



JT600N120F2MH1E

主要参数 MAIN CHARACTERISTICS

I_C	600 A
V_{CES}	1200 V
V_{cesat_typ} (@ $V_{ge}=15V$)	1.95V

用途

- 电机驱动
- 伺服驱动
- UPS 电源
- 风力发电

APPLICATIONS

- Motor Drives
- Servo Drives
- UPS System
- Wind Turbines

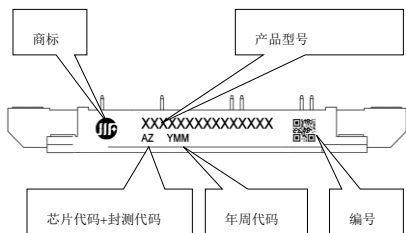
产品特性

- 低栅极电荷
- FS 技术
- 低通态压降, $V_{CE(sat)}$,
typ = 1.95V @ $I_C =$
600A and $T_C = 25^\circ C$
- RoHS 产品

FEATURES

- Low gate charge
- FS Technology
- Low saturation voltage:
 $V_{CE(sat)}$, typ = 1.95V @
 $I_C = 600A$ and $T_C = 25^\circ C$
- RoHS product

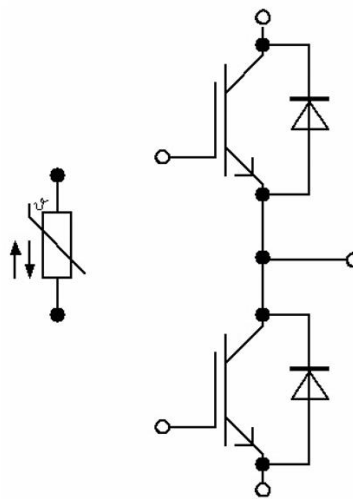
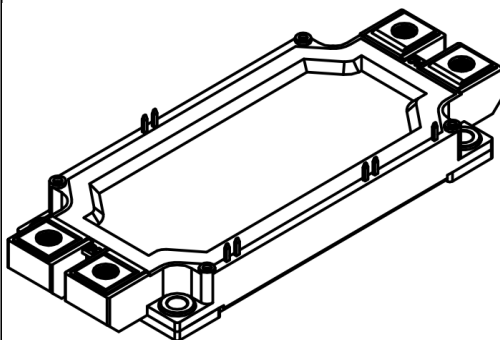
印记定义 mark definition



年周代码说明: Y(年代码, 执行内部定义)+WW (周代码)

产品型号说明: 产品类别+电流+开关速度+电压+电路拓扑+封装形式+工艺版本。

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
JT600N120F2MH1E	JT600N120F2MH1E	两单元模块	盒装	349g(typ)



绝对最大额定值 ABSOLUTE RATINGS (Tc=25°C)

项 目 Parameter	符 号 Symbol	数 值 Value	单 位
		JT600N120F2MH1E	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°C T=100°C	995	A
		600	A
最大脉冲集电极极电流 (注 1) Collector Current – pulse (note 1)	I _{CM}	1200	A
最高栅极发射极电压 Gate-Emmitter Voltage	V _{GES}	±20	V
短路时间 short circuit time	tsc	10	μs
耗散功率 Power Dissipation	P _D T _C =25°C	3650	W
结温范围 Junction Temperature	T _{vj}	175	°C
	T _{vj op}	-40~+150	
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T _L	300	°C

*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	$V_{GE(th)}$	$V_{CE} = V_{GE}, I_C=7.4mA$	5.3	-	6.3	V
饱和压降（芯片） Collector-Emmitter saturation Voltage	V_{CESAT}	$V_{GE}=15V, I_C=600A$ $T_C=25^\circ C$ $T_C=125^\circ C$ $T_C=150^\circ C$	- - -	1.75 2.05 2.15	2.1 - -	V
饱和压降（模块） Collector-Emmitter saturation Voltage	V_{CESAT}	$V_{GE}=15V, I_C=600A$ $T_C=25^\circ C$ $T_C=125^\circ C$ $T_C=150^\circ C$	- - -	1.95 2.25 2.35	2.4 - -	V
短路电流（注2） Short Collector current（Note 2）	$I_{C(SC)}$	$V_{GE}=15V, V_{CE}=600V, t_{sc} < 10\mu s, T_C=25^\circ C$	-	3000	-	A
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C_{ies}	$V_{CE}=25V,$ $V_{GE}=0V,$ $f=1.0MHz$	-	78	-	nF
输出电容 Output capacitance	C_{oes}		-	3.7	-	nF
反向传输电容 Reverse transfer capacitance	C_{res}		-	1.34	-	nF





电特性 ELECTRICAL CHARACTERISTICS

开关特性 Switching Characteristics							
开启延迟时间 Turn-On delay time	$t_{d(on)}$	$V_{CE}=600V,$ $I_C=600A,$ $R_G=1.5\Omega$ Inductive Load $di/dt=6000A/us,$ $du/dt=8000V/us$	$T_C=25^\circ C$	-	255	-	ns
上升时间 Turn-On rise time	t_r		$T_C=25^\circ C$	-	82	-	ns
关断延迟时间 Turn-Off delay time	$t_{d(off)}$		$T_C=25^\circ C$	-	55	-	ns
下降时间 Turn-Off Fall time	t_f		$T_C=25^\circ C$	-	77	-	ns
开启损耗 Turn-on energy	E_{on}		$T_C=25^\circ C$	-	14	-	mJ
关断损耗 Turn-off energy	E_{off}		$T_C=25^\circ C$	-	45	-	mJ
总的开关损耗 Total switching energy	E_{total}		$T_C=25^\circ C$	-	59	-	mJ
栅极电荷总量 Total Gate Charge	Q_g		$V_{CE} = 600V, I_C=600A$ $V_{GE}=15V$ (note3 4)	-	4.0	-	μC
内部栅极电阻 Internal gate resistance	R_{Gint}			1.8		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	$V_{GE}=0V, I_F=600A$	-	1.75	2.1	V	
正向压降 (模块) Diode Forward Voltage	V_F	$V_{GE}=0V, I_F=600A$	-	1.9	2.3	V	
峰值反向恢复电流 Peak Reverse recovery current	I_{RM}			470		A	
反向恢复时间 Diode Reverse recovery time	t_{rr}	$V_{GE}=0V, V_R=600V I_F=600A$	-	175	-	ns	
反向恢复电荷 Reverse recovery charge	Q_{rr}	$dI_F/dt=7000A/\mu s T_C=25^\circ C$	-	50	-	μC	
反向恢复能量 Reverse recovery energy	E_{rec}			26		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 $R_{th(j-c)}$	-	-	0.048	°C/W
管壳到散热底座的热阻 Thermal Resistance, Case to heatsink	Per/IGBT $R_{th(c-h)}$	-	0.033	-	°C/W
结到管壳的热阻 Thermal Resistance, Junction to Case	Per/FRED $R_{th(j-c)}$	-	-	0.08	°C/W
管壳到散热底座的热阻 Thermal Resistance, Case to heatsink	Per/FRED $R_{th(c-h)}$	-	0.048	-	°C/W

热敏电阻特性 NTC Thermistor Characteristics

项 目 Parameter	符 号 Symbol	最小 Min	典型 Typ	最大 Max	单 位 Unit	
额定电阻值 Rated resistance	- $R_{25^{\circ}\text{C}}$	4.75	5	5.25	kohm	
时间常数	静止空气中 τ	-	-	10	Sec	
最大额定功率	- P_{max}	-	-	10	mW	
B-值 B-value	$B = [(T_a \times T_b) / (T_b - T_a)] \times \ln(R_a / R_b)$ $T_b = 50^{\circ}\text{C} \pm 0.01^{\circ}\text{C}$	$B_{25/50}$	3346.2	3380	3413.8	K
工作温度	-	-50	-	200	°C	





机械性能 Mechanical Characteristics

项目 Item	符号 Symbol	测试条件 Conditions	数值 Values			单位 Unit
			最小 Min	典型 typ	最大 Max	
安装扭矩 Mounting torque	Mt	Main terminals,M6 screw	3	-	6	Nm
安装扭矩 Mounting torque	Ms	Mounting to heat sink,M5 screw	3	-	6	Nm
爬电距离 Creepage distance	ds	Terminal to terminal	11.55	-	-	mm
		Terminal to base plate	12.32	-	-	
空隙 Clearance		Terminal to terminal	10	-	-	mm
		Terminal to base plate	10.85	-	-	
存储温度 storage temperature			-40		125	°C
重量 Weight		-	-	349	-	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 $\leq 300\mu\text{s}$,占空比 $\leq 2\%$
- 4: 基本与工作温度无关

Notes:

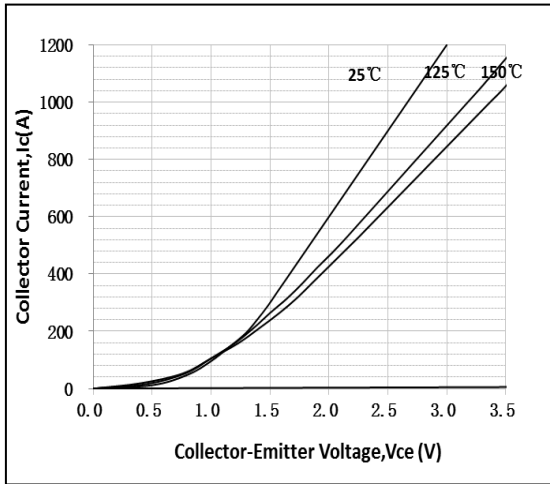
- 1: Pulse width limited by maximum junction temperature
- 2: Allowed number of short circuits: <1000; time between short circuits: >1s.
- 3: Pulse Test: Pulse Width $\leq 300\mu\text{s}$,Duty Cycle $\leq 2\%$
- 4: Essentially independent of operating temperature



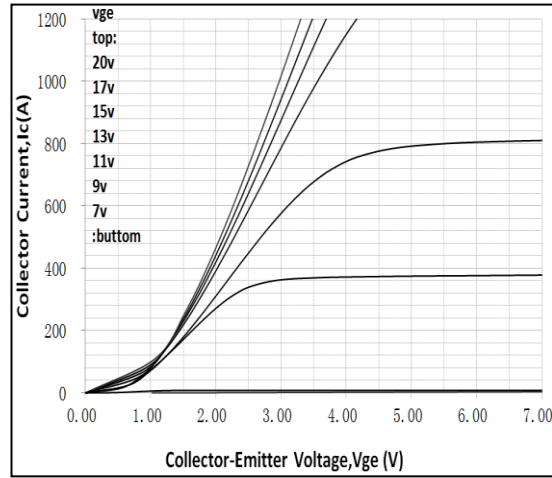


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

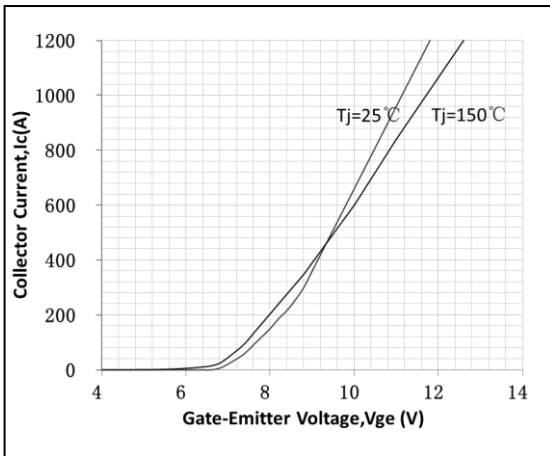
Typical Output Characteristics(Vge=15V)



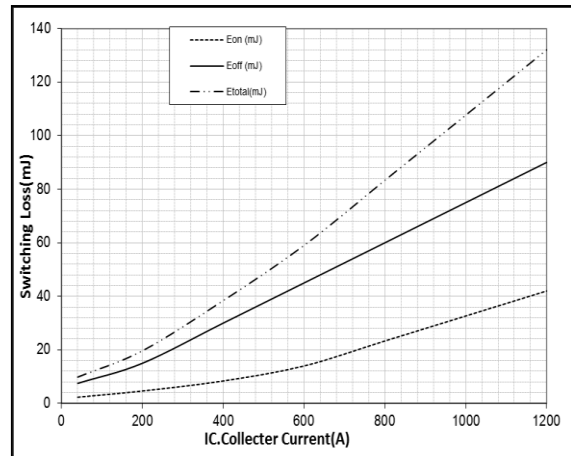
Typical Output Characteristics(Tvj=150°C)



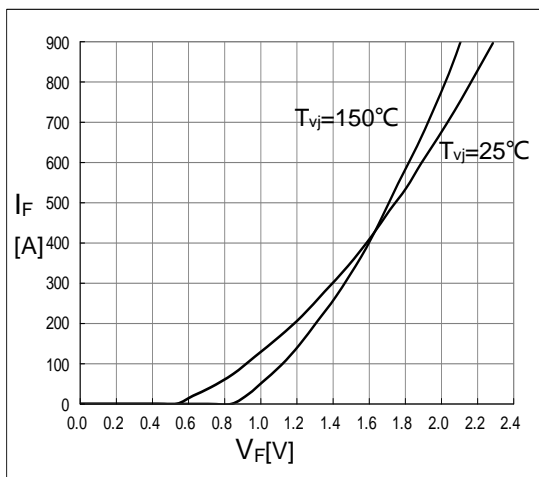
Typical Saturation Voltage Characteristics



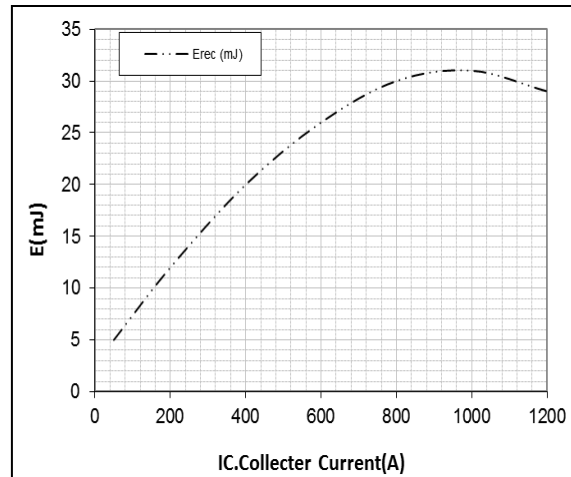
Switching Loss vs. Collector Current (Rg=1.5Ω, VGE=15V, Tvj=25°C)



Forward Characteristics



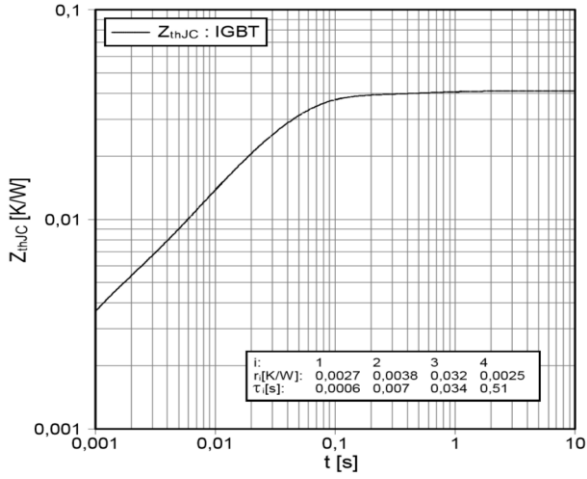
Switching Loss Diode (RG=1.5Ω, Vce=600V, Tvj=25°C)



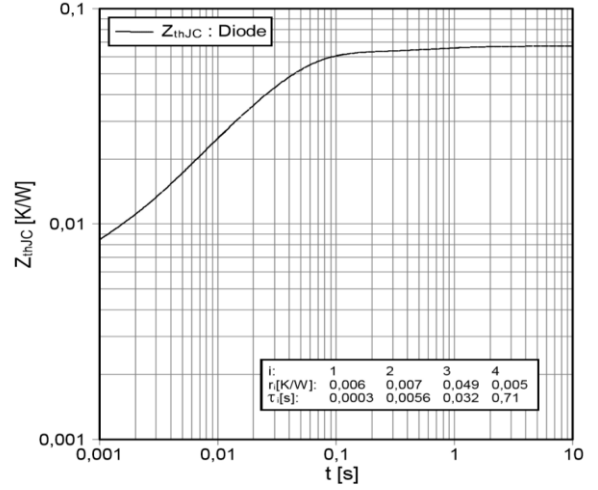


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

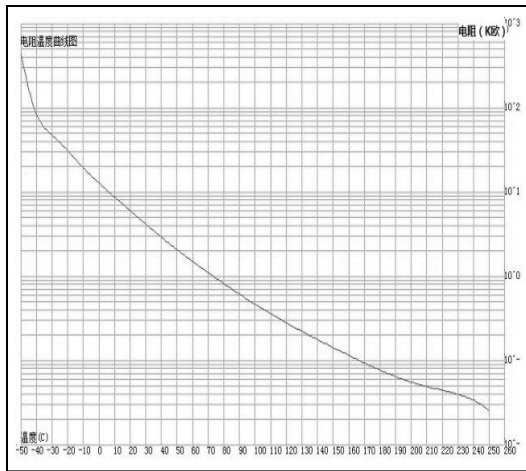
Transient Thermal Impedance (IGBT)



Transient Thermal Impedance (FRED)



Typ.NTC Temperature Characteristics

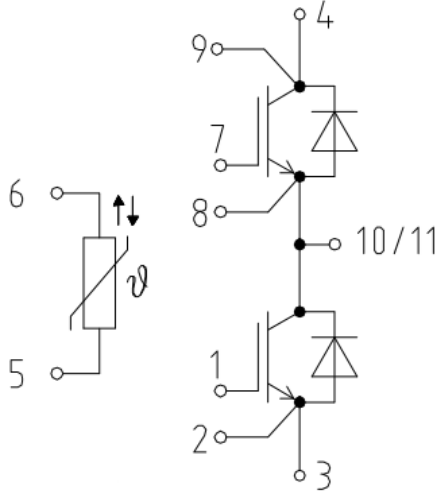




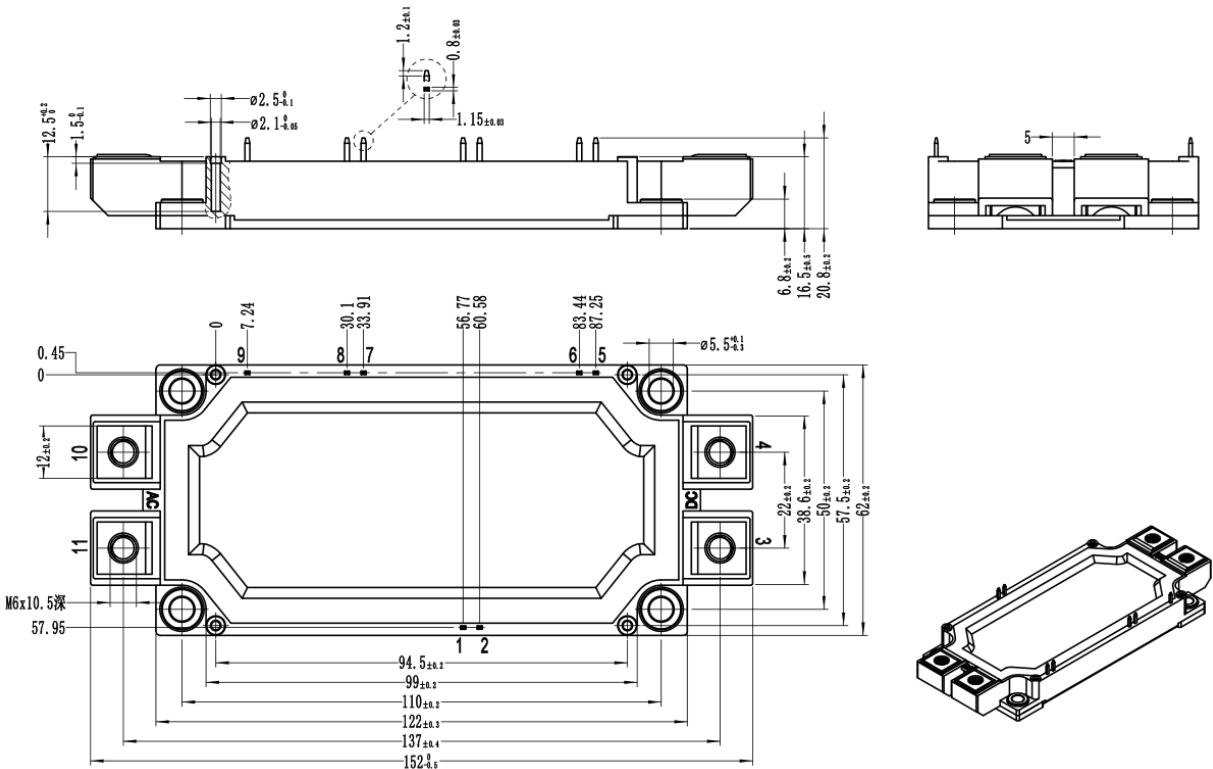
外形尺寸 PACKAGE MECHANICAL DATA

Circuit diagram

单位 Unit: mm



Package outlines





注意事项

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- 4.本说明书如有版本变更不另外告知

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