

描述 / Descriptions

P 沟道 TO-251 塑封封装场效应管。
P-CHANNEL MOSFET in a TO-251 Plastic Package.

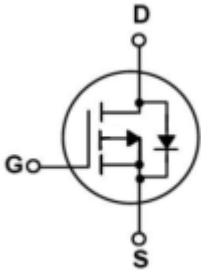
特征 / Features

大电流输出能力。无卤产品。
High Current Capability. HF Product.

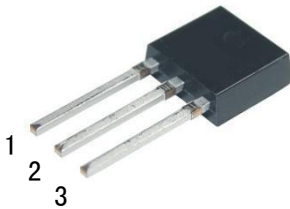
用途 / Applications

交流负载开关, 蓄电池充电/放电保护。
AC-in load switch, Battery protection charge/discharge.

内部等效电路 / Equivalent Circuit



引脚排列 / Pinning



PIN 1 : 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}	-60	V
Drain Current	$I_D(T_c=25^\circ C)$	-20	A
Drain Current - Pulsed	I_{DM}	-80	A
Gate-Source Voltage	V_{GS}	± 20	V
Avalanche Current	I_{AS}	13.8	A
Avalanche energy L=0.5mH	E_{AS}	65	mJ
Power Dissipation	$P_D(T_c=25^\circ C)$	20	W
	$P_D(T_c=100^\circ C)$	10	W
Junction and Storage Temperature Range	T_j, T_{stg}	-55~150	$^\circ C$
Maximum Junction-to-Ambient	$t \leq 10s$	30	$^\circ C/W$
Maximum Junction-to-Ambient	Steady-State		
Maximum Junction-to-Case	Steady-State	7.5	

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}	$V_{GS}=0V$ $I_D=-250\mu A$	-60	-70		V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-60V$ $V_{GS}=0V$			-1.0	μA
		$V_{DS}=-60V$ $V_{GS}=0V$ $T_J=55^\circ C$			-5.0	μA
Gate-Body Leakage Current Forward	I_{GSS}	$V_{GS}=\pm 20V$ $V_{DS}=0V$			± 0.1	μA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ $I_D=250\mu A$	-1	-1.7	-2.5	V
Static Drain-Source On-Resistance	$R_{DS(on)1}$	$V_{GS}=-10V$ $I_D=-20A$		87	92	m Ω
	$R_{DS(on)2}$	$V_{GS}=-4.5V$ $I_D=-10A$		98	102	m Ω
Diode Forward Voltage	V_{SD}	$I_S=-1A$ $V_{GS}=0V$		-0.7	-1.2	V

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
Input Capacitance	C_{iss}	$V_{DS}=-25V$ $V_{GS}=0V$ $f=1.0MHz$		1650		pF
Output Capacitance	C_{oss}			330		
Reverse Transfer Capacitance	C_{rss}			205		
Gate resistance	R_g	$V_{GS}=0V$ $V_{DS}=0V$ $f=1MHz$		6.4		Ω
Total Gate Charge	$Q_g(10V)$	$V_{GS}=-10V$ $V_{DS}=-30V$ $I_D=-12A$		7.5		nC
Total Gate Charge	$Q_g(4.5V)$			3.8		
Gate Source Charge	Q_{gs}			1.2		
Gate Drain Charge	Q_{gd}			1.9		
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=-10V$ $V_{DS}=-30V$ $R_L=2.5\Omega$ $R_{GEN}=3\Omega$		4.2		ns
Turn-On Rise Time	t_r			3.4		
Turn-Off Delay Time	$t_{d(off)}$			16		
Turn-Off Fall Time	t_f			2		
Body Diode Reverse Recovery Time	t_{rr}	$I_F=-12A$ $di/dt=500A/ms$		27		ns
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F=-12A$ $di/dt=500A/ms$		30		nC

电参数曲线图 / Electrical Characteristic Curve

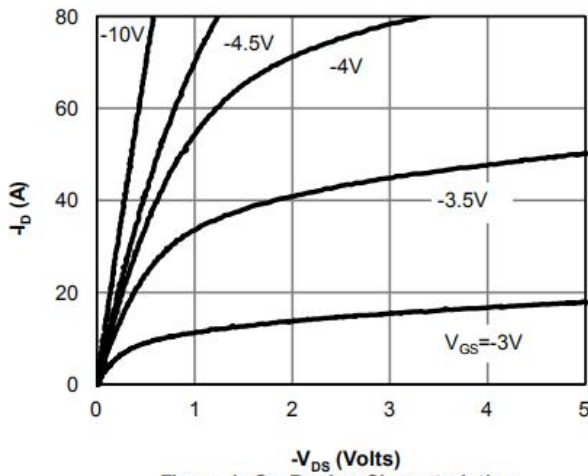


Figure 1: On-Region Characteristics

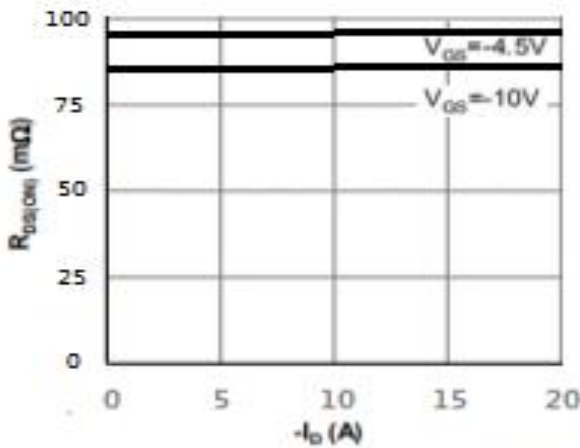
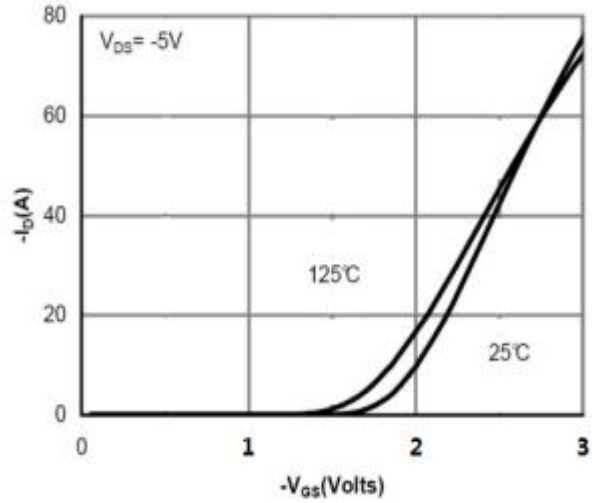


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

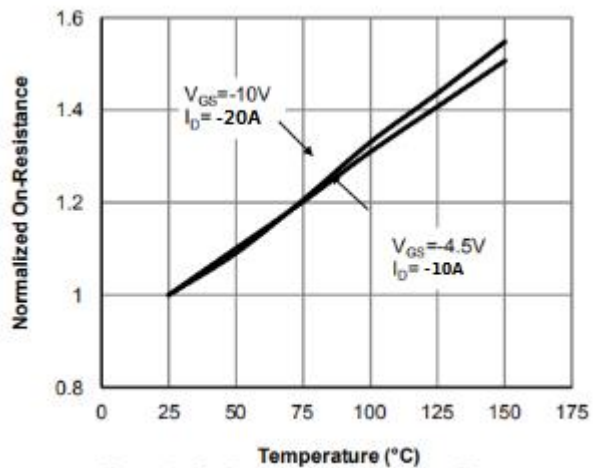


Figure 4: On-Resistance vs. Junction Temperature

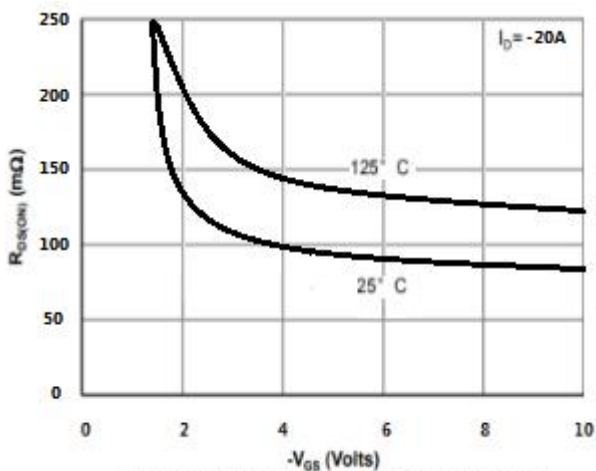


Figure 5: On-Resistance vs. Gate-Source Voltage

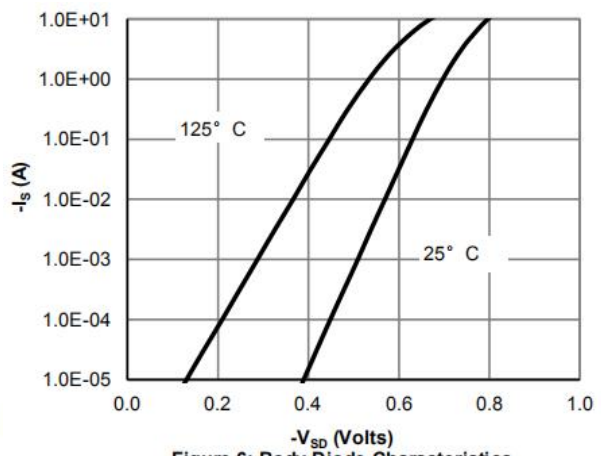


Figure 6: Body-Diode Characteristics

电参数曲线图 / Electrical Characteristic Curve

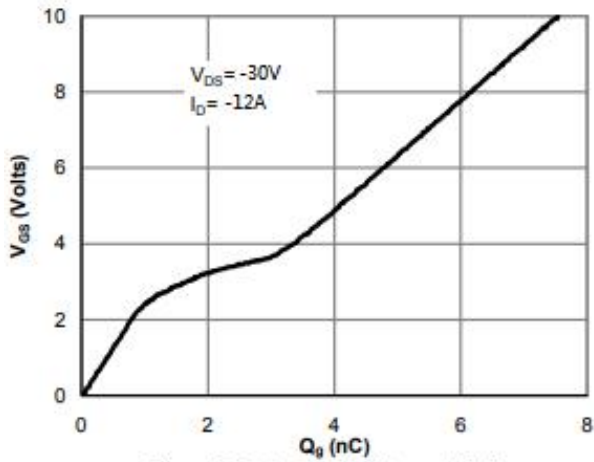


Figure 7: Gate-Charge Characteristics

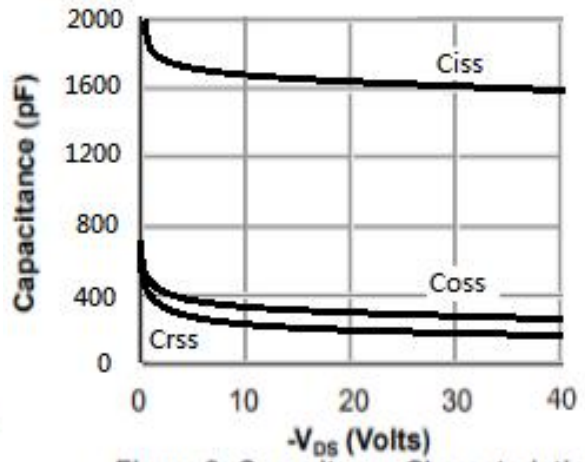


Figure 8: Capacitance Characteristics

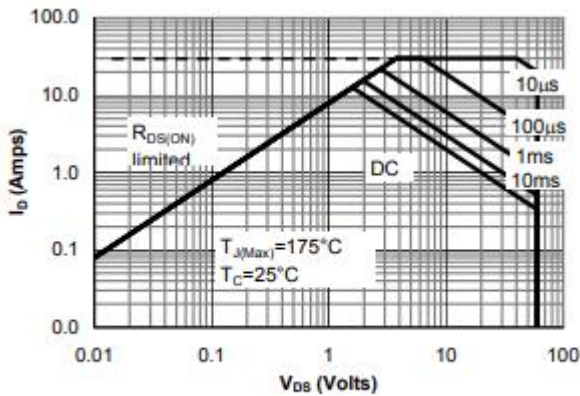


Figure 9: Maximum Forward Biased Safe Operating Area

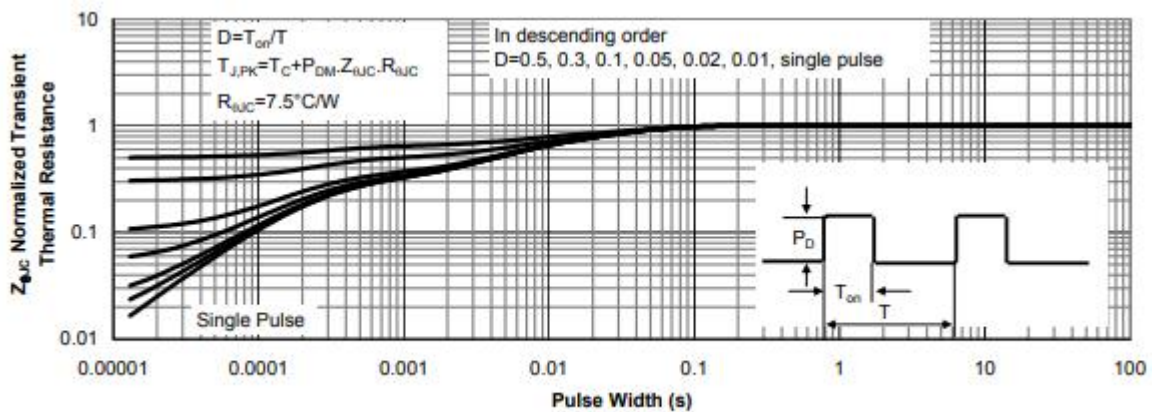
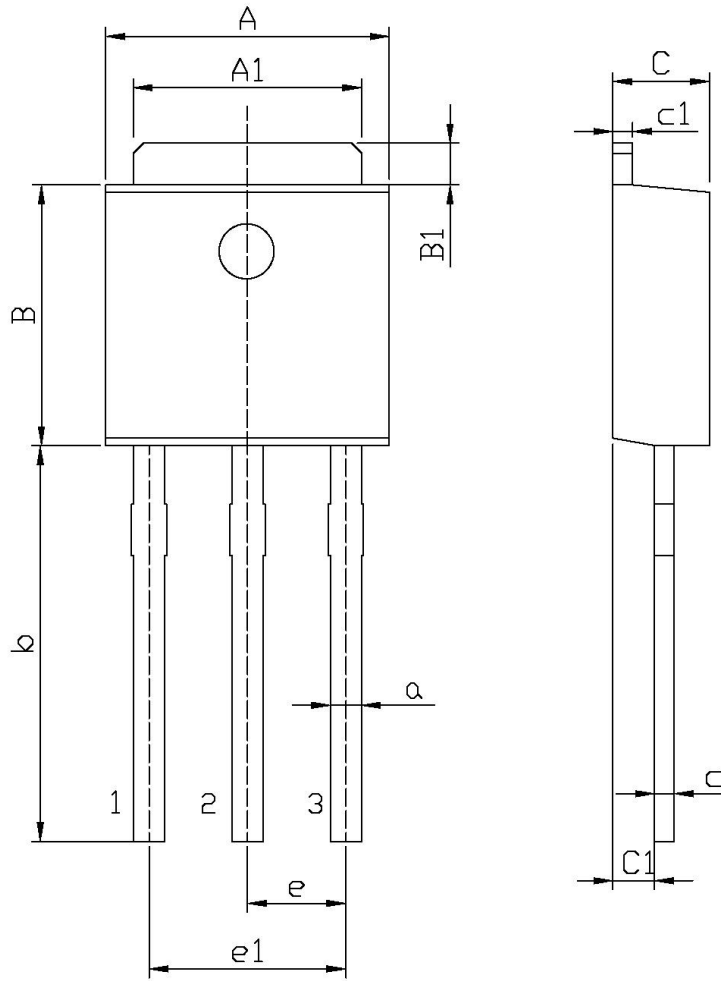


Figure 10 : Normalized Maximum Transient Thermal Impedance

外形尺寸图 / Package Dimensions

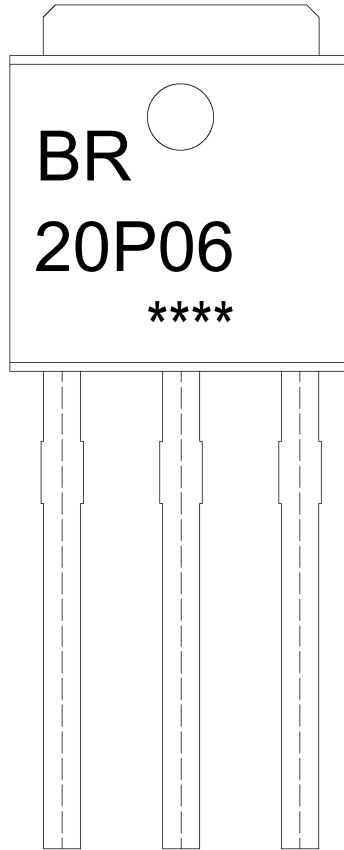


单位: mm

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	6.45	6.75	a	0.50	0.70
A1	5.10	5.50	b	9.00	9.40
B	5.95	6.25	c	0.45	0.55
B1	0.95	1.25	c1	0.45	0.55
C	2.20	2.40	e	2.24	2.34
C1	0.95	1.15	e1	4.43	4.73

TO-251

印章说明 / Marking Instructions



说明：

BR： 为公司代码

20P06： 为型号代码

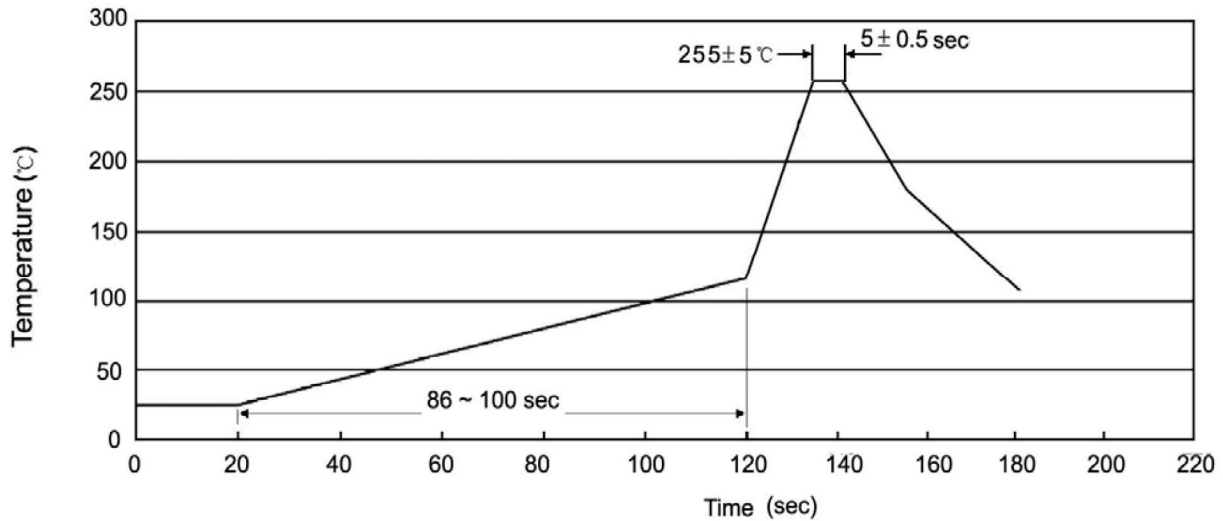
****： 为生产批号代码，随生产批号变化。

Note:

BR: Company Code

20P06: 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-251	1,000	10	10,000	5	50,000	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-251/252	75	48	3,600	5	18,000	526×20.5×5.25	555×164×50	575×290×180

使用说明 / Notices