



CST304 Dual N-Ch 30V Fast Switching MOSFETs

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



CST304 Product Summary

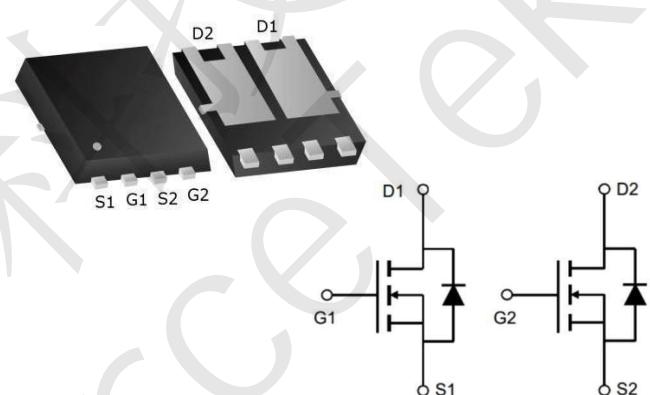
BVDSS	RDS(on)	ID
30V	15mΩ	20A

CST304 PDFN3333-8L Pin Configuration

CST304 Description

The CST304 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 CST304 meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.



CST304 Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	30	V
V _{GS}	Gate-Source Voltage	±20	V
I _D @T _c =25°C	Continuous Drain Current, V _{GS} @ 10V ¹	20	A
I _D @T _c =100°C	Continuous Drain Current, V _{GS} @ 10V ¹	10	A
I _{DM}	Pulsed Drain Current ²	56	A
EAS	Single Pulse Avalanche Energy ³	12.1	mJ
I _{AS}	Avalanche Current	48	A
P _D @T _c =25°C	Total Power Dissipation ⁴	6.0	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

CST304 Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction-ambient ¹	---	75	°C/W



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CST304 Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(\text{BR})\text{DSS}}$	Drain-Source Breakdown Voltage	$V_{\text{GS}}=0\text{V}$, $I_D=250\mu\text{A}$	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{\text{DS}}=30\text{V}$, $V_{\text{GS}}=0\text{V}$	-	-	1	μA
I_{GSS}	Gate to Body Leakage Current	$V_{\text{DS}}=0\text{V}$, $V_{\text{GS}}=\pm20\text{V}$	-	-	±100	nA
On Characteristics						
$V_{\text{GS}(\text{th})}$	Gate Threshold Voltage	$V_{\text{DS}}=V_{\text{GS}}$, $I_D=250\mu\text{A}$	1.0	1.5	2.5	V
$R_{\text{DS}(\text{on})}$ note2	Static Drain-Source on-Resistance	$V_{\text{GS}}=10\text{V}$, $I_D=5\text{A}$	-	15	20	$\text{m}\Omega$
		$V_{\text{GS}}=4.5\text{V}$, $I_D=3\text{A}$	-	21	29	$\text{m}\Omega$
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{\text{DS}}=15\text{V}$, $V_{\text{GS}}=0\text{V}$, $f=1.0\text{MHz}$	-	490	-	pF
C_{oss}	Output Capacitance		-	79	-	pF
C_{rss}	Reverse Transfer Capacitance		-	61	-	pF
Q_g	Total Gate Charge	$V_{\text{DS}}=15\text{V}$, $I_D=5.8\text{A}$, $V_{\text{GS}}=10\text{V}$	-	5.2	-	nC
Q_{gs}	Gate-Source Charge		-	0.9	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	1.3	-	nC
Switching Characteristics						
$t_{\text{d}(\text{on})}$	Turn-on Delay Time	$V_{\text{DS}}=15\text{V}$, $I_D=3\text{A}$, $V_{\text{GS}}=10\text{V}$, $R_{\text{REN}}=3\Omega$	-	4.5	-	ns
t_r	Turn-on Rise Time		-	2.5	-	ns
$t_{\text{d}(\text{off})}$	Turn-off Delay Time		-	14.5	-	ns
t_f	Turn-off Fall Time		-	3.5	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_s	Maximum Continuous Drain to Source Diode Forward Current	-	-	12	A	
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current	-	-	48	A	
V_{SD}	Drain to Source Diode Forward Voltage	$V_{\text{GS}}=0\text{V}$, $I_s=12\text{A}$	-	-	1.2	V

CST304 Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_s	Continuous Source Current ^{1,5}	$V_G=V_D=0\text{V}$, Force Current	---	---	28	A
I_{SM}	Pulsed Source Current ^{2,5}		---	---	56	A
V_{SD}	Diode Forward Voltage ²	$V_{\text{GS}}=0\text{V}$, $I_s=1\text{A}$, $T_J=25^\circ\text{C}$	---	---	1.2	V

Note :

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
3. The EAS data shows Max. rating . The test condition is $V_{\text{DD}}=25\text{V}$, $V_{\text{GS}}=10\text{V}$, $L=0.1\text{mH}$, $I_{\text{AS}}=21\text{A}$
4. The power dissipation is limited by 150°C junction temperature
5. The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.



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CST304 Typical Performance Characteristics

Figure1: Output Characteristics

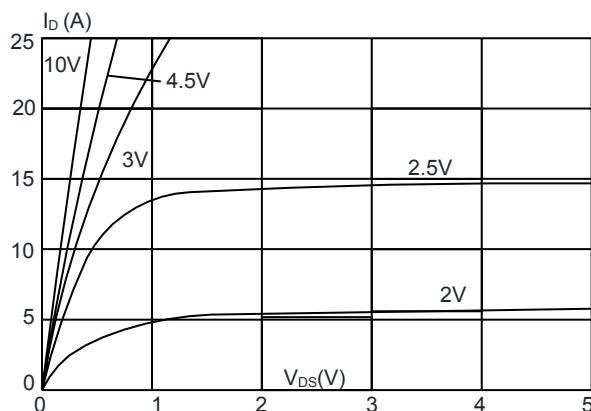


Figure 2: Typical Transfer Characteristics

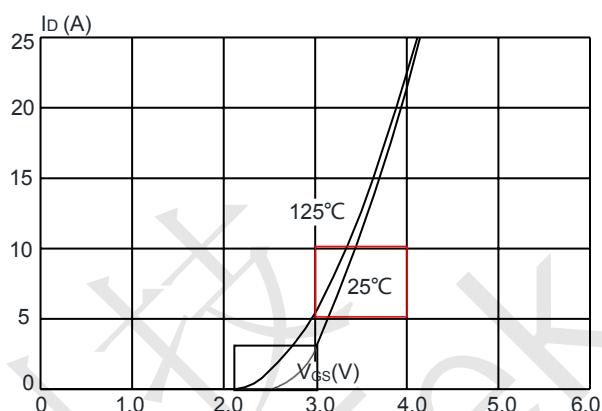


Figure 3: On-resistance vs. Drain Current

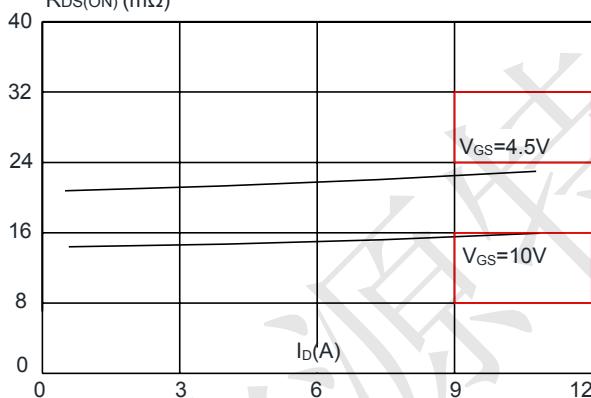


Figure 4: Body Diode Characteristics

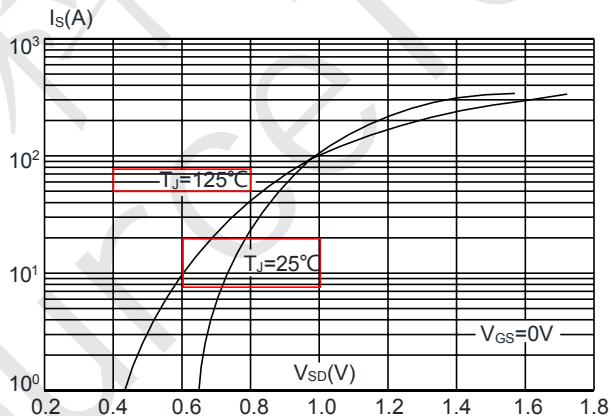


Figure 5: Gate Charge Characteristics

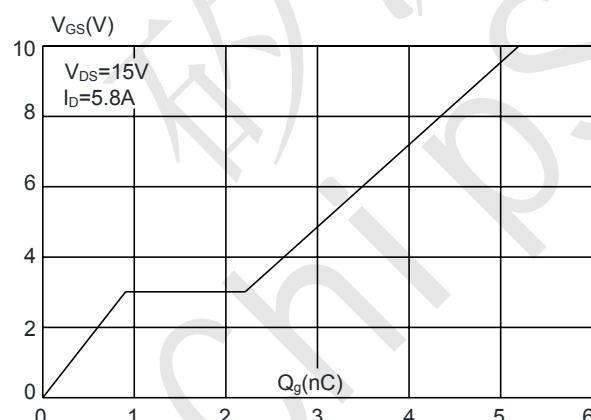
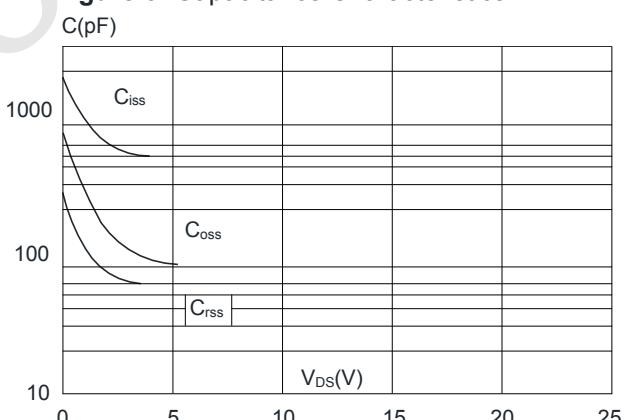


Figure 6: Capacitance Characteristics





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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

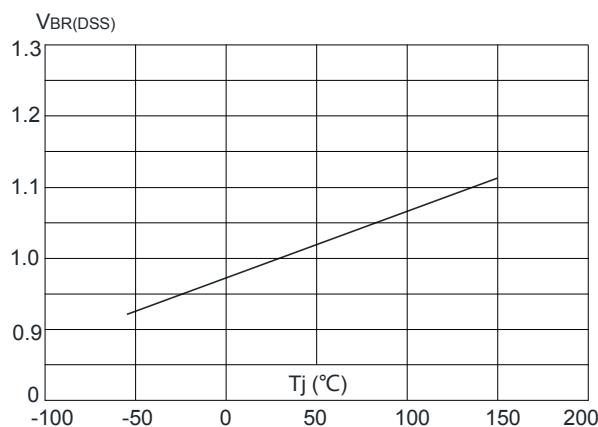


Figure 8: Normalized on Resistance vs. Junction Temperature

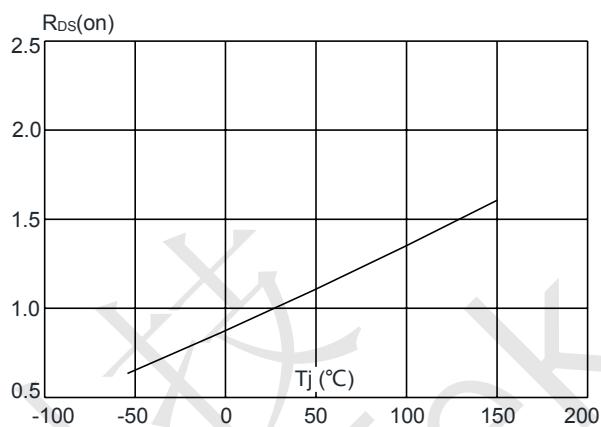


Figure 9: Maximum Safe Operating Area

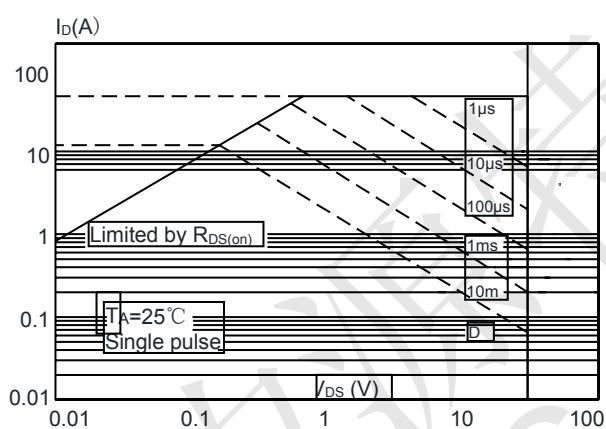


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

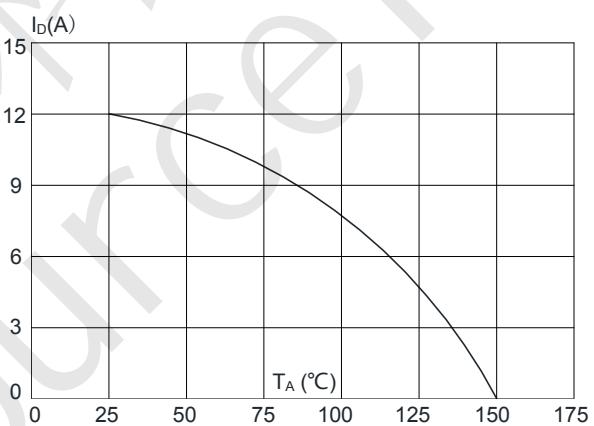
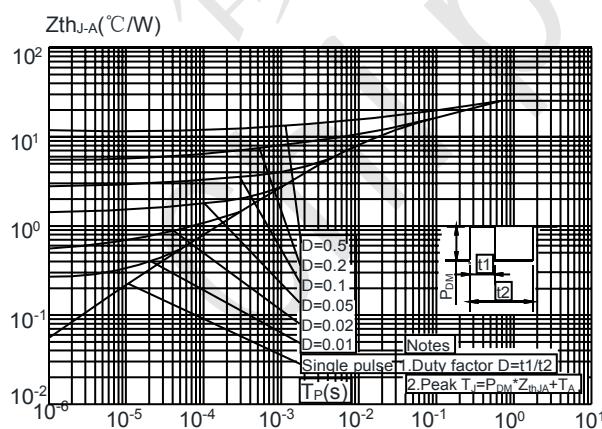


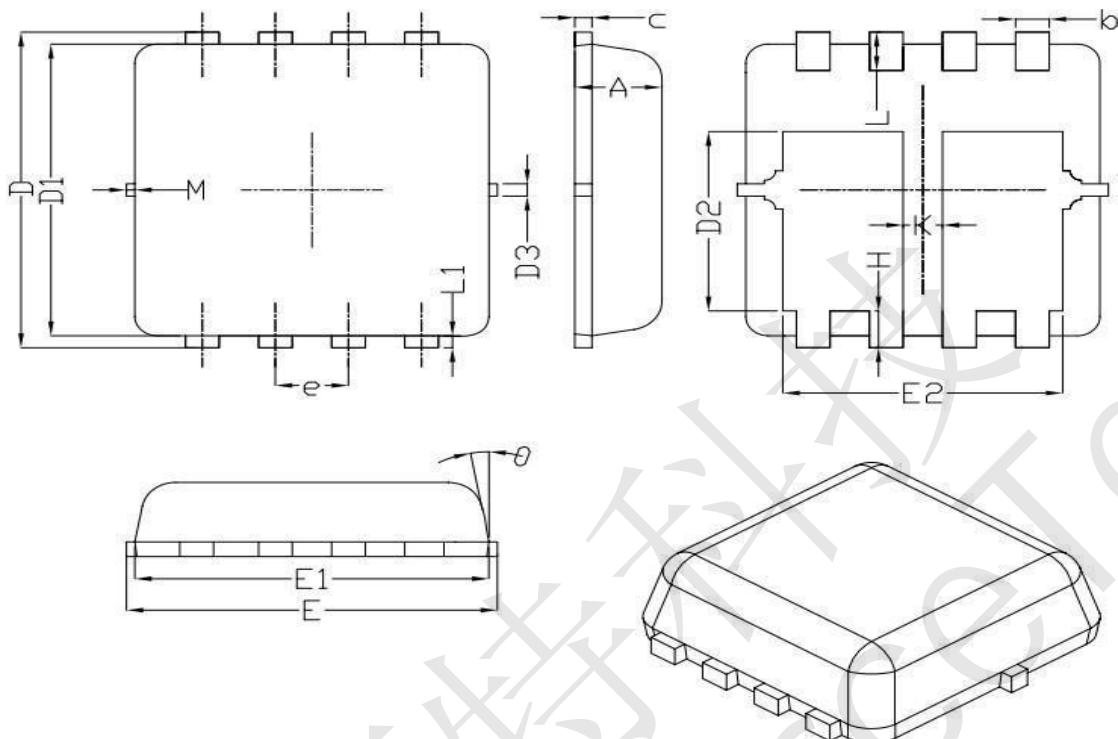
Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient





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CST304 PDFN3333-8L Package Information



Symbol	Dimensions (unit: mm)		
	Min	Typ	Max
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.78	1.88	1.98
D3	--	0.13	--
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65 BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	--	0.13	--
K	0.30	--	--
θ	--	10°	12°
M	*	*	0.15
* Not Specified			

Notes:

1. Refer to JEDEC MO-240 variation CA.
2. Dimensions "D1" and "E1" do NOT include mold flash protrusions or gate burrs.
3. Dimensions "D1" and "E1" include interterminal flash or protrusion.