

### 描述 / Descriptions

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

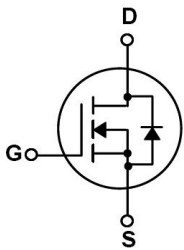
### 特征 / Features

低栅极电荷，低导通电阻，开关速度快，低反向传输电容，100%单脉冲雪崩能量测试。  
Low gate charge, low  $R_{ds(on)}$ , fast switching, Low Reverse transfer capacitances, 100% Single Pulse avalanche energy Test.

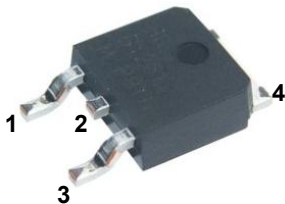
### 用途 / Applications

适用于视频对讲电源开关电路。  
Power switch circuit of Video doorphone.

### 内部等效电路 / Equivalent Circuit



### 引脚排列 / Pinning



PIN 1 : 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	$V_{DSS}$	200	V
Drain Current	$I_D(T_c=25^\circ C)$	4.8	A
Drain Current	$I_D(T_c=100^\circ C)$	3.4	A
Drain Current - Pulsed	$I_{DM}^{a1}$	19.2	A
Gate-Source Voltage	$V_{GSS}$	±30	V
Avalanche Current	$I_{AR}^{a1}$	1.6	A
Single Pulsed Avalanche Energy	$E_{AS}^{a2}$	125	mJ
Repetitive Avalanche Energy	$E_{AR}^{a1}$	12	mJ
Power Dissipation	$P_D(T_c=25^\circ C)$	40	W
Derating Factor above 25°C	$P_D$	0.32	W/°C
Peak Diode Recovery dv/dt	$dv/dt^{a3}$	5	V/ns
Operating Temperature Range	$T_J$	150	°C
Storage Temperature Range	$T_{STG}$	-55to150	°C
Maximum Temperature for Soldering	$T_L$	300	°C
Junction-to-Case	$R_{\theta JC}$	3.13	°C/W
Junction-to-Ambient	$R_{\theta JA}$	62.5	°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 to Source Breakdown Voltage	$V_{DSS}$	$V_{GS}=0V$ $I_D=250\mu A$	200			V
Drain to Source Leakage Current	$I_{DSS}$	$V_{DS}=200V$ $V_{GS}=0V$ $T_a=25^\circ C$			1.0	μA
		$V_{DS}=160V$ $V_{GS}=0V$ $T_a=125^\circ C$			10	μA
Gate to Source Forward Leakage	$I_{GSS}$	$V_{GS}=\pm 30V$ $V_{DS}=0V$			±0.1	μA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ $I_D=250\mu A$	2.0		4.0	V
Drain-to-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V$ $I_D=2.9A$		0.49	0.65	Ω
Forward Transconductance	$g_{FS}$	$V_{DS}=15V$ $I_D=2.9A$		2.0		S
Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V$ $I_S=1.8A$			1.5	V

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

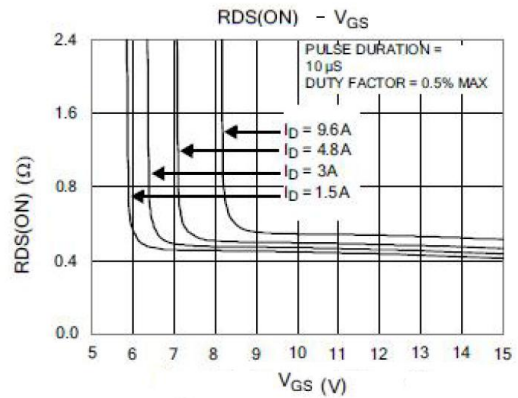
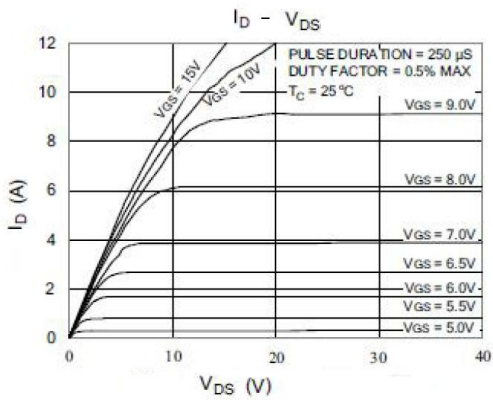
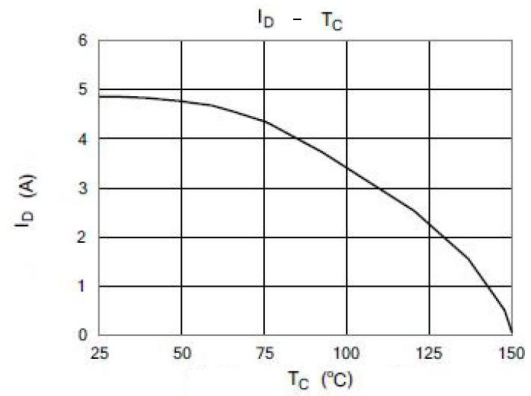
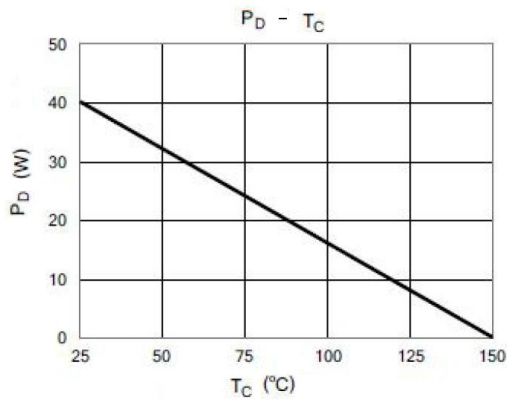
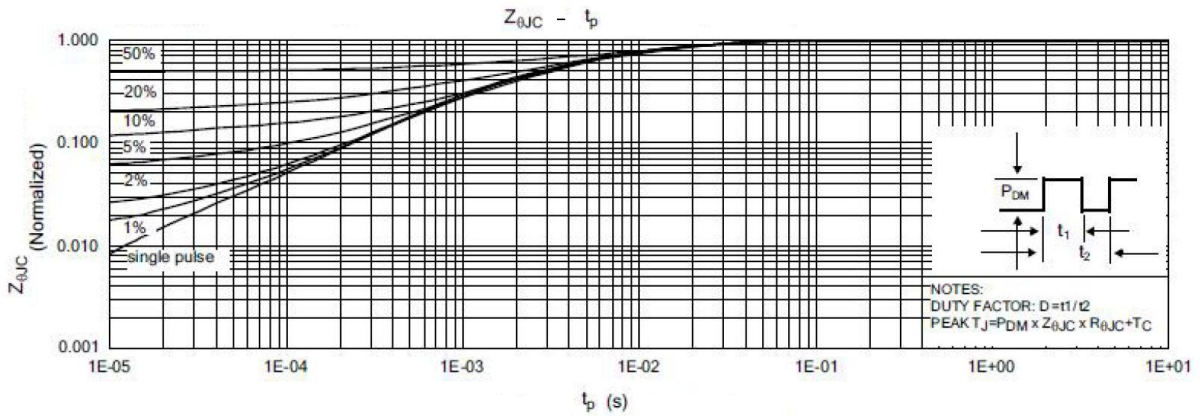
参数 Parameter	符号 Symbol	测试条件 Test Conditions	最小值 Min	典型值 Typ	最大值 Max	单位 Unit
Input Capacitance	$C_{iss}$	$V_{DS}=25V$ $V_{GS}=0V$ $f=1MHz$		255		pF
Output Capacitance	$C_{oss}$			52		pF
Reverse Transfer Capacitance	$C_{rss}$			8		pF
Turn-On Delay Time	$t_{d(on)}$	$V_{DD}=100V$ $I_D=4.8A$ $R_G=10\Omega$ $V_{GS}=10V$		7		ns
Turn-On Rise Time	$t_r$			13		ns
Turn-Off Delay Time	$t_{d(off)}$			27		ns
Turn-Off Fall Time	$t_f$			11		ns
Total Gate Charge	$Q_g$	$V_{DD}=100V$ $I_D=4.8A$ $V_{GS}=10V$		7		nC
Gate to Source Charge	$Q_{gs}$			2		nC
Gate to Drain ( “Miller” )Charge	$Q_{gd}$			3		nC
Continuous Source Current (Body Diode)	$I_S$				4.8	A
Maximum Pulsed Current (Body Diode)	$I_{SM}$				19.2	A
Reverse Recovery Time	$t_{rr}$	$I_S=4.8A$ $T_J=25^\circ C$ $di_F/dt=100A/us$ $V_{GS}=0V$		105		ns
Reverse Recovery Charge	$Q_{rr}$			380		nC
Reverse Recovery Current	$I_{RRM}$			7.2		A

a1: Repetitive rating; pulse width limited by maximum junction temperature

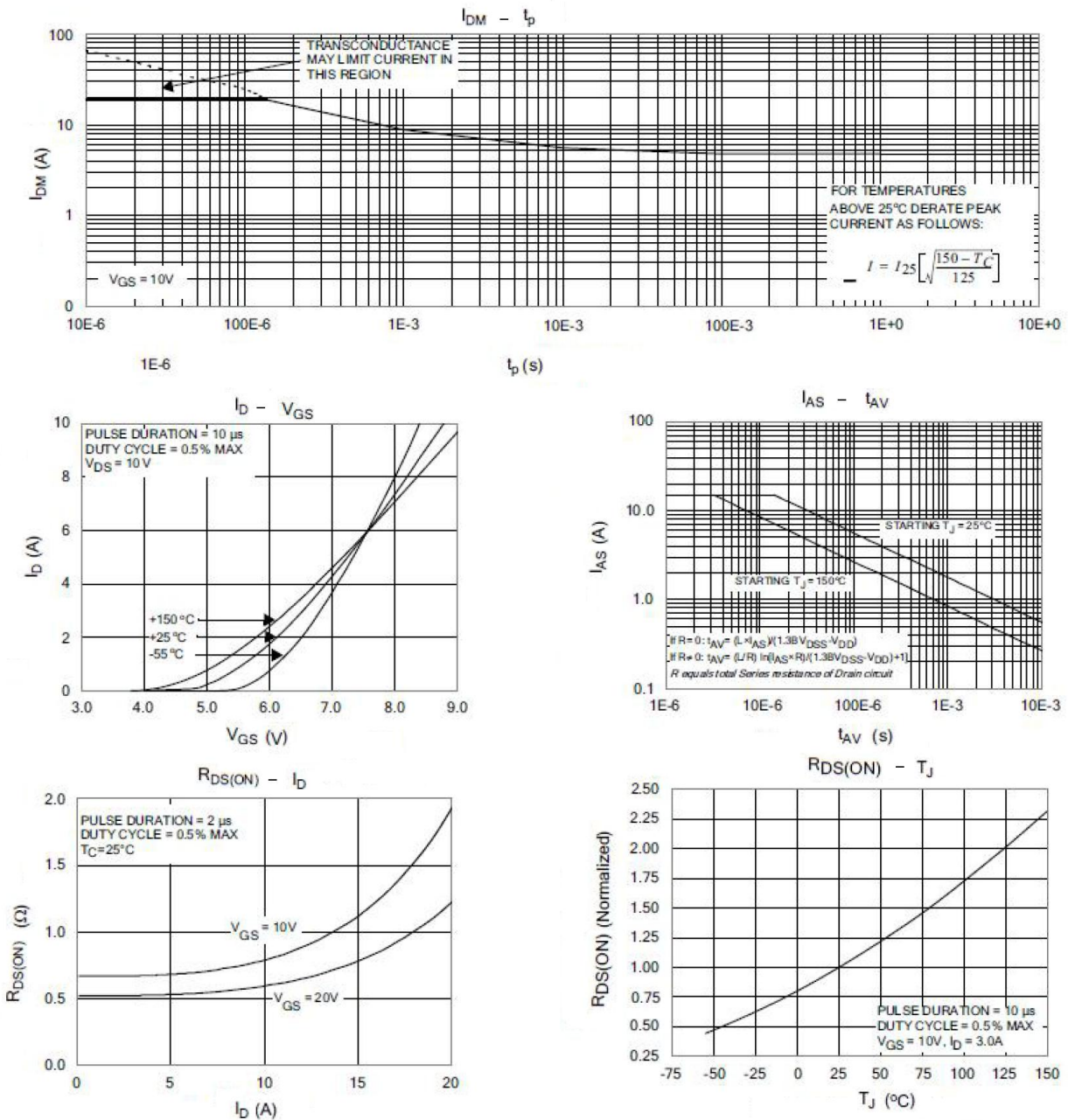
a2:  $L=10.0mH$ ,  $I_D=5A$ , Start  $T_J=25^\circ C$

a3:  $I_{SD}=4.8A$ ,  $di/dt \leq 100A/us$ ,  $V_{DD} \leq B_{VDS}$ , Start  $T_J=25^\circ C$

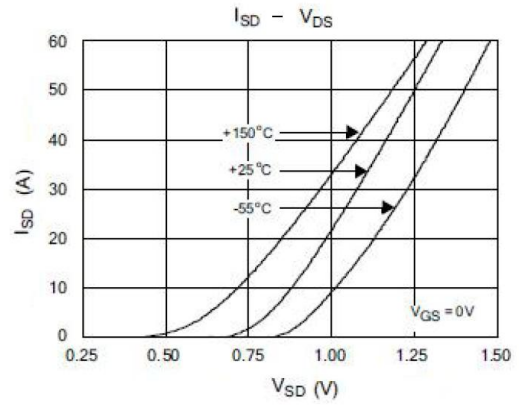
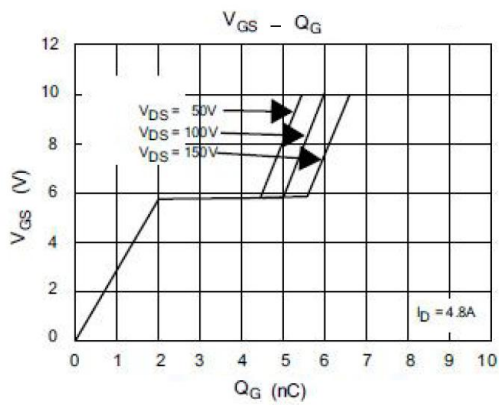
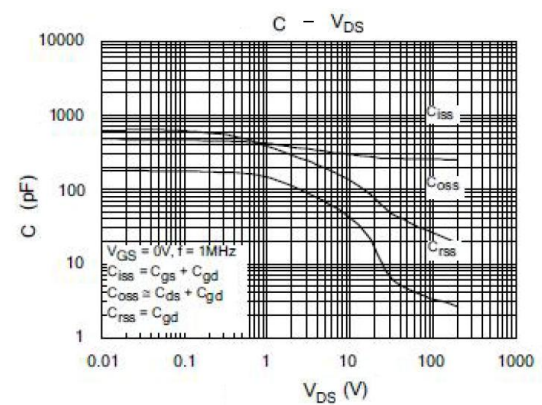
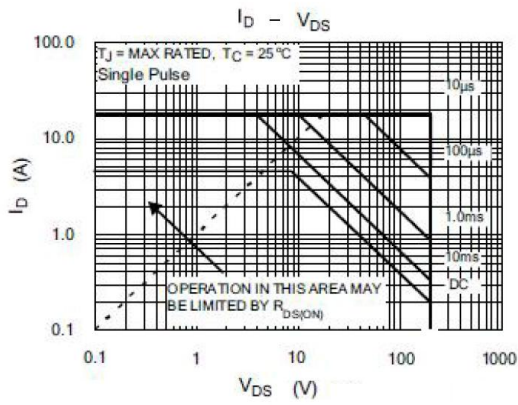
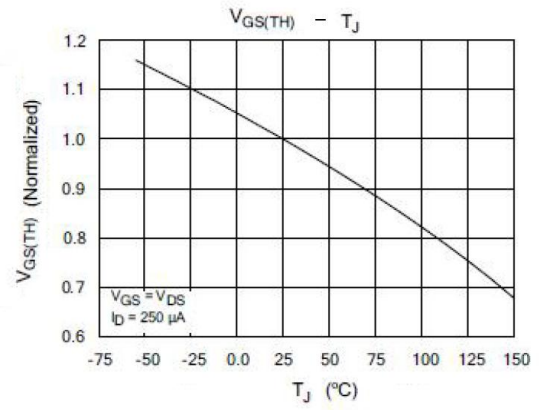
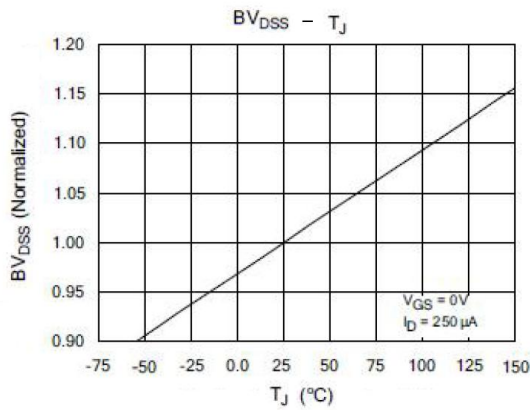
**电参数曲线图 / Electrical Characteristic Curve**



**电参数曲线图 / Electrical Characteristic Curve**

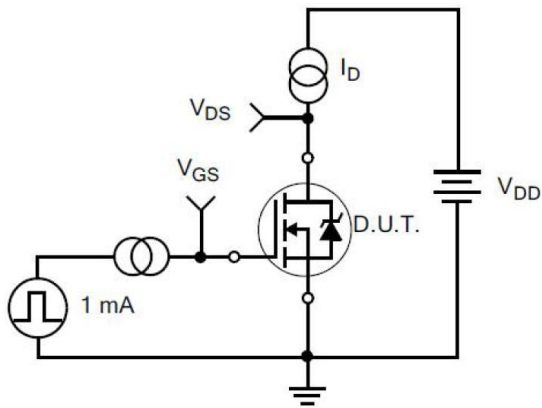


**电参数曲线图 / Electrical Characteristic Curve**

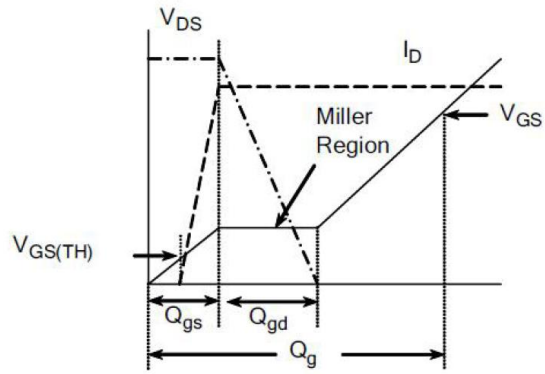




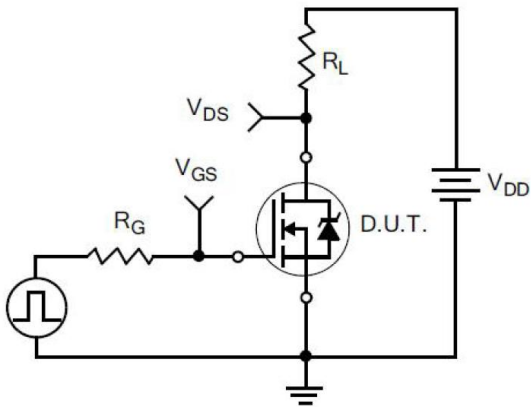
**测试电路与波形 / Test Circuit and Waveform**



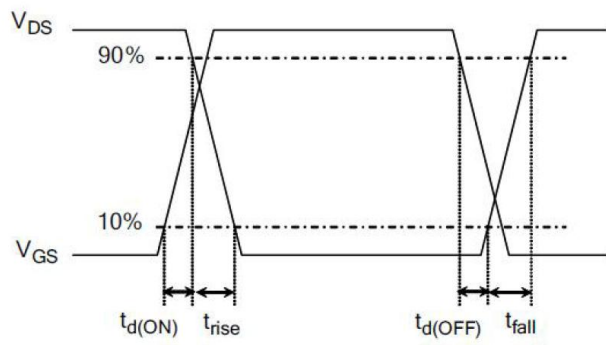
Gate Charge Test Circuit



Gate Charge Waveform

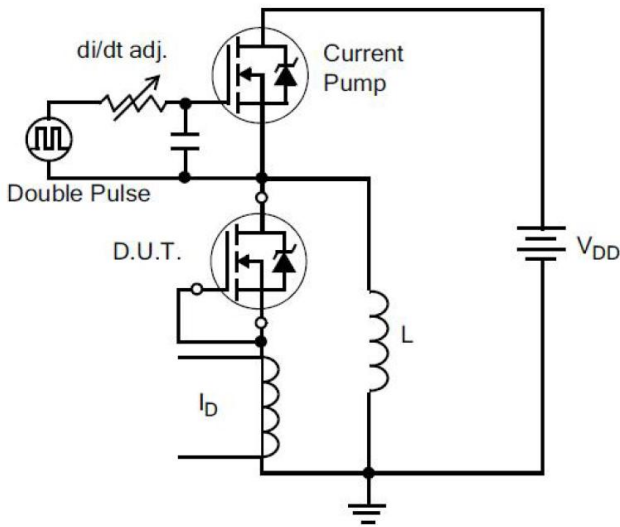


Resistive Switching Test Circuit

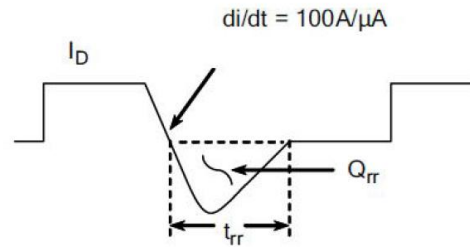


Resistive Switching Waveforms

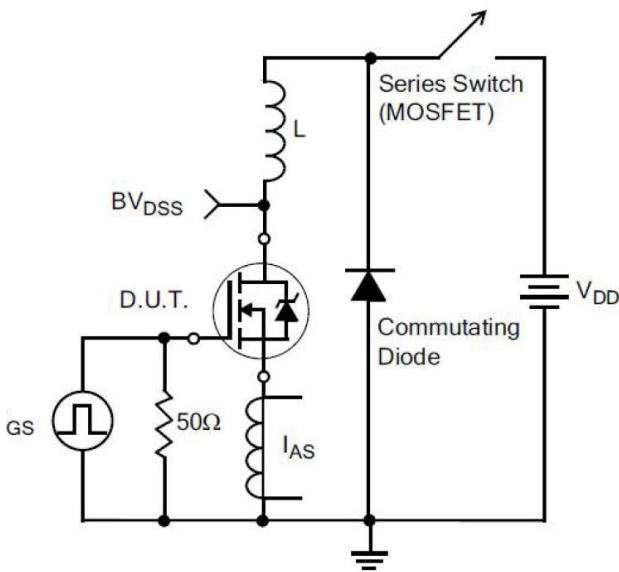
测试电路与波形 / Test Circuit and Waveform



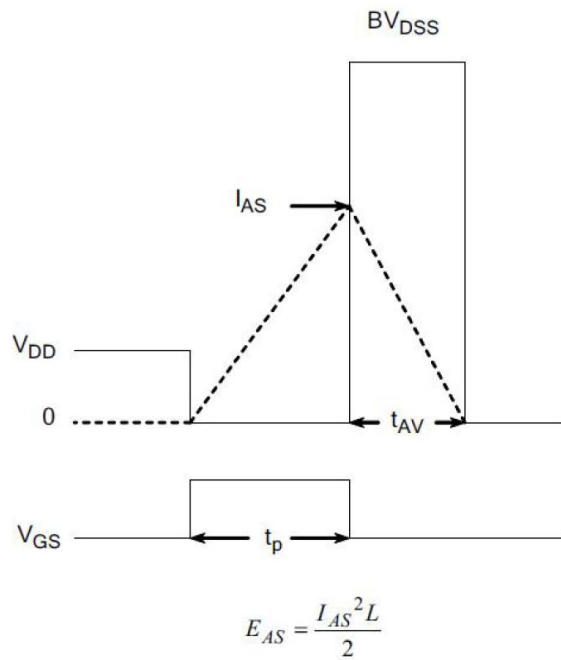
Diode Reverse Recovery Test Circuit



Diode Reverse Recovery Waveform



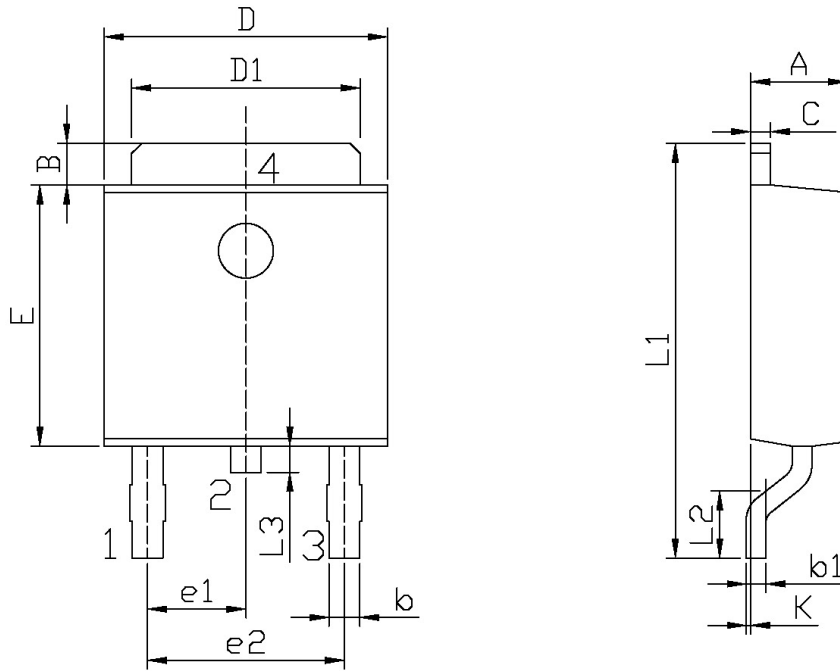
Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



外形尺寸图 / Package Dimensions

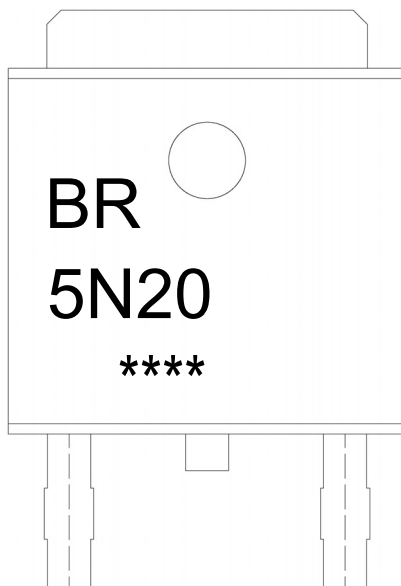


单位: mm

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

5N20： 为型号代码

\*\*\*\*： 为生产批号代码，随生产批号变化。

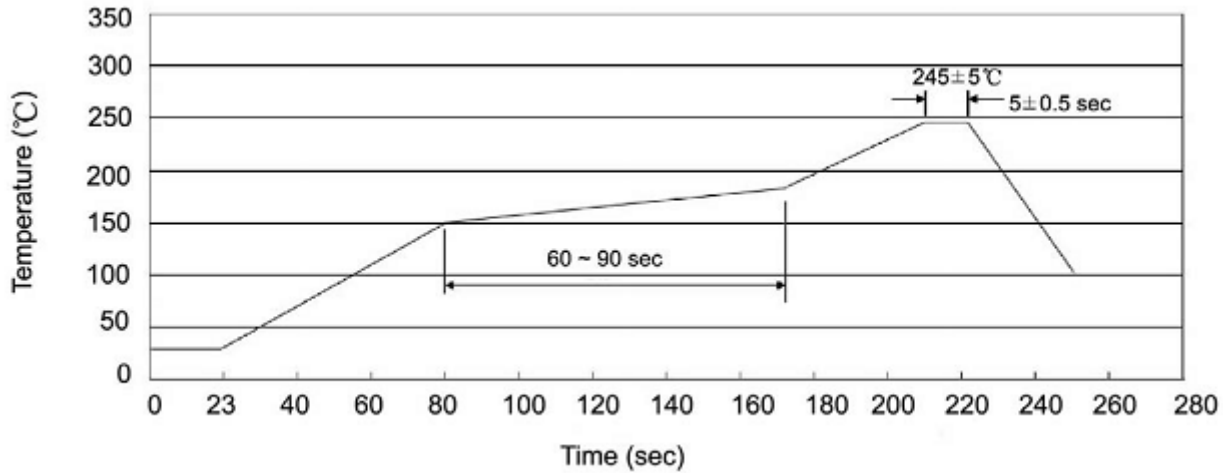
Note:

BR: Company Code.

5N20: Product Type.

\*\*\*\*: 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 25~150°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:25~150°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 <sup>3</sup> )		
	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 <sup>3</sup> )		
	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**