



### CST70P03D P-Ch 30V Fast Switching MOSFETs

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



#### CST70P03D Product Summary

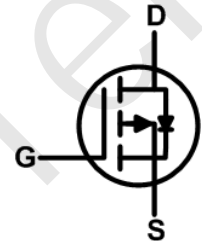
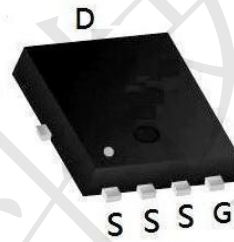
BVDSS	RDSON	ID
-30V	6.5mΩ	-65A

#### CST70P03D Description

The CST70P03D is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The CST70P03D meet the RoHS and Gree Product requirement 100% EAS guaranteed with full function reliability approved.

#### CST70P03D PDFN3333-8L Pin Configuration



#### CST70P03D Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-Source Voltage		$V_{DS}$	-30	V
Gate-Source Voltage		$V_{GS}$	±20	V
Continuous Drain Current@-10V <sup>1</sup>	$T_C=25^{\circ}C$	$I_D$	-65	A
	$T_C=75^{\circ}C$		-35	
Pulsed Drain Current <sup>2</sup>		$I_{DM}$	-175	A
Single Pulse Avalanche Energy <sup>3</sup>		<b>EAS</b>	31	mJ
Avalanche Current		$I_{AS}$	-70	A
Total Power Dissipation <sup>4</sup>	$T_C=25^{\circ}C$	<b>P<sub>D</sub></b>	31.2	W
Operating Junction and Storage Temperature Range		$T_J, T_{STG}$	-55 to+150	°C

#### CST70P03D Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient <sup>1</sup>	$R_{\theta JA}$	61	°C/W
Thermal Resistance from Junction-to-Case <sup>1</sup>	$R_{\theta JC}$	4	°C/W



### CST70P03D P-Ch 30V Fast Switching MOSFETs

#### CST70P03D Electrical Characteristics T<sub>c</sub> = 25°C, unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	<b>V<sub>(BR)DSS</sub></b>	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA	-30	-	-	V
Gate-body Leakage current	<b>I<sub>GSS</sub></b>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T <sub>J</sub> =25°C	V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V	-	-	-1	μA
	T <sub>J</sub> =55°C		-	-	-5	
Gate-Threshold Voltage	<b>V<sub>GS(th)</sub></b>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA	-1.0	-1.6	-2.5	V
Drain-Source On-Resistance <sup>2</sup>	<b>R<sub>DS(on)</sub></b>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -12A	-	6.5	9.3	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -8A	-	9.5	14.5	
Forward Transconductance	<b>g<sub>fs</sub></b>	V <sub>DS</sub> = -5V, I <sub>D</sub> = -20A	-	28	-	S
<b>Dynamic Characteristics</b>						
Input Capacitance	<b>C<sub>iss</sub></b>	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V, f = 1MHz	-	4320	-	pF
Output Capacitance	<b>C<sub>oss</sub></b>		-	529	-	
Reverse Transfer Capacitance	<b>C<sub>rss</sub></b>		-	487	-	
<b>Switching Characteristics</b>						
Gate Resistance	<b>R<sub>g</sub></b>	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz	-	4.0	-	Ω
Total Gate Charge	<b>Q<sub>g</sub></b>	V <sub>GS</sub> = -10V, V <sub>DS</sub> = -15V, I <sub>D</sub> = -15A	-	45	-	nC
Gate-Source Charge	<b>Q<sub>gs</sub></b>		-	8.5	-	
Gate-Drain Charge	<b>Q<sub>gd</sub></b>		-	12.8	-	
Turn-On Delay Time	<b>t<sub>d(on)</sub></b>	V <sub>GS</sub> = -10V, V <sub>DD</sub> = -15V, R <sub>G</sub> = 2.5Ω, I <sub>D</sub> = -15A	-	18.9	-	nS
Rise Time	<b>t<sub>r</sub></b>		-	15.7	-	
Turn-Off Delay Time	<b>t<sub>d(off)</sub></b>		-	64.8	-	
Fall Time	<b>t<sub>f</sub></b>		-	36.5	-	
<b>Drain-Source Body Diode Characteristics</b>						
Diode Forward Voltage <sup>2</sup>	<b>V<sub>SD</sub></b>	I <sub>S</sub> = -1A, V <sub>GS</sub> = 0V	-	-	-1	V
Continuous Source Current <sup>1,5</sup>	<b>I<sub>S</sub></b>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	-	-	-65	A

Note :

1. The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%
3. The EAS data shows Max. rating. The test condition is V<sub>DD</sub> = -25V, V<sub>GS</sub> = -10V, L = 0.1mH, I<sub>AS</sub> = -25A
4. The power dissipation is limited by 150°C junction temperature
5. The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub>, in real applications, should be limited by total power dissipation.



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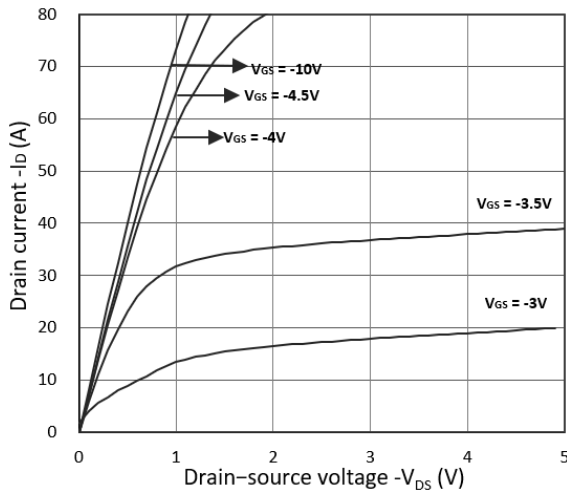


Figure 1. Output Characteristics

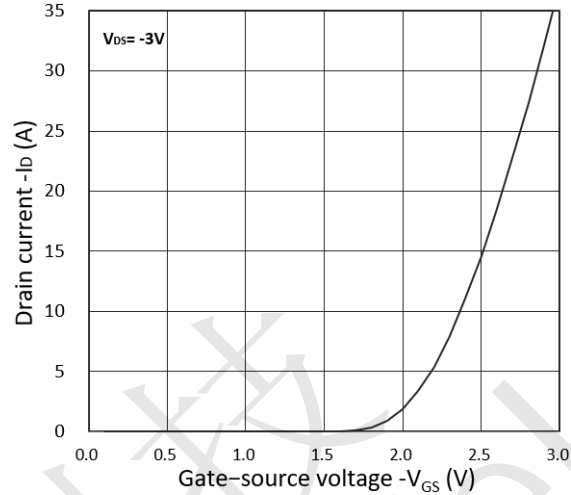


Figure 2. Transfer Characteristics

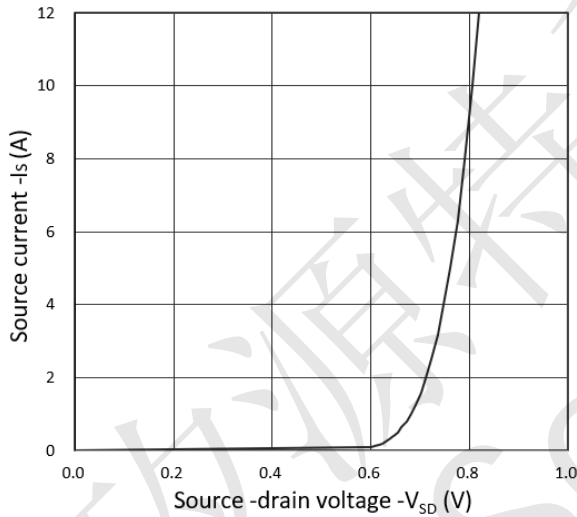


Figure 3. Forward Characteristics of Reverse

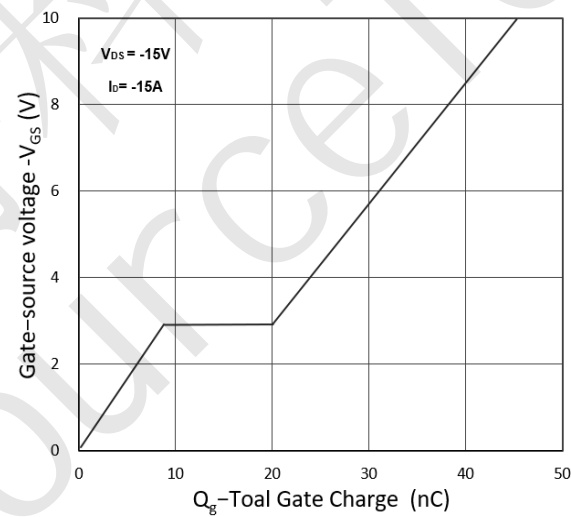


Figure 4. Gate Charge Characteristics

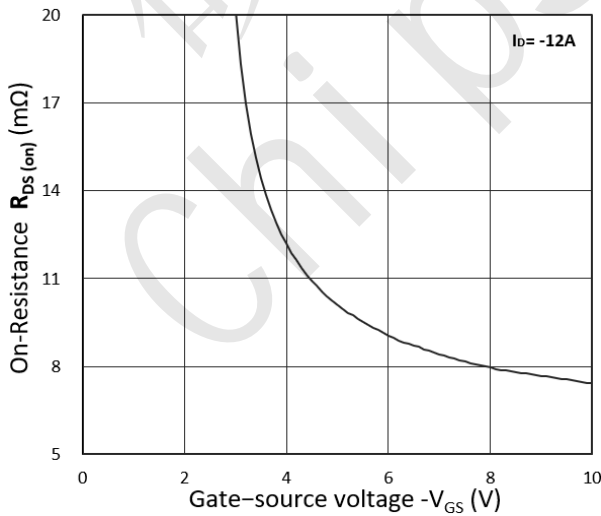


Figure 5.  $R_{DS(on)}$  vs.  $V_{GS}$

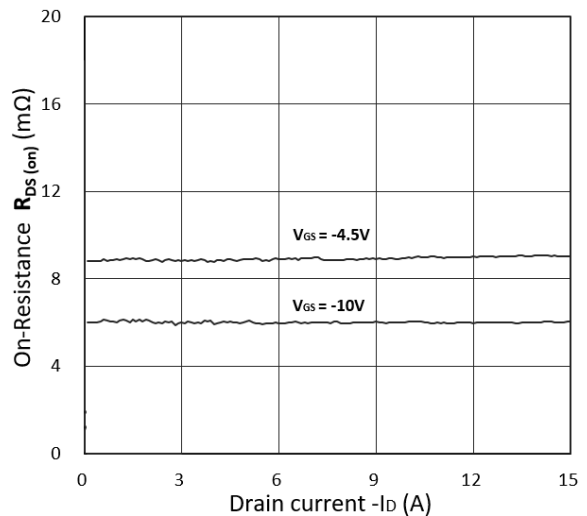


Figure 6.  $R_{DS(on)}$  vs.  $I_D$



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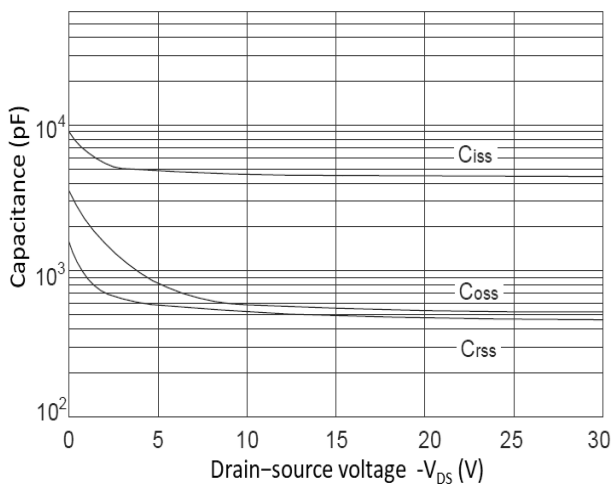


Figure 7. Capacitance Characteristics

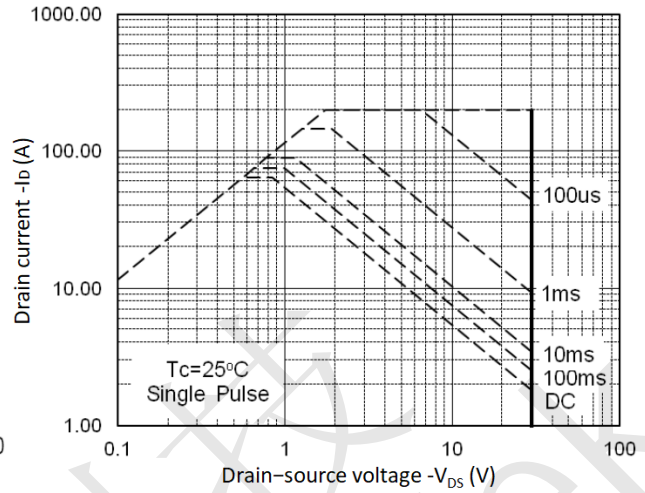


Figure 8. Safe Operating Area

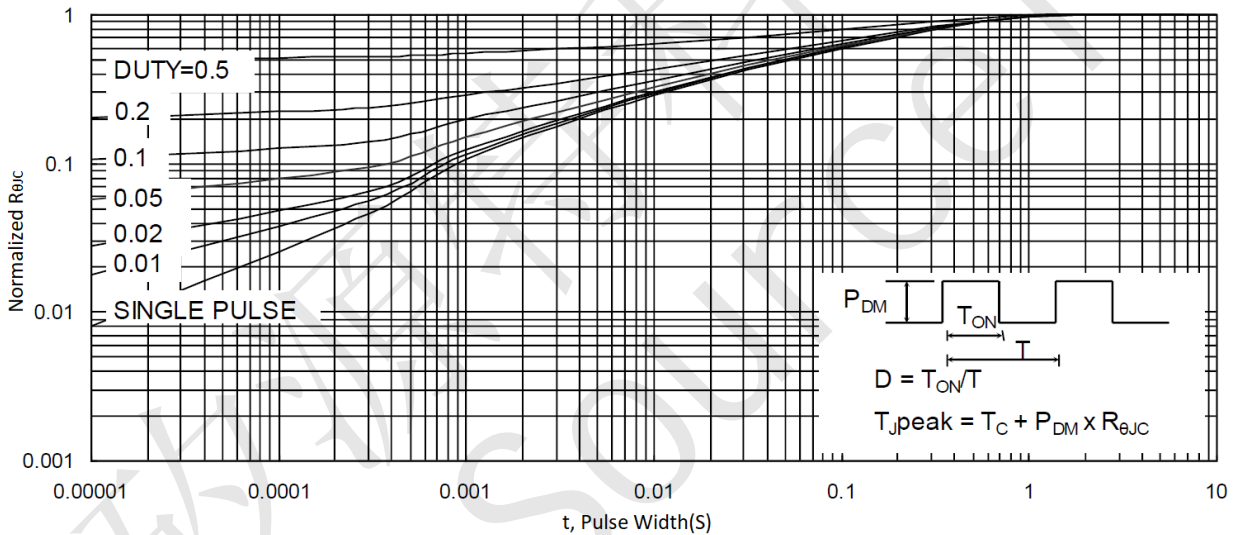


Figure 9. Normalized Maximum Transient Thermal Impedance

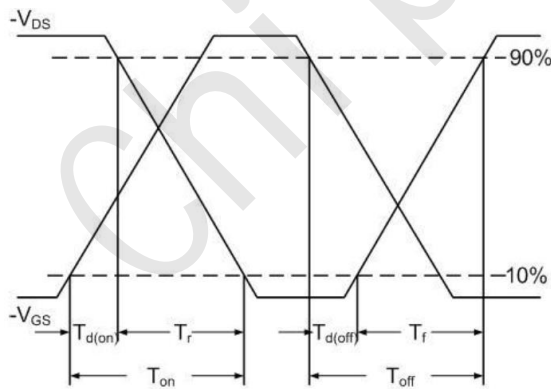


Figure 10. Switching Time Waveform

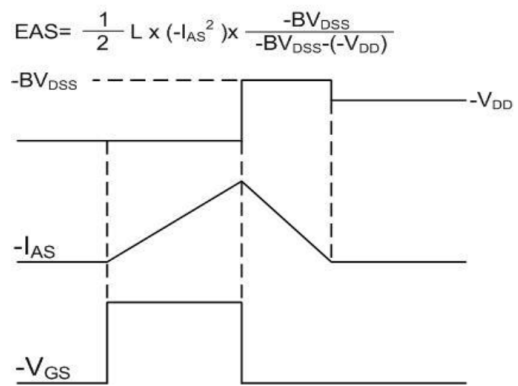
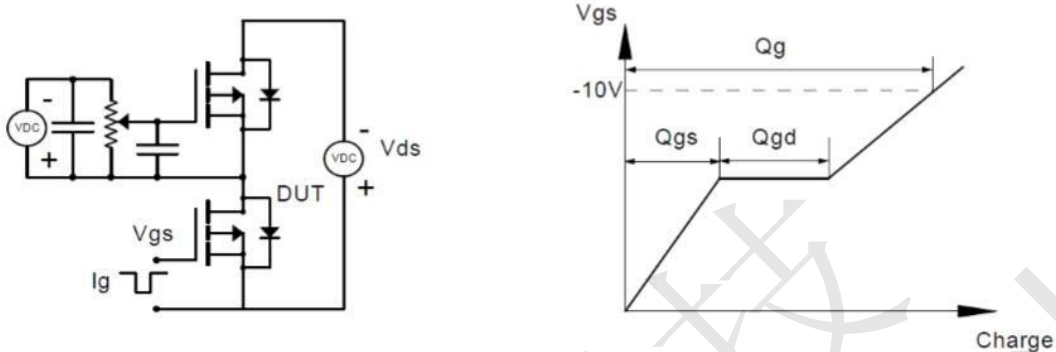


Figure 11. Unclamped Inductive Switching Waveform

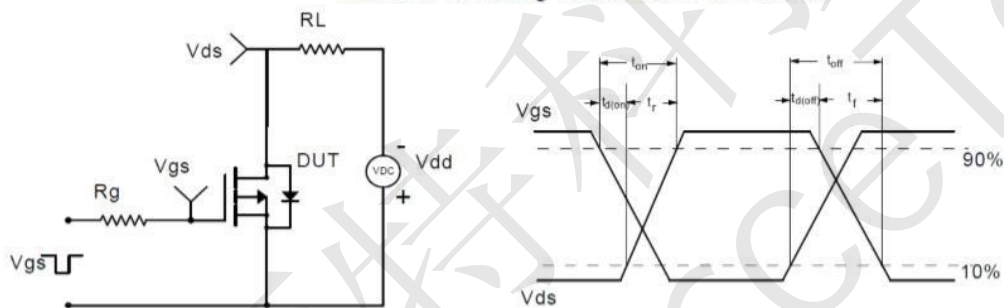


## CST70P03D Test Circuit

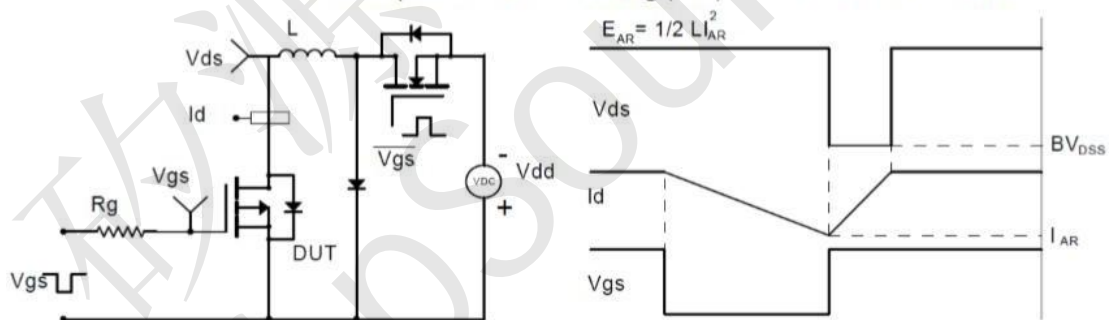
### Gate Charge Test Circuit & Waveform



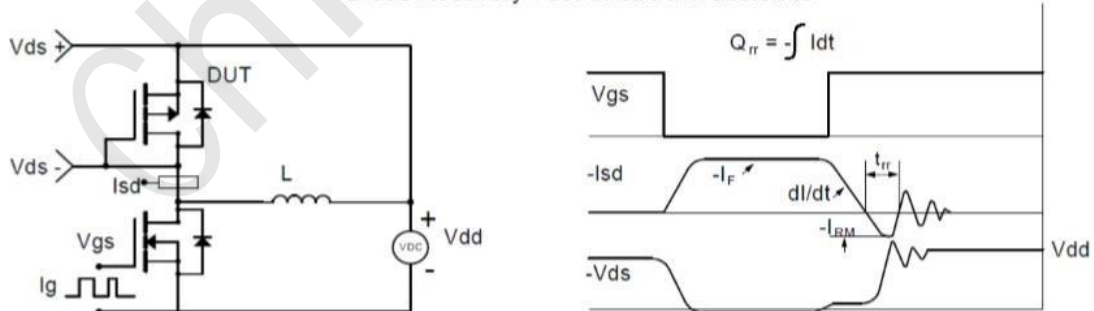
### Resistive Switching Test Circuit & Waveforms



### Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



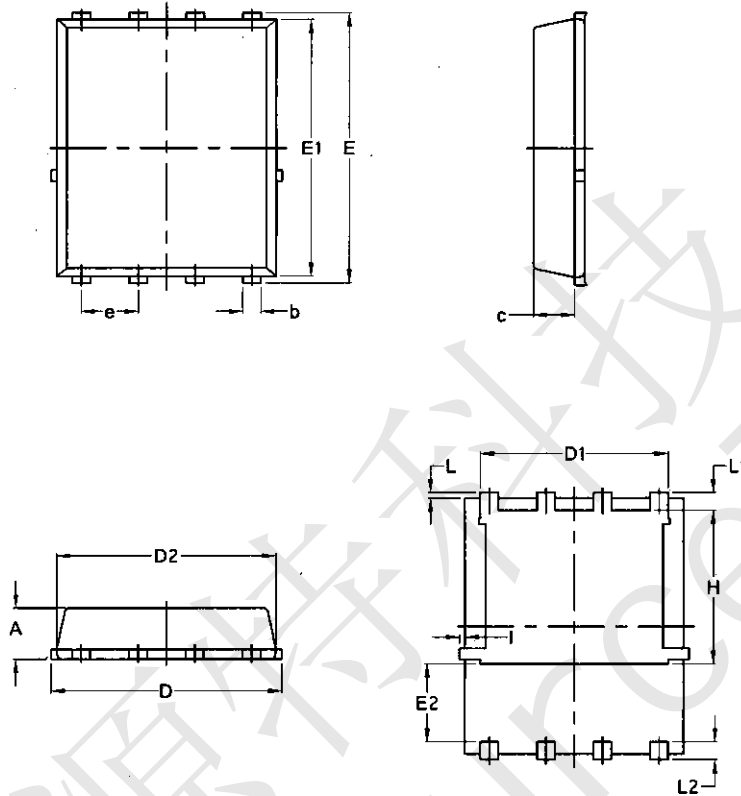
### Diode Recovery Test Circuit & Waveforms







CST70P03D Package Mechanical Data-PDFN3333-8L-Single



COMMON DIMENSIONS

(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.70	0.80	0.90
A1	0.00	0.03	0.05
b	0.24	0.30	0.35
c	0.10	0.15	0.20
D	3.25	3.32	3.40
D1	3.05	3.15	3.25
D2	2.40	2.50	2.60
E	3.00	3.10	3.20
E1	1.35	1.45	1.55
e	0.65 BSC.		
H	3.20	3.30	3.40
L	0.30	0.40	0.50
L1	0.10	0.15	0.20
L2	1.13 REF.		