描述 / Descriptions

TO-247 塑封封装绝缘栅双极晶体管。

Insulated-Gate Bipolar Transistor in a TO-247 Plastic Package.

特征 / Features

650V，75A

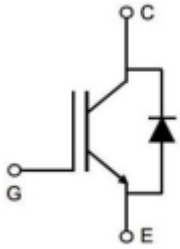
$V_{CE(SAT)}$= 1.90V(typ.) @V_{GE}=15V,I_C= 75A

用途 / Applications

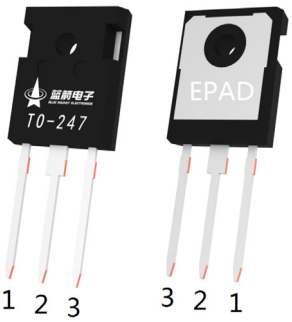
太阳能转换器、不间断电源、焊接转换器、中高范围开关频率转换器。

Solar Converters, Uninterrupted Power Supply, Welding Converters, Mid to High Range Switching Frequency Converters.

内部等效电路 / Equivalent Circuit



引脚排列 / Pinning



PIN1：G　　PIN 2、EPAD：C　　PIN 3：E

印章代码 / Marking

见印章说明。

See Marking Instructions.

极限参数 / Absolute Maximum Ratings(T_a=25℃)

参数 Parameter		符号 Symbol	数值 Rating	单位 Unit
Collector-Emitter Voltage		V_{CES}	650	V
Gate-Emitter Voltage		V_{GES}	±30	V
Continuous Collector Current	T_C=25℃	I_C	150	A
	T_C=100℃		75	A
Pulsed Collector Current , Limited by T_{Jmax}		I_{CM}	300	A
Continuous Diode Forward Current	T_C=25℃	I_F	160	A
	T_C=100℃		80	A
Power Dissipation	T_C=25℃	P_D	750	W
	T_C=100℃		375	W
Operating Junction Temperature Range		T_J	-40 to +175	℃
Storage Temperature Range		T_{STG}	-55 to +150	℃
Maximum Junction-to-Ambient		$R_{\theta JA}$	80	℃/W
Maximum IGBT Junction-to-Case		$R_{\theta JC}$	0.20	℃/W
Maximum Diode Junction-to-Case		$R_{\theta JC}$	0.55	℃/W

电性能参数 / Electrical Characteristics(Tc=25℃)

参数 Parameter	符号 Symbol	测试条件 Test Conditions		最小值 Min	典型值 Typ	最大值 Max	单位 Unit
Collector-Emitter Breakdown Voltage	BV_{CES}	I_C=250uA, V_{GE}=0V		650			V
Zero Gate Voltage Collector current	I_{CES}	V_{CE}=650V, V_{GE}=0V				250	uA
Gate-Emitter Leakage Current	I_{GES}	V_{CE}=0V, V_{GE}= ±30V				±100	nA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	V_{CE}=V_{GE}, I_C=250μA		4.0	5.0	5.5	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=75A	T_J=25℃		1.90	2.20	V
			T_J=125℃		2.00		
Total Gate Charge	Q_g	V_{GE}=15V, I_C=75A, V_{CE}=480V			200		nC
Gate to Emitter Charge	Q_{ge}				20		
Gate to Collector Charge	Q_{gc}				32		

电性能参数 / Electrical Characteristics(Ta=25℃)

参数 Parameter	符号 Symbol	测试条件 Test Conditions		最小值 Min	典型值 Typ	最大值 Max	单位 Unit
Turn-On Delay Time	$t_{d(on)}$	V_{GE}=15V, V_{CC}=400V I_C=75A, R_G=10Ω Inductive Load	TC=25℃		38		ns
			Tc=150℃		36		ns
Turn-On Rise Time	t_r		TC=25℃		118		ns
			Tc=150℃		100		ns
Turn-Off Delay Time	$t_{d(off)}$		TC=25℃		267		ns
			Tc=150℃		300		ns
Turn-Off Fall Time	t_f		TC=25℃		81		ns
			Tc=150℃		85		ns
Turn-On Energy	E_{on}		TC=25℃		4.65		mJ
			Tc=150℃		4.50		mJ
Turn-Off Energy	E_{off}		TC=25℃		2.45		mJ
			Tc=150℃		2.70		mJ
Total Switching Energy	E_{ts}		TC=25℃		7.10		mJ
			Tc=150℃		7.20		mJ
Input Capacitance	C_{ies}	V_{GE}=0V, f=1MHz	V_{CE}=25V		2850		pF
Output Capacitance	C_{oes}				410		pF
Reverse Transfer Capacitance	C_{res}				185		pF
Diode Forward Voltage	V_F	I_F=75A	T_J=25℃		1.50		V
			T_J=125℃		1.35		
Diode Reverse Recovery Time	T_{rr}	VR=400V, I_F=75A dI_F/dt=500 A/us	T_C=25℃		80		ns
			Tc=150℃		125		ns
Diode Reverse Recovery Charge	Q_{rr}		T_C=25℃		0.58		μC
			Tc=150℃		1.25		μC
Diode Peak Reverse Recovery Current	I_{rm}		T_C=25℃		12.5		A
			Tc=150℃		18.5		A

电参数曲线图 / Electrical Characteristic Curve

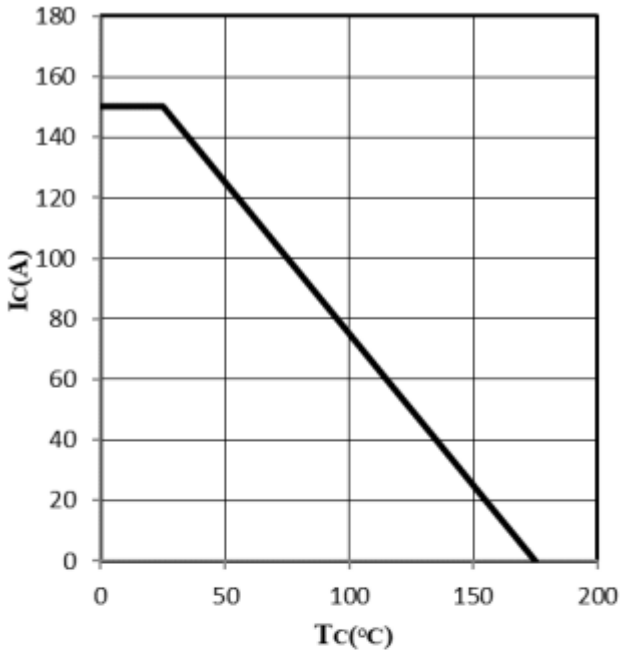


Fig 1. DC Collector current as a function of case temperature (VGE≥15V , Tj≤150℃)

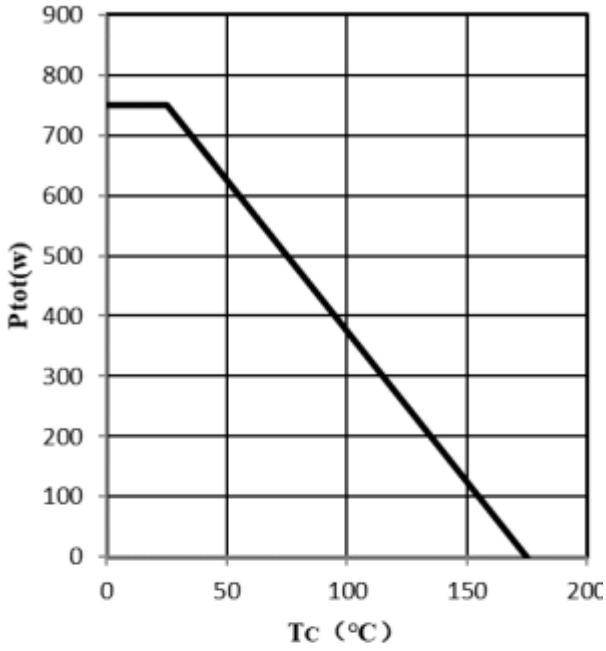


Fig 2. Power dissipation as a function of case temperature (Tj≤150℃)

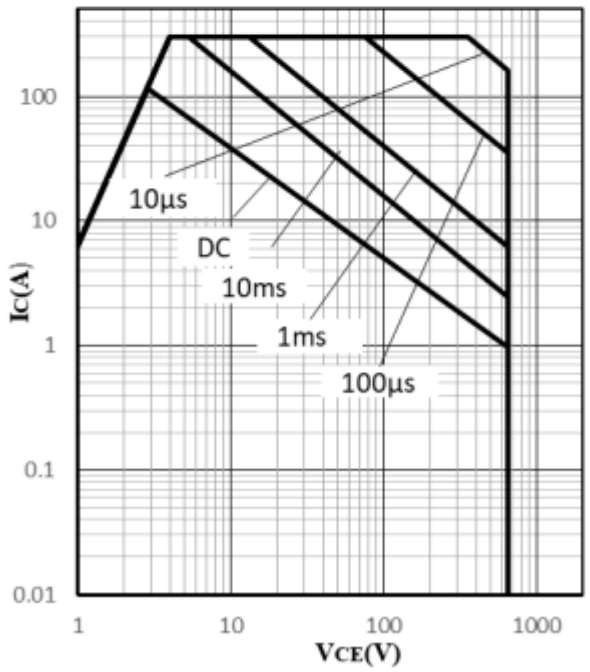


Fig 3. IGBT Forward safe operation area

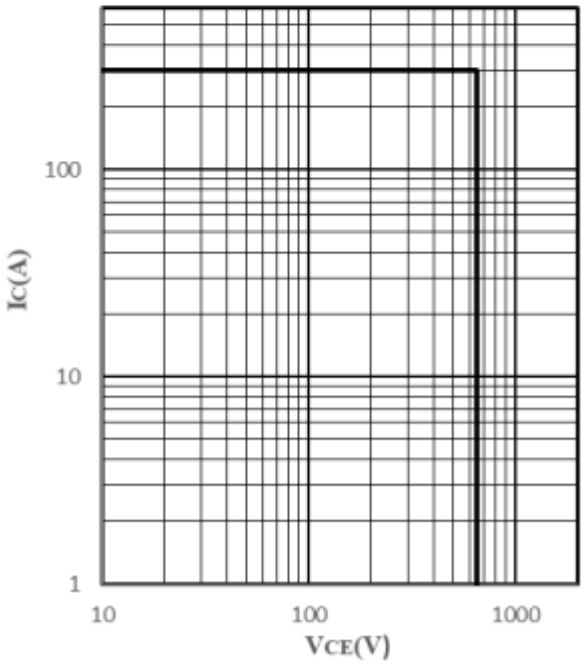


Fig 4. IGBT Reverse safe operation area

电参数曲线图 / Electrical Characteristic Curve

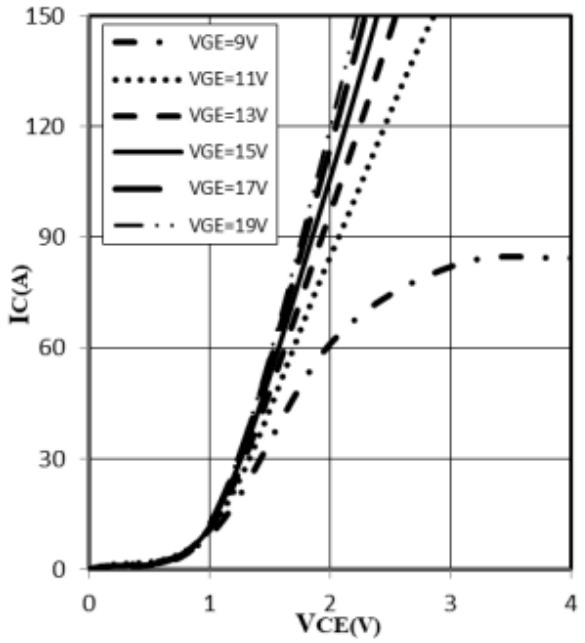


Fig 5. Typical output characteristic （Tj=25℃）

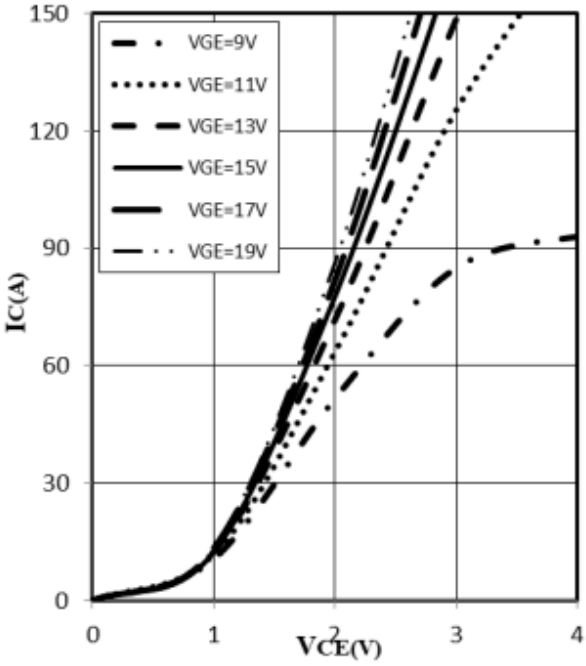


Fig 6. Typical output characteristic （Tj=125℃）

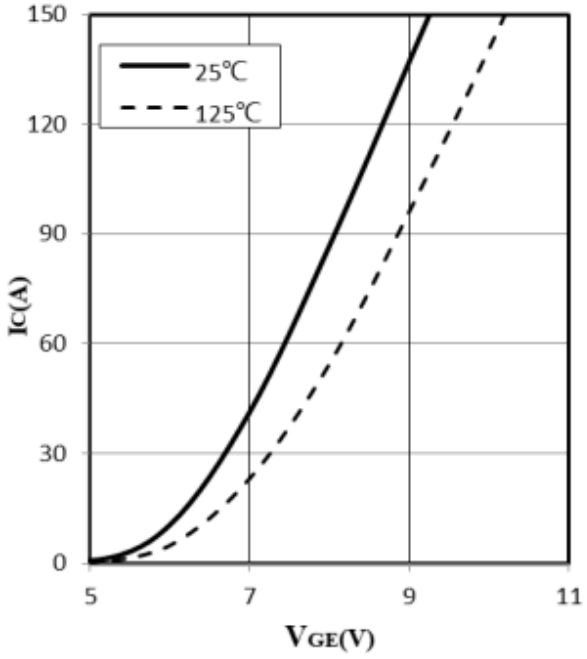


Fig 7. Typical transfer characteristic （V_{CE}=20V）

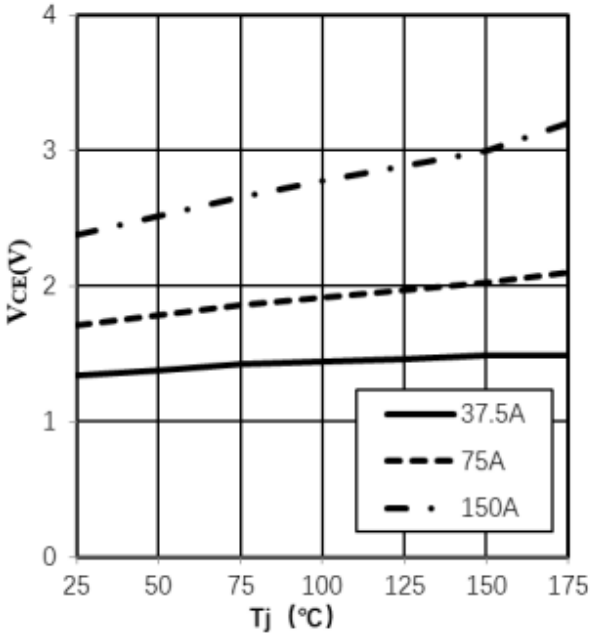


Fig 8. Typical collector-emitter saturation voltage as a function of junction temperature (VGE=15V)

电参数曲线图 / Electrical Characteristic Curve

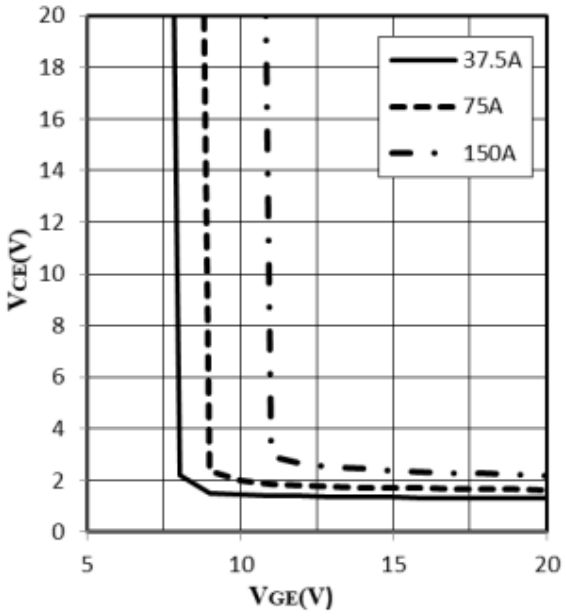


Fig 9. Typical collector-emitter saturation voltage as a function of V_{GE} (T_j=25℃)

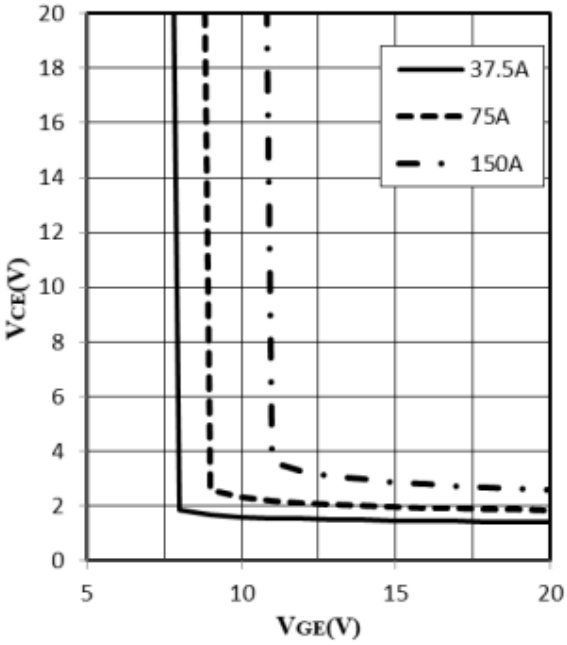


Fig 10. Typical collector-emitter saturation voltage as a function of V_{GE} (T_j=125℃)

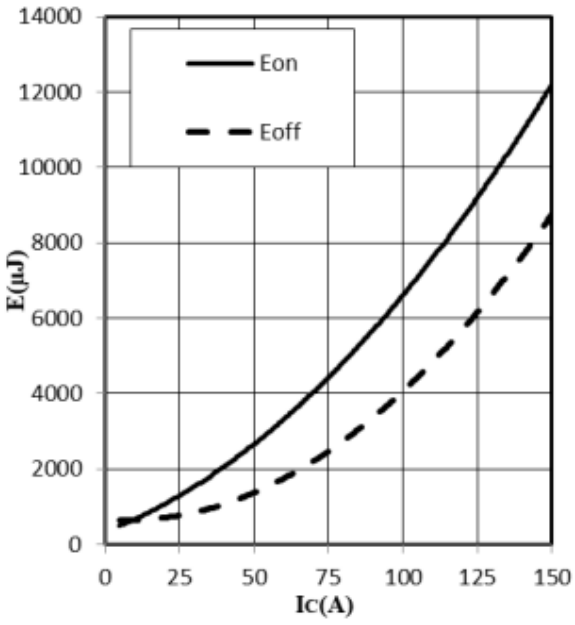


Fig 11. Typical switch energy as a function of Ic (inductive load，T_j=25℃，V_{CE}=400V,V_{GE}=15V,R_G=10Ω)

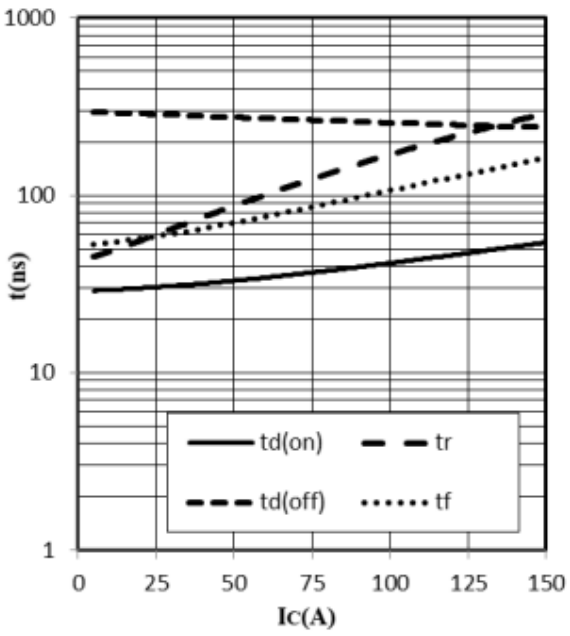


Fig 12. Typical switch time as a function of Ic (inductive load，T_j=25℃，V_{CE}=400V,V_{GE}=15V,R_G=10Ω)

电参数曲线图 / Electrical Characteristic Curve

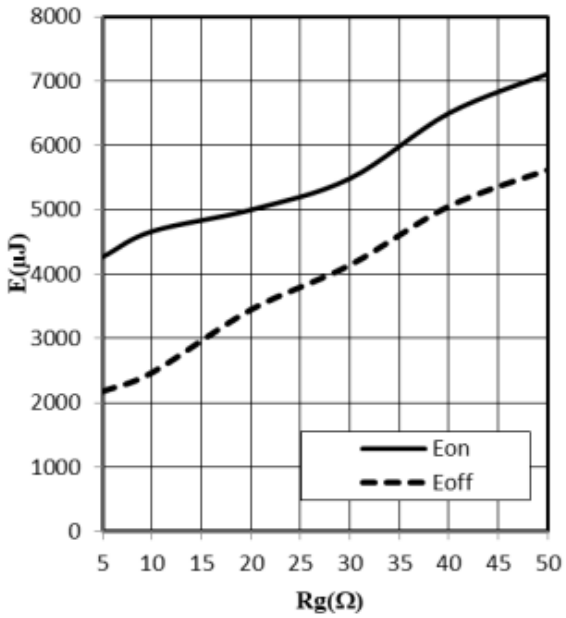


Fig 13. Typical switch energy as a function of R_G
(inductive load，T_j=25℃，V_{CE}=400V,V_{GE}=15V,Ic=75A)

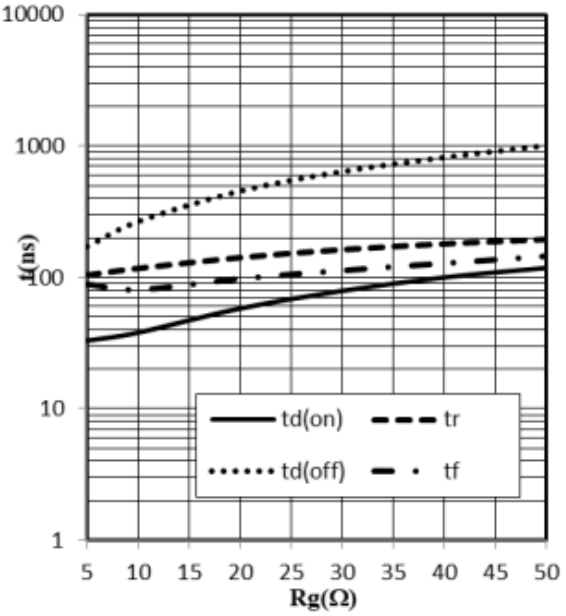


Fig 14. Typical switch time as a function of R_G
(inductive load，T_j=25℃，V_{CE}=400V,V_{GE}=15V,Ic=75A)

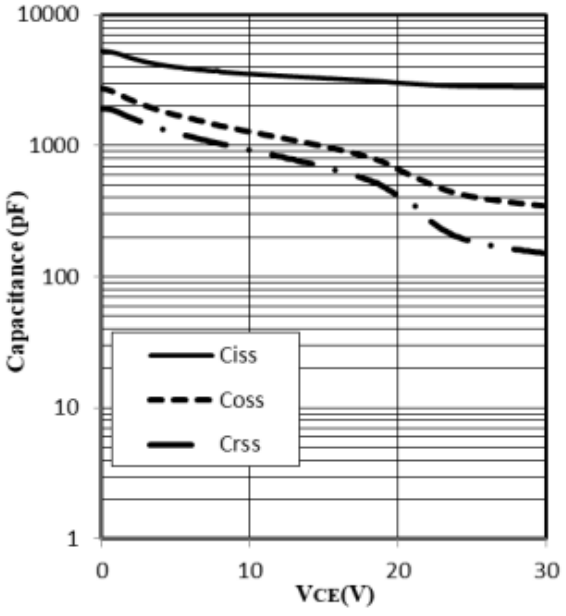


Fig 15. Typical capacitance as a function of collector-emitter voltage (V_{GE}=0V,f=1MHz)

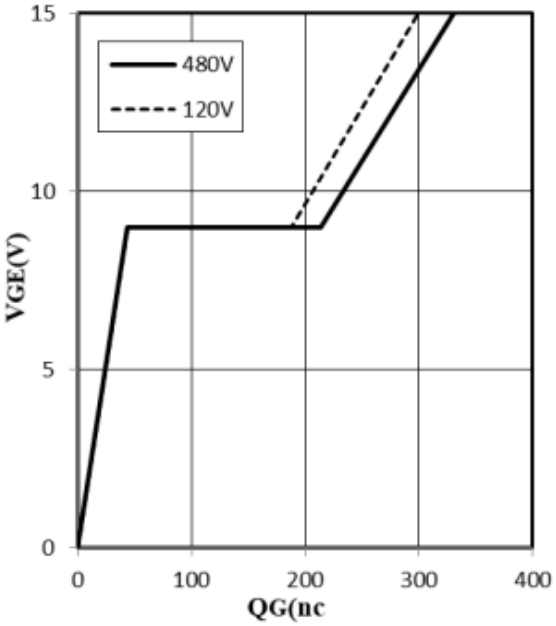


Fig 16. Typical gate charge (Ic=75A)

电参数曲线图 / Electrical Characteristic Curve

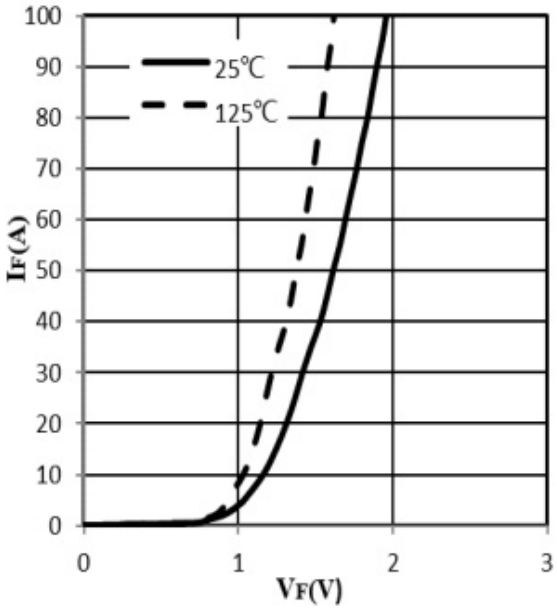


Fig 17. Typical diode forward current as a function of forward voltage

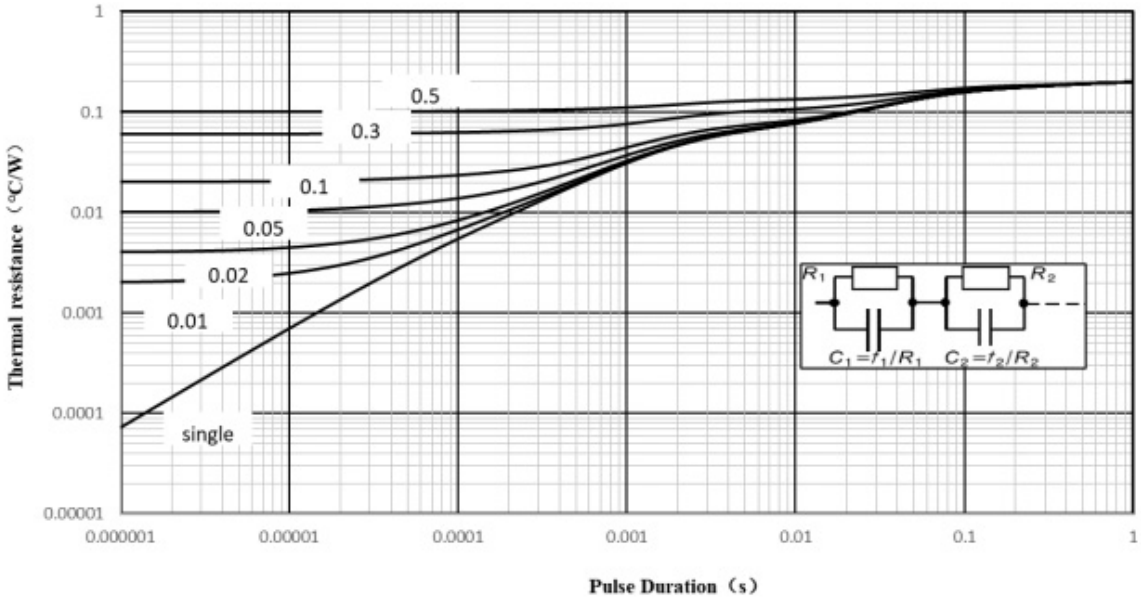
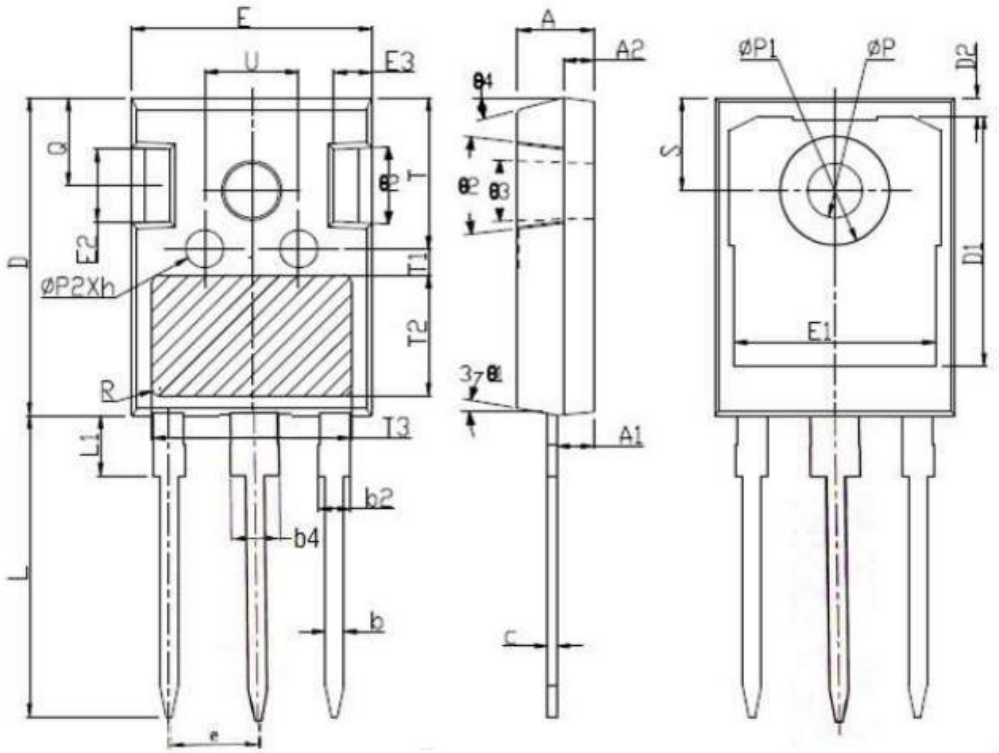


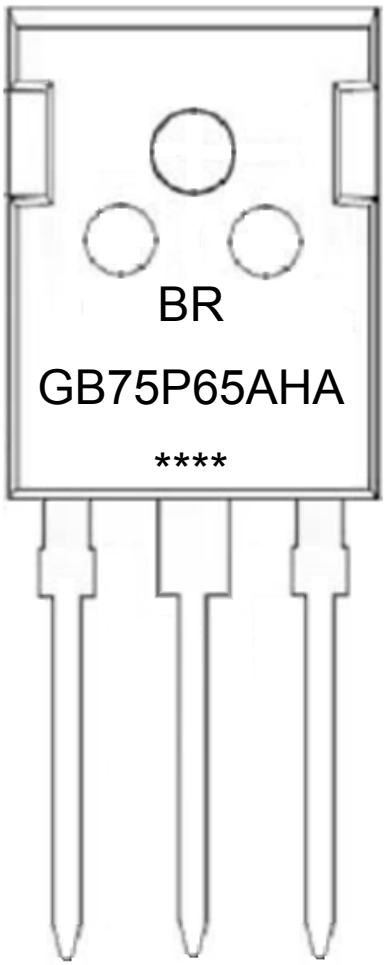
Fig 18. IGBT transient thermal resistance(D=tp/T)

外形尺寸图 / Package Dimensions



Symbol	Min	Nom	Max	Symbol	Min	Nom	Max
A	4.9	5.0	5.1	e		5.44BSC	
A1	2.3	2.4	2.5	h	0.05	0.10	0.15
A2	1.9	2.0	2.1	L	19.6	19.9	20.2
b	1.10	1.20	1.25	L1			4.3
b2	1.90	2.00	2.25	Φp	3.5	3.6	3.75
b4	2.90	3.00	3.25	Φp1			7.3
c	0.50	0.60	0.70	Φp2	2.4	2.5	2.6
D	20.8	21.0	21.2	Q	5.3		5.9
D1	16.25	16.55	16.85	S		6.15BSC	
D2	1.05	1.20	1.35	T	9.8		10.2
E	15.6	15.8	16.0	T1		1.65REF	
E1	13.1	13.3	13.5	T2		8.0REF	
E2	4.9	5.0	5.1	T3		12.8REF	
E3	2.4	2.5	2.6	U	6.0		6.4
Unit		mm		type		TO-247G	

印章说明 / Marking Instructions



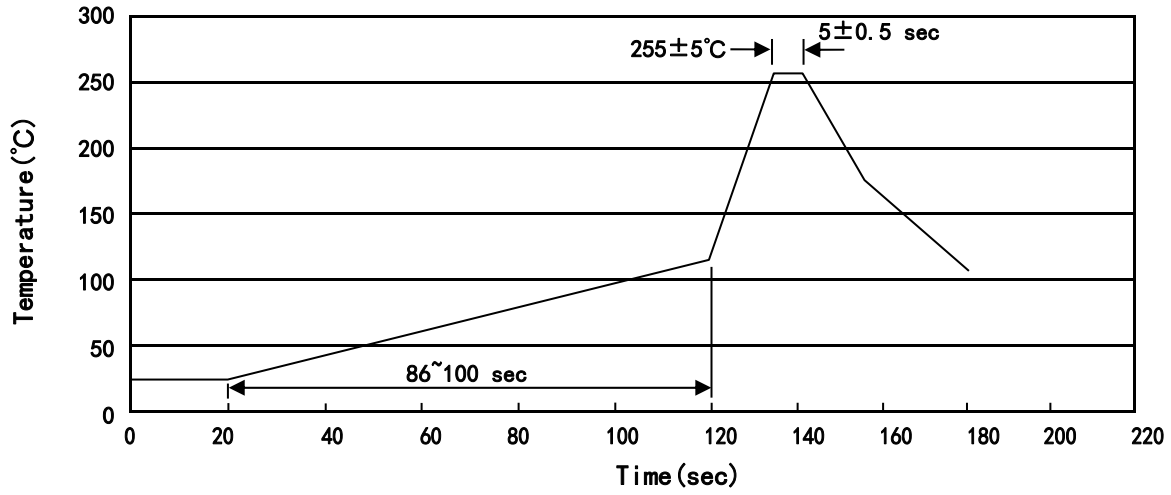
说明：

BR：	为公司代码
GB75P65AHA：	为型号代码
****：	为生产批号代码，随生产批号变化

Note:

BR:	Company Code
GB75P65AHA:	Product Type Code
****:	Lot No. Code, code change with Lot No

波峰焊温度曲线图(无铅) / Temperature Profile for Dip Soldering(Pb-Free)



说明：

1、预热温度 25～150℃，时间 60～90sec;

2、峰值温度 255±5℃，时间持续为 5±0.5sec;

3、焊接制程冷却速度为 2～10℃/sec.

Note:

1.Preheating:25~150℃, Time:60~90sec.

2.Peak Temp.:255±5℃, Duration:5±0.5sec.

3. Cooling Speed: 2~10℃/sec.

耐焊接热试验条件 / Resistance to Soldering Heat Test Conditions

温度：270±5℃ 时间：10±1 sec. Temp.:270±5℃ Time:10±1 sec

包装规格 / Packaging SPEC.

套管包装 / TUBE

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit：mm³)		
	Units/Tube 只/套管	Tubes/Inner Box 套管/盒	Units/Inner Box 只/盒	Inner Boxes/Outer Box 盒/箱	Units/Outer Box 只/箱	Tube 套管	Inner Box 盒	Outer Box 箱
TO-247	30	15	450	5	2250	520×44×6	580×158×55	595×300×178

使用说明 / Notices

本文档中提供的所有信息均受法律免责声明的约束。

All information provided in this document is subject to legal disclaimers.