

描述 / Descriptions

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

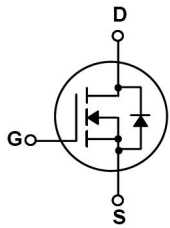
特征 / Features

低栅电荷，低反馈电容，开关速度快，具有良好的电磁干扰性能。
Low gate charge, low crss, fast switching, Have good Electromagnetic Interference performance.

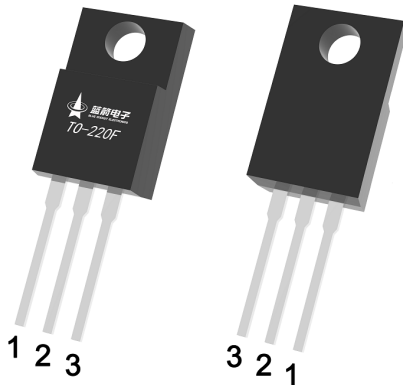
用途 / Applications

用于高功率 DC/DC 转换和功率开关。
These devices are well suited for high efficiency switching DC/DC converters and switch mode power supplies.

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.

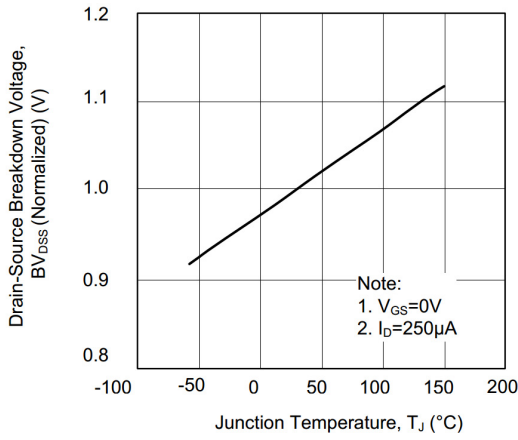
极限参数 / Absolute Maximum Ratings(Ta=25°C)

参数 Parameter	符号 Symbol	数值 Rating	单位 Unit
Drain-Source Voltage	V_{DS}	650	V
Drain Current	$I_D(T_c=25^\circ\text{C})$	4.0	A
Drain Current - Pulsed	I_{DM}	16	A
Gate-Source Voltage	V_{GS}	± 30	V
Single Pulsed Avalanche Energy	E_{AS}	160	mJ
Avalanche Current	I_{AR}	6.0	A
Power Dissipation	$P_D(T_c=25^\circ\text{C})$	30	W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$
Junction to Ambient	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Junction to Case	$R_{\theta JC}$	4.2	$^\circ\text{C/W}$

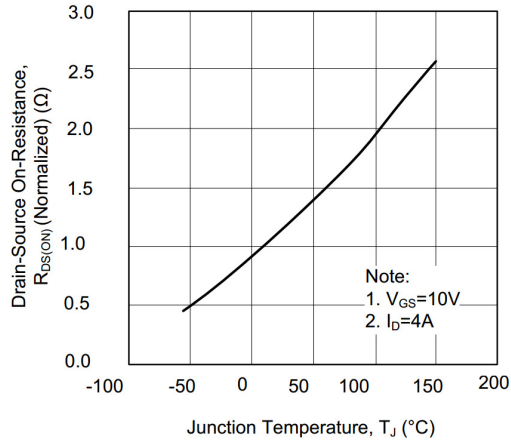
电性能参数 / Electrical Characteristics(Ta=25°C)

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}	$V_{GS}=0V$ $I_D=250\mu A$	650	680		V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=650V$ $V_{GS}=0V$			1	μA
Gate-Body Leakage Current Forward	I_{GSS}	$V_{GS}=\pm 30V$ $V_{DS}=0V$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ $I_D=250\mu A$	2.0	3.3	4.0	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V$ $I_D=2.0A$		2.2	2.7	Ω
Input Capacitance	C_{iss}	$V_{DS}=25V$ $V_{GS}=0V$ $f=1.0MHz$		570		pF
Output Capacitance	C_{oss}			44		
Reverse Transfer Capacitance	C_{rss}			3		
Total Gate Charge	Q_G	$V_{DS}=520V,$ $I_D=4.0A,$ $V_{GS}=10V$		102		nC
Gate-Source Charge	Q_{GS}			18		
Gate-Drain Charge	Q_{GD}			22		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=325V$ $I_D=4.0A$ $R_G=25\Omega$ $V_{GS}=10V$		48		ns
Turn-On Rise Time	t_r			102		
Turn-Off Delay Time	$t_{d(off)}$			205		
Turn-Off Fall Time	t_f			134		
Drain-Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V,$ $I_S=4.0A$			1.4	V

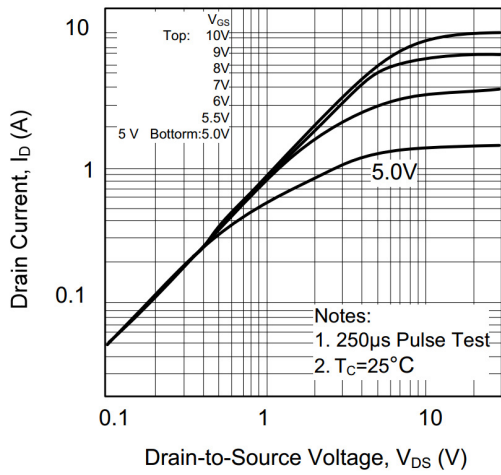
电参数曲线图 / Electrical Characteristic Curve



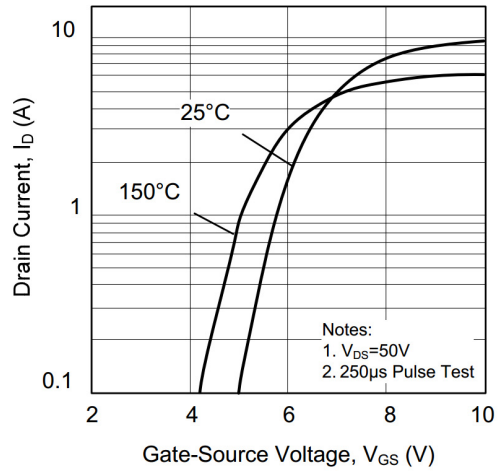
1. Breakdown Voltage Variation vs. Temperature



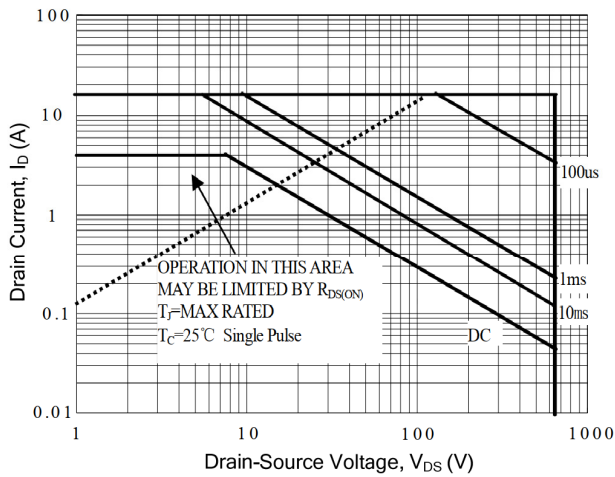
2. On-Resistance Junction Temperature



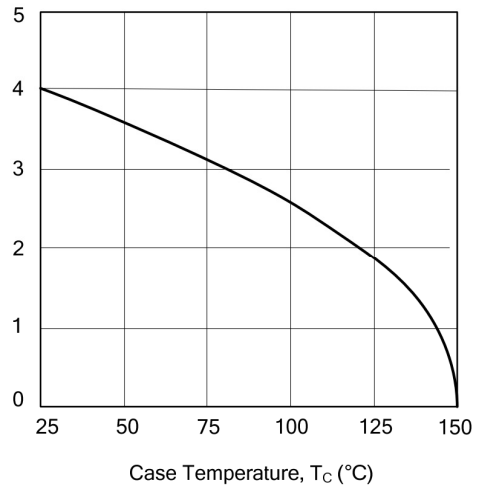
3. On-State Characteristics



4. Transfer Characteristics



5. Safe Operating Area



6. Maximum Drain Current vs. Case Temperature

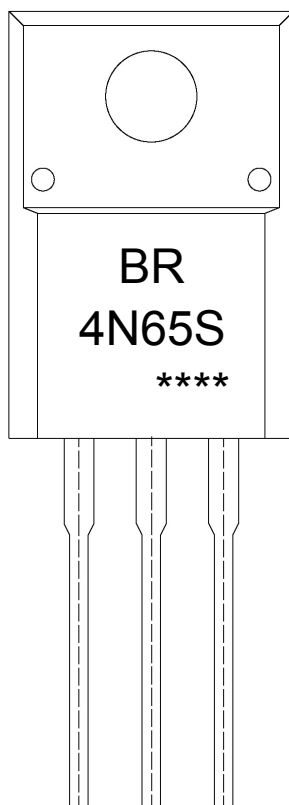
外形尺寸图 / Package Dimensions

TO-220F

单位: mm



印章说明 / Marking Instructions



说明：

BR： 为公司代码

4N65S： 为型号代码

****： 为生产批号代码，随生产批号变化

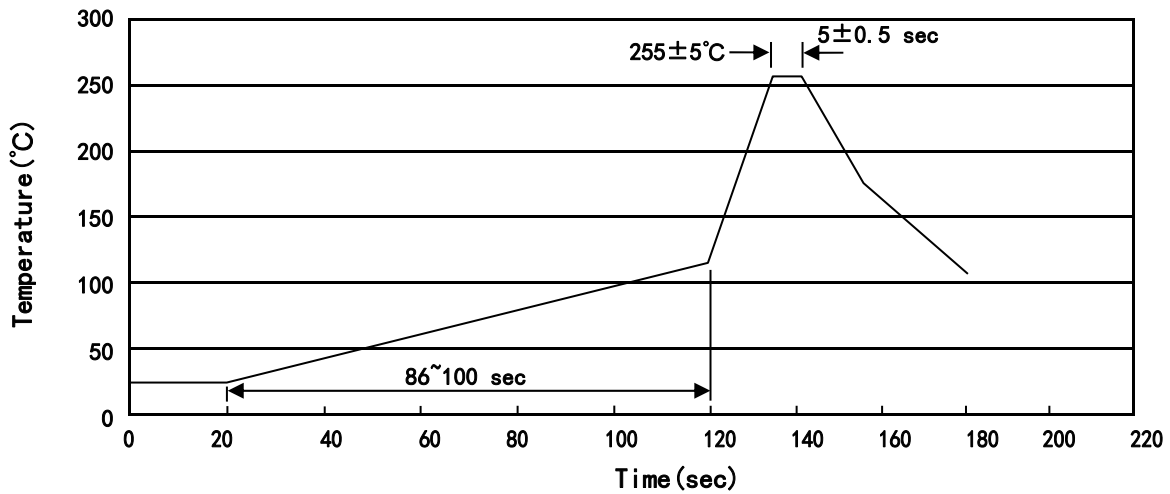
Note:

BR: Company Code

4N65S: Product Type Code

****: 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