



JT050N120F2MA1E

主要参数 MAIN CHARACTERISTICS

I _c	50 A
V _{CEs}	1200 V
V _{cesat_typ} (V _{ge} =15V)	1.80V

用途

- 大功率变流器
- 电机传动
- UPS 电源

产品特性

- FS 技术
- 低通态压降, V_{CE(sat)},
typ = 1.8V, I_c = 50A and
T_C = 25°C
- V_{CEsat} 正温度系数
- 低开关损耗

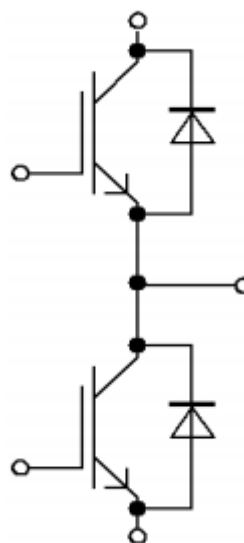
APPLICATIONS

- High Power Converters
- Motor Drives
- UPS System

FEATURES

- FS Technology
- Low saturation voltage:
V_{CE(sat)}, typ = 1.8V, I_c =
50A and T_C = 25°C
- V_{CEsat} with positive
Temperature Coefficient
- Low Switching Losses

封装 Package



订货信息 ORDER MESSAGE

订货型号 Order codes	印记 Marking	封装 Package	包装 Packaging	器件重量 Device Weight
JT050N120F2MA1E	JT050N120F2MA1E	两单元模块	盒装	163g(typ)



绝对最大额定值 ABSOLUTE RATINGS ($T_c=25^\circ\text{C}$)

项 目 Parameter	符 号 Symbol	数 值 Value	单 位 Unit
最高集电极—发射极直流电压 Collector-Emmitter Voltage	V_{ces}	1200	V
连续集电极极电流 Collector Current-continuous	I_c $T=25^\circ\text{C}$	95	A
	$T=100^\circ\text{C}$	50	A
最大脉冲集电极极电流（注1） Collector Current – pulse (note 1)	I_{CM}	100	A
最高栅极发射极电压 Gate-Emmitter Voltage	V_{GES}	± 20	V
短路时间 short circuit time	t_{sc}	10	μs
耗散功率 Power Dissipation	P_D $T_c=25^\circ\text{C}$	285	W
结温范围 Junction Temperature	T_{vjmax}	175	$^\circ\text{C}$
	$T_{vj op}$	-40~+150	

*漏极电流由最高结温限制

*Collector current limited by maximum junction temperature





电特性 ELECTRICAL CHARACTERISTICS

项 目 Parameter	符 号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单 位 Units
关态特性 Off –Characteristics						
集电极—发射极击穿电压 Collector-Emmitter Voltage	BV_{CES}	$I_C=1mA, V_{GE}=0V$	1200	-	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	$\Delta BV_{CES}/\Delta T_J$	$I_C=23mA$, referenced to $25^\circ C$	-	0.6	-	$V/^\circ C$
零栅压下集电极漏电流 Zero Gate Voltage Collector Current	I_{CES}	$V_{CE}=1200V, V_{GE}=0V,$ $T_C=25^\circ C$	-	-	1	mA
正向栅极体漏电流 Gate-body leakage current, forward	I_{GESF}	$V_{CE}=0V, V_{GE}=20V$	-	-	200	nA
反向栅极体漏电流 Gate-body leakage current, reverse	I_{GESR}	$V_{CE}=0V, V_{GE}=-20V$	-	-	-200	nA
通态特性 On-Characteristics						
阈值电压 Gate-Emmitter Threshold Voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}, I_C=0.25mA$	5.0	-	6.5	V
饱和压降 Collector-Emmitter saturation Voltage	V_{CESAT}	$V_{GE}=15V, I_C=50A$ $T_C=25^\circ C$ $T_C=125^\circ C$ $T_C=150^\circ C$	- - -	1.8 2.15 2.25	2.25 - -	V
短路电流（注2） Short Collector current（Note 2）	$I_{C(SC)}$	$V_{GE}=15V, V_{CE}=600V, t_{SC} < 10\mu s, T_C=25^\circ C$		322		A
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C_{ies}	$V_{CE}=25V,$ $V_{GE}=0V,$ $f=1.0MHz$	-	5.8		nF
输出电容 Output capacitance	C_{oes}		-	0.26		nF
反向传输电容 Reverse transfer capacitance	C_{res}		-	0.07		nF





电特性 ELECTRICAL CHARACTERISTICS

开关特性 Switching Characteristics							
开启延迟时间 Turn-On delay time	$t_d(\text{on})$	$V_{CE}=600V,$ $I_C=50A,$ $R_G=15\Omega$ Inductive Load	$T_C=25^\circ\text{C}$	-	108	-	ns
上升时间 Turn-On rise time	t_r		$T_C=25^\circ\text{C}$	-	66	-	ns
关断延迟时间 Turn-Off delay time	$t_d(\text{off})$		$T_C=25^\circ\text{C}$	-	138	-	ns
下降时间 Turn-Off Fall time	t_f		$T_C=25^\circ\text{C}$	-	188	-	ns
开启损耗 Turn-on energy	E_{on}		$T_C=25^\circ\text{C}$	-	5.0	-	mJ
关断损耗 Turn-off energy	E_{off}		$T_C=25^\circ\text{C}$	-	2.5	-	mJ
总的开关损耗 Total switching energy	E_{total}		$T_C=25^\circ\text{C}$	-	7.5	-	mJ
栅极电荷总量 Total Gate Charge	Q_g	$V_{CE}=600V, I_C=50A$ $V_{GE}=15V$ (note3 4)	-	0.2	-	μC	
内部栅极电阻 Internal gate resistance	R_{Gint}			7		Ω	
反并联二极管特性及最大额定值 Anti-Parallel Diode Characteristics and Maximum Ratings							
正向压降 (芯片) Diode Forward Voltage	V_F	$V_{GE}=0V, I_F=50A$	-	1.9	2.3	V	
峰值反向恢复电流 Peak Reverse recovery current	I_{RM}	$V_{GE}=-15V, V_R=600V I_F=50A$ $dI_F/dt=800A/\mu s T_C=25^\circ\text{C}$		29.6		A	
反向恢复时间 Diode Reverse recovery time	t_{rr}		-	372	-	ns	
反向恢复电荷 Reverse recovery charge	Q_{rr}		-	4.15	-	μC	
反向恢复能量 Reverse recovery energy	E_{rec}			1.45		mJ	





热特性 THERMAL CHARACTERISTIC

项 目 Parameter	符 号 Symbol	最小 Min	典型 typ	最大 Max	单 位 Unit
结到管壳的热阻 Thermal Resistance, Junction to Case	Per/IGBT	$R_{th(j-c)}$	-	-	0.55 °C/W
管壳到散热底座的热阻 Thermal Resistance, Case to heatsink	Per/IGBT	$R_{th(c-h)}$	-	0.09	- °C/W
结到管壳的热阻 Thermal Resistance, Junction to Case	Per/FRED	$R_{th(j-c)}$	-	-	0.85 °C/W
管壳到散热底座的热阻 Thermal Resistance, Case to heatsink	Per/FRED	$R_{th(c-h)}$	-	0.15	- °C/W

模块特性/Module Characteristics

项目 Item	符号 Sym bol	测试条件 Conditions	数值 Values			单位 Unit
			最小 Min	典型 typ	最大 Max	
绝缘测试电压 Isolation test voltage	V_{ISOL}	RMS, f = 50 Hz, t = 3S		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 (class1, IEC 61140)		Al ₂ O ₃		
安装扭矩 Mounting torque	M	螺丝M6 ScrewM6	3	-	6	Nm
端子联接扭距 Terminal Connection torque	M	螺丝M5 ScrewM5	3	-	6	Nm
爬电距离 Creepage distance		端子-散热片terminal to heatsink	-	17	-	mm
		端子-端子Terminal to terminal	-	20	-	
电气间隙 Clearance		端子-散热片terminal to heatsink	-	17	-	mm
		端子-端子Terminal to terminal	-	10	-	
相对电痕指数 Comperative tracking index	CT1		200			





外壳—散热器热阻 Thermal resistance case to heatsink	R_{thCH}	每个模块 per module λ Paste=1W/(m·K)/ λ grease =1W/(m·K)		0.05		K/W
杂散电感,模块 Stray inductance module	L_{sCE}			30		nH
模块引线电阻,端子- 芯片 Module lead resistance terminals chip	$R_{CC'+EE'}$			0.65		m Ω
储存温度 Storage temperature	T_{stg}		-40		125	$^{\circ}C$
重量 Weight		-	-	163	-	g

注释:

- 1: 脉冲宽度由最高结温限制
- 2: 两次短路之间的间隔大于 1 秒时, 允许短路测试的次数最大为 1000 次
- 3: 脉冲测试: 脉冲宽度 $\leq 300\mu s$, 占空比 $\leq 2\%$
- 4: 基本与工作温度无关

Notes:

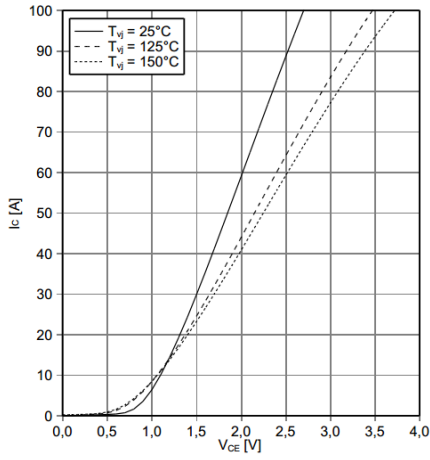
- 1: Pulse width limited by maximum junction temperature
- 2: Allowed number of short circuits: <1000; time between short circuits: >1s.
- 3: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$
- 4: Essentially independent of operating temperature



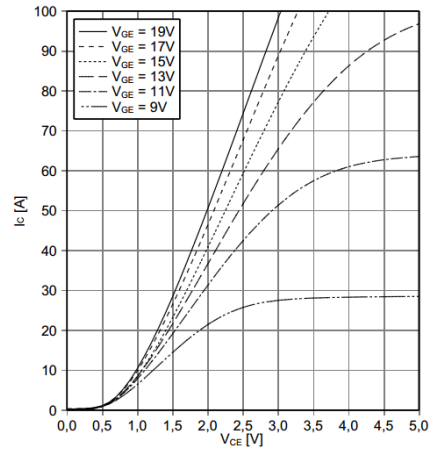


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

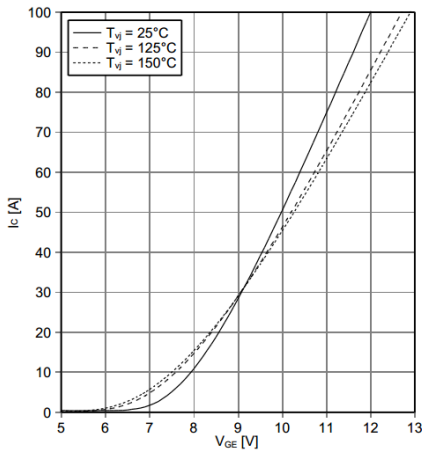
Typical Output Characteristics($V_{GE}=15V$)



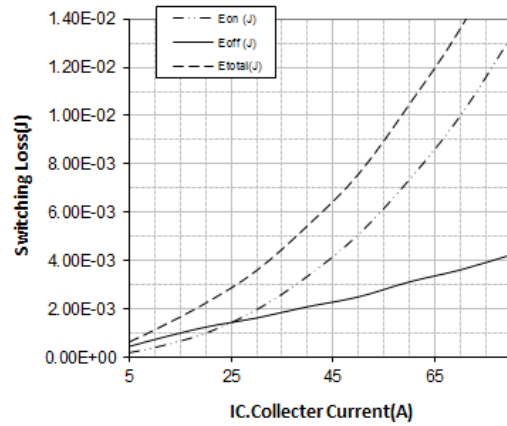
Typical Output Characteristics($T_j=150^{\circ}C$)



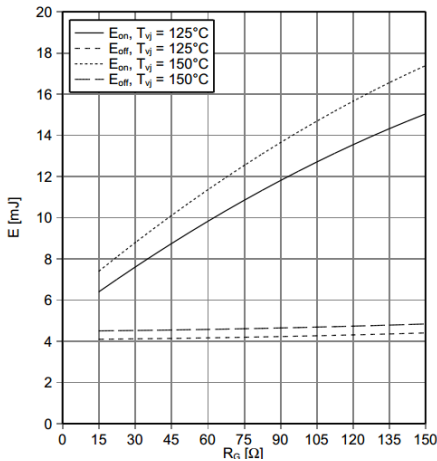
Typical transfer Characteristics($V_{CE}=20V$)



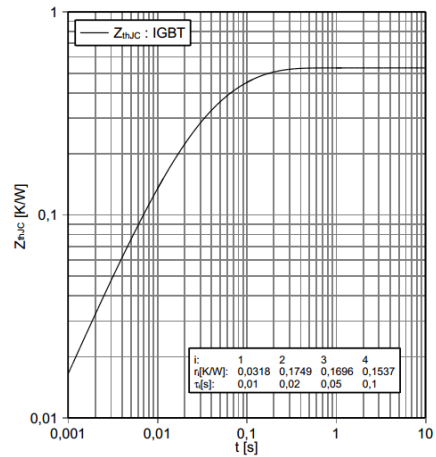
Switching Loss vs. Collector Current ($R_g=15\Omega$, $V_{GE}=\pm 15V$, $V_{CE}=600V$, $25^{\circ}C$)



Switching Loss vs. Gate Resistance $V_{CE}=600V$ $V_{GE}=\pm 15V$, $I_C=50A$

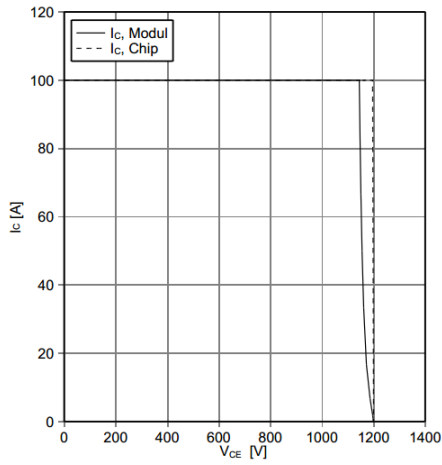


Transient Thermal Impedance (IGBT)

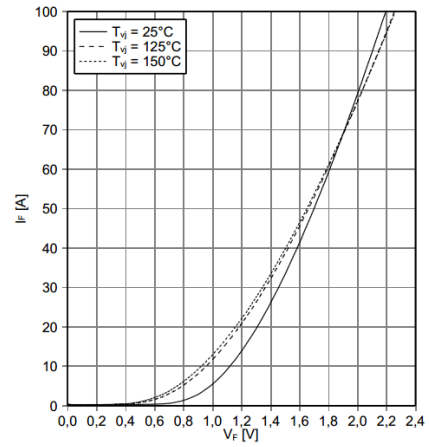




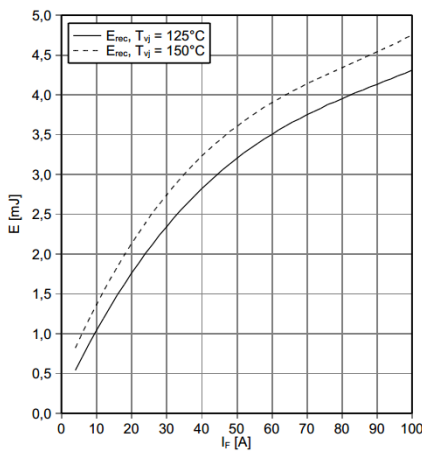
RBSOA of IGBT



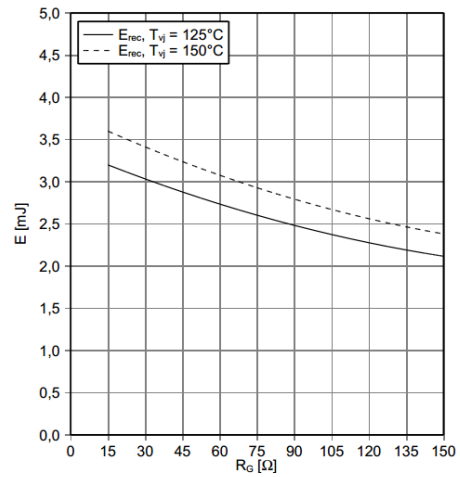
Forward Characteristics of Diode



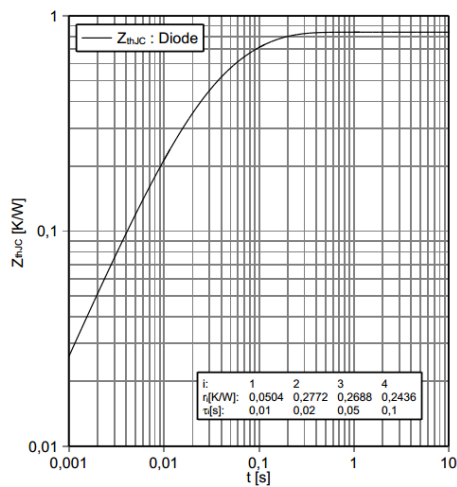
Switching Loss Diode ($R_{Gon}=15\ \Omega, V_{CE}=600V$)



Switching Loss Diode ($I_f=50A, V_{CE}=600V$)

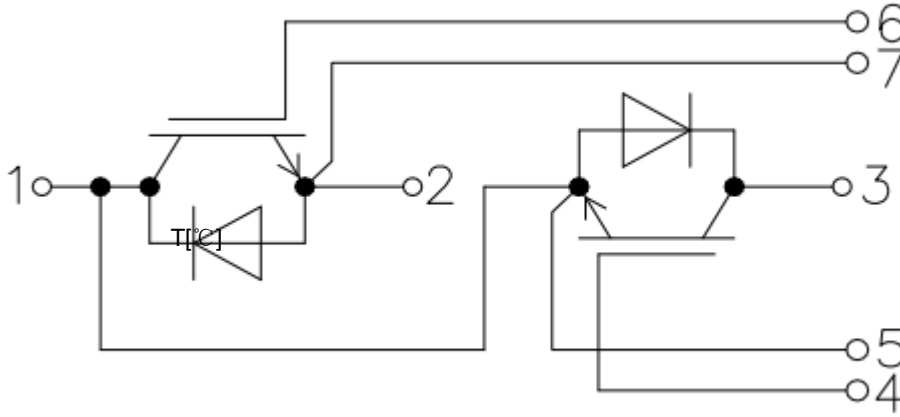


Transient Thermal Impedance (FRED)



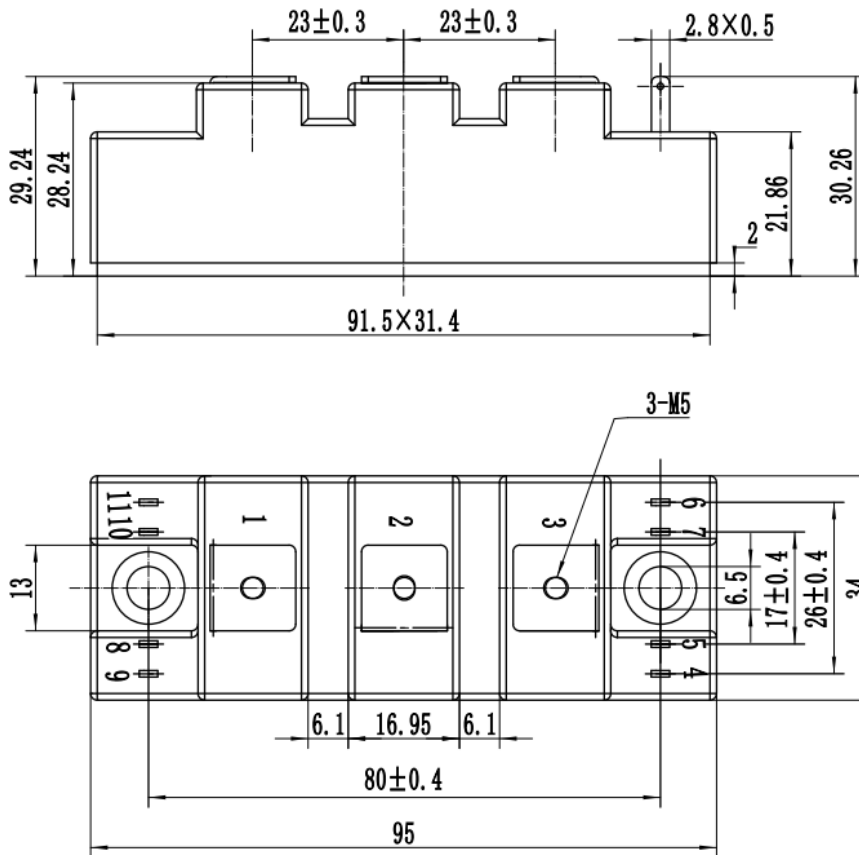


外形尺寸 PACKAGE MECHANICAL DATA
Circuit diagram



Package outlines

单位 Unit: mm





注意事项

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