



N-Ch 20V Fast Switching MOSFETs

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

CST2300A Product Summary



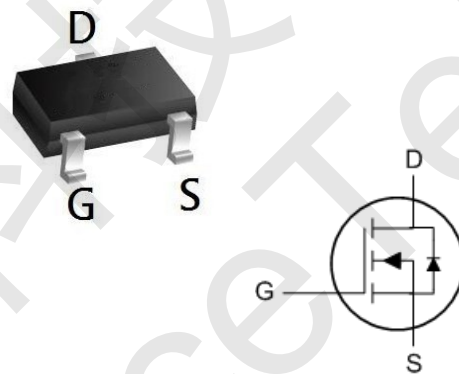
BVDSS	RDSON	ID
20V	19mΩ	6.0A

CST2300A Description

The CST2300A 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 CSTR2300A meets the RoHS and Green Product requirement with full function reliability approved.

CST2300A SOT23 Pin Configuration



CST2300A 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, $V_{GS} @ 4.5V^1$	6.0	A
$I_D@T_A=70^\circ C$	Continuous Drain Current, $V_{GS} @ 4.5V^1$	4.0	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	15.0	A
$P_D@T_A=25^\circ C$	Total Power Dissipation <sup>3</sup>	1	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

CST2300A Thermal Data

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



**CST2300A Electrical Characteristics ( $T_J=25^\circ\text{C}$ , unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=4.5V, I_D=3A$	---	19	35	m $\Omega$
		$V_{GS}=2.5V, I_D=2A$	---	35	60	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	0.4	---	1.2	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=16V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	$\mu A$
		$V_{DS}=16V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	5	
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	---	---	$\pm 100$	nA
$g_{fs}$	Forward Transconductance	$V_{DS}=5V, I_D=3A$	---	10.5	---	S
$Q_g$	Total Gate Charge (4.5V)	$V_{DS}=15V, V_{GS}=4.5V, I_D=3A$	---	4.6	---	nC
$Q_{gs}$	Gate-Source Charge		---	0.7	---	
$Q_{gd}$	Gate-Drain Charge		---	1.5	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=10V, V_{GS}=4.5V, R_G=3.3\Omega$ $I_D=3A$	---	1.6	---	ns
$T_r$	Rise Time		---	42	---	
$T_{d(off)}$	Turn-Off Delay Time		---	14	---	
$T_f$	Fall Time		---	7	---	
$C_{iss}$	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$	---	310	---	pF
$C_{oss}$	Output Capacitance		---	49	---	
$C_{rss}$	Reverse Transfer Capacitance		---	35	---	

**CST2300A Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current <sup>1,4</sup>	$V_G=V_D=0V$ , Force Current	---	---	6.0	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1.2	V

Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3.The power dissipation is limited by  $150^\circ\text{C}$  junction temperature
- 4.The data is theoretically the same as  $I_D$  and  $I_{DM}$  , in real applications , should be limited by total power dissipation.



CST2300A Typical Characteristics

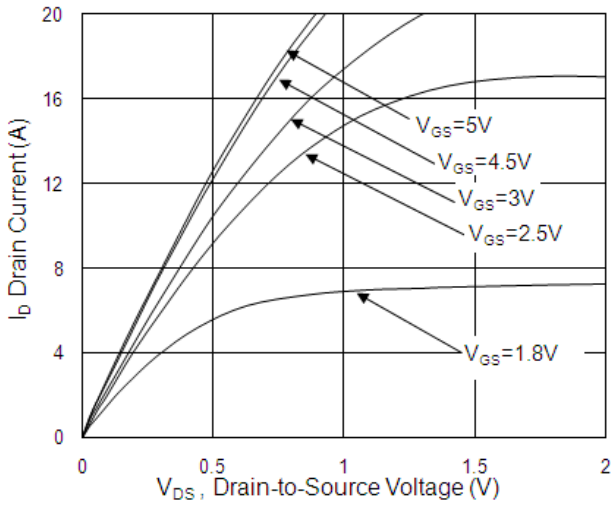


Fig.1 Typical Output Characteristics

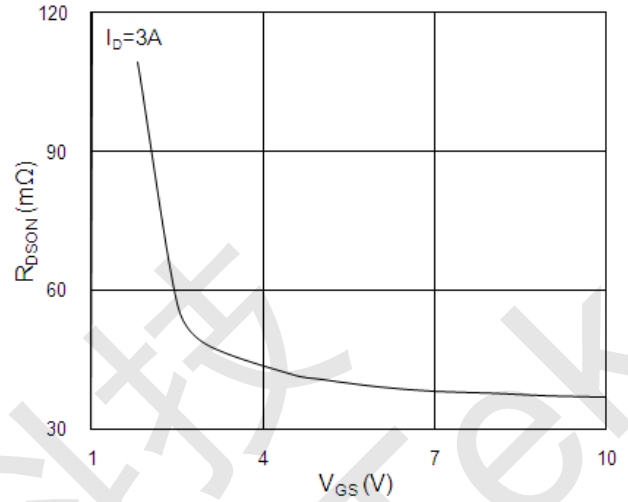


Fig.2 On-Resistance vs. Gate-Source Voltage

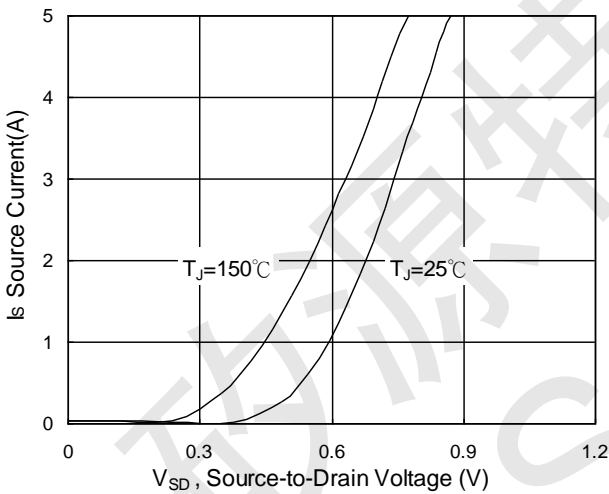


Fig.3 Forward Characteristics of Reverse

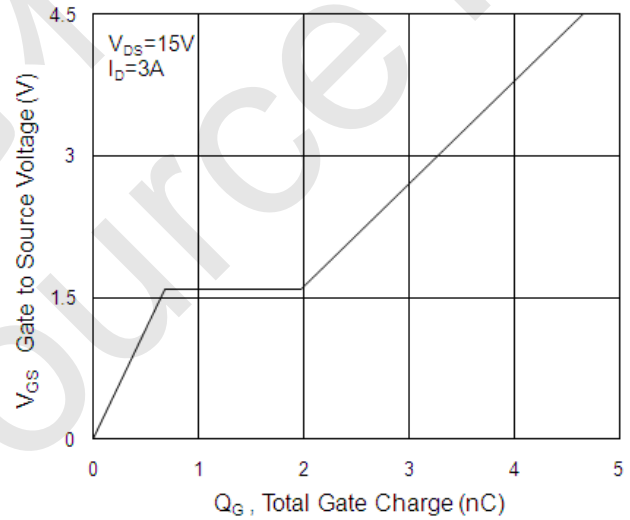


Fig.4 Gate-Charge Characteristics

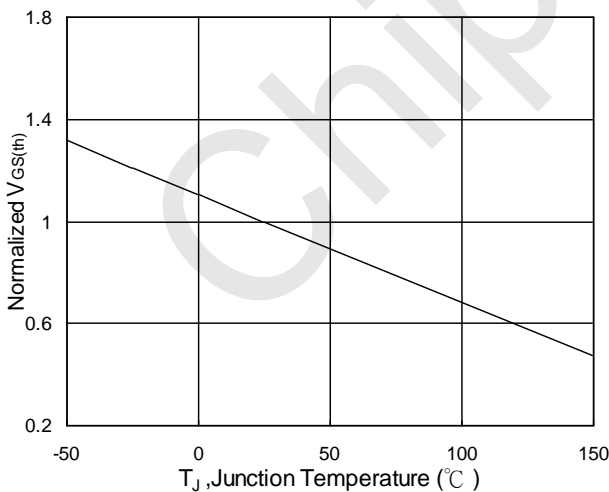


Fig.5 Normalized V<sub>GS(th)</sub> vs. T<sub>J</sub>

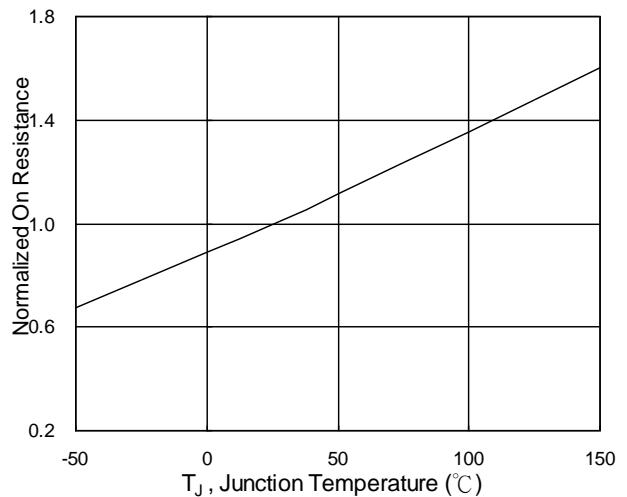


Fig.6 Normalized R<sub>DS(on)</sub> vs. T<sub>J</sub>



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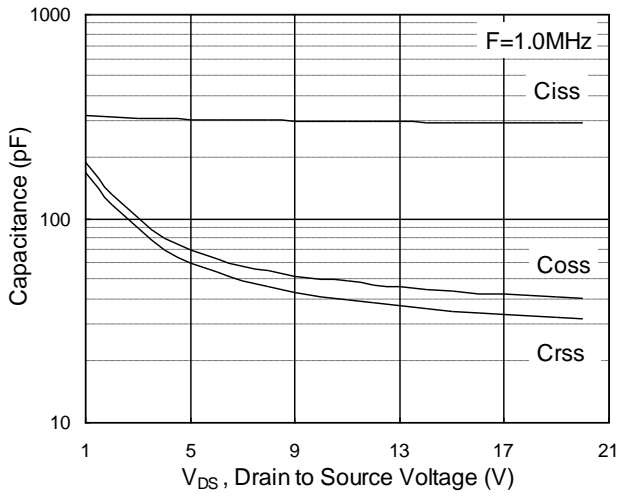


Fig.7 Capacitance

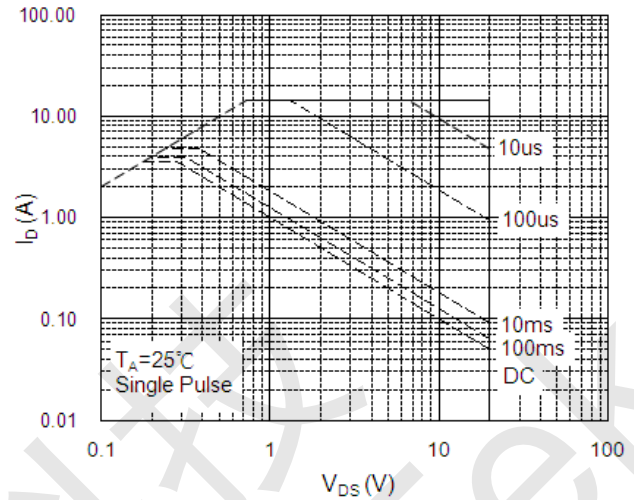


Fig.8 Safe Operating Area

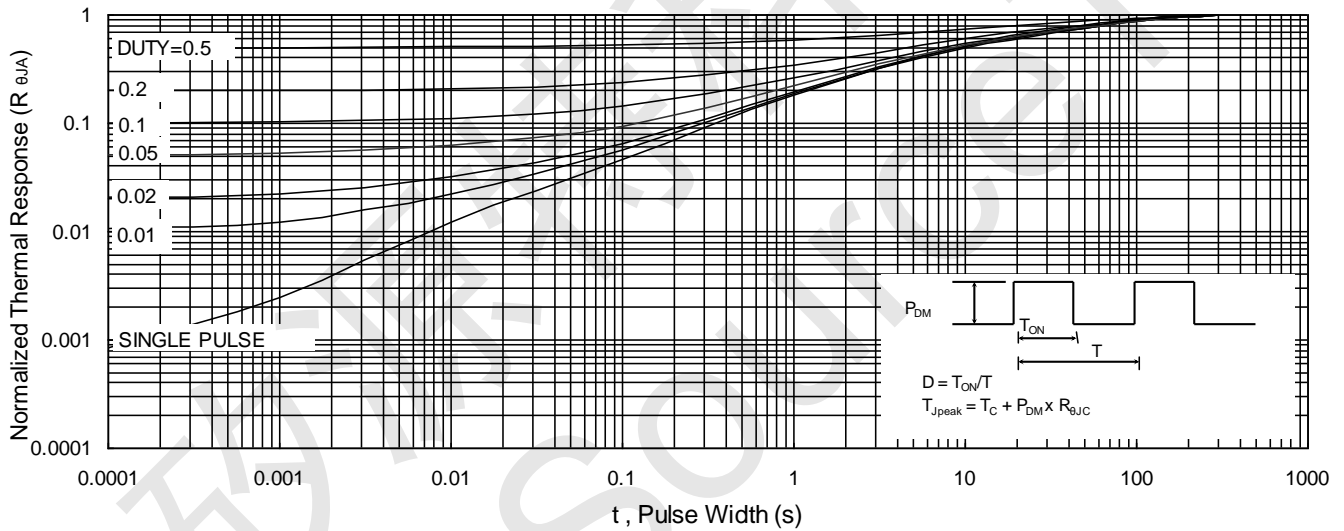


Fig.9 Normalized Maximum Transient Thermal Impedance

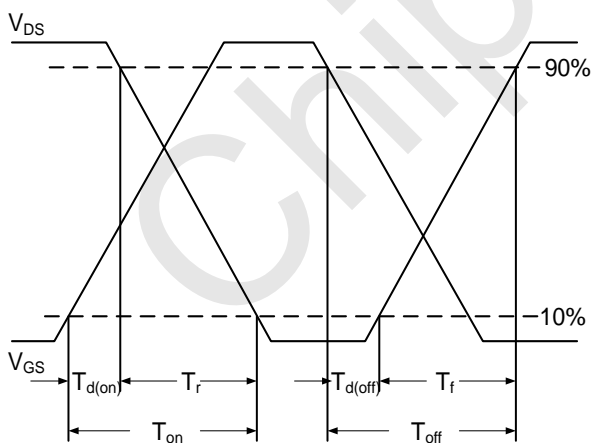


Fig.10 Switching Time Waveform

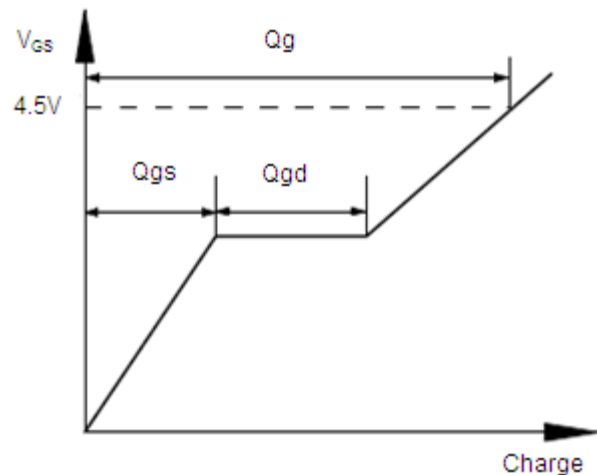
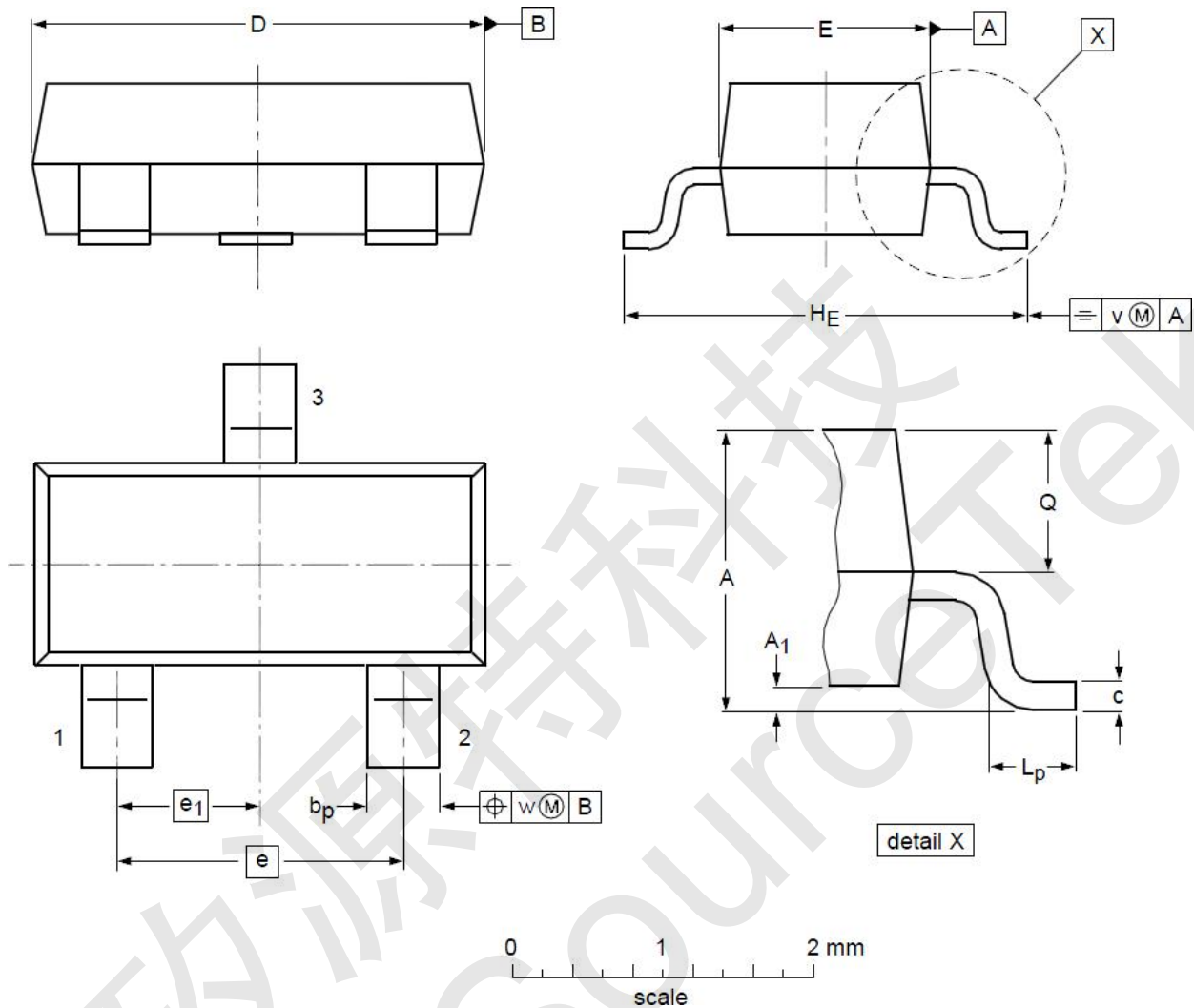


Fig.11 Gate Charge Waveform



CST2300A SOT23 Mechanical Data



DIMENSIONS ( unit : mm )

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.90	1.01	1.15	A <sub>1</sub>	0.01	0.05	0.10
b <sub>p</sub>	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 <sub>1</sub>	--	0.95	--
H <sub>E</sub>	2.25	2.40	2.55	L <sub>p</sub>	0.30	0.42	0.50
Q	0.45	0.49	0.55	v	--	0.20	--
w	--	0.10	--				