

SI2301

DATASHEET

Specification Revision History:

Version	Date	Description
V1.0	2021/05	New
V1.1	2022/07	Modify Ordering Information
V1.2	2023/02	Modify Ordering Information
V1.3	2025/05	Add application precautions and overall typesetting.

Description

The SI2301D is the high cell density trench P-ch MOSFETs, which provides excellent RDS(ON) and efficiency for most of the small power switching and load switch applications.

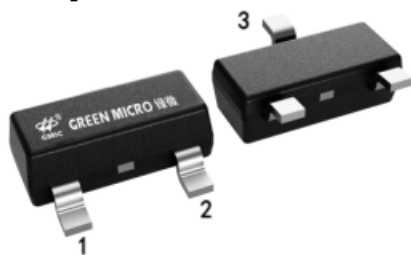
General Features

- ※ $V_{DS} = -20V$ $I_D = -2.3A$
- ※ $R_{DS(ON)} < 100m\Omega$ @ $V_{GS} = \pm 12V$

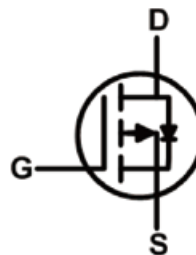
Applications

- ※ Green Device Available
- ※ Super Low Gate Charge
- ※ Excellent C_{dv}/dt effect decline
- ※ Advanced high cell density Trench technology

Simplified Outline



- 1.GATE
- 2.SOURCE
- 3.DRAIN



SOT-23

Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
SI2301-GM	SOT-23	A1SHB	REEL	3000PCS/REEL

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Symbol	Parameter	Rating	Units
V _{DSS}	Drain-Source Voltage	-20	V
V _{GS}	Continuous Gate-Source Voltage	±12	V
I _D @TA=25°C	Continuous Drain Current, V _{GS} @ -4.5V ₁	-2.3	A
I _D @TA=70°C	Continuous Drain Current, V _{GS} @ -4.5V ₁	-1.4	A
I _{DM}	Pulsed Drain Current ₂	-8	A
P _D @TA=25°C	Power Dissipation ₃	0.8	W
T _J , T _{STG}	Operation Junction and Storage Temperature Range	-55 to 150	°C
R _{θJA}	Thermal Resistance Junction-ambient ₁	156	°C/W
R _{θJC}	Thermal Resistance Junction-Case ₁	---	°C/W

Electrical Characteristics (TA=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-20	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-20V, V_{GS}=0V$	---	---	-1.0	μA
I_{GSS}	Gate -Source leakage current	$V_{GS}=\pm 12V, V_{DS}=0V$	---	---	± 100	nA
ON CHARACTERISTICS						
$V_{GS(th)}$	Gate-threshold voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.4	-0.7	-1.0	V
$R_{DS(on)}$	Drain-Source On-Resistance(note2)	$V_{GS}=-4.5V, I_D=-2A$	---	100	125	m Ω
		$V_{GS}=-2.5V, I_D=-1A$	---	135	190	
Dynamic characteristics						
C_{iss}	Input Capacitance	$V_{DS}=-10V, V_{GS}=0V, f=1M$ Hz	---	185	---	pF
C_{oss}	Output Capacitance		---	35	---	
C_{rss}	Reverse Transfer Capacitance		---	25	---	
Q_g	TotalGateCharge	$V_{DS}=-10V, I_D=-2A,$ $V_{GS}=-4.5V$	---	2.2	---	nC
Q_{gs}	Gate-SourceCharge		---	0.5	---	
Q_{gd}	Gate-Drain(“Miller”)Charge		---	0.5	---	
SWITCHING CHARACTERISTICS						
$T_{d(on)}$	Turn-on delay time	$V_{DD}=-10V, R_L=5\Omega,$ $R_{GEN}=3\Omega, V_{GS}=-4.5V,$	---	10	---	ns
T_r	Rise time		---	30	---	
$T_{d(off)}$	Turn-off delay time		---	63	---	
T_f	Fall time		---	50	---	
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
I_S	Maximum Continuous Drain to Source Diode Forward Current		---	---	-2	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		---	---	-8	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=-2A$	---	---	-1.2	V

Notes:

- 1.Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
- 2.Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

Typical Characteristics

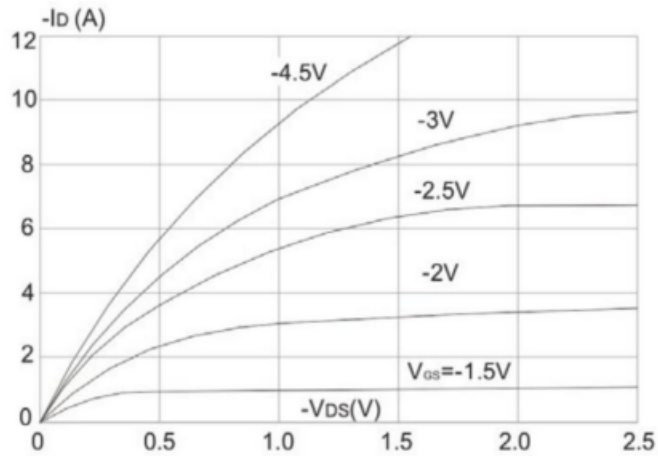


Figure 1: Output Characteristics

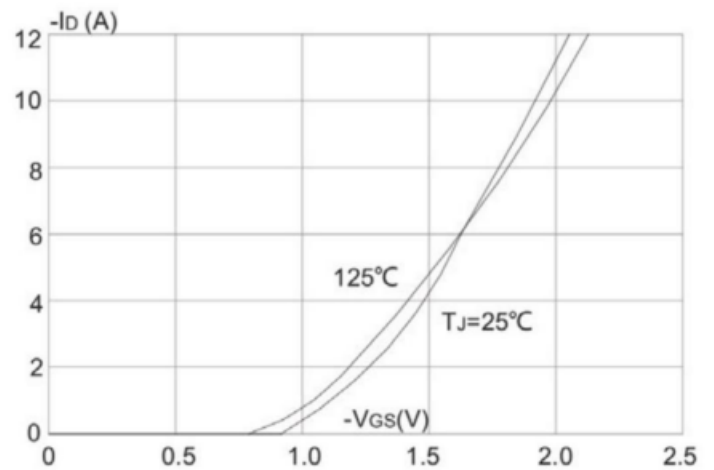


Figure 2: Typical Transfer Characteristics

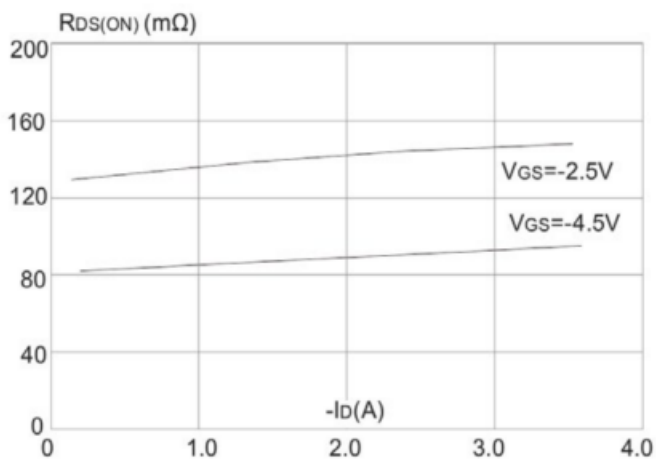


Figure 3: On-resistance vs. Drain Current

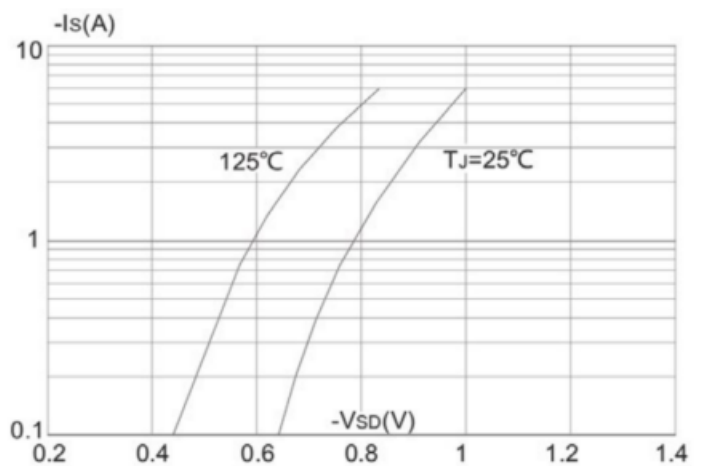


Figure 4: Body Diode Characteristics

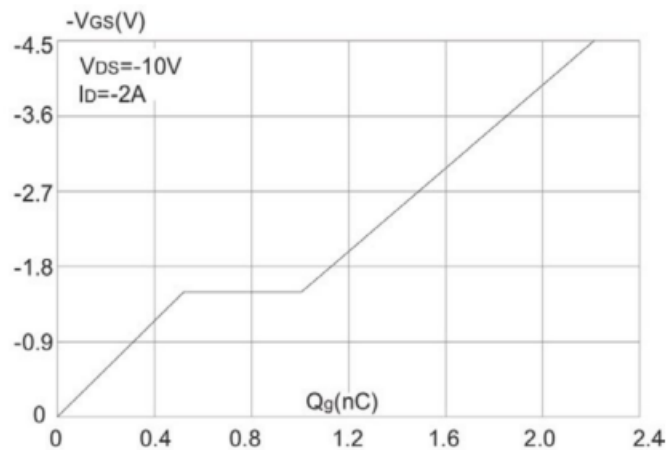


Figure 5: Gate Charge Characterist

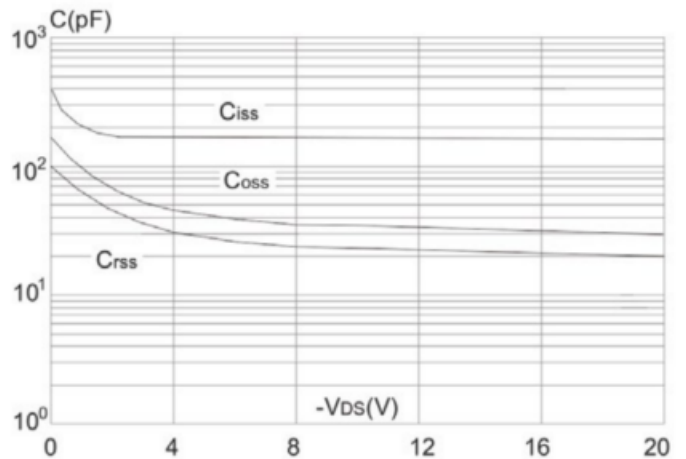


Figure 6: Capacitance Characteristics

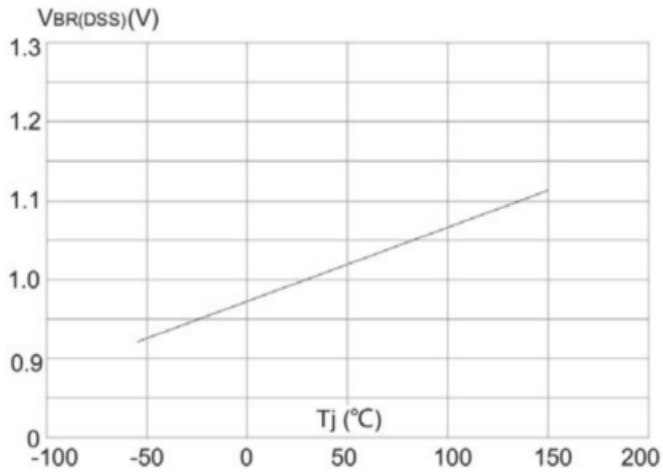


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

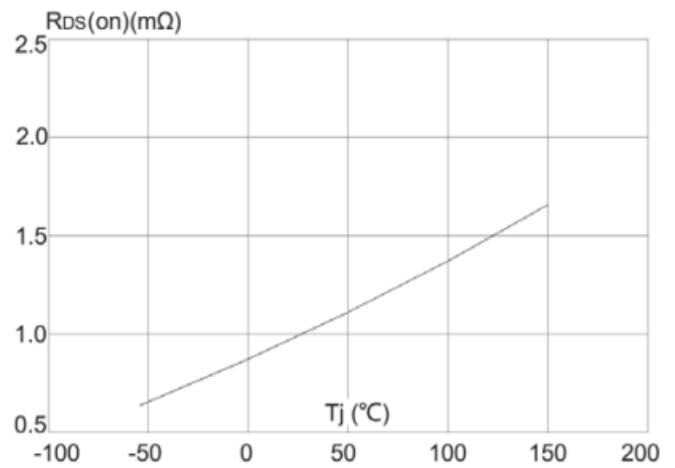


Figure 8: Normalized on Resistance vs. Junction Temperature

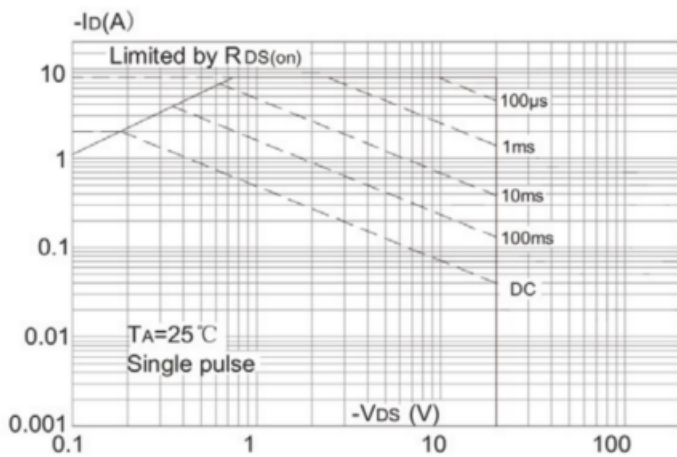


Figure 9: Maximum Safe Operating Area

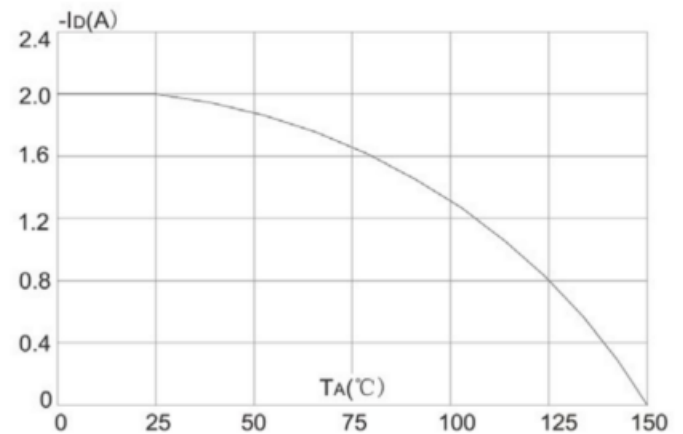


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

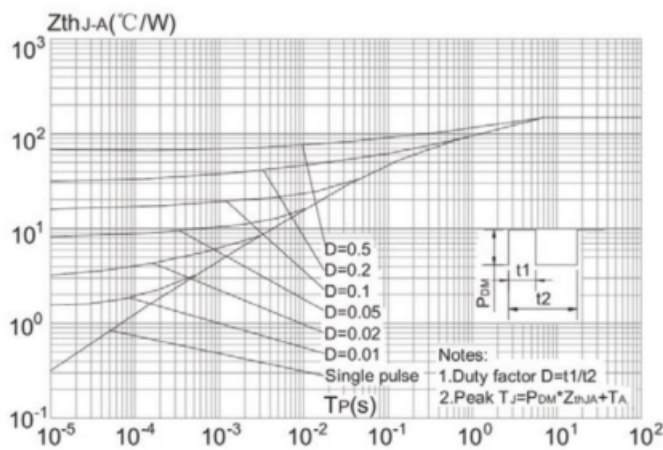
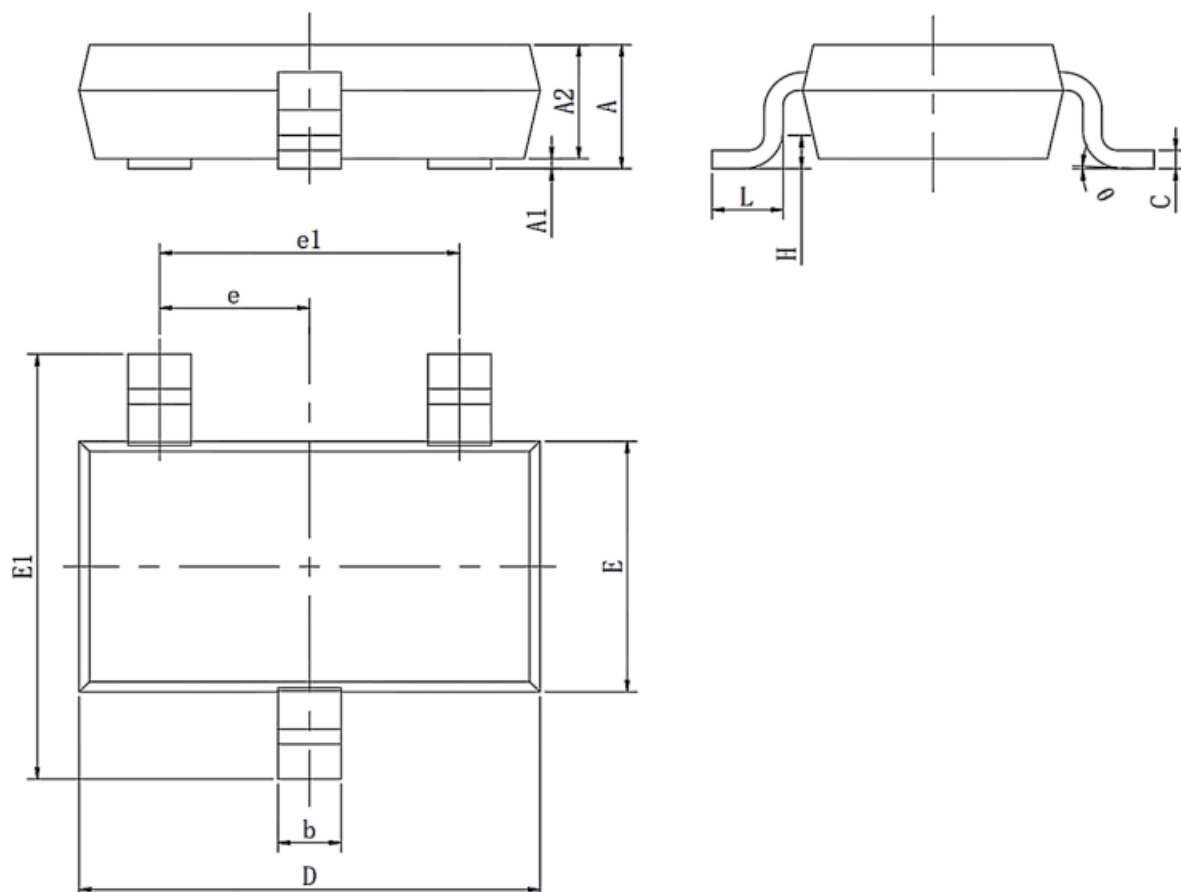


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Outline Dimensions

SOT-23
Unit : mm


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
C	0.080	0.200	0.003	0.008
D	2.800	3.020	0.110	0.119
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.95 (BSC)		0.037(BSC)	
e1	1.90 (BSC)		0.075(BSC)	
L	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

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