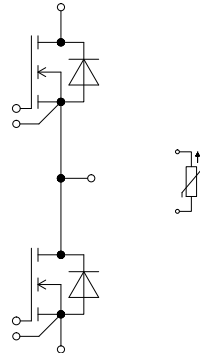
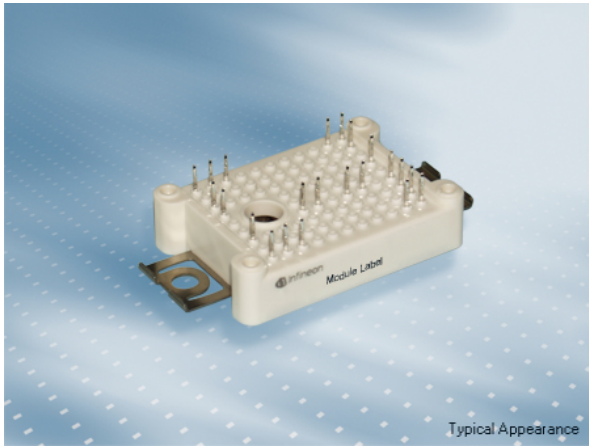


EasyDUAL 模块 采用 CoolSiC™ MOSFET 带有pressfit压接管脚和温度检测NTC
 EasyDUAL module with CoolSiC™ MOSFET and PressFIT / NTC

初步数据 / Preliminary Data



$V_{DSS} = 1200V$
 $I_{D\ nom} = 50A / I_{DRM} = 100A$

典型应用

- 高频开关应用
- zh
- 太阳能应用
- UPS系统

电气特性

- 高电流密度
- 低电感设计
- 低开关损耗

机械特性

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

Typical Applications

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

Electrical Features

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

Mechanical Features

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

Module Label Code

Barcode Code 128



DMX - Code



Content of the 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

漏源击穿电压 Drain-source breakdown voltage	$T_{vj} = 25^{\circ}\text{C}$	V_{DSS}	1200	V
直流漏极电流 DC drain current	$T_H = 95^{\circ}\text{C}$	$I_{D\text{ nom}}$	50	A
脉冲漏极电流, tp由Tjmax限定 Pulsed drain current, tp limited by Tjmax		$I_{D\text{ puls}}$	100	A
栅源峰值电压 Gate-source peak voltage		V_{GSS}	-10/20	V

特征值 / Characteristic Values

		min.	typ.	max.		
漏源通态电阻 Drain-source on resistance	$I_D = 50\text{ A}, V_{GS} = -5\text{ V}/15\text{ V}, T_{vj} = 25^{\circ}\text{C}$	$R_{DS\text{ on}}$	23,0		m Ω	
栅极阈值电压 Gate threshold voltage	$I_D = 20,0\text{ mA}, V_{DS} = V_{GS}, T_{vj} = 25^{\circ}\text{C}$ (tested after I_{GSS} at $V_{GS} = +20\text{ V}$ as precondition)	$V_{GS(th)}$	3,50	4,50	5,55	V
栅极电荷 Gate charge	$V_{GS} = -5\text{ V}/15\text{ V}, V_{DD} = 800\text{ V}$	Q_G	0,125		μC	
内部栅极电阻 Internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$	R_{Gint}	2,3		Ω	
输入电容 Input capacitance	$f = 1,00\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{DS} = 800\text{ V}, V_{GS} = 0\text{ V}$	C_{iss}	3,95		nF	
输出电容 Output capacitance	$f = 1,00\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{DS} = 800\text{ V}, V_{GS} = 0\text{ V}$	C_{oss}	0,235		nF	
反向传输电容 Reverse transfer capacitance	$f = 1,00\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{DS} = 800\text{ V}, V_{GS} = 0\text{ V}$	C_{rss}	0,026		nF	
零栅电压漏极电流 Zero gate voltage drain current	$V_{DS} = 1200\text{ V}, V_{GS} = 0\text{ V}, T_{vj} = 25^{\circ}\text{C}$	I_{DSS}		21,0	μA	
栅极漏电流 Gate-source leakage current	$V_{DS} = 0\text{ V}, V_{GS} = 20\text{ V}, T_{vj} = 25^{\circ}\text{C}$	I_{GSS}		240	nA	
开通延迟时间(电感负载) Turn on delay time, inductive load	$I_D = 50\text{ A}, V_{DS} = 600\text{ V}$ $V_{GS} = -5\text{ V}/15\text{ V}$ $R_G = 1,00\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$t_{d\text{ on}}$	12,0 11,5 8,90	ns	
上升时间(电感负载) Rise time, inductive load	$I_D = 50\text{ A}, V_{DS} = 600\text{ V}$ $V_{GS} = -5\text{ V}/15\text{ V}$ $R_G = 1,00\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_r	10,0 9,60 9,20	ns	
关断延迟时间(电感负载) Turn off delay time, inductive load	$I_D = 50\text{ A}, V_{DS} = 600\text{ V}$ $V_{GS} = -5\text{ V}/15\text{ V}$ $R_G = 1,00\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$t_{d\text{ off}}$	43,5 43,5 43,5	ns	
下降时间(电感负载) Fall time, inductive load	$I_D = 50\text{ A}, V_{DS} = 600\text{ V}$ $V_{GS} = -5\text{ V}/15\text{ V}$ $R_G = 1,00\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_f	12,0 12,0 12,0	ns	
开通损耗(每脉冲) Turn-on energy loss per pulse	$I_D = 50\text{ A}, V_{DS} = 600\text{ V}, L_{\sigma} = 35\text{ nH}$ $V_{GS} = -5\text{ V}/15\text{ V}, di/dt = 11000\text{ A}/\mu\text{s}$ ($T_{vj} = 150^{\circ}\text{C}$) $R_G = 1,00\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{on}	0,49 0,53 0,56	mJ	
关断损耗(每脉冲) Turn-off energy loss per pulse	$I_D = 50\text{ A}, V_{DS} = 600\text{ V}, L_{\sigma} = 35\text{ nH}$ $V_{GS} = -5\text{ V}/15\text{ V}, du/dt = 53000\text{ V}/\mu\text{s}$ ($T_{vj} = 150^{\circ}\text{C}$) $R_G = 1,00\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{off}	0,10 0,10 0,10	mJ	
短路数据 SC data	$V_{GS} = -5\text{ V}/15\text{ V}, V_{DD} = 800\text{ V}$ $V_{DSmax} = V_{DSS} - L_{sDS} \cdot di/dt$ $R_G = 10,0\ \Omega$	$t_p \leq 3\ \mu\text{s}, T_{vj} \leq 25^{\circ}\text{C}$ $t_p \leq 3\ \mu\text{s}, T_{vj} \leq 150^{\circ}\text{C}$	I_{SC}	650 550	A A	
结 - 散热器热阻 Thermal resistance, junction to heatsink	pro MOS-FET / per MOS-FET	R_{thJH}	0,800		K/W	
在开关状态下温度 Temperature under switching conditions		$T_{vj\text{ op}}$	-40	150	$^{\circ}\text{C}$	

Revers-Diode / reverse-diode

		min.	typ.	max.	
正向电压 Forward voltage	$I_S = 50\text{ A}, V_{GS} = -5\text{ V}$ $I_S = 50\text{ A}, V_{GS} = -5\text{ V}$ $I_S = 50\text{ A}, V_{GS} = -5\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	V_{SD}	4,00 3,80 3,75	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	$T_{NTC} = 25^{\circ}\text{C}$	R_{25}		5,00		k Ω
R100 偏差 Deviation of R100	$T_{NTC} = 100^{\circ}\text{C}, R_{100} = 493 \Omega$	$\Delta R/R$	-5		5	%
耗散功率 Power dissipation	$T_{NTC} = 25^{\circ}\text{C}$	P_{25}			20,0	mW
B-值 B-value	$R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298,15 \text{ K}))]$	$B_{25/50}$		3375		K
B-值 B-value	$R_2 = R_{25} \exp [B_{25/80}(1/T_2 - 1/(298,15 \text{ K}))]$	$B_{25/80}$		3411		K
B-值 B-value	$R_2 = R_{25} \exp [B_{25/100}(1/T_2 - 1/(298,15 \text{ K}))]$	$B_{25/100}$		3433		K

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

模块 / Module

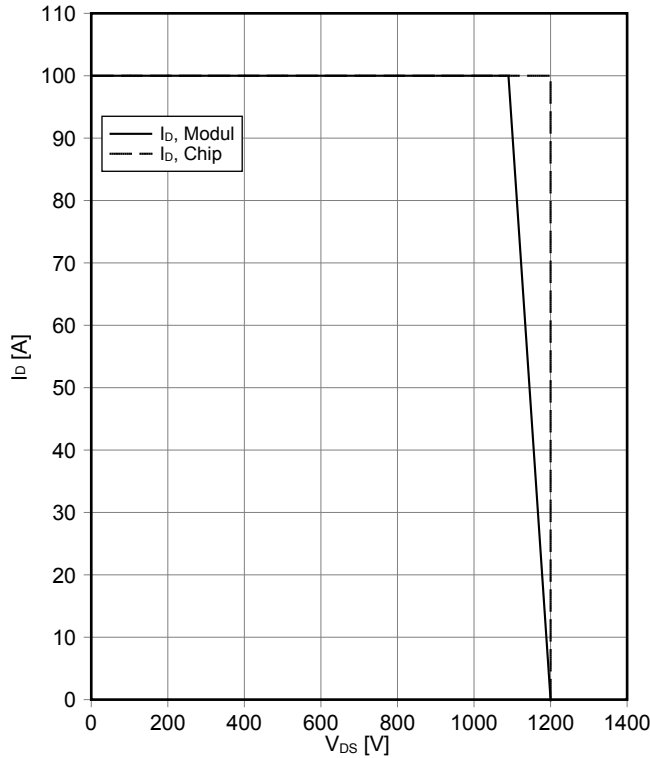
绝缘测试电压 Isolation test voltage	RMS, f = 50 Hz, t = 1 min.	V_{ISOL}		3,0		kV
内部绝缘 Internal isolation	基本绝缘 (class 1, IEC 61140) basic insulation (class 1, IEC 61140)			Al_2O_3		
爬电距离 Creepage distance	端子至散热器 / terminal to heatsink 端子至端子 / terminal to terminal			11,5 6,3		mm
电气间隙 Clearance	端子至散热器 / terminal 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		
min. typ. max.						
杂散电感, 模块 Stray inductance module		L_{sCE}		9,0		nH
储存温度 Storage temperature		T_{stg}	-40		125	$^{\circ}\text{C}$
Anpresskraft für mech. Bef. pro Feder mounting force per clamp		F	20	-	50	N
重量 Weight		G		24		g

Der Strom im Dauerbetrieb ist auf 25 A effektiv pro Anschlusspin begrenzt.
The current under continuous operation is limited to 25 A rms per connector pin.

初步数据 Preliminary Data

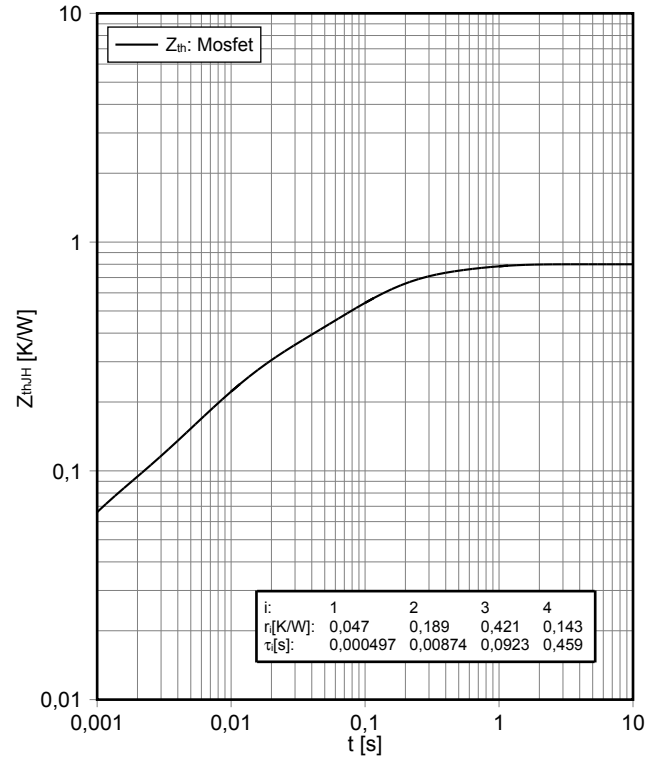
安全工作区 MOSFET (SOA) safe operating area MOSFET (SOA)

$I_D = f(V_{DS})$
 $V_{GS} = -5\text{ V} / +15\text{ V}$, $T_{vj} = 150^\circ\text{C}$, $R_G = 1\ \Omega$



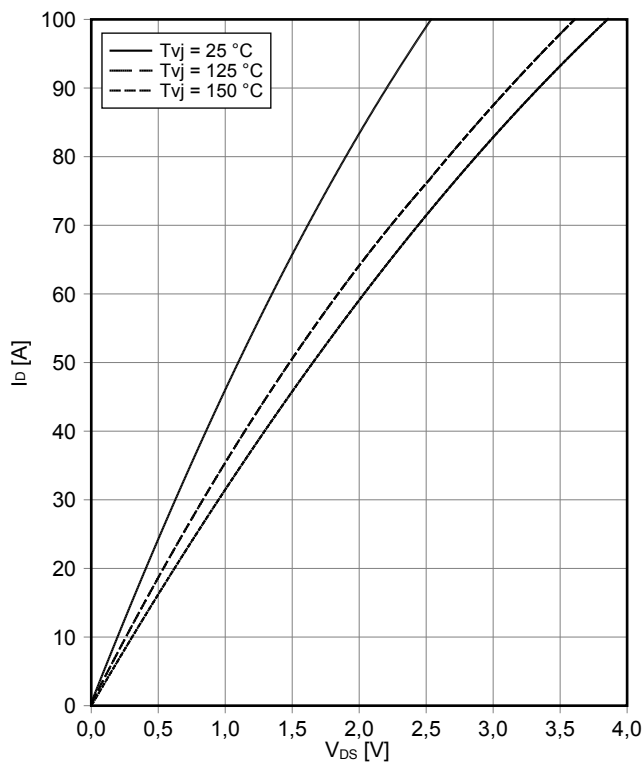
瞬态热阻抗 MOSFET transient thermal impedance MOSFET

$Z_{thJH} = f(t)$



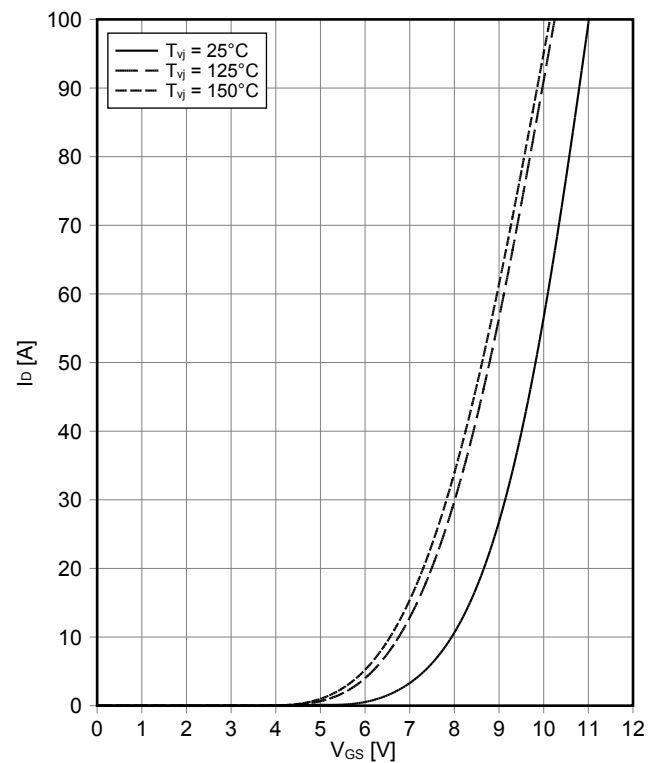
输出特性 MOSFET (典型) output characteristic MOSFET (typical)

$I_D = f(V_{DS})$
 $V_{GS} = 15\text{ V}$



传输特性 MOSFET (典型) transfer characteristic MOSFET (typical)

$I_D = f(V_{GS})$
 $V_{DS} = 20\text{ V}$

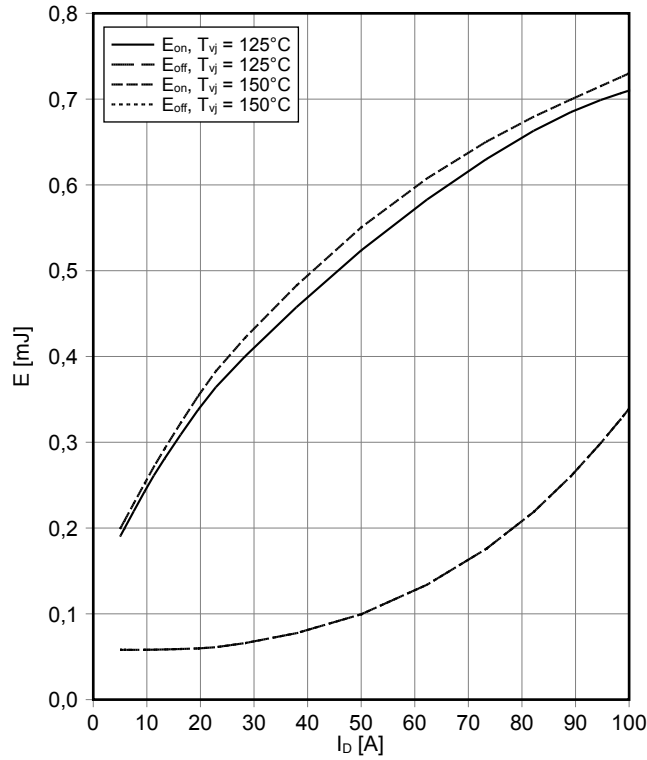


开关损耗 MOSFET (典型)

switching losses MOSFET (typical)

$E_{on} = f(I_D), E_{off} = f(I_D)$

$V_{GS} = +15\text{ V} / -5\text{ V}, R_{Gon} = 1,0\ \Omega, R_{Goff} = 1,0\ \Omega, V_{DS} = 600\text{ V}$

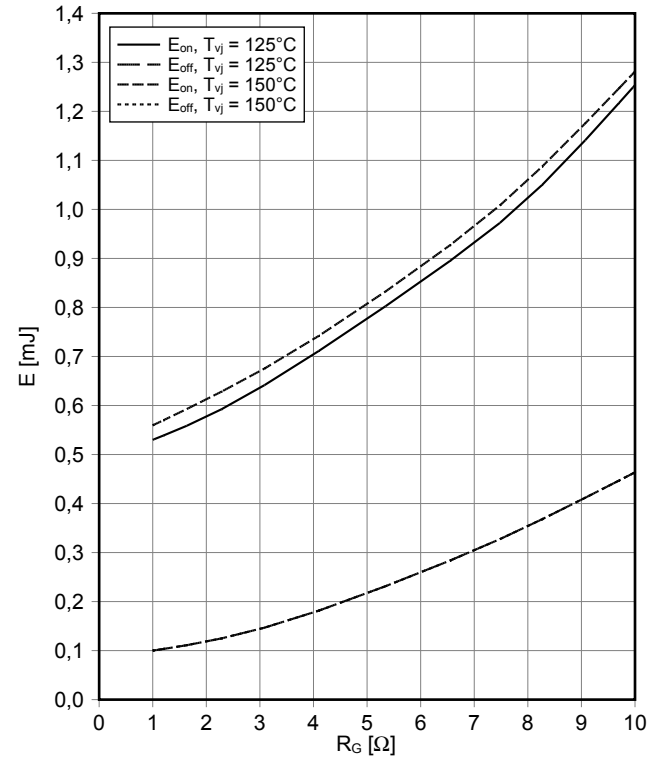


开关损耗 MOSFET (典型)

switching losses MOSFET (typical)

$E_{on} = f(R_G), E_{off} = f(R_G)$

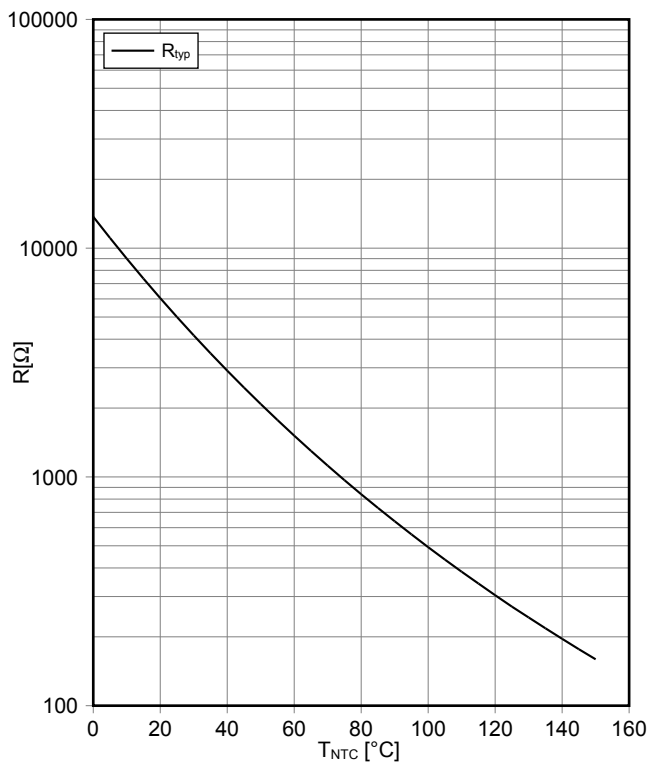
$V_{GS} = +15\text{ V} / -5\text{ V}, I_D = 50\text{ A}, V_{DS} = 600\text{ V}$



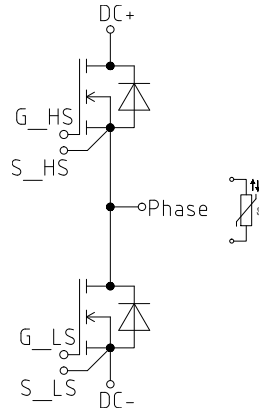
负温度系数热敏电阻 温度特性

NTC-Thermistor-temperature characteristic (typical)

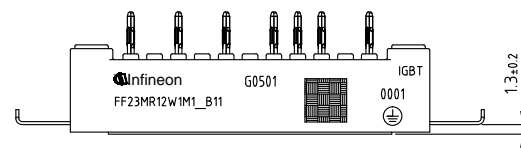
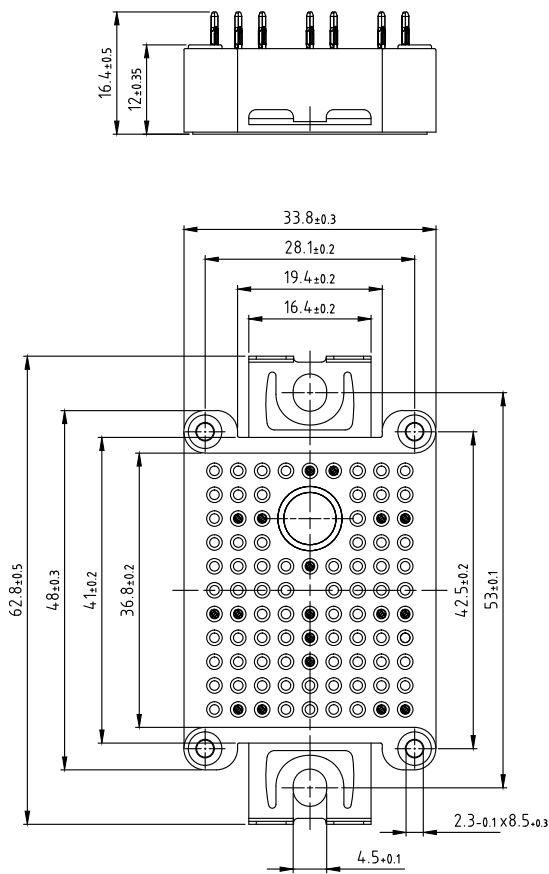
$R = f(T)$



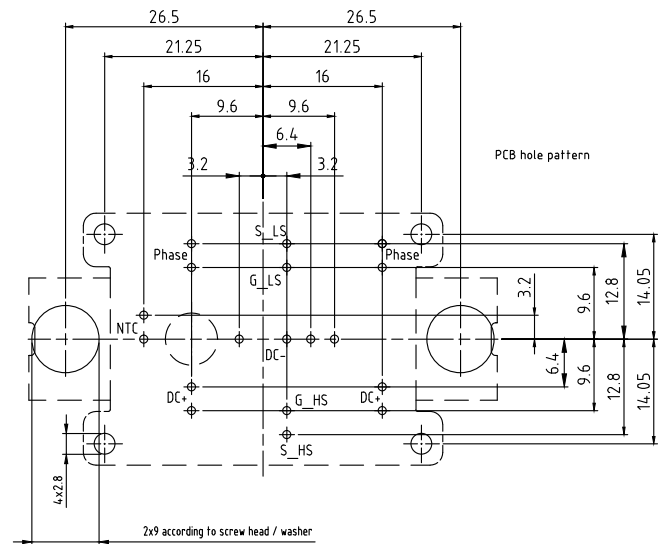
接线图 / Circuit diagram



封装尺寸 / Package outlines



- Pin-Grid 3.2mm
- Tolerance of PCB hole pattern $\pm \phi 0.1$
- Hole specification for contacts see AN 2009-01:
Diameters of drill ϕ 1.15mm
and copper thickness in hole 25-50 μ m



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