



TT150K120MA1E

主要参数 MAIN CHARACTERISTICS

I_c	150 A
V_{CES}	1200 V
V_{cesat_typ} ($V_{ge}=15V$)	1.8V

用途

- 大功率变流器
- UPS 电源

产品特性

- FS 技术
- VCEsat 正温度系数
- 低开关损耗

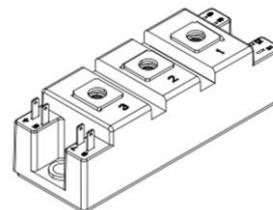
APPLICATIONS

- High Power Converters
- UPS System

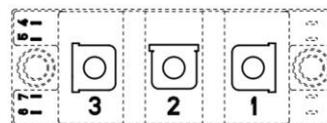
FEATURES

- FS Technology
- VCEsat with positive Temperature Coefficient
- Low Switching Losses

封装 Package

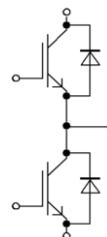


外形示意图



引脚定义

引脚示意图



电路示意图

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
TT150K120MA1E	TT150K120MA1E	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 $T_C=100^\circ\text{C}$	150	A
最大脉冲集电极极电流（注1） Collector Current – pulse (note 1)	I_{CM}	300	A
最高栅极发射极电压 Gate-Emmitter Voltage	V_{GES}	± 20	V
耗散功率 Power Dissipation	P_D $T_C=25^\circ\text{C}$	790	W
结温范围 Junction Temperature	T_{vjmax}	175	°C
	$T_{vj op}$	-40~+150	

注释:

1: 脉冲宽度由最高结温限制

Notes:

1: Pulse width 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
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}	$V_{CE}=0V, V_{GE}=20V,$ $T_C=25^\circ C$	-	-	100	nA
反向栅极体漏电流 Gate-body leakage current, reverse	I_{GESR}	$V_{CE}=0V, V_{GE}=-20V,$ $T_C=25^\circ C$	-	-	-100	nA
通态特性 On-Characteristics						
阈值电压 Gate-Emmitter Threshold Voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}, I_C=5.7mA$	5.1	-	6.5	V
饱和压降 Collector-Emmitter saturation Voltage	V_{CESAT}	$V_{GE}=15V, I_C=150A$ $T_C=25^\circ C$ $T_C=125^\circ C$ $T_C=150^\circ C$	- - -	1.8 2.1 2.2	2.5 - -	V
动态特性 Dynamic Characteristics						
输入电容 Input capacitance	C_{ies}	$V_{CE}=25V,$ $V_{GE}=0V,$	-	18		nF
反向传输电容 Reverse transfer capacitance	C_{res}	$f=1.0MHz$	-	0.2		nF





电特性 ELECTRICAL CHARACTERISTICS

开关特性 Switching Characteristics						
开启延迟时间 Turn-On delay time	$t_d(\text{on})$	$V_{CE}=600V,$ $I_C=150A,$ $R_G=15\Omega$ Inductive Load	$T_C=25^\circ\text{C}$	-	290	- ns
上升时间 Turn-On rise time	t_r		$T_C=25^\circ\text{C}$	-	120	- ns
关断延迟时间 Turn-Off delay time	$t_d(\text{off})$		$T_C=25^\circ\text{C}$	-	410	- ns
下降时间 Turn-Off Fall time	t_f		$T_C=25^\circ\text{C}$	-	50	- ns
开启损耗 Turn-on energy	E_{on}		$T_C=25^\circ\text{C}$	-	15	- mJ
关断损耗 Turn-off energy	E_{off}		$T_C=25^\circ\text{C}$	-	10	- mJ
总的开关损耗 Total switching energy	E_{total}		$T_C=25^\circ\text{C}$	-	10.4	- mJ
栅极电荷总量 Total Gate Charge	Q_g	$V_{GE}=-15V \dots +15V$	-	1.4	- μC	
内部栅极电阻 Internal gate resistance	R_{Gint}			5	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 Diode Forward Voltage	V_F	$V_{GE}=0V, I_F=150A, T_C=25^\circ\text{C}$	-	1.7	2.5	V
		$V_{GE}=0V, I_F=150A, T_C=150^\circ\text{C}$		1.5		
峰值反向恢复电流 Peak Reverse recovery current	I_{RM}	$V_{GE}=-15V, V_R=600V$ $I_F=150A$ $di_F/dt=360A/\mu\text{s}$ $T_C=25^\circ\text{C}$		85		A
反向恢复时间 Diode Reverse recovery time	t_{rr}		-	300	-	ns
反向恢复电荷 Reverse recovery charge	Q_{rr}		-	13	-	μC
反向恢复能量 Reverse recovery energy	Erec			4		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	$R_{th(j-c)}$	-	-	0.19 °C/W
管壳到散热底座的热阻 Thermal Resistance, Case to heatsink	Per/IGBT	$R_{th(c-h)}$	-	0.08	- °C/W
结到管壳的热阻 Thermal Resistance, Junction to Case	Per/FRED	$R_{th(j-c)}$	-	-	0.31 °C/W
管壳到散热底座的热阻 Thermal Resistance, Case to heatsink	Per/FRED	$R_{th(c-h)}$	-	0.13	- °C/W

模块特性/Module Characteristics

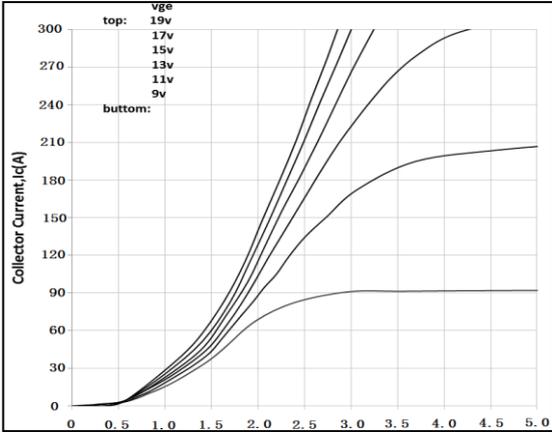
项 目 Parameter	符 号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单位 Unit
绝缘测试电压 Isolationtestvoltage	V_{ISOL}	RMS, f = 50 Hz, t = 1min		4.0		KV
模块基板材料 Material of module baseplate	Cu					
内部绝缘 Internal isolation	基本绝缘 (class 1, IEC 61140) Basic insulation (class1, IEC 61140)		Al2O3			
安装扭矩 Mounting torque	M	螺丝M6 ScrewM6	3	-	5	Nm
端子联接扭矩 Terminal Connection torque	M	螺丝M5 ScrewM6	2.5	-	5	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	-	9.5	-	
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}			20		nH
模块引线电阻,端子-芯片 Module lead resistance terminals chip	$R_{CC'+EE'}$			0.65		mΩ
储存温度 Storage temperature	T_{stg}		-40		125	°C
重量 Weight			-	163	-	g



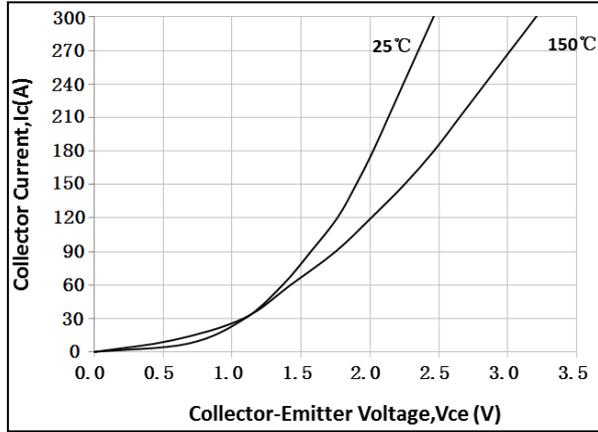


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

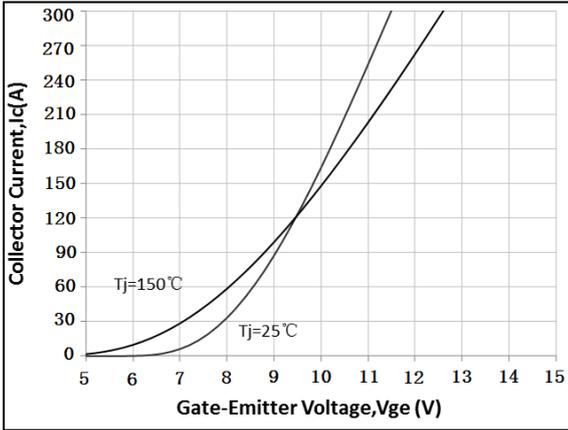
Typical Output Characteristics($V_{ge}=15V, T_c=150^{\circ}C$)



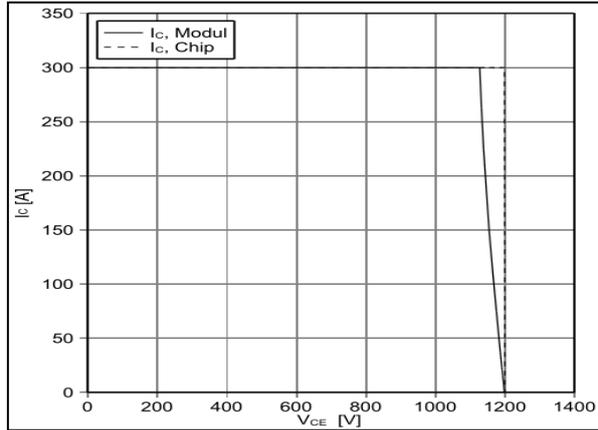
Typical Output Characteristics($V_{ge}=15V$)



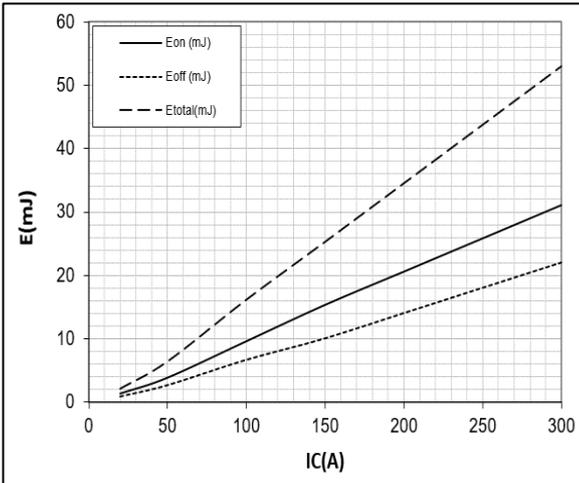
Typical transfer Characteristics($V_{ce}=20V$)



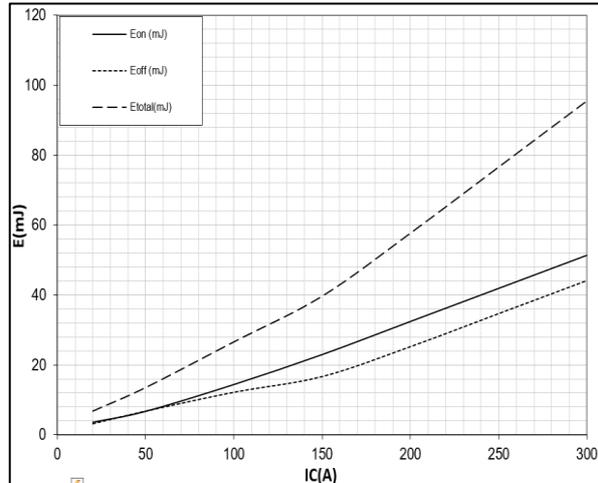
RBSOA of IGBT



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



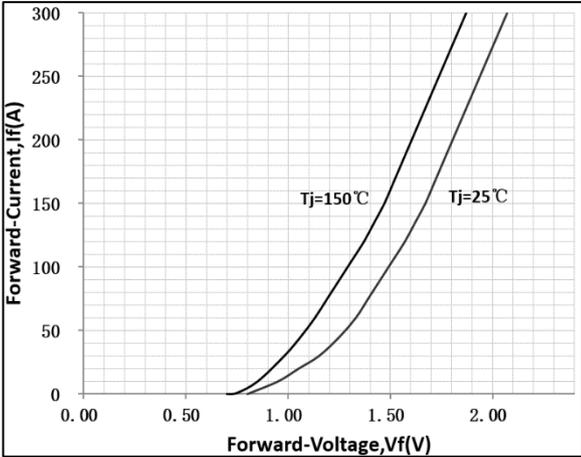
Switching Loss vs. Collector Current ($R_G=15\Omega, V_{GE}=\pm 15V, T_{vj}=150^{\circ}C$)



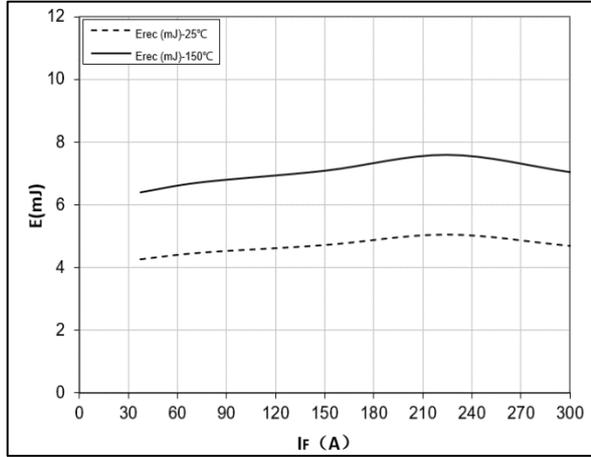


特征曲线 ELECTRICAL CHARACTERISTICS (curves)

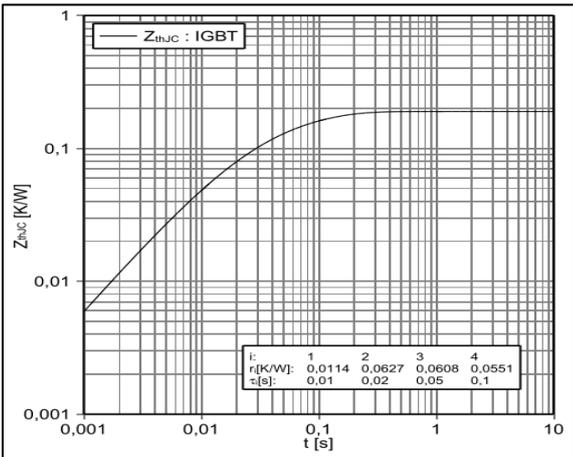
Forward Characteristics of Diode



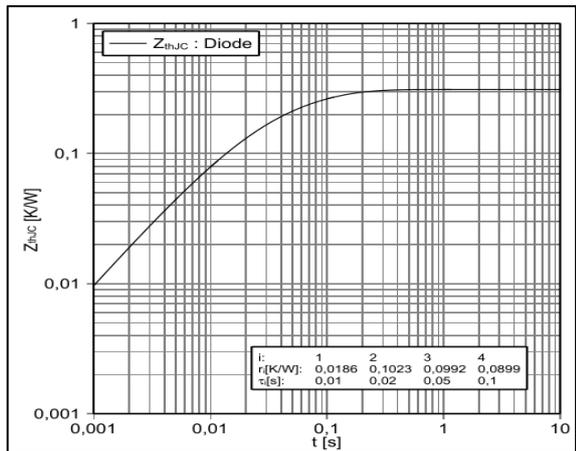
Switching Loss Diode, Erec vs. If
($R_G=15\Omega, V_{CE}=600V, V_{GE}=\pm 15V$)



Transient Thermal Impedance (IGBT)



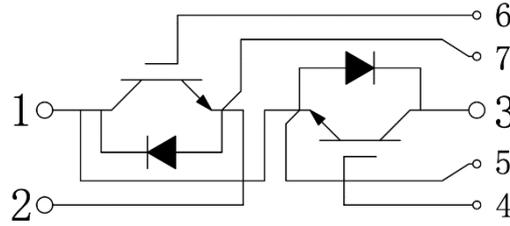
Transient Thermal Impedance (FRED)





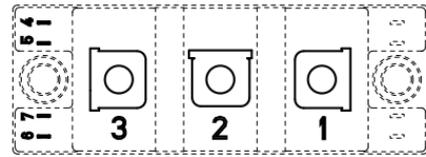
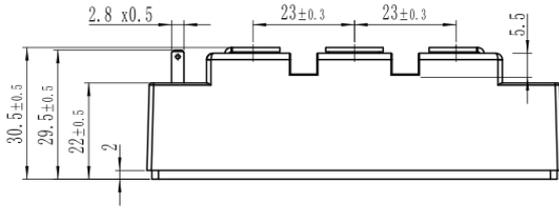
外形尺寸 PACKAGE MECHANICAL DATA

Circuit diagram

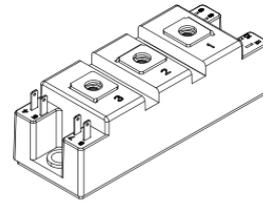
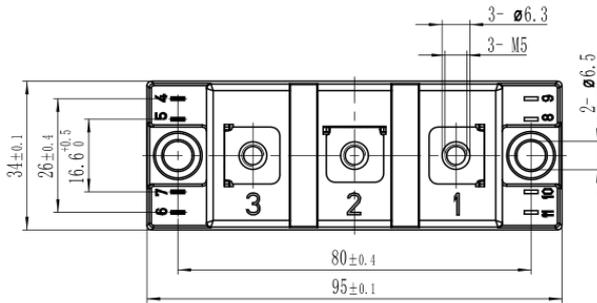


Package outlines

单位 Unit: mm



引脚定义





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