CST50N03Z 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

CST50N03Z Product Summary

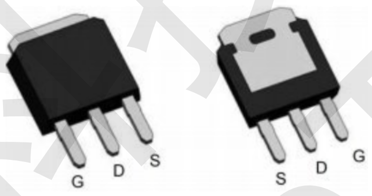
BVDSS	RDSON	ID
30V	7.6mΩ	50A

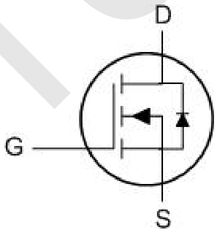
CST50N03Z Description

The CST50N03Z 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 CST50N03Z meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

CST50N03Z TO251 Pin Configuration





CST50N03Z Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		10s	Steady State	
V_{DS}	Drain-Source Voltage	30		V
V_{GS}	Gate-Source Voltage	±20		V
$I_D@T_C=25^\circ C$	Continuous Drain Current, V_{GS} @ 10V[1]	50		A
$I_D@T_C=100^\circ C$	Continuous Drain Current, V_{GS} @ 10V[1]	26		A
I_{DM}	Pulsed Drain Current[2]	168		A
EAS	Single Pulse Avalanche Energy[3]	33		mJ
I_{AS}	Avalanche Current	23.8		A
$P_D@T_C=25^\circ C$	Total Power Dissipation[4]	30.5		W
T_{STG}	Storage Temperature Range	-55 to 175		˚C
T_J	Operating Junction Temperature Range	-55 to 175		˚C

CST50N03Z Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	5.26	˚C/W

CST50N03Z 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	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =30V, V_{GS}=0V,	-	-	1.0	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	1.5	2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note3	V_{GS}=10V, I_D=20A	-	7.6	10	mΩ
		V_{GS}=4.5V, I_D=10A	-	11.5	17	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=15V, V_{GS}=0V, f=1.0MHz	-	1011	-	pF
C_{oss}	Output Capacitance		-	142	-	pF
C_{rss}	Reverse Transfer Capacitance		-	119	-	pF
Q_g	Total Gate Charge	V_{DS}=15V, I_D=20A, V_{GS}=10V	-	19	-	nC
Q_{gs}	Gate-Source Charge		-	6.3	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	4.5	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=30V, I_D=2A, R_{GEN}=3Ω, V_{GS}=10V	-	6	-	ns
t_r	Turn-on Rise Time		-	5	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	25	-	ns
t_f	Turn-off Fall Time		-	7	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	50	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	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I_F=30A,dI/dt=100A/μs	-	7	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	6.3	-	nC

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

2. EAS condition: T_J=25℃, V_{DD}=15V, V_G=10V, R_G=25Ω, L=0.5mH, I_{AS}=11.5A

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

CST50N03Z Typical Performance Characteristics

Figure1: Output Characteristics

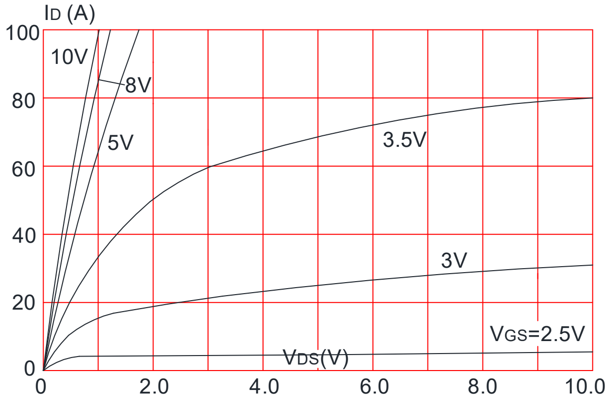


Figure 2: Typical Transfer Characteristics

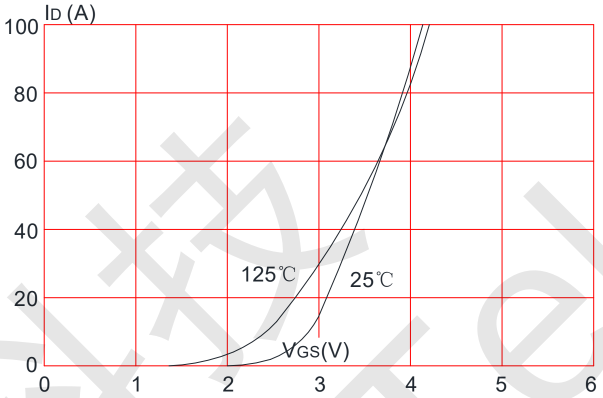


Figure 3: On-resistance vs. Drain Current

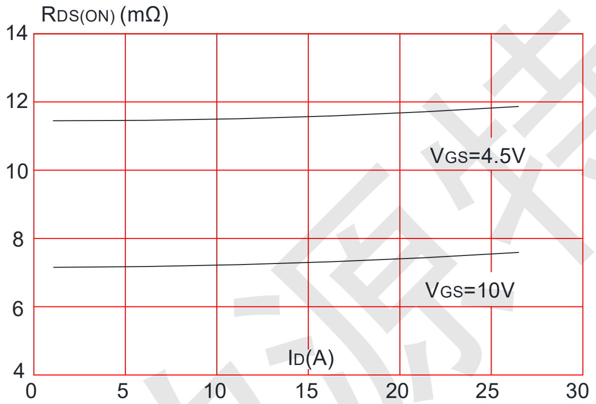


Figure 4: Body Diode Characteristics

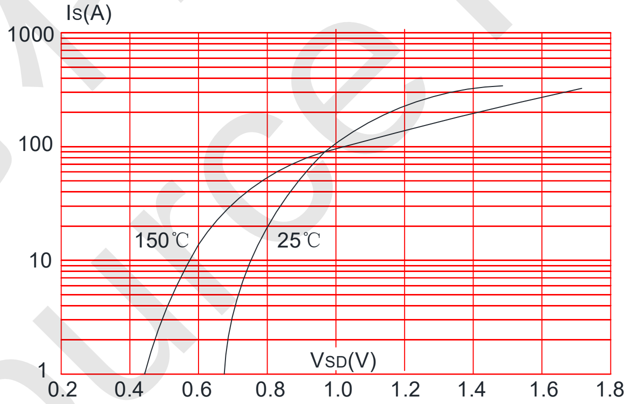


Figure 5: Gate Charge Characteristics

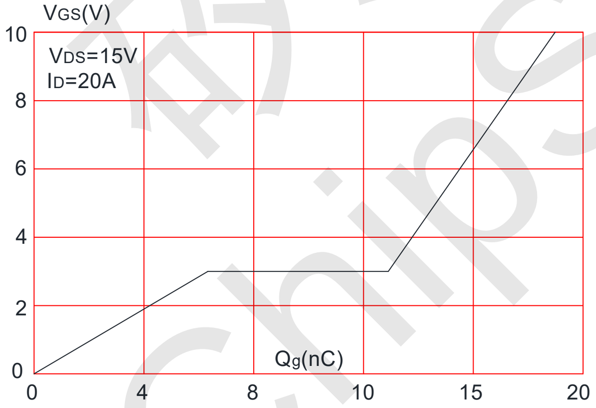


Figure 6: Capacitance Characteristics

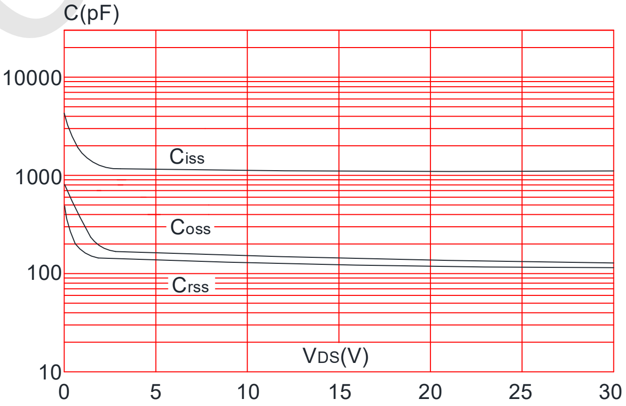


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

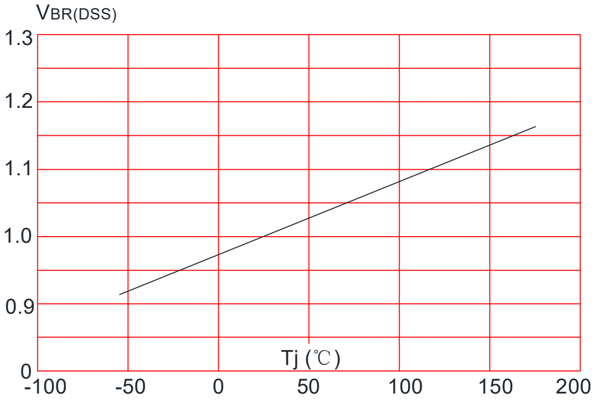


Figure 8: Normalized on Resistance vs. Junction Temperature

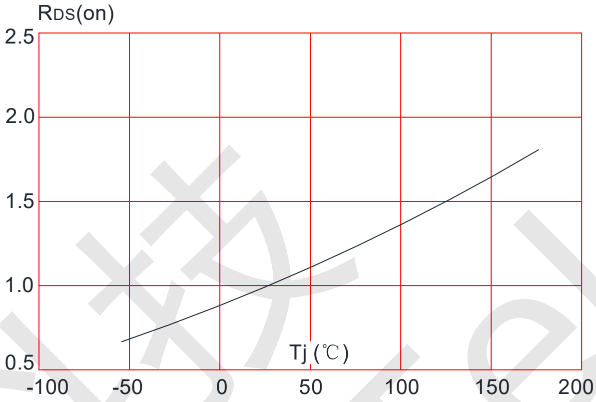


Figure 9: Maximum Safe Operating Area

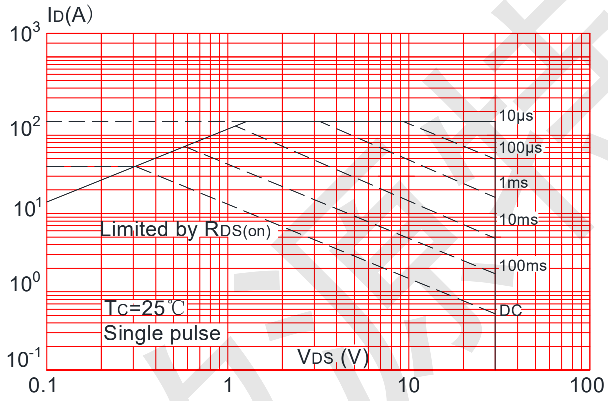
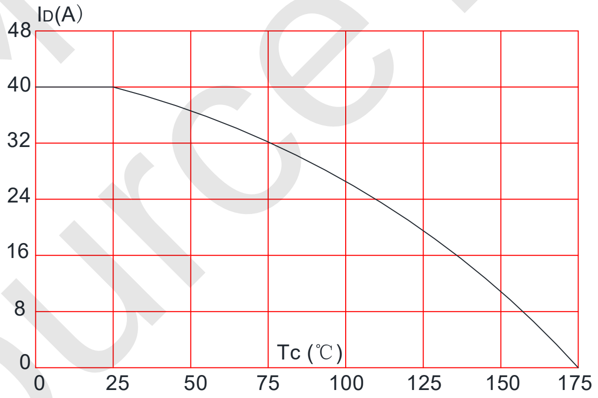
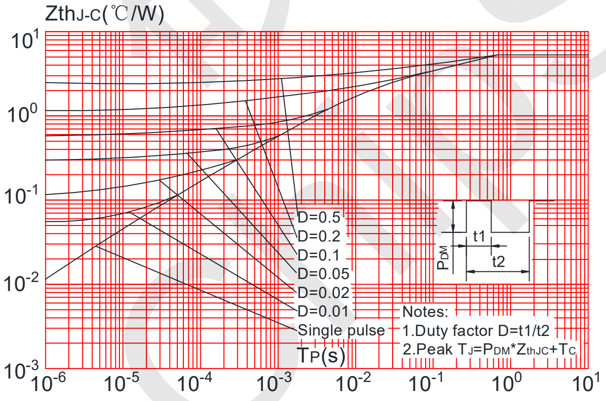


Figure 10: Maximum Continuous Drain Current vs. Case Temperature



Maximum Effective Transient Thermal Impedance, Junction-to-Case



Notes:
1.Duty factor D=t1/t2
2.Peak $T_J=P_{DM}*Z_{thJC}+T_C$

CST50N03Z Test Circuit

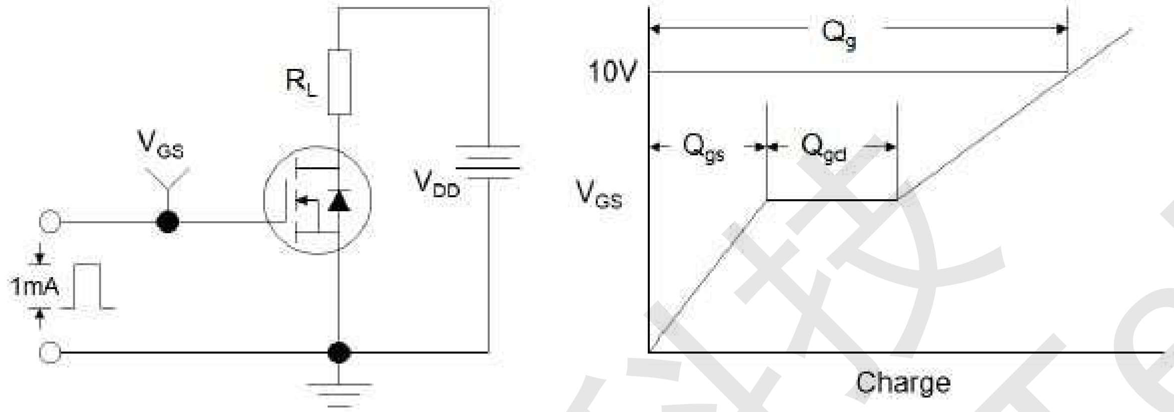


Figure1:Gate Charge Test Circuit & Waveform

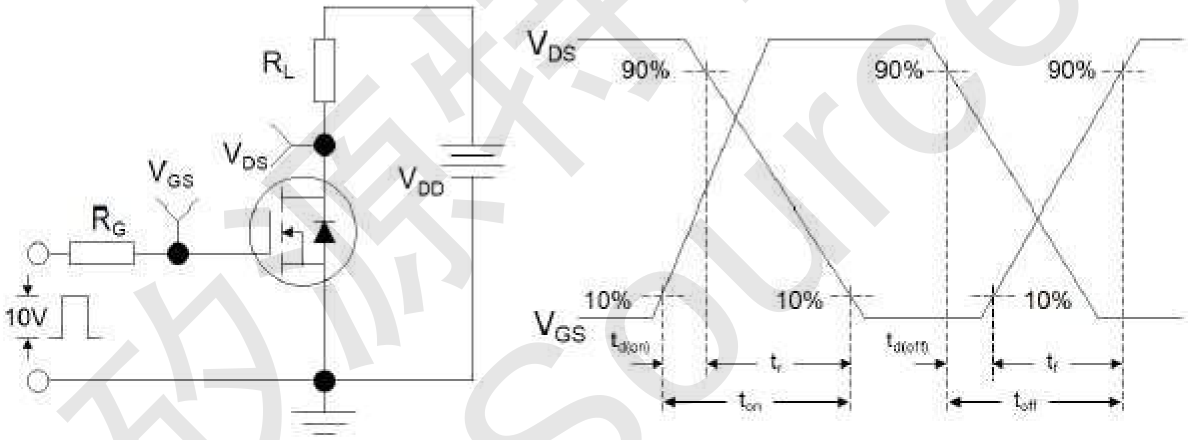


Figure 2: Resistive Switching Test Circuit & Waveforms

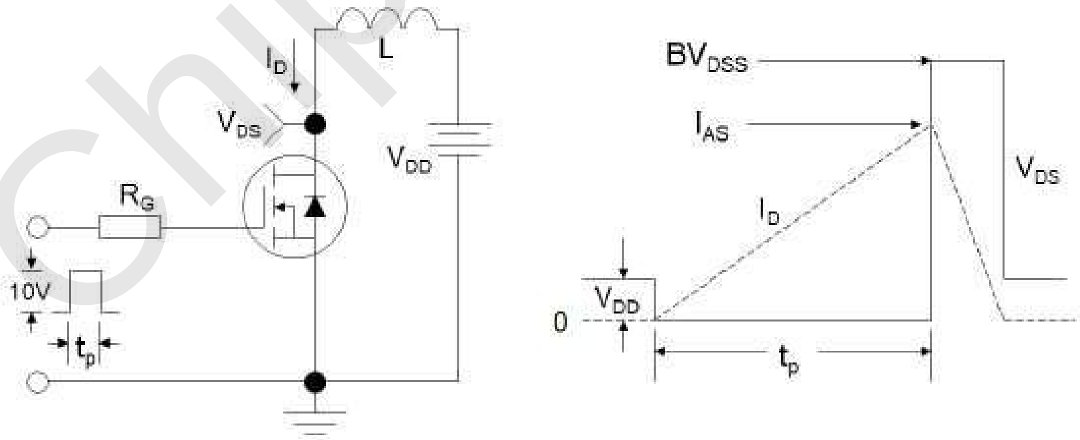


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms

CST50N03Z Package Mechanical Data TO-251