

描述 / Descriptions

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

特征 / Features

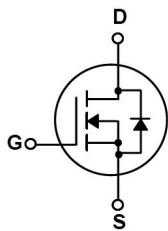
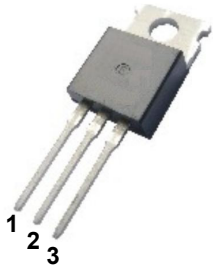
低电阻,开关速度快。

Ultra Low On-Resistance,fast switching.

用途 / Applications

该器件适用于高效电源模块, 主动式 PFC 电路和基于半桥拓扑结构的电子节能灯。

These devices are well suited for high efficient switched mode power supplies, Active power factor correction, electronic lamp ballast based on half bridge topology.

内部等效电路 / Equivalent Circuit**引脚排列 / Pinning**

PIN1 : G

PIN 2 : D

PIN 3 : S

放大及印章代码 / h_{FE} 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-Source Voltage	V_{DSS}	40	V
Drain Current ^G	$I_D(T_C=25^{\circ}C)$	170	A
	$I_D(T_C=100^{\circ}C)$	110	A
Pulsed Drain Current ^C	I_{DM}	1000	A
Gate-Source Voltage	V_{GS}	±20	V
Single Pulsed Avalanche Energy L=0.3mH ^C	E_{AS}	618	mJ
Avalanche Current ^C	I_{AS}	39.3	A
Total Power Dissipation ^B	$P_D(T_C=25^{\circ}C)$	272	W
	$P_D(T_C=100^{\circ}C)$	136	W
Power Dissipation ^B	$P_{DSM}(T_A=25^{\circ}C)$	8.3	W
	$P_{DSM}(T_A=70^{\circ}C)$	5.3	W
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°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
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V$ $I_D=250\mu A$	40			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=40V$ $V_{GS}=0V$			1	μA
		$T_J=125^{\circ}C$			5	μA
Gate-Body Leakage Current Forward	I_{GSS}	$V_{GS}=\pm 20V$ $V_{DS}=0V$			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ $I_D=250\mu A$	1	2.1	3	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V$ $I_D=30A$		1.8	3	mΩ
Forward Transconductance	g_{FS}	$V_{DS}=10V$ $I_D=10A$			60	S
Forward On Voltage	V_{SD}	$V_{GS}=0V$ $I_S=10A$		0.74	1.3	V
Input Capacitance	C_{iss}	$V_{DS}=25V$ $V_{GS}=0V$ $f=1MHz$		8040		pF
Output Capacitance	C_{oss}			622		
Reverse Transfer Capacitance	C_{rss}			473		

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
Gate resistance	R_g	$f=1\text{MHz}$		1.05		Ω
Total Gate Charge	$Q_g(10\text{V})$	$V_{GS}=10\text{V}$ $V_{DS}=20\text{V}$ $I_D=20\text{A}$		128	180	nC
Total Gate Charge	$Q_g(4.5\text{V})$			54	80	
Gate Source Charge	Q_{gs}			29		
Gate Drain Charge	Q_{gd}			11		
Output Charge	Q_{oss}	$V_{GS}=0\text{V}$ $V_{DS}=20\text{V}$		67		nC
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=10\text{V}$ $V_{DS}=20\text{V}$ $R_L=1\Omega$ $R_{GEN}=3\Omega$		16		ns
Turn-On Rise Time	t_r			16		
Turn-Off Delay Time	$t_{d(off)}$			125		
Turn-Off Fall Time	t_f			27		
Body Diode Reverse Recovery Time	t_{rr}	$I_F=20\text{A}$, $di/dt=500\text{A/ms}$		29		ns
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F=20\text{A}$, $di/dt=500\text{A/ms}$		107		nC
Maximum Junction-to-Ambient ^A	$R_{\theta JA}$	$t \leq 10\text{s}$		12	15	$^{\circ}\text{C/W}$
Maximum Junction-to-Ambient ^{AD}		Steady-State		50	60	$^{\circ}\text{C/W}$
Maximum Junction-to-Case	$R_{\theta JC}$	Steady-State		0.42	0.55	$^{\circ}\text{C/W}$

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$. The Power dissipation PDSM is based on $R_{\theta JA}$ $t \leq 10\text{s}$ and the maximum allowed junction temperature of 150°C . The value in any given application depends on the user's specific board design, and the maximum temperature of 150°C may be used if the PCB allows it.

B. The power dissipation PD is based on $T_{J(MAX)}=150^{\circ}\text{C}$, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C. Single pulse width limited by junction temperature $T_{J(MAX)}=150^{\circ}\text{C}$.

D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300ms pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}=150^{\circ}\text{C}$. The SOA curve provides a single pulse rating.

G. The maximum current rating is package limited.

H. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$.

电参数曲线图 / Electrical Characteristic Curve

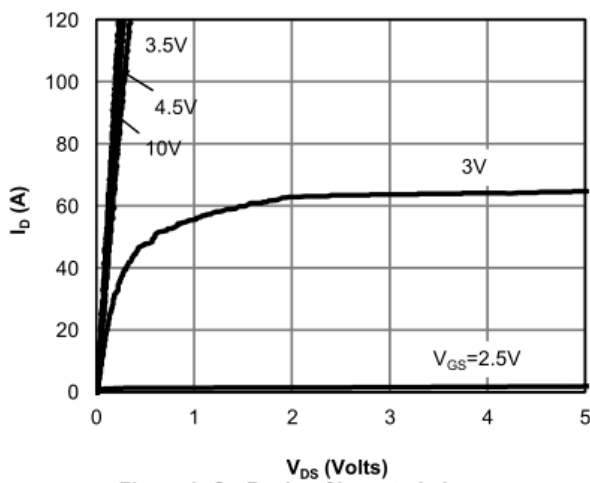


Figure 1: On-Region Characteristics

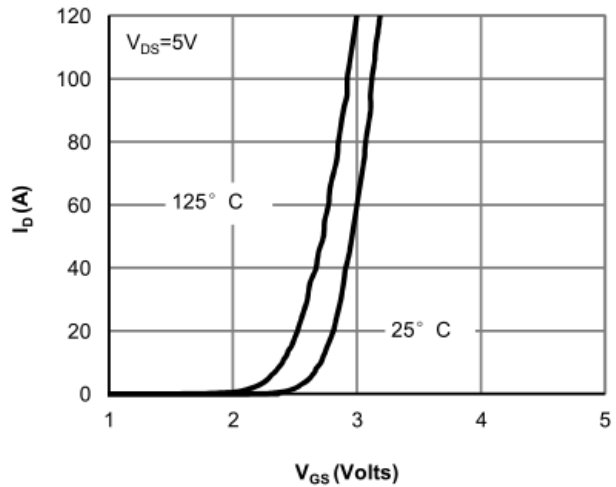


Figure 2: Transfer Characteristics

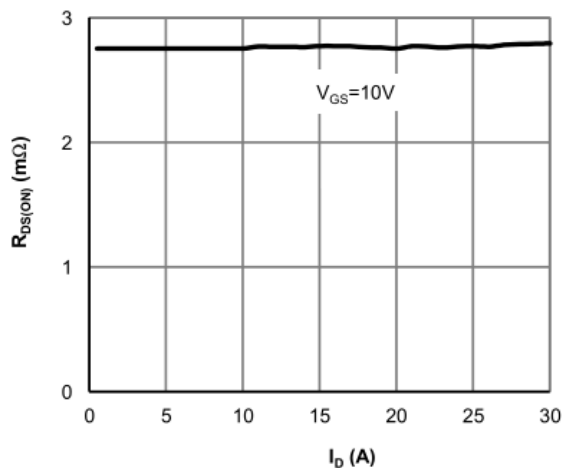


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

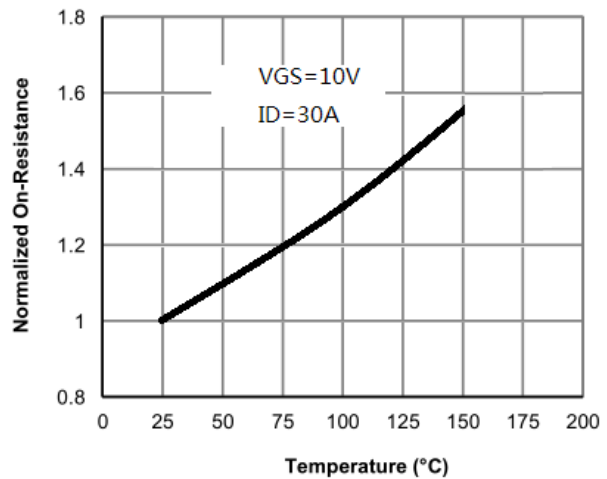


Figure 4: On-Resistance vs. Junction Temperature

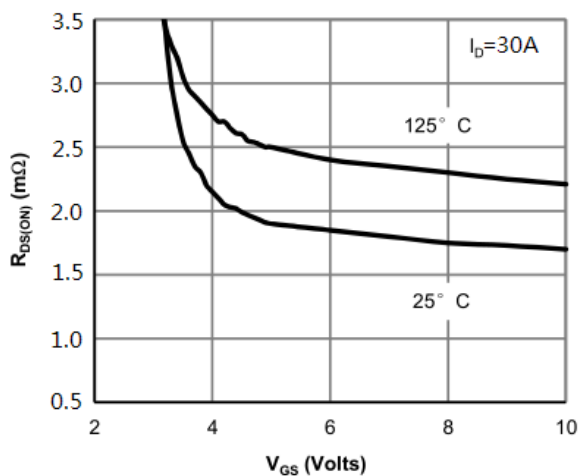


Figure 5: On-Resistance vs. Gate-Source Voltage

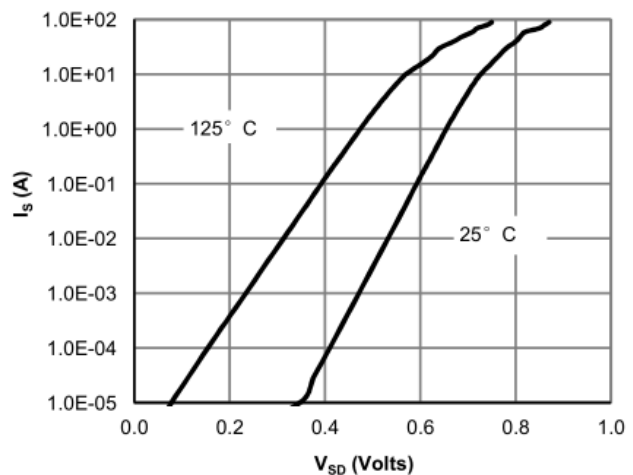
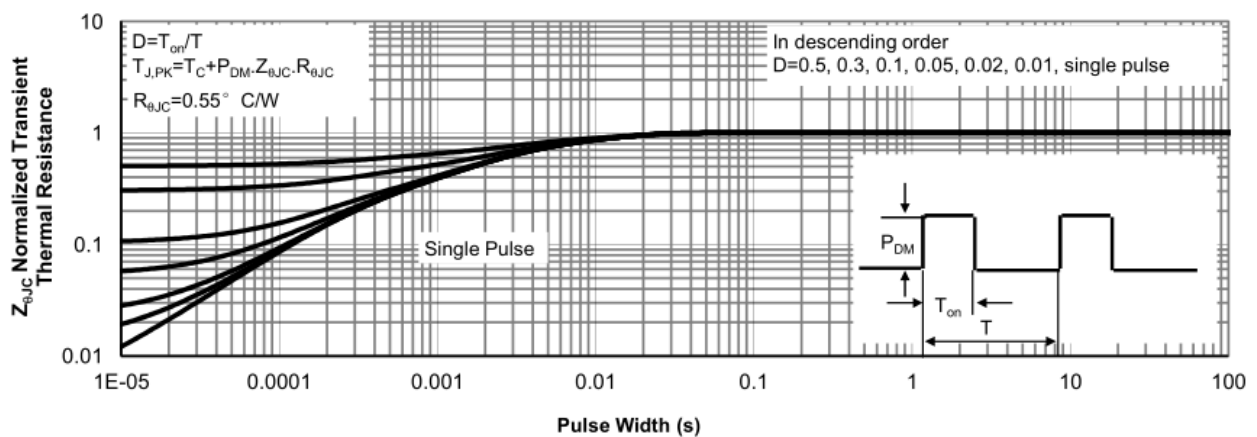
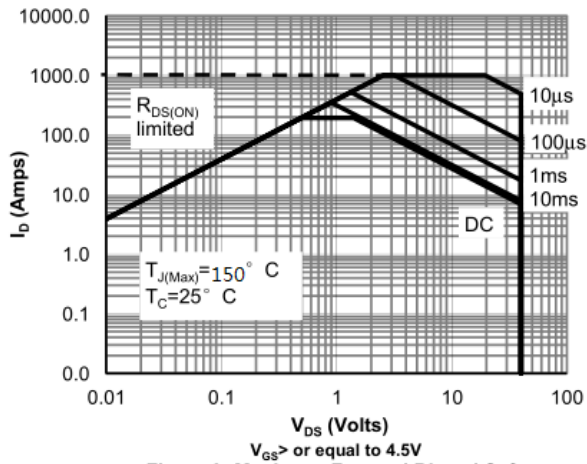
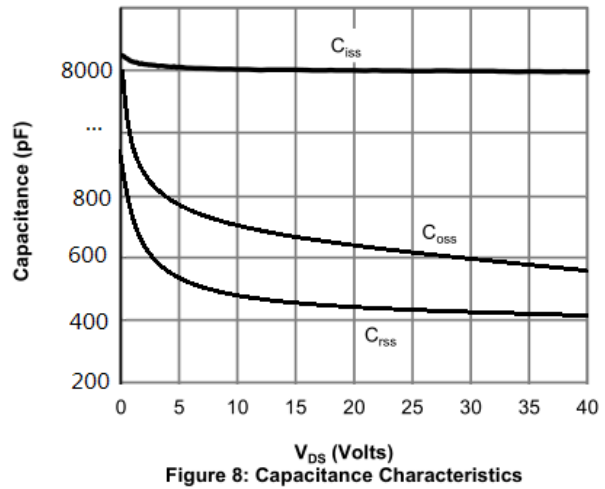
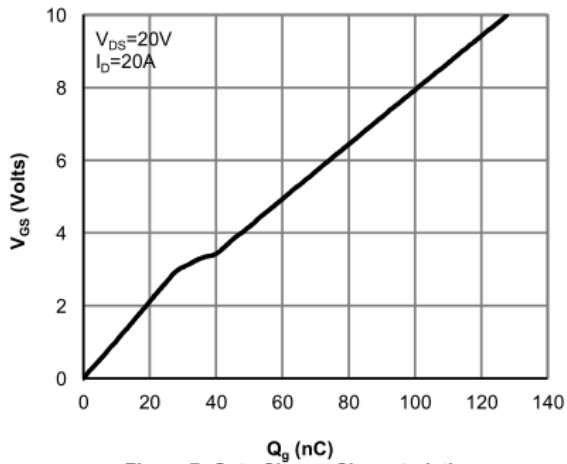


Figure 6: Body-Diode Characteristics

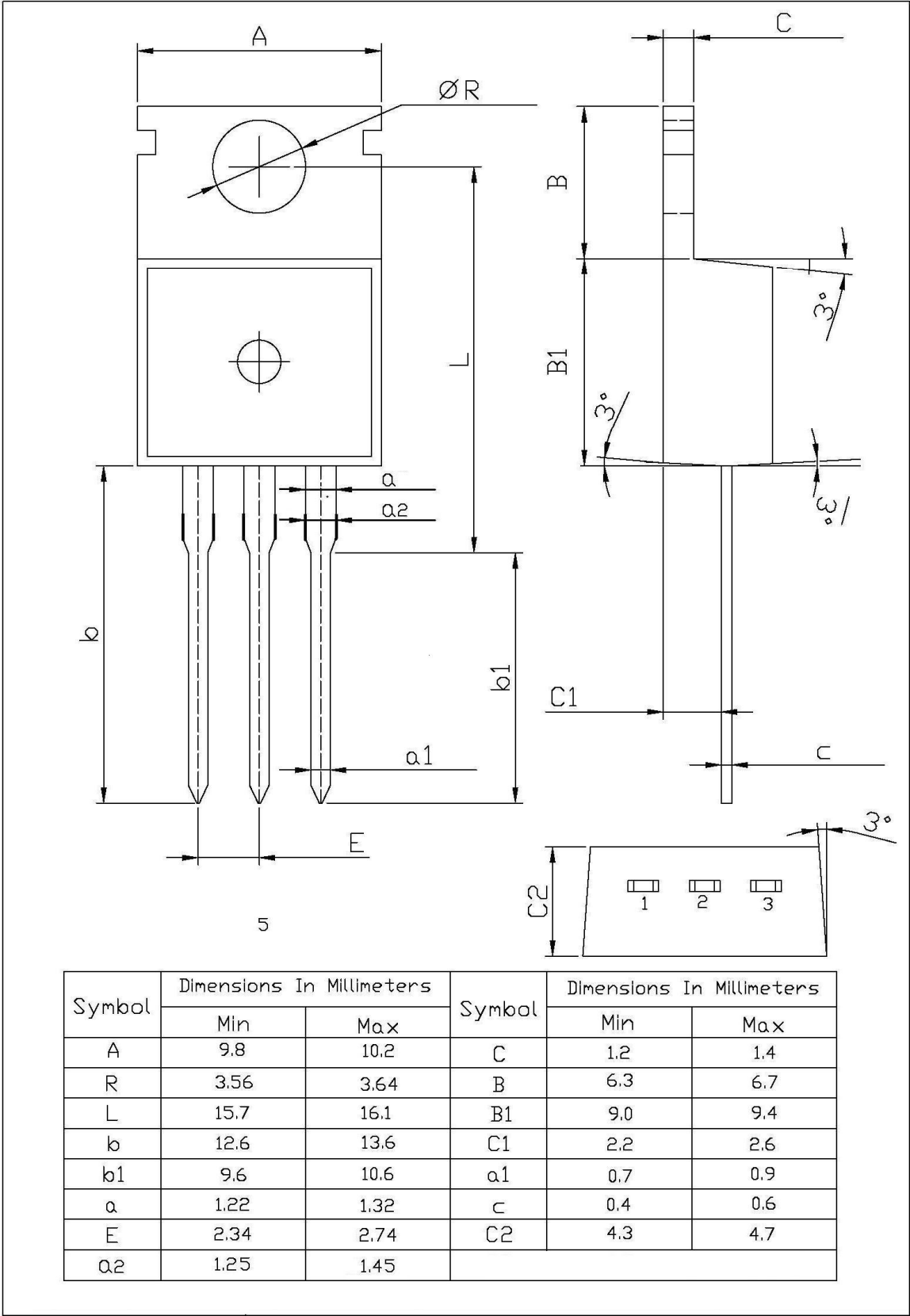
电参数曲线图 / Electrical Characteristic Curve



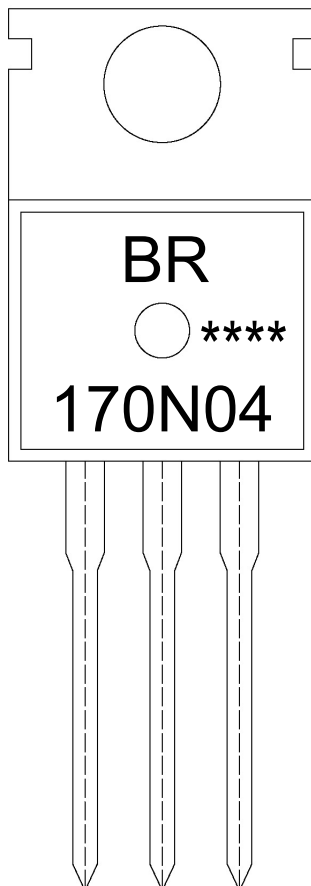
外形尺寸图 / Package Dimensions

T□-220

单位: mm



印章说明 / Marking Instructions



说明：

BR： 为公司代码

170N04： 为型号代码

****： 为生产批号代码，随生产批号变化。

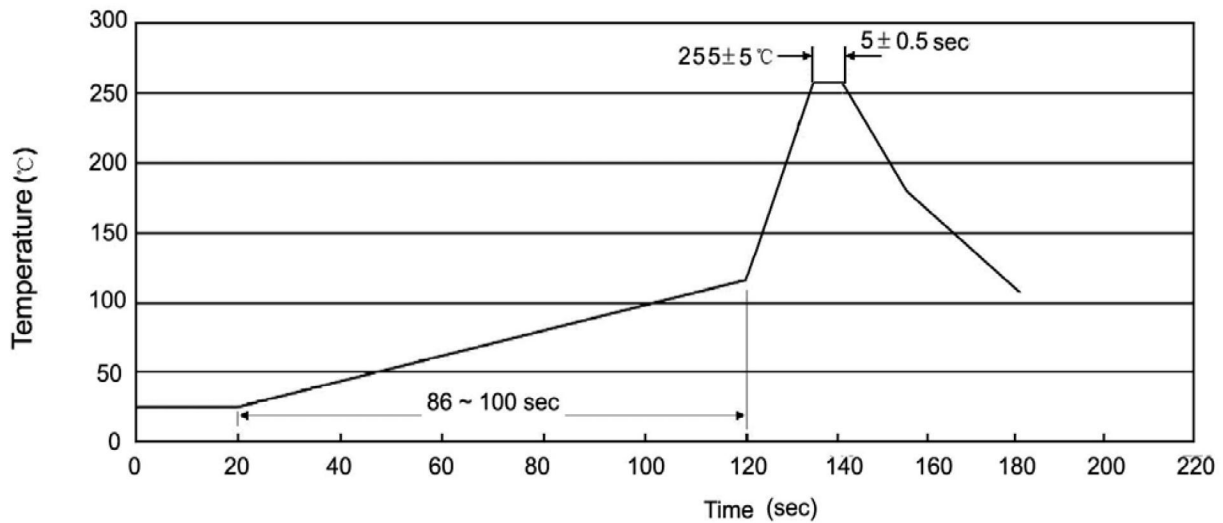
Note:

BR: Company Code

170N04: 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 ³)		
	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 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-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