



产品数据手册 Product Datasheet 版本 Ver 19.12

TFM1500NDM33-D200
二极管模块 Diode Modules

关键参数		Key Parameters	
V_{RRM}		3300	V
V_F	Typ.	2.40	V
I_F	Max.	1500	A
I_{FRM}	Max.	3000	A

典型应用	Typical Applications
●工业整流	Industrial Rectification
●电机控制	Motor Controllers
●直流斩波器	DC Choppers
●负载续流	Load Freewheeling

特点	Features
●AlSiC 基板	AlSiC Baseplate
●AlN 衬板	AlN Substrates
●高热循环能力	High Thermal Cycling Capability
●高电流密度	High Current Density

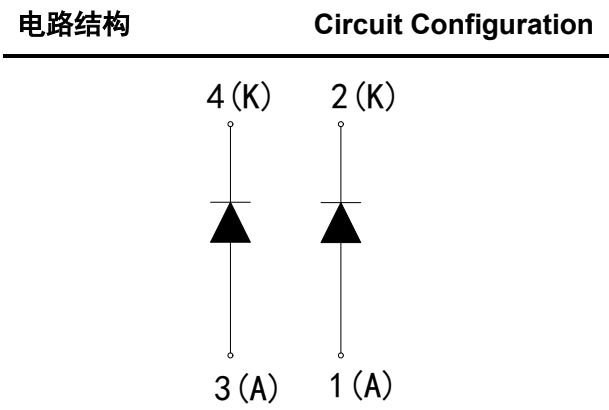


图 1.电路结构
Fig. 1 Circuit configuration

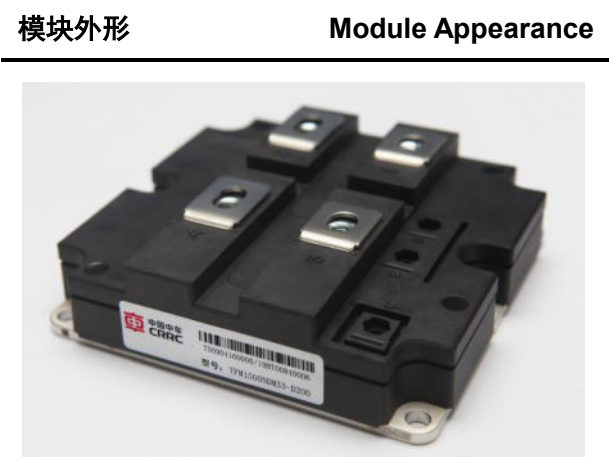


图 2. 模块外形
Fig. 2 Module appearance

模块标签说明	Module Label Code Instruction	
 ab1234567890	数据位置 Data position	数据内容 Content of data
	1--8	模块批次号 Module batch number
	9--12	模块序列号 Module serial number

最大额定值
Absolute Maximum Ratings

符号 Symbol	参数名称 Parameter	测试条件 Test Conditions	数值 Value	单位 Unit
V_{RRM}	重复峰值电压 Repetitive voltage	$T_C = 25\text{ }^{\circ}\text{C}$	3300	V
I_F	正向直流电流 Forward current	DC	1500	A
I_{FRM}	正向重复峰值电流 Peak forward current	$t_P = 1\text{ms}$	3000	A
I_{FSM}	浪涌电流 Surge current	$V_R = 0\text{V}$, $t_P = 10\text{ms}$, $T_{vj} = 25\text{ }^{\circ}\text{C}$	12000	A
$R_{\theta t}$	$R_{\theta t}$ 值 $R_{\theta t}$	$V_R = 0\text{V}$, $t_P = 10\text{ms}$, $T_{vj} = 125\text{ }^{\circ}\text{C}$	720	kA^2s
V_{isol}	绝缘电压(模块) Isolation voltage – per module	短接所有端子, 端子与基板间施加电压 (Connected terminals to base plate), AC RMS, 1 min, 50Hz, $T_C = 25\text{ }^{\circ}\text{C}$	6000	V
Q_{PD}	局部放电电荷(模块) Partial discharge – per module	IEC1287. $V_1=3500\text{V}$, $V_2=2600\text{V}$, 50Hz RMS, $T_C = 25\text{ }^{\circ}\text{C}$	10	pC

热和机械数据
Thermal & Mechanical Data

参数 Symbol	说明 Explanation	值 Value	单位 Unit
爬电距离 Creepage distance	端子-散热器 Terminal to heatsink	73	mm
	端子-端子 Terminal to terminal	33	mm
绝缘间隙 Clearance	端子-散热器 Terminal to heatsink	48	mm
	端子-端子 Terminal to terminal	20	mm
相对漏电起痕指数 CTI (Comparative Tracking Index)		>600	

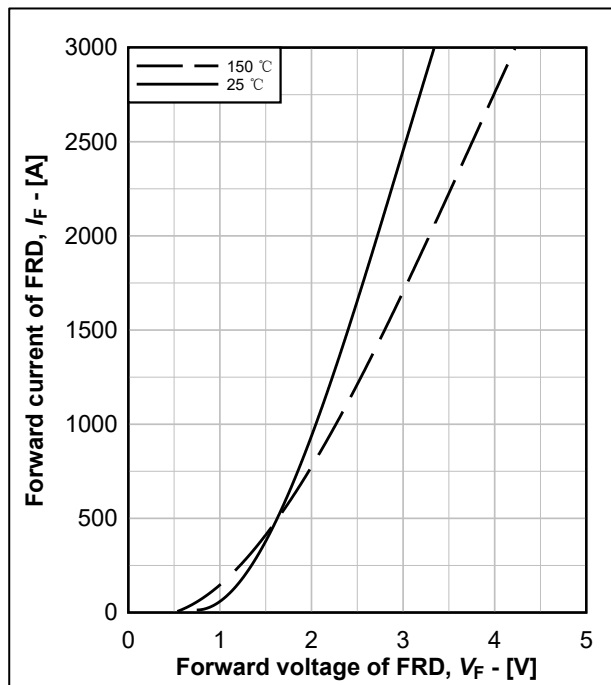
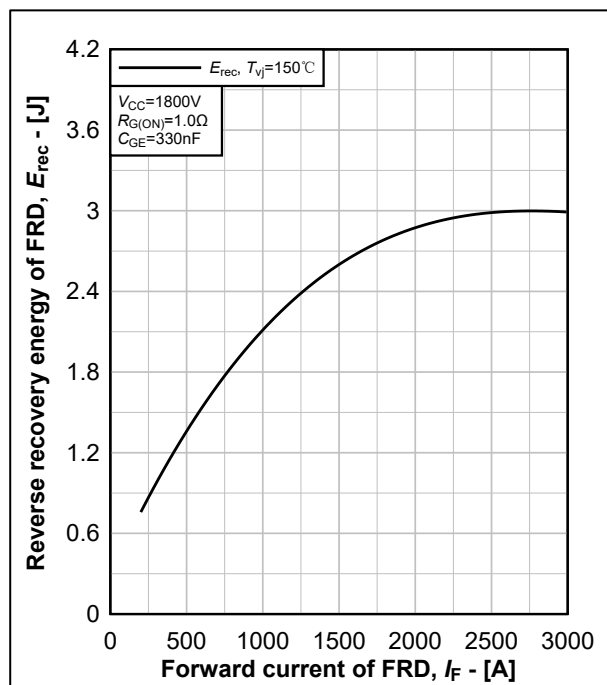
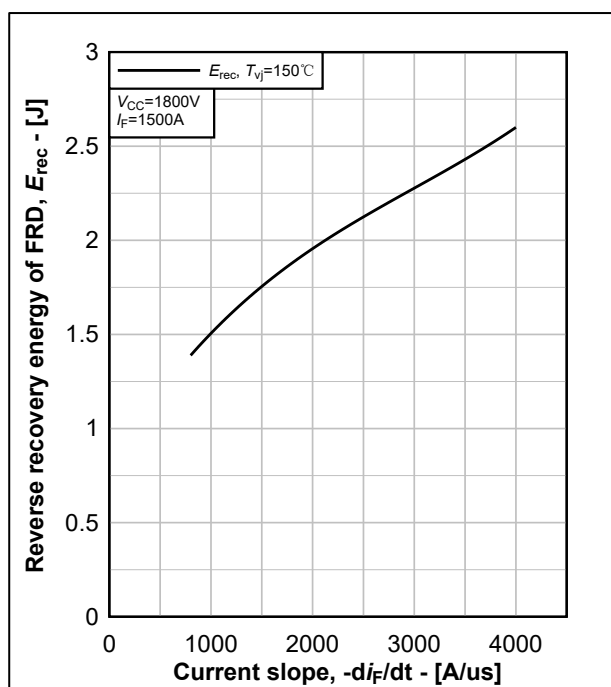
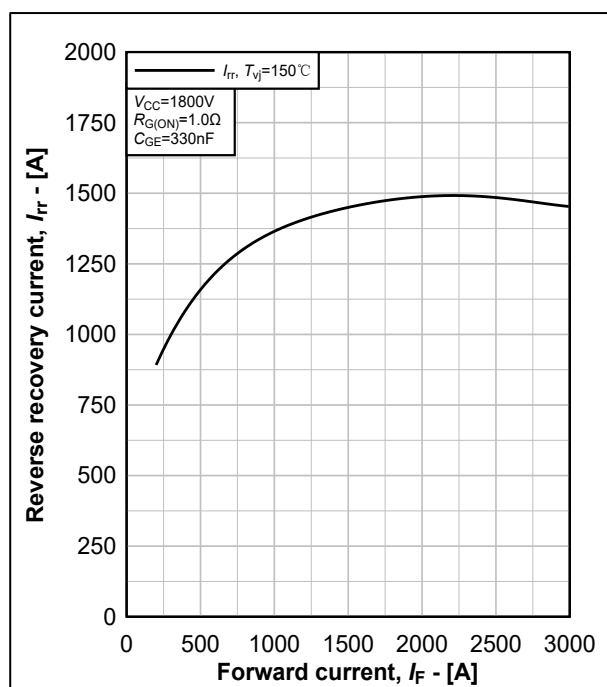
热和机械数据**Thermal & Mechanical Data**

符号 Symbol	参数名称 Parameter	测试条件 Test Conditions	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit
$R_{th(J-C)}$	结壳热阻 Thermal resistance – Diode				15	K / kW
$R_{th(C-H)}$	接触热阻 Thermal resistance – case to heatsink	安装力矩 5Nm, 导热脂 1W/m·°C Mounting torque 5Nm, with mounting grease 1W/m·°C		16		K / kW
$T_{vj\ op}$	工作结温 Operating junction temperature		-40		150	°C
T_{stg}	存储温度 Storage temperature range		-40		150	°C
M	安装力矩 Screw torque	安装紧固用 - M6 Mounting - M6			5	Nm
		电路互连用 - M8 Electrical connections - M8			10	Nm
L_M	模块电感 Module inductance			30		nH
R_{INT}	模块端子-芯片电阻 Internal transistor resistance, terminals - chip	$T_C = 25\ ^\circ\text{C}$		0.33		mΩ

电特性值
Electrical Characteristics

 除非特别声明，否则 $T_C = 25\text{ }^{\circ}\text{C}$
 $T_C = 25\text{ }^{\circ}\text{C}$ unless otherwise stated

符号 Symbol	参数名称 Parameter	条件 Test Conditions		最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit
I_{RRM}	重复反向电流 Repetitive reverse current	$V_{RM} = V_{RRM}$				1	mA
		$V_{RM} = V_{RRM}, T_C = 150\text{ }^{\circ}\text{C}$				100	mA
V_F	正向电压 Forward voltage	$I_F = 1500\text{A}$			2.40		V
		$I_F = 1500\text{A}, T_{vj} = 150\text{ }^{\circ}\text{C}$			2.80		V
Q_{rr}	反向恢复电荷 Reverse recovery charge	$I_F = 1500\text{A},$ $V_{CC} = 1800\text{V},$ $R_{G(ON)} = 1.0\text{ }\Omega,$	$T_{vj} = 25\text{ }^{\circ}\text{C}$		1020		μC
			$T_{vj} = 150\text{ }^{\circ}\text{C}$		1710		μC
I_{rr}	反向恢复电流 Reverse recovery current	$C_{GE} = 330\text{nF},$ $L_S = 150\text{nH},$ $-di_F/dt = 4000\text{A}/\mu\text{s},$ ($T_{vj} = 150\text{ }^{\circ}\text{C}$).	$T_{vj} = 25\text{ }^{\circ}\text{C}$		1260		A
			$T_{vj} = 150\text{ }^{\circ}\text{C}$		1450		A
E_{rec}	反向恢复损耗 Reverse recovery energy	IGBT: TIM1500ESM33-PSA011	$T_{vj} = 25\text{ }^{\circ}\text{C}$		1.50		J
			$T_{vj} = 150\text{ }^{\circ}\text{C}$		2.60		J

图 3.输出特性典型曲线, $I_F = f(V_F)$ Fig.3 Typical output characteristics, $I_F = f(V_F)$ 图 4.反向恢复能耗典型曲线, $E_{rec}=f(I_F)$ Fig.4 Typical reverse recovery energy, $E_{rec}=f(I_F)$ 图 5.反向恢复能耗典型曲线, $E_{rec}=f(-di_F/dt)$ Fig.5 Typical reverse recovery energy, $E_{rec}=f(-di_F/dt)$ 图 6.反向恢复电流典型曲线, $I_{rr}=f(I_F)$ Fig.6 Typical reverse recovery current, $I_{rr}=f(I_F)$

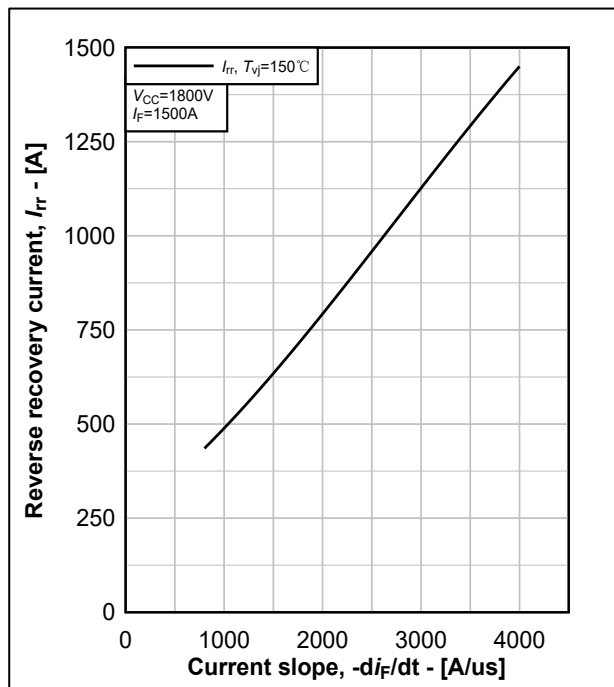


图 7.反向恢复电流典型曲线, $I_{rr} = f(-di_F/dt)$

Fig.7 Typical reverse recovery current, $I_{rr} = f(-di_F/dt)$

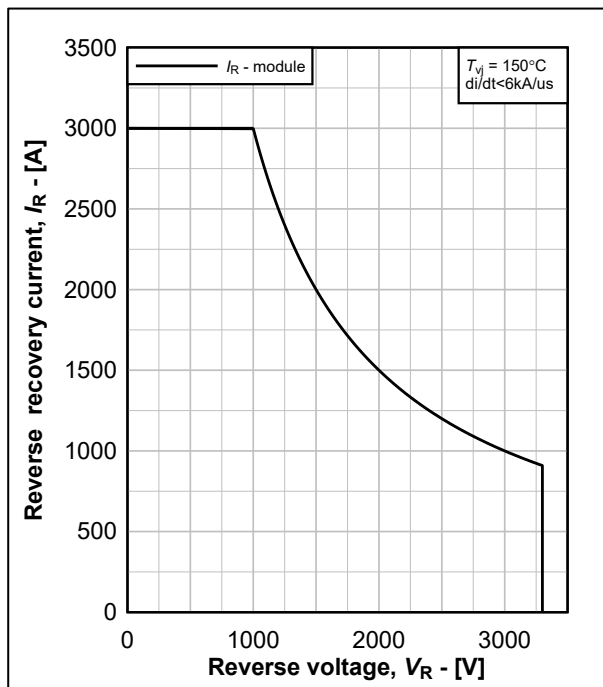


图 8.二极管反偏安全工作区, $I_{rr} = f(V_R)$

Fig.8 Diode reverse bias safe operating area, $I_{rr} = f(V_R)$

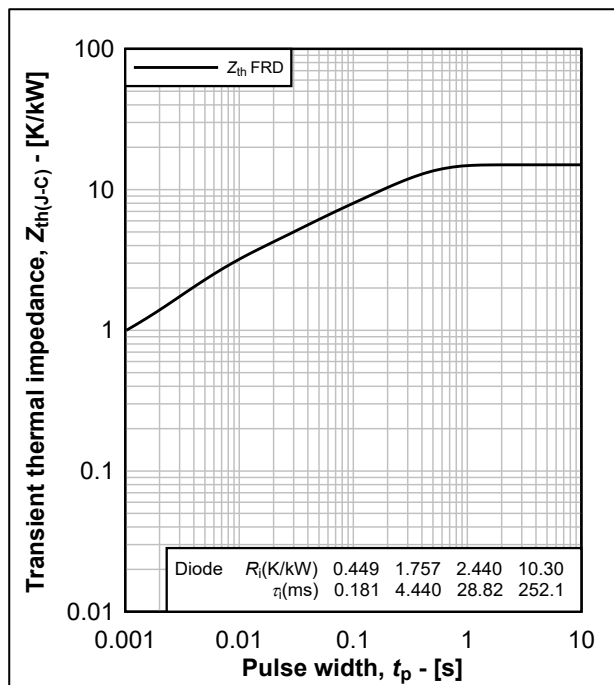
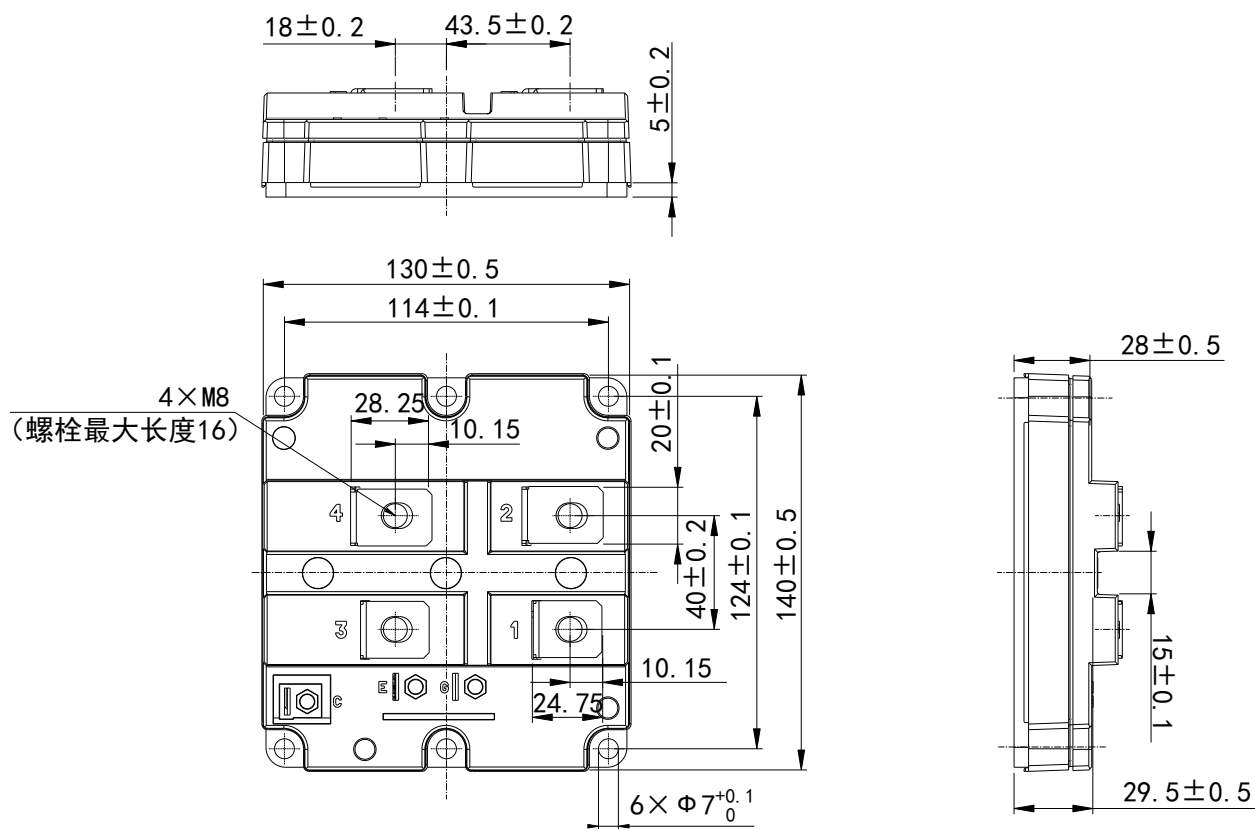


图 9. 瞬态热阻抗曲线, $Z_{th(J-C)} = f(t_p)$

Fig.9 Transient thermal impedance, $Z_{th(J-C)} = f(t_p)$



重量 Weight: 850g 模块外观类型 Module outline code: N

图 10. 模块外观尺寸

Fig. 10 Module outline drawing

株洲中车时代半导体有限公司

ZHUSHOU CRRC TIMES SEMICONDUCTOR CO., LTD

地 址 Address

湖南省株洲市石峰区田心工业园

Tianxin Industrial Park, Shifeng District,
ZhuZhou City, Hunan Province, China

邮 编 Zipcode

412001

电 话 Telephone

+86 (0)731-28498268, 28498238, 28493472

传 真 Fax

+86 (0)731-28498851, 28498494

电子邮箱 Email

sbu@crcczic.cc

网 址 Web Site

<http://www.sbu.crcczic.cc>

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