SI2307

P-Ch 30V Fast Switching MOSFETs

V_{DSS}	-30 V
I_D	-3 A
$R_{DS(ON)}$	65 m Ω

DESCRIPTION

The SI2307 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.

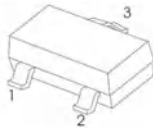
The SI2307meet the RoHS and Green Product requirement with full function reliability approved.

FEATURES

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

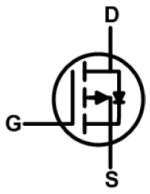
S7

SOT-23



1. GATE
2. SOURCE
3. DRAIN

Equivalent Circuit



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_A=25℃	Continuous Drain Current	-3	A
I_D@T_A=70℃	Continuous Drain Current	-1.6	A
I_{DM}	Pulsed Drain Current[2]	-10	A
P_D@T_A=25℃	Total Power Dissipation[3]	1.4	W
P_D@T_A=70℃	Total Power Dissipation[3]	0.9	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	105	℃/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1] (t ≤10s)	---	---	℃/W

Electrical Characteristics (T_J=25℃ unless otherwise specified)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-30	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.02	---	V/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-27V , V_{GS}=0V , T_J=25℃	---	---	-1	uA
		V_{DS}=-24V , V_{GS}=0V , T_J=125℃	---	---	-10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V , I_D=-3A	---	65	95	mΩ
		V_{GS}=-4.5V , I_D=-2A	---	110	145	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-1.0	-1.6	-2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-2.8	---	mV/℃
gfs	Forward Transconductance	V_{DS}=-10V , I_D=-1A	---	3	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[2,3]	V_{DS}=-24V , V_{GS}=-4.5V , I_D=-2A	---	2.5	---	nC
Q_{gs}	Gate-Source Charge[2,3]		---	0.1	---	
Q_{gd}	Gate-Drain Charge[2,3]		---	1.8	---	
$T_{d(on)}$	Turn-On Delay Time[2,3]	V_{DD}=-15V , V_{GS}=-10V , R_G=6Ω I_D=-1A	---	6.1	---	ns
T_r	Rise Time[2,3]		---	8.7	---	
$T_{d(off)}$	Turn-Off Delay Time[2,3]		---	33.2	---	
T_f	Fall Time[2,3]		---	3.7	---	
C_{iss}	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , F=1MHz	---	226	---	pF
C_{oss}	Output Capacitance		---	39	---	
C_{rss}	Reverse Transfer Capacitance		---	29	---	
R_g	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	9.5	---	Ω

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	-3.3	A
I_{SM}	Pulsed Source Current		---	---	-6.6	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1.2	V

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

RATING AND CHARACTERISTIC CURVES

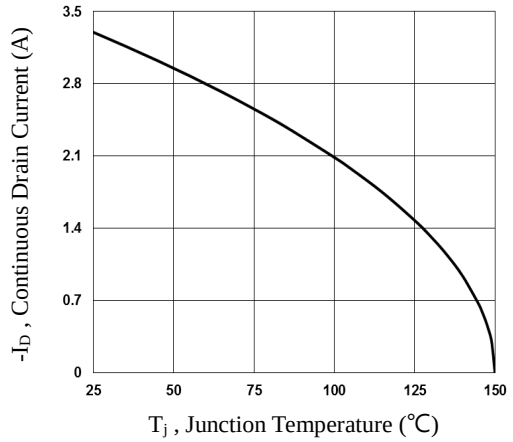


Fig.1 Continuous Drain Current vs. T_C

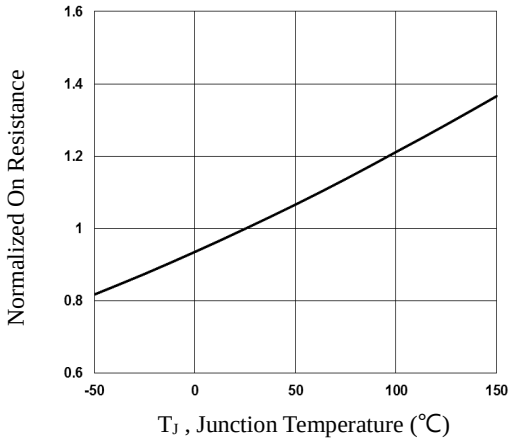


Fig.2 Normalized RDSON vs. T_J

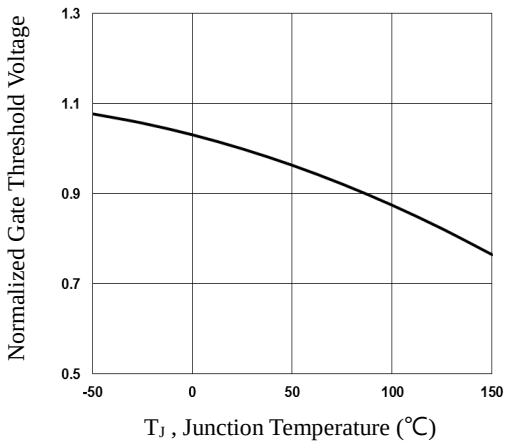


Fig.3 Normalized V_{th} vs. T_J

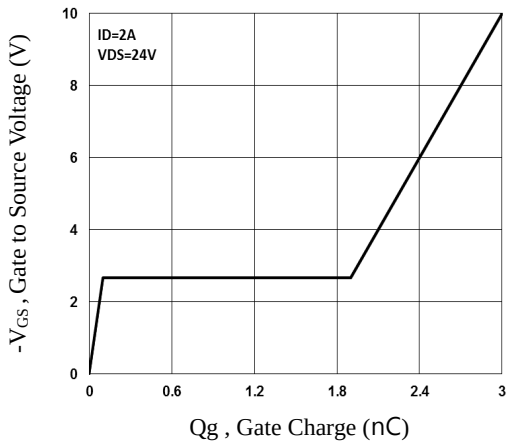


Fig.4 Gate Charge Waveform

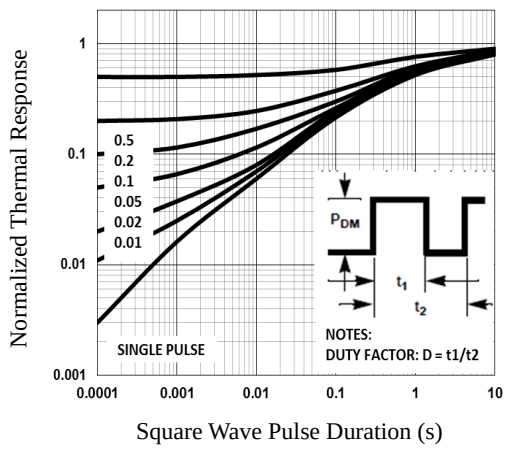


Fig.5 Normalized Transient Impedance

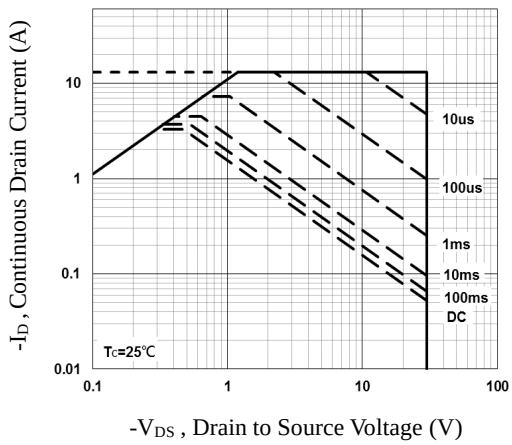


Fig.6 Maximum Safe Operation Area

RATING AND CHARACTERISTIC CURVES

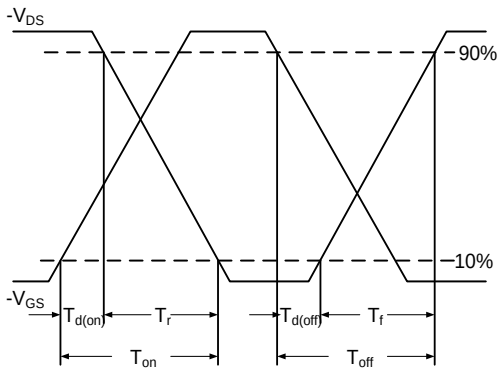


Fig.7 Switching Time Waveform

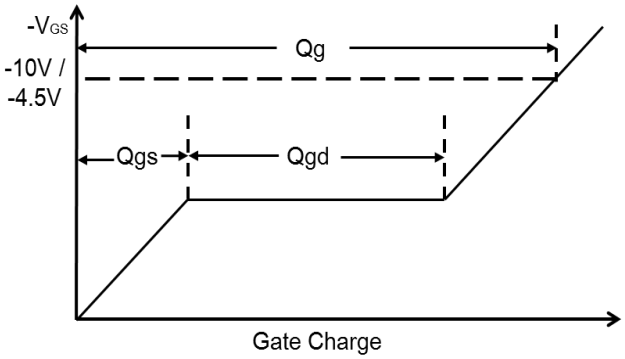
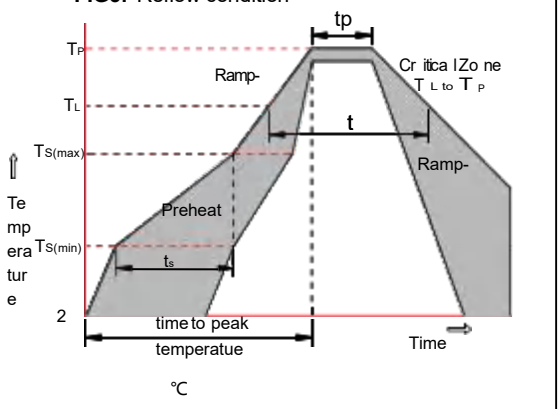


Fig.8 Gate Charge Waveform

Soldering parameters

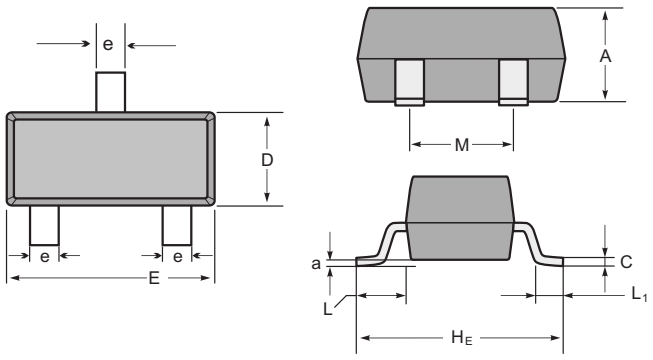
Reflow Condition		Pb-Free assembly (see as bellow)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150℃
	-Temperature Max($T_{s(max)}$)	+200℃
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3℃/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3℃/sec. Max
Reflow	-Temperature(T_L)(Liquid us)	+217℃
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_p)		+260(+0/-5)℃
Time within 5℃ of actual Peak Temp (t_p)		30 secs. Max
Ramp-down Rate		6℃/sec. Max
Time 25℃ to Peak Temp (T_P)		8 min. Max
Do not exceed		+260℃

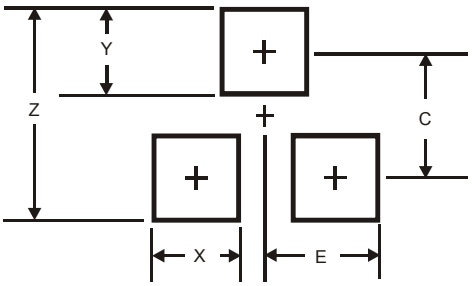
FIG5: Reflow condition



Package Dimensions & Suggested Pad Layout

SOT23





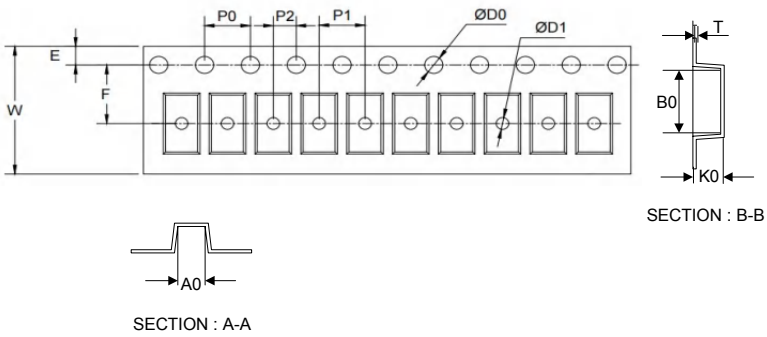
SOT-23 mechanical data

UNIT		A	C	D	E	H_E	e	M	L	L_1	a
mm	max	1.1	0.15	1.4	3.0	2.6	0.5	1.95	0.55 (ref)	0.36 (ref)	0.0
	min	0.9	0.08	1.2	2.8	2.2	0.3	1.7			0.15
mil	max	43	6	55	118	102	20	77	22 (ref)	14 (ref)	0.0
	min	35	3	47	110	87	12	67			6

Dimensions	SOT23
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

Tape & rell specification

Tape

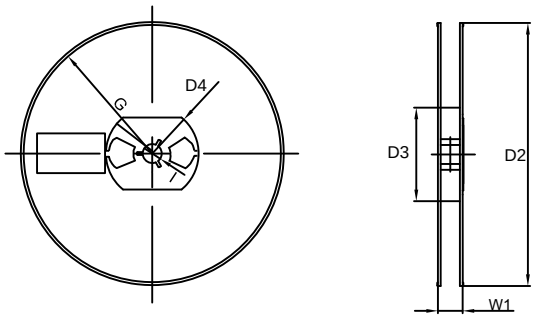


SECTION : B-B

SECTION : A-A

Symbol	Dimension (mm)
P0	4.00±0.10
P1	4.00±0.10
P2	2.00±0.10
D0	1.55±0.10
D1	1.05±0.10
E	1.55±0.10
F	3.60±0.10
W	8.00±0.10
A0	3.80±0.20
B0	3.25±0.20
K0	1.45±0.10
T	0.25±0.05

7” Reel



D2	178.0±3.0
D3	55Min.
D4	R24.0±3.0
G	R82.0±3.0
I	13.0±2.0
W1	11.0±3.0

Quantity: 3000PCS

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