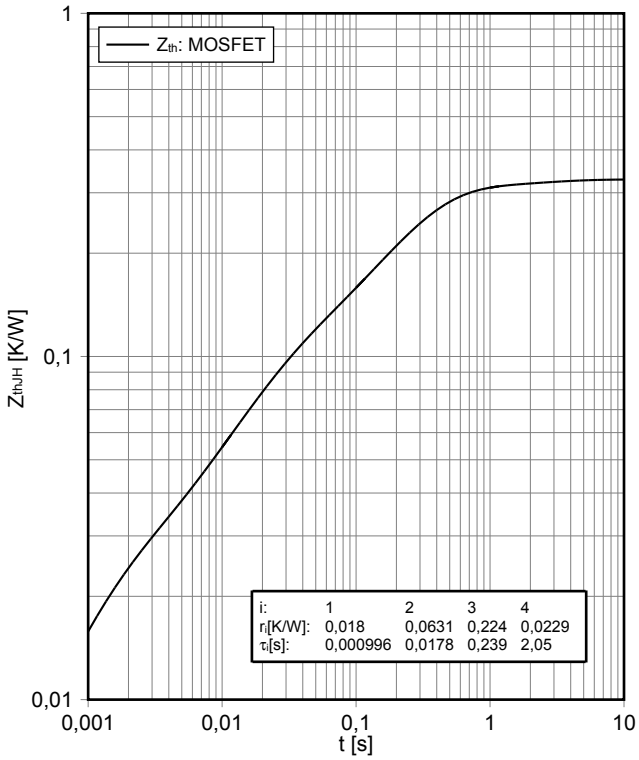


初步数据
Preliminary Data

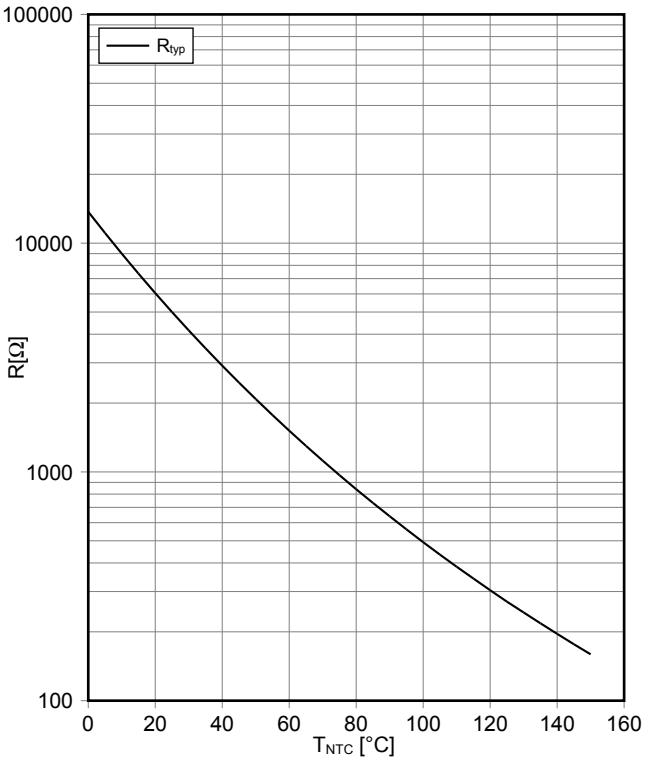
反偏安全工作区 MOSFET (RBSOA)
reverse bias safe operating area MOSFET (RBSOA)
$I_D = f(V_{DS})$
V_{GS} = -5 V / 15 V, T_{vj} = 150°C, R_G = 1,8 Ω



瞬态热阻抗 MOSFET
transient thermal impedance MOSFET
$Z_{thJH} = f(t)$

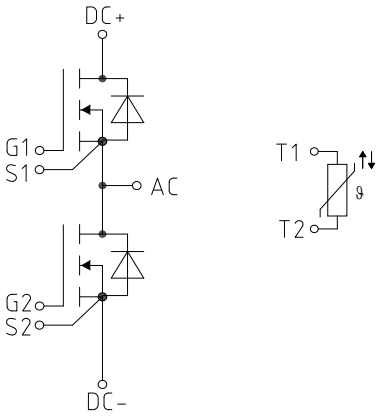


负温度系数热敏电阻 温度特性
NTC-Thermistor-temperature characteristic (typical)
R = f (T)

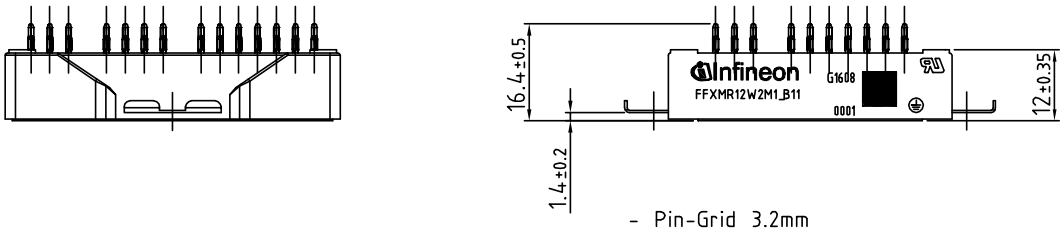


初步数据
Preliminary Data

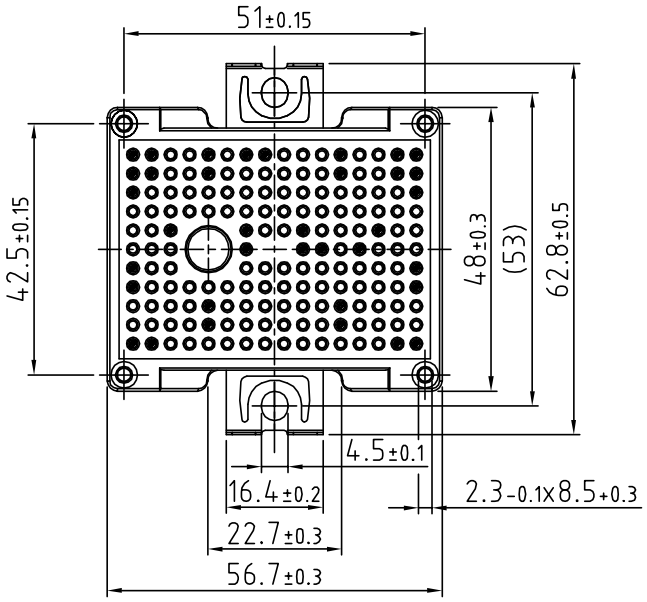
接线图 / Circuit diagram

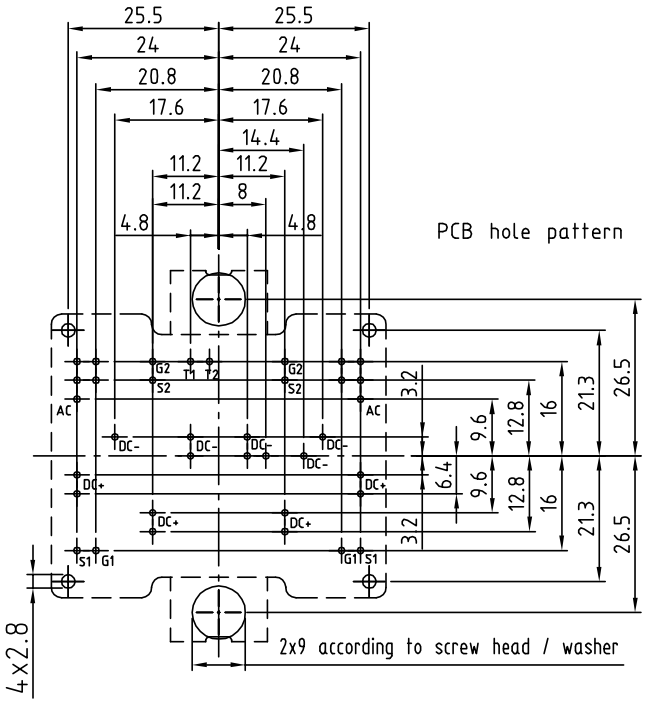


封装尺寸 / Package outlines



- Pin-Grid 3.2mm
- Tolerance of PCB hole pattern ⌖ ø0.1
- Hole specification for contacts see AN 2009-01:
  Diameters of drill ø 1.15mm
  and copper thickness in hole 25-50µm





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