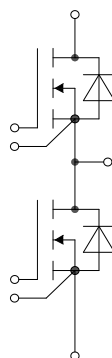


62mm C-Series 模块 采用 CoolSiC™ Trench MOSFET 和预涂导热介质
 62mm C-Series module with CoolSiC™ Trench MOSFET and pre-applied Thermal Interface Material

初步数据 / Preliminary Data



$V_{DSS} = 1200V$
 $I_{D\ nom} = 375A / I_{DRM} = 750A$

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
- 高电流密度

Electrical Features

- Low switching losses
- High current density

机械特性

- 预涂导热介质

Mechanical Features

- Pre-applied Thermal Interface Material

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

漏源极电压 Drain-source voltage		$T_{vj} = 25^{\circ}\text{C}$	V_{DSS}	1200	V
直流漏极电流 DC drain current	$T_{vj} = 175^{\circ}\text{C}, V_{GS} = 15\text{ V}$	$T_H = 60^{\circ}\text{C}$	$I_{D\text{ nom}}$	375	A
脉冲漏极电流 Pulsed drain current	经设计验证, t_p 由 $T_{vj\text{ max}}$ 限定 verified by design, t_p limited by $T_{vj\text{ max}}$		$I_{D\text{ pulse}}$	750	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	$I_D = 375\text{ A}$ $V_{GS} = 15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$R_{DS\text{ on}}$	2,83 3,92 4,33	m Ω
栅极阈值电压 Gate threshold voltage	$I_D = 168\text{ mA}, V_{DS} = V_{GS}, T_{vj} = 25^{\circ}\text{C}$ (tested after 1ms pulse at $V_{GS} = +20\text{ V}$)		$V_{GS(th)}$	3,45 4,50 5,15	V
总的栅极电荷 Total gate charge	$V_{GS} = -5\text{ V} / 15\text{ V}, V_{DS} = 800\text{ V}$		Q_G	1,00	μC
内部栅极电阻 Internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$		R_{Gint}	1,0	Ω
输入电容 Input capacitance	$f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}$ $V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}$		C_{iss}	29,8	nF
输出电容 Output capacitance	$f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}$ $V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}$		C_{oss}	1,65	nF
反向传输电容 Reverse transfer capacitance	$f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}$ $V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}$		C_{rss}	0,227	nF
C_{oss} stored energy	$T_{vj} = 25^{\circ}\text{C}$ $V_{DS} = 25\text{ V}, V_{GS} = -5\text{ V} / 15\text{ V}$		E_{oss}	660	μJ
零栅电压漏极电流 Zero gate voltage drain current	$V_{DS} = 1200\text{ V}, V_{GS} = -5\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$	I_{DSS}	5,40 520	μA
栅极漏电流 Gate-source leakage current	$V_{DS} = 0\text{ V}$ $T_{vj} = 25^{\circ}\text{C}$	$V_{GS} = 20\text{ V}$ $V_{GS} = -10\text{ V}$	I_{GSS}	400	nA
开通延迟时间(电感负载) Turn on delay time, inductive load	$I_D = 375\text{ A}, V_{DS} = 600\text{ V}$ $V_{GS} = -5\text{ V} / 15\text{ V}$ $R_{Gon} = 4,30\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$t_{d\text{ on}}$	79,4 71,6 71,6	ns
上升时间(电感负载) Rise time, inductive load	$I_D = 375\text{ A}, V_{DS} = 600\text{ V}$ $V_{GS} = -5\text{ V} / 15\text{ V}$ $R_{Gon} = 4,30\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_r	198 219 219	ns
关断延迟时间(电感负载) Turn off delay time, inductive load	$I_D = 375\text{ A}, V_{DS} = 600\text{ V}$ $V_{GS} = -5\text{ V} / 15\text{ V}$ $R_{Goff} = 3,60\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$t_{d\text{ off}}$	69,3 60,4 60,4	ns
下降时间(电感负载) Fall time, inductive load	$I_D = 375\text{ A}, V_{DS} = 600\text{ V}$ $V_{GS} = -5\text{ V} / 15\text{ V}$ $R_{Goff} = 3,60\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_f	51,5 46,8 46,8	ns
开通损耗(每脉冲) Turn-on energy loss per pulse	$I_D = 375\text{ A}, V_{DS} = 600\text{ V}, L\sigma = 10\text{ nH}$ $di/dt = 7,05\text{ kA}/\mu\text{s}$ ($T_{vj} = 150^{\circ}\text{C}$) $V_{GS} = -5\text{ V} / 15\text{ V}, R_{Gon} = 4,30\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{on}	18,5 16,0 16,0	mJ
关断损耗(每脉冲) Turn-off energy loss per pulse	$I_D = 375\text{ A}, V_{DS} = 600\text{ V}, L\sigma = 10\text{ nH}$ $du/dt = 7,67\text{ kV}/\mu\text{s}$ ($T_{vj} = 150^{\circ}\text{C}$) $V_{GS} = -5\text{ V} / 15\text{ V}, R_{Goff} = 3,60\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{off}	13,0 13,5 13,5	mJ
结 - 散热器热阻 Thermal resistance, junction to heatsink	每个MOSFET / per MOSFET valid with IFX pre-applied thermal interface material		R_{thJH}	0,140	K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\text{ op}}$	-40 150	$^{\circ}\text{C}$

Body diode

最大额定值 / Maximum Rated Values

DC body diode forward current	$T_{vj} = 175^{\circ}\text{C}, V_{GS} = -5\text{ V}$	$T_H = 60^{\circ}\text{C}$	I_{SD}	120	A
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特征值 / Characteristic Values

			min. typ. max.		
正向电压 Forward voltage	$I_{SD} = 375\text{ A}, V_{GS} = -5\text{ V}$ $I_{SD} = 375\text{ A}, V_{GS} = -5\text{ V}$ $I_{SD} = 375\text{ A}, V_{GS} = -5\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	V_{SD}	4,60 4,35 4,30	5,65 V

初步数据
 Preliminary Data

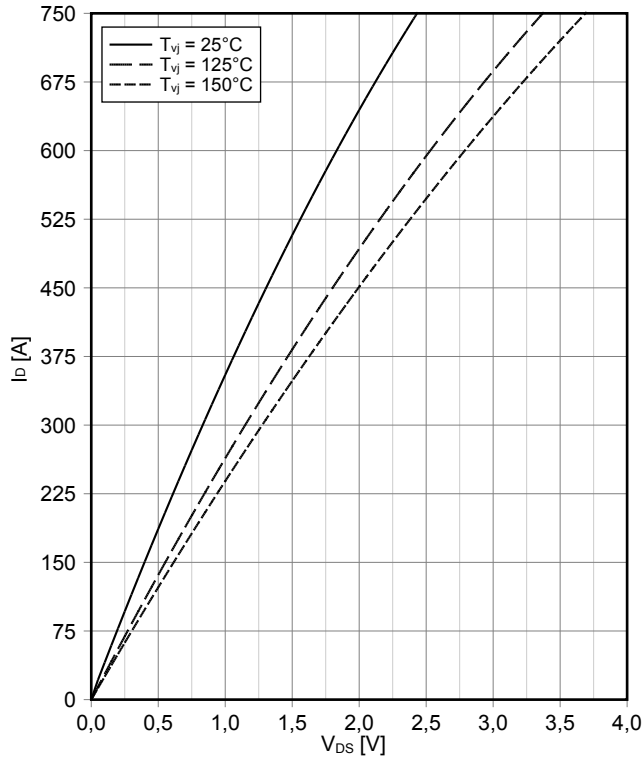
模块 / Module

绝缘测试电压 Isolation test voltage	RMS, f = 50 Hz, t = 1 min.	V _{ISOL}	4,0		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 ₂ O ₃		
爬电距离 Creepage distance	端子至散热器 / terminal to heatsink 端子至端子 / terminal to terminal		29,0 23,0		mm
电气间隙 Clearance	端子至散热器 / terminal to heatsink 端子至端子 / terminal to terminal		23,0 11,0		mm
相对电痕指数 Comperative tracking index		CTI	> 400		
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}		20	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'}		0,475	mΩ
储存温度 Storage temperature		T _{stg}	-40		125 °C
最高基板工作温度 Maximum baseplate operation temperature		T _{BPmax}			125 °C
模块安装的安装扭矩 Mounting torque for modul mounting	螺丝 M6 根据相应的应用手册进行安装 Screw M6 - Mounting according to valid application note	M	3,00		6,00 Nm
端子联接扭矩 Terminal connection torque	螺丝 M6 根据相应的应用手册进行安装 Screw M6 - Mounting according to valid application note	M	2,5	-	5,0 Nm
重量 Weight		G		340	g

Important note: The selection of positive and negative gate-source voltages impacts the long-term behavior of the device. The design guidelines described in Application Note AN 2018-09 must be considered to ensure sound operation of the device over the planned lifetime. Storage and shipment of modules with TIM => see AN2012-07

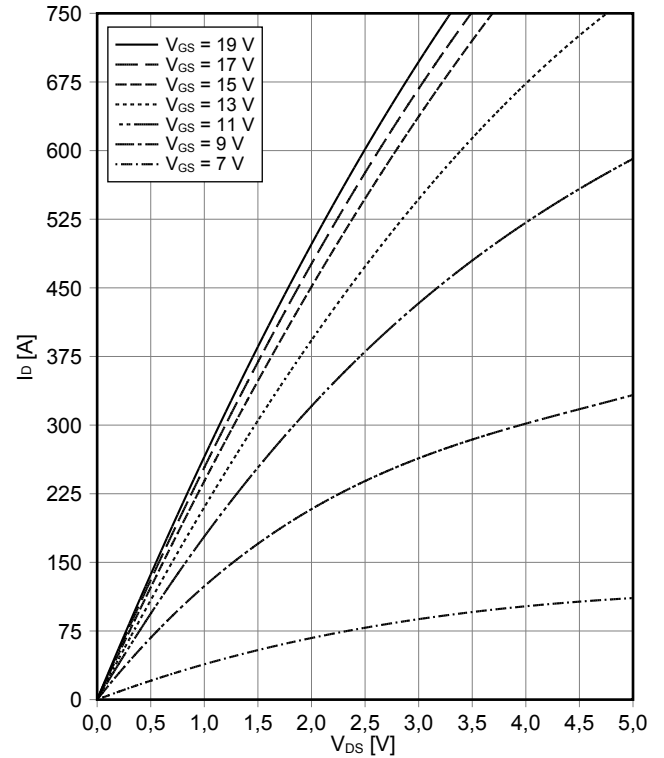
输出特性 MOSFET (典型)
output characteristic MOSFET (typical)

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



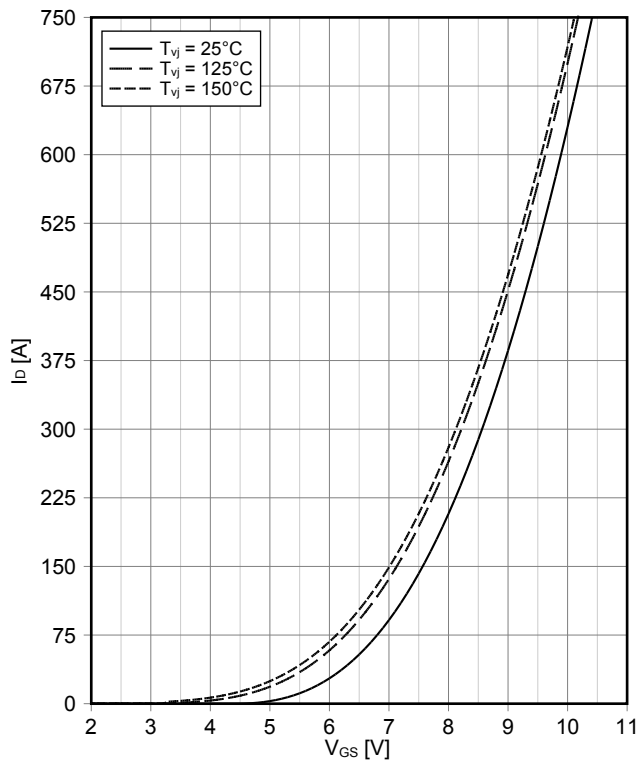
输出特性 MOSFET (典型)
output characteristic MOSFET (typical)

$I_D = f(V_{DS})$
 $T_{vj} = 150^\circ\text{C}$



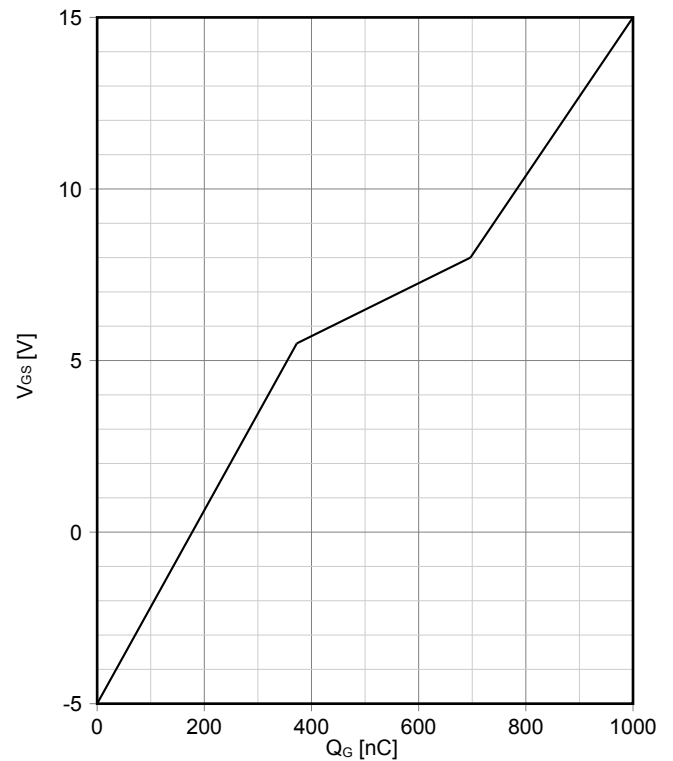
传输特性 MOSFET (典型)
transfer characteristic MOSFET (typical)

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



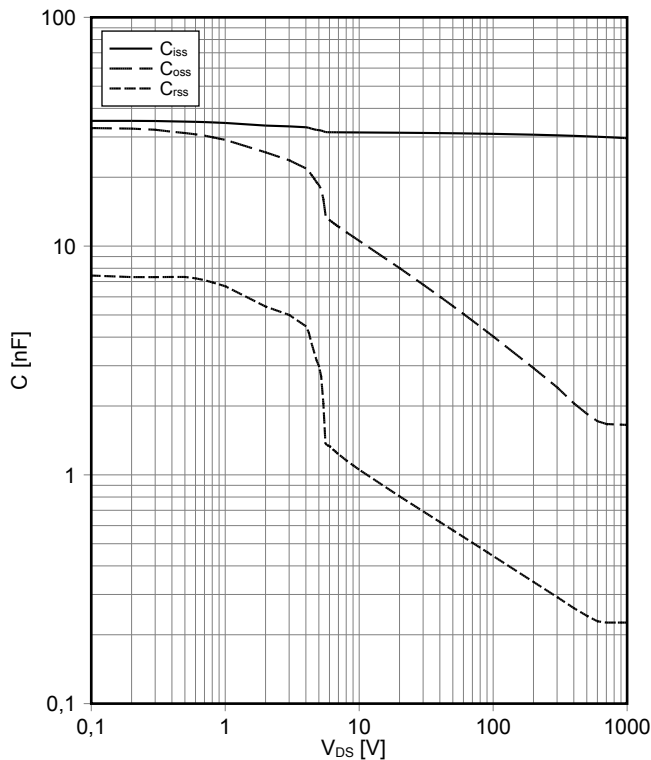
栅极电荷特性 MOSFET (典型)
gate charge characteristic MOSFET (typical)

$V_{GS} = f(Q_G)$
 $V_{DS} = 800\text{ V}, I_D = 375\text{ A}, T_{vj} = 25^\circ\text{C}$

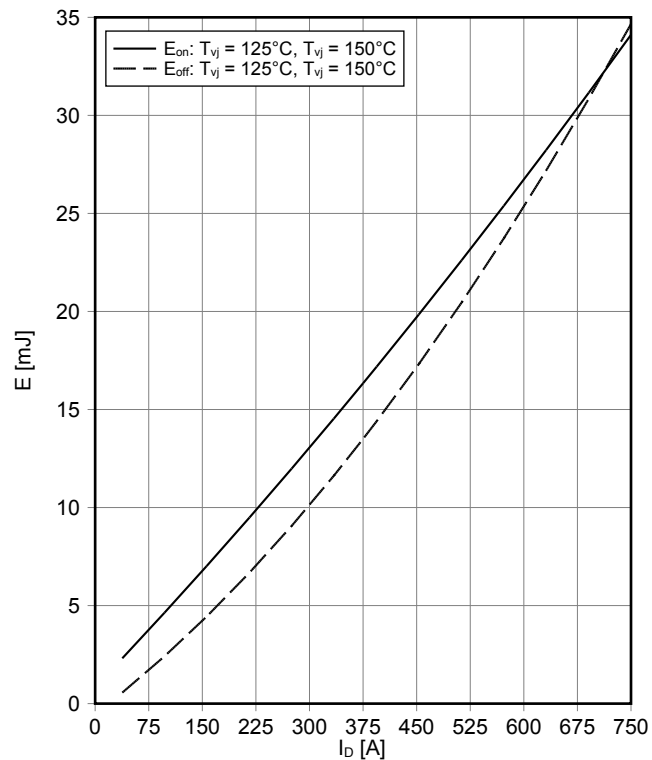


初步数据 Preliminary Data

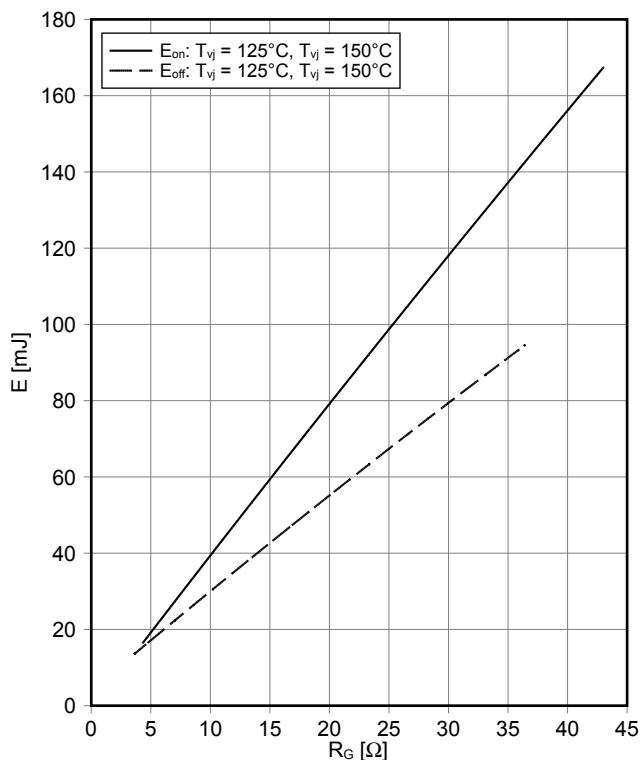
电容特性 MOSFET (典型)
capacity characteristic MOSFET (typical)
 $C = f(V_{DS})$
 $V_{GS} = 0\text{ V}$, $T_{vj} = 25^\circ\text{C}$, $f = 1\text{ MHz}$



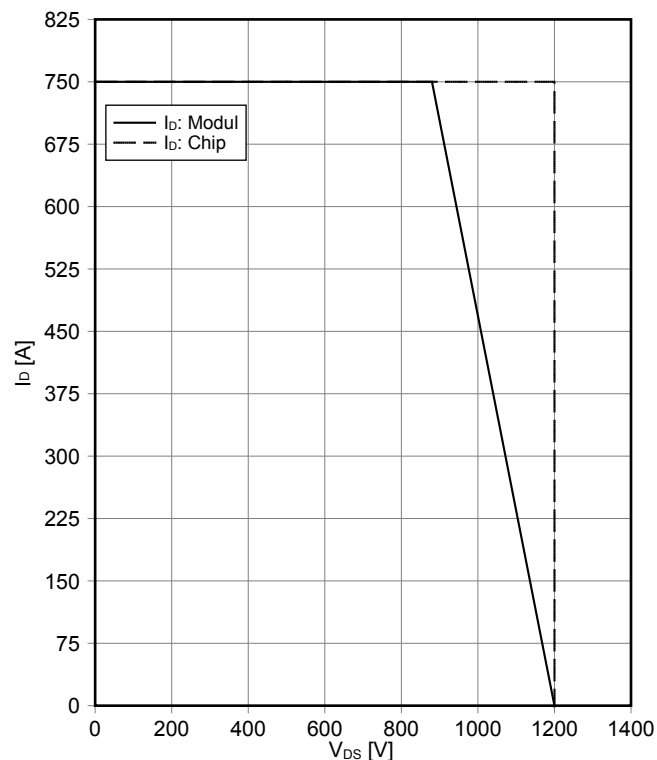
开关损耗 MOSFET (典型)
switching losses MOSFET (typical)
 $E_{on} = f(I_D)$, $E_{off} = f(I_D)$
 $V_{GS} = -5\text{ V} / +15\text{ V}$, $R_{Gon} = 4,3\ \Omega$, $R_{Goff} = 3,6\ \Omega$, $V_{DS} = 600\text{ V}$



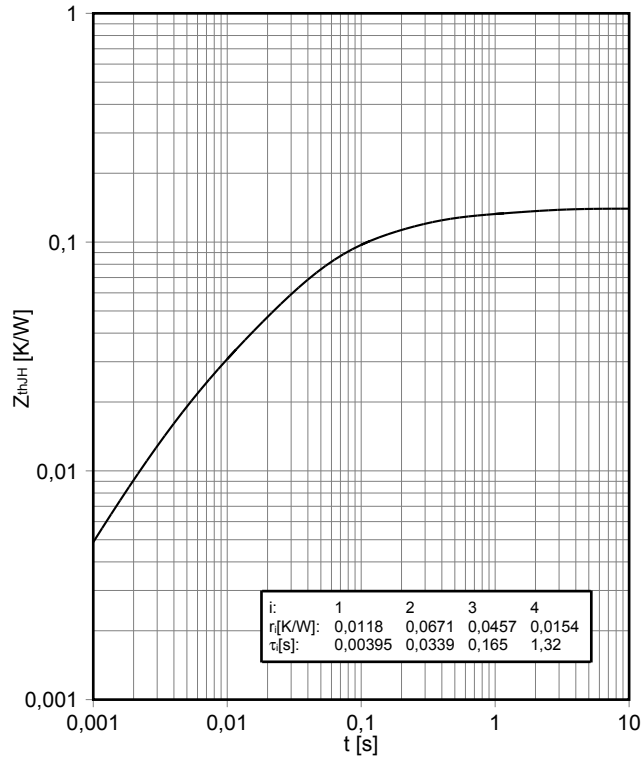
开关损耗 MOSFET (典型)
switching losses MOSFET (typical)
 $E_{on} = f(R_G)$, $E_{off} = f(R_G)$
 $V_{GS} = -5\text{ V} / +15\text{ V}$, $I_D = 375\text{ A}$, $V_{DS} = 600\text{ V}$



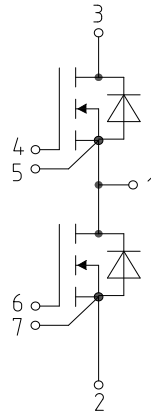
反偏安全工作区 MOSFET (RBSOA)
reverse bias safe operating area MOSFET (RBSOA)
 $I_D = f(V_{DS})$
 $V_{GS} = -5\text{ V} / +15\text{ V}$, $R_{Goff} = 3,6\ \Omega$, $T_{vj} = 150^\circ\text{C}$



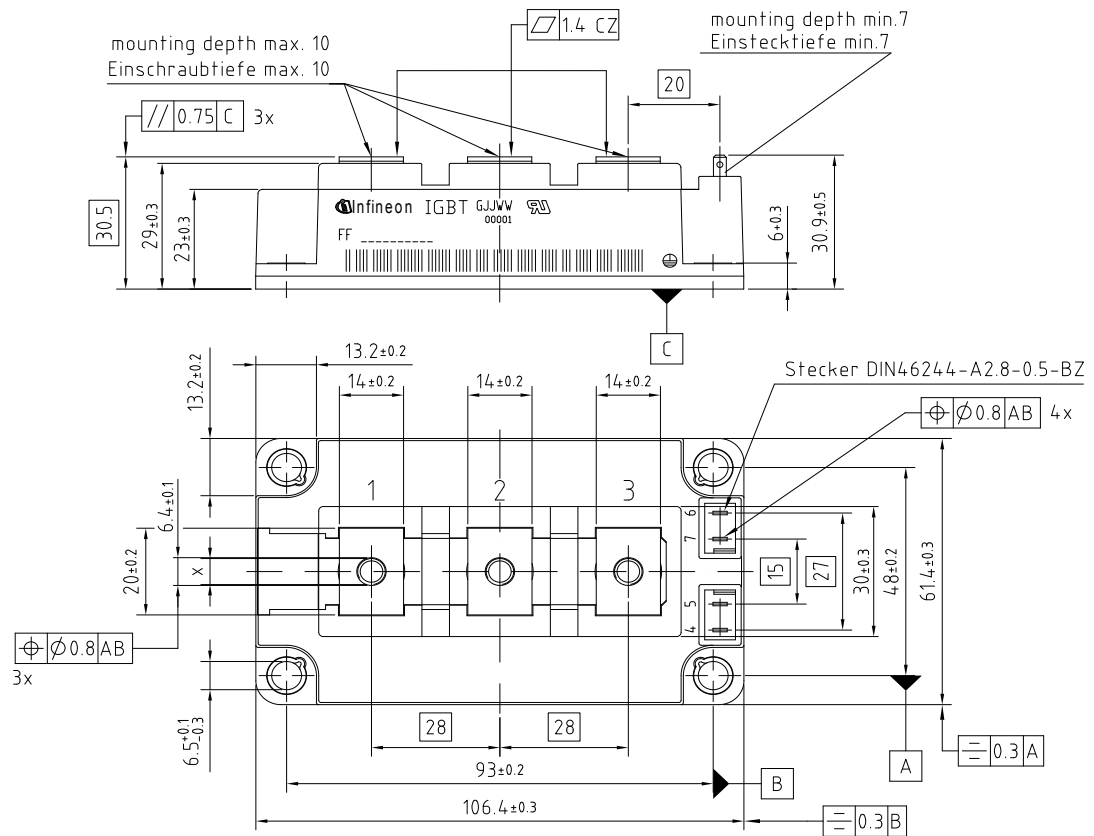
瞬态热阻抗 MOSFET
transient thermal impedance MOSFET
 $Z_{thJH} = f(t)$



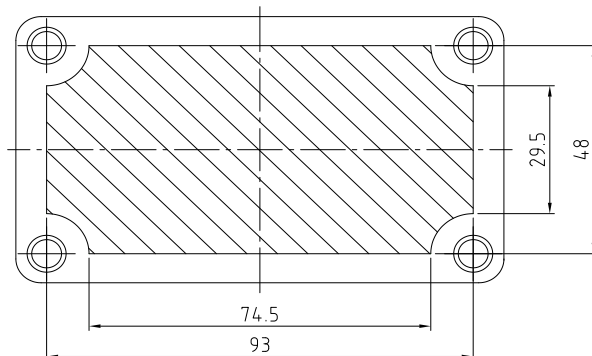
接线图 / Circuit diagram



封装尺寸 / Package outlines



x: M5/M6 depending on type
x: M5/M6 je nach Typ



Sperrfläche für Thermisches Interface Material
restricted area for Thermal Interface Material

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