



# JT050K120F2MA1E

## 主要参数 MAIN CHARACTERISTICS

$I_C$	50 A
$V_{CES}$	1200 V
$V_{cesat\_typ}$ ( $V_{ge}=15V$ )	2.0V

### 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 =2V,  $I_C = 50A$  and  
 $T_C = 25^\circ C$
- $V_{CEsat}$  正温度系数
- 低开关损耗

### APPLICATIONS

- High Power Converters
- Motor Drives
- UPS System

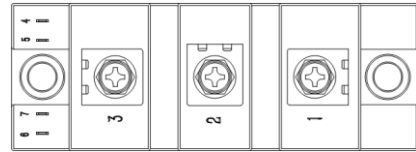
### FEATURES

- FS Technology
- Low saturation voltage:  
 $V_{CE(sat)}$ , typ =2V,  $I_C = 50A$   
and  $T_C = 25^\circ C$
- $V_{CEsat}$  with positive  
Temperature Coefficient
- Low Switching Losses

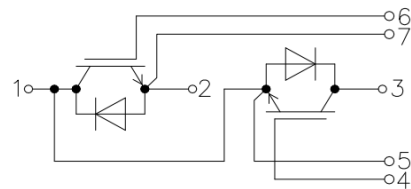
## 封装 Package



外形示意图



引脚示意图



电路示意图

订货型号 Order codes	印记 Marking	封装 Package	包装 Packaging	器件重量 Device Weight
JT050K120F2MA1E	JT050K120F2MA1E	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	$I_C \quad T=100^\circ\text{C}$	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	$V_{GES}$	$\pm 20$	V
耗散功率 Power Dissipation	$P_D \quad T_C=25^\circ\text{C}$	285	W
结温范围 Junction Temperature	$T_{vjmax}$	175	$^\circ\text{C}$
	$T_{vjop}$	-40~+150	





## 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
<b>关态特性 Off –Characteristics</b>						
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
<b>通态特性 On-Characteristics</b>						
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	$V_{CESAT}$	$V_{GE}=15V, I_C=50A$ $T_C=25^\circ C$ $T_C=125^\circ C$ $T_C=150^\circ C$	- - -	2.0 2.25 2.35	2.4 - -	V
<b>动态特性 Dynamic Characteristics</b>						
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	$t_{d(on)}$	$V_{CE}=600V,$ $I_C=50A,$ $R_G=15\Omega$ Inductive Load	$T_C=25^\circ C$	-	110	-	ns
上升时间 Turn-On rise time	$t_r$		$T_C=25^\circ C$	-	55	-	ns
关断延迟时间 Turn-Off delay time	$t_{d(off)}$		$T_C=25^\circ C$	-	120	-	ns
下降时间 Turn-Off Fall time	$t_f$		$T_C=25^\circ C$	-	100	-	ns
开启损耗 Turn-on energy	$E_{on}$		$T_C=25^\circ C$	-	4.8	-	mJ
关断损耗 Turn-off energy	$E_{off}$		$T_C=25^\circ C$	-	1.5	-	mJ
总的开关损耗 Total switching energy	$E_{total}$		$T_C=25^\circ C$	-	6	-	mJ
栅极电荷总量 Total Gate Charge	$Q_g$	$V_{GE}=-15V...+15V$	-	0.2	-	$\mu C$	
内部栅极电阻 Internal gate resistance	$R_{Gint}$			7		$\Omega$	
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	$V_F$	$V_{GE}=0V,$ $I_F=50A$	-	1.7	2.2	V	
峰值反向恢复电流 Peak Reverse recovery current	$I_{RM}$	$V_{GE}=-15V, V_R=600V I_F=50A$ $di_F/dt=800A/\mu s$ $T_C=25^\circ C$		31		A	
反向恢复时间 Diode Reverse recovery time	$t_{rr}$		-	100	-	ns	
反向恢复电荷 Reverse recovery charge	$Q_{rr}$		-	5	-	$\mu C$	
反向恢复能量 Reverse recovery energy	$E_{rec}$			1.8		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 = 1min		4		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 <sub>2</sub> O <sub>3</sub>		
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 $\lambda_{Paste}=1W/(m \cdot K)/\lambda_{grease}$ $=1W/(m \cdot K)$		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 $\Omega$
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

Notes:

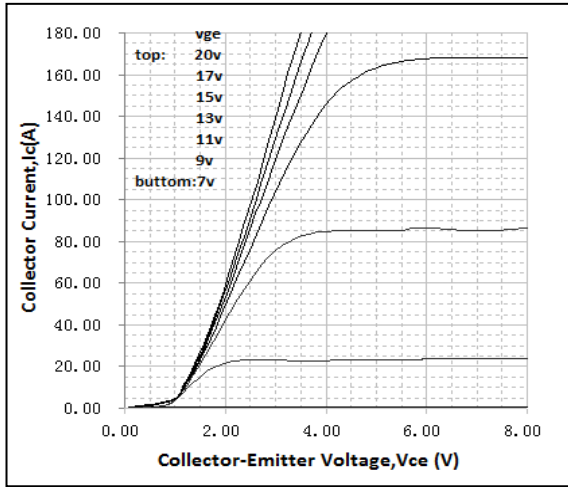
1: Pulse width limited by maximum junction temperature



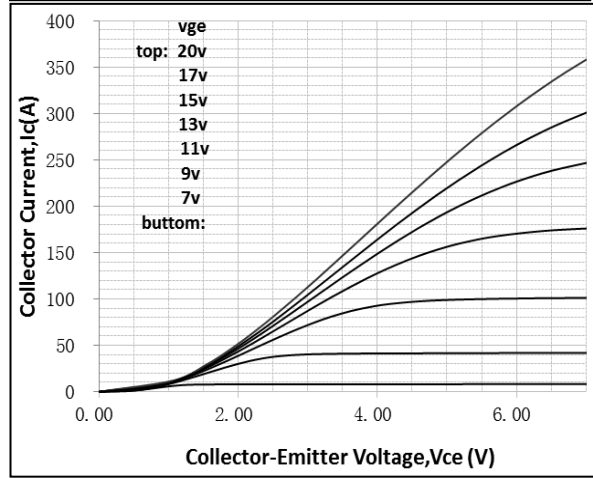


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

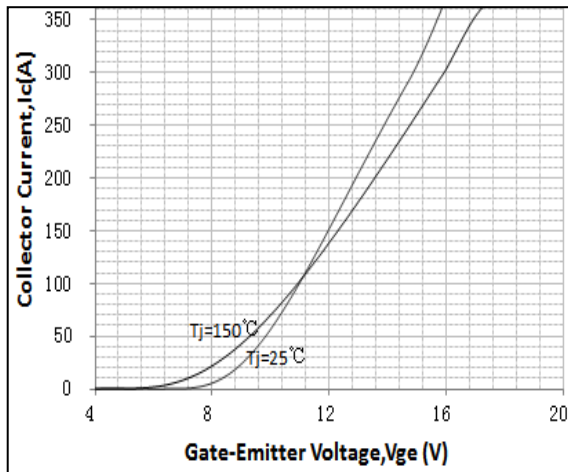
Typical Output Characteristics( $T_j=25^{\circ}\text{C}$ )



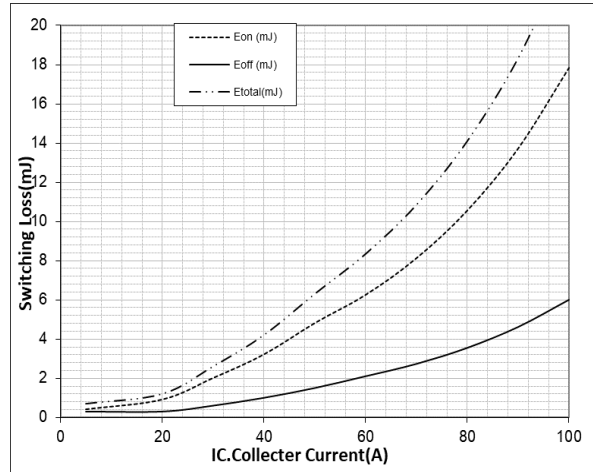
Typical Output Characteristics( $T_j=150^{\circ}\text{C}$ )



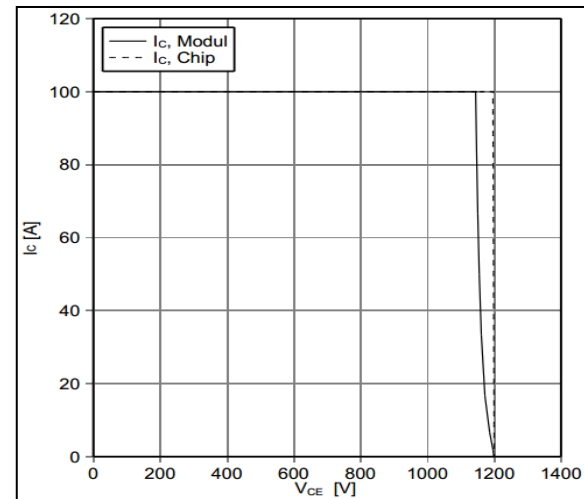
Typical transfer Characteristics( $V_{CE}=20\text{V}$ )



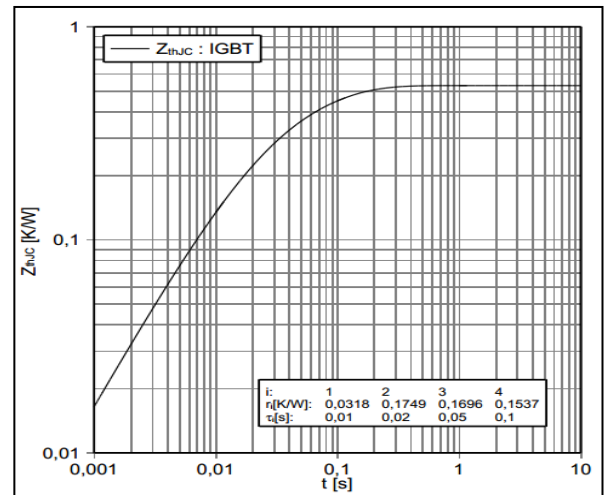
Switching Loss vs. Collector Current ( $R_g=15\ \Omega$ ,  $V_{GE}=\pm 15\text{V}$ ,  $V_{CE}=600\text{V}$ ,  $25^{\circ}\text{C}$ )



RBSOA of IGBT

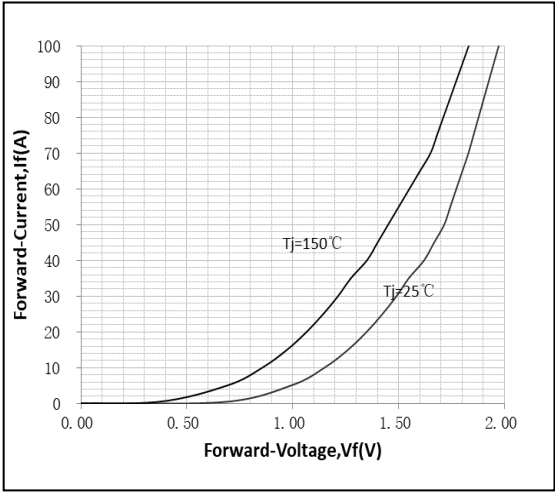


Transient Thermal Impedance (IGBT)

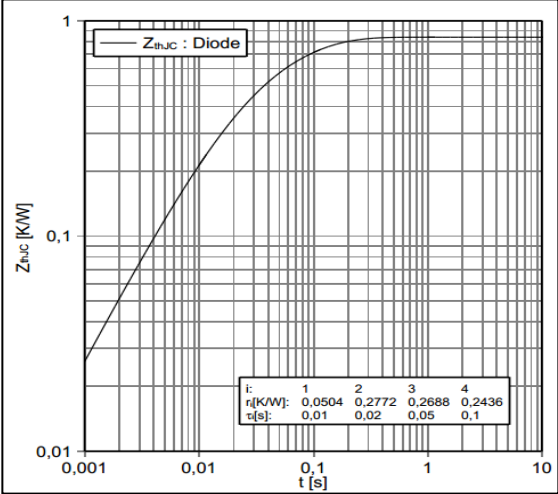




**Forward Characteristics of Diode**



**Transient Thermal Impedance (FRED)**

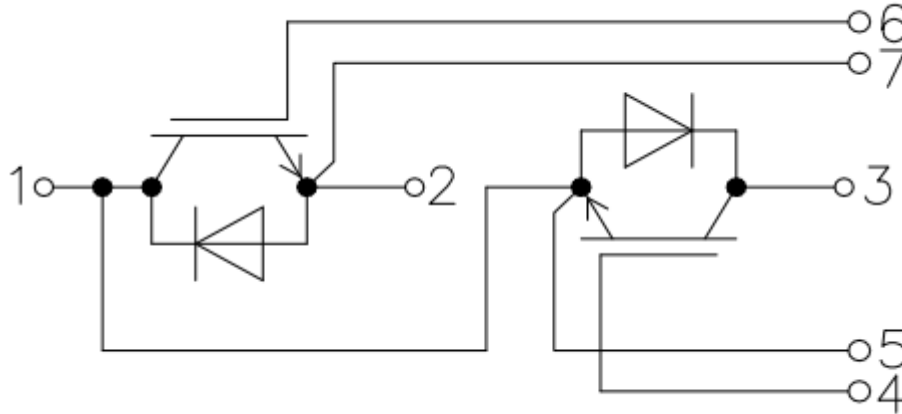






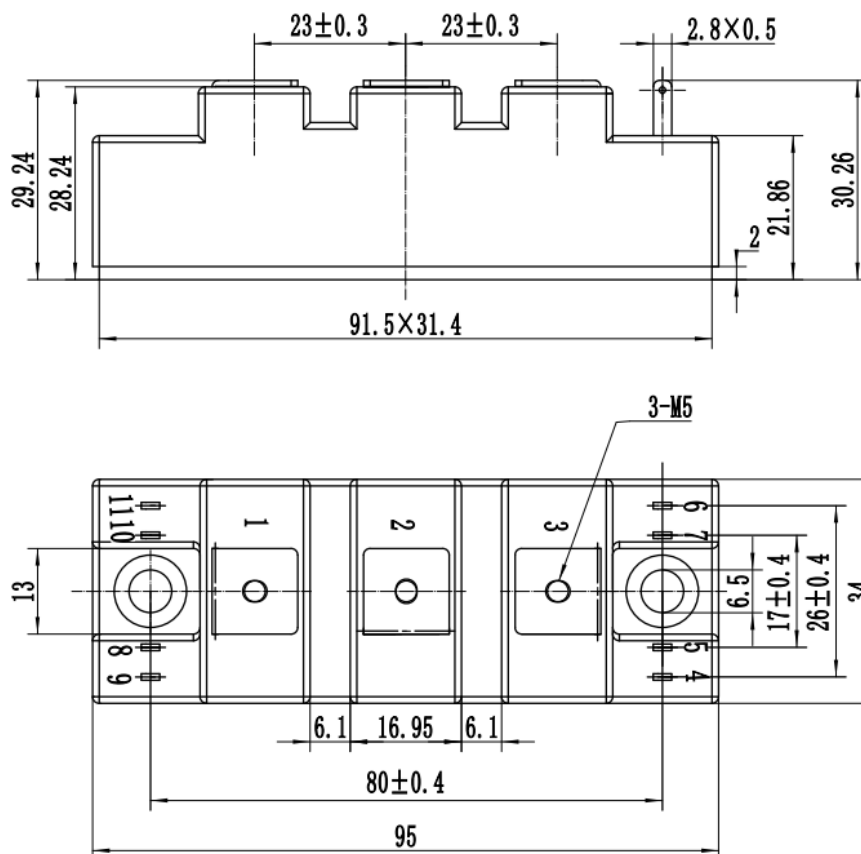
外形尺寸 PACKAGE MECHANICAL DATA

Circuit diagram



Package outlines

单位 Unit: mm





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