

BRCS120N06SRA

Rev.A Apr.-2023

/ Descriptions

N TO-220

N-CHANNEL MOSFET in a TO-220 Plastic Package.

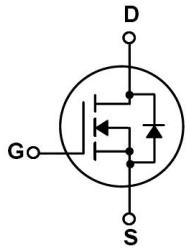
/ Features

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

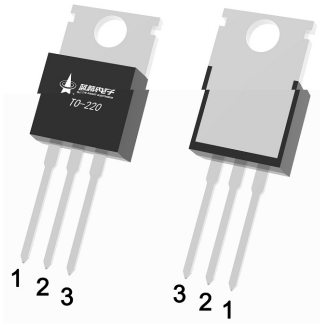
/ Applications

Suited for low voltage applications such as automotive, DC/DC Converters, and high efficiency switching for power management in portable and battery operated products.

/ Equivalent Circuit



/ Pinning



PIN1 G

PIN 2 D

PIN 3 S

/ Marking

See Marking Instructions.

/ Absolute Maximum Ratings(Ta=25)

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	60	V
Drain Current		$I_D(T_c=25^\circ\text{C})$	60	A
Drain Current - Pulsed		I_{DM}	225	A
Gate-Source Voltage		V_{GS}	± 20	V
Avalanche Current		I_{AS}	20	A
Single Pulsed Avalanche Energy		E_{AS}	170	mJ
Power Dissipation		$P_D(T_c=25^\circ\text{C})$	96	W
Storage Temperature Range		T_{stg}	-55 ~ 150	
Thermal Resistance-Junction to Ambient	$t \leq 10\text{s}$	R_{JA}	15	/W
	Steady-State		62	
Thermal Resistance-Junction to Case	Steady-State	R_{JC}	1.3	

/ Electrical Characteristics(Ta=25)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DS}	$V_{GS}=0\text{V}$ $I_D=250\text{ }\mu\text{A}$	60	63		V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60\text{V}$ $V_{GS}=0\text{V}$			1.0	A
		$V_{DS}=48\text{V}$ $T_C=150^\circ\text{C}$			10	
Gate-Body Leakage Current Forward	I_{GSS}	$V_{GS}=\pm 20\text{V}$ $V_{DS}=0\text{V}$			± 0.1	A
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ $I_D=250\text{ }\mu\text{A}$	1	1.6	3	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10\text{V}$ $I_D=25\text{A}$		10.5	15	m Ω
		$V_{GS}=4.5\text{V}$ $I_D=18\text{A}$		13.5	20	
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0\text{V}$ $I_S=25\text{A}$			1.25	V
Gate resistance	R_g	$V_{GS}=0\text{V}$ $V_{DS}=0\text{V}$, $f=1\text{MHz}$		1.49		
Input Capacitance	C_{iss}	$V_{DS}=25\text{V}$ $V_{GS}=0\text{V}$ $f=1.0\text{MHz}$		1010		pF
Output Capacitance	C_{oss}			250		
Reverse Transfer Capacitance	C_{rss}			280		
Total Gate Charge	$Q_g(10\text{V})$	$V_{GS}=10\text{V}$ $V_{DS}=30\text{V}$ $I_D=20\text{A}$		22		nC
Total Gate Charge	$Q_g(4.5\text{V})$			8.7		
Gate Source Charge	Q_{gs}			5.5		
Gate Drain Charge	Q_{gd}			2.6		

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Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=10V$ $V_{DS}=30V$ $R_L=1.5$ $R_{GEN}=3$		8.9		ns
Turn-On Rise Time	t_r			3.7		
Turn-Off Delay Time	$t_{d(off)}$			25		
Turn-Off Fall Time	t_f					

/ Electrical Characteristic Curve

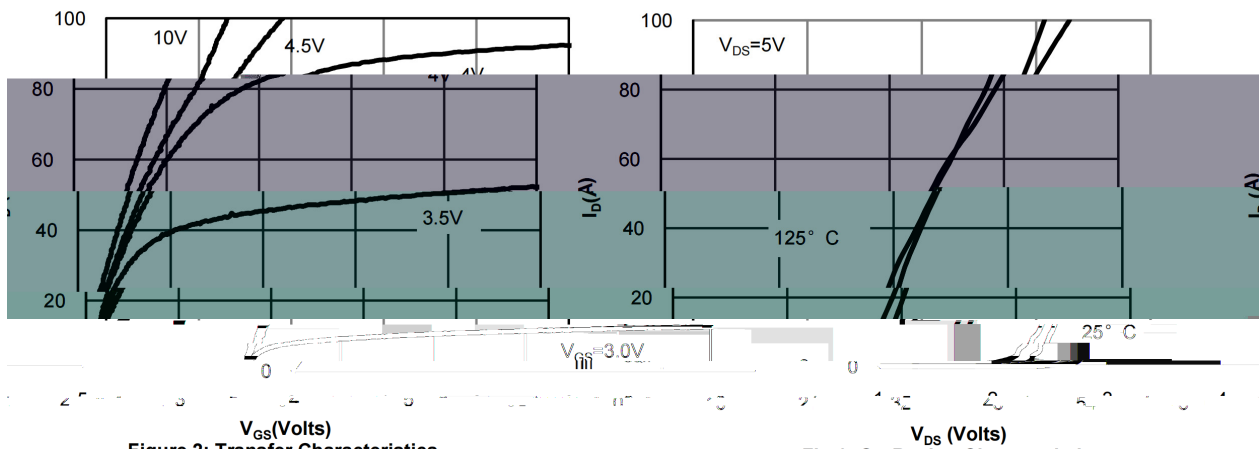


Figure 2: Transfer Characteristics

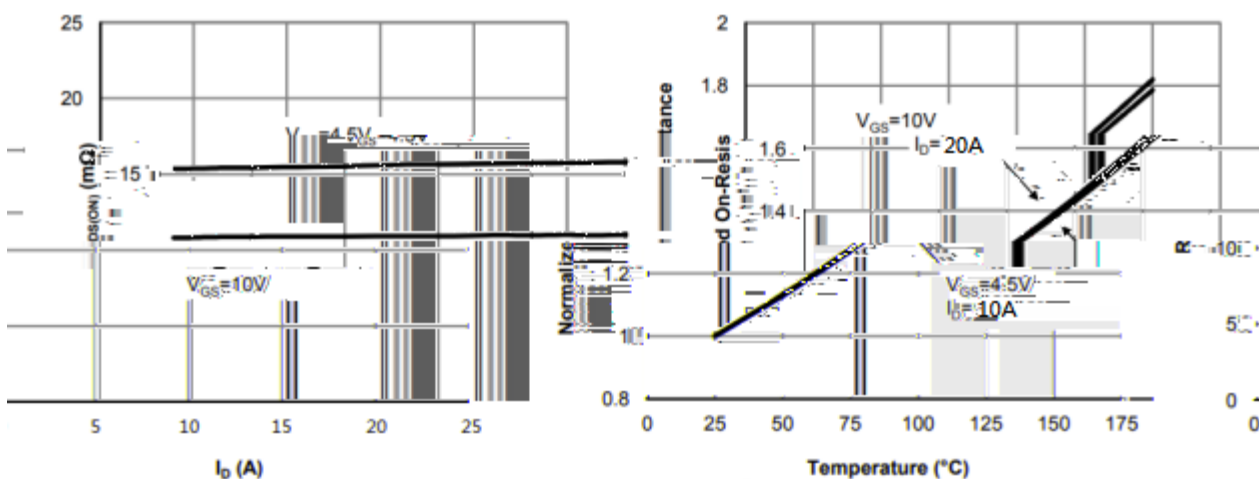


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

Figure 4: On-Resistance vs. Junction Temperature

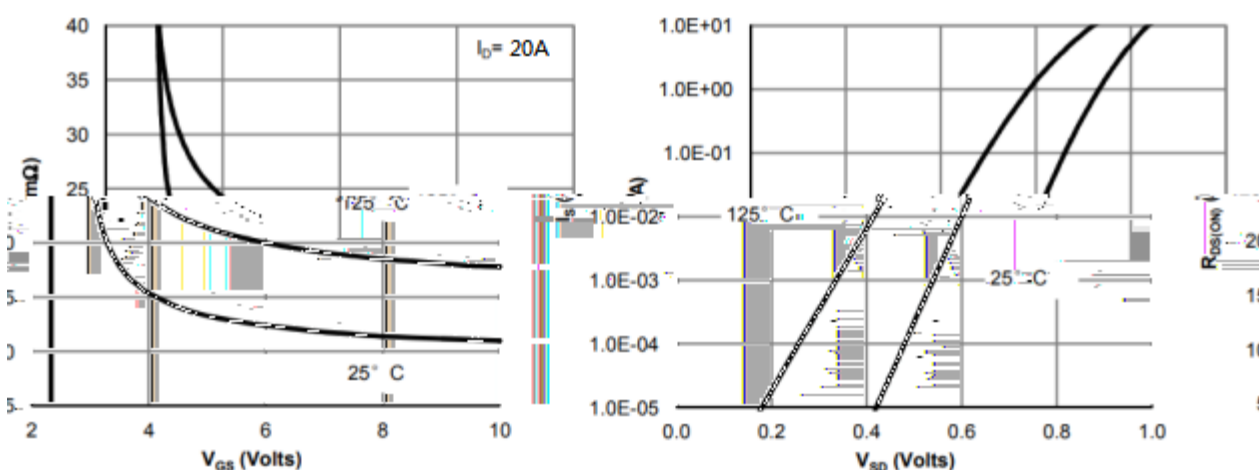


Figure 5: On-Resistance vs. Gate-Source Voltage

Figure 6: Drain-Source Capacitance vs. Drain-Source Voltage

/ Electrical Characteristic Curve

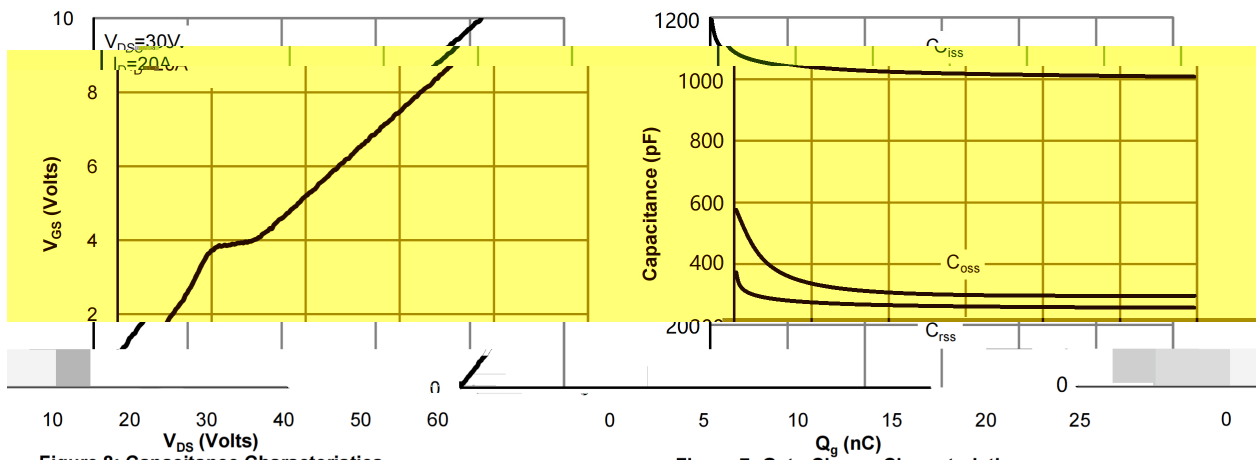


Figure 8: Capacitance Characteristics

Figure 7: Gate-Charge Characteristics

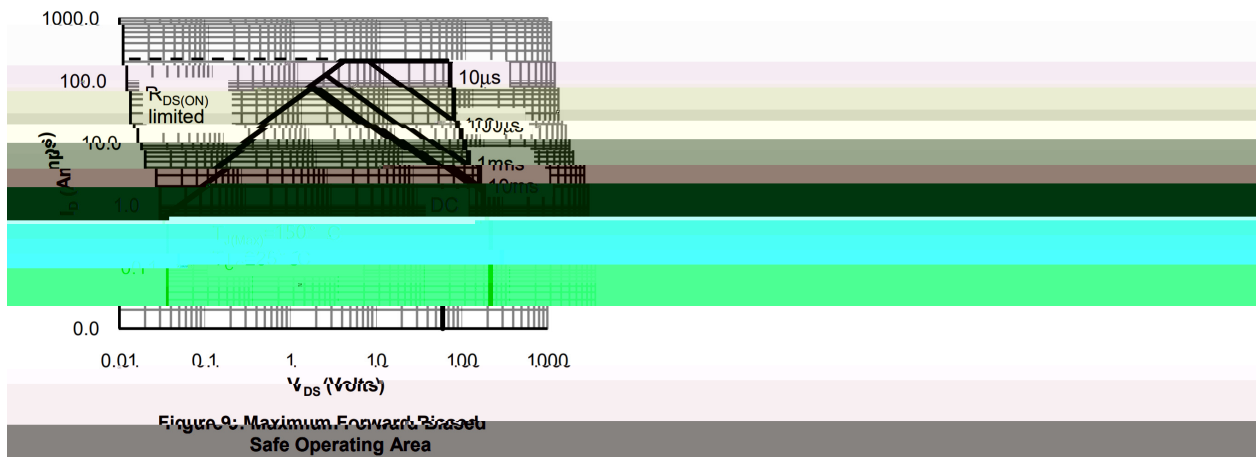
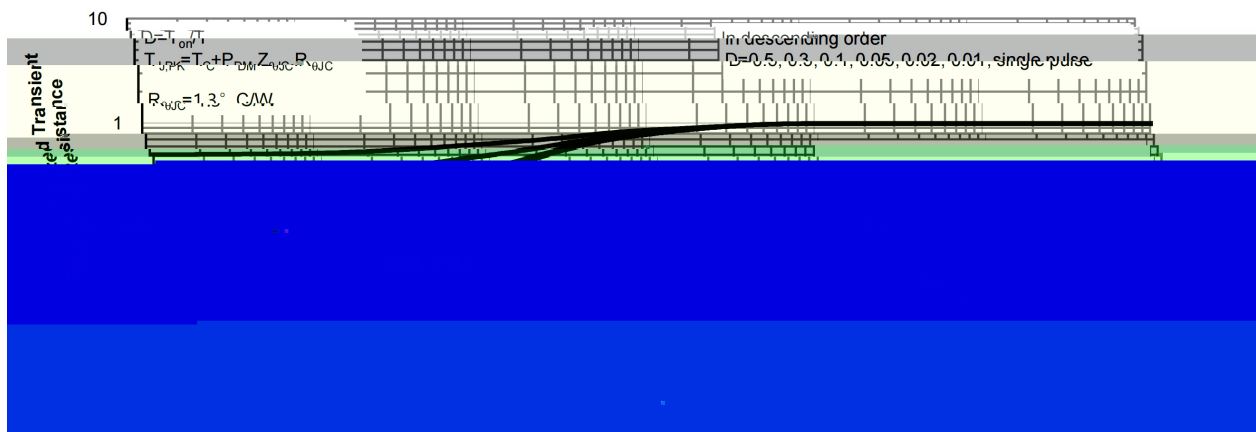
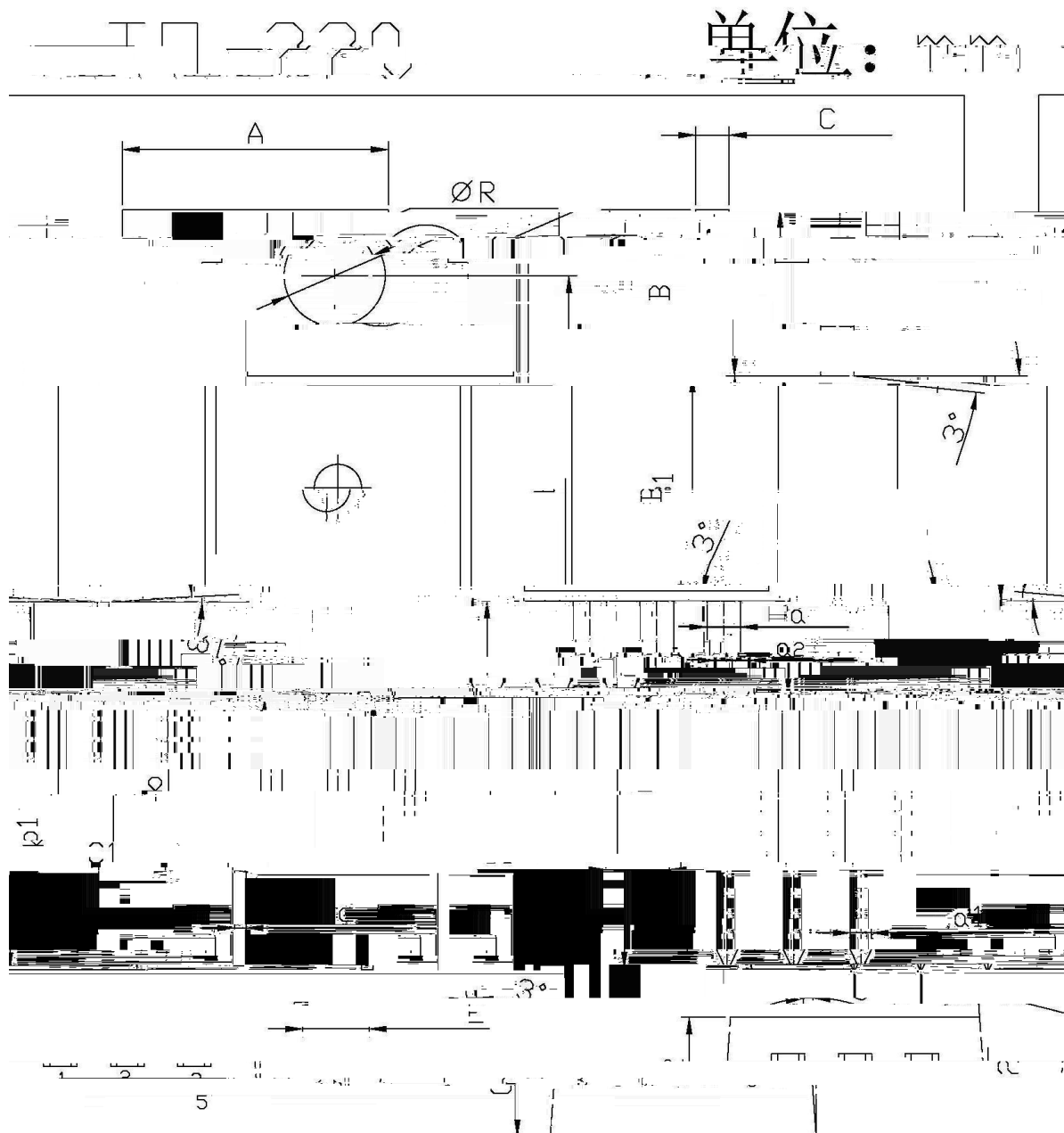


Figure 9: Maximum Forward Bias Safe Operating Area

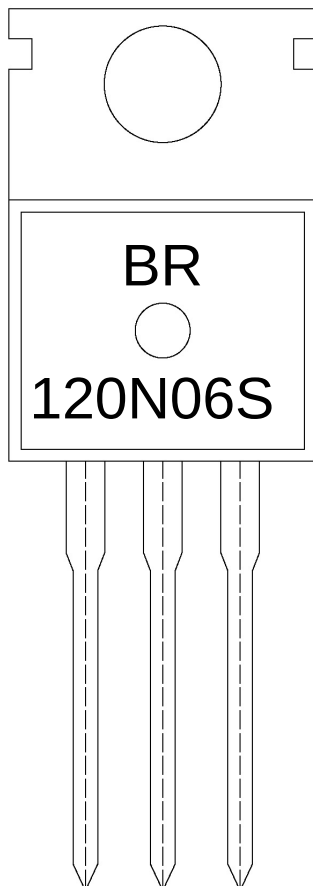


/ Package Dimensions



Symbol		Dimensions In Millimeters		Symbol		Dimensions In Millimeters	
		Min.	Max.			Min.	Max.
	Δ	9.8	10.2		C	1.2	1.4
6.7			R	3.56		3.64	R
							6.3

/ Marking Instructions



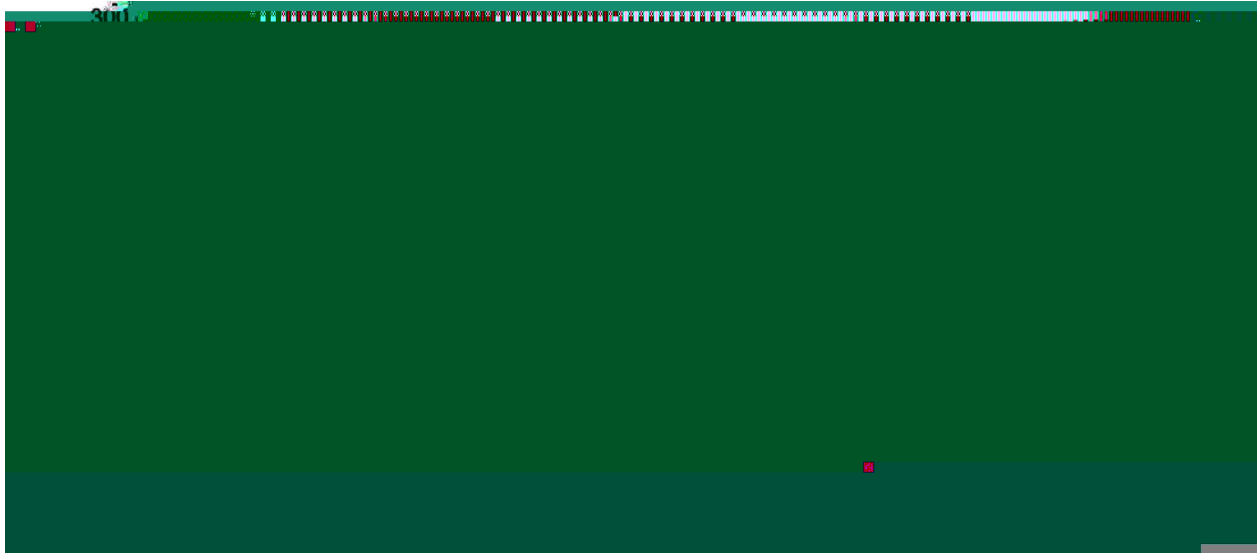
Note:

BR: Company Code

120N06S: Product Type

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

() / Temperature Profile for Dip Soldering(Pb-Free)



Note:

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

/ Resistance to Soldering Heat Test Conditions

270	5	10	1 sec.	Temp.:270±5	Time:10±1 sec
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/ Packaging SPEC.

/ BULK

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm ³)		
	只袋	袋盒	只盒	盒箱	只箱	袋	盒	箱
TO-220/F	200	10	2,000	5	10,000	135×190	237×172×102	560×245×195

/ TUBE

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm ³)		
	只套管	套管盒	只盒	盒箱	只箱	套管	盒	箱
TO-220/F	50	20	1,000	5	5,000	532×31.4×5.5	555×164×50	575×290×180

/ Notices