

# BRCS250C03YAQ

Rev.C Jun.-2024

## 描述 / Descriptions

PDFN3×3-8L 塑封封装互补增强模式 MOS 场效应管。

Complementary Enhancement MOSFET in a PDFN3×3-8L Plastic Package.

## 特征 / Features

N-channel

P-channel

$V_{DS}(V)=30V$

$V_{DS}(V)=-30V$

$I_D=20A$

$I_D=-12A$

$R_{DS(ON)}<25m\Omega(V_{GS}=10V)$

$R_{DS(ON)}<60m\Omega(V_{GS}=-10V)$

$R_{DS(ON)}<40m\Omega(V_{GS}=4.5V)$

$R_{DS(ON)}<85m\Omega(V_{GS}=-4.5V)$

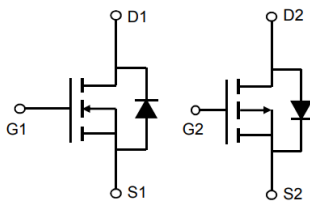
符合 AEC-Q101 标准高可靠性要求，无卤产品。Qualified to AEC-Q101 Standards for High Reliability, HF Product.

## 用途 / Applications

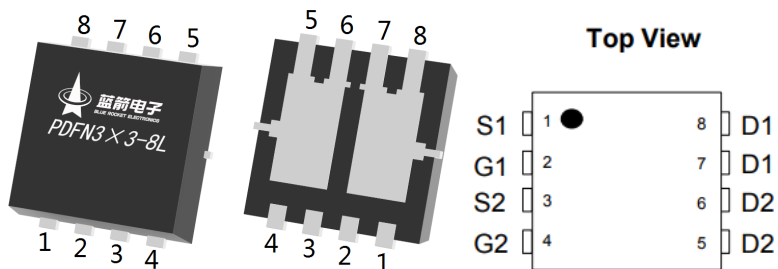
用于高功率 DC/DC 转换和功率开关。适用于作负载开关或脉宽调制应用，满足汽车应用的严格要求。

These devices are well suited for high efficiency switching DC/DC converters and switch mode power supplies. And suitable for use as a load switch or in PWM applications, Meet the stringent requirements of automotive applications.

## 内部等效电路 / Equivalent Circuit



## 引脚排列 / Pinning



## 印章代码 / 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
		N-channe	P-channell	
Drain-Source Voltage	$V_{DSS}$	±30		V
Gate-Source Voltage	$V_{GSS}$	±20		V
Continuous Drain Current	$I_D(T_C=25^\circ C)$	20	-12	A
Continuous Drain Current	$I_D(T_A=25^\circ C)$	7.7	-4.3	A
Power Dissipation	$P_D(T_C=25^\circ C)$	11.2	10	W
Power Dissipation	$P_D(T_A=25^\circ C)$	2.7	1.8	W
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150		°C
Maximum Junction-to-Ambient	$R_{\theta JA}(\text{Steady-State})$	45		°C/W
Maximum Junction-to-Case	$R_{\theta JC}(\text{Steady-State})$	11.2	12.5	°C/W

## N-沟道电性能参数/N-CHANNEL 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	
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V	I <sub>D</sub> =250μA	30	35		V	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =30V	V <sub>GS</sub> =0V			1.0	μA	
		V <sub>DS</sub> =30V T <sub>J</sub> =55°C	V <sub>GS</sub> =0V			5.0	μA	
Gate-Body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V	V <sub>DS</sub> =0V			±100	nA	
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub>	I <sub>D</sub> =250μA	1.0	1.6	2.5	V	
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V	I <sub>D</sub> =6.9A		20	25	mΩ	
		V <sub>GS</sub> =4.5V	I <sub>D</sub> =5.0A		28	40	mΩ	
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V	I <sub>S</sub> =1.0A		0.78	1.2	V	
Input Capacitance	C <sub>iss</sub>				690		pF	
Output Capacitance	C <sub>oss</sub>	V <sub>DS</sub> =25V f=1.0MHz	V <sub>GS</sub> =0V		200		pF	
Reverse Transfer Capacitance	C <sub>rss</sub>				130		pF	
Gate resistance	R <sub>g</sub>	V <sub>DS</sub> =0V f=1.0MHz	V <sub>GS</sub> =0V		2.7		Ω	
Total Gate Charge(10V)	Q <sub>g</sub>				5.2		nC	
Total Gate Charge(4.5V)		V <sub>GS</sub> =10V I <sub>D</sub> =6A	V <sub>DS</sub> =15V			2.5		nC
Gate-Source Charge	Q <sub>gs</sub>					0.8		nC
Gate-Drain Charge	Q <sub>gd</sub>					1.3		nC
Turn-On Delay Time	t <sub>d(on)</sub>						4.5	
Turn-On Rise Time	t <sub>r</sub>	V <sub>DS</sub> =15 V R <sub>L</sub> =2.5Ω	V <sub>GS</sub> =10V R <sub>GEN</sub> =3Ω		2.5		ns	
Turn-Off Delay Time	t <sub>d(off)</sub>				14.5		ns	
Turn-Off Fall Time	t <sub>f</sub>				3.5		ns	

## N-沟道电参数曲线图 / N-CHANNEL Electrical Characteristic Curve

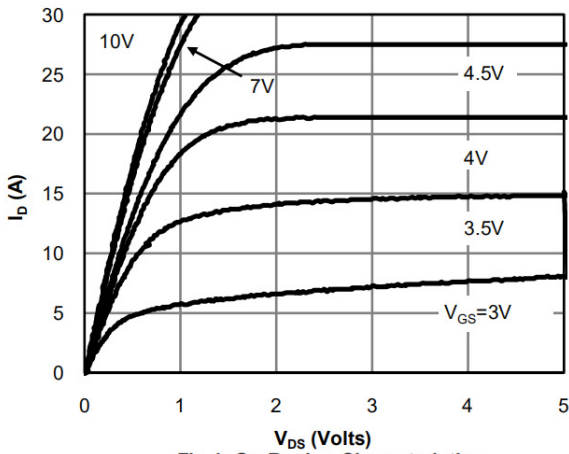


Fig 1: On-Region Characteristics

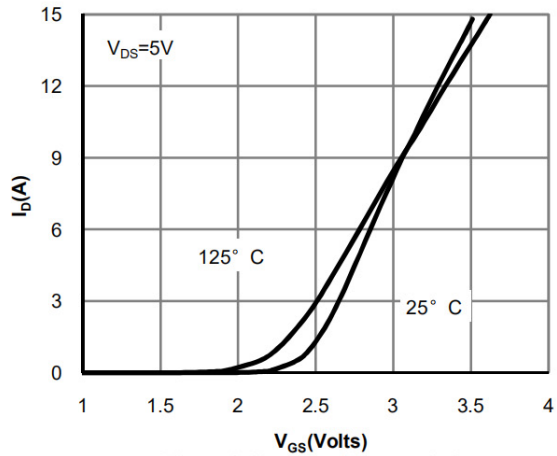


Figure 2: Transfer Characteristics

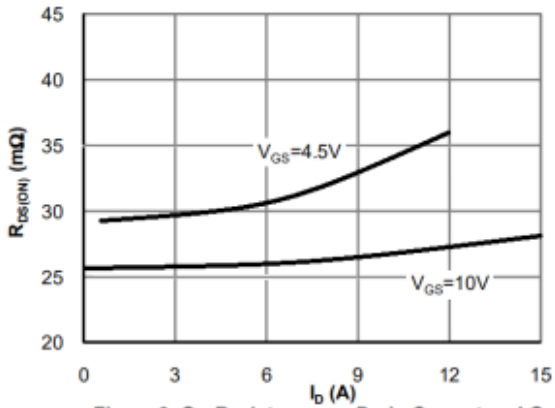


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

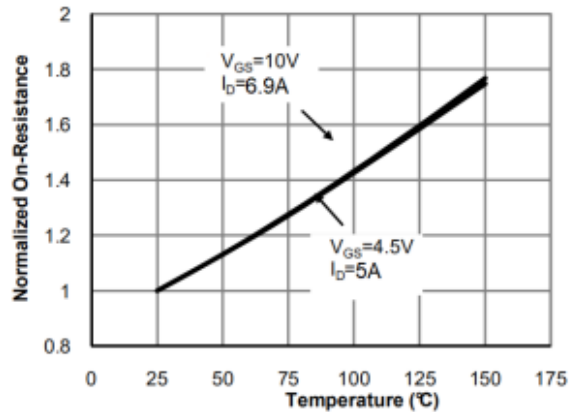


Figure 4: On-Resistance vs. Junction Temperature

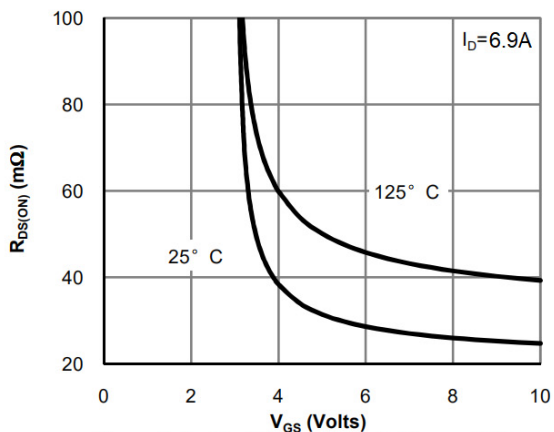


Figure 5: On-Resistance vs. Gate-Source Voltage

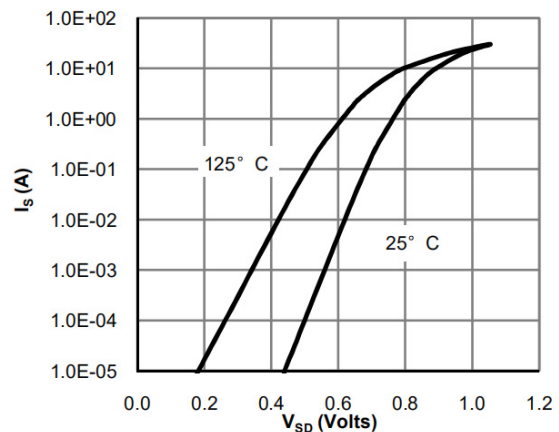
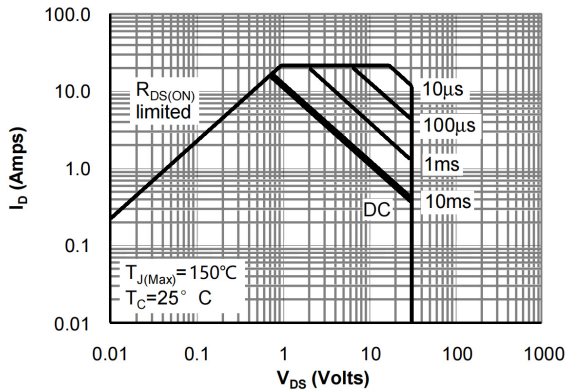
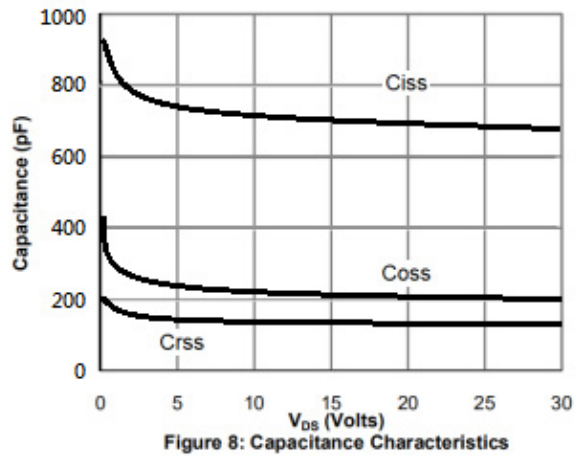
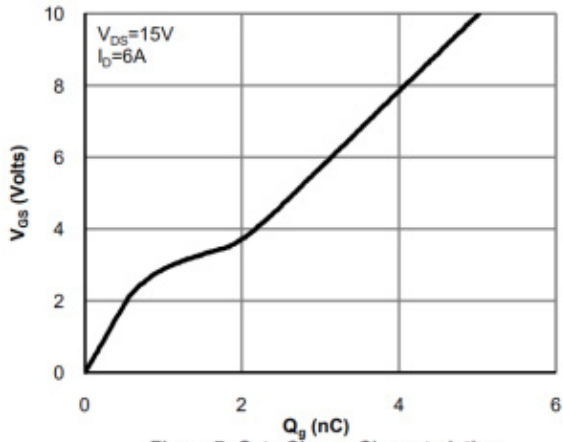


Figure 6: Body-Diode Characteristics

## N-沟道电参数曲线图 / N-CHANNEL Electrical Characteristic Curve



## P-沟道电性能参数/P-CHANNEL 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
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V I <sub>D</sub> =-250μA	-30	-34		V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-30V V <sub>GS</sub> =0V			-1.0	μA
		V <sub>DS</sub> =-30V V <sub>GS</sub> =0V T <sub>J</sub> =55°C			-5.0	μA
Gate-Body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V V <sub>DS</sub> =0V			±100	nA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> I <sub>D</sub> =-250μA	-1.0	-1.85	-2.5	V
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =-10V I <sub>D</sub> =-6.0A		52	60	mΩ
		V <sub>GS</sub> =-4.5V I <sub>D</sub> =-5.0A		73	85	mΩ
Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V I <sub>S</sub> =-1.0A		-0.81	-1.2	V
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-25V V <sub>GS</sub> =0V f=1.0MHz		900		pF
Output Capacitance	C <sub>oss</sub>			235		pF
Reverse Transfer Capacitance	C <sub>rss</sub>			195		pF
Gate resistance	R <sub>g</sub>	V <sub>DS</sub> =0V V <sub>GS</sub> =0V f=1.0MHz		26		Ω
Total Gate Charge(10V)	Q <sub>g</sub>	V <sub>GS</sub> =-10V V <sub>DS</sub> =-15V I <sub>D</sub> =-6.5A		13.6		nC
Total Gate Charge(4.5V)				6.7		nC
Gate-Source Charge	Q <sub>gs</sub>			2.5		nC
Gate-Drain Charge	Q <sub>gd</sub>			3.2		nC
Turn-On Delay Time	t <sub>d(on)</sub>				8	
Turn-On Rise Time	t <sub>r</sub>	V <sub>DS</sub> =-15V V <sub>GS</sub> =-10V R <sub>L</sub> =2.3Ω R <sub>GEN</sub> =3Ω		6		ns
Turn-Off Delay Time	t <sub>d(off)</sub>			17		ns
Turn-Off Fall Time	t <sub>f</sub>			5		ns

P-沟道电参数曲线图 / P-CHANNEL Electrical Characteristic Curve

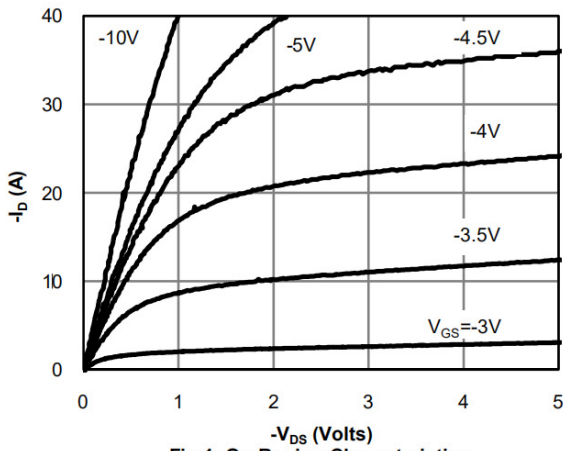


Fig 1: On-Region Characteristics

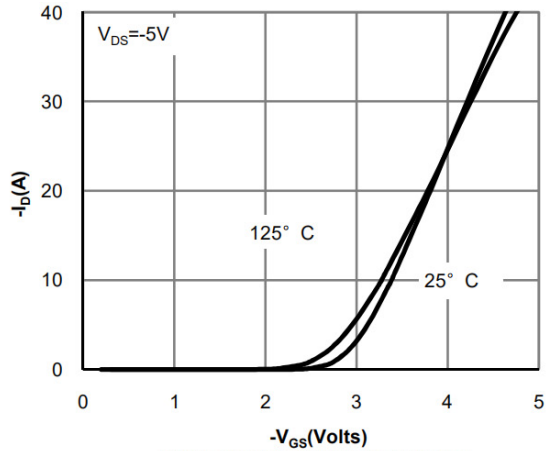


Figure 2: Transfer Characteristics

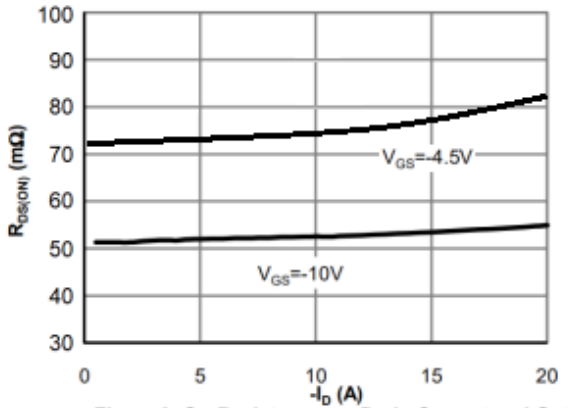


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

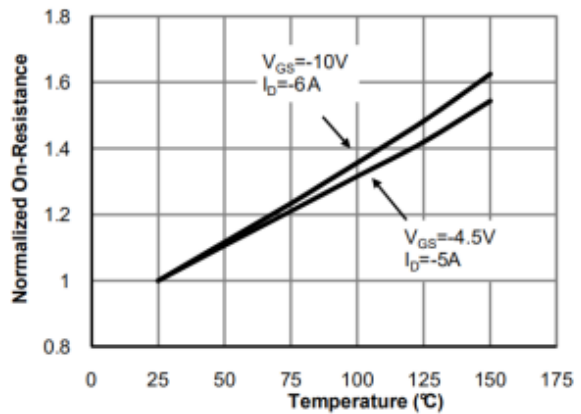


Figure 4: On-Resistance vs. Junction Temperature

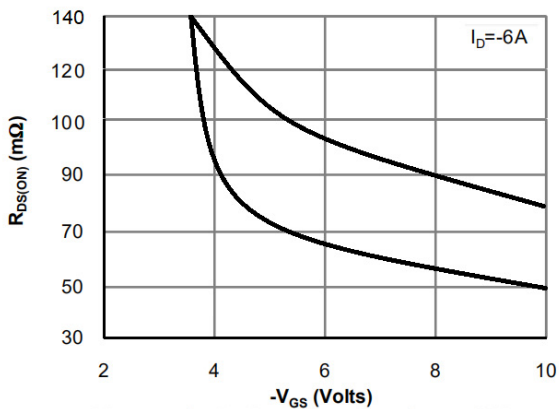


Figure 5: On-Resistance vs. Gate-Source Voltage

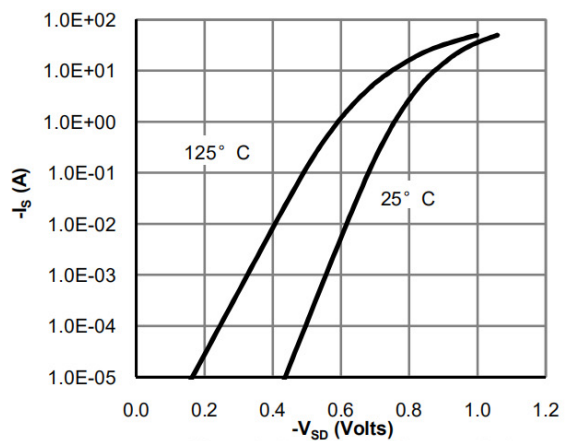


Figure 6: Body-Diode Characteristics

## P-沟道电参数曲线图 / P-CHANNEL Electrical Characteristic Curve

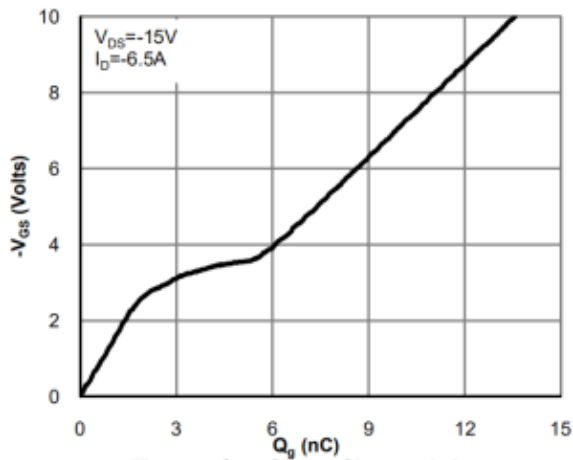


Figure 7: Gate-Charge Characteristics

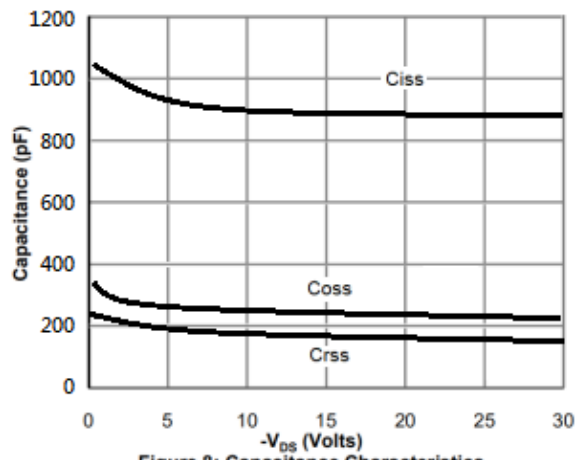


Figure 8: Capacitance Characteristics

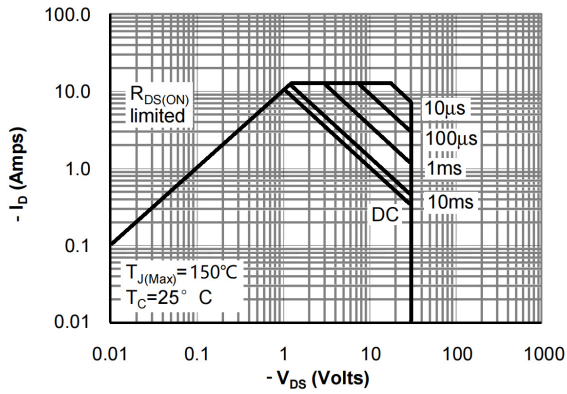


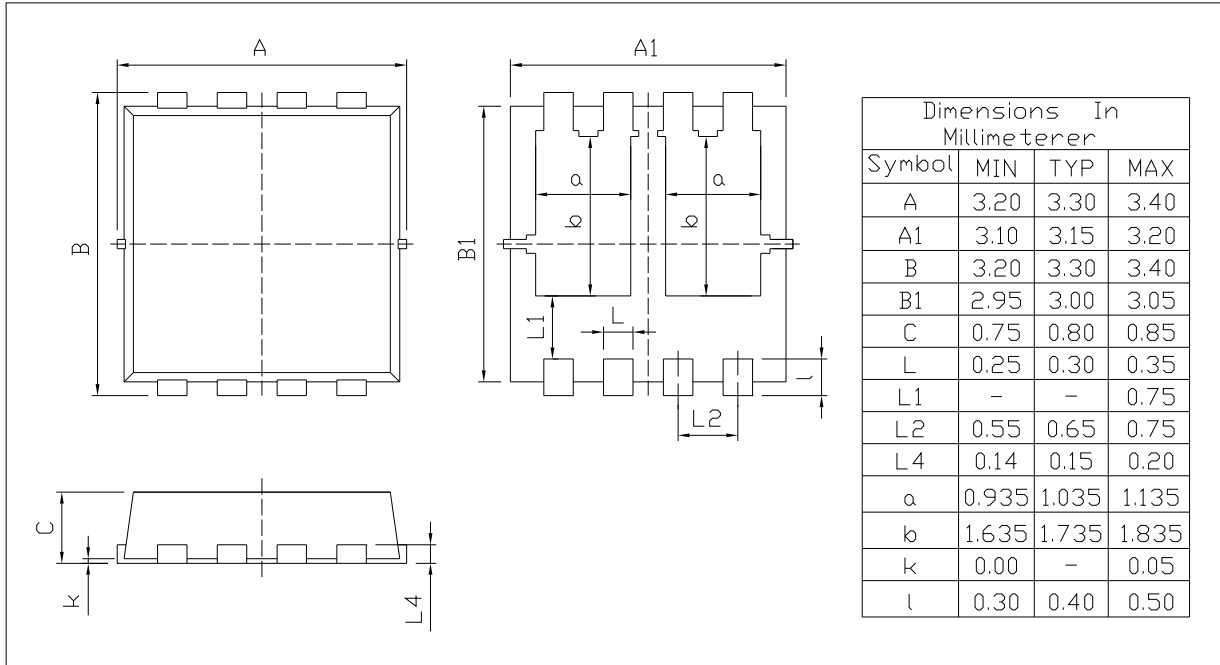
Figure 9: Maximum Forward Biased Safe Operating Area



**外形尺寸图 / Package Dimensions**

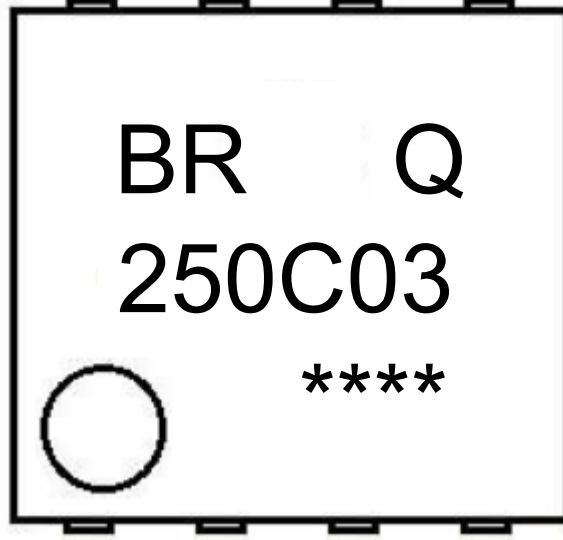
PDFN3X3-8L

Unit:mm



Rev.00 202011

**印章说明 / Marking Instructions**



说明：

BR： 为公司代码

Q： 为汽车无卤产品标识

250C03： 为型号代码

\*\*\*\*： 为生产批号代码，随生产批号变化

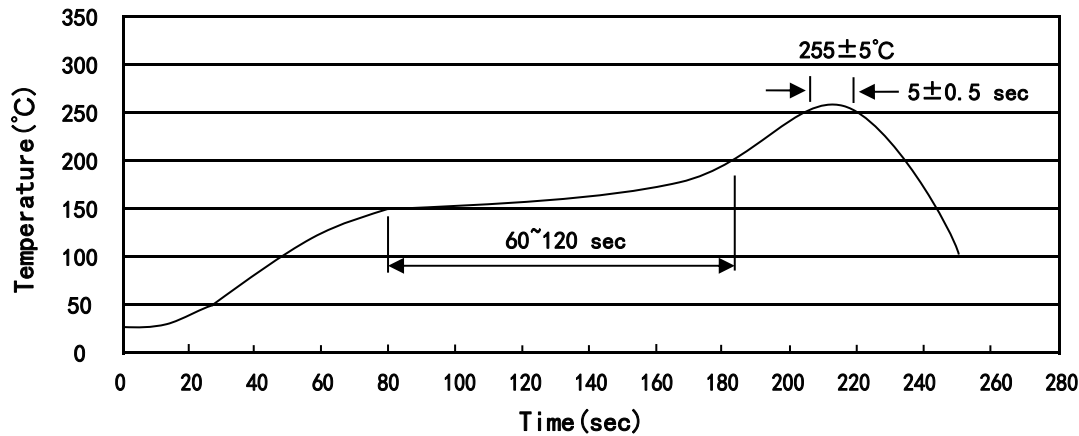
Note:

BR: Company Code

Q: Automobile halogen-free product Code

250C03: Product Type Code

\*\*\*\*: Lot No. Code, code change with Lot No

**回流焊温度曲线图(无铅) / Temperature Profile for IR Reflow Soldering(Pb-Free)**


说明：

- 1、预热温度 150~200°C，时间 60~120sec;
- 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:150~200°C, Time:60~120sec.
- 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：260±5°C

时间：10±1 sec.

Temp.:260±5°C

Time:10±1 sec

**包装规格 / Packaging SPEC.**

卷盘包装 / REEL

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm <sup>3</sup> )		
	Units/Reel 只/卷盘	Reels/Inner Box 卷盘/盒	Units/Inner Box 只/盒	Inner Boxes/Outer Box 盒/箱	Units/Outer Box 只/箱	Reel	Inner Box 盒	Outer Box 箱
PDFN3×3-8L	5,000	2	10,000	6	60,000	13" ×12	360×360×50	380×335×366

**使用说明 / Notices**