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

CST50P04 Description

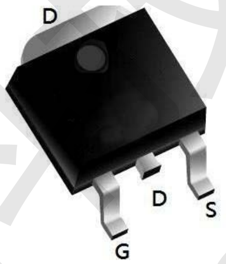
The CST50P04 is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

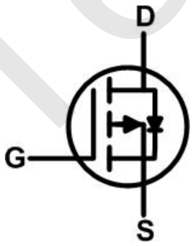
The CST50P04 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

CST50P04 Product Summary

BVDSS	RDSON	ID
-40V	8.3 mΩ	-52A

CST50P04 TO252 Pin Configuration





CST50P04 Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25˚C	Continuous Drain Current, -V_{GS} @ -10V[1]	-52	A
I_D@T_C=100˚C	Continuous Drain Current, -V_{GS} @ -10V[1]	-35	A
I_{DM}	Pulsed Drain Current[2]	-160	A
EAS	Single Pulse Avalanche Energy[3]	144	mJ
I_{AS}	Avalanche Current	-30.0	A
P_D@T_C=25˚C	Total Power Dissipation[4]	45	W
T_{STG}	Storage Temperature Range	-55 to 150	˚C
T_J	Operating Junction Temperature Range	-55 to 150	˚C

CST50P04 Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	62	˚C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	3.6	˚C/W

CST50P04 Electrical Characteristics (T_J=25℃ 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= -250μA	-40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}= -40V, V_{GS}=0V	-	-	-1	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS}=0V, V_{GS}= ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D= -250μA	-1.0	-1.7	-2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note3	V_{GS}= -10V, I_D= -20A	-	8.3	13	mΩ
		V_{GS}= -4.5V, I_D= -10A	-	15	22	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}= -20V, V_{GS}=0V, f=1.0MHz	-	3800	-	pF
C_{oss}	Output Capacitance		-	329	-	pF
C_{rss}	Reverse Transfer Capacitance		-	289	-	pF
Q_g	Total Gate Charge	V_{DS}= -20V, I_D= -20A, V_{GS}= -10V	-	68	-	nC
Q_{gs}	Gate-Source Charge		-	10	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	14	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}= -20V, I_D= -20A, V_{GS}= -10V, R_{GEN}=2.4Ω	-	10	-	ns
t_r	Turn-on Rise Time		-	82	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	93	-	ns
t_f	Turn-off Fall Time		-	74	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-40	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-160	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S= -30A	-	-0.8	-1.2	V
trr	Reverse Recovery Time	V_{GS}=0V, I_S= -30A, di/dt=100A/μs	-	20	-	ns
Qrr	Reverse Recovery Charge		-	13	-	nC

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

2. EAS condition: T_J= 25℃, V_{DD}= -20V, V_G= -10V, L= 0.5mH, R_G= 25Ω, I_{AS}= -24A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

CST50P04 Typical Performance Characteristics

Figure1: Output Characteristics

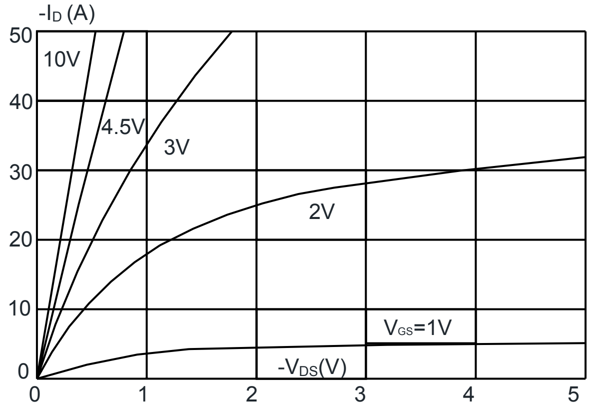


Figure 2: Typical Transfer Characteristics

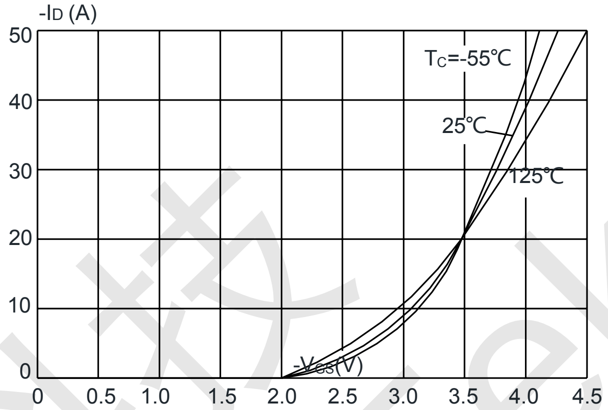


Figure 3: On-resistance vs. Drain Current

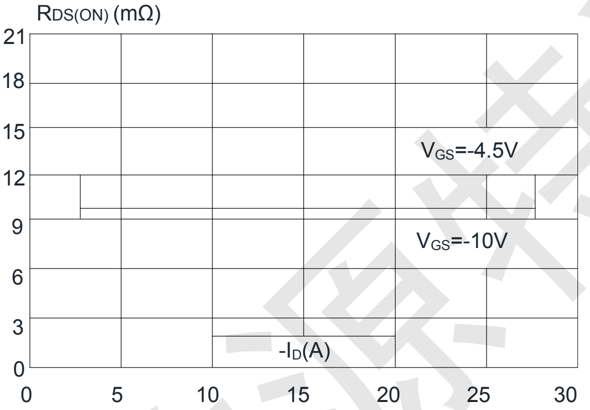


Figure 4: Body Diode Characteristics

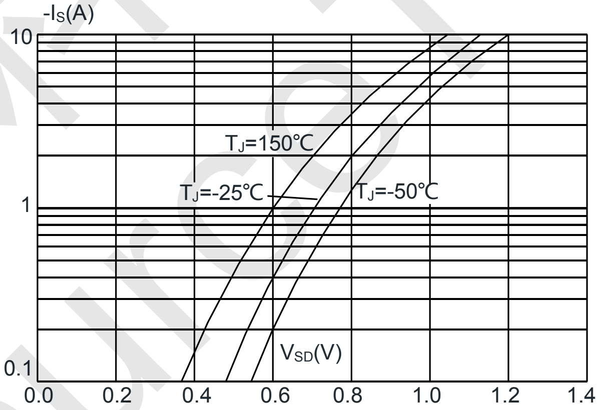


Figure 5: Gate Charge Characteristics

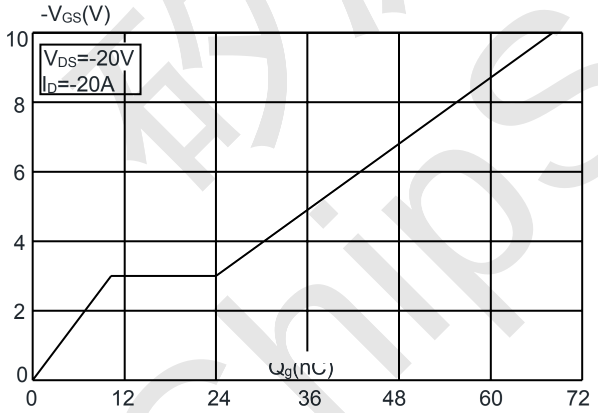


Figure 6: Capacitance Characteristics

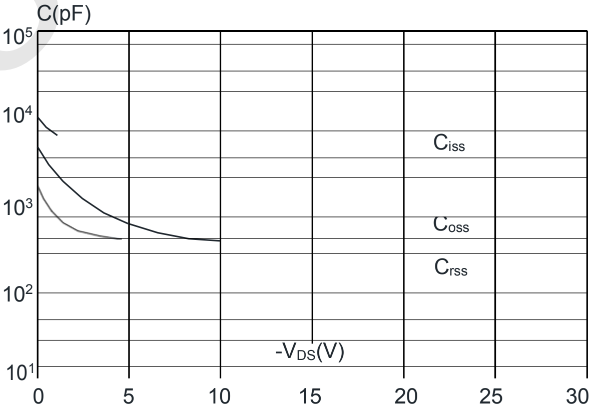


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

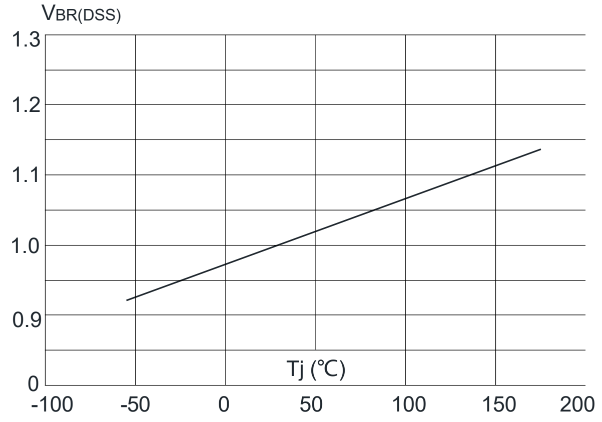


Figure 8: Normalized on Resistance vs. Junction Temperature

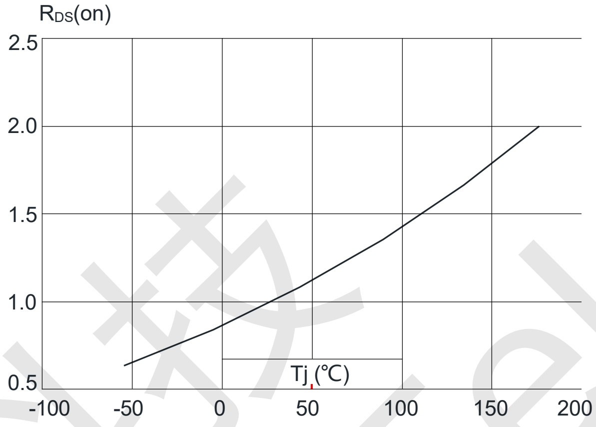


Figure 9: Maximum Safe Operating Area

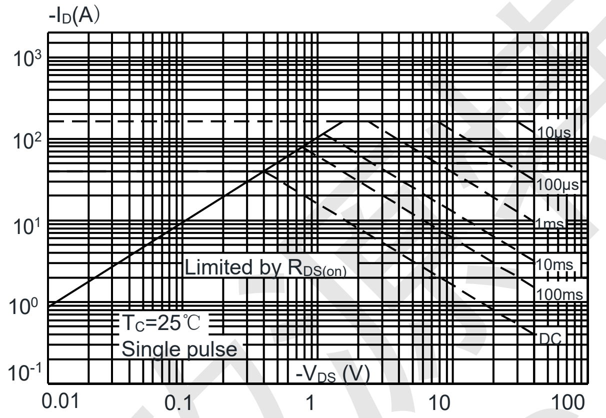


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

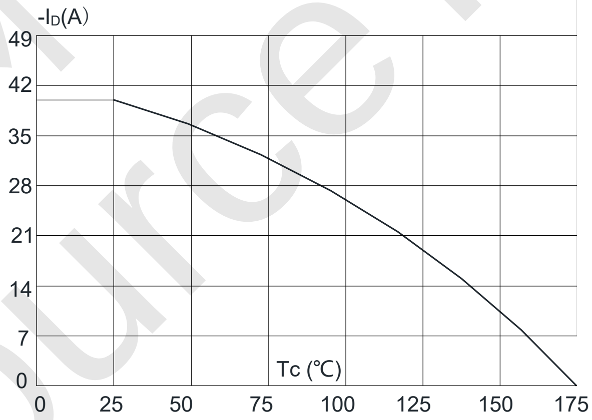
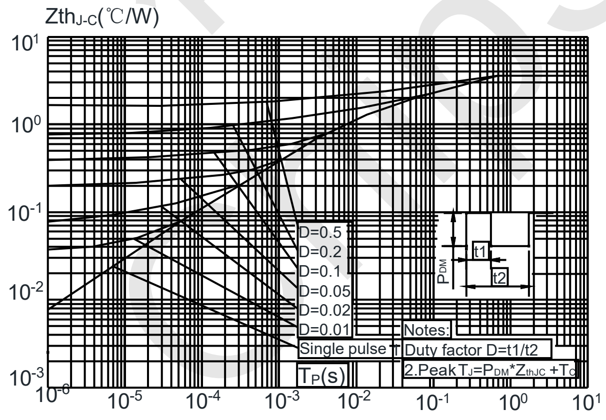
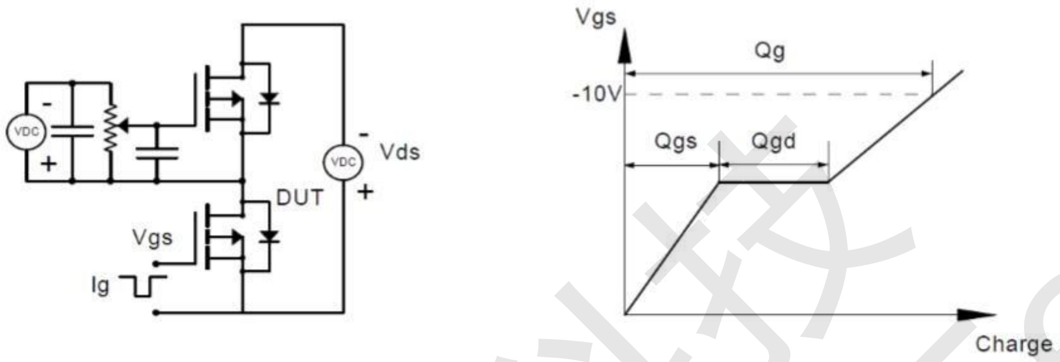


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

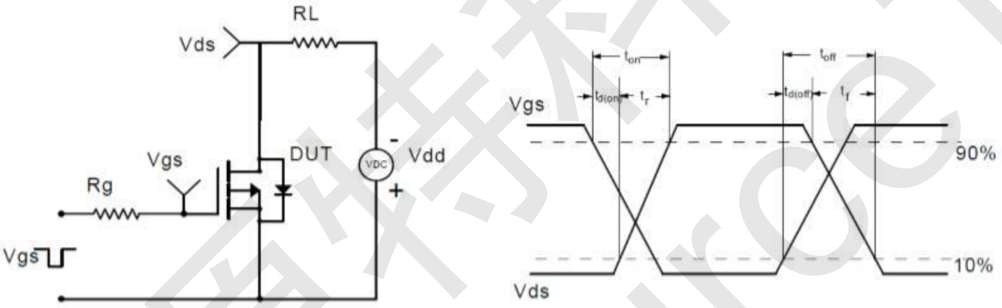


CST50P04 Test Circuit

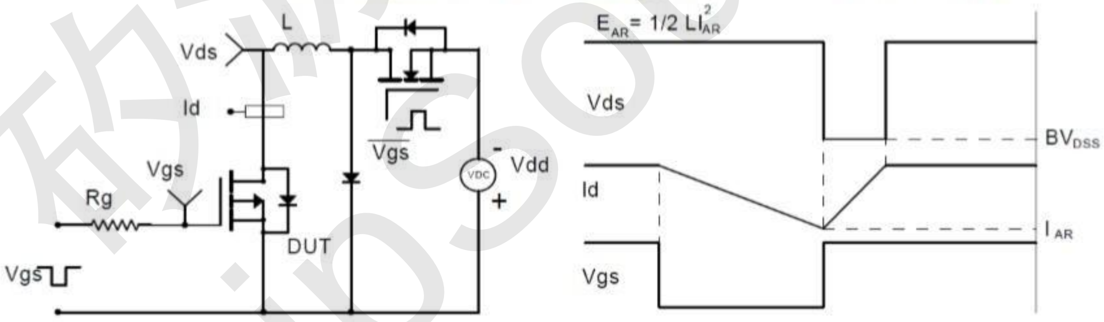
Gate Charge Test Circuit & Waveform



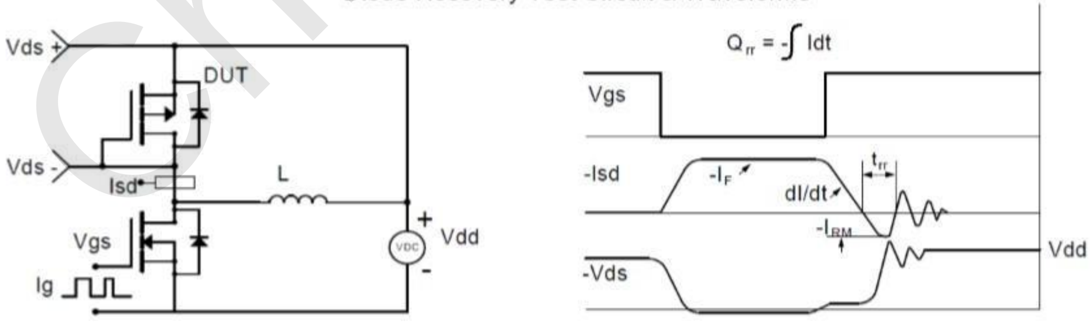
Resistive Switching Test Circuit & Waveforms



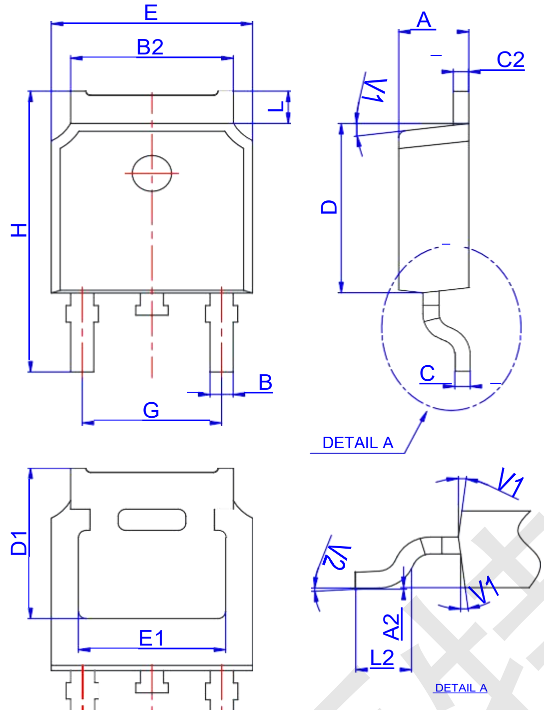
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



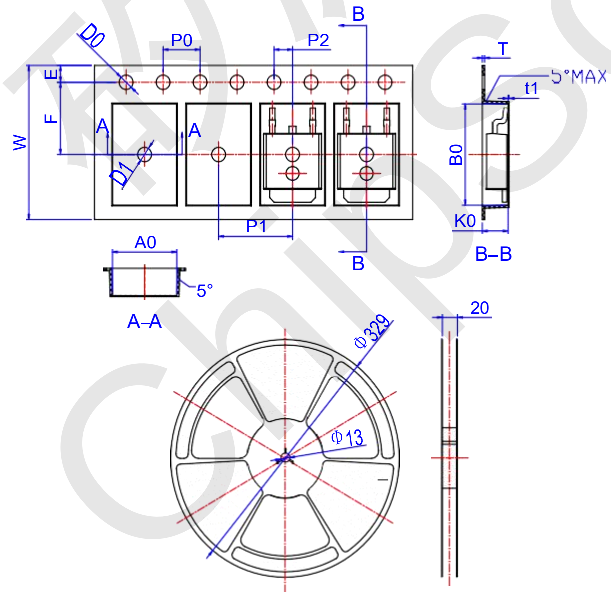
CST50P04 Package Mechanical Data-TO-252



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°

CST50P04 Reel Spectification-TO-252



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