

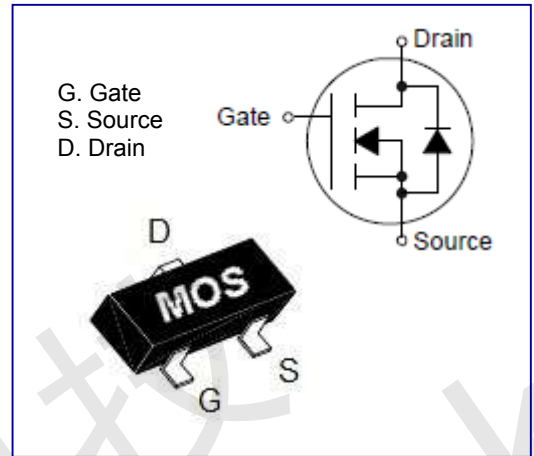


CST2302X

20V* N-Channel Enhancement-Mode MOSFET

General Description

- $I_D=3.2A$
- $R_{DS(on)}=48m\Omega(Typ.)@V_{GS}=4.5V$
- $R_{DS(on)}=65m\Omega(Typ.)@V_{GS}=2.5V$
- $R_{DS(on)}=90m\Omega(Typ.)@V_{GS}=1.8V$
- Low Gate charge
- Fast switching speed
- High density cell design for ultra low On-Resistance
- Application:
 - Switching applications
 - Power management
- Lead free and green devices available
- Package: SOT23



Absolute Maximum Ratings ($T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20*	V
Gate-Source Voltage	V_{GS}	± 12	V
Drain Current ^a	I_D	$T_C=25^\circ C$	3.2
		$T_C=70^\circ C$	1.5
Drain Current –Pulsed ^a	I_{DM}	9.6	A
Power Dissipation ($T_C=25^\circ C$)	P_D	0.90	W
Power Dissipation ($T_C=75^\circ C$)		0.50	
Storage Temperature Range	T_{STG}	-55 ~ +150	$^\circ C$
Operating Junction Temperature Range	T_J	-55 ~ +150	$^\circ C$
Thermal Resistance, Junction-to-Ambient ¹	$R_{\theta JA}$	125	$^\circ C/W$

Electrical Characteristics ($T_A=25^\circ C$ unless otherwise noted)

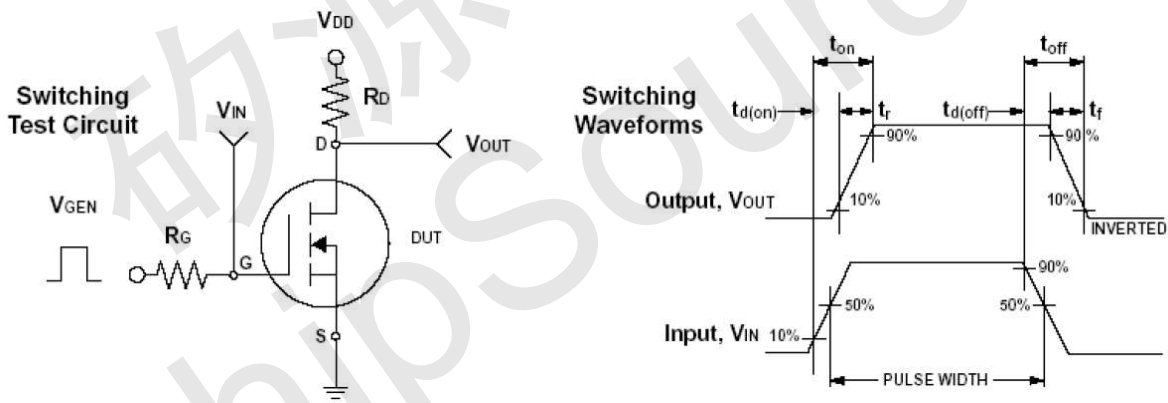
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$		20		V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=16V, V_{GS}=0V$			1	μA
Gate-Body Leakage			I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V$		± 100
On Characteristics ^a						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.3		1.0	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=2.4A$		48	60	$m\Omega$
		$V_{GS}=2.5V, I_D=2.0A$		65	85	$m\Omega$
		$V_{GS}=1.8V, I_D=1.0A$		90	125	$m\Omega$
Forward Transconductance	g_{fs}	$V_{DS}=5V, I_D=1A$				S



Drain-Source Diode Characteristics ^a						
Continuous Source Current	I_S	$V_G=V_D=0V$, Force Current	---	---	2.4	A
Pulsed Source Current	I_{SM}		---	---	9.6	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V$, $I_S=1A$	---	---	1.3	V
Dynamic Characteristics ^b						
Input Capacitance	C_{iss}	$V_{DS}=10V$, $V_{GS}=0V$, $F=1.0MHz$	---			pF
Output Capacitance	C_{oss}		---			pF
Reverse Transfer Capacitance	C_{rss}		---			pF
Switching Characteristics ^b						
Total Gate Charge	Q_g	$V_{DS}=10V$, $V_{GS}=4.5V$, $I_D=2.0A$	---			nC
Gate-Source Charge	Q_{gs}		---			nC
Gate-Drain Charge	Q_{gd}		---			nC
Turn-On Delay Time	$T_d(on)$	$V_{DD}=10V$, $I_D=1.0A$, $V_{GEN}=4.5V$, $R_G=6\Omega$	---			ns
Rise Time	T_r		---			ns
Turn-Off Delay Time	$T_d(off)$		---			ns
Fall Time	T_f		---			ns

Notes: a. Repetitive Rating: Pulsed width limited by maximum junction temperature.
b. Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$. Essential independent of operating temperature.
c. Guaranteed by design, not subject to production testing.

Switching Time Test Circuit and Waveforms





Soldering Methods For Products

1. Storage environment : Temperature=10°C ~ 35°C, Humidity=65% ± 15%
2. Reflow soldering of surface mount devices

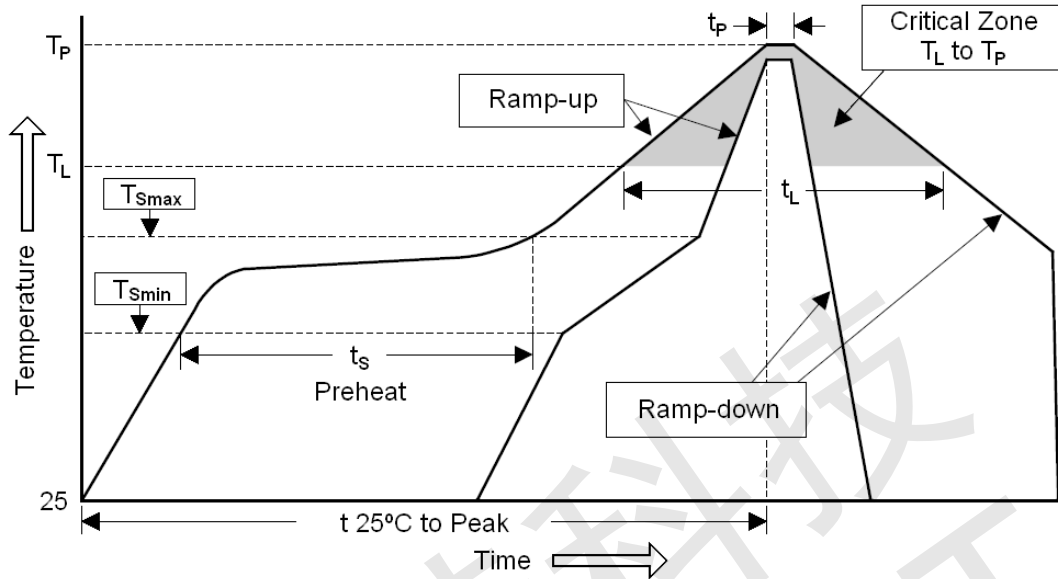


Figure : Temperature Profile

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	< 3°C/sec	< 3°C/sec
Preheat		
- Temperature Min (T_{Smin})	100°C	100°C
- Temperature Max (T_{Smax})	150°C	200°C
- Time (Min to Max) (t_s)	60 ~ 120 sec	60 ~ 180 sec
T_{Smax} to T_L		
- Ramp-up rate	< 3°C/sec	< 3°C/sec
Time maintained above:		
- Temperature (T_L)	183°C	217°C
- Time (t_L)	60 ~ 150 sec	60 ~ 150 sec
Peak Temperature (T_P)	240°C +0/-5°C	260°C +0/-5°C
Time within 5°C of actual Peak Temperature (t_p)	10 ~ 30 sec	20 ~ 40 sec
Ramp-down rate	< 6°C/sec	< 6°C/sec
Time 25°C to Peak Temperature	< 6 minutes	< 8 minutes

3. Flow (wave) soldering (solder dipping)

Product	Peak Temperature	Dipping Time
Pb devices	245°C ±5°C	5sec ±1sec
Pb-Free devices	260°C +0/-5°C	5sec ±1sec

Notices:

- MOS 管电路是静电敏感元器件，且对生产环境要求较严，建议在存放及生产操作时一定要避免静电干扰，经锡炉或回焊炉的温度切勿超过 260 度。