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

V_{CES} =650V，I_C (T_C=100℃)=75A

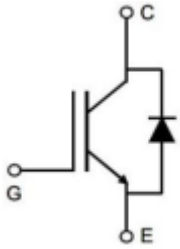
$V_{CE(SAT)}$= 2.00V(typ.) @V_{GE}=15V,I_C= 75A

用途 / Applications

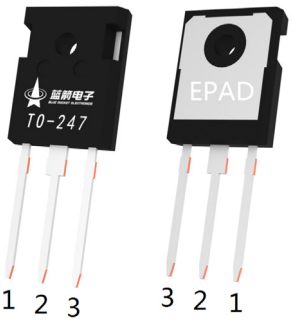
电机驱动器、不间断电源、增压器、便携式电源站。

Motor driver, Uninterrupted Power Supply, Boost, Portable power station.

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(Ta=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	150	A
	T_C=100℃		75	A
Diode Repetitive Peak Forward Current		I_{FRM}	300	A
Short circuit withstand time		t_{sc}	8	μs
Power Dissipation	T_C=25℃	P_D	341	W
Maximum Temperature for Soldering		T_L	260	℃
Operating Junction Temperature Range		T_J	-40 to +175	℃
Storage Temperature Range		T_{STG}	-55 to +175	℃
Maximum Junction-to-Ambient		$R_{\theta JA}$	40	℃/W
Maximum IGBT Junction-to-Case		$R_{\theta JC}$	0.44	℃/W
Maximum Diode Junction-to-Case		$R_{\theta JC}$	0.58	℃/W

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
Collector-Emitter Breakdown Voltage	BV_{CES}	I_C=1mA, V_{GE}=0V		650			V
Zero Gate Voltage Collector current	I_{CES}	V_{CE}=650V, V_{GE}=0V				10	uA
Gate-Emitter Leakage Current	I_{GES}	V_{CE}=0V, V_{GE}= ±20V				±200	nA
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	I_C=1.0mA, V_{GE}=0V		4.3	5.3	6.3	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=75A	T_J=25℃		2.00	2.30	V
			T_J=125℃		2.23		
			T_J=175℃		2.37		
Total Gate Charge	Q_g	V_{GE}=15V, V_{CC}=520V I_C=75A			167		nC
Gate to Emitter Charge	Q_{ge}				20		
Gate to Collector Charge	Q_{gc}				25		

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=5Ω Inductive Load	T_J=25℃		39		ns
			T_J=175℃		42		ns
Turn-On Rise Time	t_r		T_J=25℃		71		ns
			T_J=175℃		75		ns
Turn-Off Delay Time	$t_{d(off)}$		T_J=25℃		131		ns
			T_J=175℃		162		ns
Turn-Off Fall Time	t_f		T_J=25℃		44		ns
			T_J=175℃		40		ns
Turn-On Energy	E_{on}		T_J=25℃		2.63		mJ
			T_J=175℃		2.83		mJ
Turn-Off Energy	E_{off}		T_J=25℃		0.18		mJ
			T_J=175℃		0.20		mJ
Total Switching Energy	E_{ts}		T_J=25℃		2.81		mJ
			T_J=175℃		3.03		mJ
Input Capacitance	C_{ies}	V_{GE}=0V, V_{CE}=25V f=1MHz			3360		pF
Output Capacitance	C_{oes}				179		pF
Reverse Transfer Capacitance	C_{res}				90		pF
Diode Forward Voltage	V_F	I_F=40A	T_J=25℃		1.55	1.95	V
			T_J=125℃		1.32		
			T_J=175℃		1.26		
Diode Reverse Recovery Time	T_{rr}	VR=400V, I_F=40A， dI_F/dt=200 A/us	T_J=25℃		90		ns
			T_J=175℃		117		
Diode Reverse Recovery Charge	Q_{rr}		T_J=25℃		112		μC
			T_J=175℃		163		
Diode Peak Reverse Recovery Current	I_{rm}		T_J=25℃		3.2		A
			T_J=175℃		4.6		

电参数曲线图 / Electrical Characteristic Curve

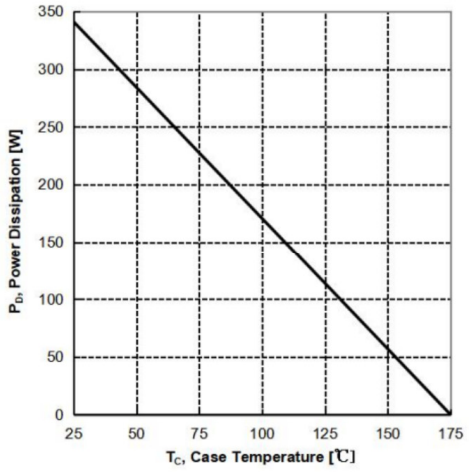


Fig. 1 Power Dissipation

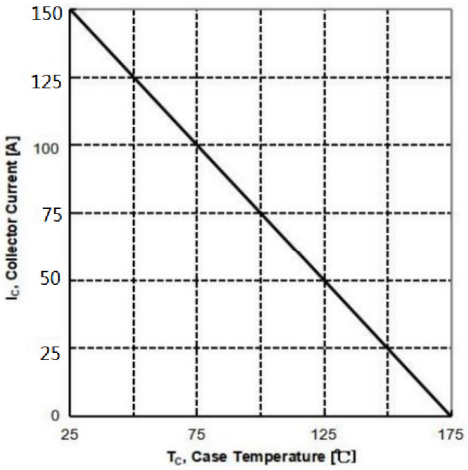


Fig. 2 TYP. Collector Current vs. Case Temperature

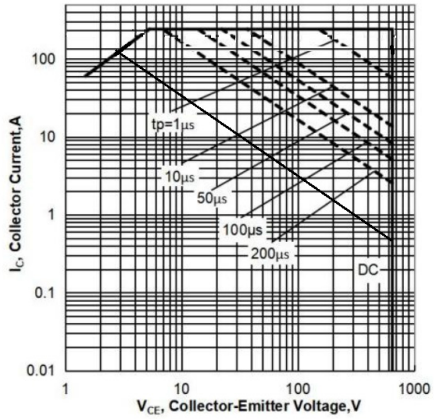


Fig. 3 Safe Operation Area

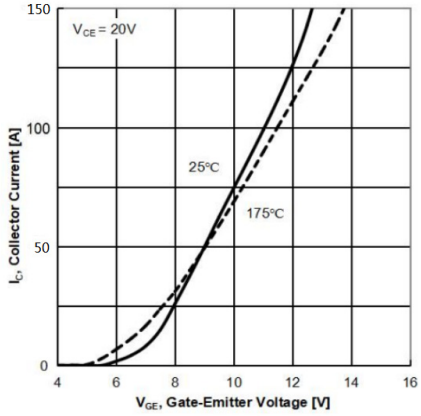


Fig. 4 TYP. Transfer Characteristics

Fig. 3 Forward bias safe operating area (D=0, T_c=25℃, T_{vj}≤175℃; V_{GE}=15V. Recommended use at V_{GE}≥7.5V)

Fig. 4 Power dissipation as a function of case temperature (T_{vj}≤175℃)

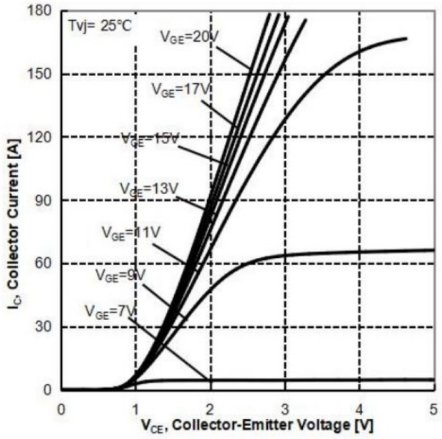


Fig. 5 TYP. Output Characteristics

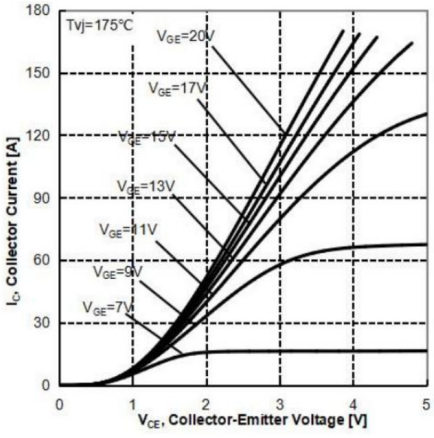


Fig. 6 TYP. Output Characteristics

电参数曲线图 / Electrical Characteristic Curve

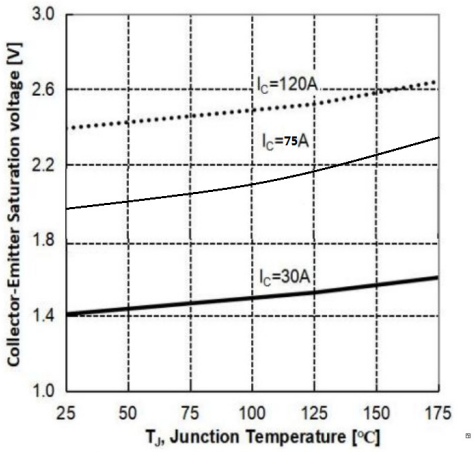


Fig. 7 TYP. Typical Collector-Emitter Saturation Voltage vs. Junction Temperature

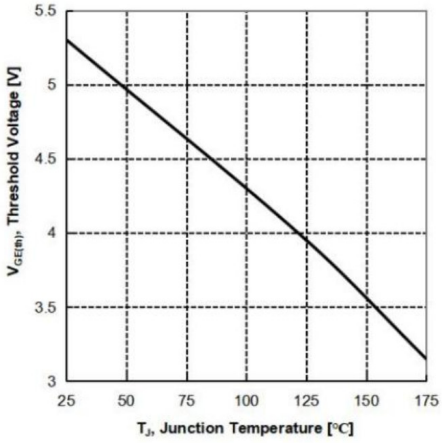


Fig. 8 TYP. Gate-Emitter Threshold Voltage vs. Junction Temperature

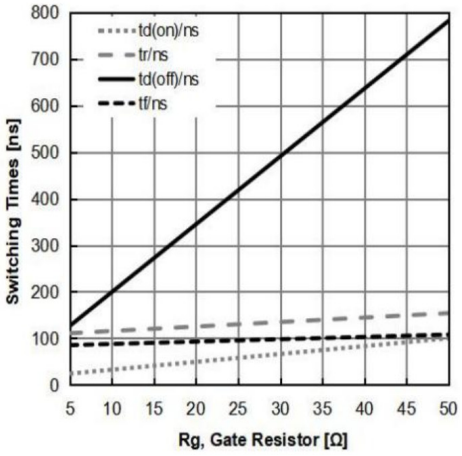


Fig. 9 TYP. Switching Times vs. Gate Resistor
(T_j=25℃,V_{CE}=400V,V_{GE}=15V,I_C= 75A)

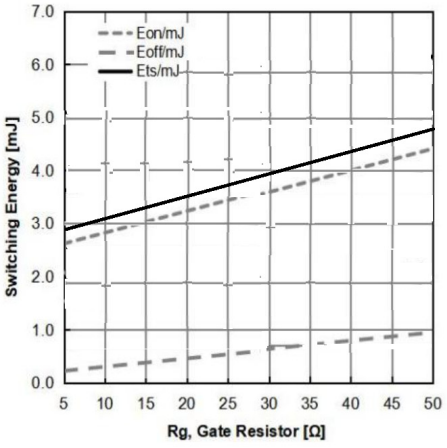


Fig. 10 TYP. Switching Energy vs. Gate Resistor
(T_j=25℃,V_{CE}=400V,V_{GE}=15V,I_C= 75A)

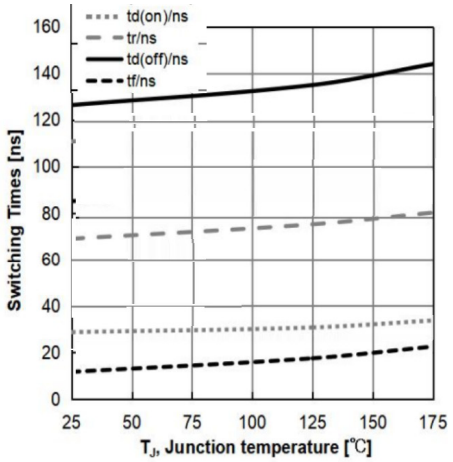


Fig. 11 TYP. Switching Times vs. Junction Temperature
(V_{CE}=400V,V_{GE}=15V,I_C= 75A , R_g=5Ω)

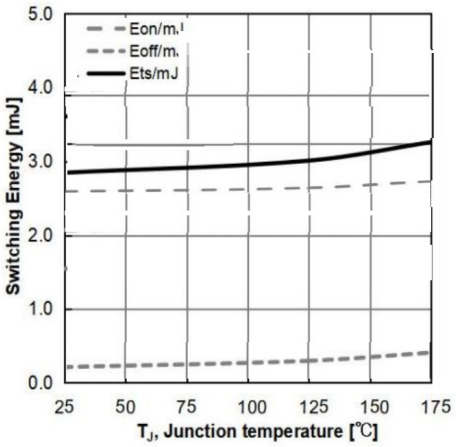


Fig. 12 TYP. Switching Energy vs. Junction Temperature
(VCE=400V,VGE=15V,IC=75A , Rg=5Ω)

电参数曲线图 / Electrical Characteristic Curve

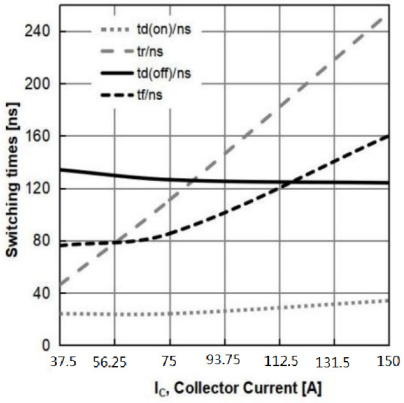


Fig. 13 TYP. Switching Times vs. Collector current
(R_g=5Ω,V_{CE}=400V,V_{GE}=15V, T_j=25℃)

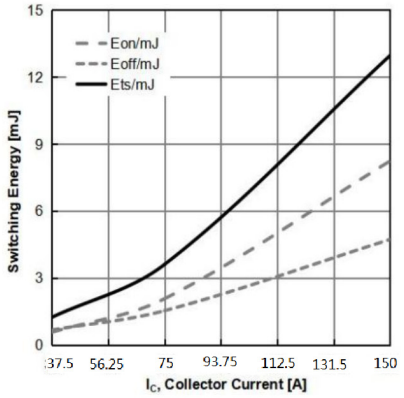


Fig. 14 TYP. Switching Energy vs. Collector current
(R_g=5Ω,V_{CE}=400V,V_{GE}=15V, T_j=25℃)

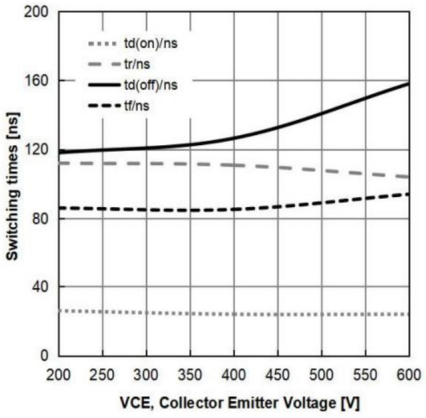


Fig. 15 TYP. Switching Times vs. VCE
(T_j=25℃, I_C=50A,V_{GE}=15V,R_g=5Ω)

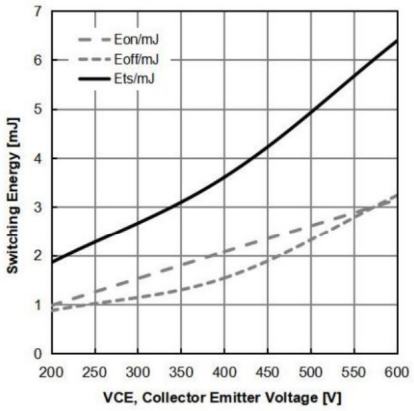


Fig. 16 TYP. Switching Energy vs. VCE
(T_j=25℃, I_C=50A,V_{GE}=15V, R_g=5Ω)

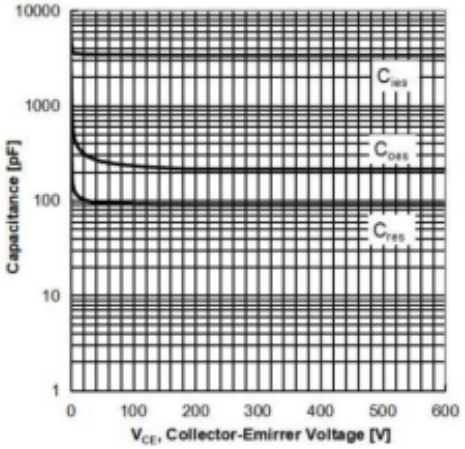


Fig. 17 TYP. Capacitance vs. Collector-Emitter Voltage

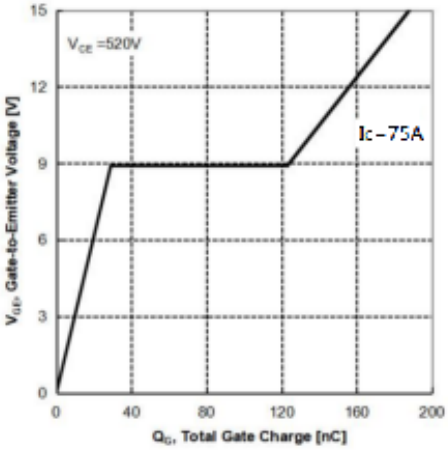


Fig. 18 Gate Charge

电参数曲线图 / Electrical Characteristic Curve

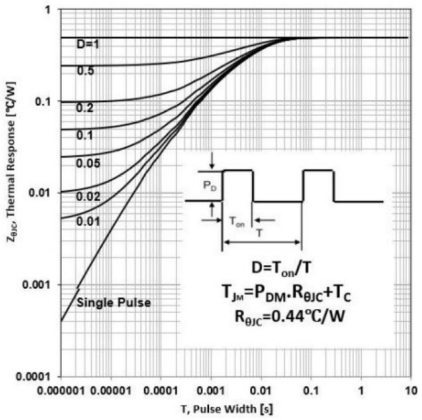


Fig. 19 TYP. IGBT Transient Thermal Impedance vs. Pulse Width

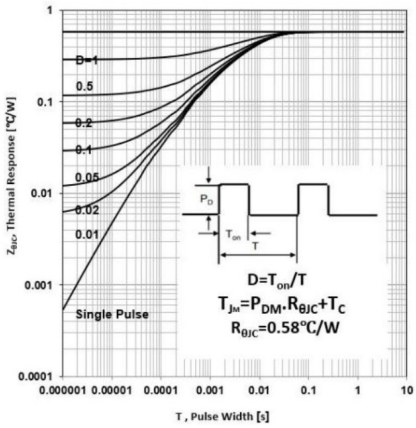


Fig. 20 TYP. Diode Transient Thermal Impedance vs. Pulse Width

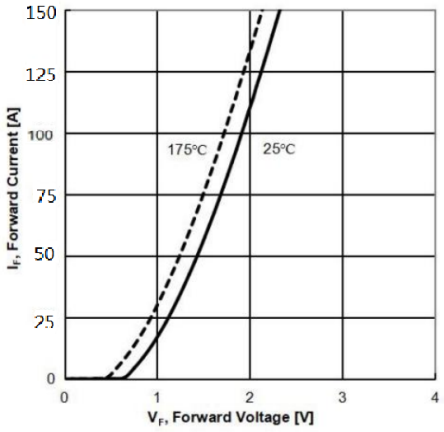
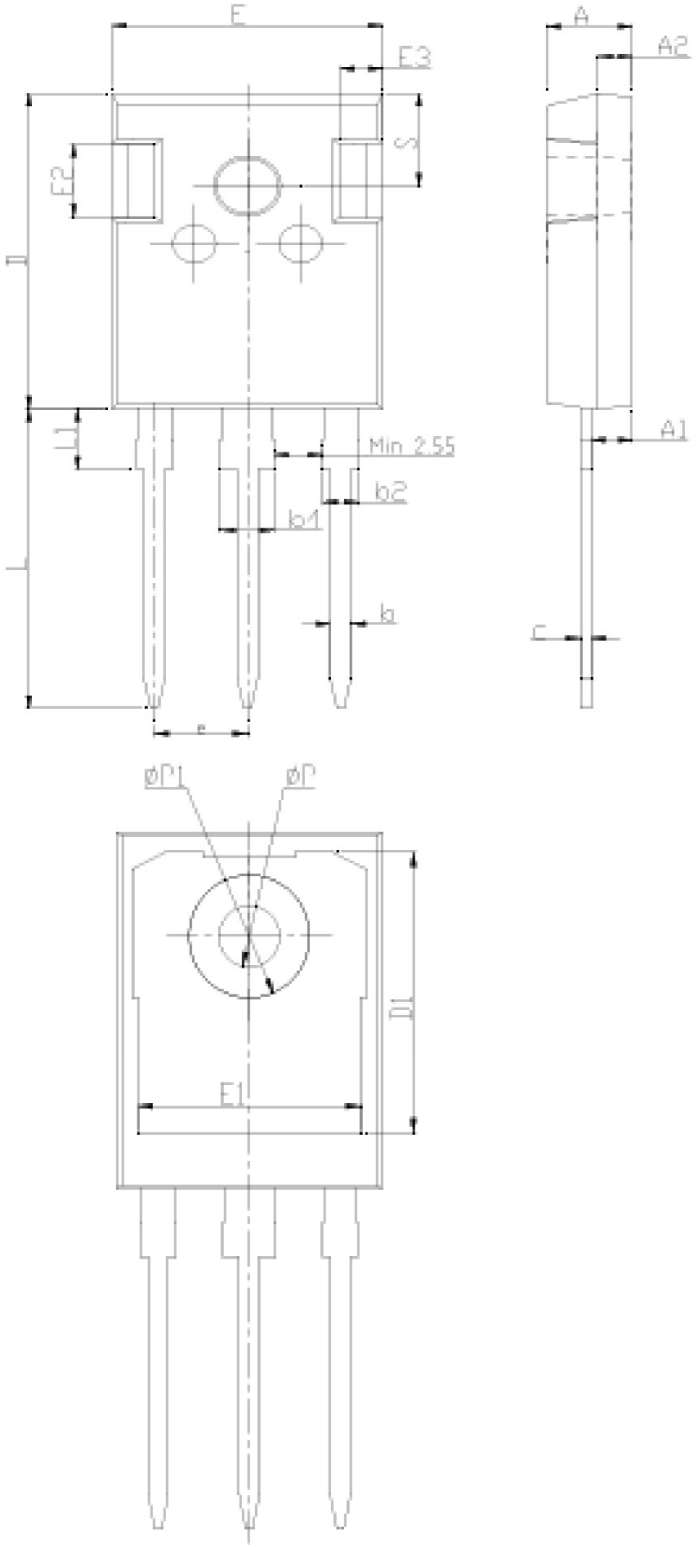


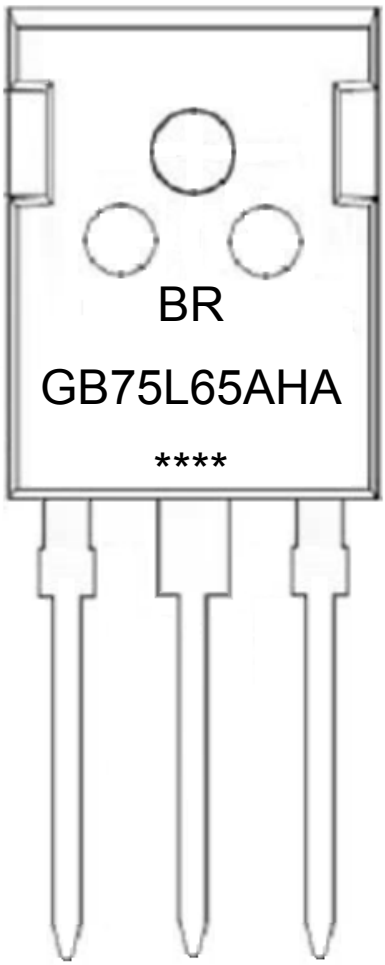
Fig. 21 TYP. Forward characteristic of Diode

外形尺寸图 / Package Dimensions



Symbol	Dimensions In Millmeters		
	Min	Nor	Max
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.70	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44BSC		
L	19.62	19.92	20.22
L1	-	-	4.30
øP	3.40	3.60	3.80
øP1	-	-	7.30
S	6.15BSC		

印章说明 / Marking Instructions



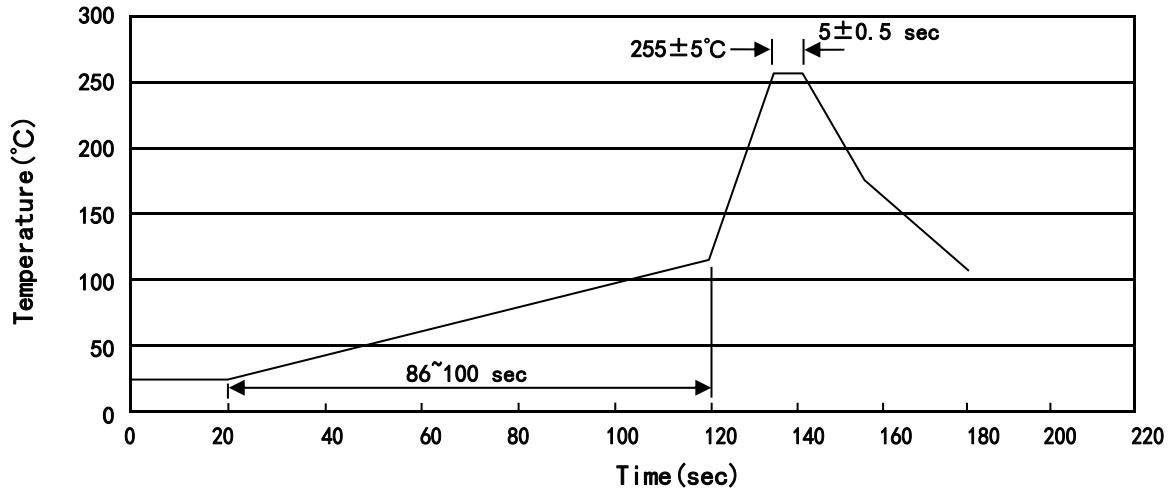
说明：

BR：	为公司代码
GB75L65AHA：	为型号代码
****：	为生产批号代码，随生产批号变化

Note:

BR:	Company Code
GB75L65AHA:	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

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