



### CST2020S N-Ch 20V Fast Switching MOSFETs



- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

#### CST2020S Product Summary

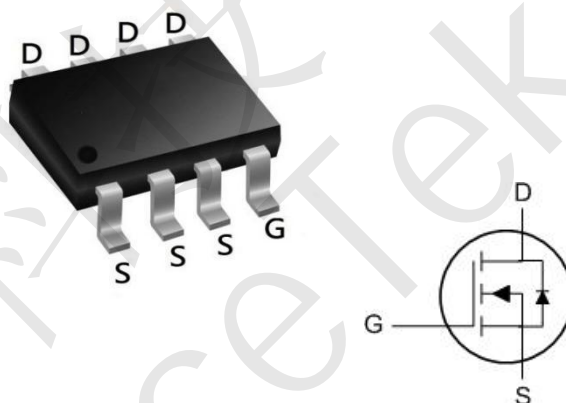
BVDSS	RDS(ON)	ID
20V	4.8 mΩ	20A

#### CST2020S Description

The CST2020S is the high cell density trenched N-ch MOSFETs, which provide excellent RDS(ON) and gate charge for most of the synchronous buck converter applications.

The CST2020S meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

#### CST2020S SOP8 Pin Configuration



#### CST2020S Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	20	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub> @T <sub>C</sub> =25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	20	A
I <sub>D</sub> @T <sub>C</sub> =100°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	11	A
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	80	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	48	mJ
I <sub>AS</sub>	Avalanche Current	11	A
P <sub>D</sub> @T <sub>C</sub> =25°C	Total Power Dissipation <sup>4</sup>	38	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

#### CST2020S Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJC</sub>	Thermal Resistance Junction-Case <sup>1</sup>	---	4.2	°C/W



### CST2020S N-Ch 20V Fast Switching MOSFETs

#### CST2020S 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,	-	-	1.0	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>note3</small>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A	-	4.8	6.5	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =5A	-	6.8	10	
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1.0MHz	-	1832	-	pF
C <sub>oss</sub>	Output Capacitance		-	289	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	271	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =10V, I <sub>D</sub> =10A, V <sub>GS</sub> =4.5V	-	23	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	4.5	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	7.3	-	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =10V, I <sub>D</sub> =10A, R <sub>GEN</sub> =3Ω, V <sub>GS</sub> =4.5V	-	15	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	37	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	52	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	21	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	20	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	80	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =10A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	IF=25A, dI/dt=100A/μs	-	25	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	21	-	nC

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

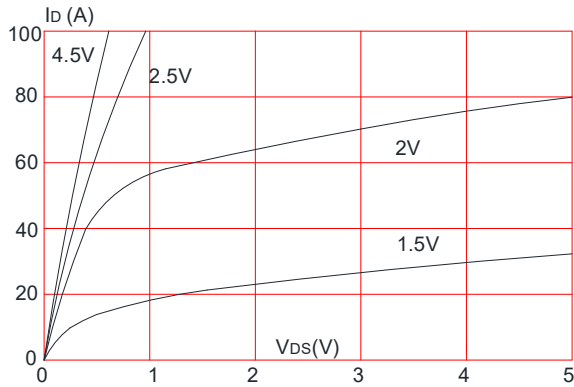
2. EAS condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=10V, V<sub>G</sub>=4.5V, L=0.5mH, R<sub>G</sub>=25Ω, I<sub>AS</sub>=4.8A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

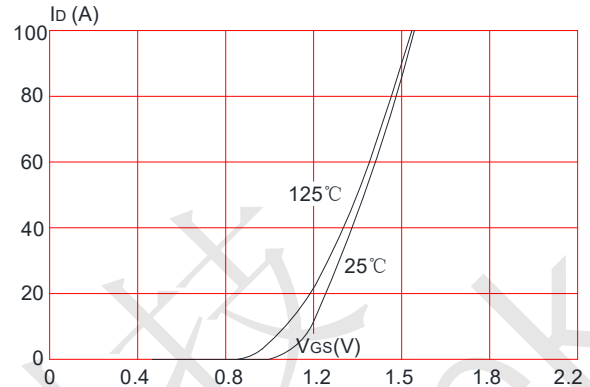


## CST2020S Typical Performance Characteristics

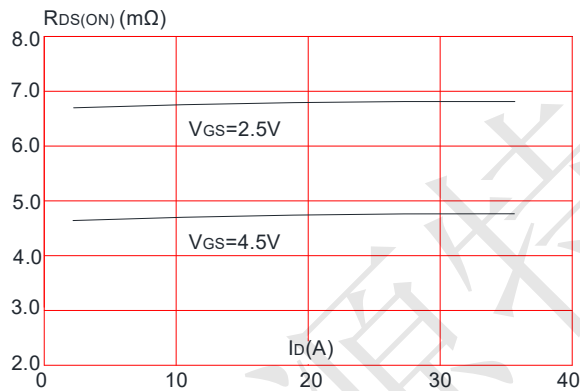
**Figure 1:** Output Characteristics



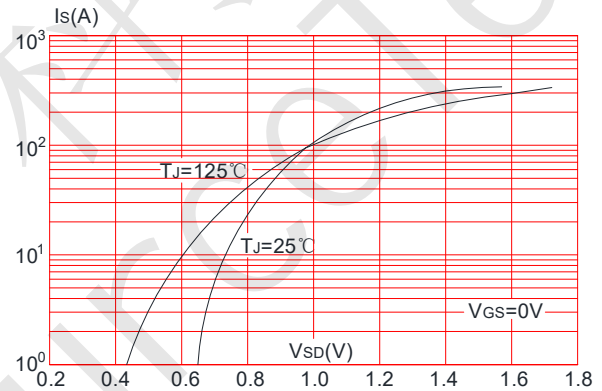
**Figure 2:** Typical Transfer Characteristics



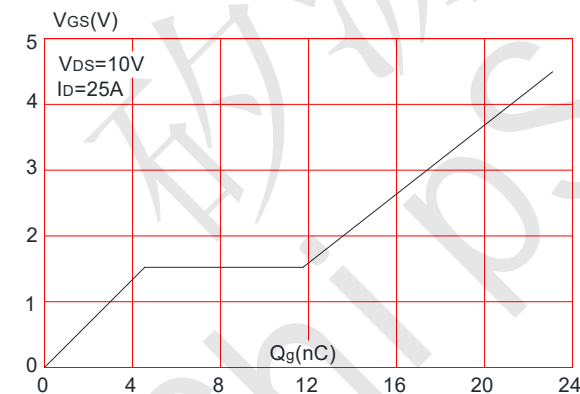
**Figure 3:** On-resistance vs. Drain Current



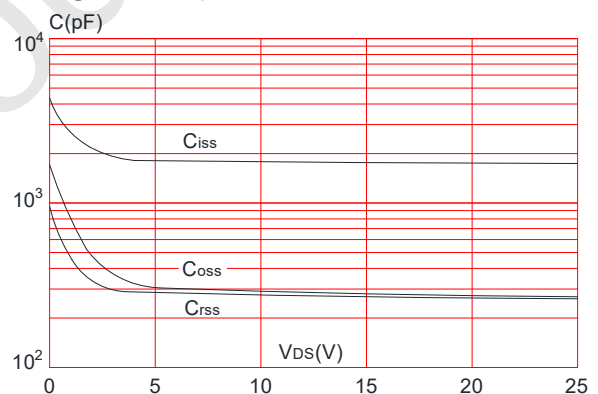
**Figure 4:** Body Diode Characteristics



**Figure 5:** Gate Charge Characteristics



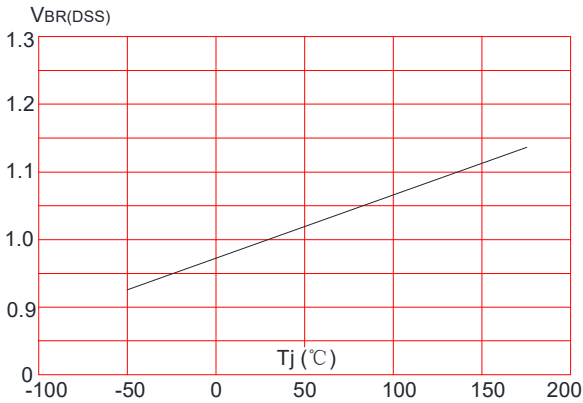
**Figure 6:** Capacitance Characteristics



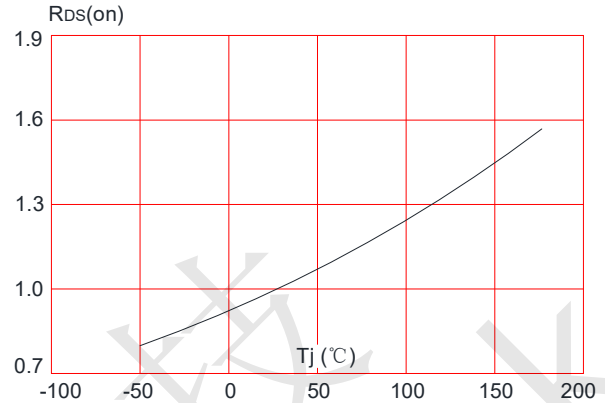


### CST2020S N-Ch 20V Fast Switching MOSFETs

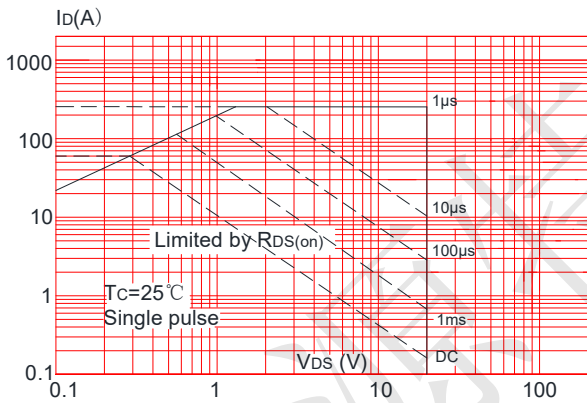
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



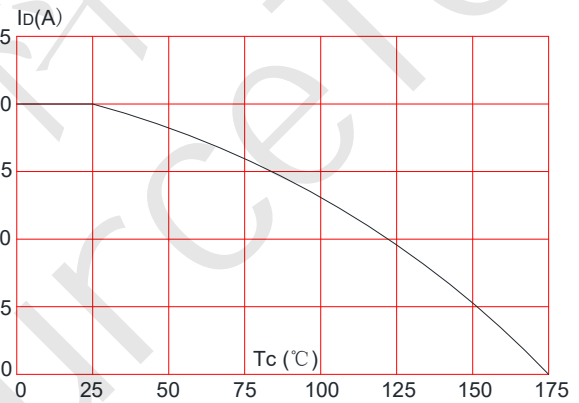
**Figure 8:** Normalized on Resistance vs. Junction Temperature



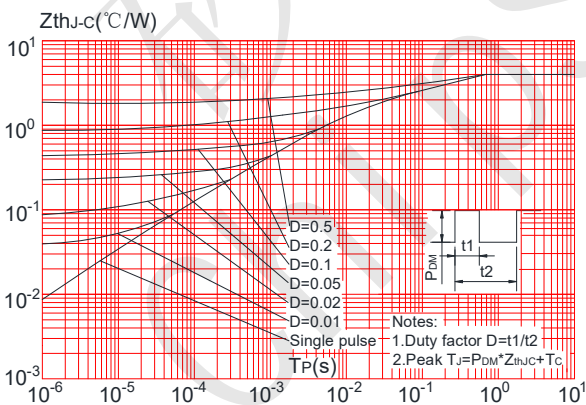
**Figure 9:** Maximum Safe Operating Area



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

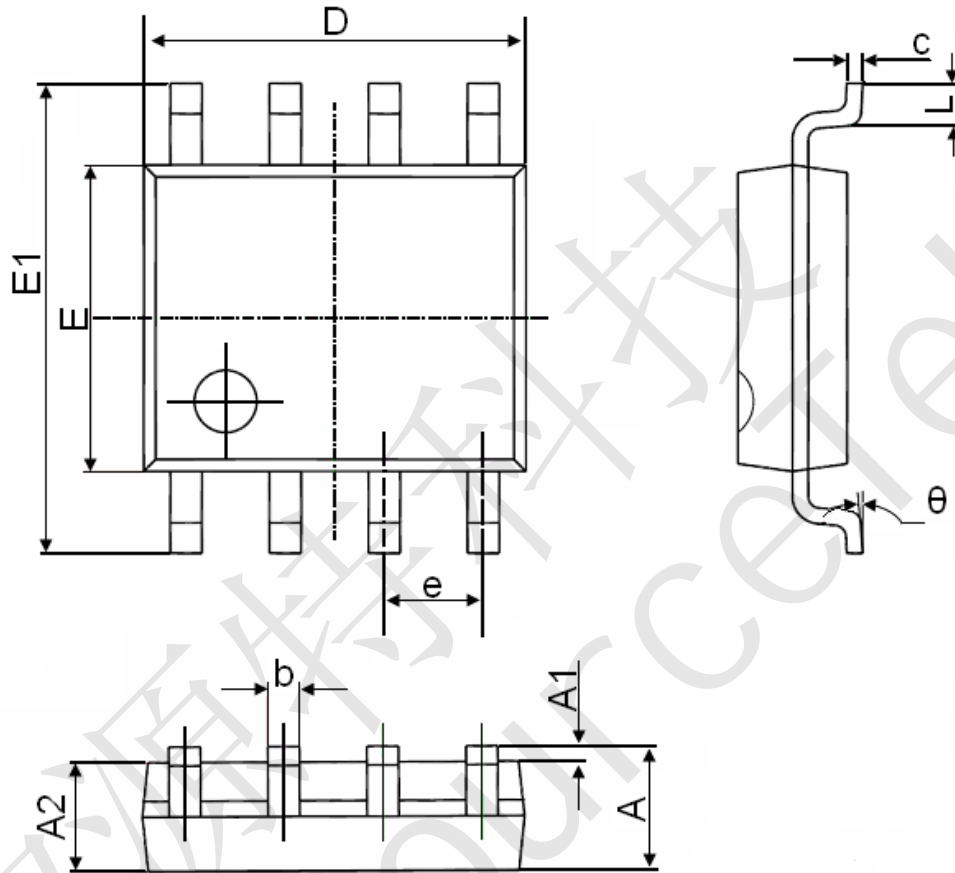


**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Case





CST2020S Package Mechanical Data-SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°