



### CST30N02 N-Ch 20V Fast Switching MOSFETs

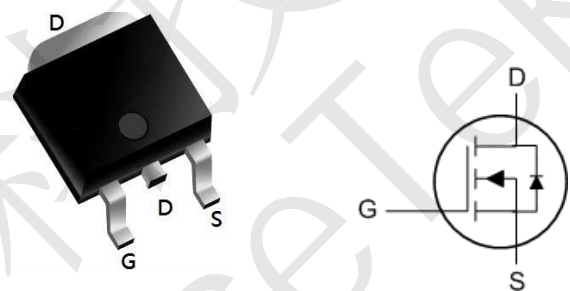
- ★ 100% EAS Guaranteed
- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

#### CST30N02 Product Summary



BVDSS	RDS(on)	ID
20V	12mΩ	30A

#### CST30N02 TO252 Pin Configuration



#### CST30N02 Description

The CST30N02 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 CST30N02 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

#### CST30N02 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>	30	A
I <sub>D</sub> @T <sub>C</sub> =100°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	18	A
I <sub>D</sub> @T <sub>A</sub> =25°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	8.2	A
I <sub>D</sub> @T <sub>A</sub> =70°C	Continuous Drain Current, V <sub>GS</sub> @ 10V <sup>1</sup>	6.5	A
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	60	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	12.1	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>	5	W
P <sub>D</sub> @T <sub>A</sub> =25°C	Total Power Dissipation <sup>4</sup>	2	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

#### CST30N02 Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction-ambient (Steady State) <sup>1</sup>	---	100	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction-Case <sup>1</sup>	---	---	°C/W



### CST30N02 Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	<b>BV<sub>DSS</sub></b>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250μA	20	-	-	V
Gate Leakage Current	<b>I<sub>GSS</sub></b>	V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0 V	-	-	±100	nA
Drain Cut-off Current	<b>I<sub>DSS</sub></b>	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0 V	-	-	1	μA
Gate Threshold Voltage	<b>V<sub>GS(th)</sub></b>	V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250μA	0.45	0.7	1	V
Drain-Source On-State Resistance <sup>3</sup>	<b>R<sub>DS(on)</sub></b>	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 5A	-	12	20	mΩ
		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 4.7A	-	17	30	
		V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 4.3A	-	28	50	
<b>Dynamic Characteristics<sup>4</sup></b>						
Input Capacitance	<b>C<sub>iss</sub></b>	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 10V, f = 1MHz	-	700	-	pF
Output Capacitance	<b>C<sub>oss</sub></b>		-	120	-	
Reverse Transfer Capacitance	<b>C<sub>rss</sub></b>		-	105	-	
<b>Switching Characteristics<sup>4</sup></b>						
Total Gate Charge	<b>Q<sub>g</sub></b>	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 10V, I <sub>D</sub> = 5A	-	10.5	-	nC
Gate-Source Charge	<b>Q<sub>gs</sub></b>		-	2	-	
Gate-Drain Charge	<b>Q<sub>gd</sub></b>		-	2.5	-	
Turn-On Time	<b>t<sub>d(on)</sub></b>	V <sub>GEN</sub> = 5V, V <sub>DD</sub> = 10V, I <sub>D</sub> = 5A, R <sub>G</sub> = 3Ω,	-	10	-	ns
Rise Time	<b>t<sub>r</sub></b>		-	20	-	
Turn-Off Time	<b>t<sub>d(off)</sub></b>		-	32	-	
Fall Time	<b>t<sub>f</sub></b>		-	12	-	
<b>Source-Drain Diode Characteristics</b>						
Body Diode Voltage <sup>3</sup>	<b>V<sub>SD</sub></b>	I <sub>S</sub> = 4A, V <sub>GS</sub> = 0V	-	-	1.2	V
Continuous Source Current	<b>I<sub>S</sub></b>		-	-	30	A

#### Notes:

1. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub> = 150°C.
2. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
3. Pulse Test: Pulse width ≤ 300μs, duty cycle ≤ 2%.
4. This value is guaranteed by design hence it is not included in the production test.



### CST30N02 Typical Characteristics

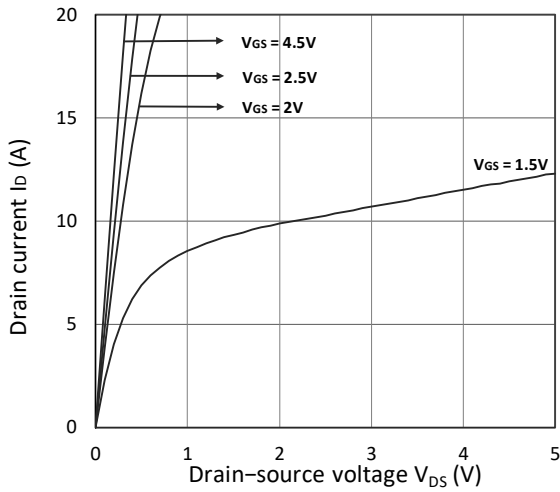
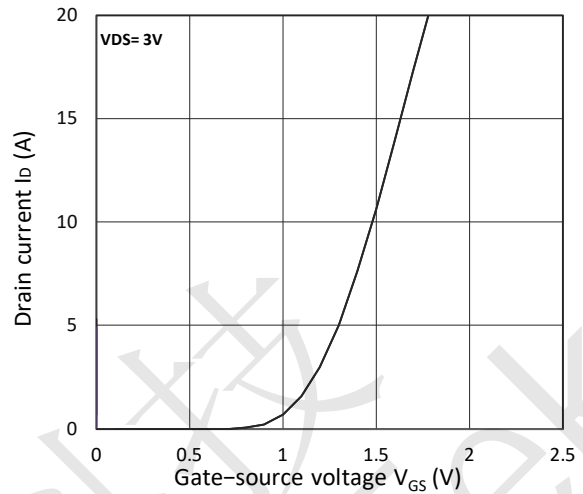


Figure 1. Output Characteristics



Gate-source voltage  $V_{GS}$  (V)

Figure 4.  $R_{DS(on)}$  vs.  $V_{GS}$

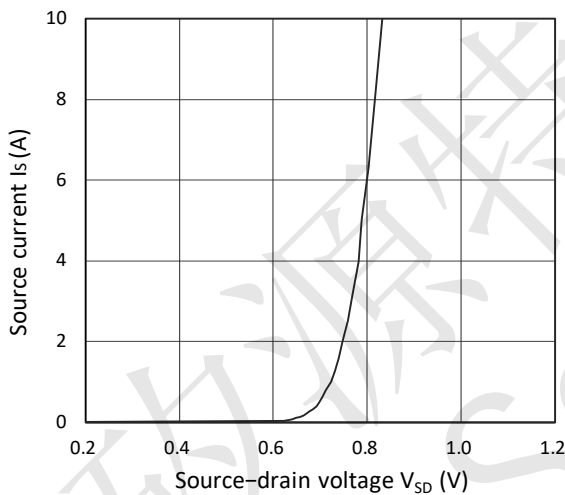


Figure 3. Forward Characteristics of Reverse

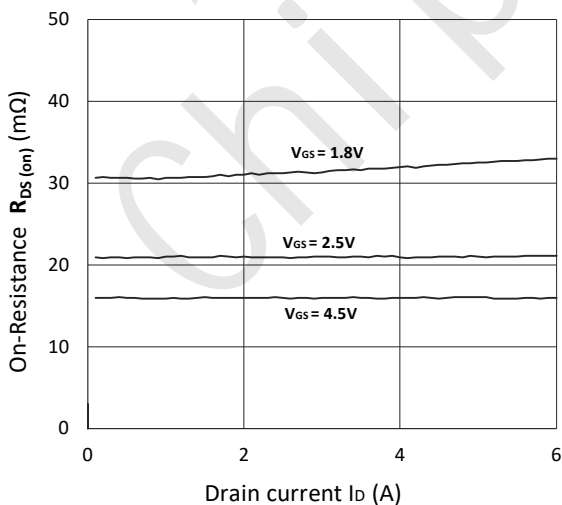
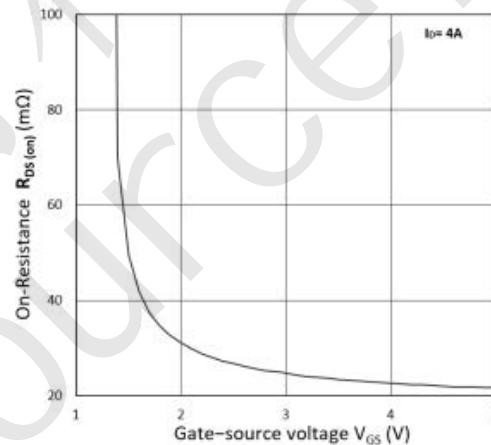


Figure 5.  $R_{DS(on)}$  vs.  $I_D$

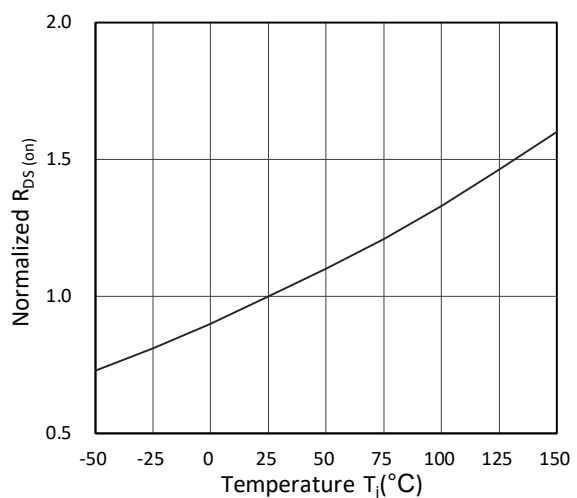


Figure 6. Normalized  $R_{DS(on)}$  vs. Temperature

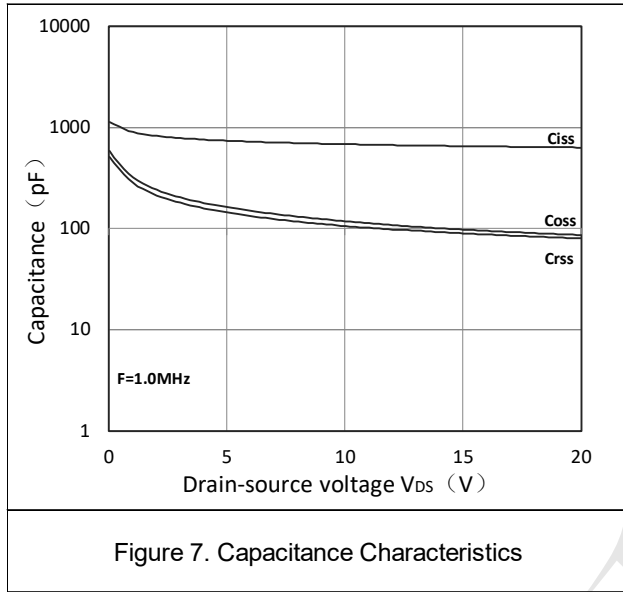


Figure 7. Capacitance Characteristics

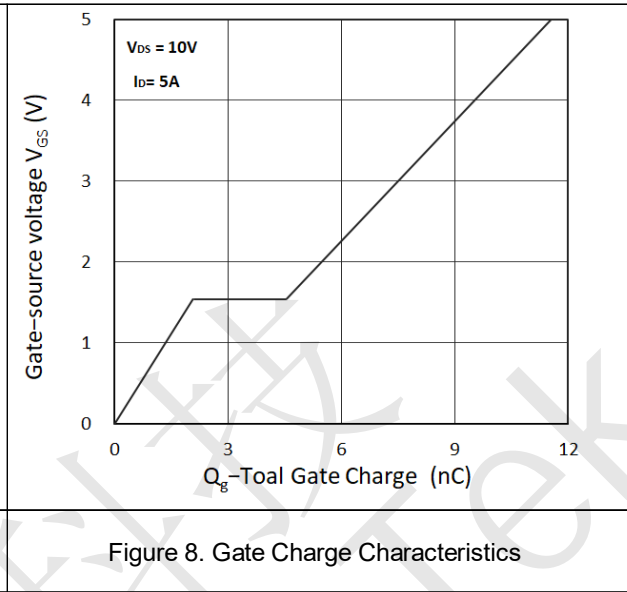
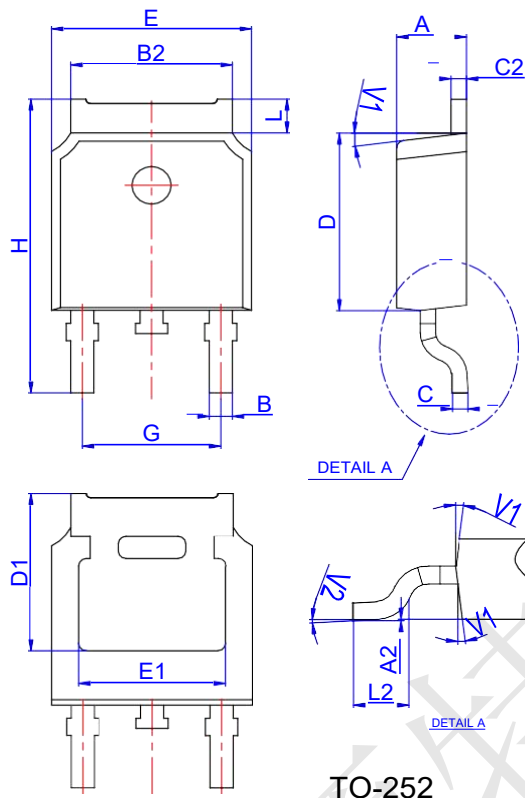


Figure 8. Gate Charge Characteristics



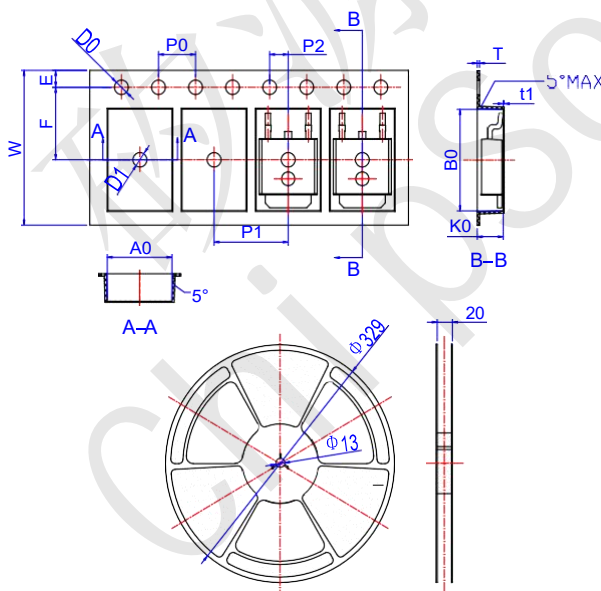
### CST30N02 Package Mechanical Data-TO-252-4R



TO-252

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°

### CST30N02 Reel Specification-TO-252-4R



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