



CST100N02 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

CST100N02 Product Summary



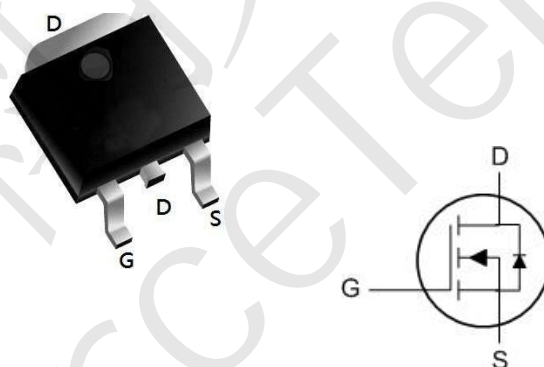
BVDSS	RDSON	ID
20V	2.7 mΩ	100A

CST100N02 Description

The CST100N02 is the high cell density trenched N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The CST100N02 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

CST100N02 TO252 Pin Configuration



CST100N02 Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	20	V
V _{GS}	Gate-Source Voltage	±20	V
I _D @T _C =25°C	Continuous Drain Current, V _{GS} @ 10V ¹	100	A
I _D @T _C =100°C	Continuous Drain Current, V _{GS} @ 10V ¹	59	A
I _{DM}	Pulsed Drain Current ²	360	A
EAS	Single Pulse Avalanche Energy ³	118	mJ
I _{AS}	Avalanche Current	41	A
P _D @T _C =25°C	Total Power Dissipation ⁴	88	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

CST100N02 Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R _{θJC}	Thermal Resistance Junction-Case ¹	---	1.8	°C/W



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CST100N02 Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=20V, V_{GS}=0V$	-	-	1	μA
I_{GSS}	Gate to Body Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.4	0.7	1.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance <small>note3</small>	$V_{GS}=4.5V, I_D=30A$	-	2.7	4	m Ω
		$V_{GS}=2.5V, I_D=20A$	-	4	6	
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=10V, V_{GS}=0V,$ $f=1.0MHz$	-	3200	-	pF
C_{oss}	Output Capacitance		-	460	-	pF
C_{riss}	Reverse Transfer Capacitance		-	445	-	pF
Q_g	Total Gate Charge	$V_{DS}=10V, I_D=30A,$ $V_{GS}=4.5V$	-	48	-	nC
Q_{gs}	Gate-Source Charge		-	3.6	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	19	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	$V_{DS}=10V, I_D=30A,$ $R_G=1.8\Omega, V_{GS}=4.5V$	-	9.7	-	ns
t_r	Turn-On Rise Time		-	37	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	63	-	ns
t_f	Turn-Off Fall Time		-	52	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	100	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	360	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_{SD}=30A,$ $T_J=25^\circ\text{C}$	-	-	1.2	V
t_{rr}	Reverse Recovery Time	$T_J=25^\circ\text{C}, I_F=30A,$ $di/dt=100A/\mu s$	-	23	-	ns
Q_{rr}	Reverse Recovery Charge		-	10	-	nC

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

2. EAS condition: $T_J=25^\circ\text{C}, V_{DD}=15V, V_G=4.5V, R_G=25\Omega, L=0.5mH, I_{AS}=21A$

3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$



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CST100N02 Typical Performance Characteristics

Figure 1: Output Characteristics

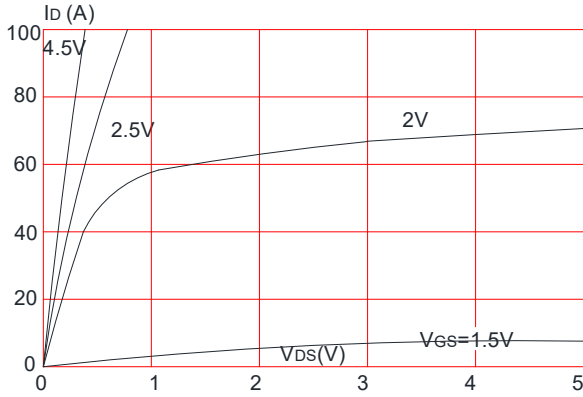


Figure 2: Typical Transfer Characteristics

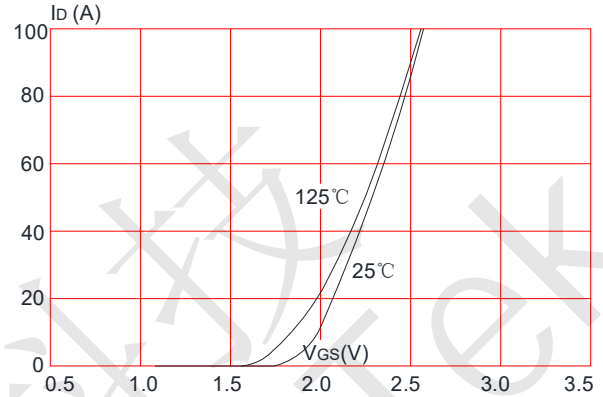


Figure 3: On-resistance vs. Drain Current

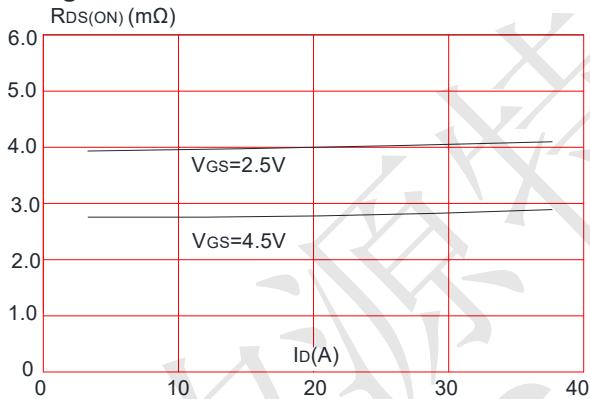


Figure 4: Body Diode Characteristics

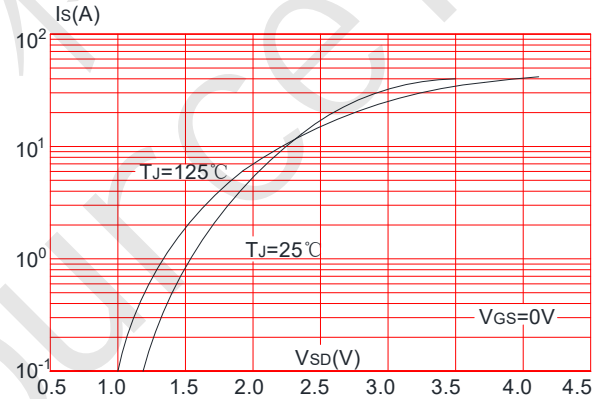


Figure 5: Gate Charge Characteristics

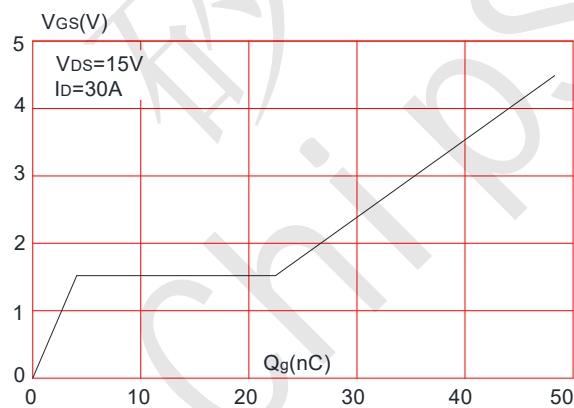
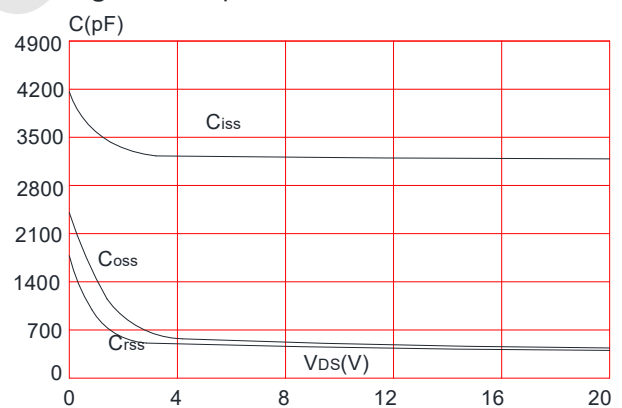


Figure 6: Capacitance Characteristics





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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

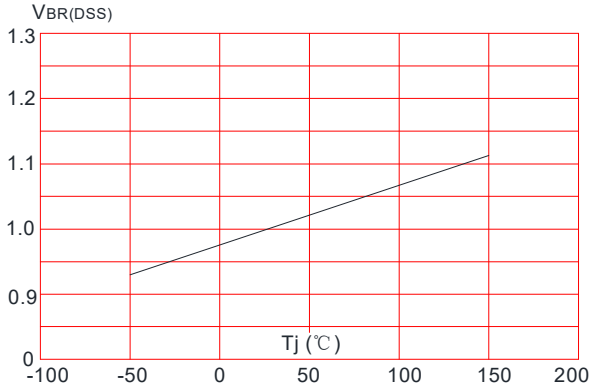


Figure 8: Normalized on Resistance vs. Junction Temperature

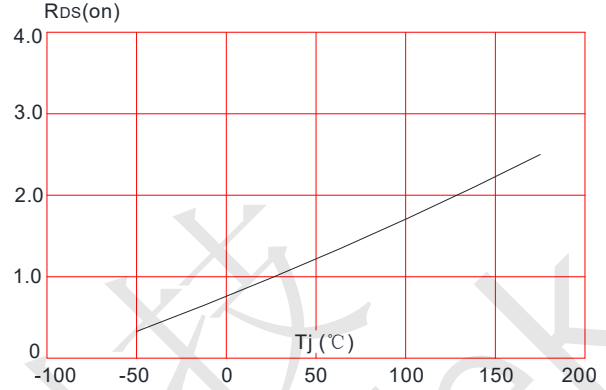


Figure 9: Maximum Safe Operating Area

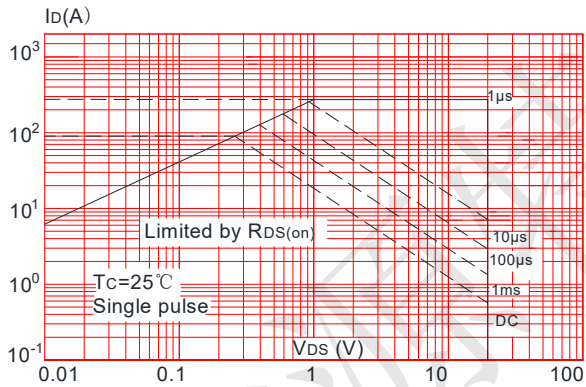


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

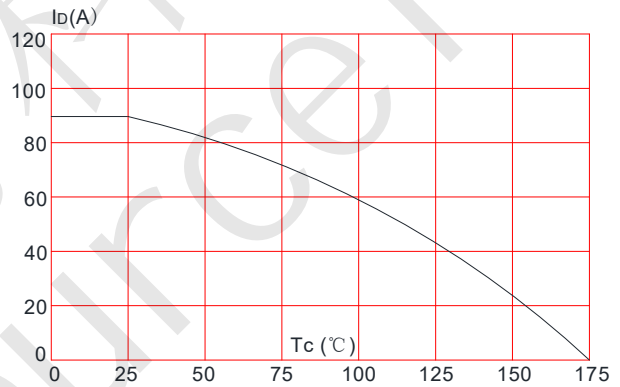
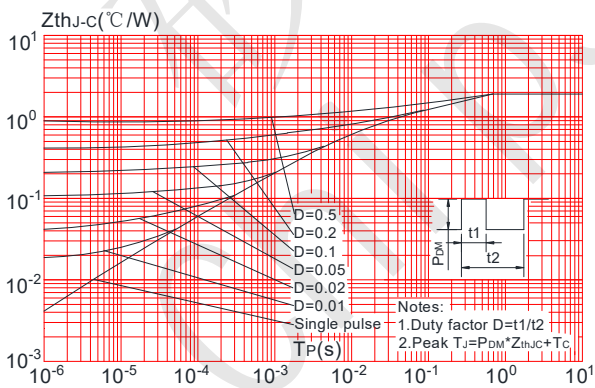


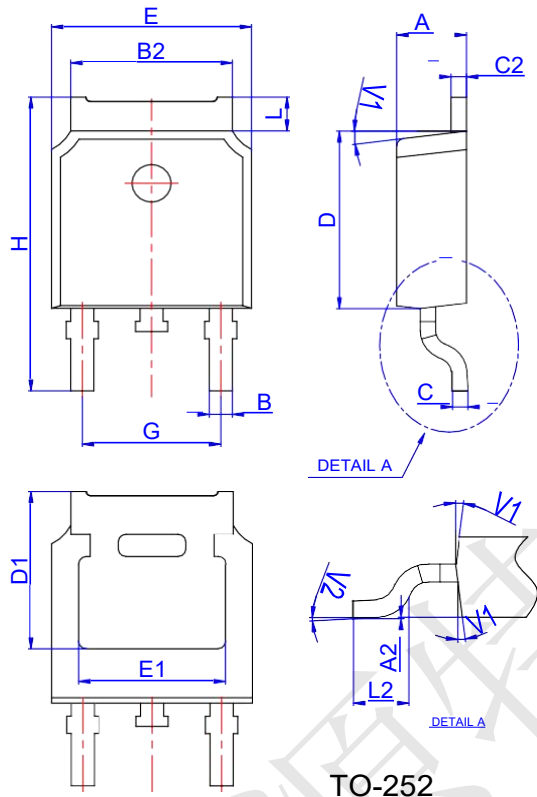
Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case





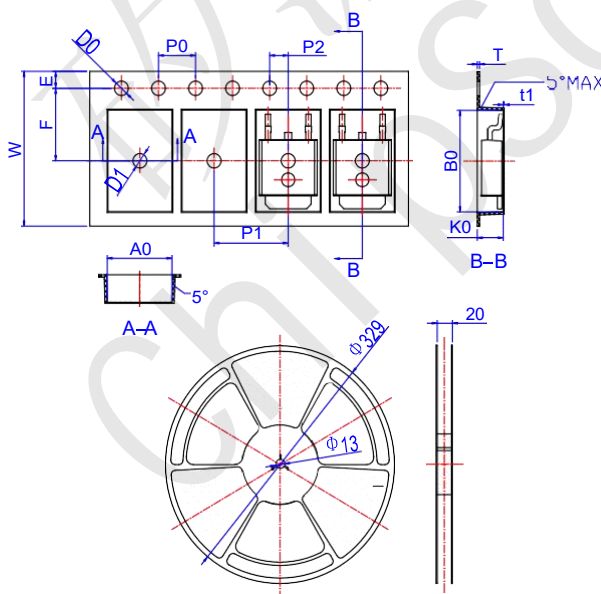
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CST100N02 Package Mechanical Data TO 252 3R



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Specification-TO-252-3R



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583