



SI2301CDS

SOT-23 P Channel Enhancement MOS Field Effect Transistor

SOT-23 P 沟道增强型场效应管

1. Description 描述

This P Channel Enhancement MOSFET encapsulated in a small SOT-23 Surface-Mounted Device (SMD) plastic package.

这种 P 沟道增强型 MOS 场效应管采用小型 SOT-23 表面贴装 (SMD) 塑料封装。

2. Features 特性

Feature 特性	Description 描述
Drain-Source Voltage 漏极-源极电压	$V_{DS} = -20V$
Drain Current(continuous) 漏极电流-连续	$I_D = -3.5A$
Applications 应用	<ul style="list-style-type: none">• Battery Protection 电池保护• Load Switch 负载开关• Power Management 电源管理
Environmental Compliance 环保合规	Totally Lead-Free & Fully RoHS Compliant. 完全无铅和符合 RoHS 标准 ^[1] Halogen and Antimony Free, "Green" Device. 无卤素和无镉, "绿色"器件 ^[2]
Automotive Compliance 汽车合规	Qualified according to AEC-Q101 and recommended for use in automotive applications. 通过了 AEC-Q101 认证, 推荐用于汽车电子应用场景。

[1] No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.

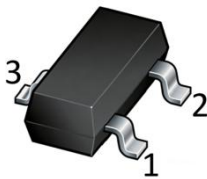
无铅, 完全符合欧盟标准 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) 和 2015/863/EU (RoHS 3)。

[2] Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

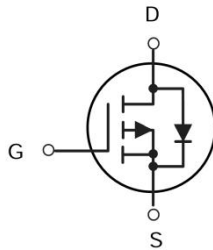
无卤素和无镉的“绿色”产品指溴含量<900ppm, 氯含量<900ppm (溴+氯总含量<1500ppm) 和镉化合物含量<1000ppm。

3. Mechanical Data 封装数据

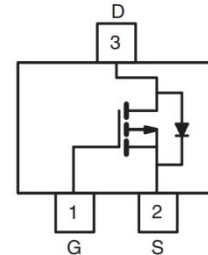
Feature 特性	Description 描述
Package 封装	SOT-23
Moisture Sensitivity Level 湿敏感度等级	J-STD-020 MSL1
Material 材料	Molded Plastic, “Green” Molding Compound; UL Flammability Classification Rating 94V-0. 模塑塑料封装, “绿色”成型复合材料; UL 可燃性等级 94V-0.
Dimensions 尺寸	1.9mm pitch; 2.9mm × 1.3mm × 1.0mm body 相邻引脚中心距为 1.9mm, 封装本体 (不含引脚) 尺寸为 2.9mm × 1.3mm × 1.0mm
Terminals Compliance 引脚合规	3 terminals, Tin Plated Leads, Solderable per MILSTD-202, Method 208 ^③ 3 个镀锡引脚, 可焊性符合 MIL-STD-202 标准中 208 方法 e3 条款的要求
Weight 重量	0.008 grams (Approximate) 约 0.008 克
Polarity 极性	See Diagrams Below 极性见下图



SOT-23 Top View



Device Symbol



Top View Pin-Out

4. Ordering Information 订购信息

Part Number	Compliance	Package	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
SI2301CDS	Automotive	SOT-23	7	8	3000

5. Marking Information 丝印信息

Part Number	Marking Code
SI2301CDS	N1

**6. Absolute Maximum Ratings($T_a = + 25^\circ\text{C}$) 绝对最大额定值**

Characteristic 特性	Symbol 符号	Value 值	Unit 单位
Drain-Source Voltage 漏极-源极电压	V_{DS}	-20	V
Gate- Source Voltage 栅极-源极电压	V_{GS}	± 10	V
Drain Current(continuous)漏极电流-连续	I_D	-3.5	A
Drain Current(pulsed)漏极电流-脉冲	I_{DM}	-13	A

7. Thermal Characteristics($T_a = + 25^\circ\text{C}$) 热特性

Characteristic 特性	Symbol 符号	Value 值	Unit 单位
Power Dissipation 耗散功率	P_D	1	W
Thermal Resistance From Junction To Ambient 结到环境的热阻	$R_{\theta JA}$	125	$^\circ\text{C}/\text{W}$
Junction Temperature 结温	T_J	-55 ~ +150	$^\circ\text{C}$
Storage Temperature 储藏温度	T_{stg}	-55 ~ +150	$^\circ\text{C}$

8. Electrical Characteristics($T_a = + 25^\circ\text{C}$) 电特性

Characteristic 特性	Symbol 符号	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Conditions 条件
Drain-Source Breakdown Voltage 漏极-源极击穿电压	BV_{DSS}	-20	-	-	V	$I_D = -250\mu\text{A}$, $V_{GS} = 0$
Gate Threshold Voltage 栅极开启电压	$V_{GS(th)}$	-0.4	-	-1	V	$I_D = -250\mu\text{A}$, $V_{DS} = V_{GS}$
Zero Gate Voltage Drain Current 零栅压漏极电流	I_{DSS}	-	-	-1	μA	$V_{GS} = 0$, $V_{DS} = -20\text{V}$
Gate Body Leakage 栅极漏电流	I_{GSS}	-	-	± 100	nA	$V_{GS} = \pm 8\text{V}$, $V_{DS} = 0$



Product DataSheet

Characteristic 特性	Symbol 符号	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Conditions 条件
Static Drain-Source On-State Resistance 静态漏源导通电阻	$R_{DS(on)}$	-	0.09	0.112	Ω	$I_D = -2.8A,$ $V_{GS} = -4.5V$
		-	0.11	0.142	Ω	$I_D = -2A,$ $V_{GS} = -2.5V$
Diode Forward Voltage Drop 内附二极管正向压降	V_{SD}	-	-	-1.2	V	$I_S = -0.7A,$ $V_{GS} = 0$
Input Capacitance 输入电容	C_{ISS}	-	438	-	pF	$V_{GS} = 0,$ $V_{DS} = -10V,$ $f = 1MHz$
Common Source Output Capacitance 共源输出电容	C_{OSS}	-	76	-	pF	$V_{GS} = 0,$ $V_{DS} = -10V,$ $f = 1MHz$
Reverse Transfer Capacitance 反馈电容	C_{RSS}	-	62	-	pF	$V_{GS} = 0,$ $V_{DS} = -10V,$ $f = 1MHz$
Total Gate Charge 栅极电荷密度	Q_g	-	5.4	-	nC	$V_{GS} = -4.5V,$ $V_{DS} = -10V,$ $I_D = -2A$
Gate Source Charge 栅源电荷密度	Q_{gs}	-	1.2	-	nC	$V_{GS} = -4.5V,$ $V_{DS} = -10V,$ $I_D = -2A$
Gate Drain Charge 栅漏电荷密度	Q_{gd}	-	1.2	-	nC	$V_{GS} = -4.5V,$ $V_{DS} = -10V,$ $I_D = -2A$
Turn-ON Delay Time 开启延迟时间	$t_{d(on)}$	-	7	-	ns	$V_{GS} = -4.5V,$ $V_{DS} = -10V,$ $I_D = -1A,$ $R_{GEN} = 2.5\Omega$
Turn-ON Rise Time 开启上升时间	t_r	-	22	-	ns	$V_{GS} = -4.5V,$ $V_{DS} = -10V,$ $I_D = -1A,$ $R_{GEN} = 2.5\Omega$
Turn-OFF Delay Time 关断延迟时间	$t_{d(off)}$	-	38	-	ns	$V_{GS} = -4.5V,$ $V_{DS} = -10V,$ $I_D = -1A,$ $R_{GEN} = 2.5\Omega$
Turn-OFF Fall Time 关断下降时间	t_f	-	35	-	ns	$V_{GS} = -4.5V,$ $V_{DS} = -10V,$ $I_D = -1A,$ $R_{GEN} = 2.5\Omega$

9. Typical Electrical Characteristics Curve 典型电特性曲线

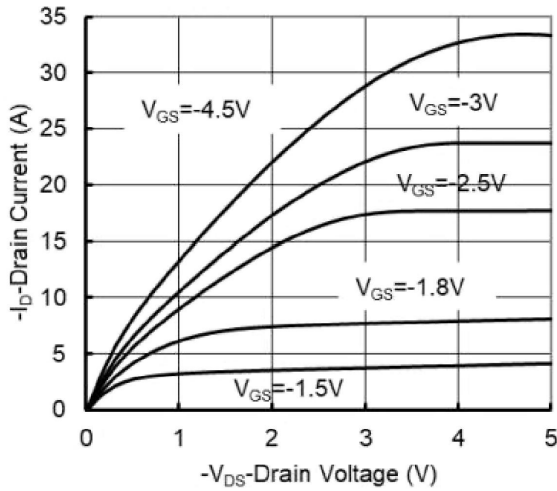


Figure1. Output Characteristics

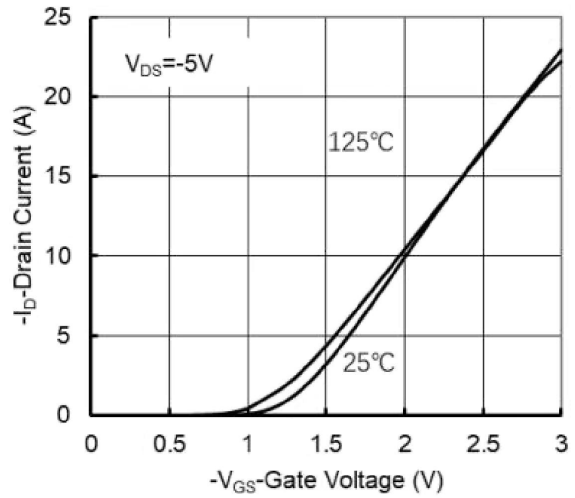


Figure2. Transfer Characteristics

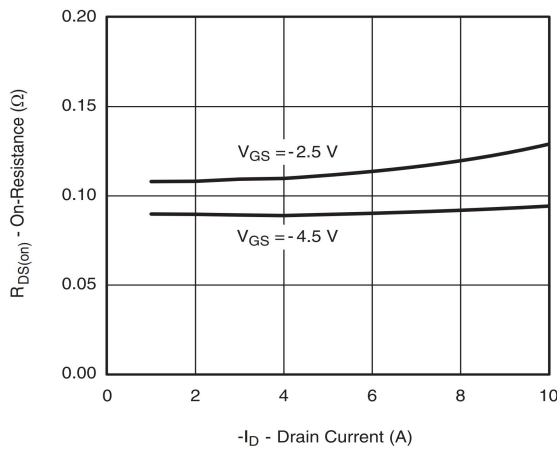


Figure3. On-Resistance vs. Drain Current

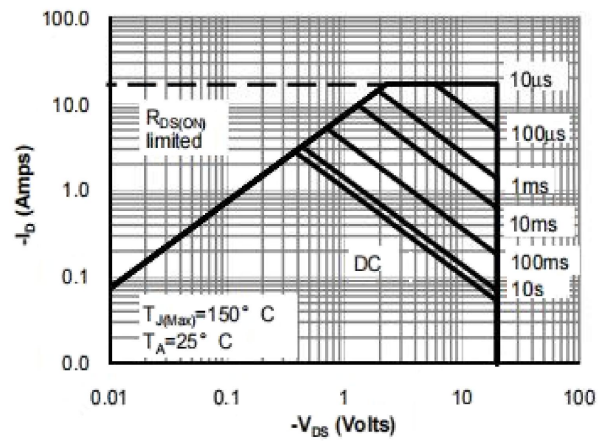


Figure 4: Safe Operating Area

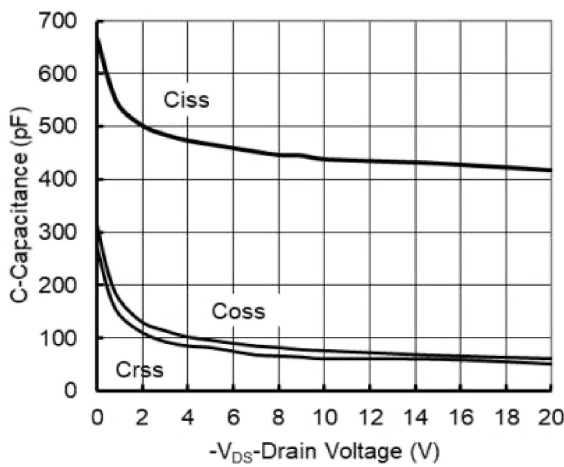


Figure 5: Capacitance Characteristics

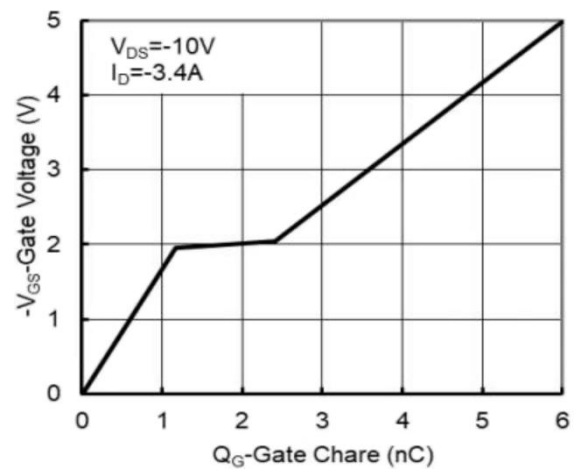
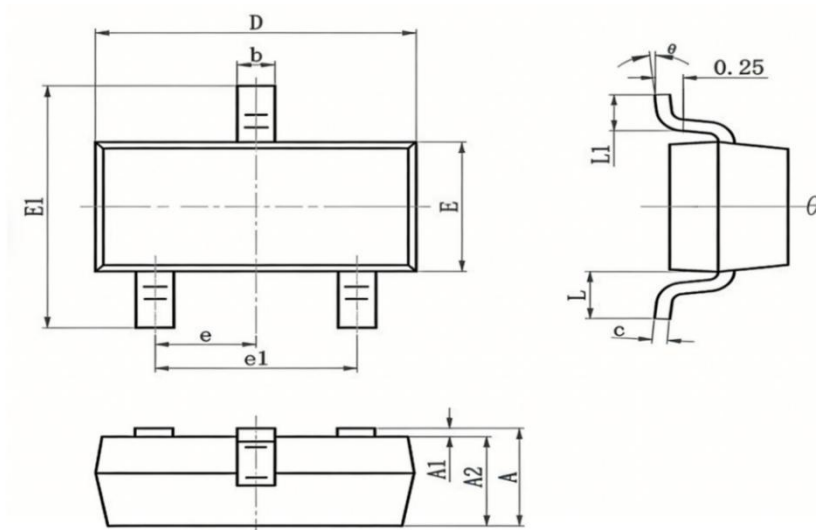


Figure 6: Gate-Charge Characteristics

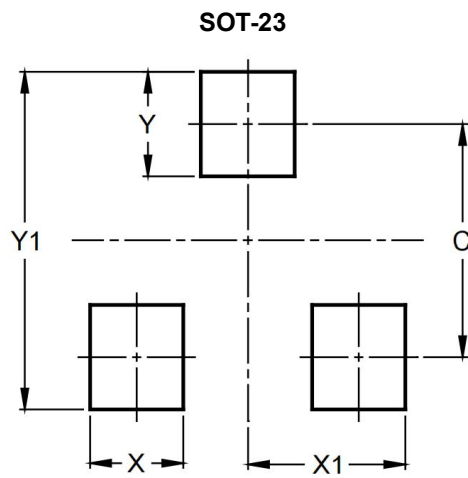
10. Package Outline Dimensions 封装外形尺寸

SOT-23



Symbol 符号	Millimeters 毫米	
	Min.最小值	Max.最大值
A	0.900	1.150
A1	0	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.900	1.000
e1	1.800	2.000
L	0.500	0.600
L1	0.300	0.500
θ	0°	8°

11. Suggested Pad Layout 推荐焊盘布局



Dimensions 尺寸	Millimeters 毫米
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

Fig. Soldering footprint for SOT-23

图 SOT-23 的引脚焊接



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