

BRFL15N50

Rev.A Sep.-2017

描述 / Descriptions

TO-220FL 塑封封装 N 沟道 MOS 场效应管。N-CHANNEL MOSFET in a TO-220FL Plastic Package.

特征 / Features

$R_{DS(on)}$ 小, 门电荷低, C_{rss} 小, 开关速度快。

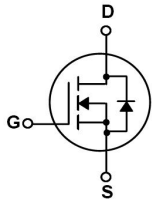
Low $R_{DS(on)}$, low gate charge, low C_{rss} , fast switching.

用途 / Applications

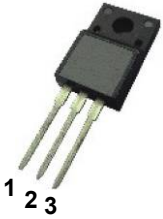
用于汽车直流电机控制和 D 类放大器。

Automotive、DC Motor Control and Class D Amplifier.

内部等效电路 / Equivalent Circuit



引脚排列 / Pinning



PIN1 : G

PIN 2 : D

PIN 3 : S

分档及印章代码 / Classifications & Marking

见印章说明。See Marking Instructions.

极限参数 / Absolute Maximum Ratings(Ta=25°C)

参数 Parameter	符号 Symbol	数值 Rating	单位 Unit
Drain-to-Source Voltage	V_{DSS}	500	V
Drain Current	$I_D(T_c=25^\circ\text{C})$	15	A
Drain Current	$I_D(T_c=100^\circ\text{C})$	9.5	A
Drain Current - Pulsed	I_{DM}^{a1}	60	A
Gate-Source Voltage	V_{GS}	± 30	V
Single Pulsed Avalanche Energy	E_{AS}^{a2}	1000	mJ
Avalanche Energy ,Repetitive	E_{AR}^{a1}	200	mJ
Avalanche Current	I_{AS}^{a1}	6.3	A
Peak Diode Recovery dv/dt	dv/dt^{a3}	5.0	V/ns
Power Dissipation	P_D	70	W
Derating Factor above 25°C	P_D	0.56	W/°C
Operating and Storage Temperature Range	T_J, T_{STG}	150,-55~150	°C
Maximum Temperature for Soldering	T_L	300	°C

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
OFF Characteristics						
Drain-Source Breakdown Voltage	V_{DSS}	$V_{GS}=0V \quad I_D=250\mu A$	500			V
Bvdss Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu A,$ Reference 25°C		0.6		V/°C
Drain to Source Leakage Current	I_{DSS}	$V_{DS}=500V$ $V_{GS}=0V \quad T_a = 25^\circ\text{C}$			1	μA
		$V_{DS}=400V$ $V_{GS}=0V, T_a = 125^\circ\text{C}$			10	
Gate to Source Forward Leakage	$I_{GSS(F)}$	$V_{GS}=30V$			100	μA
Gate to Source Reverse Leakage	$I_{GSS(R)}$	$V_{GS}=-30V$			-100	
ON Characteristics						
Drain-to-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V \quad I_D=7.5A$		0.3	0.4	Ω
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS} \quad I_D=250\mu A$	2.0		4.0	V
Pulse width $t_p \leq 380 \mu s, \delta \leq 2\%$						

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
Dynamic Characteristics						
Forward Transconductance	g_{fs}	$V_{DS}=15V, I_D=7.5A$		18		S
Input Capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=25V$ $f=1.0MHz$		2400		pF
Output Capacitance	C_{oss}			235		
Reverse Transfer Capacitance	C_{rss}			25.5		
Resistive Switching Characteristics						
Turn-on Delay Time	$t_{d(ON)}$	$I_D=15A, V_{DD}=250V$ $V_{GS}=10V, R_G=6.1\Omega$		15		ns
Rise Time	t_r			30		
Turn-Off Delay Time	$t_{d(OFF)}$			50		
Fall Time	t_f			40		
Total Gate Charge	Q_g	$I_D=15A, V_{DD}=250V$ $V_{GS}=10V$		50		nC
Gate to Source Charge	Q_{gs}			12		
Gate to Drain ("Miller") Charge	Q_{gd}			20		
Source-Drain Diode Characteristics						
Continuous Source Current (Body Diode)	I_S				15	A
Maximum Pulsed Current (Body Diode)	I_{SM}				60	A
Diode Forward Voltage	V_{SD}	$I_S=15A, V_{GS}=0V$			1.5	V
Reverse Recovery Time	t_{rr}	$I_S=15A, T_j=25^\circ C$ $di/dt=100A/us,$ $V_{GS}=0V$		582		ns
Reverse Recovery Charge	Q_{rr}				4.7	
Pulse width $t_p \leq 380 \mu s, \delta \leq 2\%$						
Junction-to-Case	$R_{\theta JC}$			1.79		$^\circ C/W$
Junction-to-Ambient	$R_{\theta JA}$			100		

^{a1} : Repetitive rating; pulse width limited by maximum junction temperature

^{a2} : $L=10.0mH, I_D=14.1A, Start T_j=25^\circ C$

^{a3} : $I_{SD}=15A, di/dt \leq 100A/us, V_{DD} \leq BV_{DS}, Start T_j=25^\circ C$

电参数曲线图 / Electrical Characteristic Curve

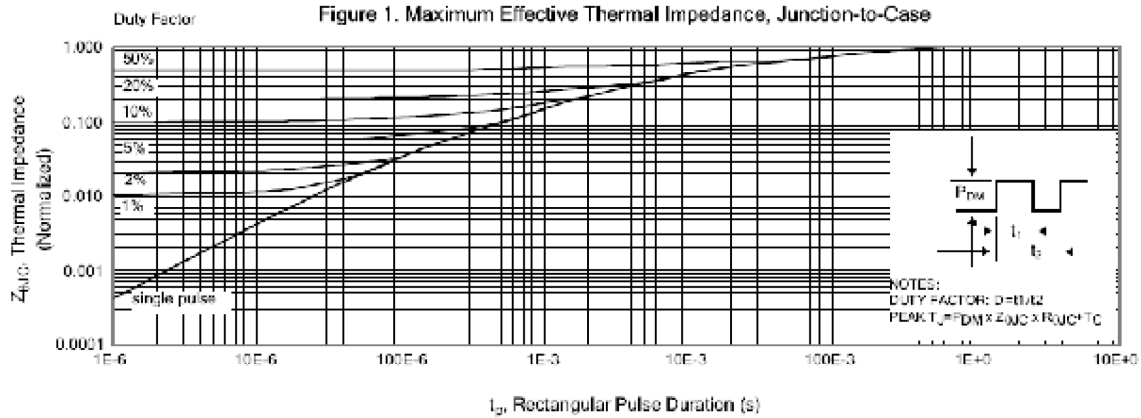


Figure 2. Maximum Power Dissipation vs Case Temperature

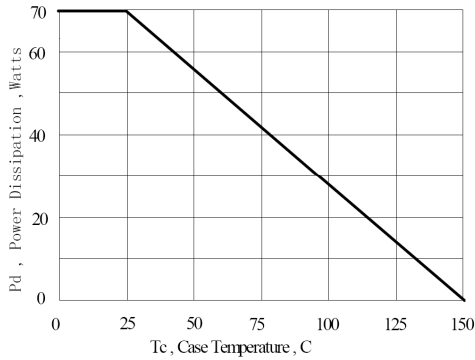


Figure 3. Maximum Continuous Drain Current vs Case Temperature

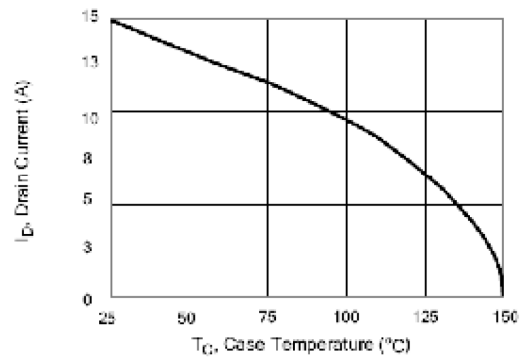


Figure 4. Typical Output Characteristics

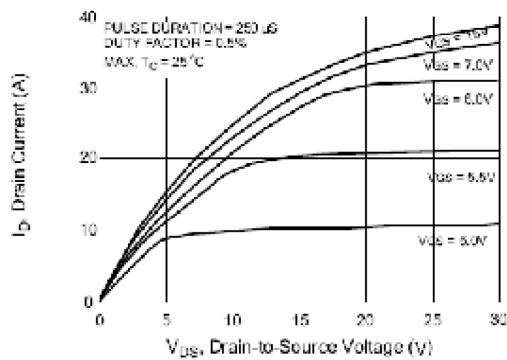
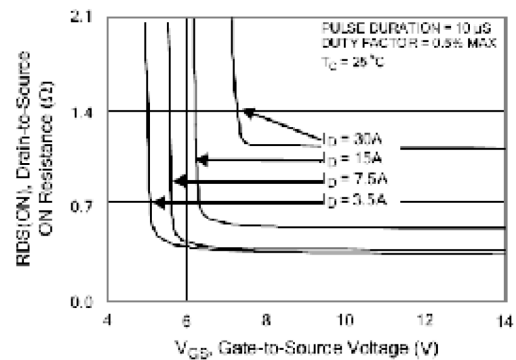


Figure 5. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current



电参数曲线图 / Electrical Characteristic Curve

Figure 6. Maximum Peak Current Capability

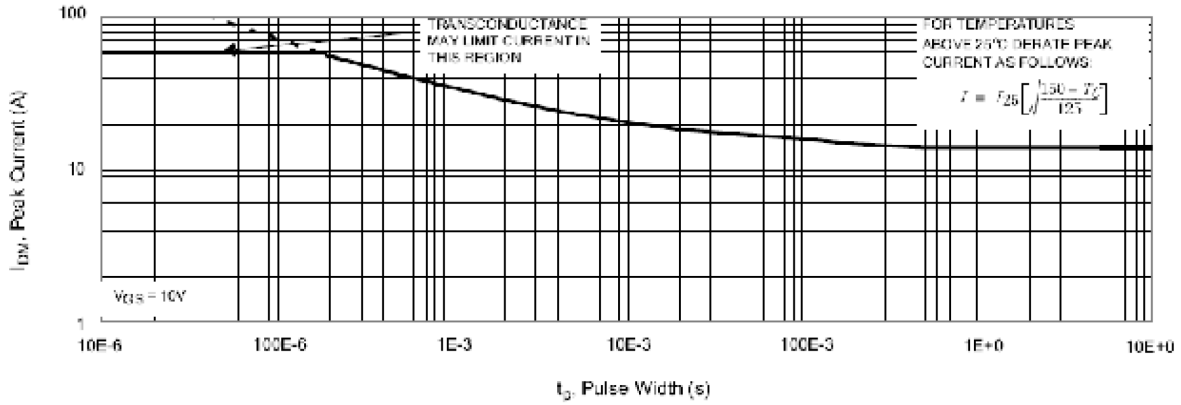


Figure 7. Typical Transfer Characteristics

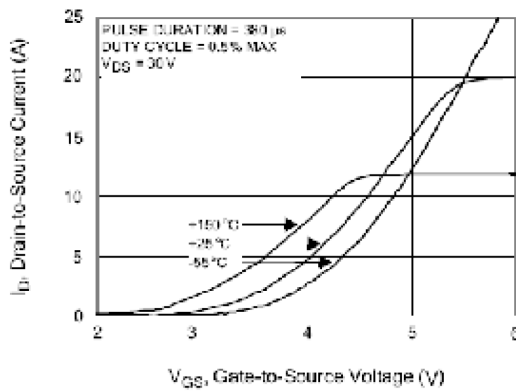


Figure 8. Unclamped Inductive Switching Capability

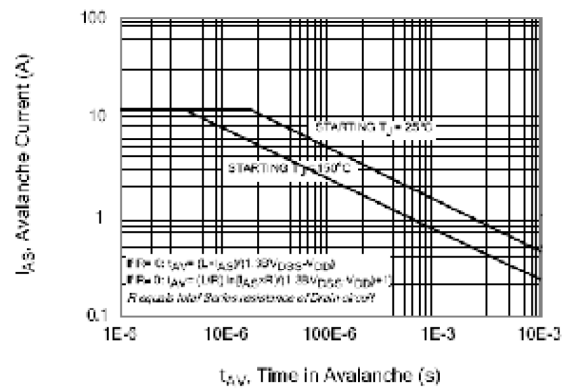


Figure 9. Typical Drain-to-Source ON Resistance vs Drain Current

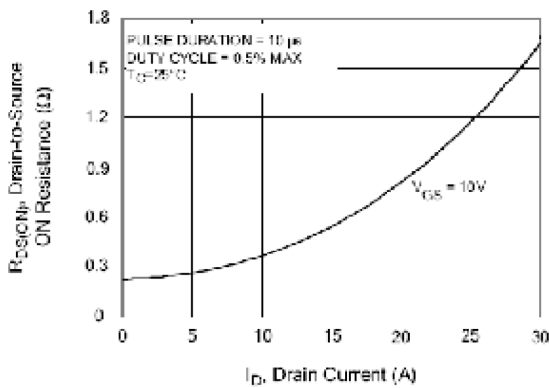
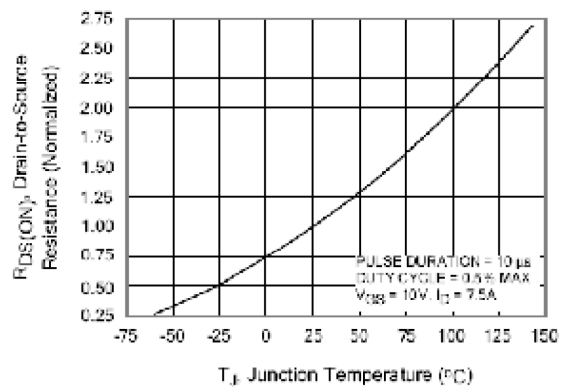


Figure 10. Typical Drain-to-Source ON Resistance vs Junction Temperature



电参数曲线图 / Electrical Characteristic Curve

Figure 11. Typical Breakdown Voltage vs Junction Temperature

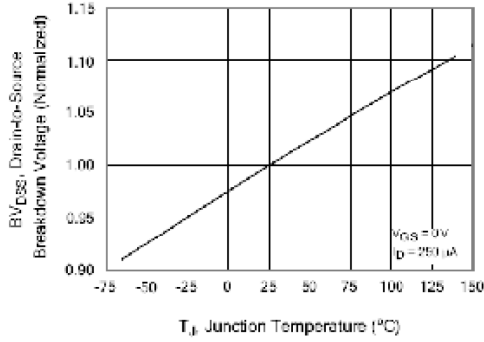


Figure 12. Typical Threshold Voltage vs Junction Temperature

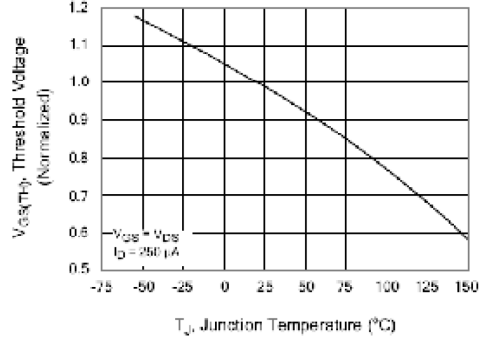


Figure 13. Maximum Forward Bias Safe Operating Area

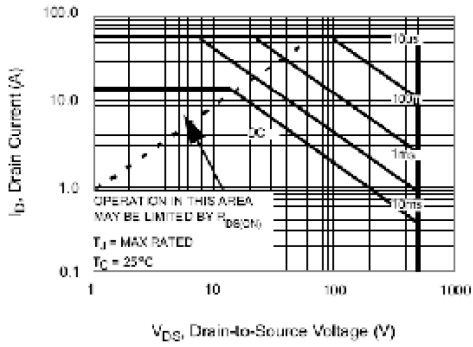


Figure 14. Typical Capacitance vs Drain-to-Source Voltage

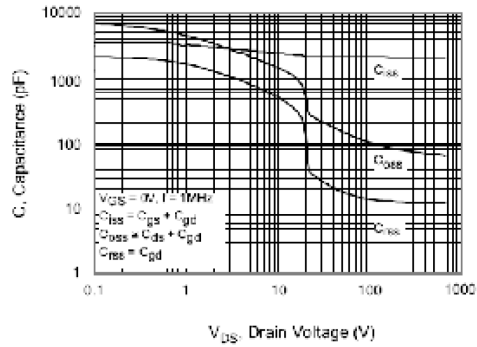


Figure 15. Typical Gate Charge vs Gate-to-Source Voltage

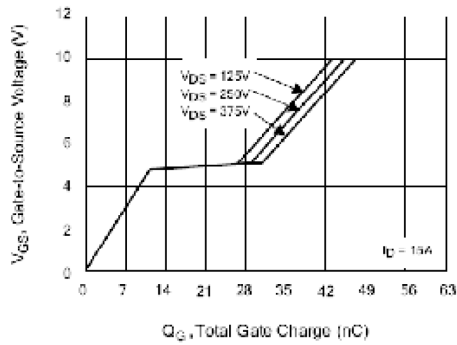
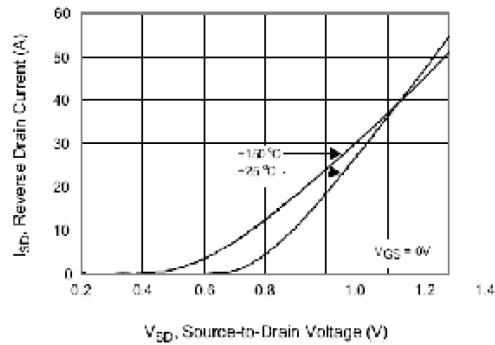


Figure 16. Typical Body Diode Transfer Characteristics



测试电路和波形 / Test Circuit and Waveform

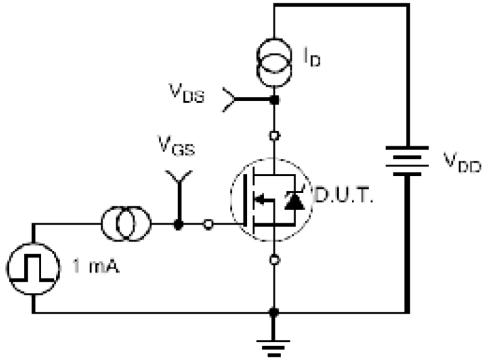


Figure 17. Gate Charge Test Circuit

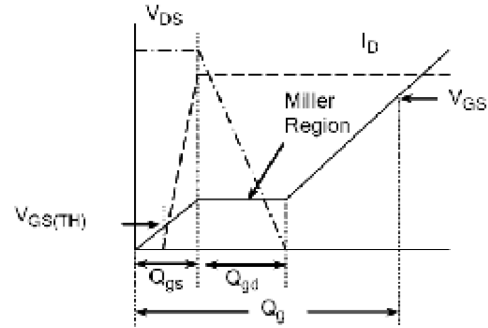


Figure 18. Gate Charge Waveform

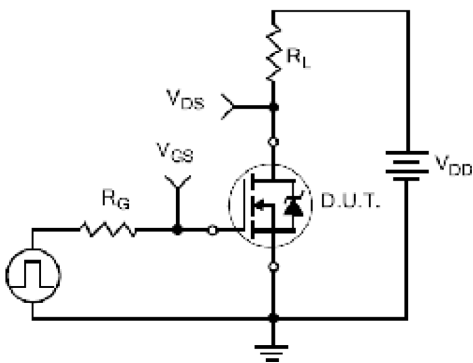


Figure 19. Resistive Switching Test Circuit

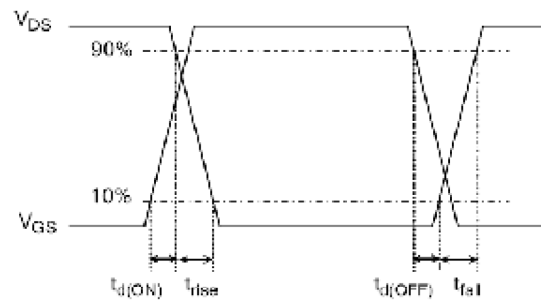


Figure 20. Resistive Switching Waveforms

测试电路和波形 / Test Circuit and Waveform

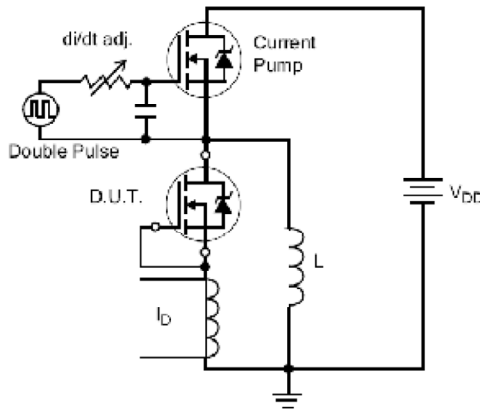


Figure 21. Diode Reverse Recovery Test Circuit

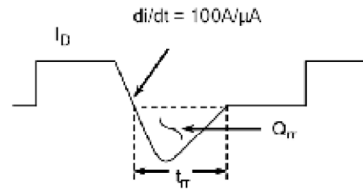


Figure 22. Diode Reverse Recovery Waveform

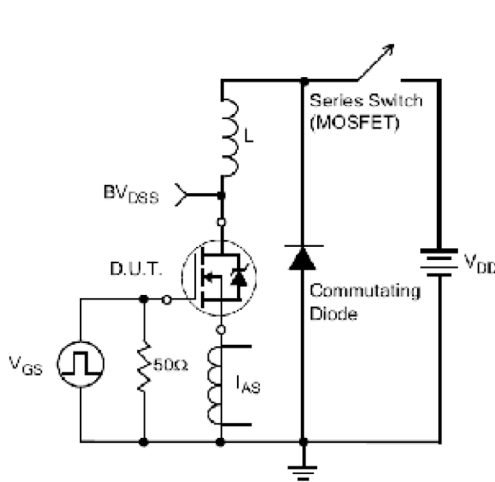


Figure 23. Undamped Inductive Switching Test Circuit

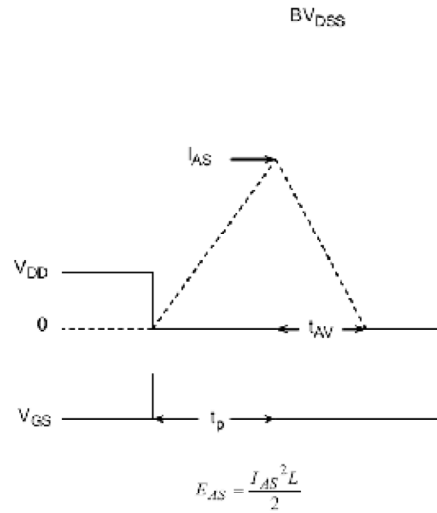
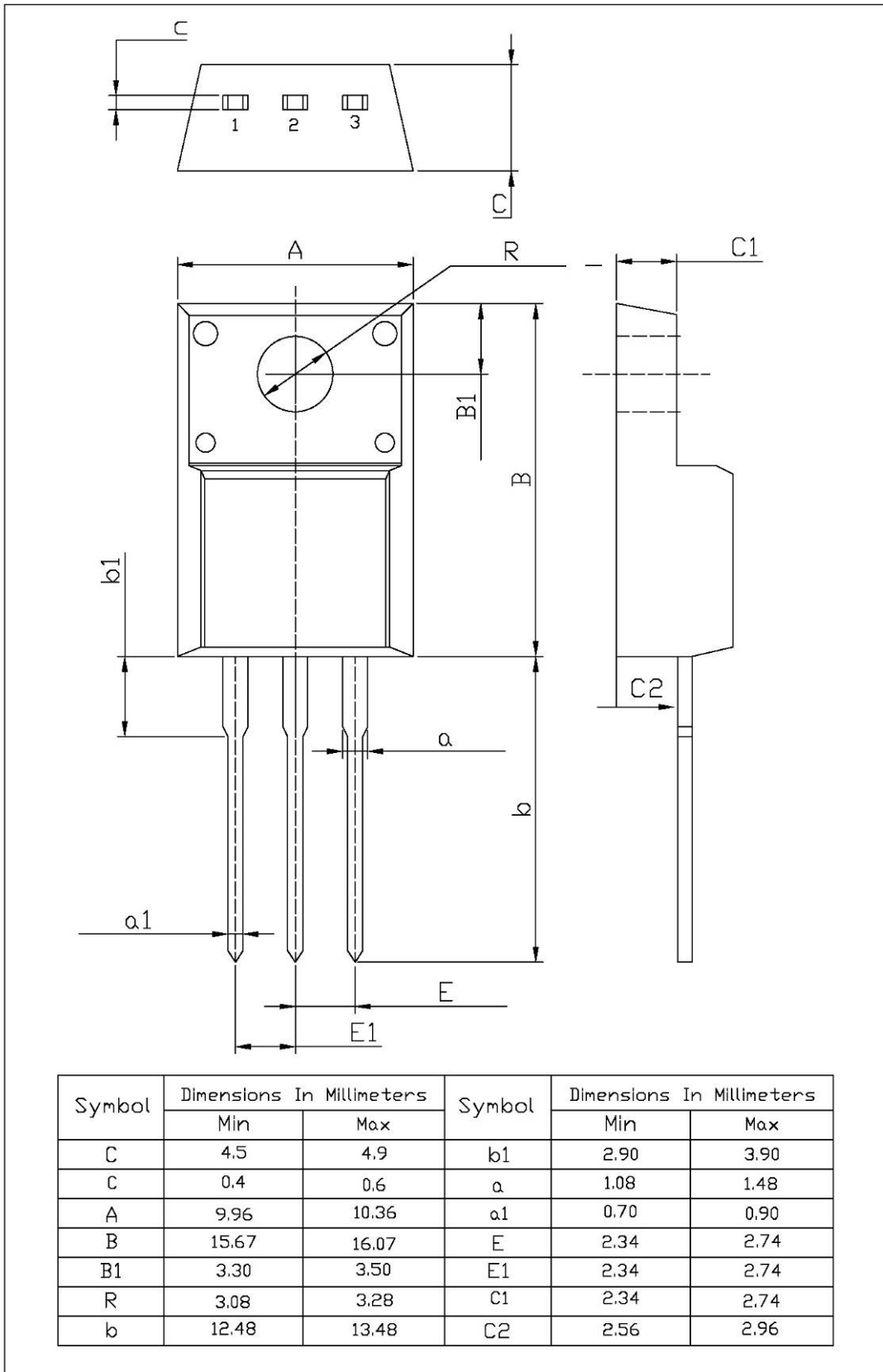


Figure 24. Undamped Inductive Switching Waveforms

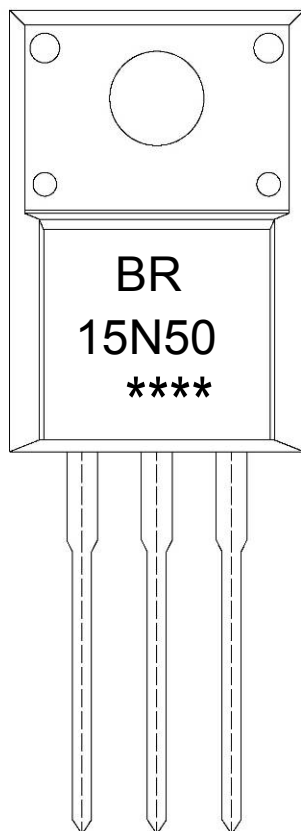
外形尺寸图 / Package Dimensions

TO-220FL

单位: mm



印章说明 / Marking Instructions



说明：

BR： 为公司代码

15N50： 为型号代码

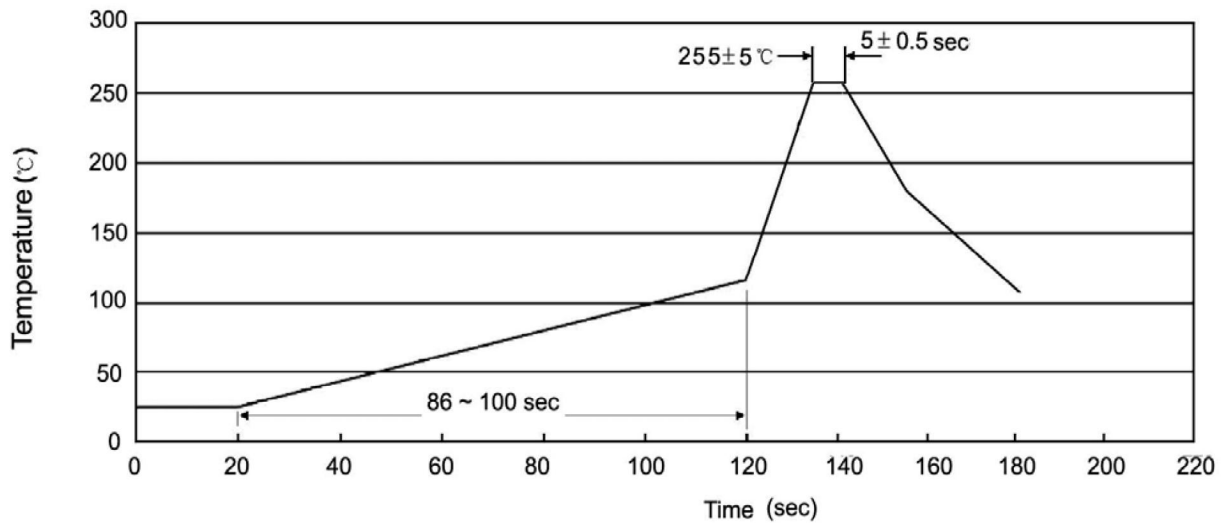
****： 为生产批号代码，随生产批号变化。

Note:

BR: Company Code

15N50: Product Type.

****: 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