

描述 / Descriptions

N 沟道 TO-252 塑封封装场效应管。N-CHANNEL MOSFET in a TO-252 Plastic Package.

特征 / Features

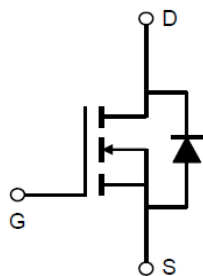
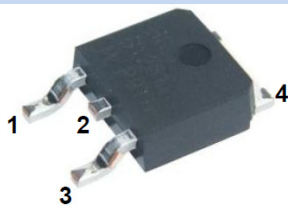
RDS(on) 小, 门电荷低, Crss 小, 开关速度快。无卤产品。

Low RDS(on), low gate charge, low Crss, fast switching. HF Product.

用途 / Applications

用于低压电路如: 汽车电路、DC/DC 转换、便携式产品的电源高效转换、TV/Monitor 电源板卡。

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

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

PIN1 : G

PIN 2 : D

PIN 3 : S

PIN 4 : D

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_{DS}	150	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C=25^\circ\text{C}$	I_D	20	A
	$T_C=100^\circ\text{C}$		13.5	
Pulsed Drain Current ^C		I_{DM}	35	
Avalanche Current ^C		I_{AS}	14.5	A
Avalanche energy $L=0.1\text{mH}$ ^C		E_{AS}	12.5	mJ
Power Dissipation ^B	$T_C=25^\circ\text{C}$	P_D	105	W
	$T_C=100^\circ\text{C}$		41.5	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^\circ\text{C}$
Maximum Junction-to-Ambient ^A	$t \leq 10\text{s}$	$R_{\theta JA}$	20	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^{AD}	Steady-State		50	$^\circ\text{C/W}$
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	1.4	$^\circ\text{C/W}$

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}	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	150	156		V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=150\text{V}, V_{GS}=0\text{V}$			1	μA
		$T_J=125^\circ\text{C}$			5	
Gate-Body leakage current	I_{GSS}	$V_{DS}=0\text{V}, V_{GS}=\pm 20\text{V}$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	2		4	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10\text{V}, I_D=10\text{A}$		59	90	$\text{m}\Omega$
		$V_{GS}=7\text{V}, I_D=10\text{A}$		62	110	
Diode Forward Voltage	V_{SD}	$I_S=1\text{A}, V_{GS}=0\text{V}$			1	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}	$V_{GS}=0V, V_{DS}=25V, f=1MHz$		1700		pF
Output Capacitance	C_{oss}			4.5		
Reverse Transfer Capacitance	C_{rss}			58		
Gate resistance	R_g	$V_{GS}=0V, V_{DS}=0V, f=1MHz$		3.4		Ω
Total Gate Charge	$Q_g(10V)$	$V_{GS}=10V, V_{DS}=75V, I_D=10A$		15.5	22	nC
Total Gate Charge	$Q_g(4.5V)$			7	10	
Gate Source Charge	Q_{gs}			4		
Gate Drain Charge	Q_{gd}			1.2		
Turn-On Delay Time	$t_{D(on)}$	$V_{GS}=10V, V_{DS}=75V, R_L=7.5\Omega, R_{GEN}=3\Omega$		6.5		ns
Turn-On Rise Time	t_r			5		
Turn-Off Delay Time	$t_{D(off)}$			23		
Turn-Off Fall Time	t_f			2.5		
Body Diode Reverse Recovery Time	t_{rr}	$I_F=10A, dI/dt=500A/ms$		37		ns
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F=10A, dI/dt=500A/ms$		265		nC

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 $T_A=25^\circ C$. The

Power dissipation PDSM is based on $R_{\theta JA}$ and the maximum allowed junction temperature of $150^\circ C$. The value in any given application depends on the user's specific board design, and the maximum temperature of $150^\circ C$ may be used if the PCB allows it.

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

C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^\circ C$. Ratings are based on low frequency and duty cycles to keep initial $T_J=25^\circ C$.

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

电参数曲线图 / Electrical Characteristic Curve

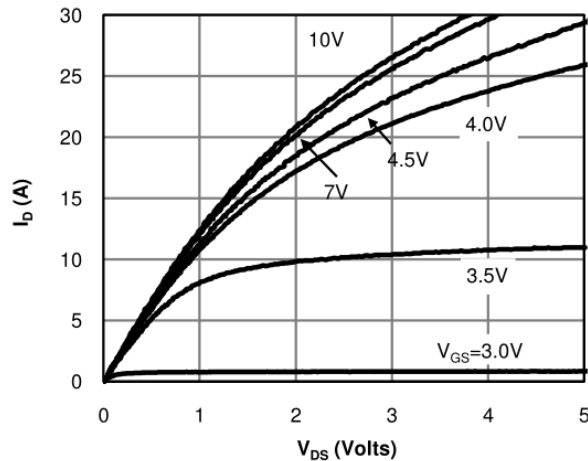


Fig 1: On-Region Characteristics

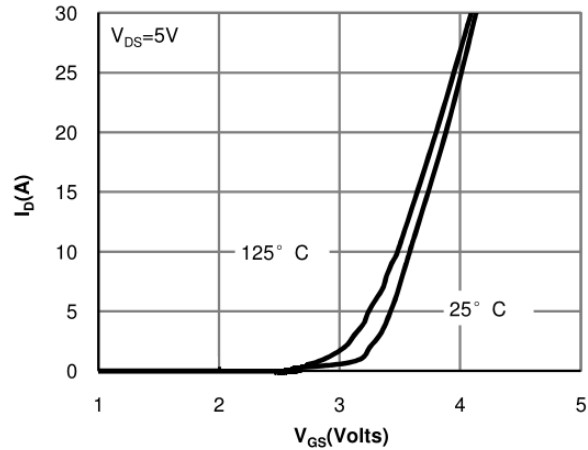


Figure 2: Transfer Characteristics

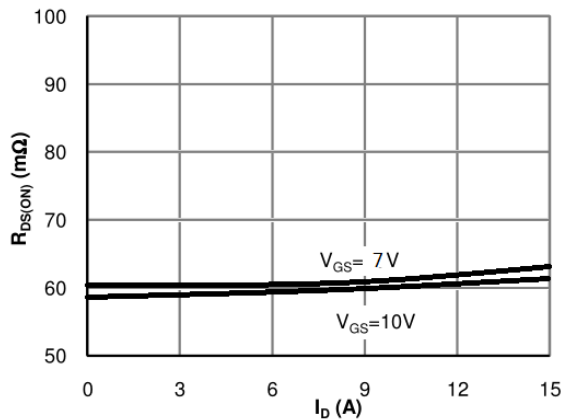


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

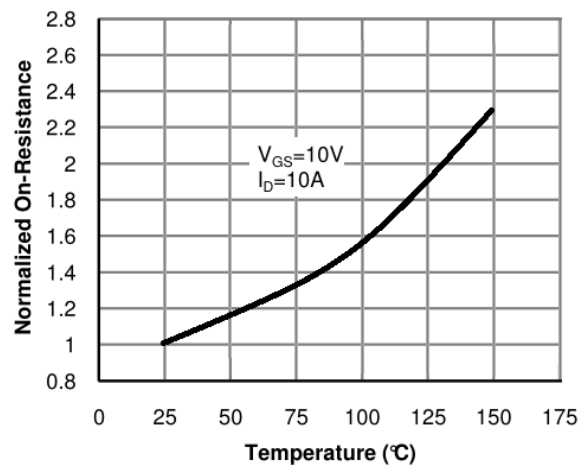


Figure 4: On-Resistance vs. Junction Temperature

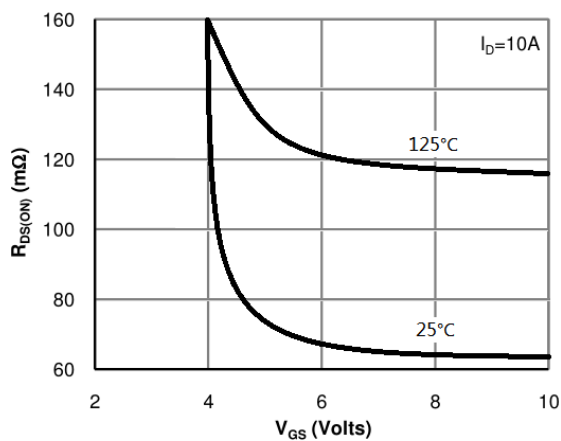


Figure 5: On-Resistance vs. Gate-Source Voltage

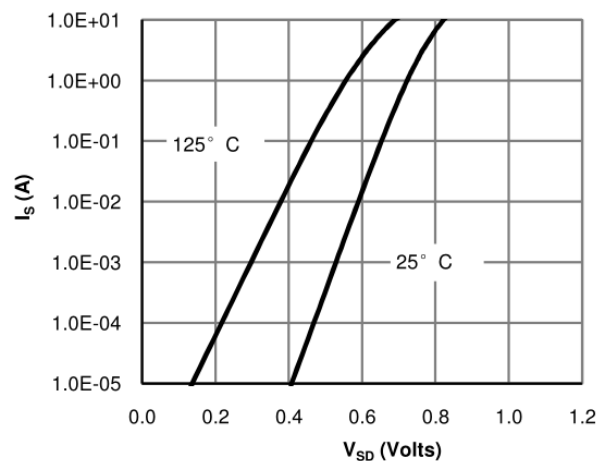
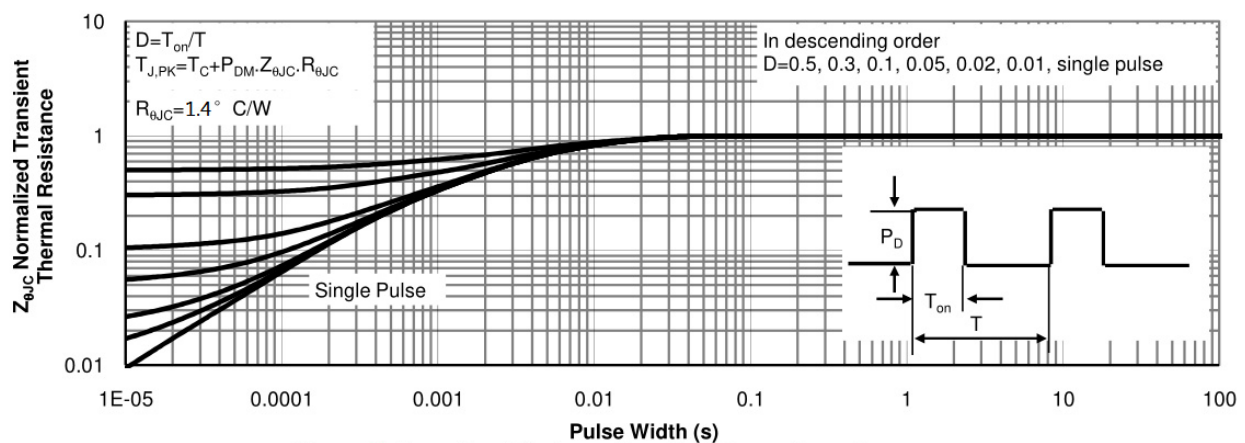
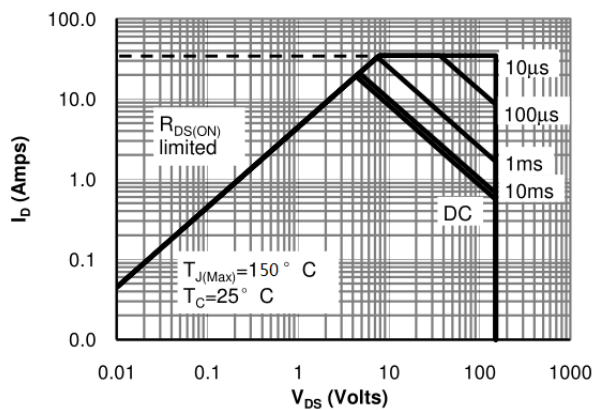
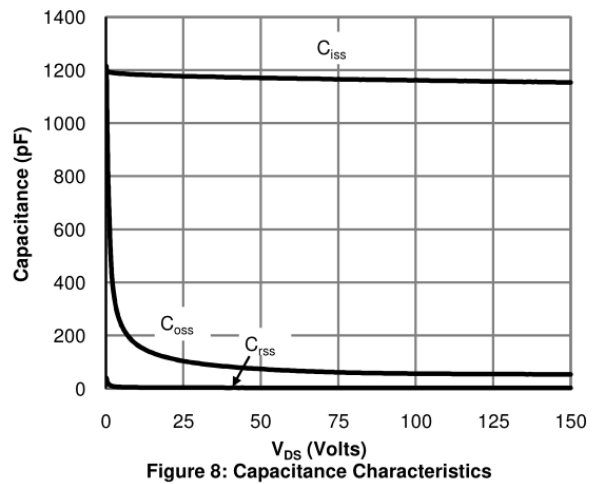
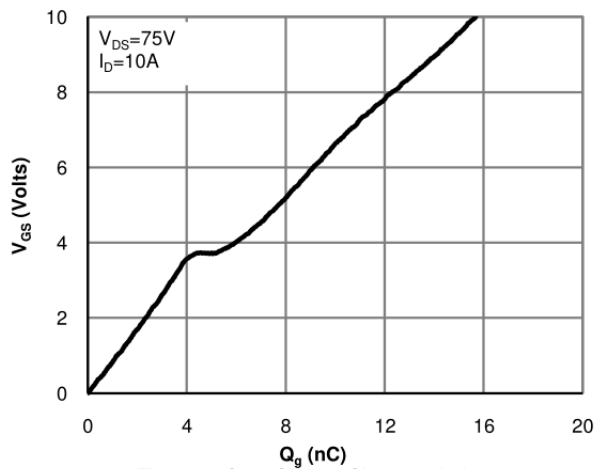
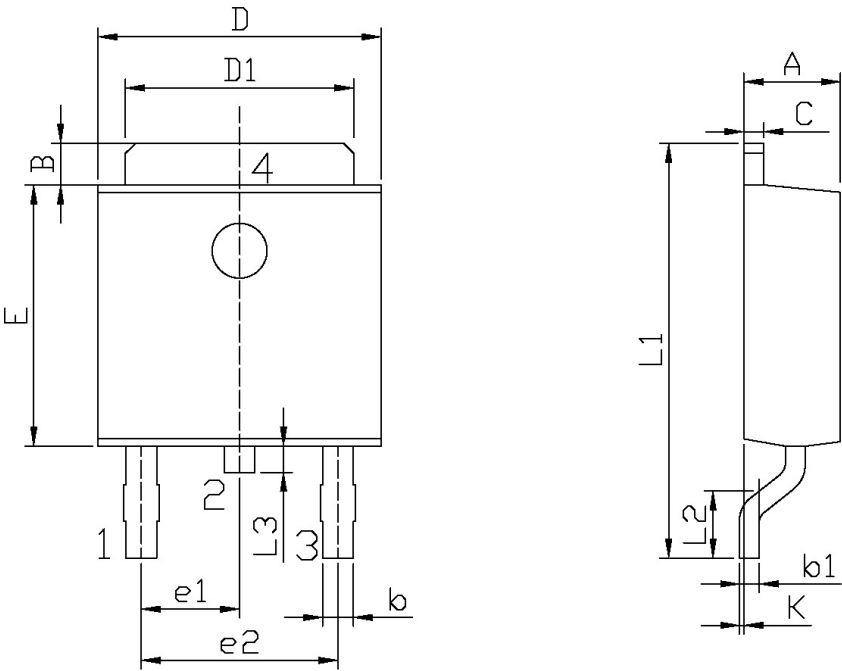


Figure 6: Body-Diode Characteristics

电参数曲线图 / Electrical Characteristic Curve



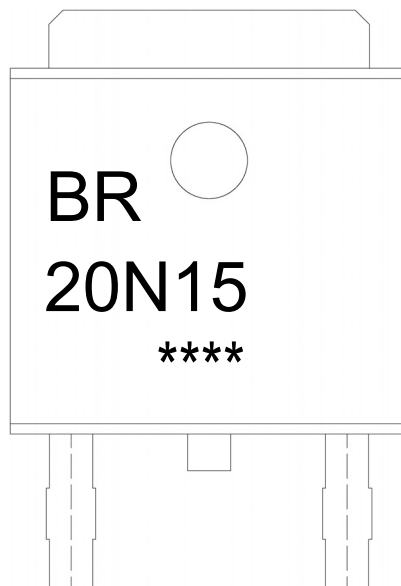
外形尺寸图 / Package Dimensions



单位: mm

Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	2.20	2.40	E	5.95	6.25
B	0.95	1.25	e1	2.24	2.34
b	0.50	0.70	e2	4.43	4.73
b1	0.45	0.55	L1	9.45	9.95
C	0.45	0.55	L2	1.25	1.75
D	6.45	6.75	L3	0.60	0.90
D1	5.10	5.50	K	0.00	0.10

TO-252

印章说明 / Marking Instructions

说明：

BR： 为公司代码

20N15 为型号代码

****： 为生产批号代码，随生产批号变化。

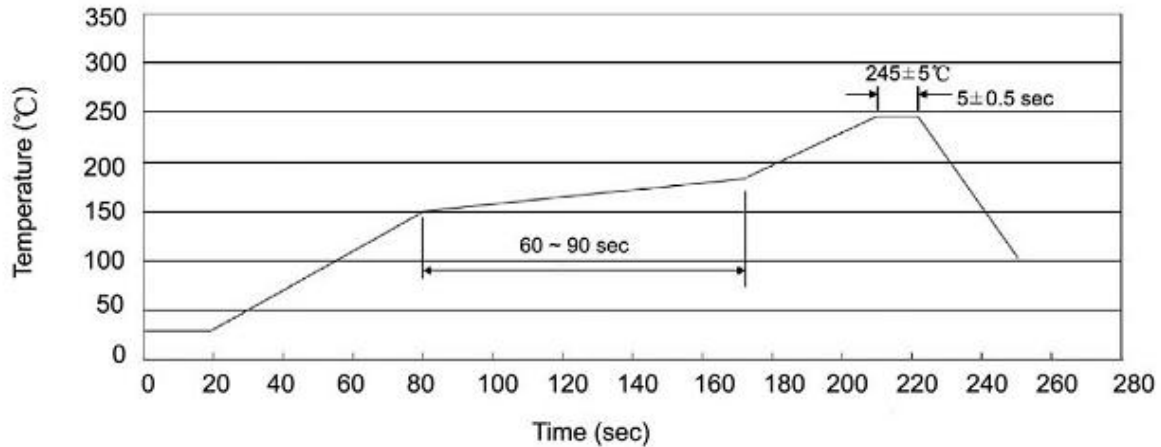
Note:

BR: Company Code

20N15 : Product Type Code.

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

回流焊温度曲线图(无铅) / Temperature Profile for IR Reflow Soldering(Pb-Free)



说明：

- 1、预热温度 150 ~ 180°C，时间 60 ~ 90sec;
- 2、峰值温度 245±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:150~180°C, Time:60~90sec.
- 2.Peak Temp.:245±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：260±5°C

时间：10±1 sec.

Temp.:260±5°C

Time:10±1 sec

包装规格 / Packaging SPEC.

卷盘包装 / REEL

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm ³)		
	Units/Reel 只/卷盘	Reels/Inner Box 卷盘/盒	Units/Inner Box 只/盒	Inner Boxes/Outer Box 盒/箱	Units/Outer Box 只/箱	Reel	Inner Box 盒	Outer Box 箱
TO-252	2,500	2	5,000	6	30,000	13" ×16	360×360×50	380×335×366

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