



### CST2311L P-Ch 20V Fast Switching MOSFETs

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

#### CST2311L Product Summary



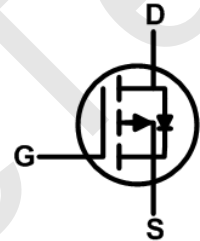
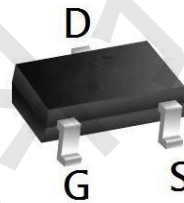
BVDSS	RDSON	ID
-20V	24mΩ	-5.0A

#### CST2311L Description

The CST2311L is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications

The CST2311L meet the RoHS and Green Product requirement with full function reliability approved.

#### CST2311L SOT 23-3L Pin Configurations



#### CST2311L Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	-20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-5.0	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-3.0	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	-16	A
$P_D @ T_A = 25^\circ C$	Total Power Dissipation <sup>3</sup>	1.31	W
$P_D @ T_A = 70^\circ C$	Total Power Dissipation <sup>3</sup>	0.84	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

#### CST2311L Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup>	---	125	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup> (t ≤ 10s)	---	---	$^\circ C/W$



### CST2311L P-Ch 20V Fast Switching MOSFETs

#### CST2311L Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> = -250μA	-20	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = -20V, V <sub>GS</sub> =0V,	-	-	-1	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±12V	-	-	±100	nA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> = -250μA	-0.4	-0.7	-1.0	V
R <sub>DS(on)</sub>	Static Drain-Source on-Resistance <small>note2</small>	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -4.1A	-	24	29	mΩ
		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -3A	-	29	39	
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = -10V, V <sub>GS</sub> =0V, f=1.0MHz	-	830	-	pF
C <sub>oss</sub>	Output Capacitance		-	132	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	85	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> = -10V, I <sub>D</sub> = -2A, V <sub>GS</sub> = -4.5V	-	8.8	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	1.4	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	1.9	-	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> = -10V, I <sub>D</sub> = -3.3A, R <sub>G</sub> = 1Ω, V <sub>GEN</sub> = -4.5V	-	10	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	32	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	50	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	51	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	-5.0	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-16	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> = -4.1A	-	-	-1.2	V

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%



## CST2311L Typical Performance Characteristics

Figure 1: Output Characteristics

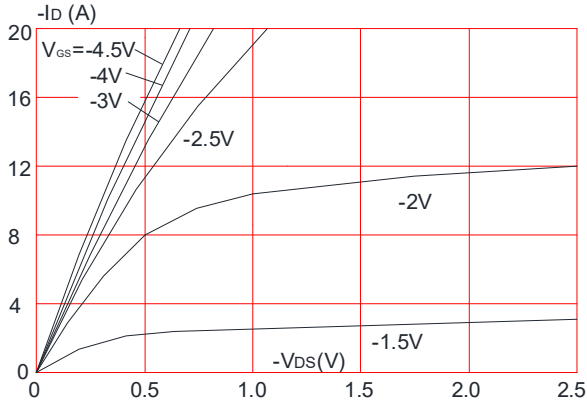


Figure 2: Typical Transfer Characteristics

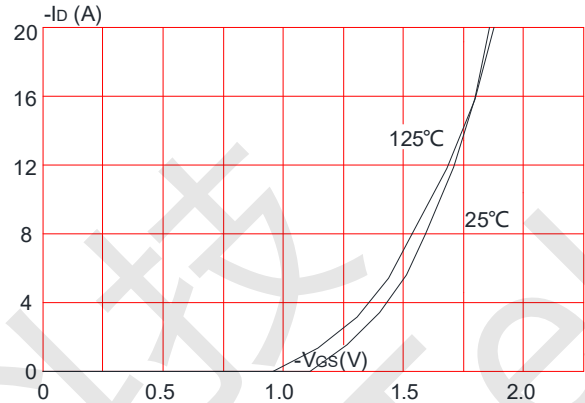


Figure 3: On-resistance vs. Drain Current

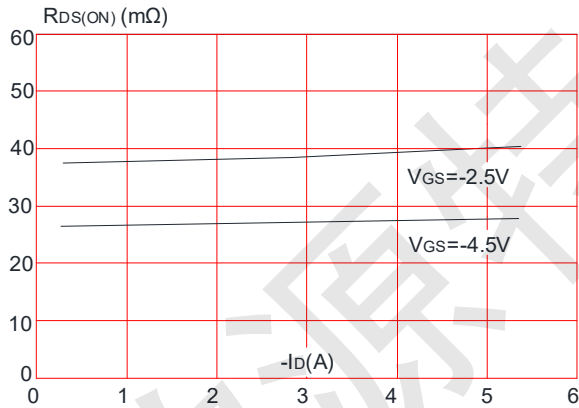


Figure 4: Body Diode Characteristics

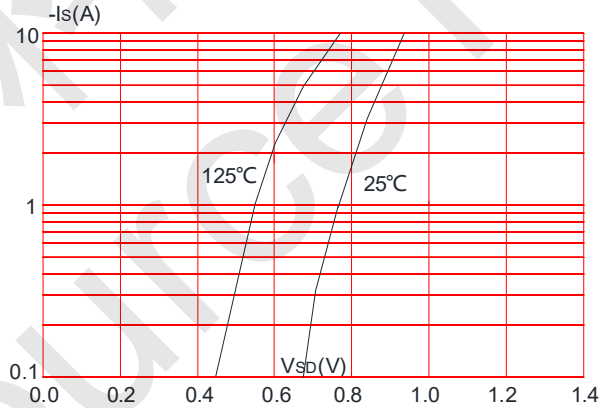


Figure 5: Gate Charge Characteristics

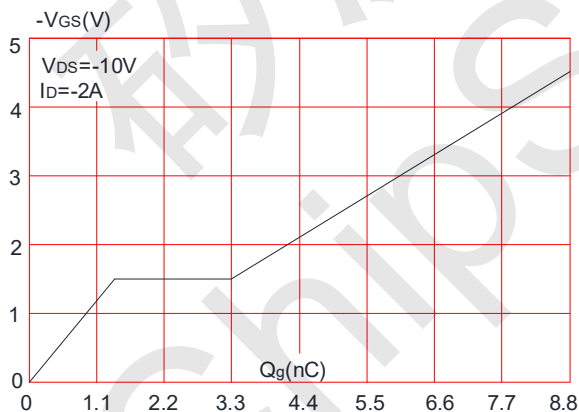
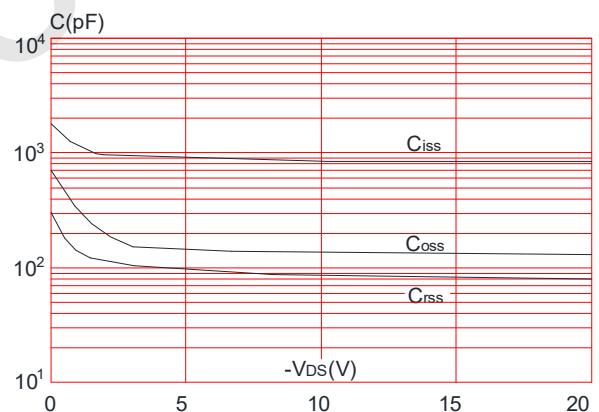


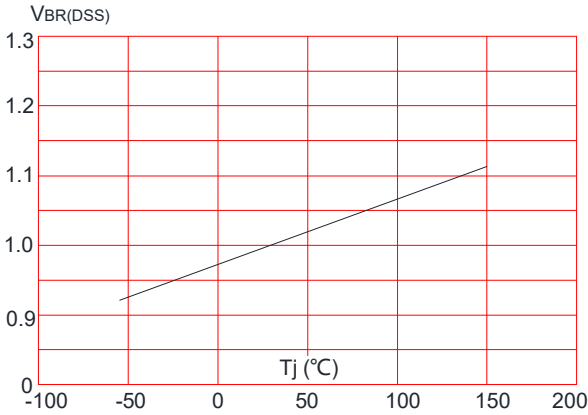
Figure 6: Capacitance Characteristics



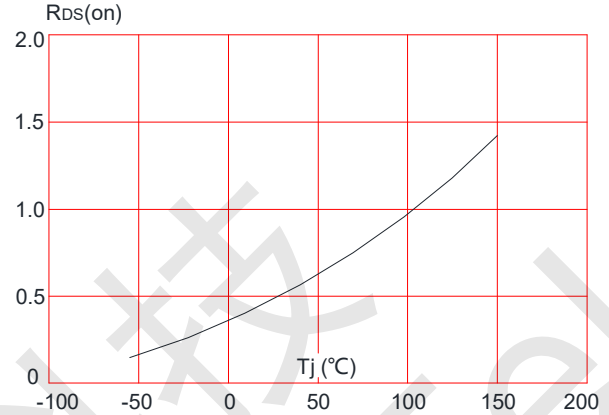


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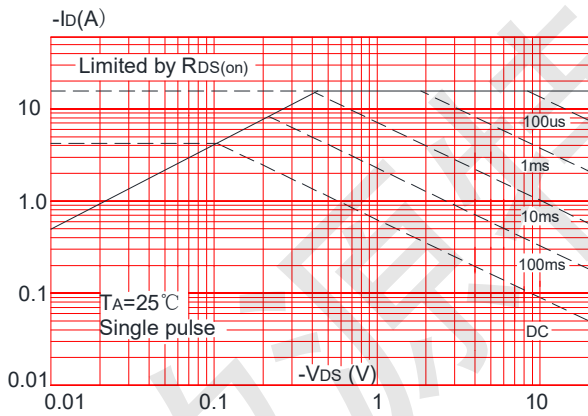
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



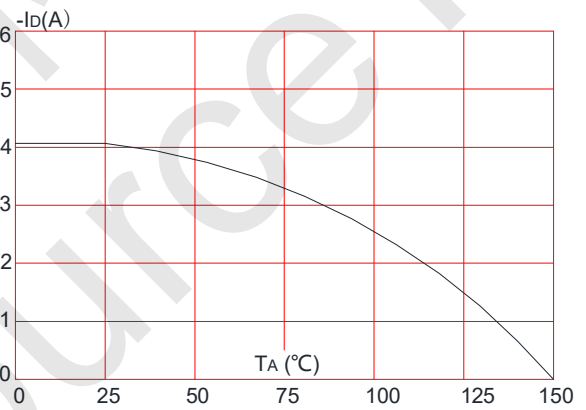
**Figure 8:** Normalized on Resistance vs. Junction Temperature



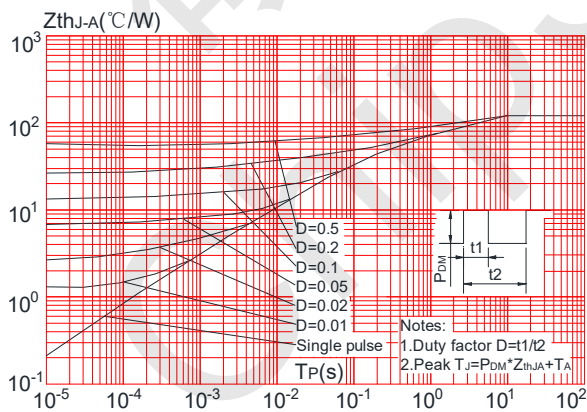
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature

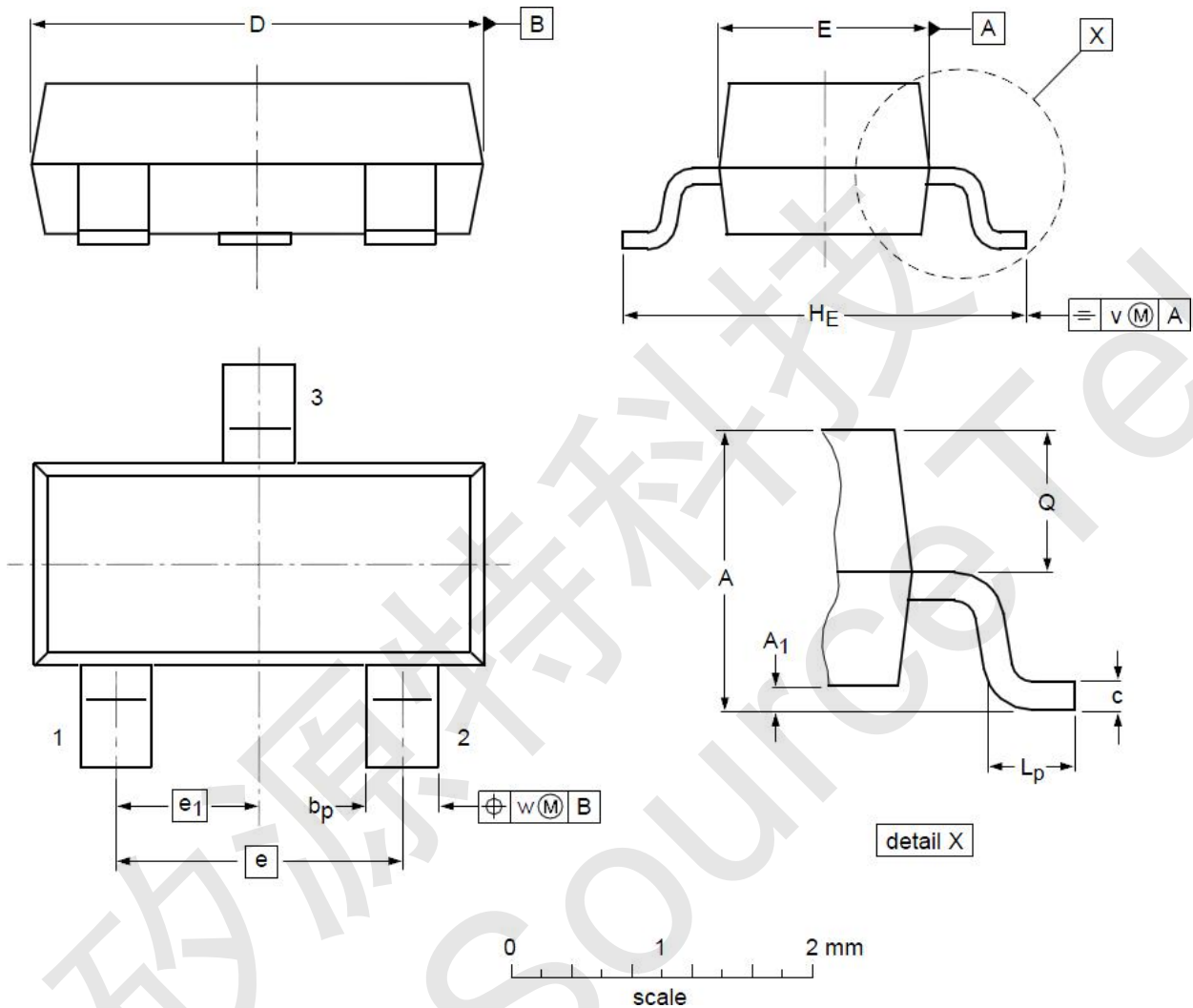


**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient





CST2311L Package Mechanical Data-SOT-23-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
$\theta$	0°	8°	0°	8°