

BRGB15N65FL

Rev.A Sep.-2023

描述 / Descriptions

TO-220FL 塑封封装绝缘栅双极晶体管。

Insulated-Gate Bipolar Transistor in a TO-220FL Plastic Package

特征 / Features

650V/15A $V_{CE(SAT)} = 1.60V(\text{typ.}) @ I_C = 15A$

快速开关 Fast Switching

低 $V_{CE(SAT)}$ Low $V_{CE(SAT)}$

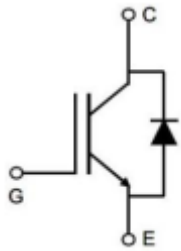
无卤产品。 HF Product.

用途 / Applications

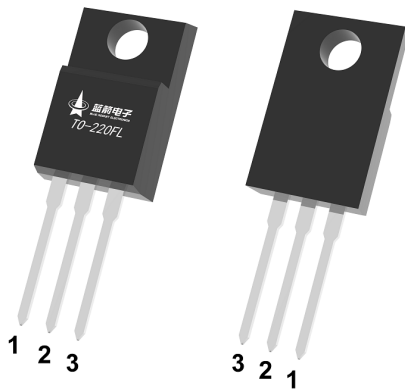
电机驱动，车载充电器，汽车加热器。

Motor Drives, OBC, PTC.

内部等效电路 / Equivalent Circuit



引脚排列 / Pinning



PIN 1 : G

PIN 2 : C

PIN 3 : E

印章代码 / Marking

见印章说明。

See Marking Instructions.

极限参数 / Absolute Maximum Ratings($T_a=25^{\circ}\text{C}$)

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	I_C	$T_C=+25^{\circ}\text{C}$	30
		$T_C=+100^{\circ}\text{C}$	15
Pulsed Collector Current , Limited by T_{Jmax}	I_{CM}	60	A
Continuous Diode Forward Current	I_F	$T_C=+25^{\circ}\text{C}$	30
		$T_C=+100^{\circ}\text{C}$	15
Diode Maximum Forward Current, limited by T_{Jmax}	I_{FM}	60	A
Power Dissipation	P_D	$T_C=+25^{\circ}\text{C}$	152
		$T_C=+100^{\circ}\text{C}$	78
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +175	$^{\circ}\text{C}$
Maximum Junction-to-Ambient	$R_{\theta JA}$	60	$^{\circ}\text{C}/\text{W}$
Maximum IGBT Junction-to-Case	$R_{\theta JC}$	4.0	$^{\circ}\text{C}/\text{W}$
Maximum Diode Junction-to-Case	$R_{\theta JC}$	4.8	$^{\circ}\text{C}/\text{W}$

电性能参数 / Electrical Characteristics($T_a=25^{\circ}\text{C}$)

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}	$I_C=250\mu\text{A}, V_{GE}=0\text{V}$	650			V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15\text{V}, I_C=15\text{A}$	$T_J=25^{\circ}\text{C}$	1.60	1.85	V
			$T_J=125^{\circ}\text{C}$	1.84		
			$T_J=175^{\circ}\text{C}$	2.05		
Diode Forward Voltage	V_F	$V_{GE}=0\text{V}, I_F=15\text{A}$	$T_J=25^{\circ}\text{C}$	1.40	1.65	V
			$T_J=125^{\circ}\text{C}$	1.30		
			$T_J=175^{\circ}\text{C}$	1.25		
Gate-Emitter Threshold Voltage	$V_{GE(th)}$	$V_{CE}=V_{GE}, I_C=1\text{mA}$	4.5	5.2	6.5	V
Zero Gate Voltage Collector current	I_{CES}	$V_{CE}=650\text{V}, V_{GE}=0\text{V}$			10	μA
Gate-Emitter Leakage Current	I_{GES}	$V_{CE}=0\text{V}, V_{GE}=\pm 20\text{V}$			± 100	nA

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

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	
Input Capacitance	C _{ies}	V _{GE} =0V, V _{CE} =25V, f=1MHz		791		pF	
Output Capacitance	C _{oes}			130		pF	
Reverse Transfer Capacitance	C _{res}			33		pF	
Total Gate Charge	Q _g	V _{GE} =15V, V _{CC} =520V, I _C =15A		45		nC	
Gate to Emitter Charge	Q _{ge}			7		nC	
Gate to Collector Charge	Q _{gc}			23		nC	
Turn-On Delay Time	t _{d(on)}	T _J =25°C, V _{GE} =15V, V _{CC} =400V, I _C =15A, R _G =5Ω Inductive Load		12		ns	
Turn-On Rise Time	t _r			14		ns	
Turn-Off Delay Time	t _{d(off)}			40		ns	
Turn-Off Fall Time	t _f			74		ns	
Turn-On Energy	E _{on}			0.15		mJ	
Turn-Off Energy	E _{off}			0.26		mJ	
Total Switching Energy	E _{ts}			0.41		mJ	
Diode Reverse Recovery Time	T _{rr}		T _J =25°C, I _F =15A, di/dt=200A/us		70		ns
Diode Reverse Recovery Charge	Q _{rr}				0.5		uC
Diode Peak Reverse Recovery Current	I _{rm}				8.0		A
Turn-On Delay Time	t _{d(on)}	T _J =175°C, V _{GE} =15V, V _{CC} =400V, I _C =15A, R _G =5Ω Inductive Load		13		ns	
Turn-On Rise Time	t _r			16		ns	
Turn-Off Delay Time	t _{d(off)}			59		ns	
Turn-Off Fall Time	t _f			70		ns	
Turn-On Energy	E _{on}			0.26		mJ	
Turn-Off Energy	E _{off}			0.37		mJ	
Total Switching Energy	E _{ts}			0.63		mJ	
Diode Reverse Recovery Time	T _{rr}	T _J =175°C, I _F =15A, di/dt=200A/us		86		ns	
Diode Reverse Recovery Charge	Q _{rr}			0.7		uC	
Diode Peak Reverse Recovery Current	I _{rm}			9.4		A	

电参数曲线图 / Electrical Characteristic Curve

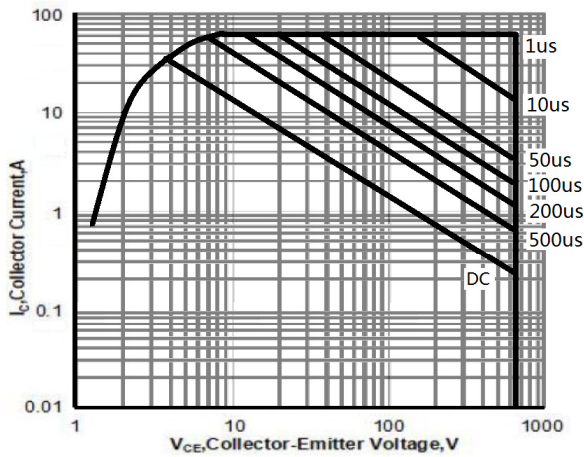


Figure.1 Safe Operation Area

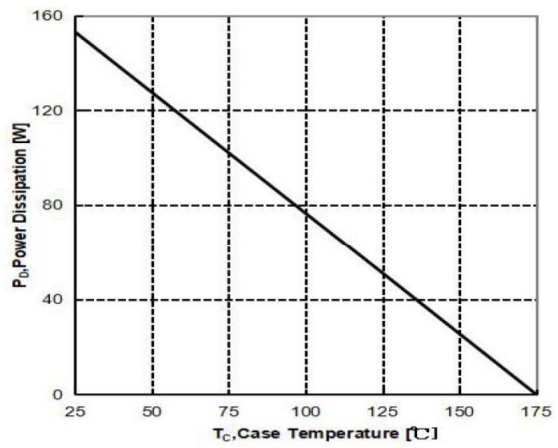


Figure.2 Power Dissipation

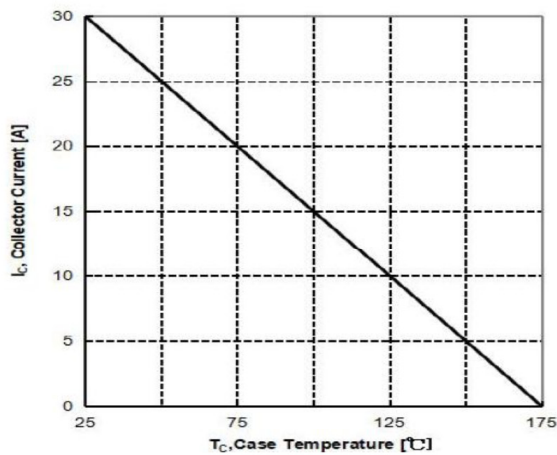


Figure.3 Collector Current vs Case Temperature

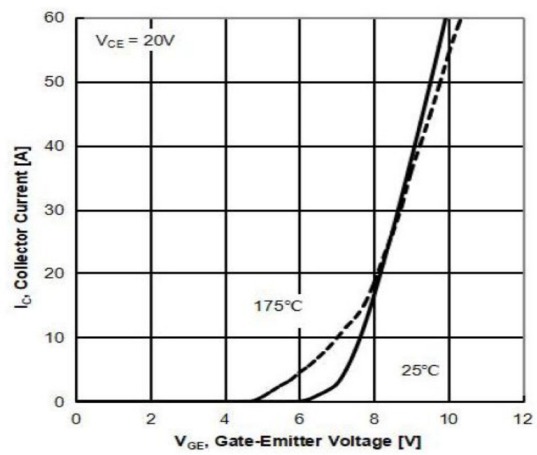


Figure.4 Typical Transfer Characteristics

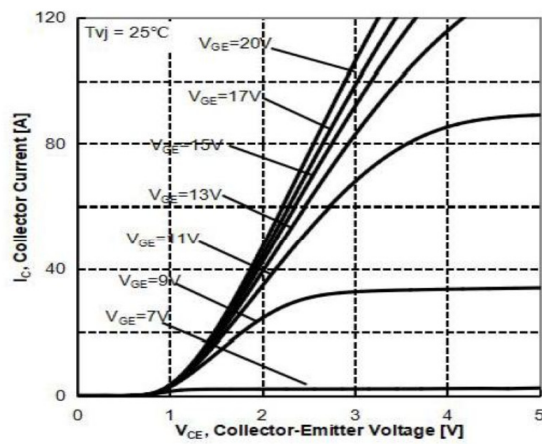


Figure.5 Typical Output Characteristics (Tj=25°C)

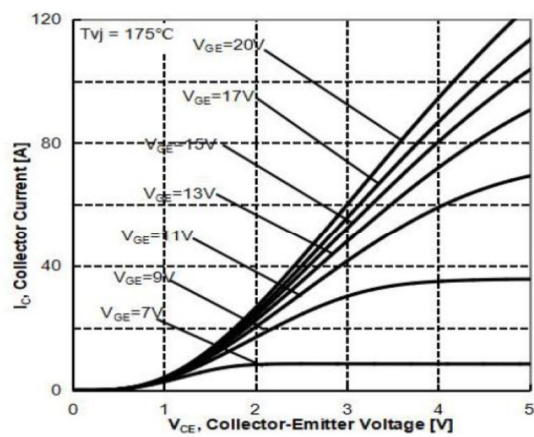


Figure.6 Typical Output Characteristics (Tj=175°C)

电参数曲线图 / Electrical Characteristic Curve

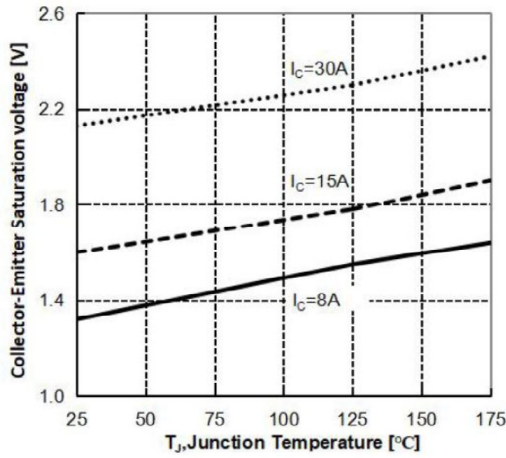


Figure.7 Typical Collector-Emitter Saturation Voltage vs Junction Temperature

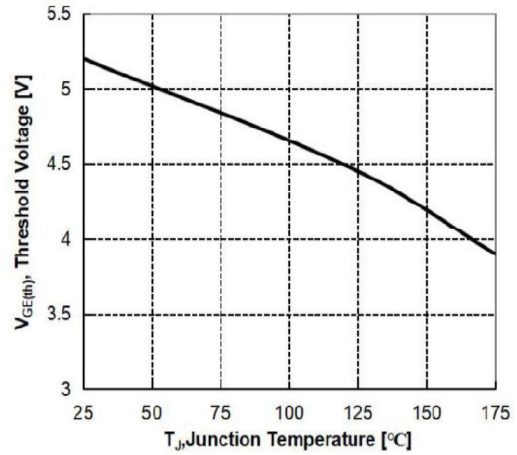


Figure.8 Typical Gate-Emitter Threshold Voltage vs Junction Temperature

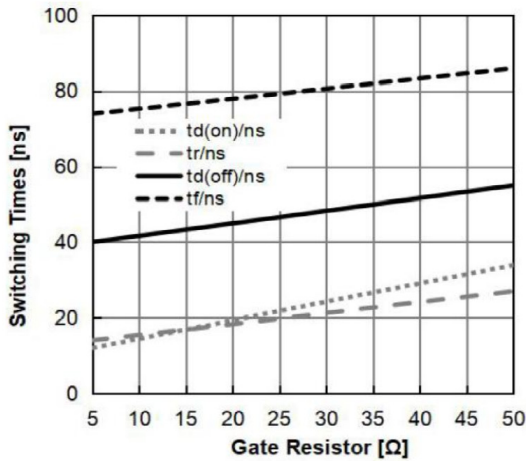


Figure.9 Typical Switching Times vs Gate Resistor (Tj=25°C, VCE=400V, VGE=15/0V, IC=15A)

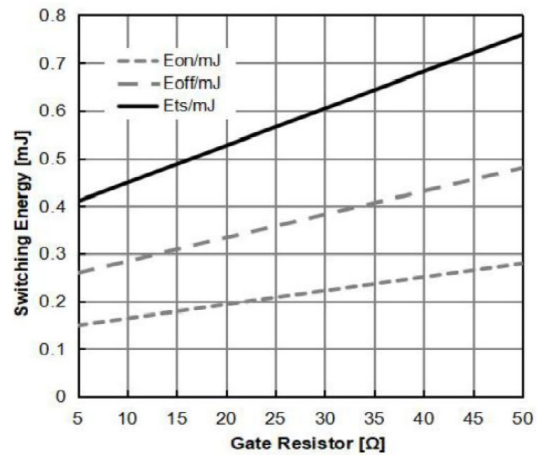


Figure.10 Typical Switching Energy vs Gate Resistor (Tj=25°C, VCE=400V, VGE=15/0V, IC=15A)

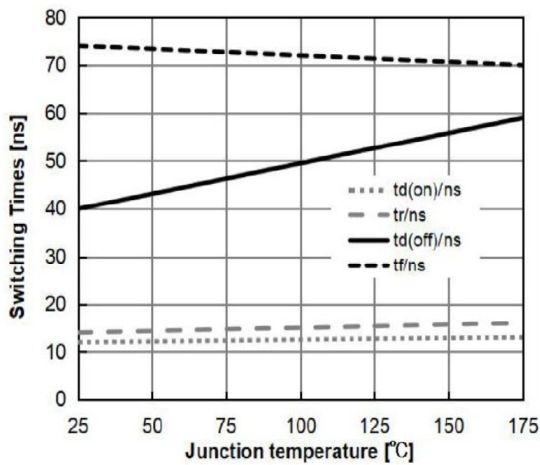


Figure.11 Typical Switching Times vs Junction Temperature (VCE=400V, VGE=15/0V, IC=15A)

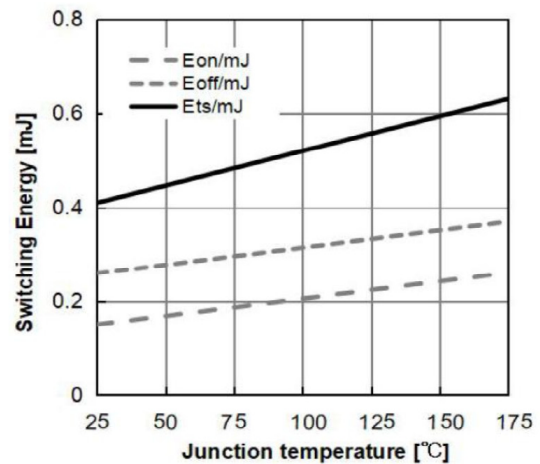


Figure.12 Typical Switching Energy vs Junction Temperature (VCE=400V, VGE=15/0V, IC=15A)

电参数曲线图 / Electrical Characteristic Curve

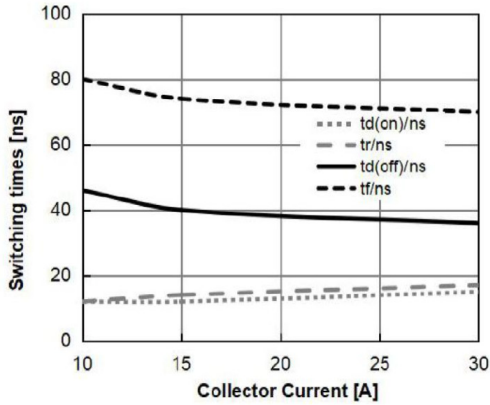


Figure.13 Typical Switching Times vs Collector Current
($T_j=25^\circ\text{C}$, $V_{CE}=400\text{V}$, $V_{GE}=15/0\text{V}$)

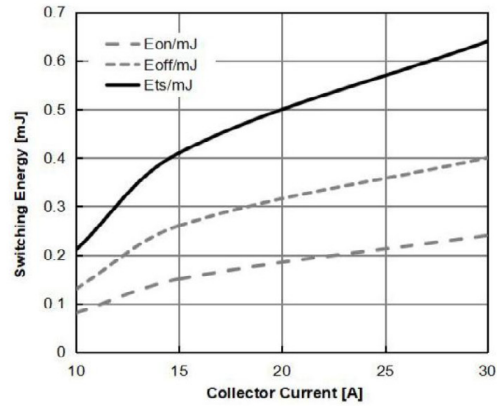


Figure.14 Typical Switching Energy vs Collector Current
($T_j=25^\circ\text{C}$, $V_{CE}=400\text{V}$, $V_{GE}=15/0\text{V}$)

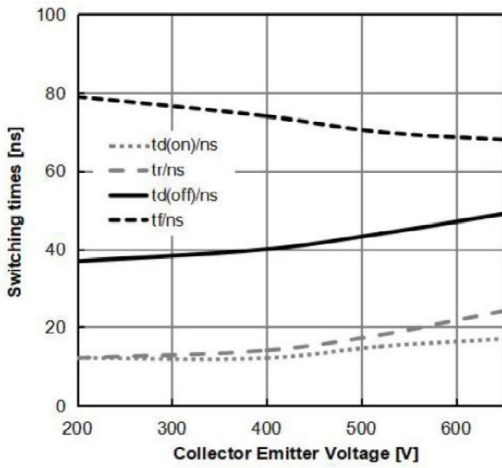


Figure.15 Typical Switching Times vs VCE
($T_j=25^\circ\text{C}$, $V_{GE}=15/0\text{V}$, $I_C=15\text{A}$)

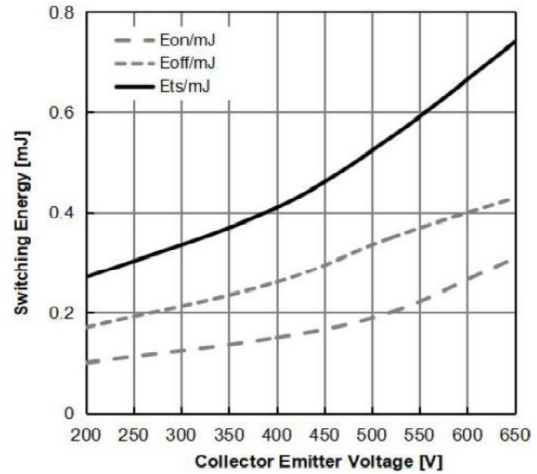


Figure.16 Typical Switching Energy vs VCE
($T_j=25^\circ\text{C}$, $V_{GE}=15/0\text{V}$, $I_C=15\text{A}$)

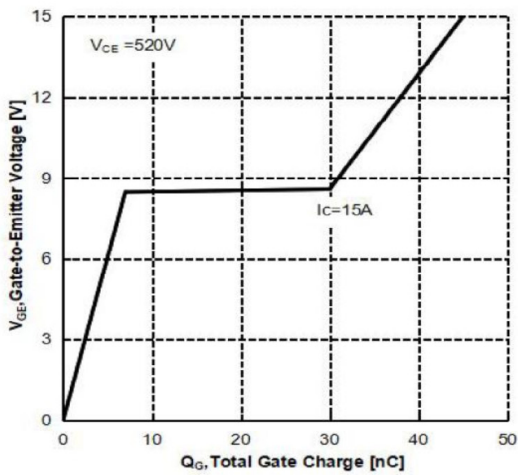


Figure.17 Typical Gate Charge

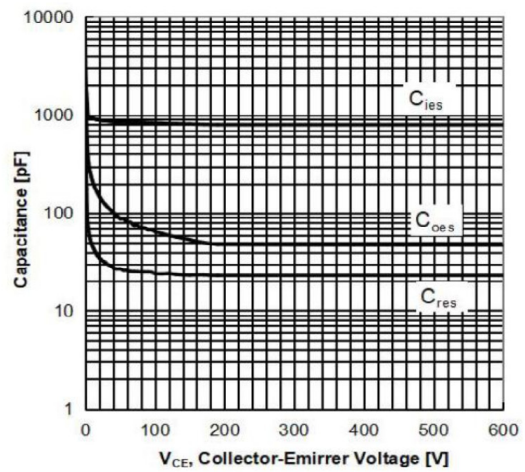


Figure.18 Typical Capacitance vs Collector-Emitter Voltage

电参数曲线图 / Electrical Characteristic Curve

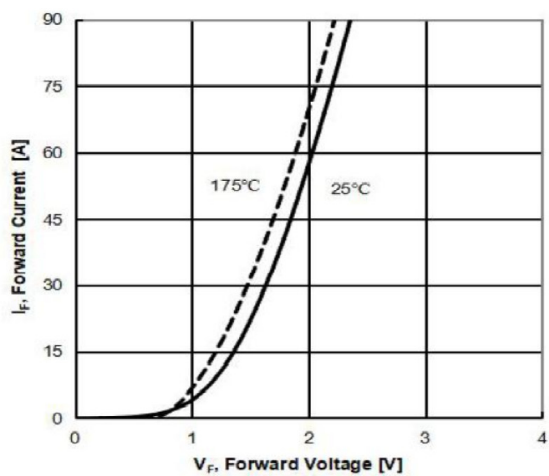
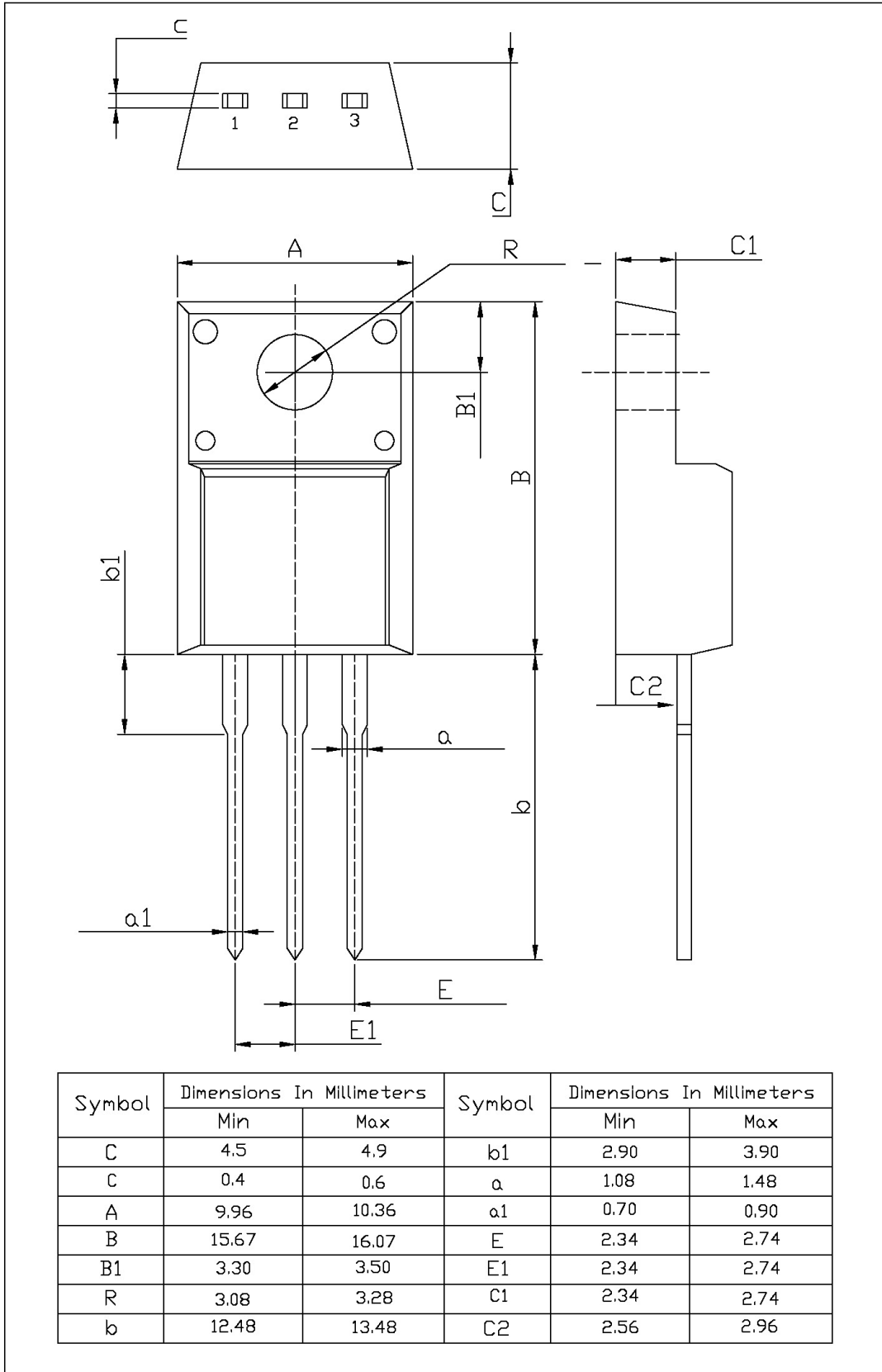


Figure.19 Typical Diode Forward Current vs Forward Voltage

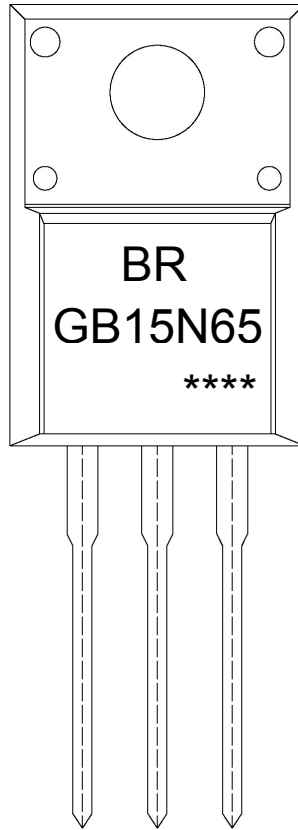
外形尺寸图 / Package Dimensions

TO-220FL

单位: mm



印章说明 / Marking Instructions



说明：

BR： 为公司代码

GB15N65： 为型号代码

****： 为生产批号代码，随生产批号变化

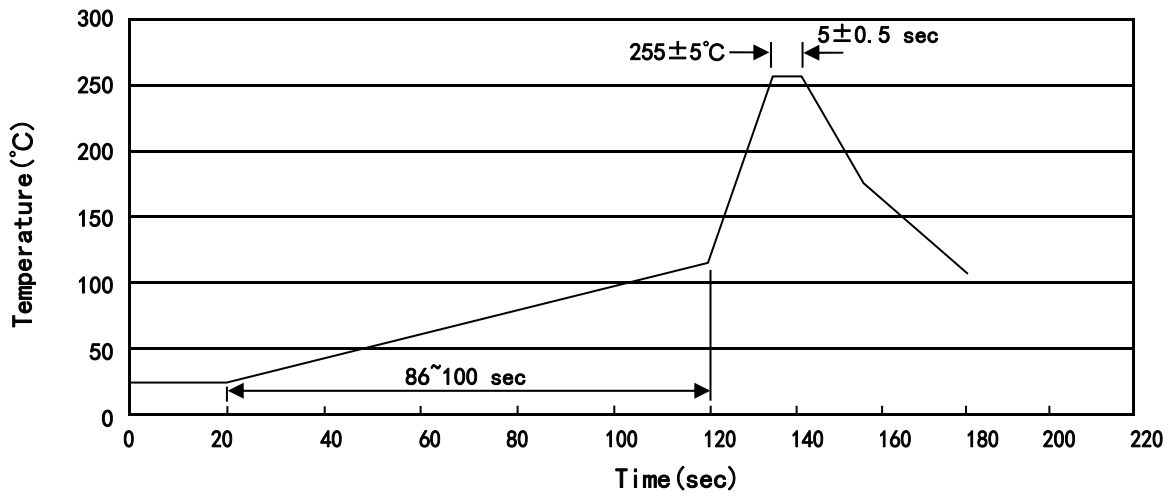
Note:

BR: Company Code

GB15NN65: 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°C，时间 60~90sec;
- 2、峰值温度 255±5°C，时间持续为 5±0.5sec;
- 3、焊接制程冷却速度为 2~10°C/sec.

Note:

- 1.Preheating:25~150°C, Time:60~90sec.
- 2.Peak Temp.:255±5°C, Duration:5±0.5sec.
3. Cooling Speed: 2~10°C/sec.

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

温度：270±5°C

时间：10±1 sec.

Temp.:270±5°C

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: mm ³)		
	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-220FL	50	20	1,000	5	5,000	532×33×7.0	555×164×50	575×290×180

使用说明 / Notices