



CST120N03A N-Ch 30V Fast Switching MOSFETs

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

CST120N03A Product Summary

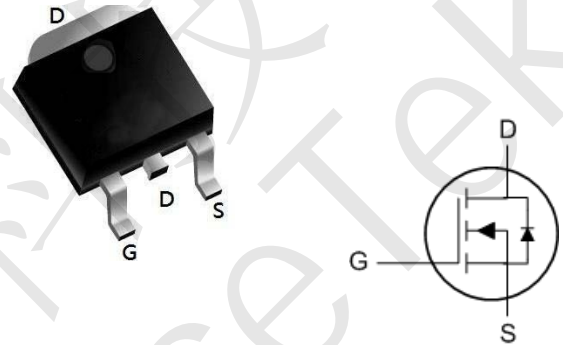


BVDSS	RDSON	ID
30V	2.5mΩ	120 A

CST120N03A Description

The CST120N03A 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 CST120N03A meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

CST120N03A TO252 Pin Configuration



CST120N03A Absolute Maximum Ratings

$T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	SLD120N03T	Units
V_{DSS}	Drain-Source Voltage	30	V
I_D	Drain Current - Continuous ($T_C = 25^\circ\text{C}$) - Continuous ($T_C = 100^\circ\text{C}$)	120	A
		78	A
I_{DM}	Drain Current - Pulsed (Note 1)	480	A
V_{GSS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	333	mJ
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	88	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.4	$^\circ\text{C}/\text{W}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$
T_L	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	300	$^\circ\text{C}$



CST120N03A N-Ch 30V Fast Switching MOSFETs

CST120N03A Electrical Characteristics $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$	--	--	1	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -20\text{ V}, V_{DS} = 0\text{ V}$	--	--	-100	nA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.0	1.5	2.2	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$	--	2.5	3.1	m Ω
		$V_{GS} = 4.5\text{ V}, I_D = 15\text{ A}$	--	3.6	4.5	

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}$	--	4000	-	μF
C_{oss}	Output Capacitance		--	437	-	μF
C_{rss}	Reverse Transfer Capacitance		--	396	-	μF

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{GS} = 10\text{ V}, V_{DS} = 15\text{ V}, R_L = 3\text{ }\Omega, I_D = 30\text{ A}$ (Note 3)	--	14	--	ns
t_r	Turn-On Rise Time		--	18	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	40	--	ns
t_f	Turn-Off Fall Time		--	12	--	ns
Q_g	Total Gate Charge	$V_{DS} = 15\text{ V}, I_D = 30\text{ A}, V_{GS} = 10\text{ V}$ (Note 3)	--	72	--	nC
Q_{gs}	Gate-Source Charge		--	46	--	nC
Q_{gd}	Gate-Drain Charge		--	13	--	nC

Drain-Source Diode Characteristics and Maximum Ratings

I_S	Maximum Continuous Drain-Source Diode Forward Current	--	--	120	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current	--	--	480	A
V_{SD}	Drain to Source Diode Forward Voltage, $V_{GS} = 0\text{ V}, I_{SD} = 30\text{ A}, T_J = 25^\circ\text{C}$	--	--	1.2	V
T_{rr}	Reverse recovery time, $I_F = 30\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}$			48	ns
Q_{rr}	Reverse recovery charge, $I_F = 30\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}$			80	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: $T_J = 25^\circ\text{C}, V_{DD} = 15\text{ V}, V_G = 10\text{ V}, R_G = 25\text{ }\Omega, L = 0.5\text{ mH}, I_{AS} = 25\text{ A}$
3. Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycles $\leq 0.5\%$



CST120N03A N-Ch 30V Fast Switching MOSFETs

N- Channel Typical Characteristics

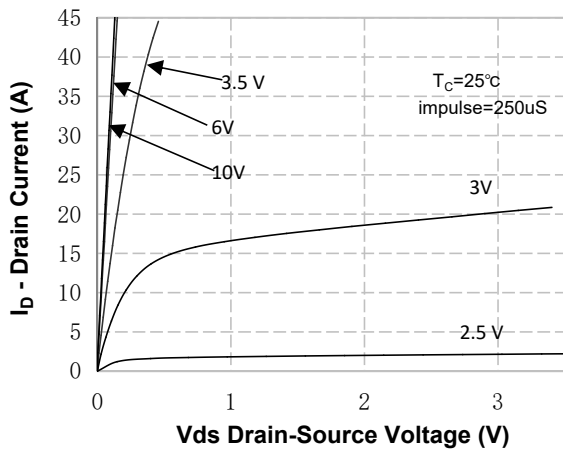


Figure 1. On-Region Characteristics

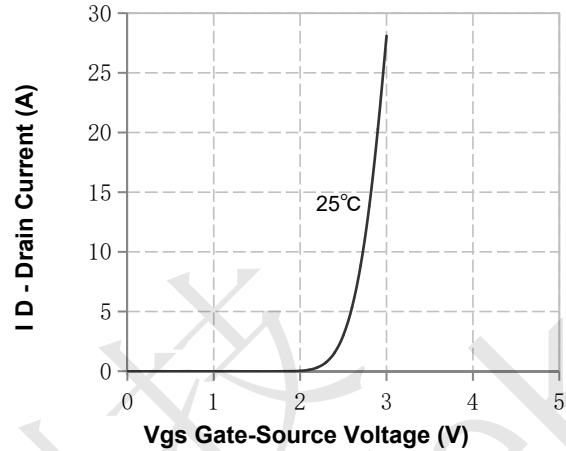


Figure 2. Transfer Characteristics

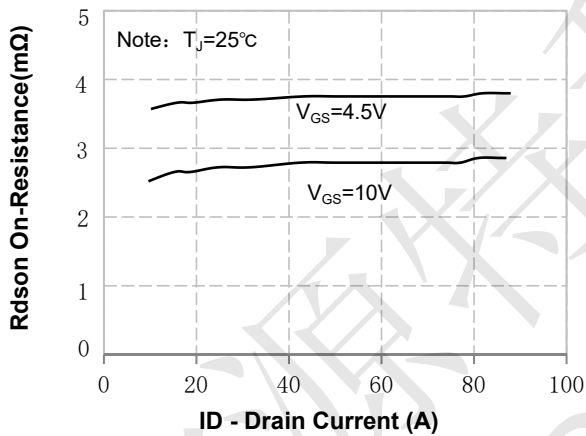


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

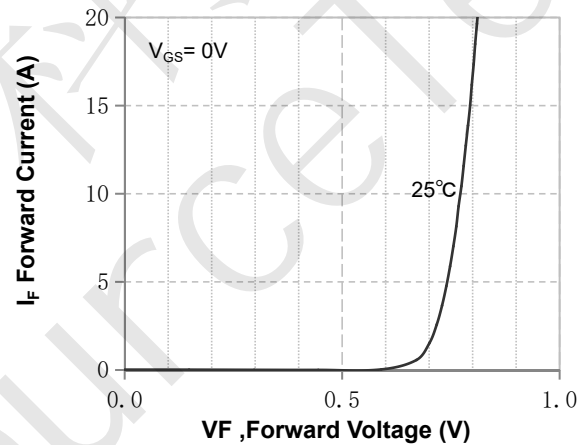


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

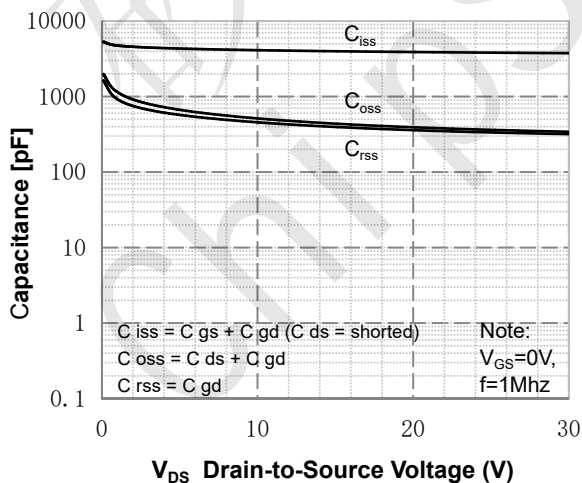


Figure 5. Capacitance Characteristics

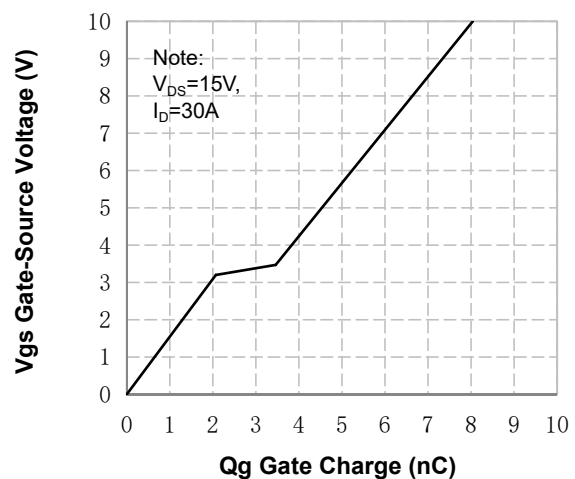


Figure 6. Gate Charge Characteristics



N- Channel Typical Characteristics (Continued)

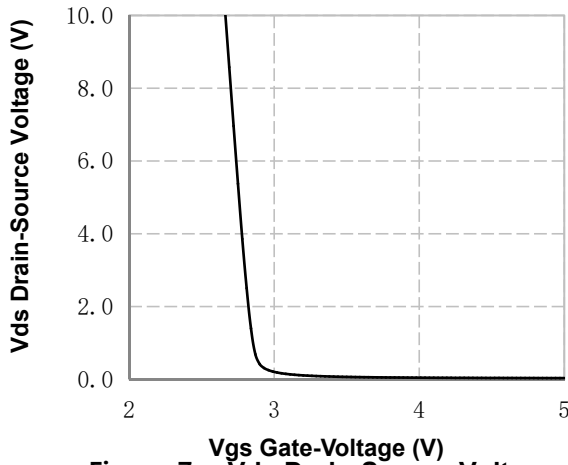


Figure 7. Vds Drain-Source Voltage vs Gate Voltage

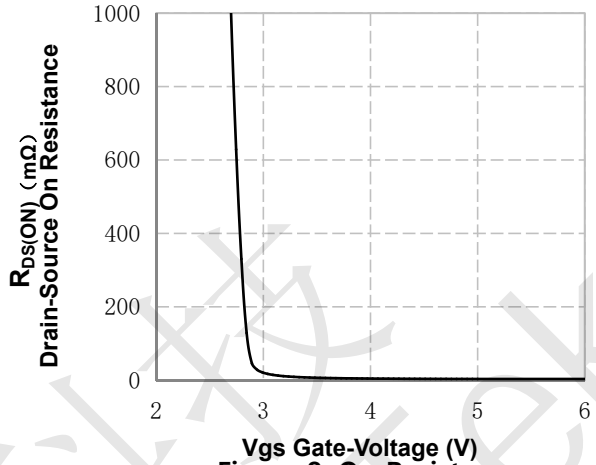


Figure 8. On-Resistance vs Gate Voltage

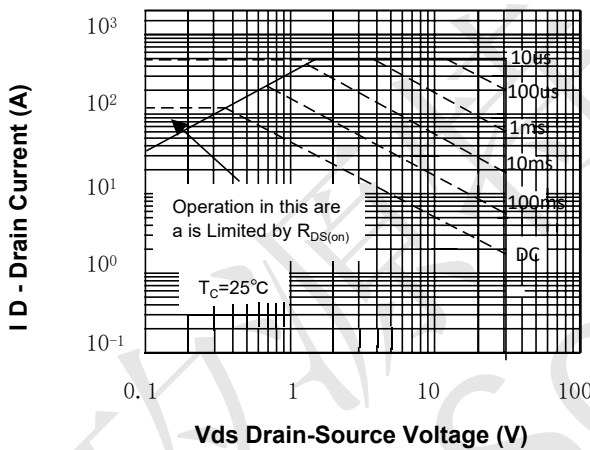


Figure 9. Maximum Safe Operating Area

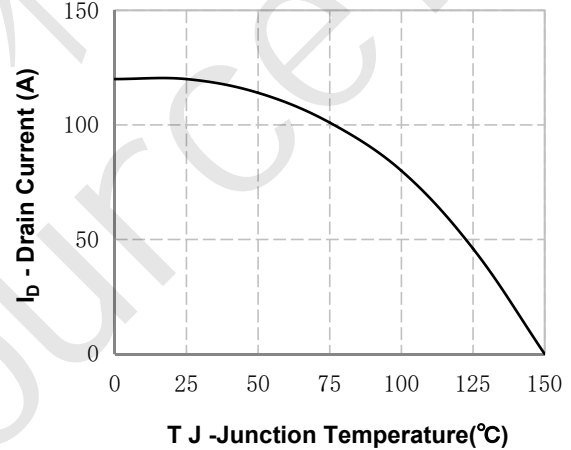


Figure 10. Maximum Continuous Drain Current vs Temperature

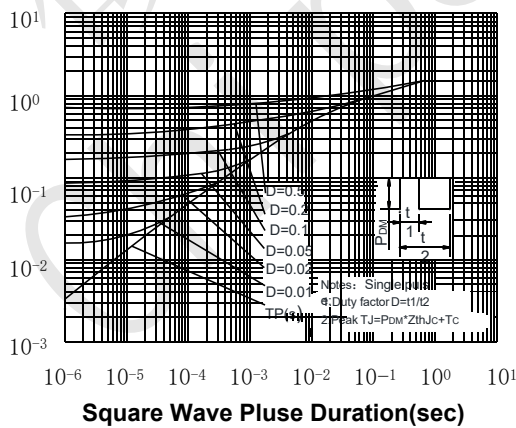
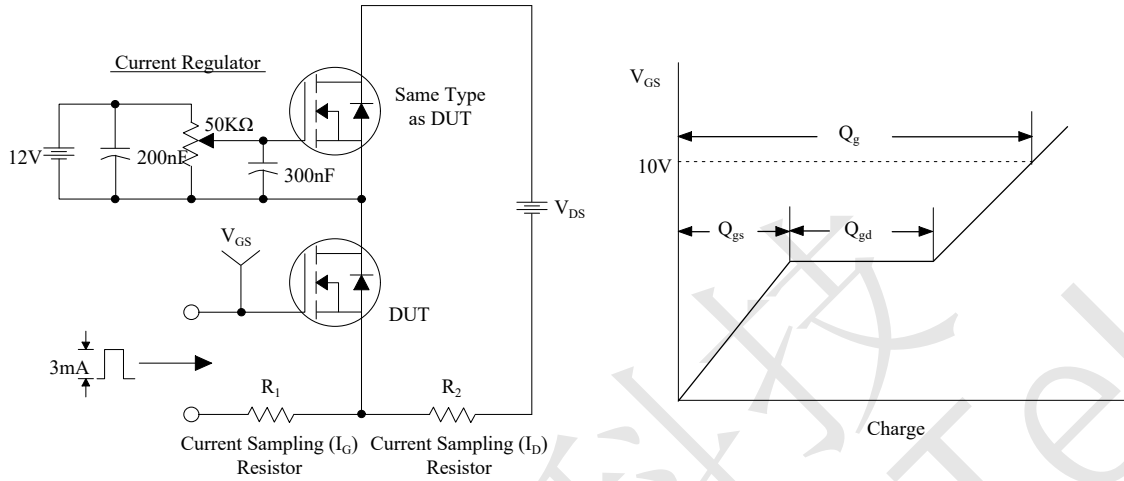


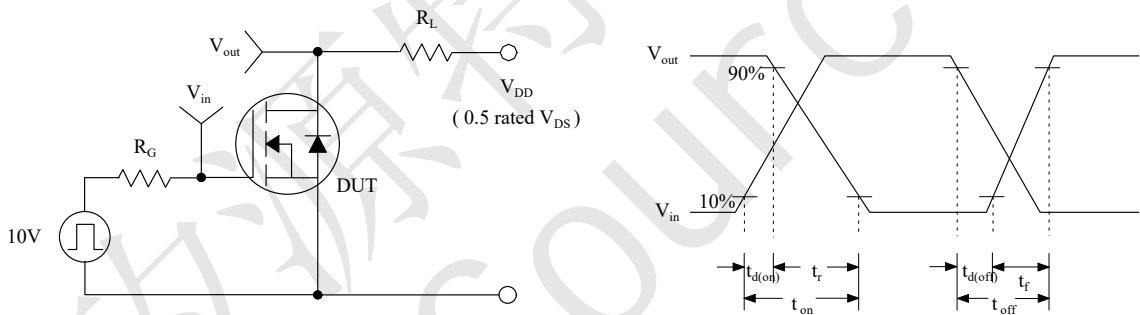
Figure 11. Transient Thermal Response Curve



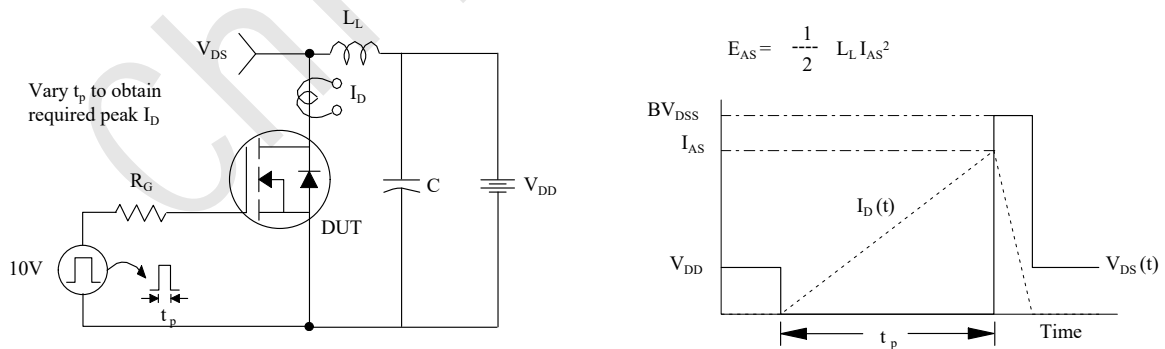
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

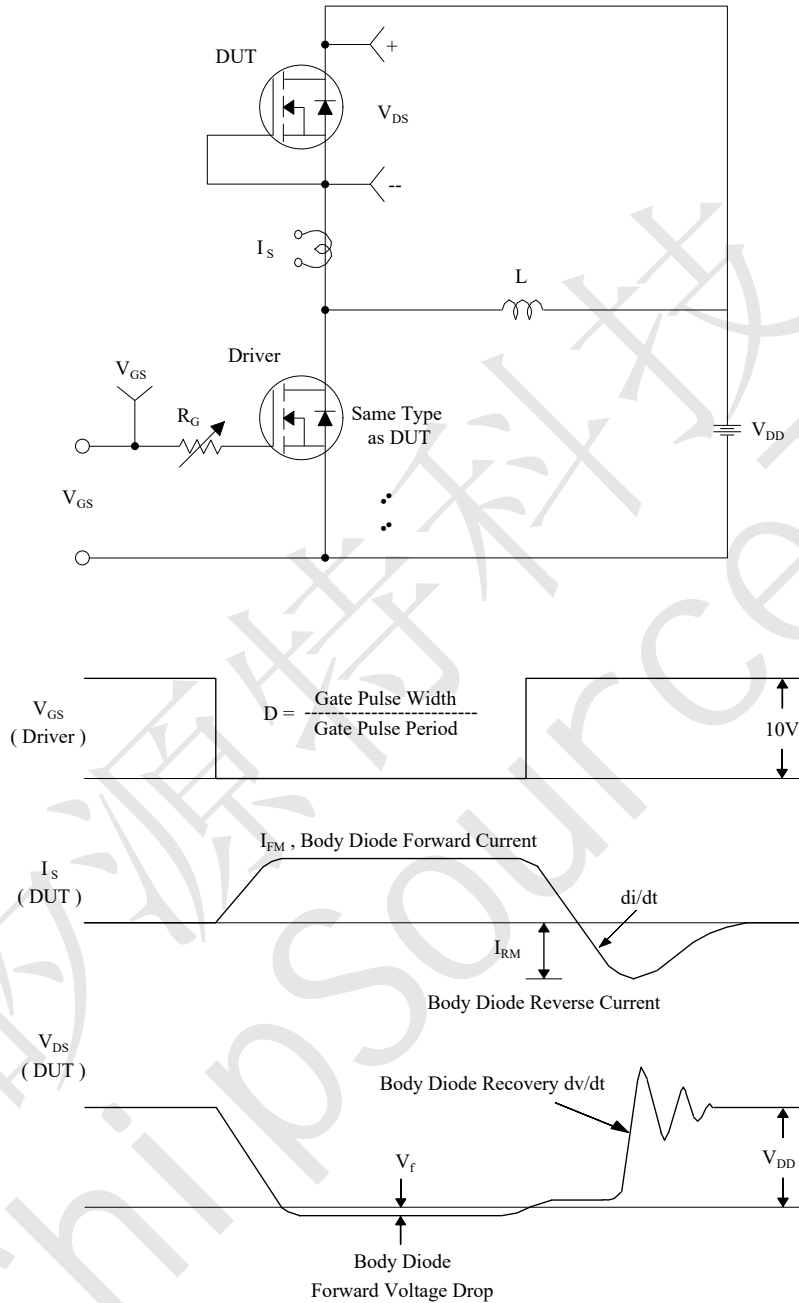


Unclamped Inductive Switching Test Circuit & Waveforms



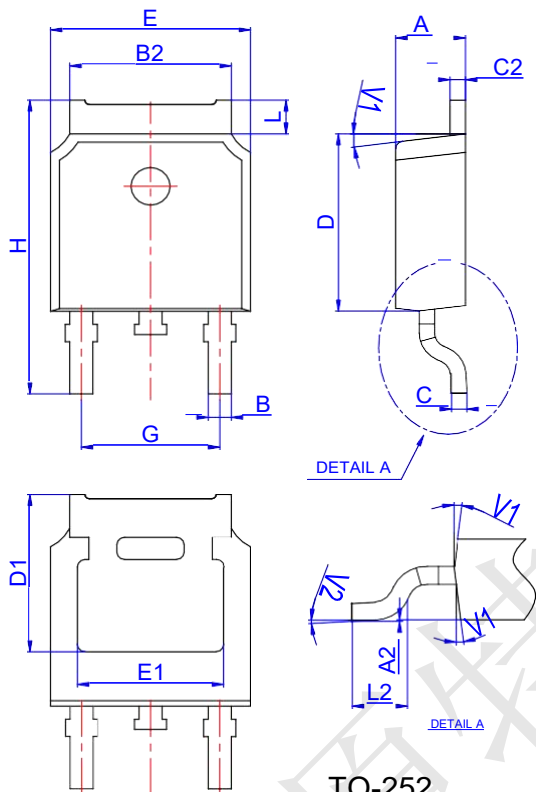


Peak Diode Recovery dv/dt Test Circuit & Waveforms





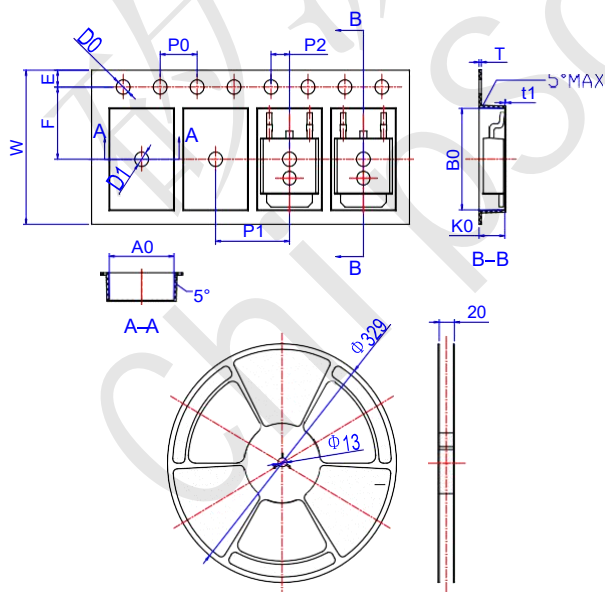
CST120N03A Package Mechanical Data TO 252



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°

TO-252

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