

# BRF65R380C

Rev.B May.-2022

## 描述 / Descriptions

TO-220F 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-220F Plastic Package.

## 特征 / Features

低  $R_{DS(on)} \times Q_g$  , 100%雪崩测试, 符合 ROHS 标准。

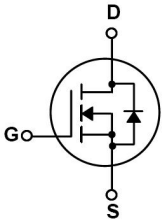
Very low  $R_{DS(on)} \times Q_g$ , 100% avalanche tested, RoHS compliant.

## 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



PIN 1 : 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°C)**

参数 Parameter	符号 Symbol	数值 Rating	单位 Unit
Drain-Source Voltage	$V_{DSS}$	650	V
Drain Current	$I_D(T_c=25^\circ\text{C})$	11	A
Drain Current - Pulsed	$I_{DM}$	44	A
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Single Pulsed Avalanche Energy	$E_{AS}$	277	mJ
Avalanche Current	$I_{AS}$	8	A
Power Dissipation	$P_D(T_c=25^\circ\text{C})$	27	W
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$
Junction-to-Case	$R_{\theta JC}$	4.6	$^\circ\text{C/W}$
Junction-to-Ambient	$R_{\theta JA}$	65	$^\circ\text{C/W}$

**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
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V$ $I_D=250\mu\text{A}$	650	700		V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=650V$ $V_{GS}=0V$ $T_J=25^\circ\text{C}$			1.0	$\mu\text{A}$
Gate-Body Leakage Current, Forward	$I_{GSS}$	$V_{GS}=\pm 30V$			$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ $I_D=250\mu\text{A}$	2.5	3.3	4.0	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V$ $I_D=5.5A$		320	380	m $\Omega$
Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V$ $I_{SD}=1A$ $T_J=25^\circ\text{C}$			1.2	V
Gate Resistance	$R_g$	$V_{GS}=0V$ $f=1.0\text{MHz}$		4.1		$\Omega$
Input Capacitance	$C_{iss}$	$V_{DS}=100V$ $V_{GS}=0V$ $f=1.0\text{MHz}$		735		pF
Output Capacitance	$C_{oss}$			35		pF
Reverse Transfer Capacitance	$C_{rss}$			0.45		pF
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=400V$ $I_D=5.5A$ $R_G=25\Omega$ $V_{GS}=10V$		16.3		ns
Turn-On Rise Time	$t_r$			35		ns
Turn-Off Delay Time	$t_{d(off)}$			78		ns
Turn-Off Fall Time	$t_f$			39.5		ns

## 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
Continuous Diode Forward Current	$I_S$				11	A
Total Gate Charge	$Q_g$	$V_{DS}=480V$ $I_D=5.5A$ $V_{GS}=10V$		19.2		nC
Gate-Source Charge	$Q_{gs}$			3.1		nC
Gate-Drain Charge	$Q_{gd}$			8.2		nC
Reverse recovery time	$T_{rr}$	$V_R=400V$ , $I_F=5.5A$ , $di_F/dt=100A/\mu s$		310		ns
Reverse recovery charge	$Q_{rr}$			2.8		uC

电参数曲线图 / Electrical Characteristic Curve

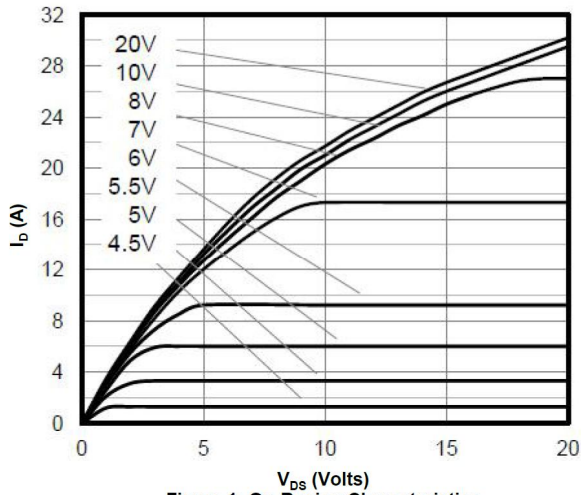


Figure 1: On-Region Characteristics

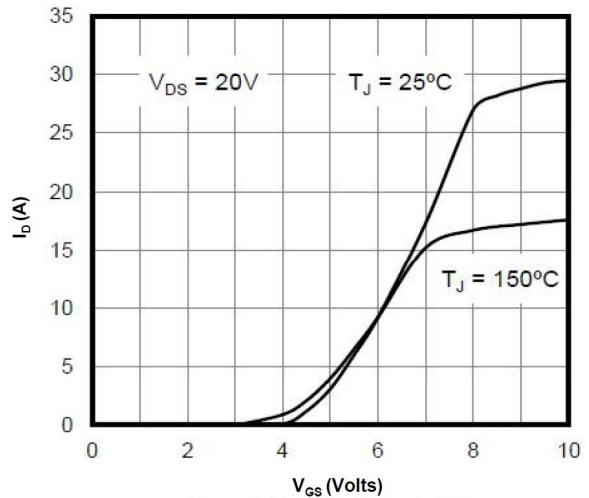


Figure 2: Transfer Characteristics

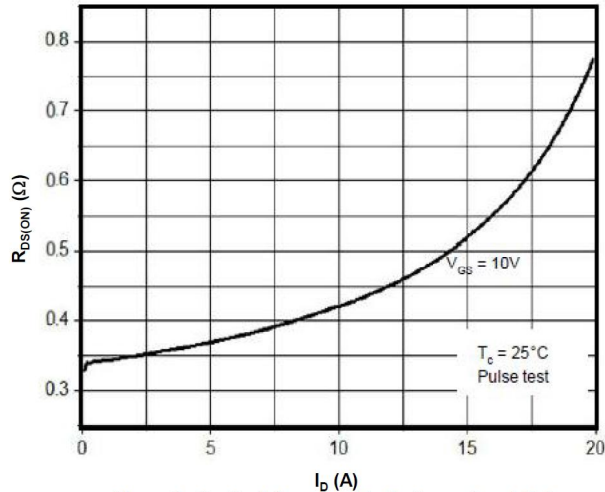


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

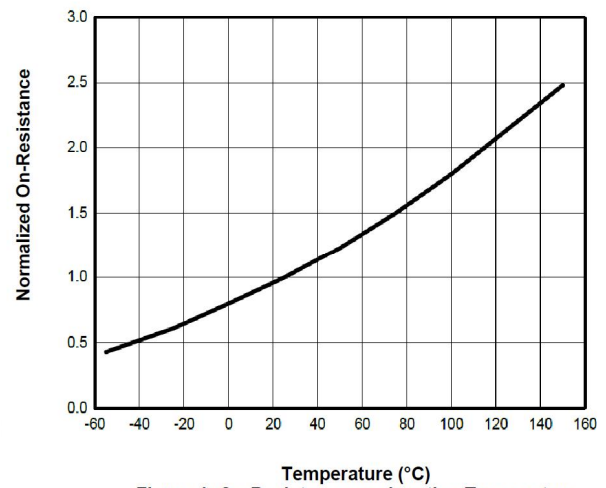


Figure 4: On-Resistance vs. Junction Temperature

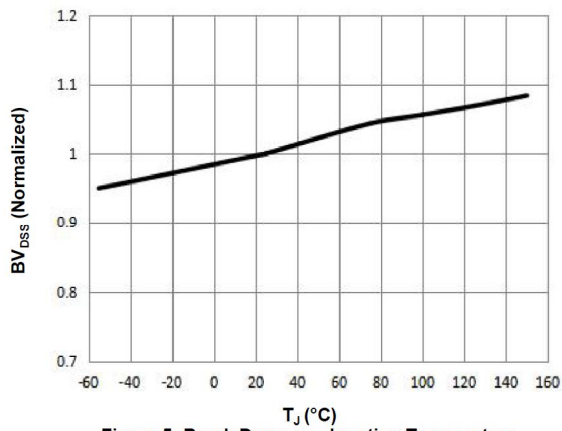


Figure 5: Break Down vs. Junction Temperature

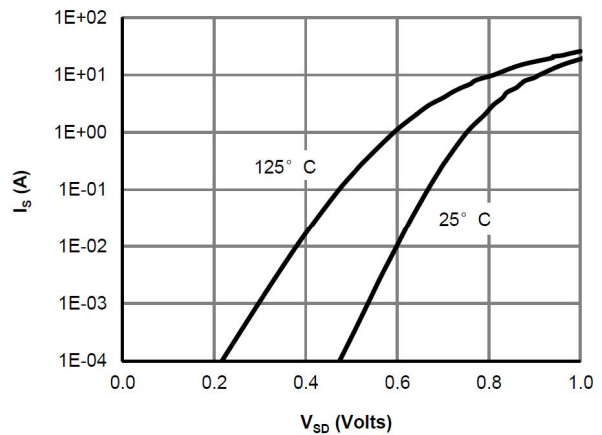


Figure 6: Body-Diode Characteristics

**电参数曲线图 / Electrical Characteristic Curve**

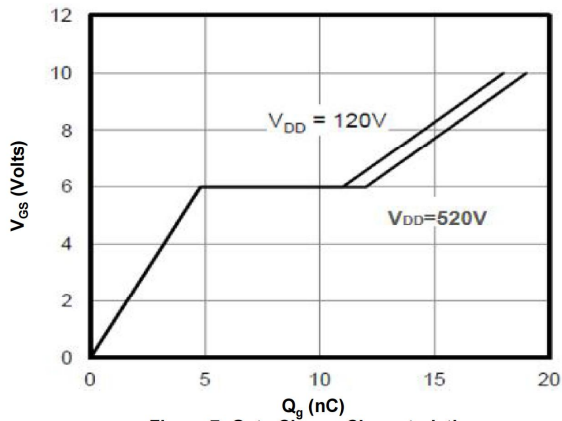


Figure 7: Gate-Charge Characteristics

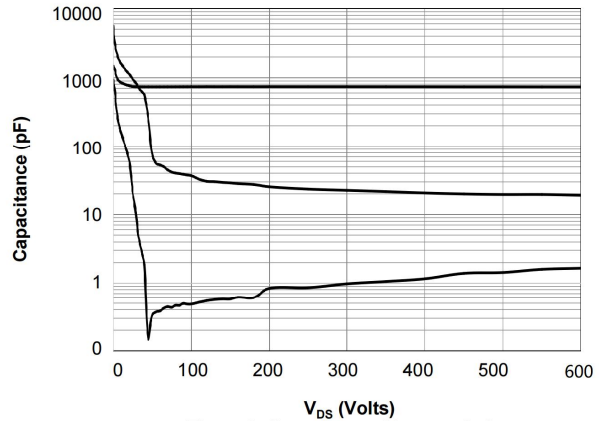


Figure 8: Capacitance Characteristics

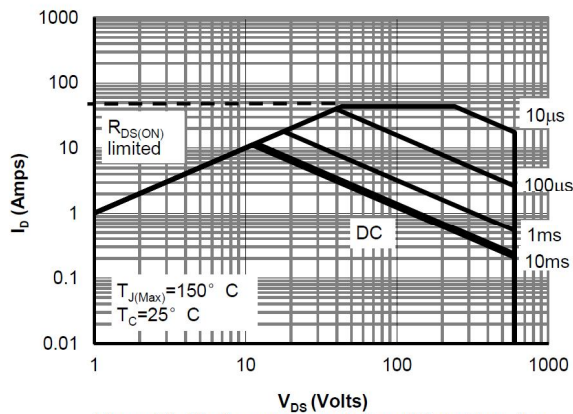


Figure 09: Maximum Forward Biased Safe Operating Area

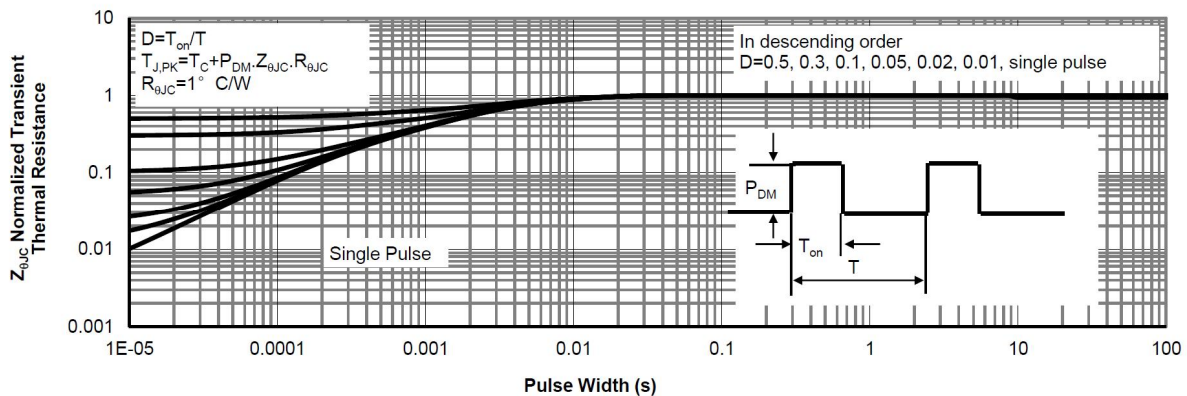
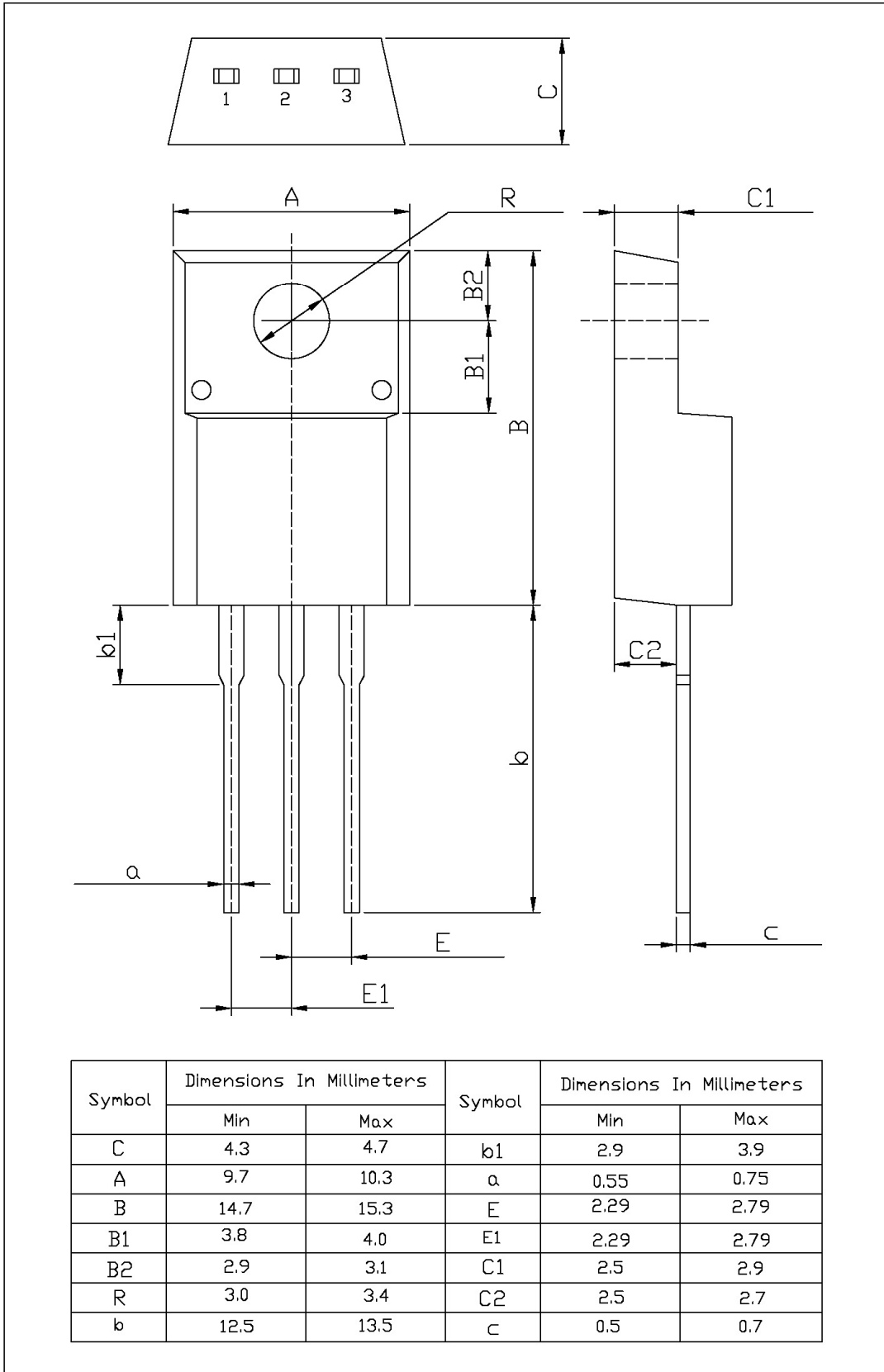


Figure 10: Normalized Maximum Transient Thermal Impedance

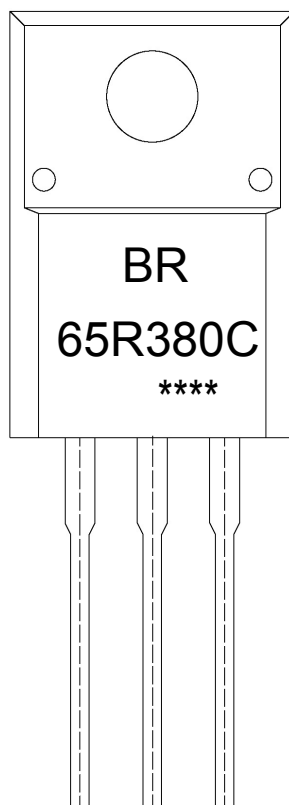
外形尺寸图 / Package Dimensions

TO-220F

单位: mm



## 印章说明 / Marking Instructions



说明：

BR： 为公司代码

65R380C： 为型号代码

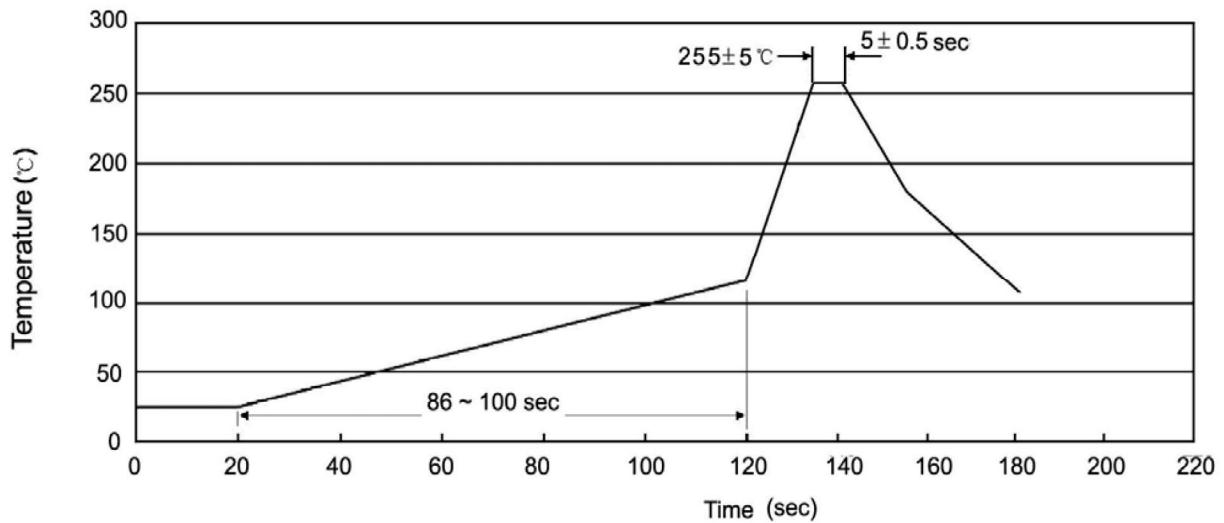
\*\*\*\*： 为生产批号代码，随生产批号变化

Note:

BR: Company Code

65R380C: 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.**

散件包装 / BULK

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm <sup>3</sup> )		
	Units/Bag 只/袋	Bags/Inner Box 袋/盒	Units/Inner Box 只/盒	Inner Boxes/Outer Box 盒/箱	Units/Outer Box 只/箱	Bag 袋	Inner Box 盒	Outer Box 箱
TO-220/F	200	10	2,000	5	10,000	135×190	237×172×102	560×245×195

套管包装 / TUBE

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm <sup>3</sup> )		
	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-220/F	50	20	1,000	5	5,000	532×31.4×5.5	555×164×50	575×290×180

**使用说明 / Notices**