

Description

The SI2312A is the high cell density trench N-ch MOSFETs, which provides excellent $R_{DS(on)}$ and efficiency for most of the small power switching and load switch applications.

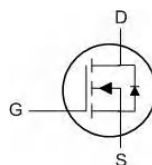
The SI2312A meet the RoHS and Green Product requirement with full function reliability approved.

V_{DS} 20 V
 I_D 7 A
 $R_{DS(on)}$ 12m Ω

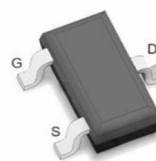
ANV

Features

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



Schematic Diagram



SOT-23-3L top view

MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D @ T_A = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 4.5\text{V}^1$	7.0	A
$I_D @ T_A = 70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 4.5\text{V}^1$	5.0	A
I_{DM}	Pulsed Drain Current ²	32	A
$P_D @ T_A = 25^\circ\text{C}$	Total Power Dissipation ³	2	W
$P_D @ T_A = 70^\circ\text{C}$	Total Power Dissipation ³	0.66	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	120	$^\circ\text{C/W}$

Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

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,	-	-	1.0	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	0.5	0.75	1.2	V
R _{DS(on)}	Static Drain-Source on-Resistance note2	V _{GS} =4.5V, I _D =6A	-	12	15	mΩ
		V _{GS} =2.5V, I _D =5A	-	16	22.5	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=1.0MHz	-	700	-	pF
C _{oss}	Output Capacitance		-	132	-	pF
C _{rss}	Reverse Transfer Capacitance		-	114	-	pF
Q _g	Total Gate Charge	V _{DS} =10V, I _D =4A, V _{GS} =4.5V	-	15	-	nC
Q _{gs}	Gate-Source Charge		-	2	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	5.2	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DS} =10V, I _D =4A, R _{GEN} =3Ω, V _{GS} =4.5V	-	9	-	ns
t _r	Turn-on Rise Time		-	25	-	ns
t _{d(off)}	Turn-off Delay Time		-	37	-	ns
t _f	Turn-off Fall Time		-	14	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	8	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	32	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S =8A	-	-	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 $\leq 0.5\%$

RATING AND CHARACTERISTIC CURVES

Figure1: Output Characteristics

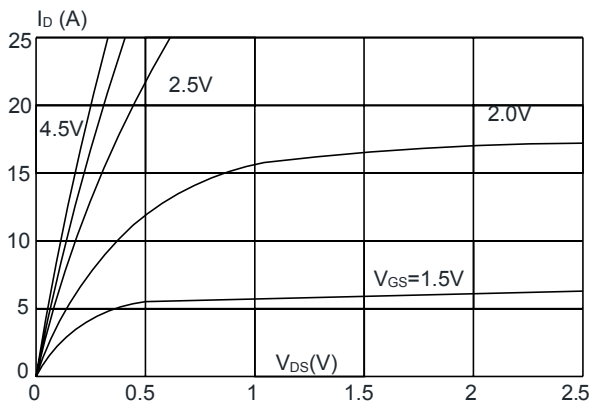


Figure 2: Typical Transfer Characteristics

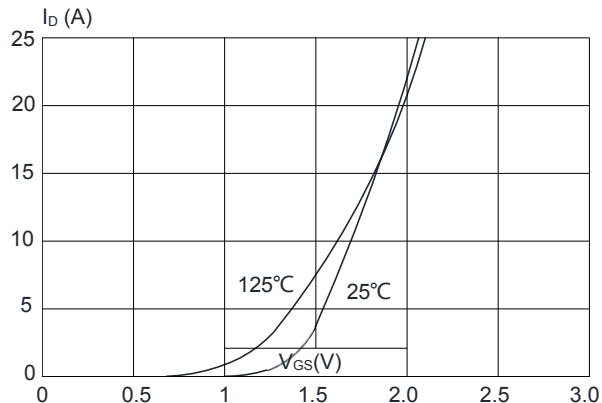


Figure 3: On-resistance vs. Drain Current

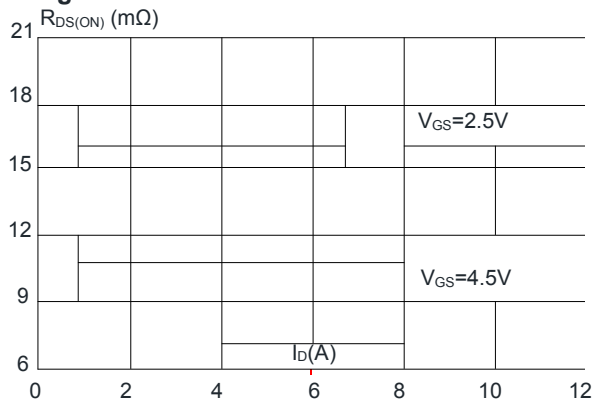


Figure 4: Body Diode Characteristics

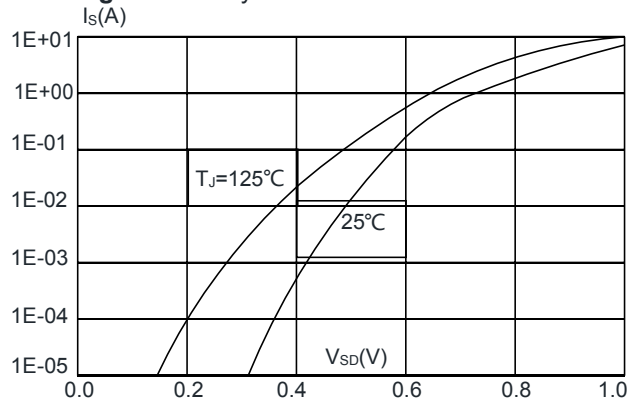


Figure 5: Gate Charge Characteristics

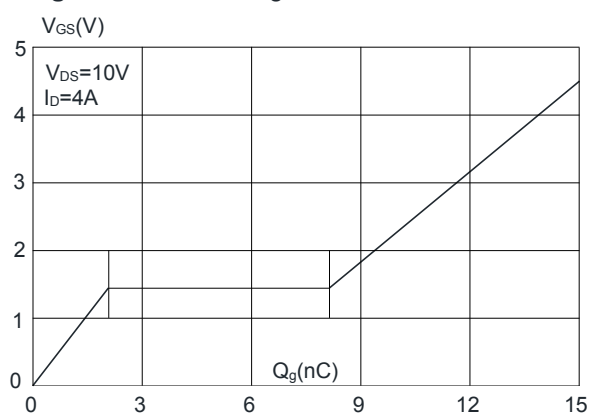
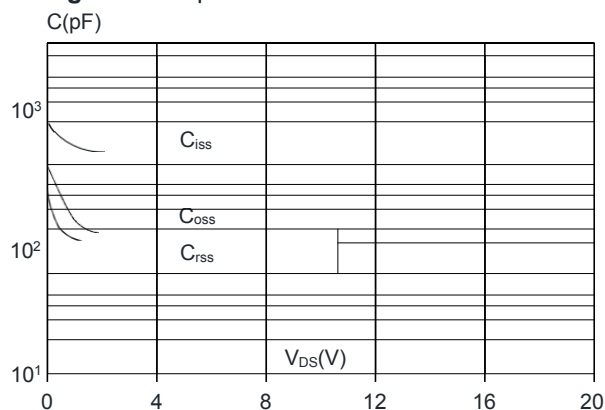


Figure 6: Capacitance Characteristics



RATING AND CHARACTERISTIC CURVES

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

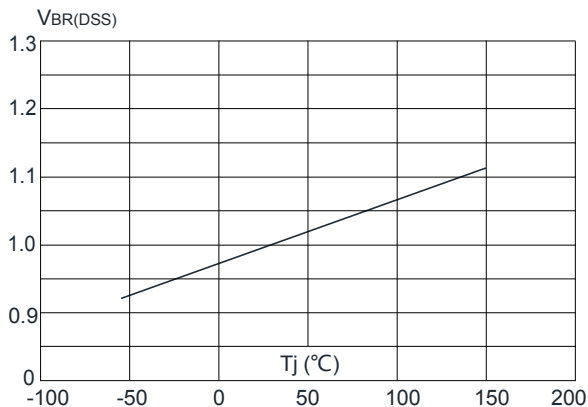


Figure 8: Normalized on Resistance vs. Junction Temperature

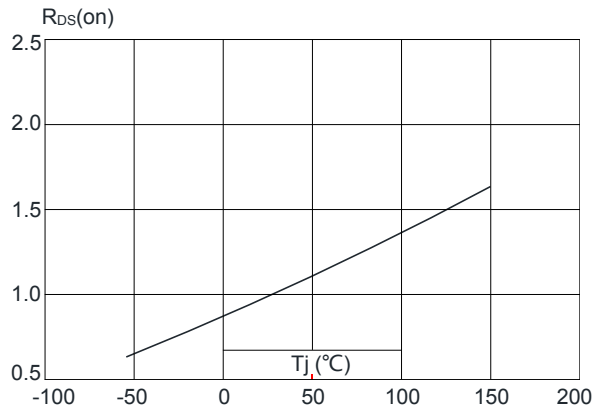


Figure 9: Maximum Safe Operating Area

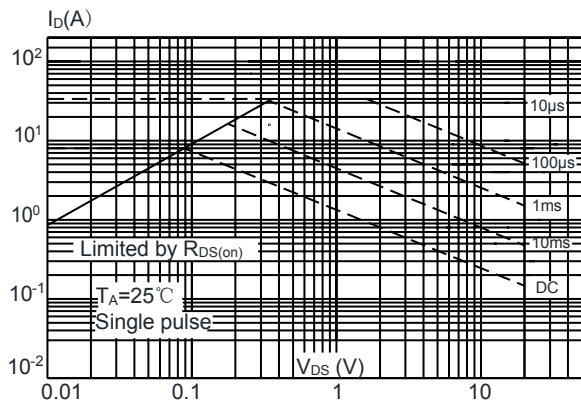


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

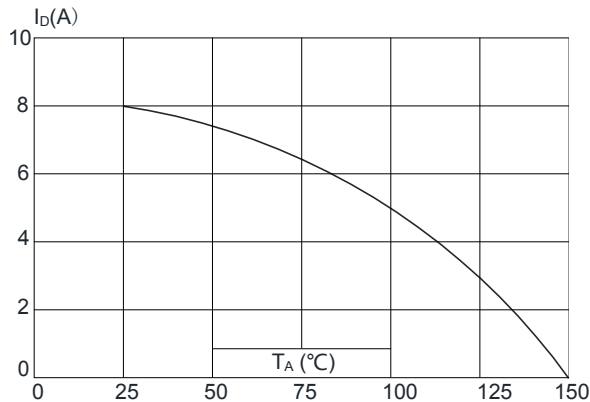
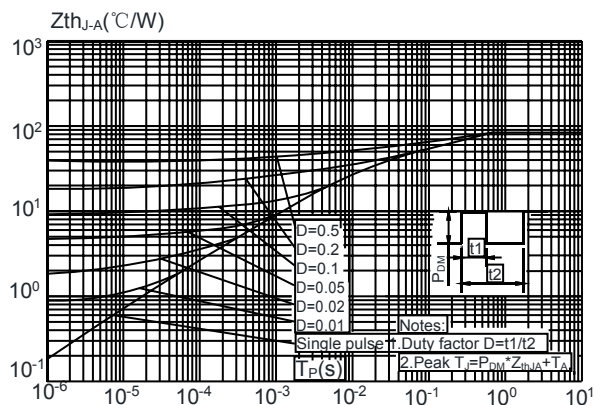
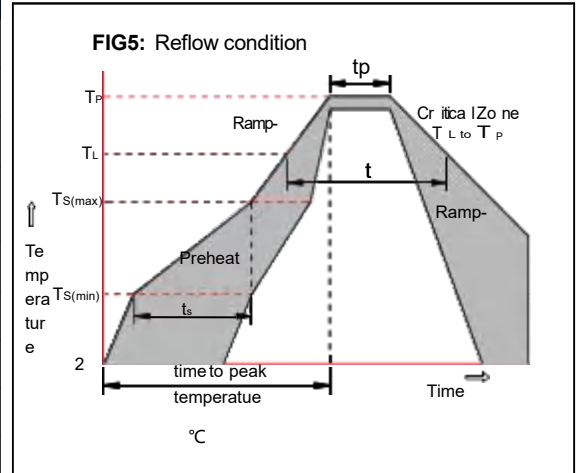


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



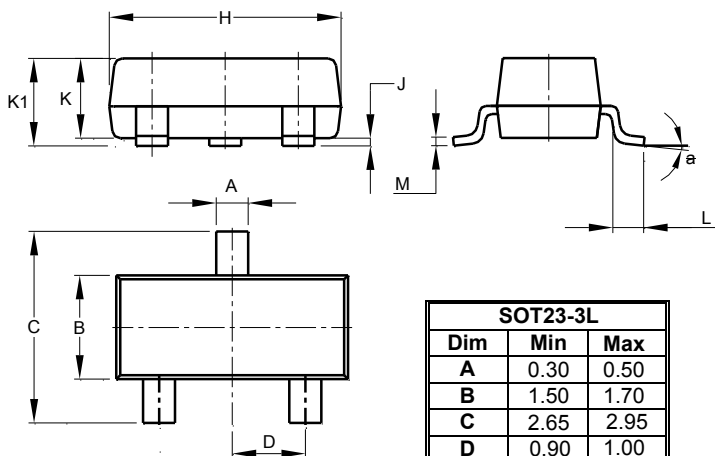
Soldering parameters

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

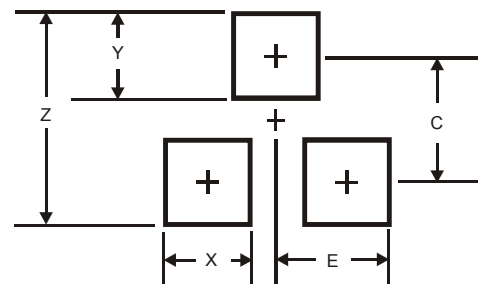


Package Dimensions & Suggested Pad Layout

SOT23-3L

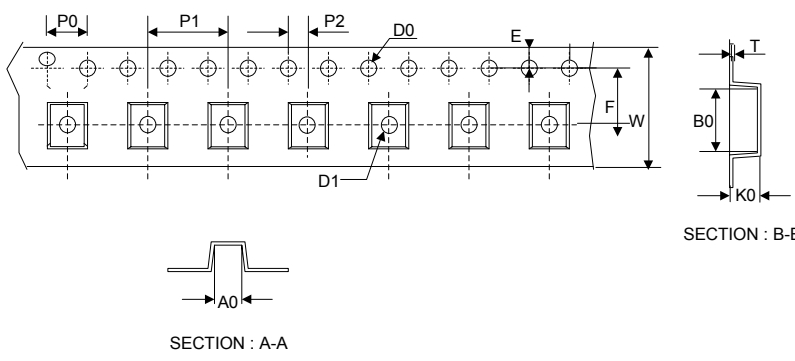
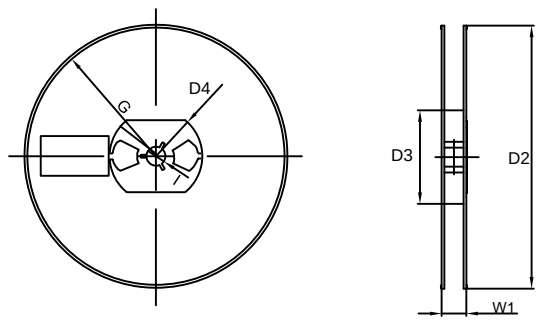


SOT23-3L		
Dim	Min	Max
A	0.30	0.50
B	1.50	1.70
C	2.65	2.95
D	0.90	1.00
H	2.82	3.02
J		0.10
K	1.05	1.15
K1	1.05	1.25
L	0.30	0.60
M	0.10	0.20
a	0°	8°
All Dimensions in mm		



Dimensions	SOT23-3L
Z	3.3
X	0.9
Y	1.0
C	2.3
E	1.40

Tape & reel specification

Tape		Symbol	Dimension (mm)
 SECTION : A-A SECTION : B-B		P0	4.00±0.20
		P1	4.00±0.20
		P2	2.00±0.20
		D0	1.55±0.20
		D1	1.05±0.20
		E	1.55±0.20
		F	3.60±0.20
		W	8.00±0.20
		A0	3.80±0.20
		B0	3.50±0.20
		K0	1.55±0.20
		T	0.25±0.15
7" Reel		D2	178.0±5.0
		D3	55Min.
		D4	R24.0±3.0
		G	R82.0±3.0
		I	13.0±2.0
		W1	11.0±3.0
		Quantity: 3000PCS	