**N-Channel Power MOSFET**

### 描述 / Descriptions

SOP-8 塑封封装 N 沟道 Power Trench MOS 双场效应管。
Dual N-Channel Power Trench MOSFET in a SOP-8 Plastic Package.

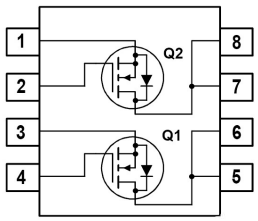
### 特征 / Features

优化电池保护电路，允许工作电压范围宽：±10 $V_{GSS}$，低栅极电荷。内置双 MOSFET。
Optimized for use in battery protection circuits, ±10 $V_{GSS}$ allows for wide operating voltage range, Low gate charge. Built-in dual MOSFET.

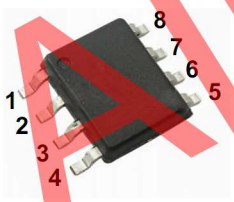
### 用途 / Applications

电池保护，负载开关，电源管理。
Battery protection, Load Switch, Power management.

### 内部等效电路 / Equivalent Circuit




### 引脚排列 / Pinning




PIN1:S2　　PIN 2:G2　　PIN 3：S1　　PIN 4：G1

PIN5、PIN 6:D1　　PIN 7、PIN 8：D2

## 极限参数 / Absolute Maximum Ratings(Ta=25℃)

| 参数 Parameter | 符号 Symbol | 数值 Rating | 单位 Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DSS}$ | 20 | V |
| Gate-Source Voltage | $V_{GS}$ | ±10 | V |
| Drain Current– Continuous(note 1a) | $I_D$ | 6.5 | A |
| Drain Current–Pulsed | | 20 | A |
| Power Dissipation for Dual Operation | $P_D$ | 2.0 | W |
| Power Dissipation for Single Operation(note 1a) | | 1.6 | W |
| Power Dissipation for Dual Operation(note 1b) | | 1.0 | W |
| Power Dissipation for Single Operation(note 1c) | | 0.9 | W |
| Thermal Resistance, Junction-to-Ambient (note 1a) | $R_{\theta JA}$ | 78 | ℃/ W |
| Thermal Resistance, Junction-to case(note 1) | $R_{\theta JC}$ | 40 | ℃/ W |
| Operating and Junction Temperature Range | $T_j$ $T_{stg}$ | -55～150 | ℃ |

## 电性能参数 / Electrical Characteristics(Ta=25℃)

| 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 $I_D$=250μA | 20 | | | V |
| Breakdown Voltage Temperature Coefficient | $\Delta B_{VDSS}/\Delta T_J$ | $I_D$=250μA Referenced to 25℃ | | 14 | | mV/℃ |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=16V $V_{GS}$=0V | | | 1.0 | μA |
| Gate-Body Leakage Current Forward | $I_{GSS}$ | $V_{GS}$=±8.0V $V_{DS}$=0V | | | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$ $I_D$=250μA | 0.5 | 0.7 | 1.5 | V |
| Gate Threshold Voltage Temperature Coefficient | $\Delta V_{GS(th)}/\Delta T_J$ | $I_D$=250μA Referenced to 25℃ | | -3.0 | | mV/℃ |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}$=4.5V $I_D$=6.5A | | 21 | 26 | mΩ |
| | | $V_{GS}$=4.5V $I_D$=6.5A $T_J$=125℃ | | 27 | 34 | |
| | | $V_{GS}$=2.5V $I_D$=5.4A | | 26 | 35 | |
| On-State Drain Current | $I_{D(on)}$ | $V_{DS}$=5.0V $V_{GS}$=5.0V | 15 | | | A |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=5.0V $I_D$=3.0A | | 11 | | S |

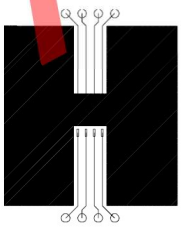
## 电性能参数 / Electrical Characteristics(Ta=25℃)

| 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 | $C_{iss}$ | $V_{DS}$=10V $V_{GS}$=0V f=1.0MHz | | 700 | | pF |
| Output Capacitance | $C_{oss}$ | | | 175 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 85 | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$=10V $I_D$=1.0A $R_{GEN}$=6Ω $V_{GS}$=4.5V | | 8 | 16 | ns |
| Turn-On Rise Time | $t_r$ | | | 10 | 18 | |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 18 | 29 | |
| Turn-Off Fall Time | $t_f$ | | | 5.0 | 10 | |
| Total Gate Charge | $Q_g$ | $V_{DD}$=10V $I_D$=3.0A $V_{GS}$=4.5 | | 7.0 | 10 | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 1.2 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 1.9 | | |
| Maximum Continuous Drain-Source Diode Forward Current | $I_S$ | | | | 1.3 | A |
| Drain-Source Diode Forward Voltage | $V_{SD}$ | $I_S$=1.3A $V_{GS}$=0V (note2) | | 0.65 | 1.2 | V |

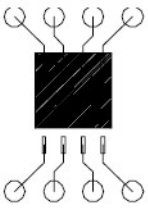
Notes:

1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design.

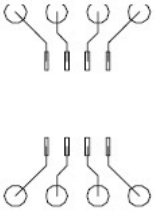
a) 78℃/W when mounted on a 0.5 $in^2$ pad of 2 oz. copper.



b) 125℃/W when mounted on a 0.02 $in^2$ pad of 2 oz. copper.



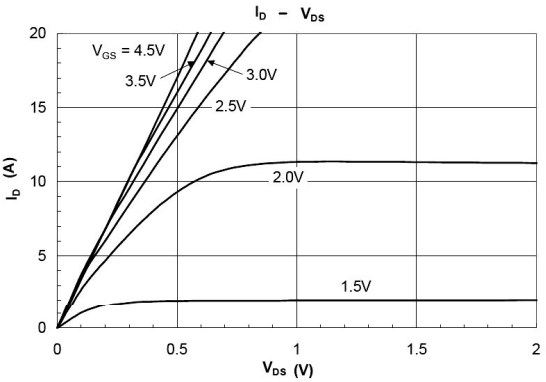
c) 135℃/W when mounted on a minimum pad.

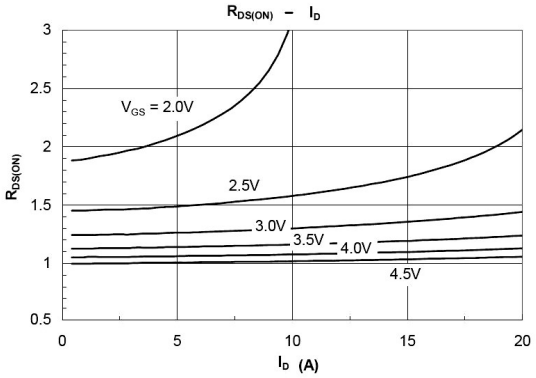


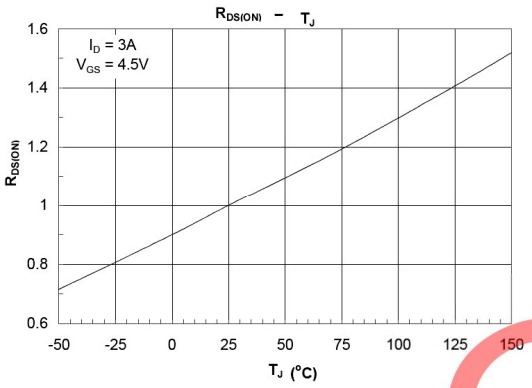
Scale 1 : 1 on letter size paper

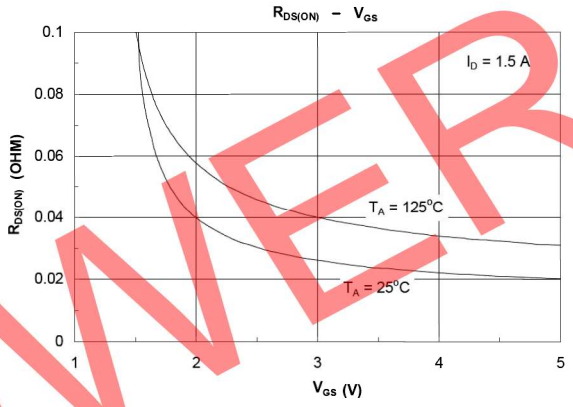
2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%

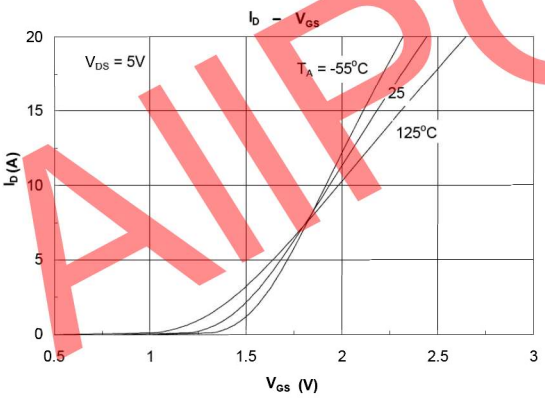
## 电参数曲线图 / Electrical Characteristic Curve

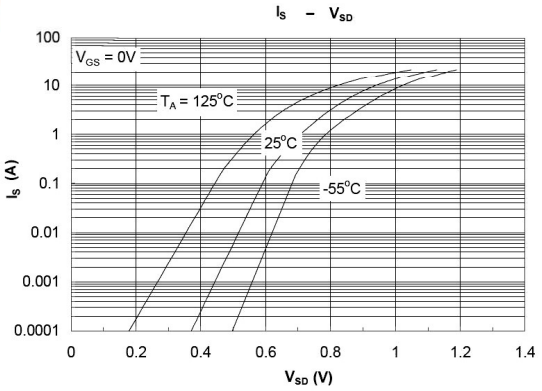


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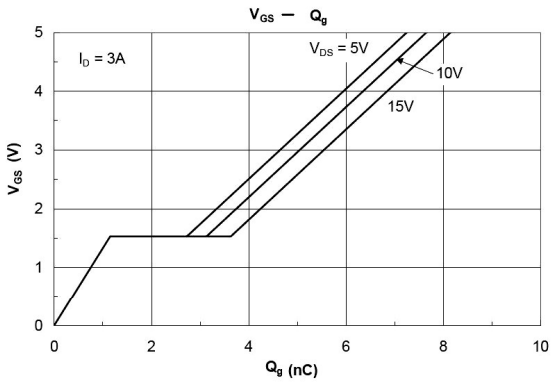
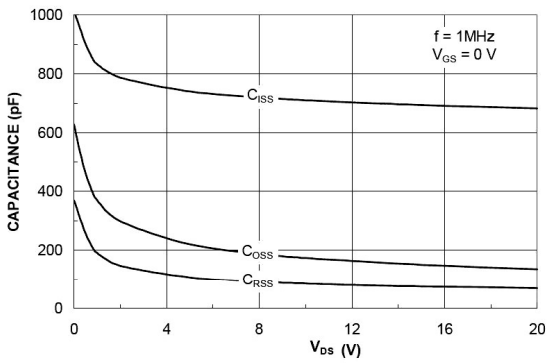
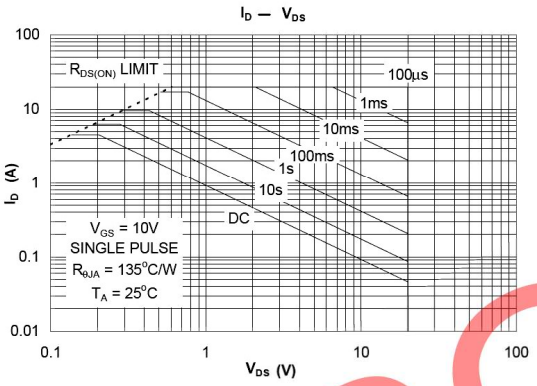
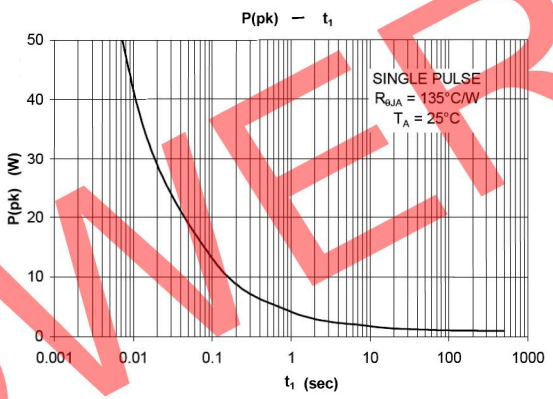
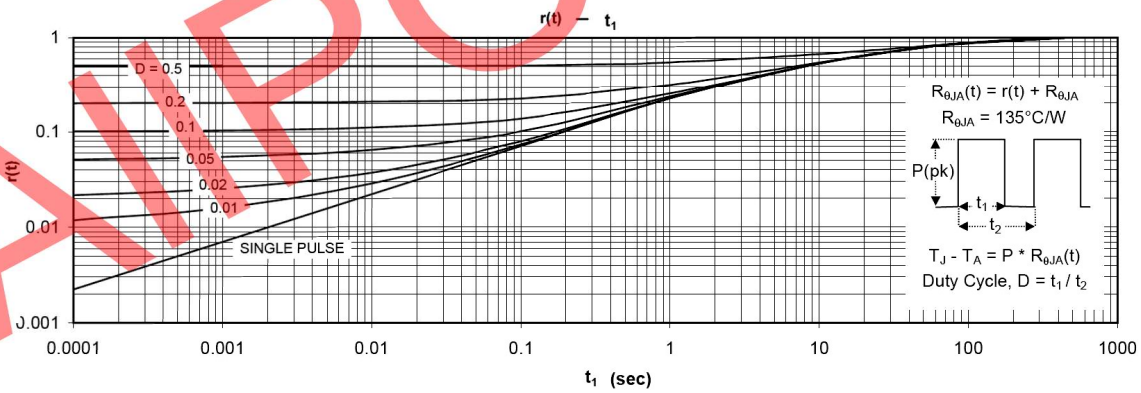


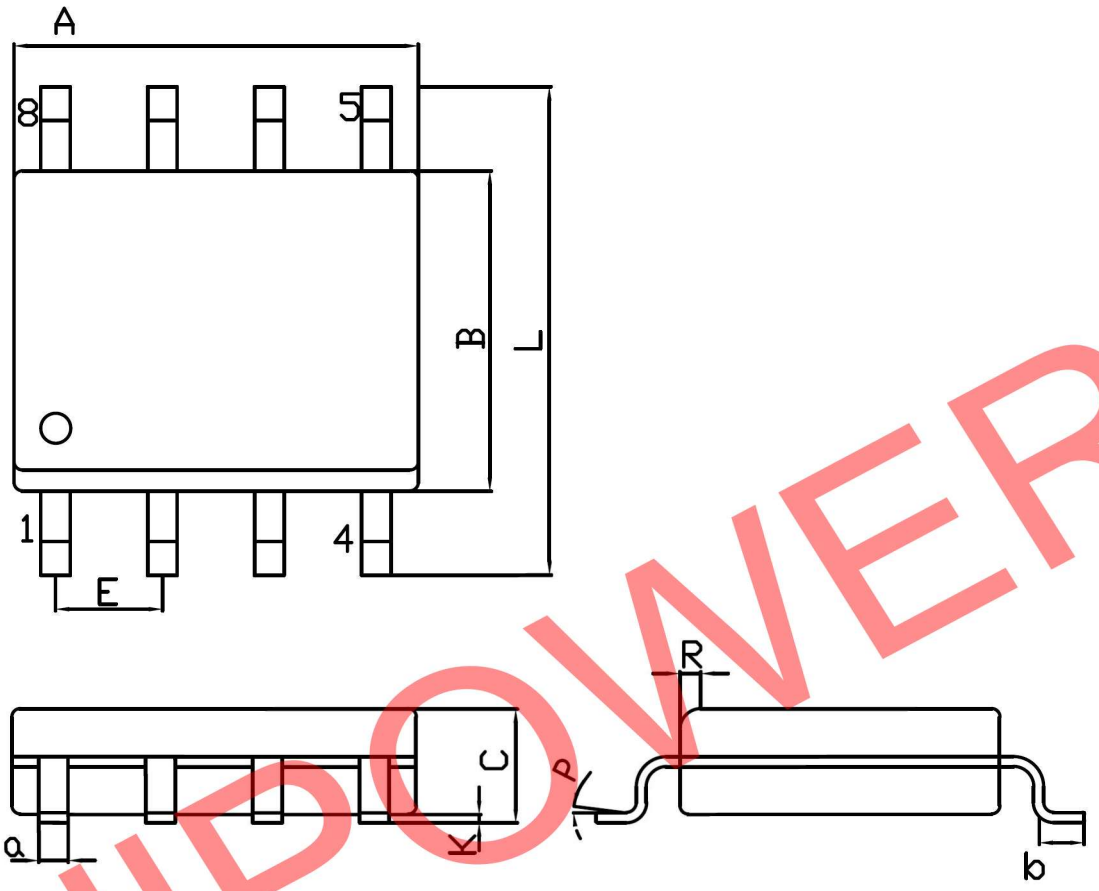



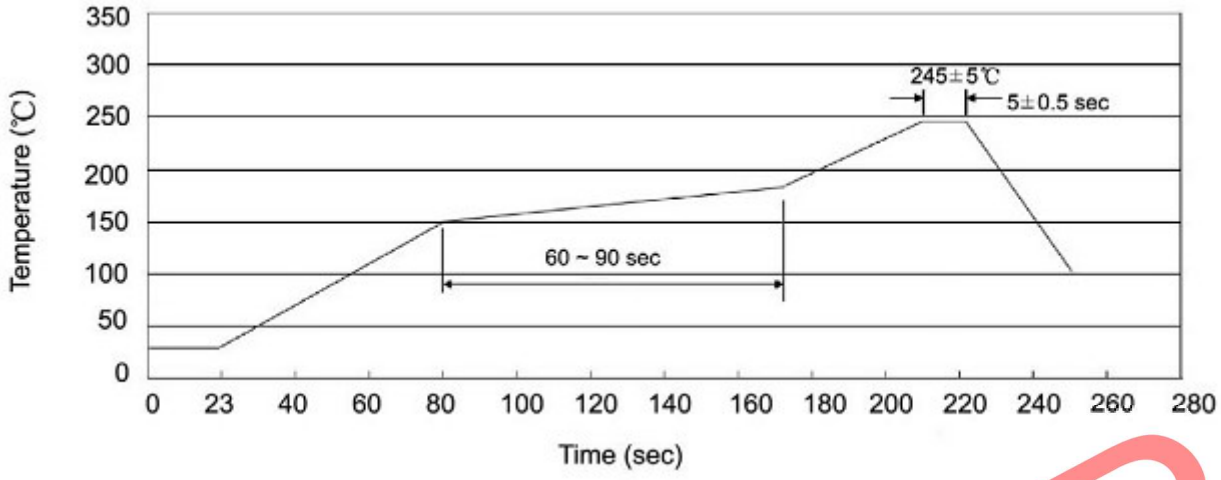
## 外形尺寸图 / Package Dimensions

SOP-8 Unit:mm




| Symbol | Dimensions In Millimeters | | Symbol | Dimensions In Millimeters | |
|---|---|---|---|---|---|
| | Min | Max | | Min | Max |
| A | 4.70 | 5.10 | C | 1.35 | 1.75 |
| B | 3.70 | 4.10 | a | 0.35 | 0.49 |
| L | 6.00 | 6.40 | R | 0.30 | 0.60 |
| E | 1.27BSC | | P | 0° | 7° |
| K | 0.12 | 0.22 | b | 0.40 | 1.25 |

## 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℃，时间 60～90sec;

2、峰值温度 245±5℃，时间持续为 5±0.5sec;

3、焊接制程冷却速度为 2～10℃/sec.

Note:

1.Preheating:25~150℃, Time:60~90sec.

2.Peak Temp.:245±5℃, Duration:5±0.5sec.

3. Cooling Speed: 2~10℃/sec.

## 耐焊接热试验条件 / Resistance to Soldering Heat Test Conditions

温度：260±5℃ 时间：10±1 sec. Temp.:260±5℃ 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 |
| SOP/ESOP-8 | 4,000 | 2 | 8,000 | 5 | 40,000 | 13″ ×16 | 360×360×50 | 385×257×392 |

## 使用说明 / Notices