-2.5A, -20V P-CHANNEL ENHANCEMENT MODE POWER MOSFET

■ DESCRIPTION

The S I 2301 is the high cell density trenched P-ch MOSFETs, which provides excellent RDSON and efficiency for most of the small power switching and load switch applications.

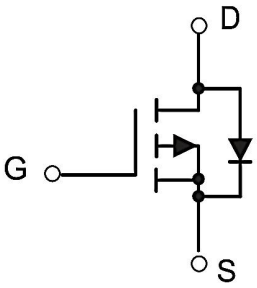
The S I 2301 meet the RoHS and Green Product requirement with full function reliability approved.

1. GATE
2. SOURCE
3. DRAIN

■ FEATURE

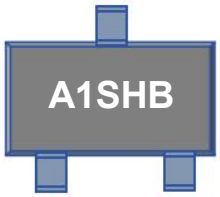
* Green Device Available
* Super Low Gate Charge
* Excellent Cdv/dt effect decline
* Advanced high cell density Trench technology

Equivalent Circuit



■ MARKING

Type Code: Marking: A1SHB



■ ABSOLUTE MAXIMUM RATINGS(TA=25°C, unless otherwise specified.)

SYMBOL	PARAMETER	VALUE	UNIT
VDS	Drain-Source Voltage	-20	V
VGS	Gate Source Voltage	±10	V
ID@TA=25℃	Continuous Drain Current, VGS @ -4.5V	-2.5	A
ID@TA=70℃	Continuous Drain Current, VGS @ -4.5V	-1.4	A
IDM	Pulsed Drain Current	-8	A
PD@TA=25℃	Total Power Dissipation	0.4	W
TJ	Storage Temperature	150	°C
TSTG	Thermal Resistance Fr .0om Junction To Ambient	-55~150	°C

■ THERMAL DATA

SYMBOL	PARAMETER	TYP.	MAX.	UNIT
RθJA	Thermal Resistance Junction-ambient		315	℃/W

■ ELECTRICAL CHARACTERISTICS (TA=25°C, unless otherwise specified)

SYMBOL	PARAMETER	TEST CONDITION	MIN.	TYP.	MAX.	UNITS
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250μA	-20			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-20V, V_{GS}=0V			-1	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS}=0V, V_{GS}=±12V			±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250μA	-0.4	-0.7	-1.0	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note2	V_{GS}=-4.5V, I_D=-2A		75	115	mΩ
		V_{GS}=-2.5V, I_D=-1.5A		135	160	
Dynamic Characteristics						
Ciss	Input Capacitance	V_{DS}=-10V, V_{GS}=0V f =1.0MHz		185		pF
Coss	Output Capacitance			35		pF
Crss	Reverse Transfer Capacitance			25		pF
Qg	Total Gate Charge	V_{DS}=-10V, I_D=-2A V_{GS}=-4.5V		2.2		nC
Qgs	Gate-Source Charge			0.5		nC
Qgd	Gate-Drain(“Miller”) Charge			0.5		nC
Switching Characteristics						
td(on)	Turn-on Delay Time	V_{DD}=-10V, R_L=5Ω R_{GEN}=3Ω,V_{GS}=-4.5V		10		ns
tr	Turn-on Rise Time			30		ns
td(off)	Turn-off Delay Time			63		ns
tf	Turn-off Fall Time			50		ns
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≤300μs, Duty Cycle≤2%

■ TYPICAL CHARACTERISTICS

Figure1: Output Characteristics

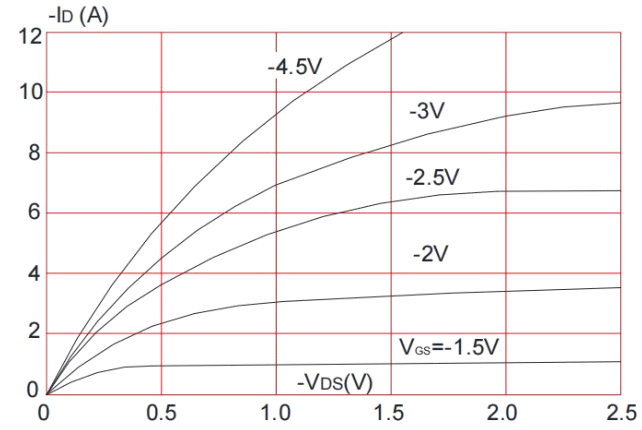


Figure 2: Typical Transfer Characteristics

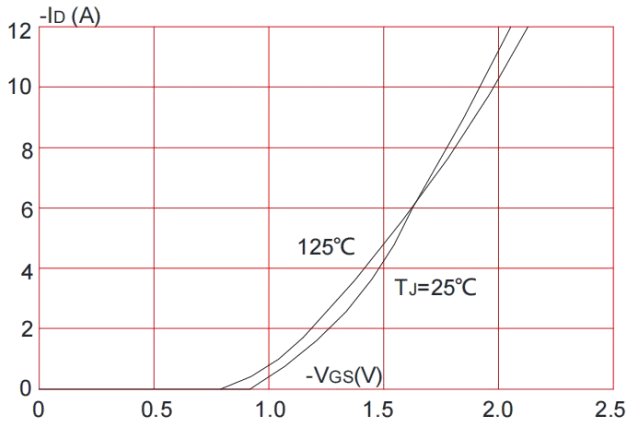


Figure 3: On-resistance vs. Drain Current

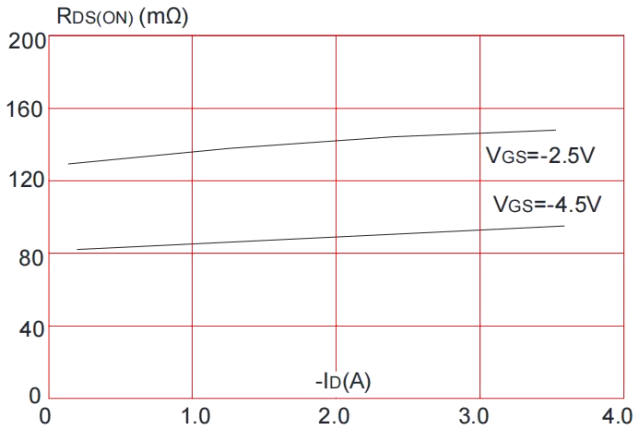


Figure 4: Body Diode Characteristics

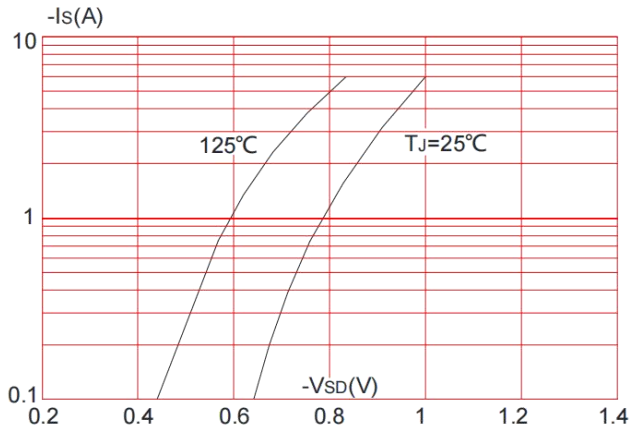


Figure 5: Gate Charge Characteristics

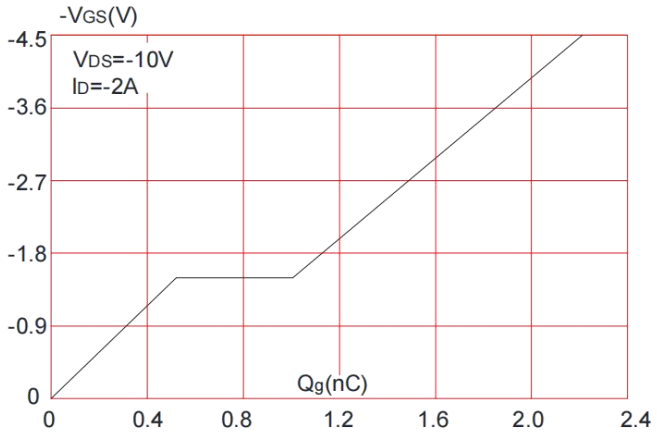
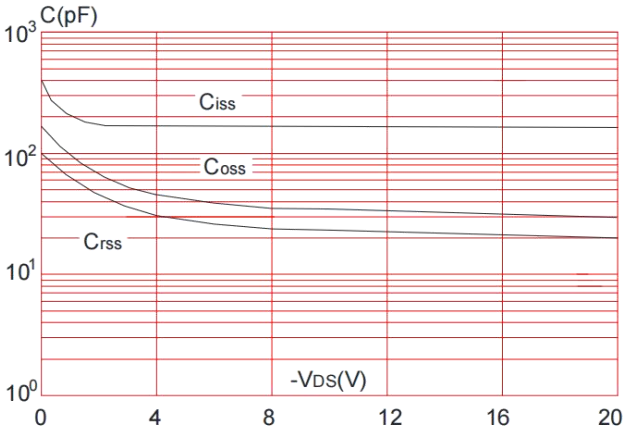


Figure 6: Capacitance Characteristics



■ TYPICAL CHARACTERISTICS

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

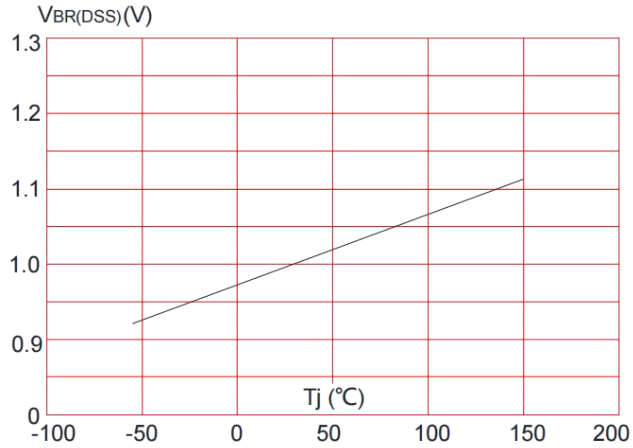


Figure 8: Normalized on Resistance vs. Junction Temperature

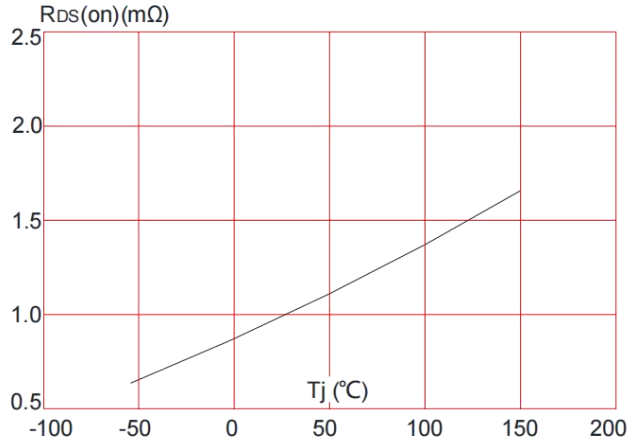


Figure 9: Maximum Safe Operating Area

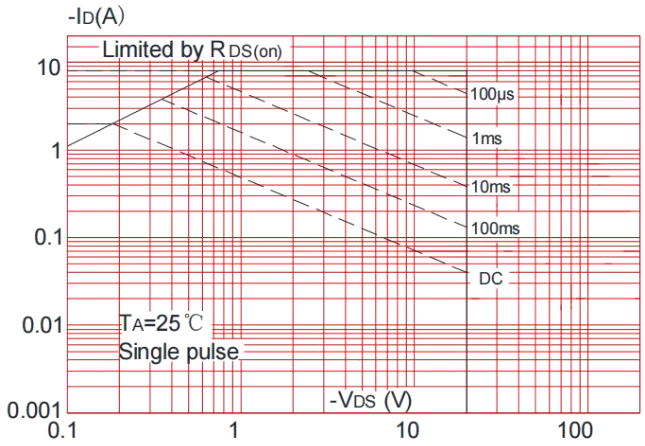


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

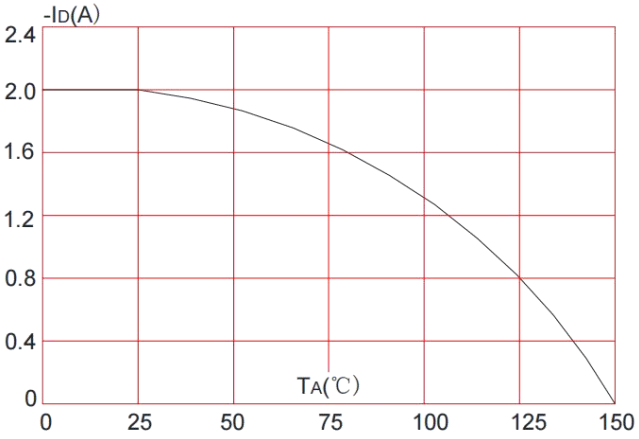
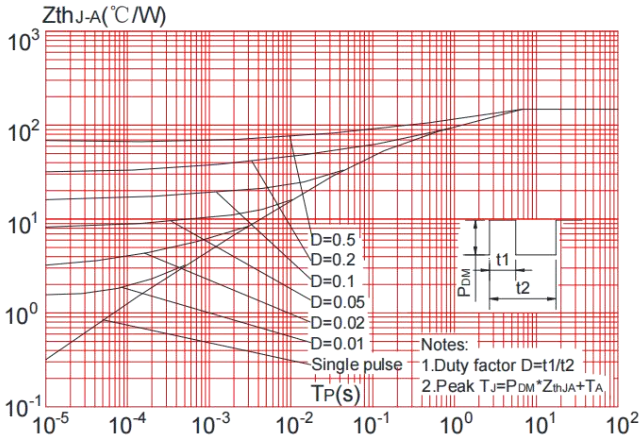
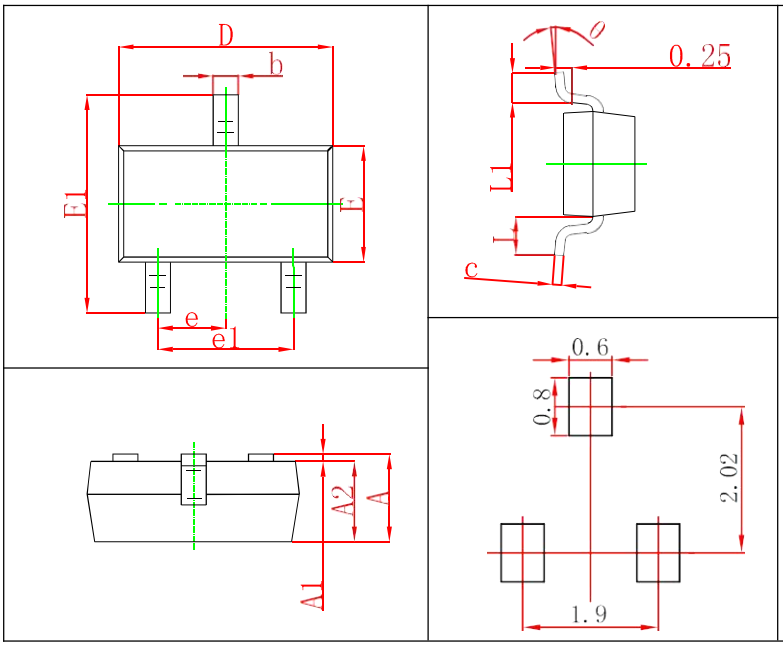


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



■ SOT23 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.9	1.15	0.035	0.045
A1	0	0.1	0	0.004
A2	0.9	1.05	0.035	0.041
b	0.3	0.5	0.012	0.02
c	0.08	0.15	0.003	0.006
D	2.8	3	0.11	0.118
E	1.2	1.4	0.047	0.055
E1	2.25	2.55	0.089	0.1
e	0.950 TYP		0.037 TYP	
e1	1.8	2	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.25	0.45	0.01	0.02
θ	0°	8°	0°	8°

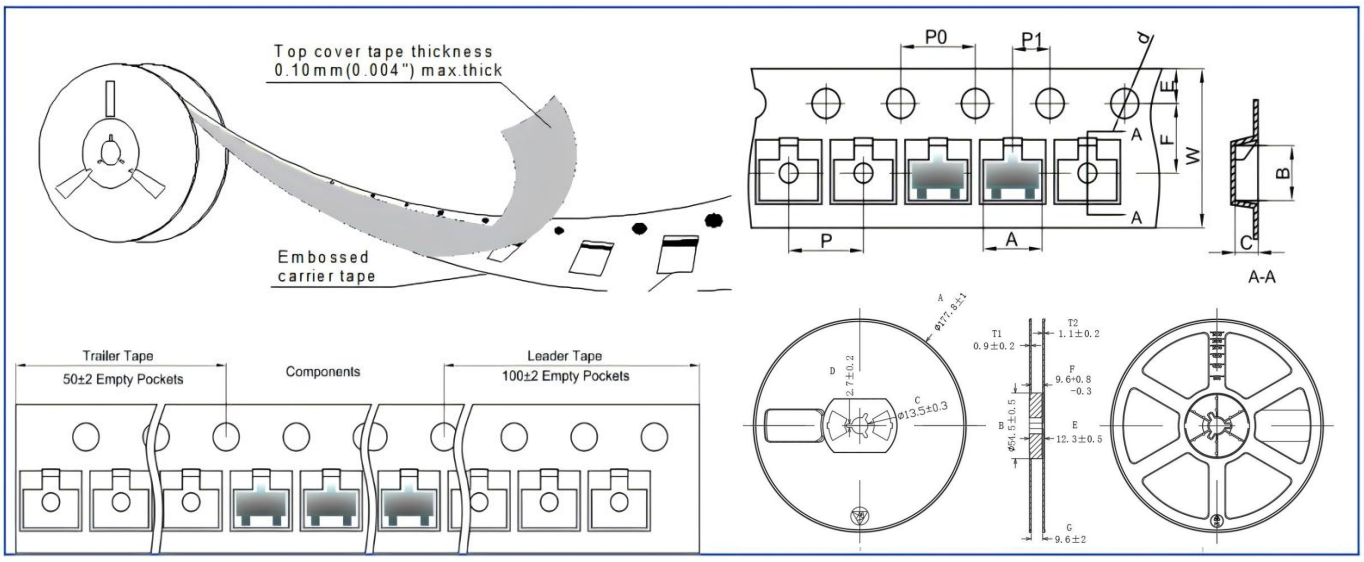
Note:

1.Controlling dimension:in millimeters.

2.General tolerance:±0.05mm.

3.The pad layout is for reference purposes only.

■ REEL PACKING



Dimensions are in millimeter										
PKG TYPE	A	B	C	d	E	F	Po	P	P1	W
SOT-23	3.17	2.77	1.22	Φ1.55	1.75	3.50	4.00	4.00	2.00	8.00

Reel Optiom	A	B	C	D	E	F	G	T1	T2	Q.TY PER REEL
7" Dia	Φ177.8	Φ54.5	Φ13.5	2.7	12.3	9.6	9.6	0.9	1.1	3000PCS