

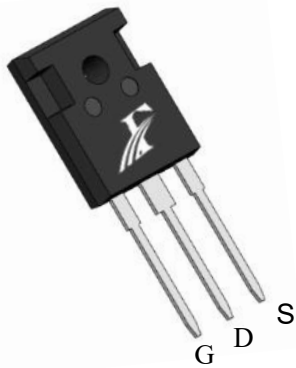
主要参数 MAIN CHARACTERISTICS

I _C	40 A
V _{CES}	1200 V
V _{cesat-typ} (@I _C =40A)	1.76 V

用途 APPLICATIONS

不间断电源	UPS
光伏逆变器	PV Inverter
电焊机	Welder
开关电源	Switching power supply

封装形式 Package

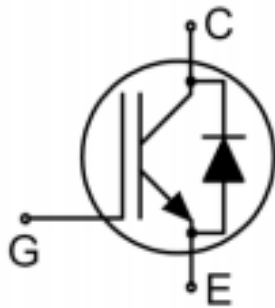


TO-247
FHA series

产品特性 FEATURES

低栅极电荷	Low gate charge
T-FS 技术	Trench Field Stop technology
低开关损耗	Low Switching losses
低 V _{CEsat}	Low V _{CEsat}
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
符合 RoHS 标准	RoHS compliant

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℃)	80	A
		(T _C =100℃)	40	
最大脉冲集电极极电流 (注1) Collector Current – pulse (note 1)	I _{CM}		160	A
二极管连续正向电流 Diode Continuous Forward Current	I _F	(T _C =25℃)	40	A
		(T _C =100℃)	20	
二极管最大正向电流 Diode Maximum Forward Current	I _{FM}		80	A
最高栅极发射极电压 Gate-Emmitter Voltage	V _{GE}		±20	V
耗散功率 Power Dissipation (T _C =25℃)	P _D		428	W
最高结温及存储温度 Operating and Storage Temperature Range	T _J , T _{STG}		175,-55~+175	℃
引线最高焊接温度 Maximum Lead Temperature for Soldering Purposes (1.6mm from case for 10s)	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)

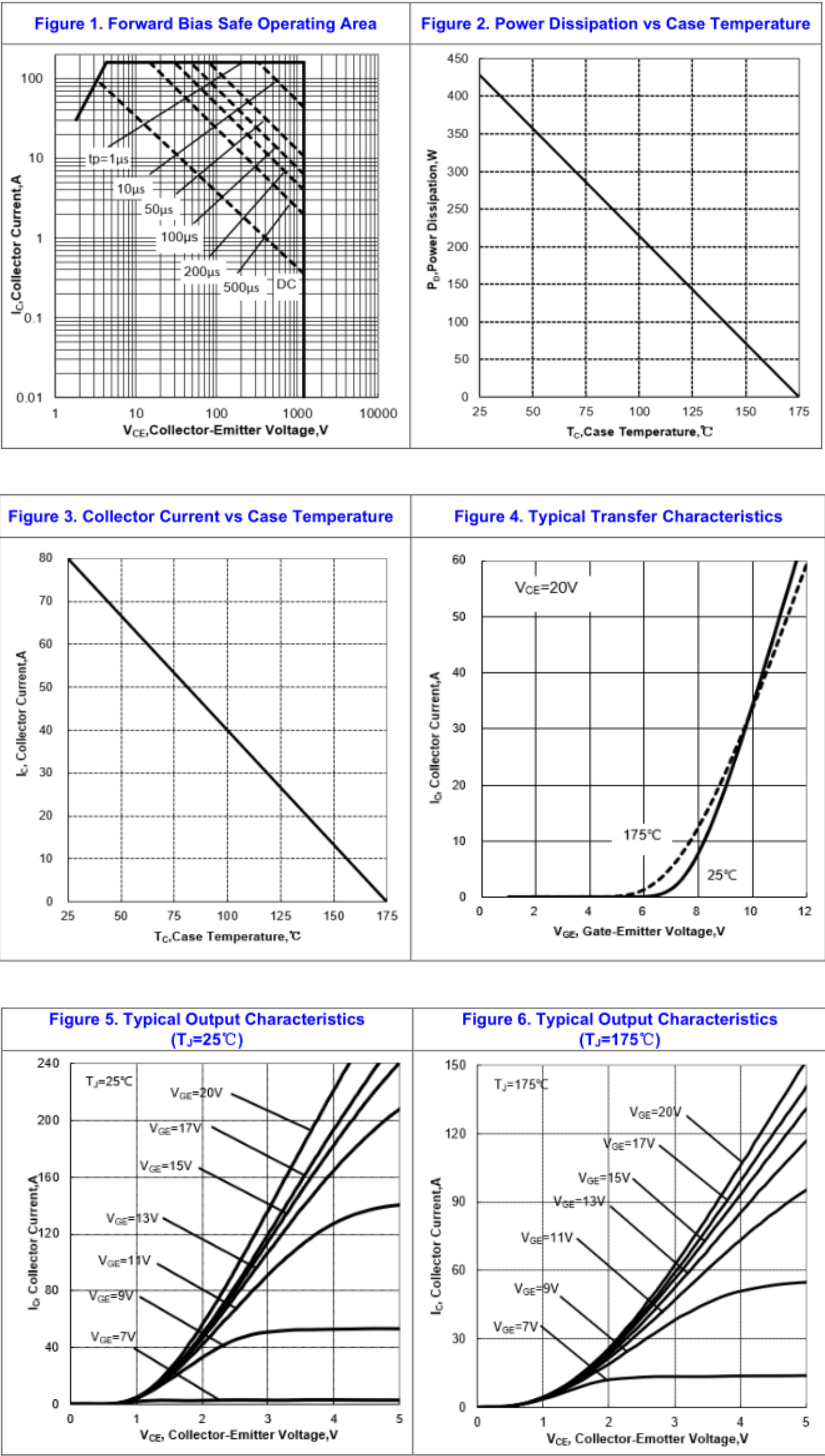
项目 Parameter	符号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单位 Units
关态特性 Off –Characteristics						
集电极－发射极击穿电压 Collector-Emmitter Voltage	BV _{CES}	V _{GE} =0V,I _C =250uA	1200	1300	-	V
击穿电压温度特性 Breakdown Voltage Temperature Coefficient	ΔBV _{CES} /ΔT _J	I _C =1mA, referenced to 25°C	-	1.2	-	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	-	-	10	uA
栅极体漏电流 Gate-Emitter leakage current	I _{GES(F/R)}	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 =1mA	4.7	5.3	6.3	V
饱和压降 Collector-Emmitter saturation Voltage	V _{CESAT}	V _{GE} =15V,I _C =40A,	-	1.76	2.15	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 =40A, R _G =5Ω, T _J =25°C, Inductive Load	-	15	-	ns
上升时间 Turn-On rise time	tr		-	24	-	ns
关断延迟时间 Turn-Off delay time	td(off)		-	108	-	ns
下降时间 Turn-Off Fall time	tf		-	70	-	ns
开启损耗 Turn-on energy	Eon		-	2.45	-	mJ
关断损耗 Turn-off energy	Eoff		-	1.20	-	
总的开关损耗 Total switching energy	Ets		-	3.65	-	
开启延迟时间 Turn-On delay time	td(on)	V _{GE} =15V, V _{CC} =600V, I _C =40A, R _G =5Ω, T _J =175°C, Inductive Load	-	14	-	ns
上升时间 Turn-On rise time	tr		-	25	-	ns
关断延迟时间 Turn-Off delay time	td(off)		-	136	-	ns
下降时间 Turn-Off Fall time	tf		-	132	-	ns
开启损耗 Turn-on energy	Eon		-	3.10	-	mJ
关断损耗 Turn-off energy	Eoff		-	2.20	-	
总的开关损耗 Total switching energy	Ets		-	5.30	-	
栅极电荷总量 Total Gate Charge	Qg	V _{CE} =960V, I _C =40A, V _{GE} =15V	-	93	-	nC
栅极－发射极电荷 Gate-emitter charge	Qge		-	20	-	
栅极－集电极电荷 Gate-collector charge	Qgc		-	38	-	
栅极电阻 Gate Resistance	Rg	f=1.0MHz,V _{CE} OPEN	-	1.9	-	Ω
输入电容 Input capacitance	Cies	V _{CE} =25V, V _{GE} =0V, f=1.0MHz	-	2049	-	pF
输出电容 Output capacitance	Coes		-	129	-	
反向传输电容 Reverse transfer capacitance	Cres		-	19	-	

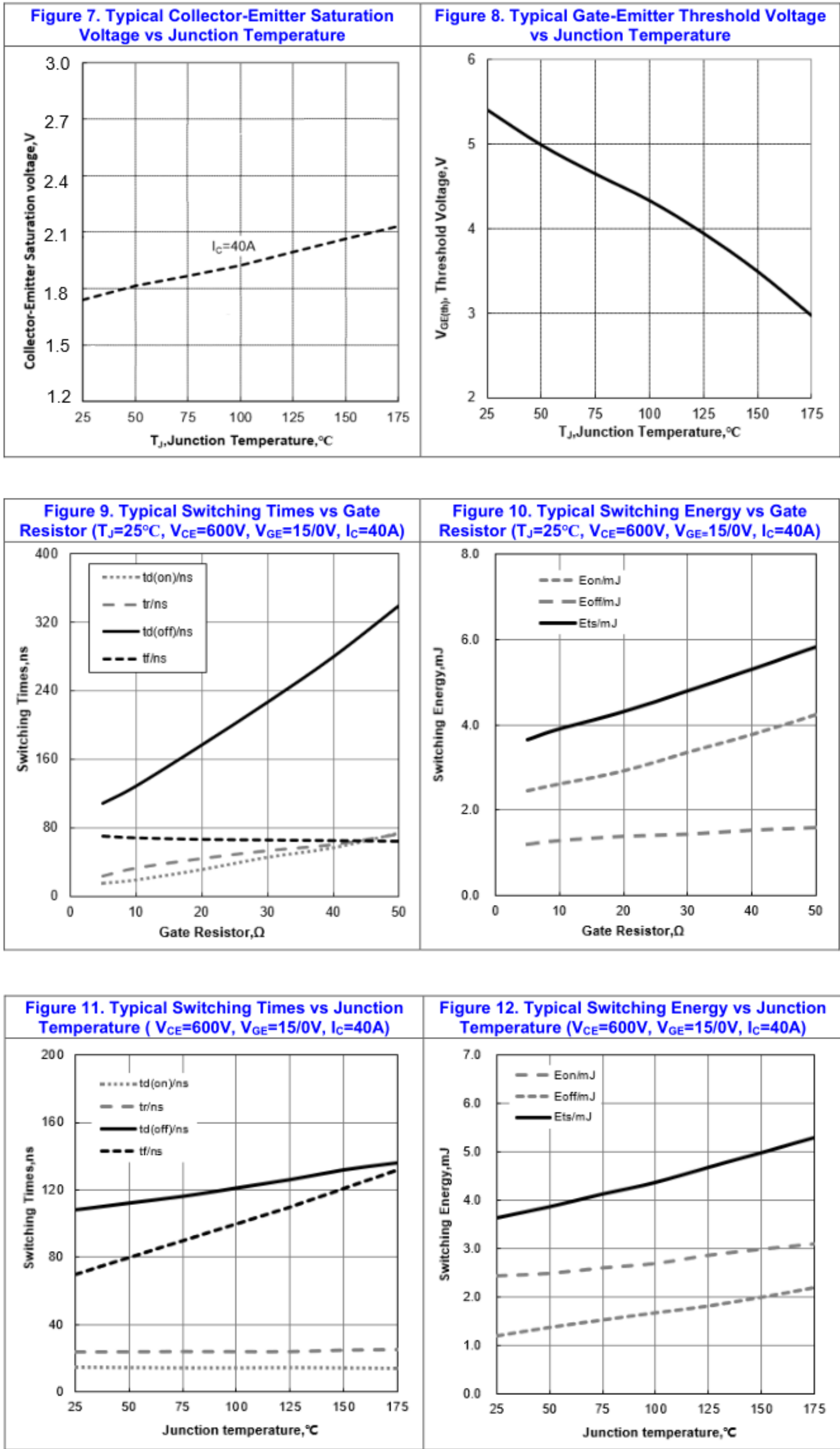
二极管特性Diode characteristics						
项目 Parameter	符号 Symbol	测试条件 Tests conditions	最小 Min	典型 Typ	最大 Max	单位 Units
正向压降 Diode Forward Voltage	V _F	I _F =20A	-	1.70	2.2	V
		I _F =40A	-	2.05	2.5	
反向恢复时间 Reverse recovery time	T _{rr}	I _F =20A, di/dt=200A/μs, T _J =25°C	-	50	-	ns
反向恢复电流 Reverse recovery current	I _{rrm}		-	12	-	A
反向恢复电荷 Reverse recovery charge	Q _{rr}		-	350	-	nC
反向恢复时间 Reverse recovery time	T _{rr}	I _F =40A, di/dt=200A/μs, T _J =25°C	-	56	-	ns
反向恢复电流 Reverse recovery current	I _{rrm}		-	16	-	A
反向恢复电荷 Reverse recovery charge	Q _{rr}		-	380	-	nC
反向恢复时间 Reverse recovery time	T _{rr}	I _F =20A, di/dt=200A/μs, T _J =175°C	-	64	-	ns
反向恢复电流 Reverse recovery current	I _{rrm}		-	16	-	A
反向恢复电荷 Reverse recovery charge	Q _{rr}		-	840	-	nC
反向恢复时间 Reverse recovery time	T _{rr}	I _F =20A, di/dt=200A/μs, T _J =175°C	-	74	-	ns
反向恢复电流 Reverse recovery current	I _{rrm}		-	20	-	A
反向恢复电荷 Reverse recovery charge	Q _{rr}		-	880	-	nC

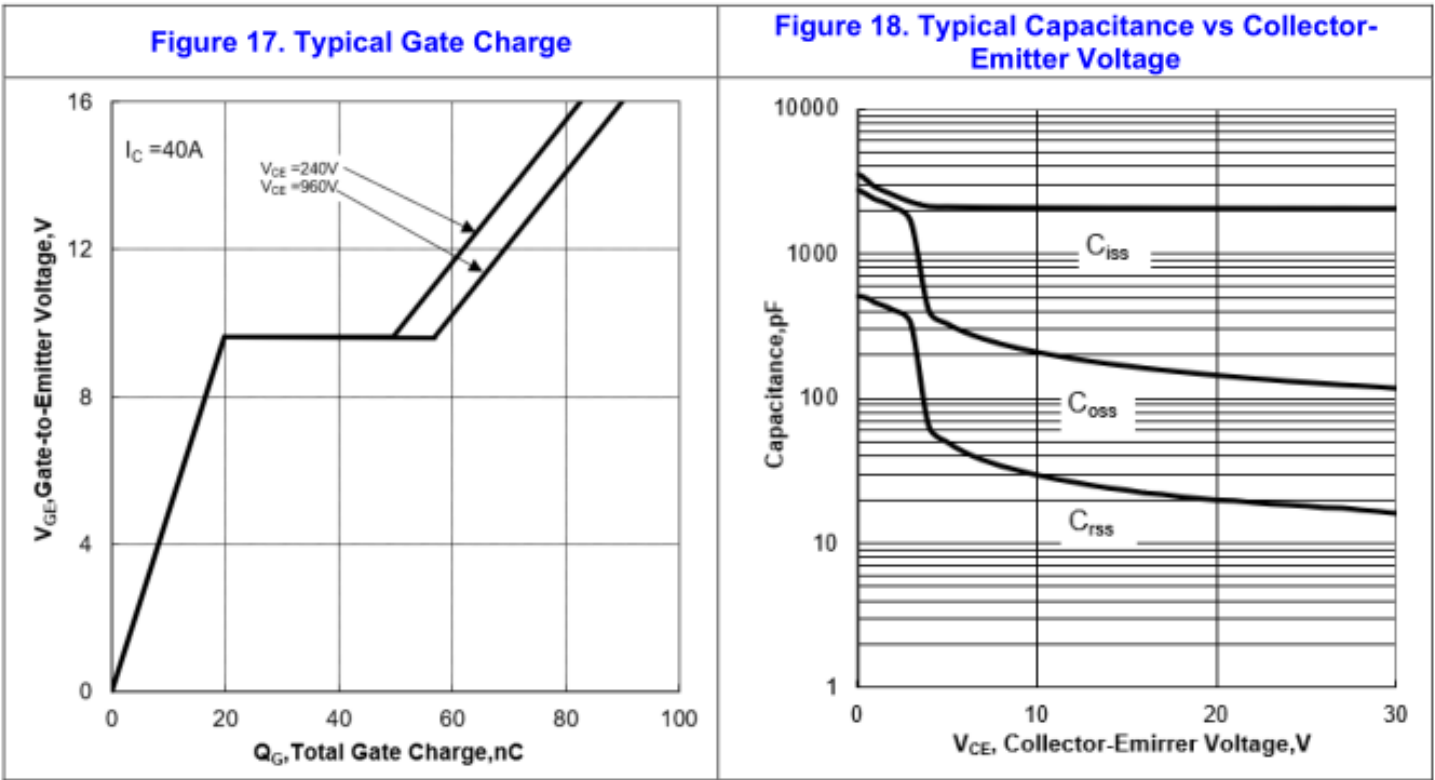
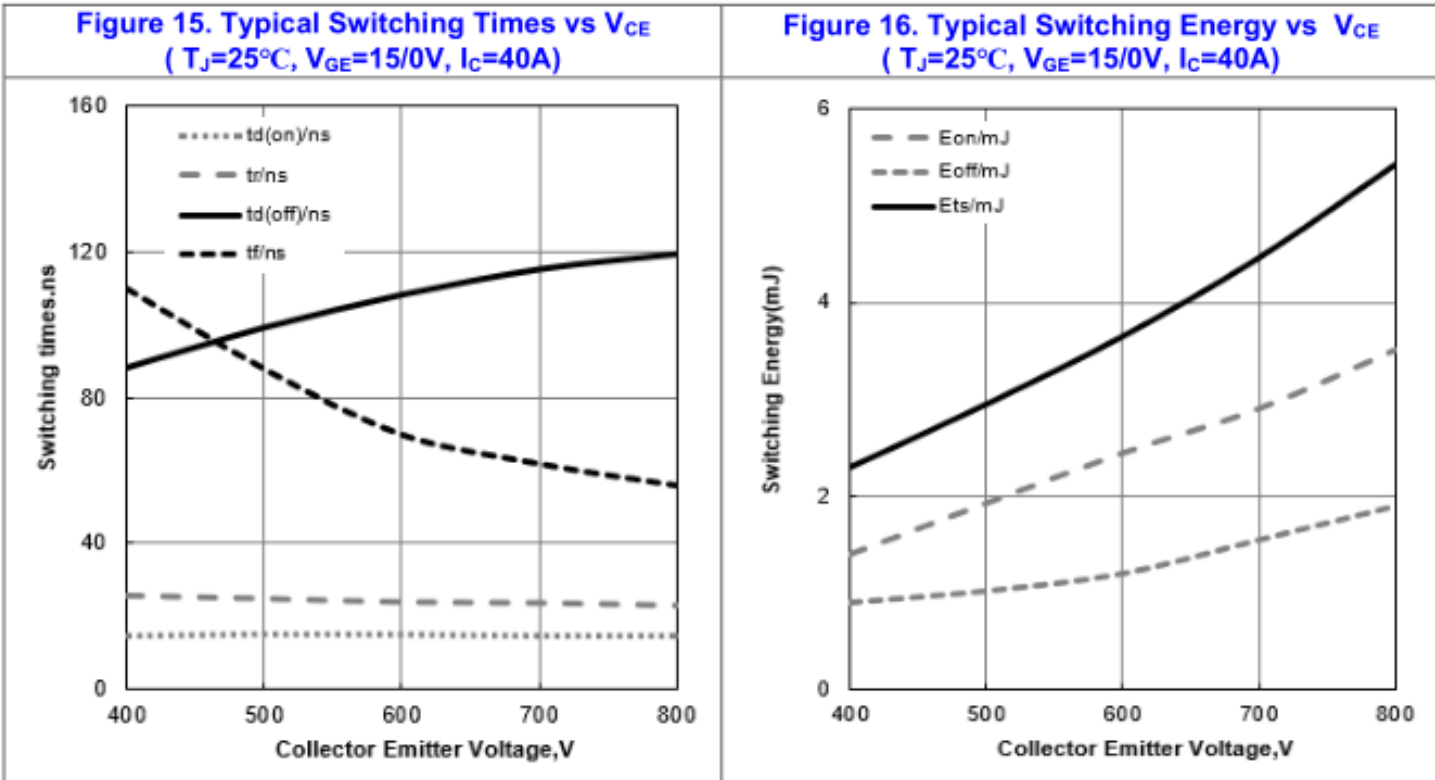
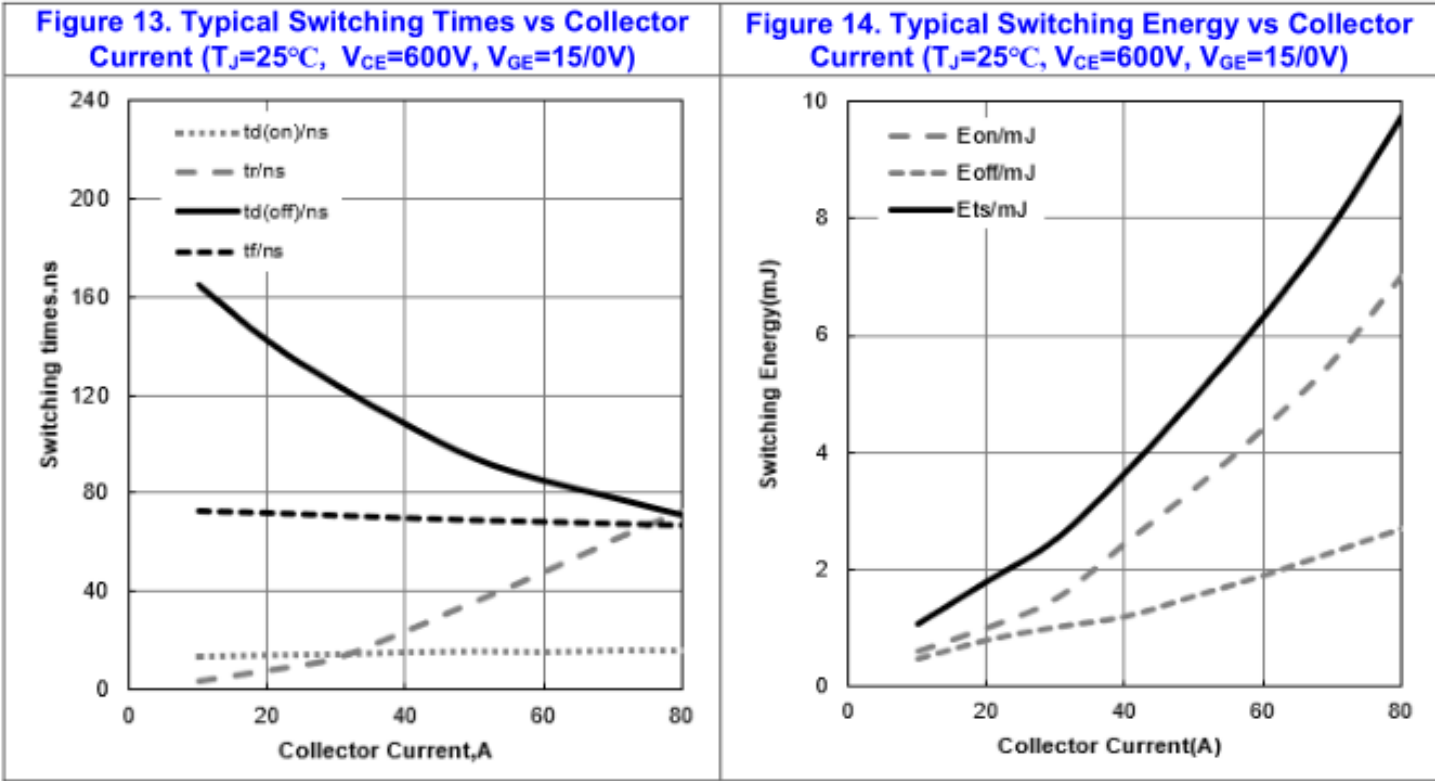
热特性 THERMAL CHARACTERISTIC

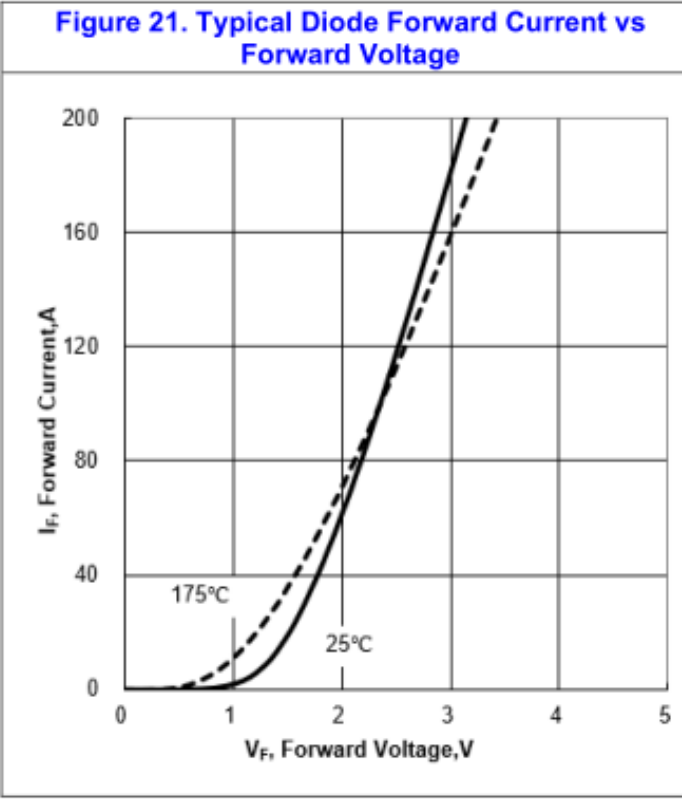
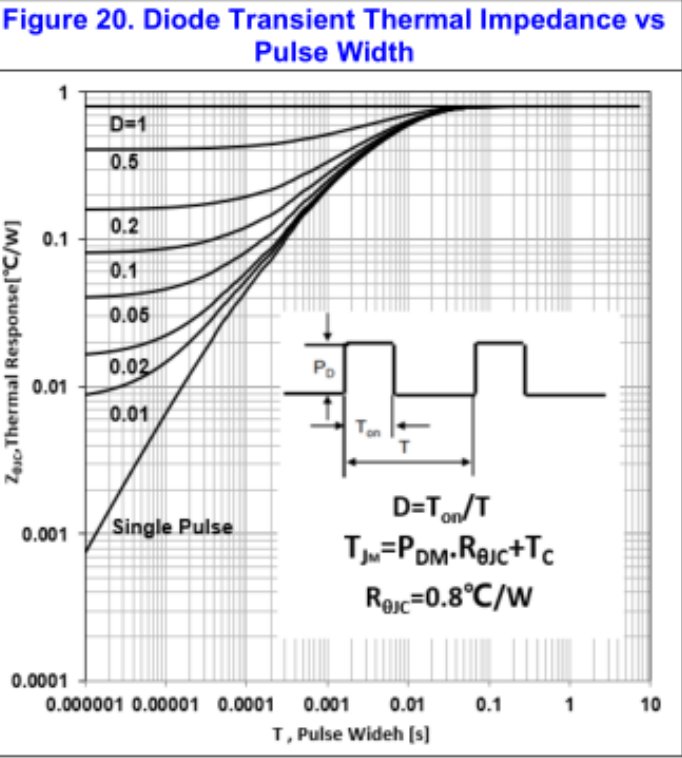
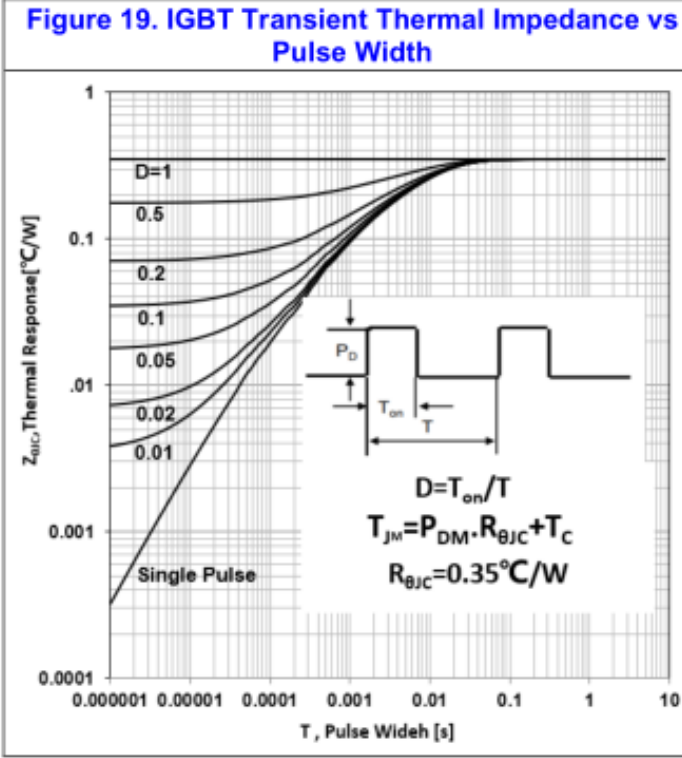
项目 Parameter	符号 Symbol	数 值 Value	单位 Unit
结到管壳的热阻 (IGBT) Thermal Resistance, Junction to Case (IGBT)	R _{th(j-c)}	0.35	°C/W
结到管壳的热阻 (Diode) Thermal Resistance, Junction to Case (Diode)	R _{th(j-c)}	0.8	°C/W
结到环境的热阻 Thermal Resistance, Junction to Ambient	R _{th(j-A)}	40	°C/W

特性曲线
(ELECTRICAL CHARACTERISTICS (curves))

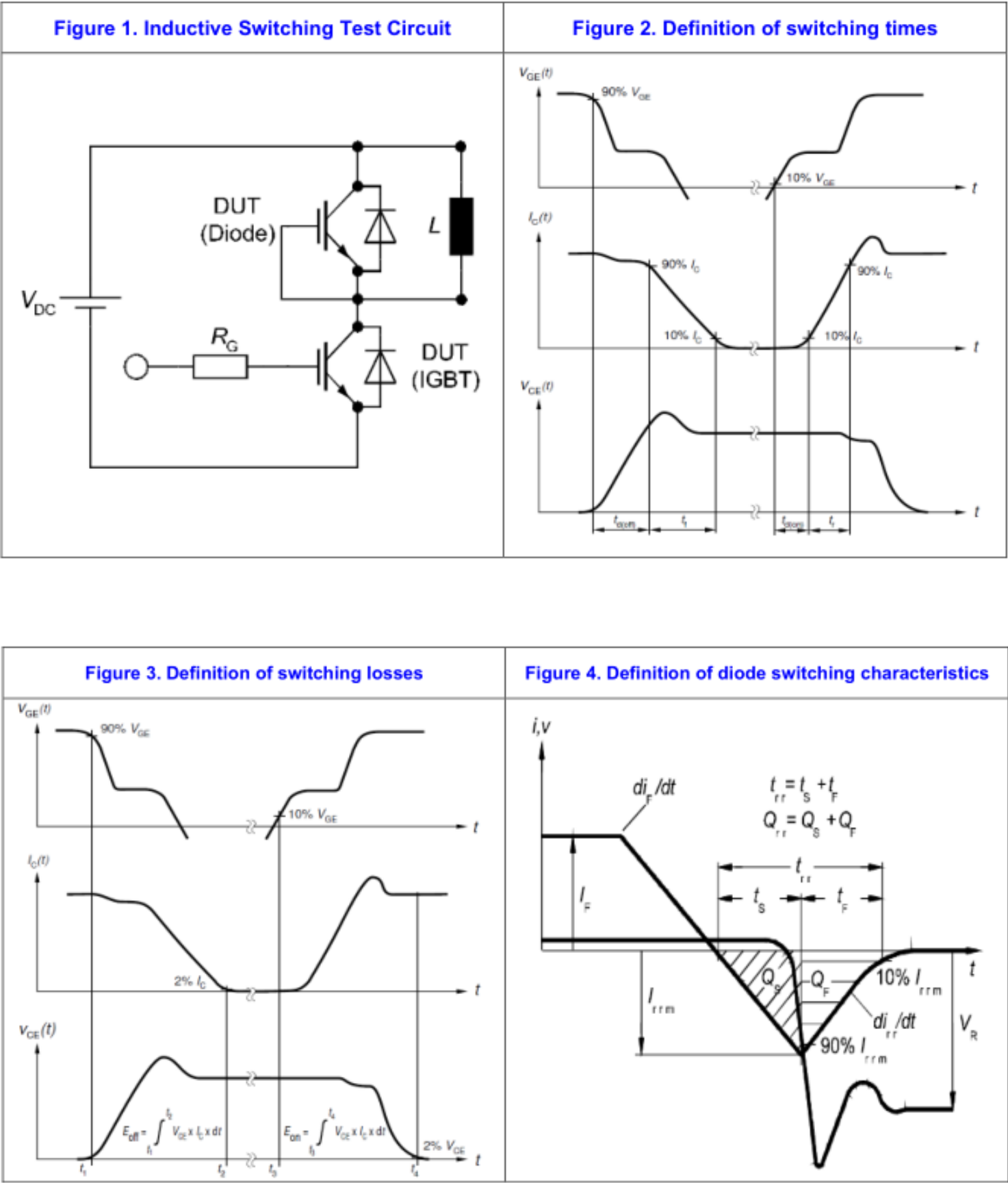




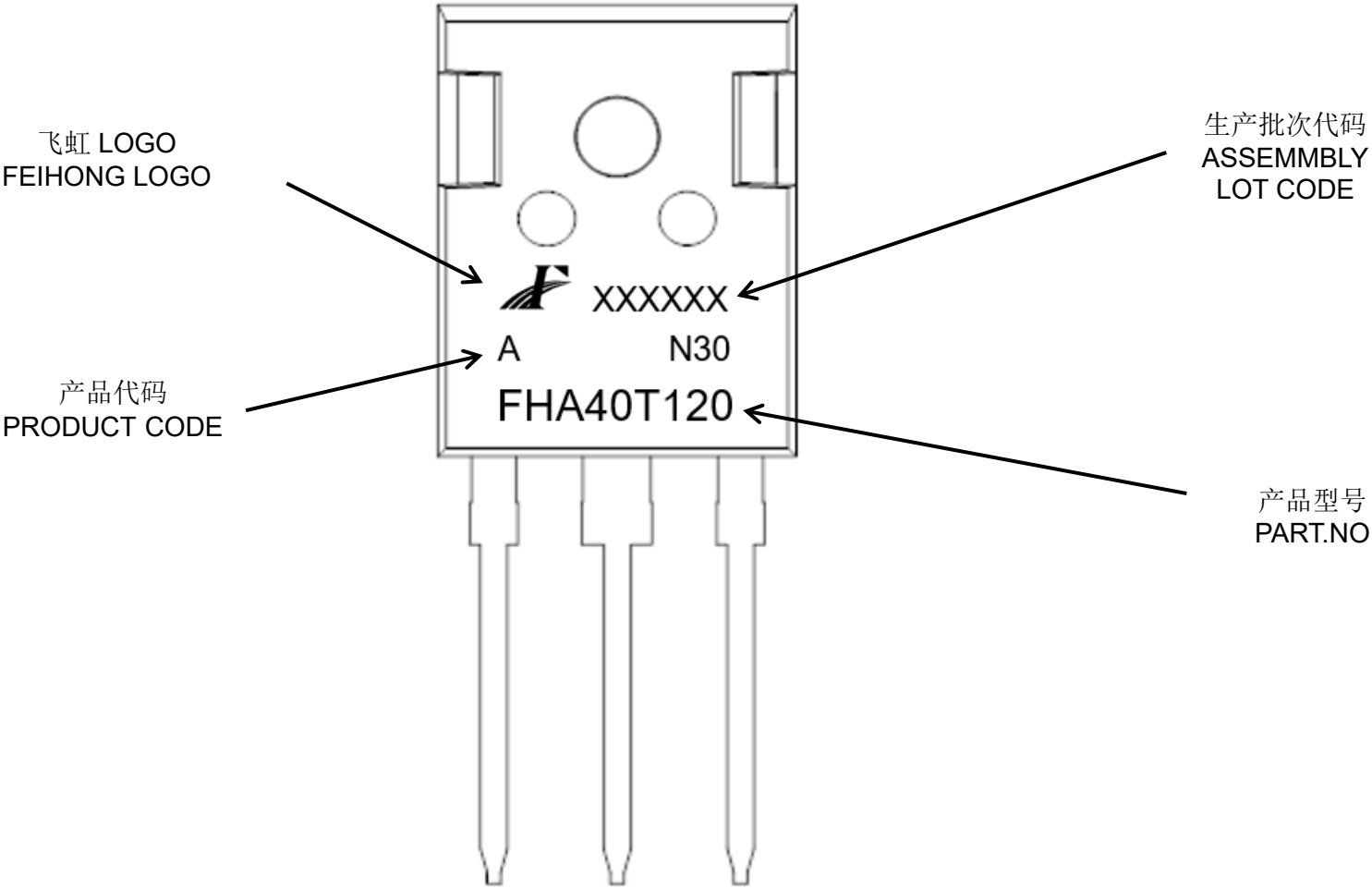




Test Circuit and Waveform



印记 Marking:



外形尺寸:

Package Dimension:

TO-247

