



### CST40P03D 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



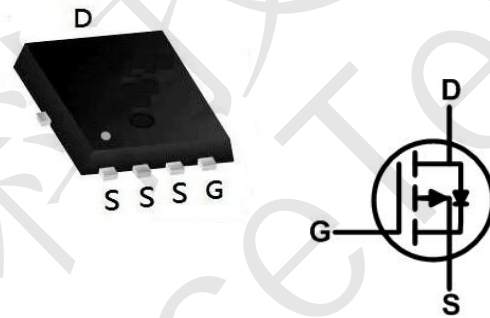
#### CST40P03D Product Summary

BVDSS	RDSON	ID
-30V	12mΩ	-40A

#### CST40P03D Description

The CST40P03D 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 CST40P03D meet the RoHS and Gree Product requirement 100% EAS guaranteed with full function reliability approved.

#### CST40P03D PDFN3333-8L Pin Configuration



#### CST40P03D Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		10s	Steady State	
V <sub>DS</sub>	Drain-Source Voltage	-30		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>	-40		A
I <sub>D</sub> @T <sub>C</sub> =100°C	Continuous Drain Current, V <sub>GS</sub> @ -10V <sup>1</sup>	-25		A
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	-120		A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	105		mJ
I <sub>AS</sub>	Avalanche Current	-50		A
P <sub>D</sub> @T <sub>A</sub> =25°C	Total Power Dissipation <sup>4</sup>	15		W
T <sub>STG</sub>	Storage Temperature Range	-55 to 150		°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150		°C

#### CST40P03D Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction-Ambient <sup>1</sup>	---	66	°C/W



### CST40P03D P-Ch 30V Fast Switching MOSFETs

#### CST40P03D Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> = -250μA	-30	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = -30V, V <sub>GS</sub> =0V,	-	-	-1	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±20V	-	-	±100	nA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> = -250μA	-1.0	-1.6	-2.5	V
R <sub>DS(on)</sub>	Static Drain-Source on-Resistance <small>Note3</small>	V <sub>GS</sub> = -10V, I <sub>D</sub> = -10A	-	12	15	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -5A	-	18	27	
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = -15V, V <sub>GS</sub> =0V, f=1.0MHz	-	1330	-	pF
C <sub>oss</sub>	Output Capacitance		-	183	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	156	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> = -15V, I <sub>D</sub> = -5A, V <sub>GS</sub> = -10V	-	22	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	1.0	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	1.8	-	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> = -15V, I <sub>D</sub> = -10A, V <sub>GS</sub> =-10V, R <sub>GEN</sub> =2.5Ω	-	9	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	13	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	48	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	20	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	-40	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-90	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> = -15A	-	-0.8	-1.2	V
t <sub>rr</sub>	Reverse Recovery Time	T <sub>J</sub> =25°C,	-	64	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	V <sub>DD</sub> = -24V, I <sub>F</sub> =-2.8A, dI/dt=-100A/μs	-	25	-	nC

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

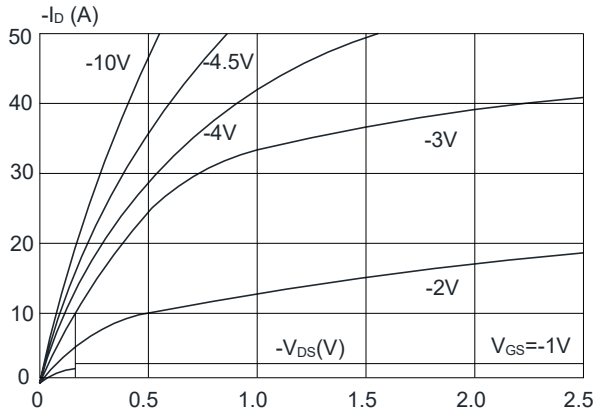
2. EAS condition: T<sub>J</sub>=25°C, V<sub>GS</sub>=10V, R<sub>G</sub>=25Ω, L=0.5mH, I<sub>AS</sub>=-12.7A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

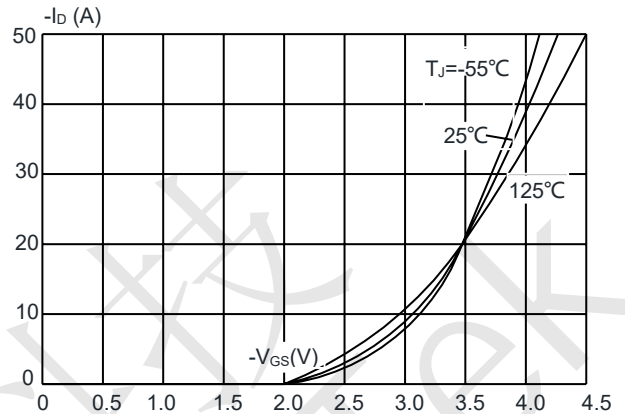


## CST40P03D Typical Performance Characteristics

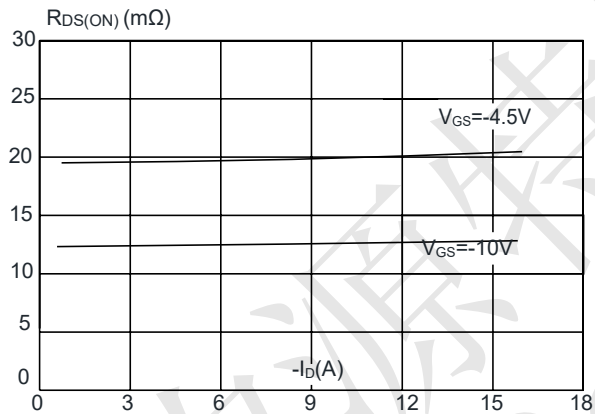
**Figure 1: Output Characteristics**



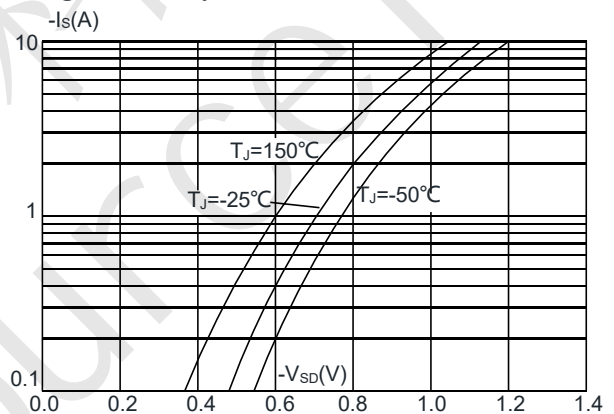
**Figure 2: Typical Transfer Characteristics**



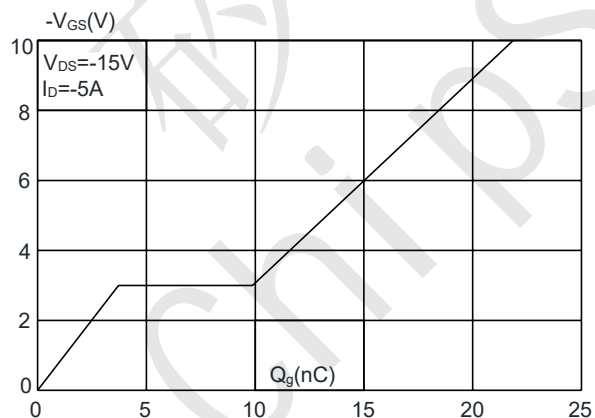
**Figure 3: On-resistance vs. Drain Current**



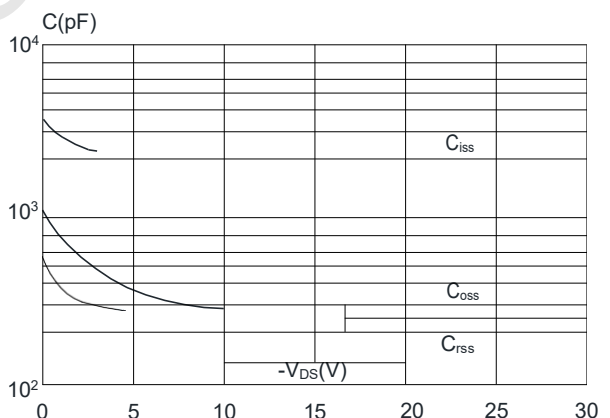
**Figure 4: Body Diode Characteristics**



**Figure 5: Gate Charge Characteristics**



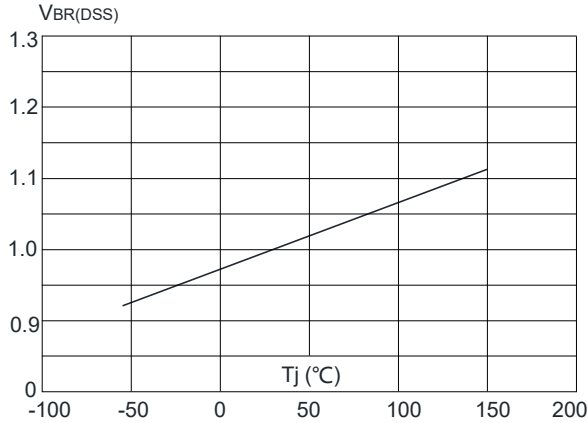
**Figure 6: Capacitance Characteristics**



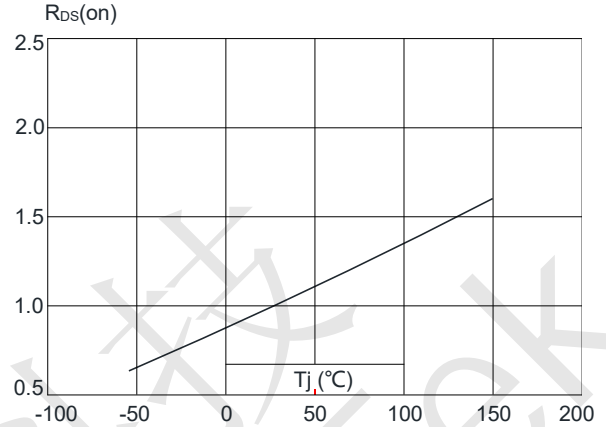


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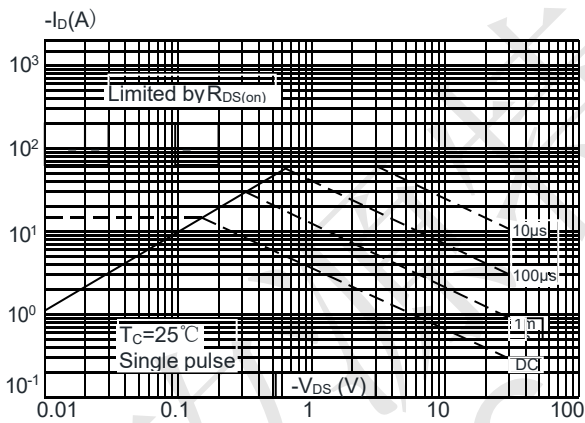
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



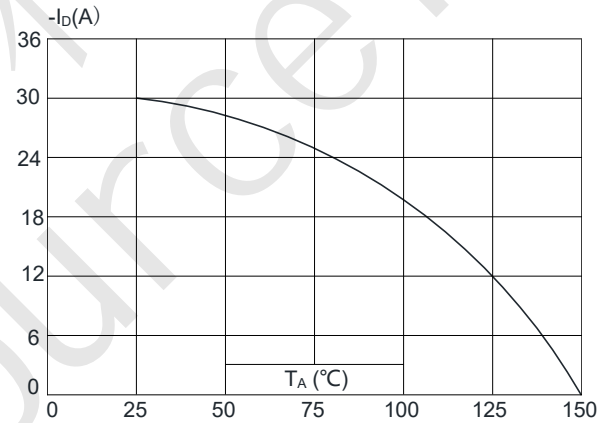
**Figure 8:** Normalized on Resistance vs. Junction Temperature



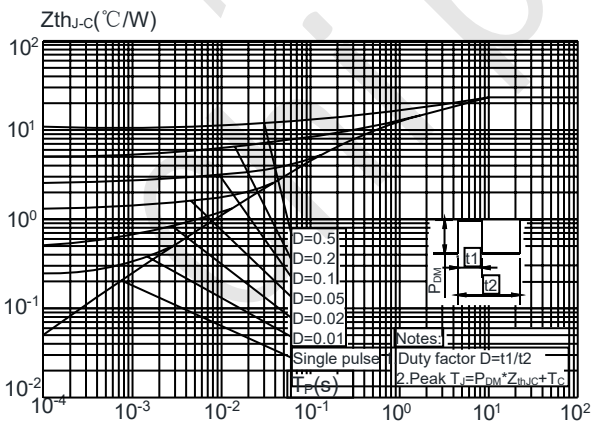
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature



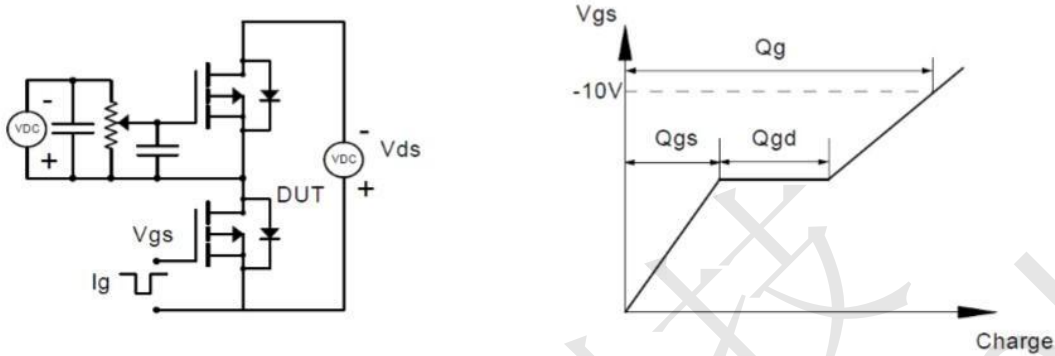
**Figure 11:** Maximum Effective Transient Thermal Impedance, Junction-to-Case



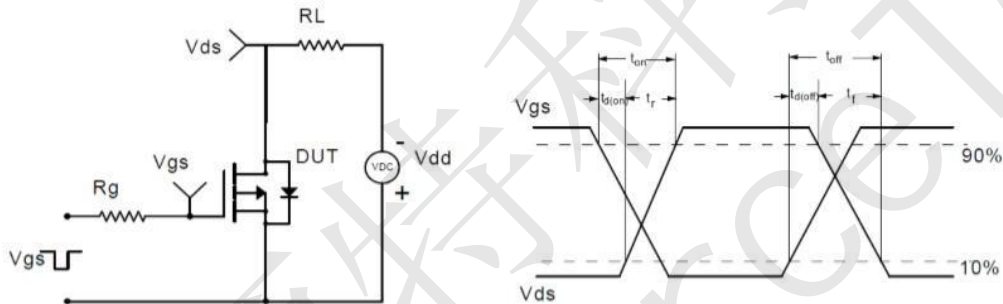


#### CST40P03D Test Circuit

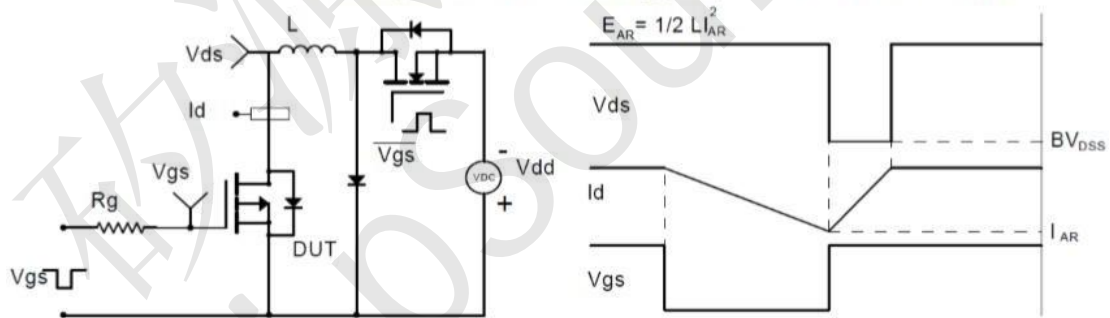
##### Gate Charge Test Circuit & Waveform



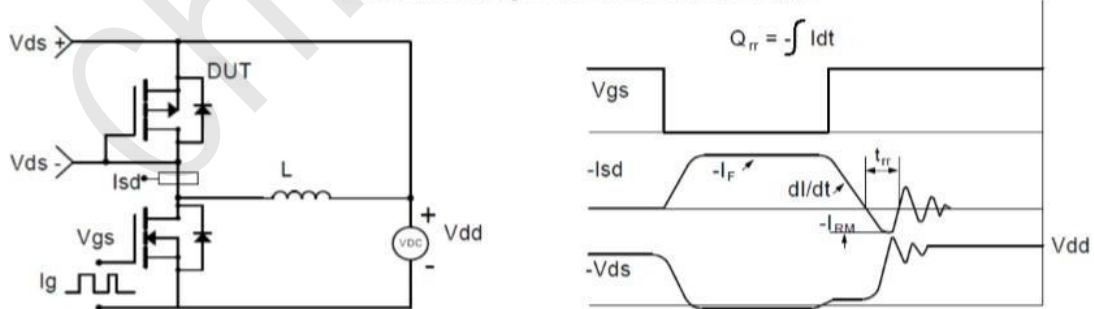
##### Resistive Switching Test Circuit & Waveforms



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

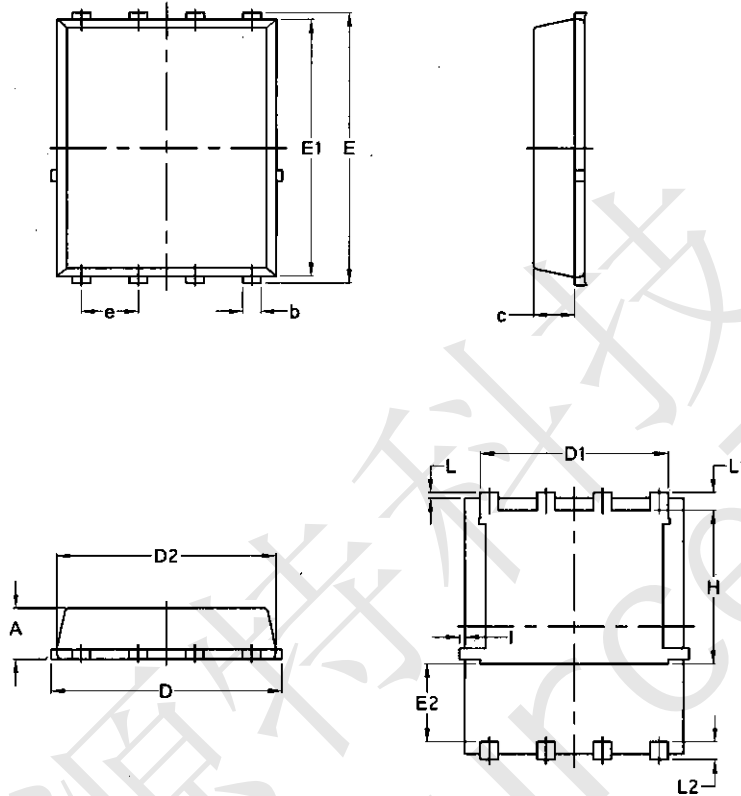


##### Diode Recovery Test Circuit & Waveforms





CST40P03D 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.		