



沟槽栅场截止型 IGBT

Trench-FS IGBT

FHA25T120A

主要参数 MAIN CHARACTERISTICS

Ic (100℃)	25 A
V _{CES}	1200 V
V _{cesat-typ} (@Ic=25A)	1.78 V

用途 APPLICATIONS

不间断电源	UPS
电焊机	Welding Machines
光伏逆变器	PV Inverter

产品特性 FEATURES

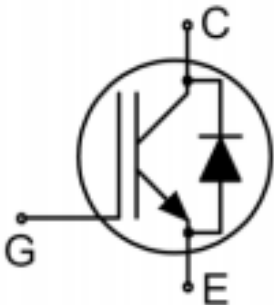
Trench-FS 技术	Trench Field Stop technology
低栅极电荷	Low gate charge
低开关损耗	Low Switching losses
低 V _{CEsat}	Low V _{CEsat}
RoHS 产品	RoHS product
带有反向并行快恢复二极管	With anti-parallel fast recovery diode
正温度系数	Positive temperature coefficient
高可靠性	High reliability

封装形式 Package



TO-247
FHA series

等效电路 Equivalent Circuit



绝对最大额定值 ABSOLUTE RATINGS (T_c=25℃)

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 _{CE}		1200	V
连续集电极极电流 Collector Current-continuous	I _C	(T _C =25℃)	50	A
		(T _C =100℃)	25	
最大脉冲集电极极电流 (注1) Collector Current – pulse (note 1)	I _{CM}		75	A
二极管连续正向电流 Diode Continuous Forward Current	I _F	(T _C =25℃)	30	A
		(T _C =100℃)	15	
二极管最大正向电流 Diode Maximum Forward Current	I _{FM}		45	A
最高栅极发射极电压 Gate-Emmitter Voltage	V _{GE}		±30	V
耗散功率 Power Dissipation (T _C =25℃)	P _D		375	W
最高结温及存储温度 Operating and Storage Temperature Range	T _J , T _{STG}		175,-50~+150	℃
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes	T _L		260	℃

注1：集极电流由最高结温限制
Note1:Collector current limited by maximum junction temperature

电特性 ELECTRICAL CHARACTERISTICS(at T_c= 25°C, unless otherwise specified)

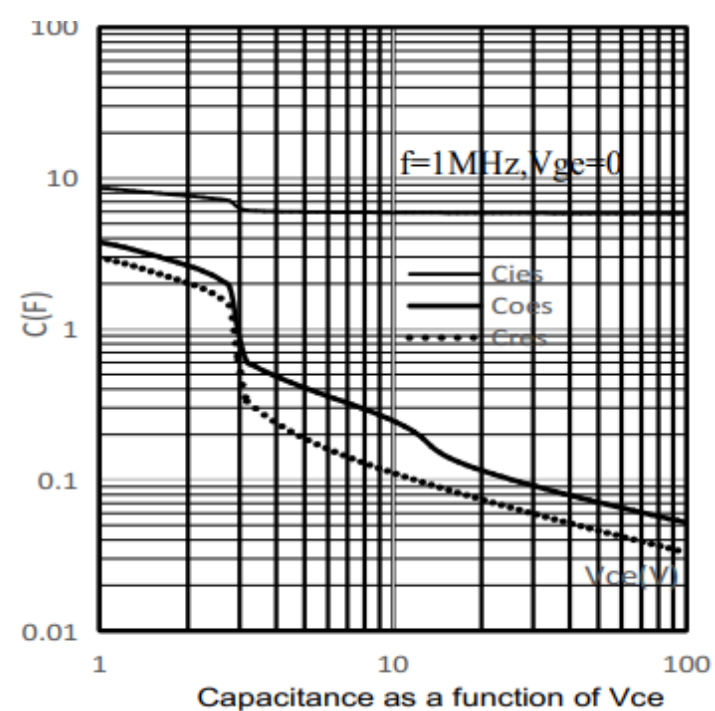
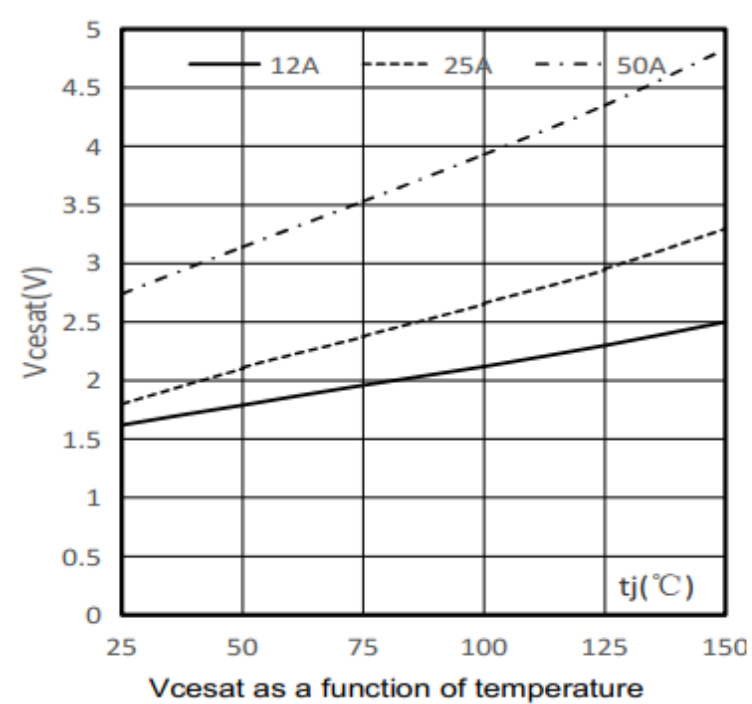
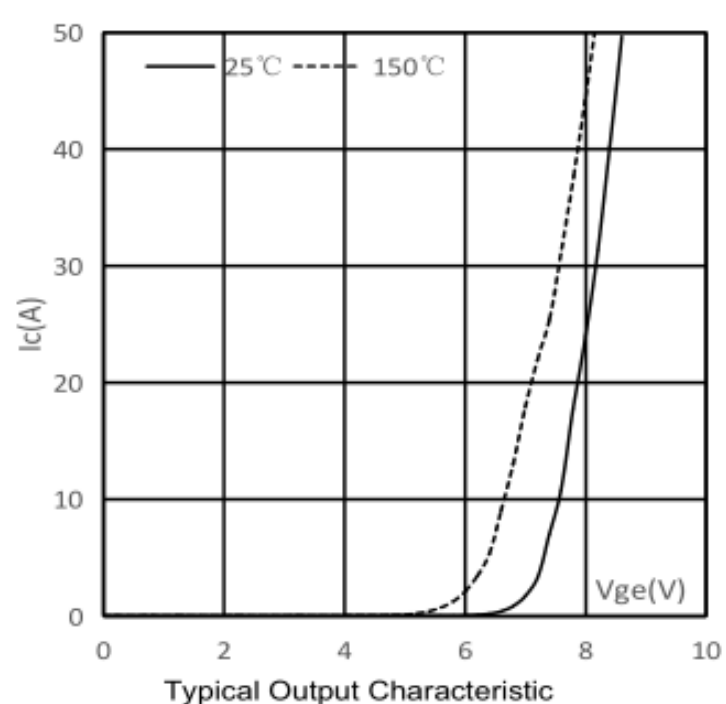
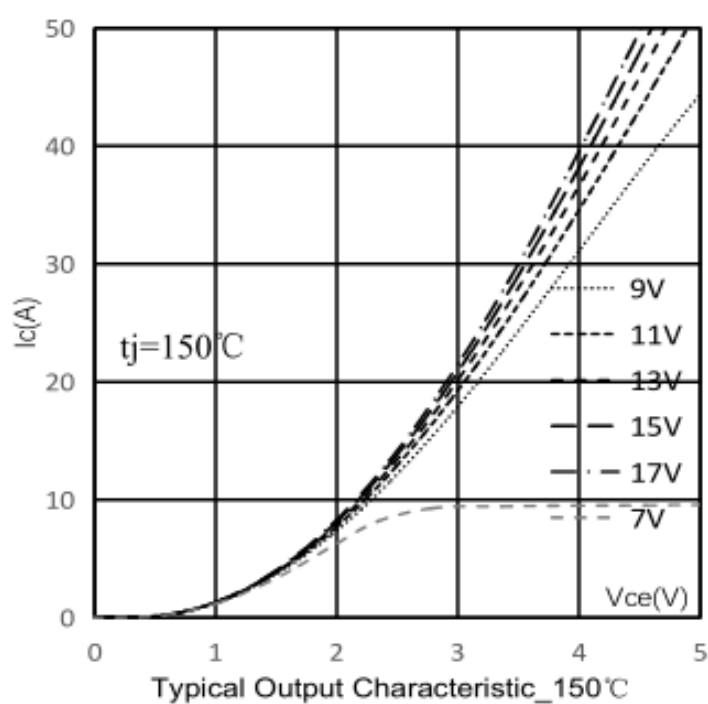
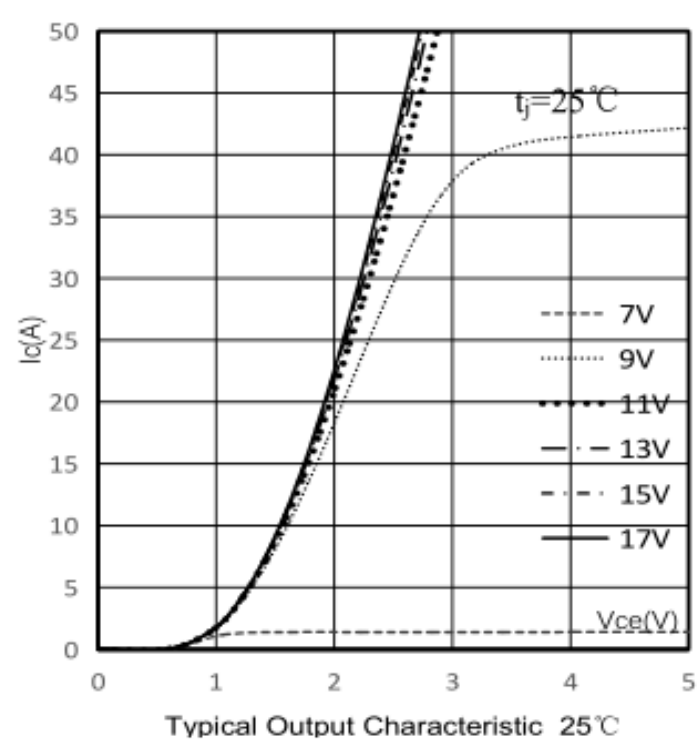
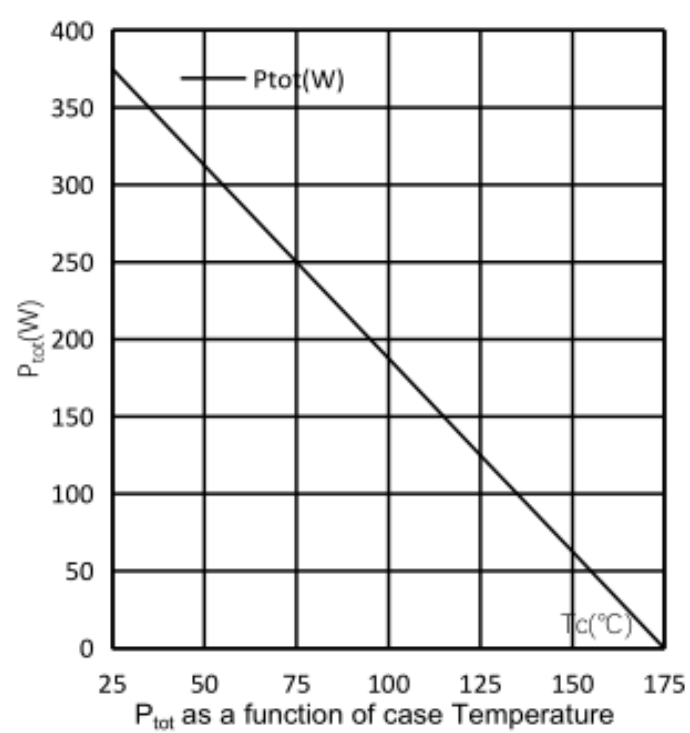
项目 Parameter	符号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单位 Units
关态特性 Off –Characteristics						
集电极－发射极击穿电压 Collector-Emmitter Voltage	BV _{CES}	V _{GE} =0V,I _C =250uA	1200	-	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	ΔBV _{CES} /ΔT _J	I _C =1mA, referenced to 25°C	-	1.2	-	V/°C
零栅压下集电极漏电流 Zero Gate Voltage Collector Current	I _{CES}	V _{CE} =1200V,V _{GE} =0V	-	-	5	uA
栅极体漏电流 Gate-Emitter leakage current	I _{GES(F/R)}	V _{CE} =0V, V _{GE} =±30V	-	-	±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 =1mA	4.8	5.4	5.9	V
饱和压降 Collector-Emmitter saturation Voltage	V _{CESAT}	V _{GE} =15V,I _C =25A,T _J =25°C , T _J =150°C	- -	1.78 3.3	2.2 -	V
动态特性 Dynamic Characteristics						
开启延迟时间 Turn-On delay time	td(on)	V _{GE} =15V, V _{CC} =600V, I _C =25A, R _G =10Ω, T _J =25°C, Inductive Load L=200uH	-	85.2	-	ns
上升时间 Turn-On rise time	tr		-	53.3	-	ns
关断延迟时间 Turn-Off delay time	td(off)		-	289	-	ns
下降时间 Turn-Off Fall time	tf		-	66.9	-	ns
开启损耗 Turn-on energy	Eon		-	1.73	-	mJ
关断损耗 Turn-off energy	Eoff		-	0.93	-	
总的开关损耗 Total switching energy	Ettotal		-	2.66	-	
开启延迟时间 Turn-On delay time	td(on)	V _{GE} =15V, V _{CC} =600V, I _C =25A, R _G =10Ω, T _J =150°C, Inductive Load L=200uH	-	76.4	-	ns
上升时间 Turn-On rise time	tr		-	50.8	-	ns
关断延迟时间 Turn-Off delay time	td(off)		-	319	-	ns
下降时间 Turn-Off Fall time	tf		-	60.0	-	ns
开启损耗 Turn-on energy	Eon		-	2.56	-	mJ
关断损耗 Turn-off energy	Eoff		-	1.06	-	
总的开关损耗 Total switching energy	Ettotal		-	3.62	-	
栅极电荷总量 Total Gate Charge	Qg	V _{CE} =960V, I _C =40A, V _{GE} =15V	-	226	-	nC
栅极－发射极电荷 Gate-emitter charge	Qge		-	45.1	-	
栅极－集电极电荷 Gate-collector charge	Qgc		-	95.1	-	
栅极电阻 Gate Resistance	Rg	f=1.0MHz,V _{CE} OPEN	-	0.95	-	Ω
输入电容 Input capacitance	Cies	V _{CE} =30V, V _{GE} =0V, f=1.0MHz	-	5990	-	pF
输出电容 Output capacitance	Coes		-	92.7	-	
反向传输电容 Reverse transfer capacitance	Cres		-	67.3	-	

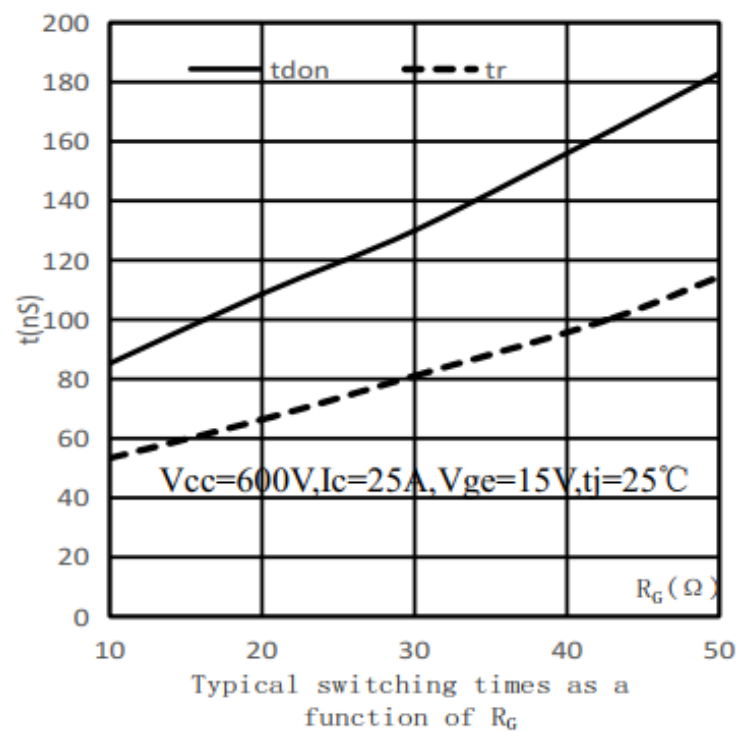
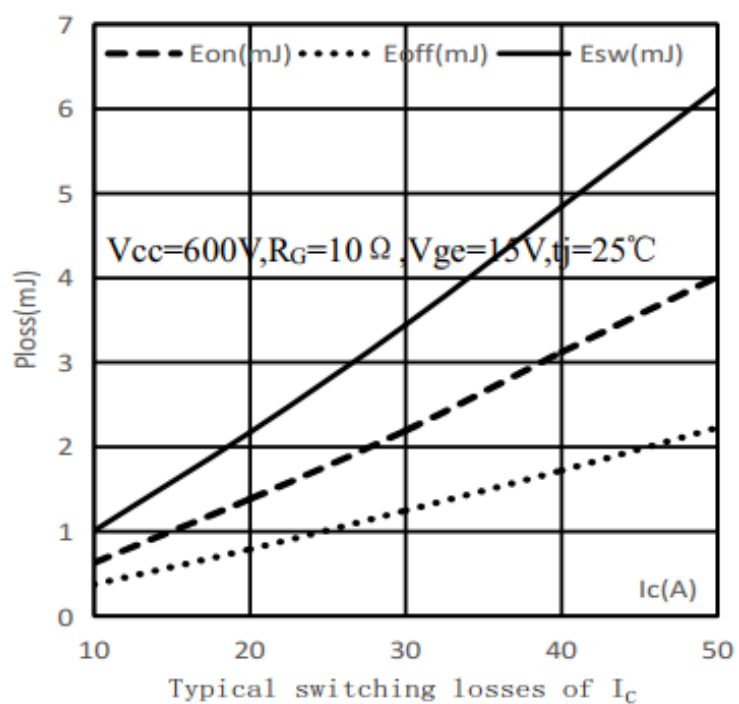
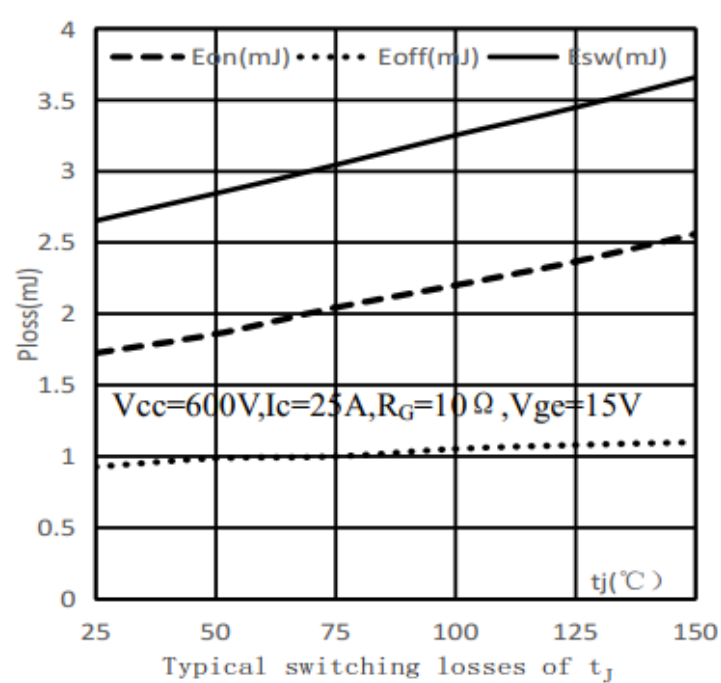
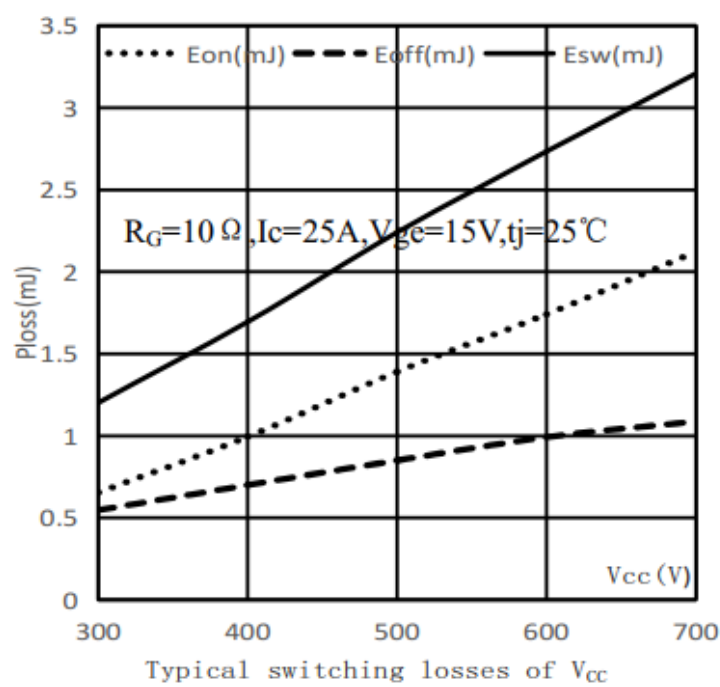
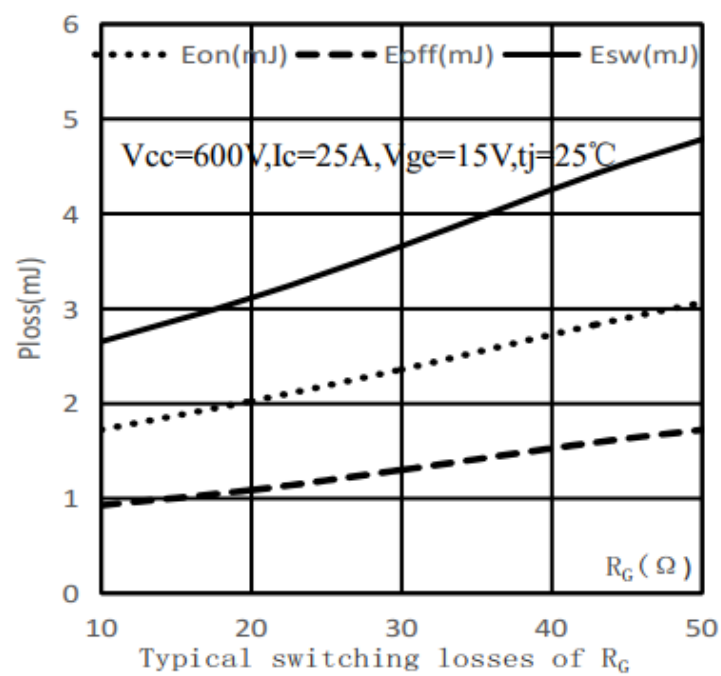
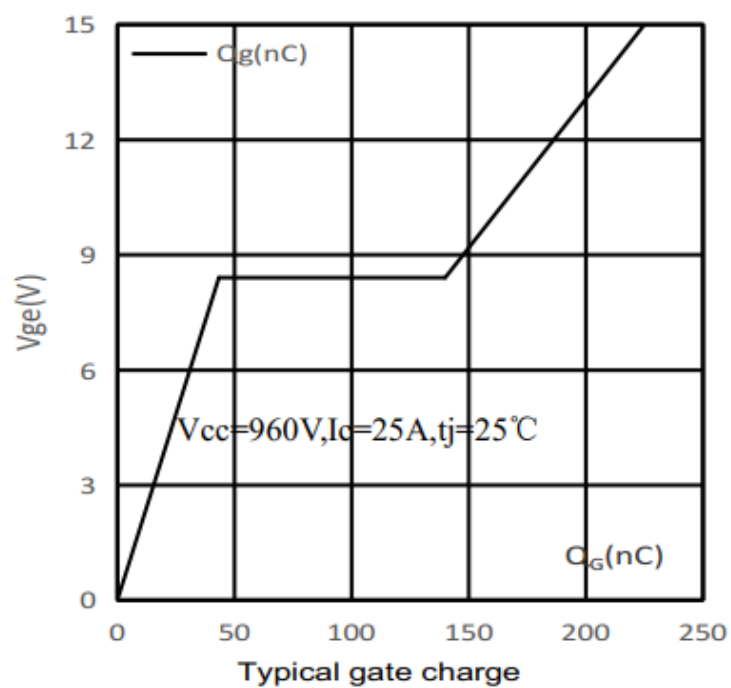
二极管特性Diode characteristics						
项目 Parameter	符号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单位 Units
正向压降 Diode Forward Voltage	V _F	I _F =15A	-	1.5	1.85	V
		I _F =25A	-	1.7	2.2	
反向恢复时间 Reverse recovery time	t _{rr}	I _F =25A , V _R =600V, V _{GE} =15V, R _G =10Ω, T _J =25℃	-	157	-	ns
反向恢复电流 Reverse recovery current	I _{rrm}		-	27.2	-	A
反向恢复电荷 Reverse recovery charge	Q _{rr}		-	2370	-	nC
反向恢复时间 Reverse recovery time	t _{rr}	I _F =25A , V _R =600V, V _{GE} =15V, R _G =10Ω, T _J =150℃	-	270	-	ns
反向恢复电流 Reverse recovery current	I _{rr}		-	33	-	A
反向恢复电荷 Reverse recovery charge	Q _{rr}		-	4260	-	nC

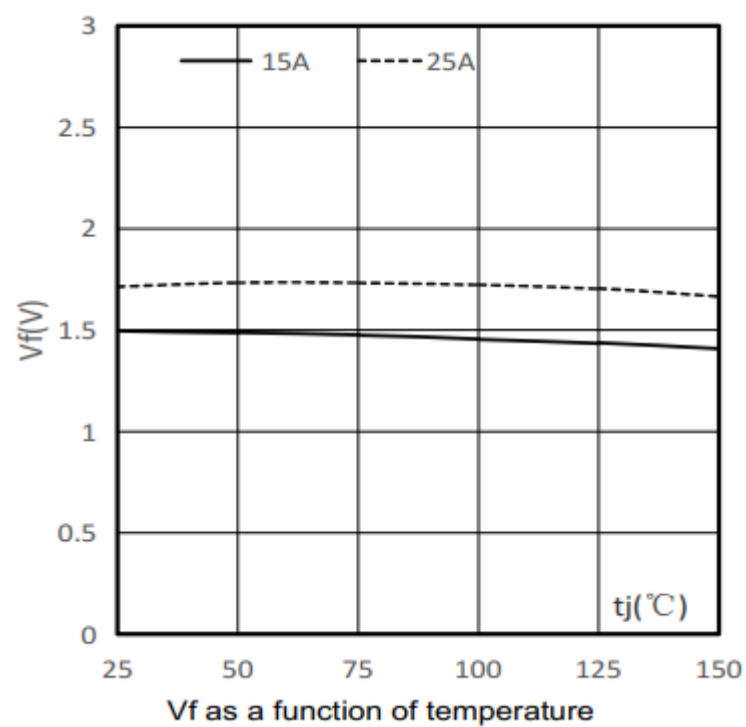
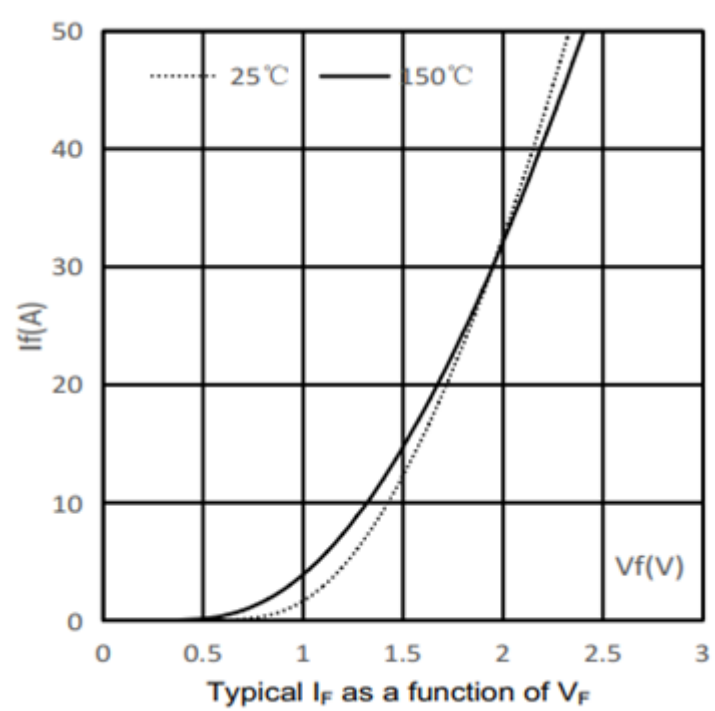
热特性 THERMAL CHARACTERISTIC

项目 Parameter	符号 Symbol	数 值 Value	单位 Unit
结到管壳的热阻 (IGBT) Thermal Resistance, Junction to Case (IGBT)	R _{th(j-c)}	0.40	℃/W
结到管壳的热阻 (FRD) Thermal Resistance, Junction to Case (Diode)	R _{th(j-c)}	1.32	℃/W
结到环境的热阻 Thermal Resistance, Junction to Ambient	R _{th(j-A)}	40	℃/W

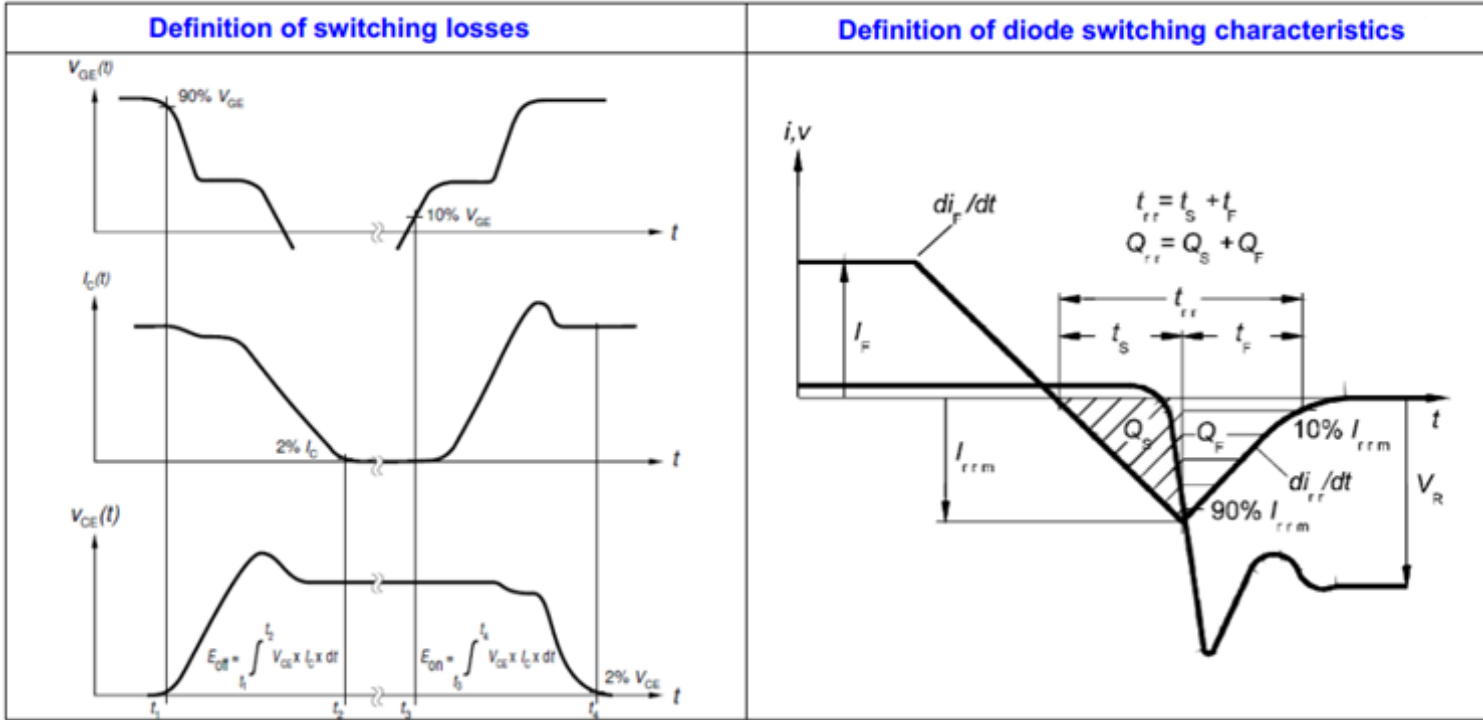
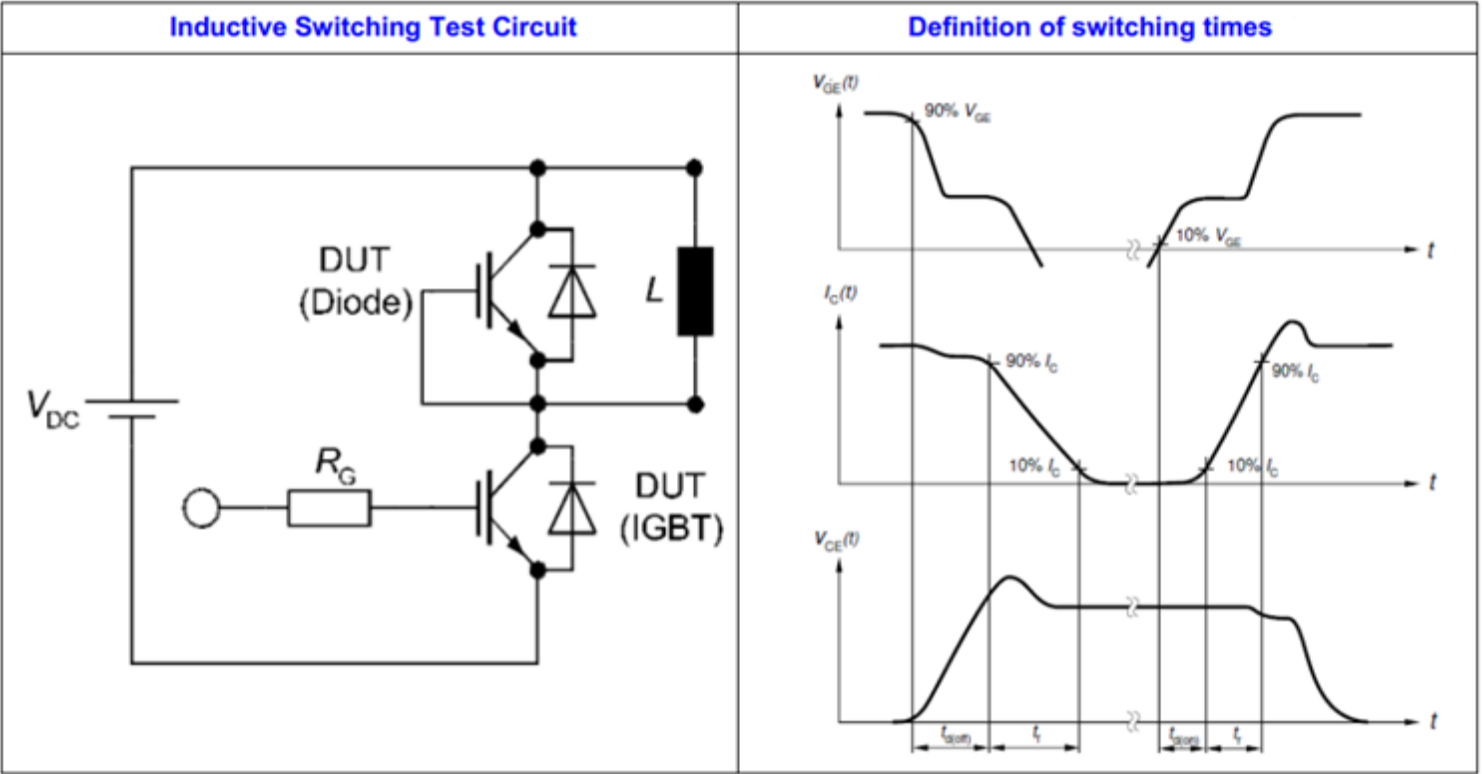
特性曲线
(ELECTRICAL CHARACTERISTICS (curves))



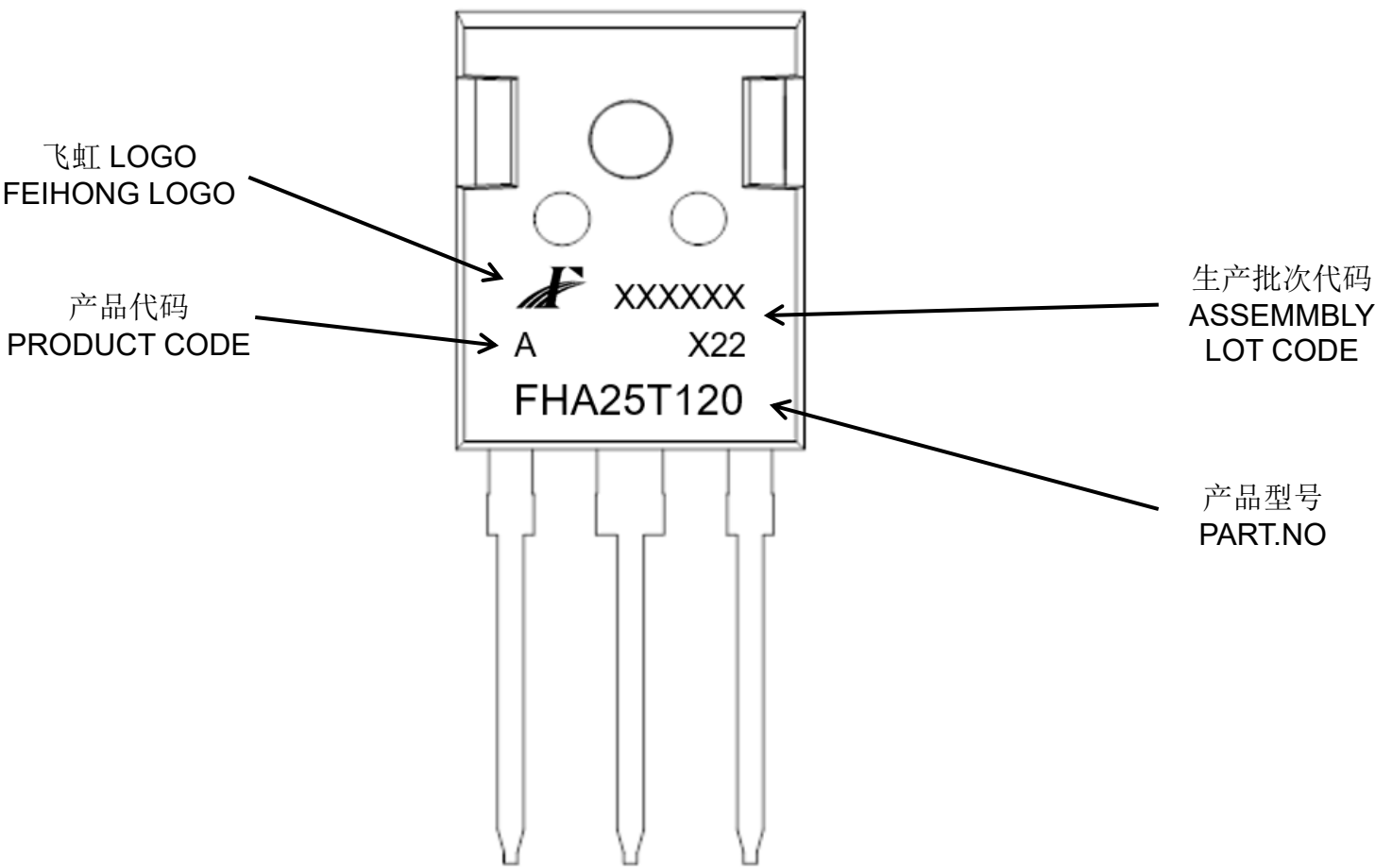




Test Circuit and Waveform



印记 Marking:



外形尺寸:

Package Dimension:

TO-247

