BRFL65R190C

Rev.A May.-2024

DATA SHEET

描述 / Descriptions

TO-220FL 塑封封装 N 沟道 650V 超结工艺功率场效应管。

N-CHANNEL 650V Super-Junction Power MOSFET in a TO-220FL Plastic Package.

特征 / Features

低 $R_{DS(on)}$×Qg，100%雪崩测试，符合 ROHS 标准，无卤产品。

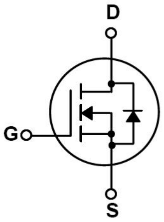
Very low $R_{DS(on)}$×Qg,100%avalanche tested,RoHS compliant,HF Product.

用途 / Applications

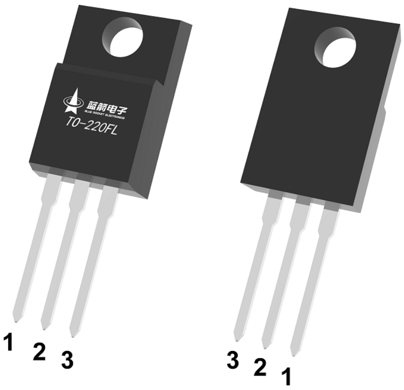
用于开关电源，不间断电源，功率因素校正。

For switch mode power supply, uninterruptible power supply, power factor correction.

内部等效电路 / Equivalent Circuit



引脚排列 / Pinning



PIN1：G　　PIN 2：D　　PIN 3：S

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
Drain-Source Voltage	V_{DSS}	650	V
Drain Current	I_D(Tc=25℃)	20	A
Drain Current - Pulsed	I_{DM}	60	A
Gate-Source Voltage	V_{GS}	±30	V
Single Pulsed Avalanche Energy	E_{AS}	488	mJ
Avalanche Current	I_{AS}	9.5	A
Power Dissipation	P_D(Tc=25℃)	34	W
Operating and Storage Temperature Range	T_J,T_{STG}	-55 to 150	℃
Junction-to-Case	$R_{\theta JC}$	3.6	℃/W
Junction-to-Ambient	$R_{\theta JA}$	80	℃/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
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	650			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=650V V_{GS}=0V T_J=25℃			5.0	μA
Gate-Body Leakage Current, Forward	I_{GSS}	V_{GS}=±30V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} I_D=250μA	2.5		4.5	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS}=10V I_D=10A		160	190	mΩ
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V I_{SD}=1A T_J=25℃			1.2	V
Gate Resistance	R_g	V_{GS} = 0V f = 1.0MHz		3.5		Ω
Input Capacitance	C_{iss}	V_{DS}=100V V_{GS}=0V f=1.0MHz		1725		pF
Output Capacitance	C_{oss}			90		pF
Reverse Transfer Capacitance	C_{rss}			2.5		pF
Turn-On Delay Time	$t_{d(on)}$	V_{DS}=400V I_D=10A R_G=25Ω V_{GS}=10V		26		ns
Turn-On Rise Time	t_r			39		ns
Turn-Off Delay Time	$t_{d(off)}$			115		ns
Turn-Off Fall Time	t_f			32		ns

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
Continuous Diode Forward Current	I_S			20		A
Total Gate Charge	Q_g	V_{DS}=480V I_D=10A V_{GS}=10V		38.2		nC
Gate-Source Charge	Q_{gs}			10		nC
Gate-Drain Charge	Q_{gd}			13		nC
Reverse recovery time	t_{rr}	V_R=400 V, I_F=10A, dI_F/dt=100 A/μs		340		ns
Reverse recovery charge	Q_{rr}			6.7		uC

电参数曲线图 / Electrical Characteristic Curve

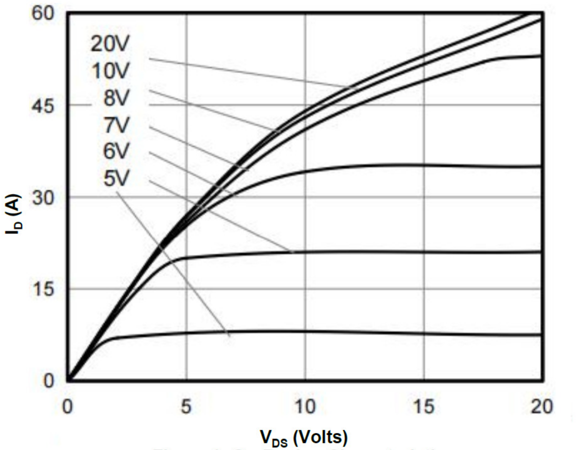


Figure 1: On-Region Characteristics

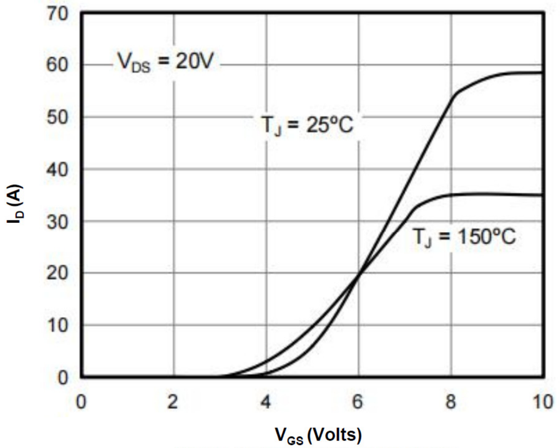


Figure 2: Transfer Characteristics

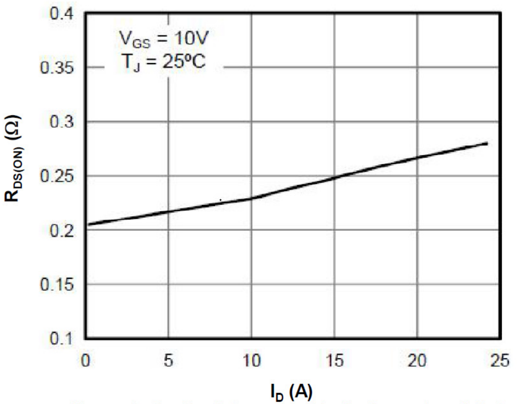


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

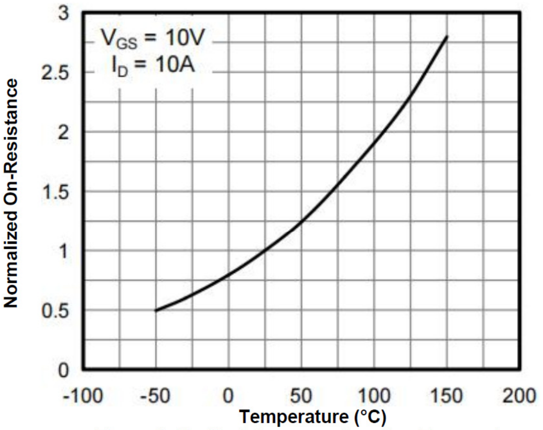


Figure 4: On-Resistance vs. Junction Temperature

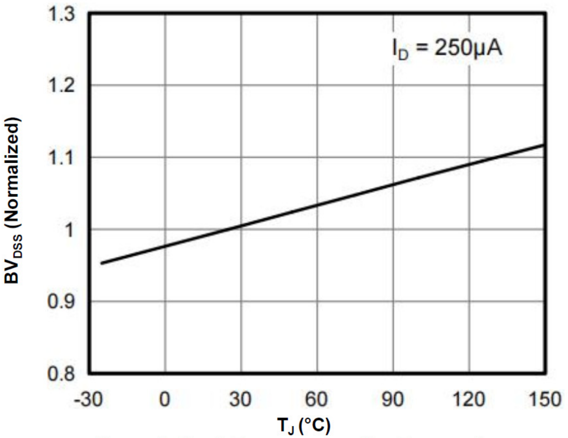


Figure 5: Break Down vs. Junction Temparature

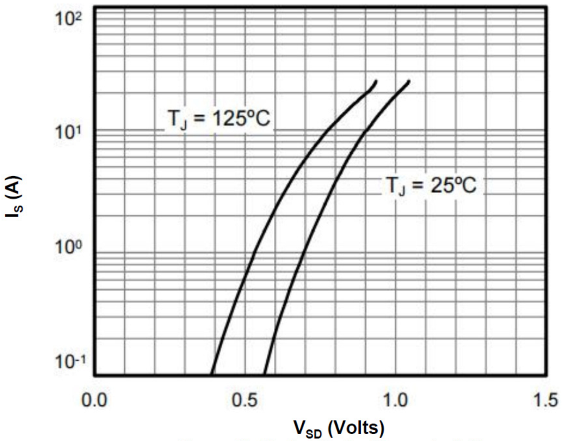


Figure 6: Body-Diode Characteristics

电参数曲线图 / Electrical Characteristic Curve

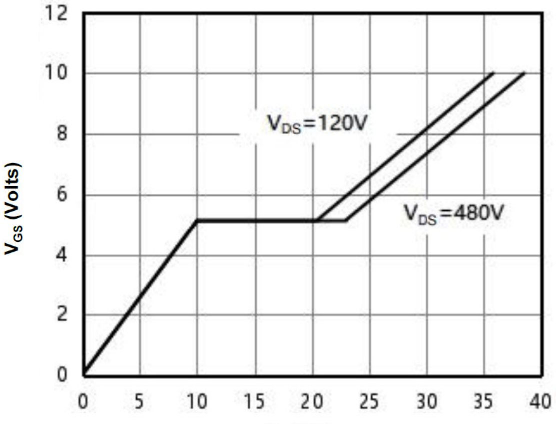


Figure 7: Gate-Charge Characteristics

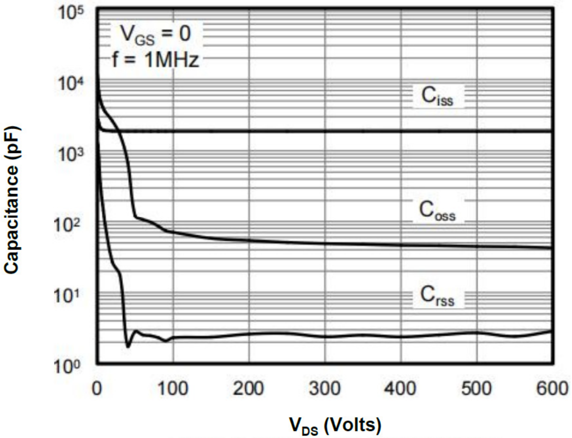


Figure 8: Capacitance Characteristics

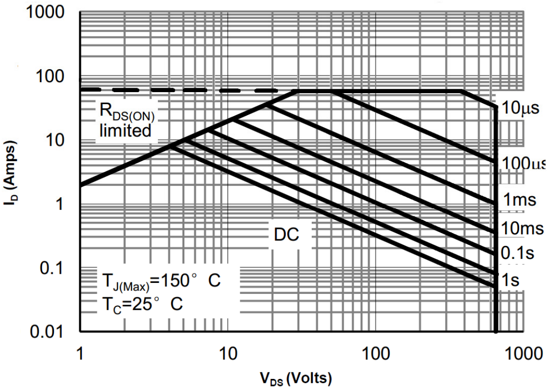


Figure 9: Maximum Forward Biased Safe Operating Area

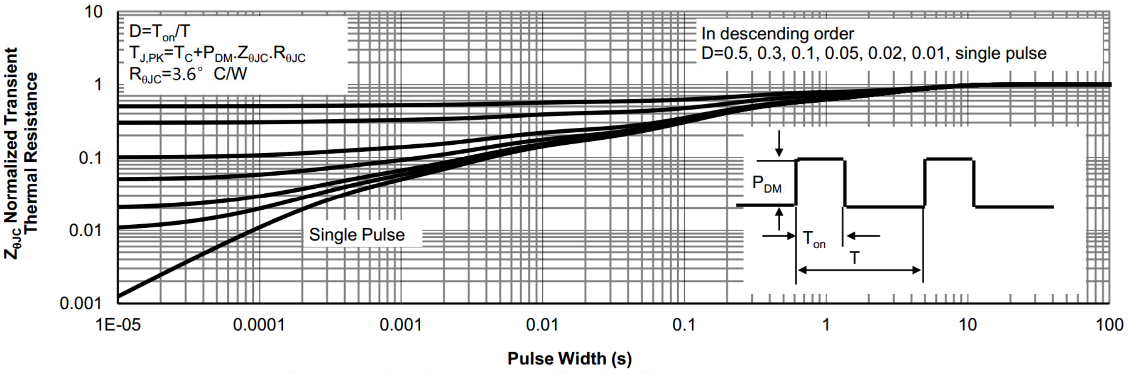
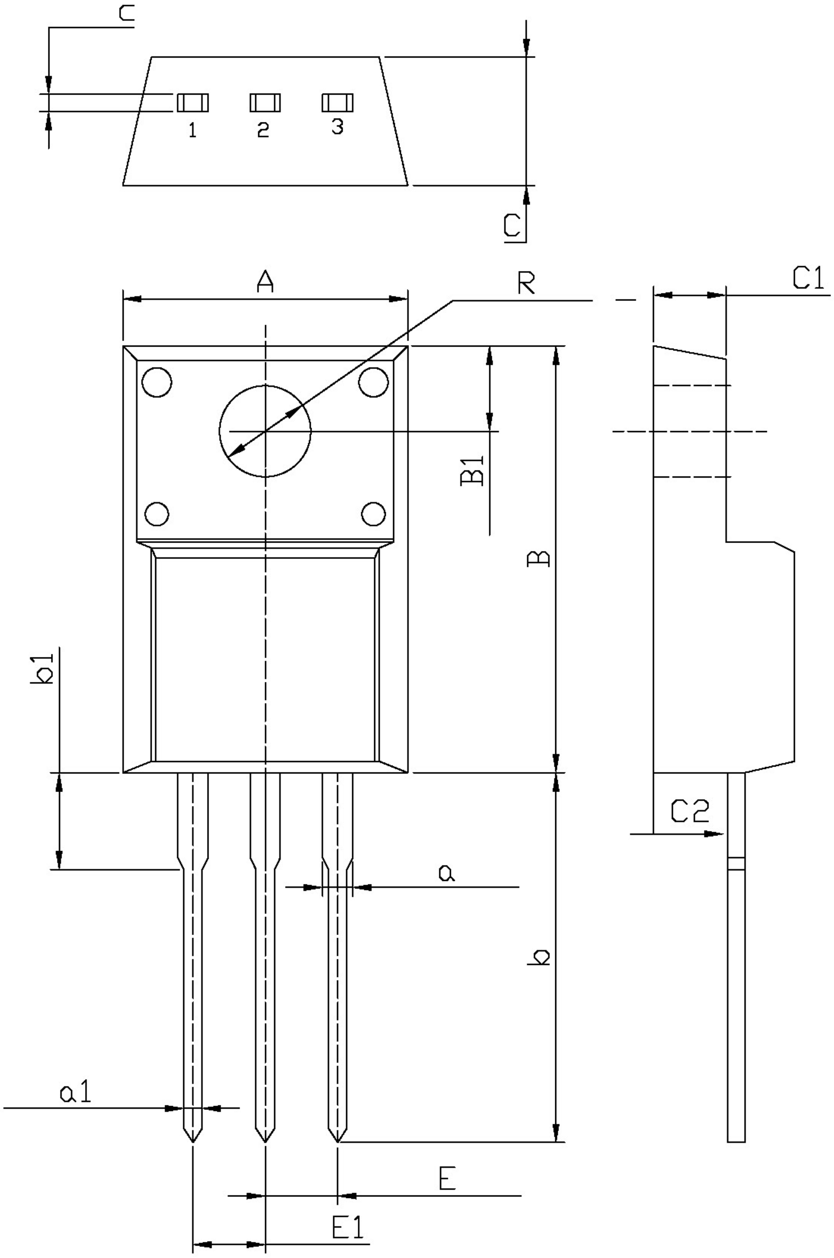


Figure10: Normalized Maximum Transient Thermal Impedance

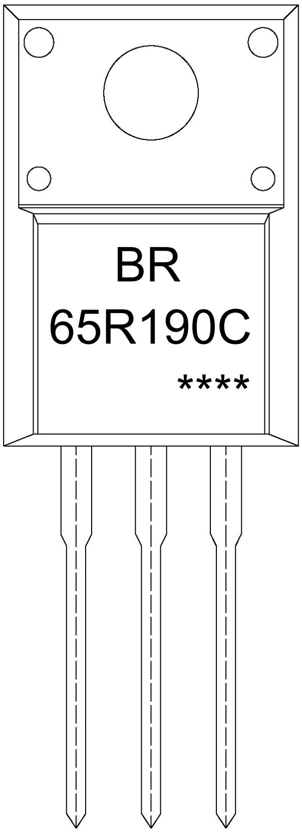
外形尺寸图 / Package Dimensions

TO-220FL 单位：mm



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
C	4.5	4.9	b1	2.90	3.90
c	0.4	0.6	a	1.08	1.48
A	9.96	10.36	a1	0.70	0.90
B	15.67	16.07	E	2.34	2.74
B1	3.30	3.50	E1	2.34	2.74
R	3.08	3.28	C1	2.34	2.74
b	12.48	13.48	C2	2.56	2.96

印章说明 / Marking Instructions



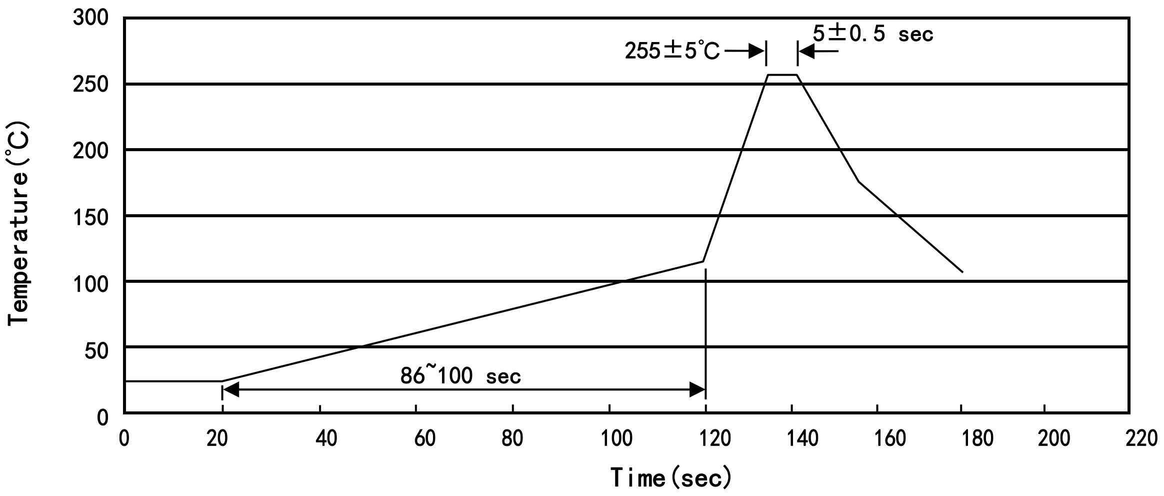
说明：

BR：	为公司代码
65R190C：	为型号代码
****：	为生产批号代码，随生产批号变化

Note:

BR:	Company Code
65R190C:	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：	Note:
1、预热温度 25～150℃，时间 60～90sec;	1.Preheating:25~150℃, Time:60~90sec.
2、峰值温度 255±5℃，时间持续为 5±0.5sec;	2.Peak Temp.:255±5℃, Duration:5±0.5sec.
3、焊接制程冷却速度为 2～10℃/sec.	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：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