





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

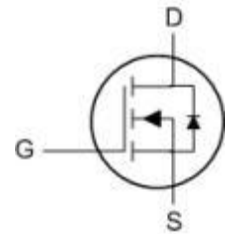

Product Summary

BVDSS	RDSON	ID
30V	29mΩ	4.0A

Description

The SI2306 is the high cell density trenched N-ch MOSFETs, which provides excellent RDSON and efficiency for most of the small power switching and load switch applications.

The SI2306 meet the RoHS and Green Product requirement with full function reliability approved.

SOT23 Pin Configuration

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_A=25^\circ C$	Continuous Drain Current, $V_{GS}@ 10V^1$	4.0	A
$I_D@T_A=70^\circ C$	Continuous Drain Current, $V_{GS}@ 10V^1$	2.6	A
I_{DM}	Pulsed Drain Current ²	16.4	A
$P_D@T_A=25^\circ C$	Total Power Dissipation ³	1	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	---	125	°C/ W
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	80	°C/ W

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=30V, V_{GS}=0V,$	-	-	1.0	μA
I_{GSS}	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}= \pm 20V$	-	-	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.5	2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note2</small>	$V_{GS}=10V, I_D=4A$	-	29	38	m Ω
		$V_{GS}=4.5V, I_D=3A$	-	45	65	
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=15V, V_{GS}=0V,$ $f=1.0MHz$	-	233	-	pF
C_{oss}	Output Capacitance		-	44	-	pF
C_{riss}	Reverse Transfer Capacitance		-	33	-	pF
Q_g	Total Gate Charge	$V_{DS}=15V, I_D=2A,$ $V_{GS}=10V$	-	3	-	nC
Q_{gs}	Gate-Source Charge		-	0.5	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	0.8	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=15V,$ $I_D=4A, R_{GEN}=3\Omega,$ $V_{GS}=10V$	-	4	-	ns
t_r	Turn-on Rise Time		-	2.1	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	15	-	ns
t_f	Turn-off Fall Time		-	3.2	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	4	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	16	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=4A$	-	-	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 $\leq 0.5\%$

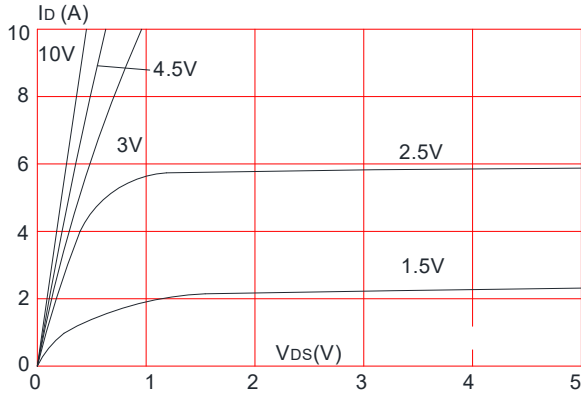
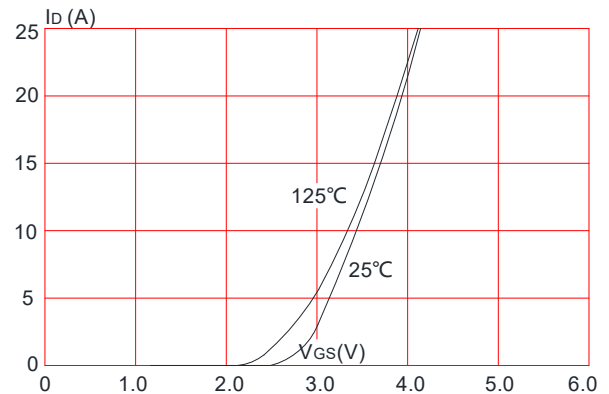
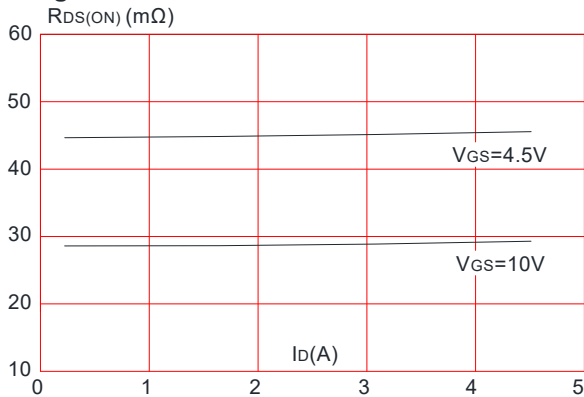
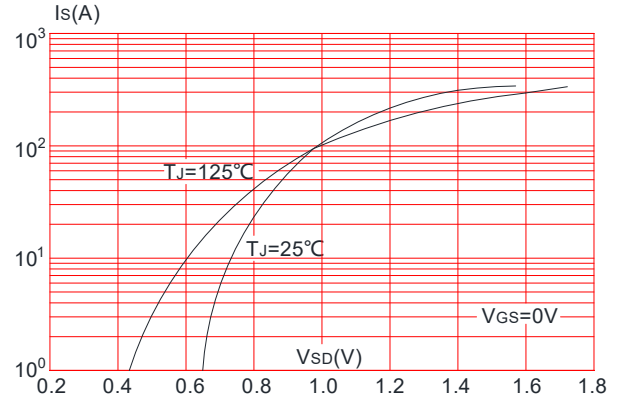
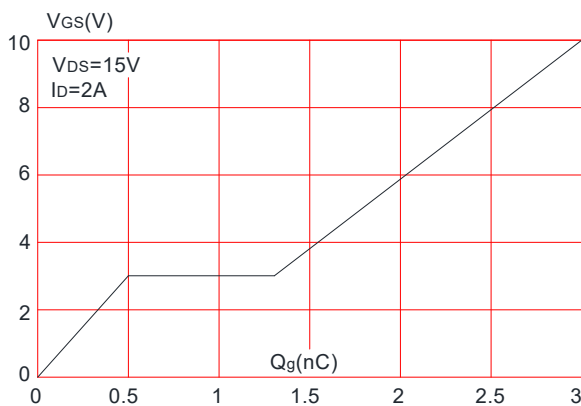
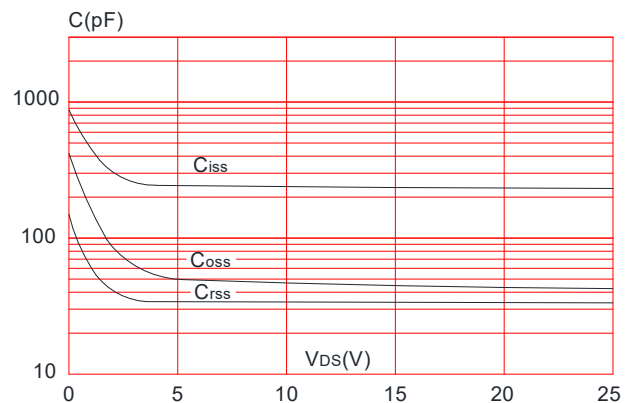
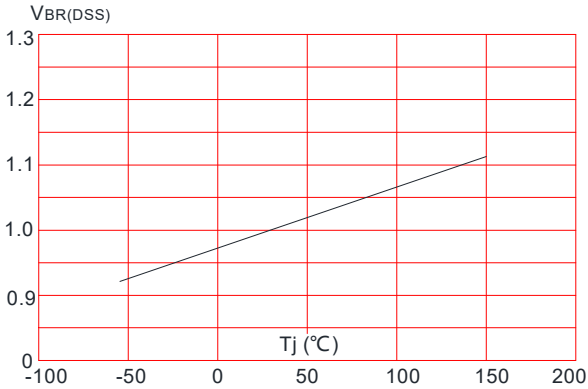
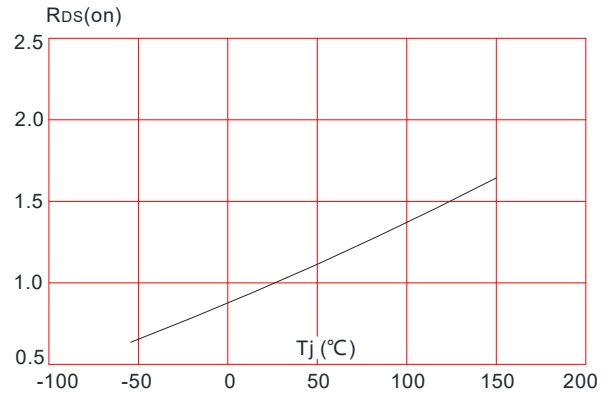
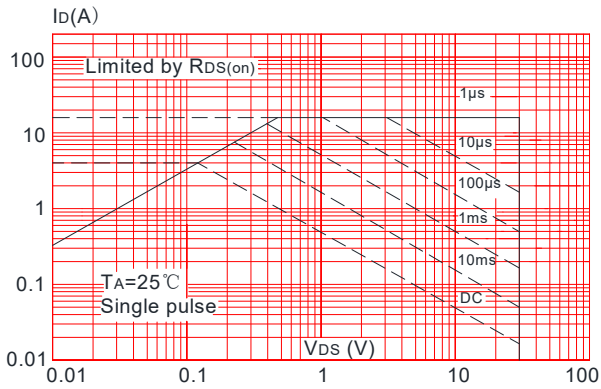
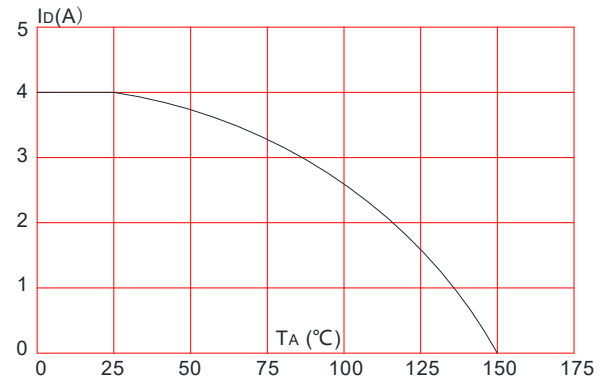
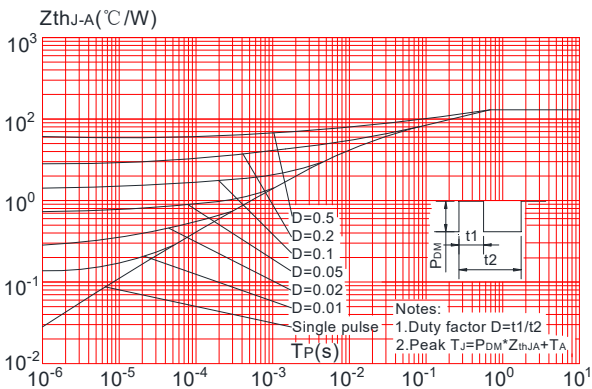
Typical Performance Characteristics
Figure 1: Output Characteristics

Figure 2: Typical Transfer Characteristics

Figure 3: On-resistance vs. Drain Current

Figure 4: Body Diode Characteristics

Figure 5: Gate Charge Characteristics

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


Test Circuit

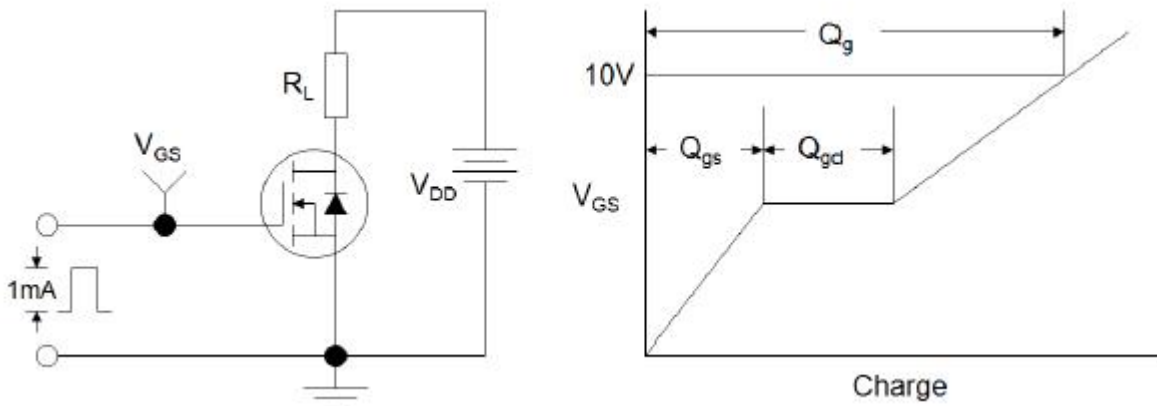


Figure1:Gate Charge Test Circuit & Waveform

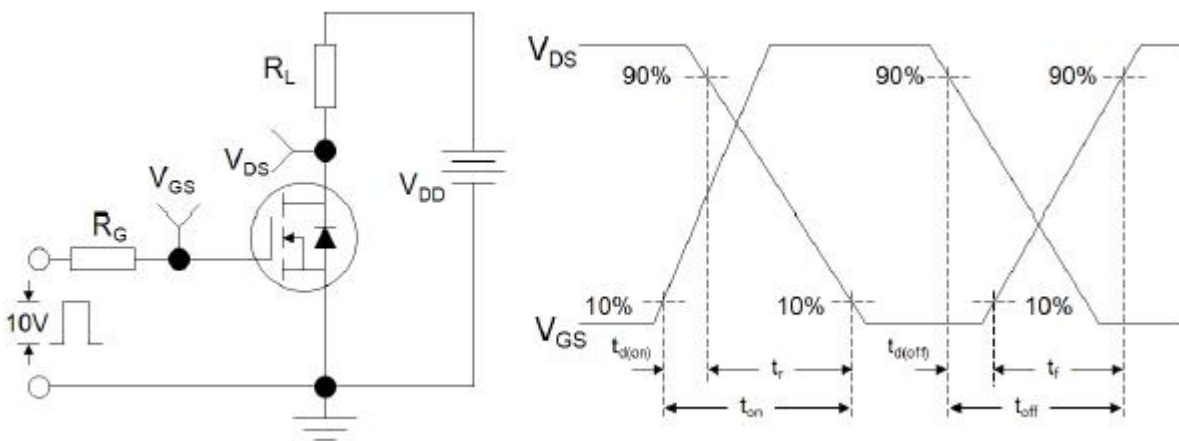


Figure 2: Resistive Switching Test Circuit & Waveforms

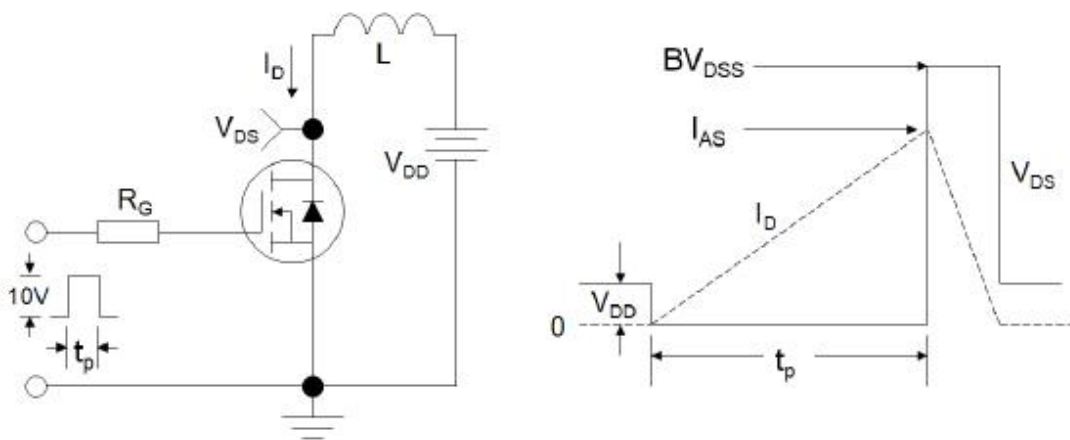
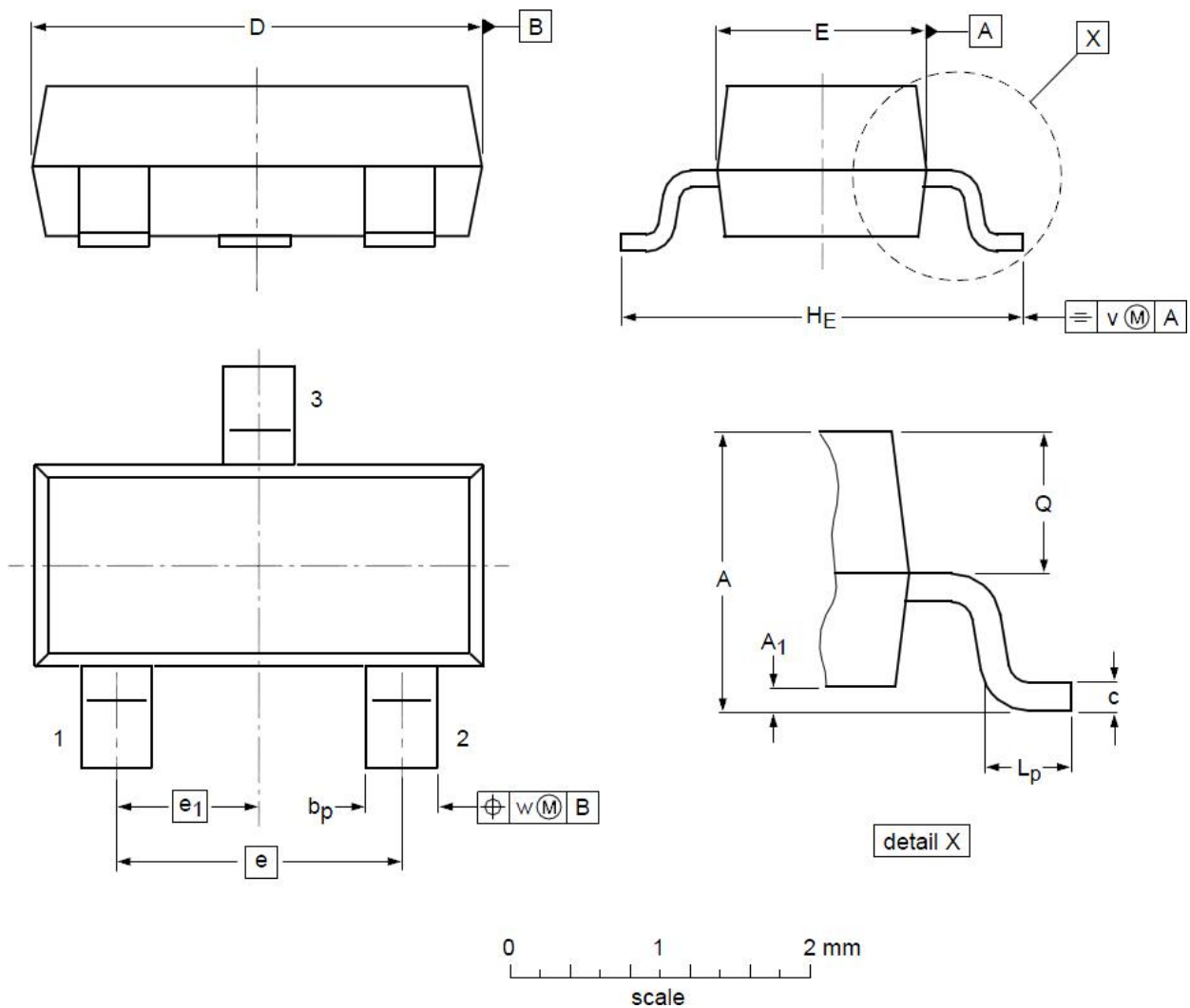


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

Package Mechanical Data-SOT-23

DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.90	1.01	1.15	A ₁	0.01	0.05	0.10
b _p	0.30	0.42	0.50	c	0.08	0.13	0.15
D	2.80	2.92	3.00	E	1.20	1.33	1.40
e	--	1.90	--	e ₁	--	0.95	--
H _E	2.25	2.40	2.55	L _p	0.30	0.42	0.50
Q	0.45	0.49	0.55	v	--	0.20	--
w	--	0.10	--				