



CST75N10F N-Ch 100 V Fast Switching MOSFETs

CST75N10F Features

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

CST75N10F Applications

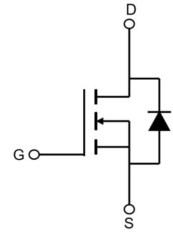
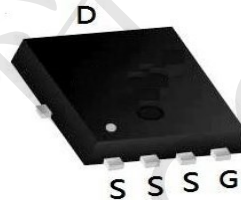
- DC-DC Converters
- Power management functions
- Synchronous-rectification applications

CST75N10F Product Summary



BVDSS	RDSON	ID
100V	6.2mΩ	75A

CST75N10F PDFN5X6 Pin Configuration



CST75N10F Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Max.	Units	
V_{DSS}	Drain-Source Voltage	100	V	
V_{GSS}	Gate-Source Voltage	± 20	V	
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$	75	A
		$T_C = 100^\circ\text{C}$	52	A
I_{DM}	Pulsed Drain Current ^{note1}	320	A	
E_{AS}	Single Pulsed Avalanche Energy ^{note2}	90	mJ	
P_D	Power Dissipation	$T_C = 25^\circ\text{C}$	107	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.2	$^\circ\text{C}/\text{W}$	
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +175	$^\circ\text{C}$	



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CST75N10F Electrical Characteristics (T_J=25°C 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	100	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =100V, 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	1.8	2.5	V
R _{DS(on)}	Static Drain-Source on-Resistance note3	V _{GS} =10V, I _D =20A	-	6.2	8.1	mΩ
		V _{GS} =4.5V, I _D =10A	-	7.2	10.8	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =50V, V _{GS} =0V, f=1.0MHz	-	2046	-	pF
C _{oss}	Output Capacitance		-	865	-	pF
C _{rss}	Reverse Transfer Capacitance		-	25	-	pF
Q _g	Total Gate Charge	V _{DS} =50V, I _D =30A, V _{GS} =10V	-	34	-	nC
Q _{gs}	Gate-Source Charge		-	7	-	nC
Q _{gd}	Gate-Drain("Miller") Charge		-	6.6	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} =50V, I _D =25A, R _G =6Ω, V _{GS} =10V	-	12	-	ns
t _r	Turn-on Rise Time		-	46	-	ns
t _{d(off)}	Turn-off Delay Time		-	42	-	ns
t _f	Turn-off Fall Time		-	104	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	75	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	320	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S =30A	-	-	1.2	V
t _{rr}	Body Diode Reverse Recovery Time	T _J =25°C, I _F =12A, di/dt=100A/μs	-	42	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	40	-	nC

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

2. EAS condition: T_J=25°C, V_{DD}=50V, V_G=10V, R_G=25Ω, L=0.5mH, I_{AS}=19A

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



CST75N10F Typical Performance Characteristics

Figure 1: Output Characteristics

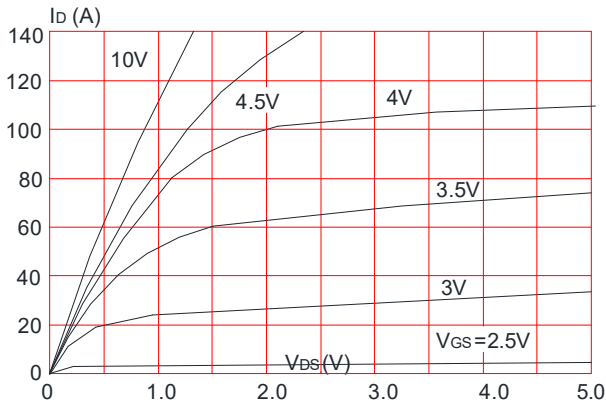


Figure 2: Typical Transfer Characteristics

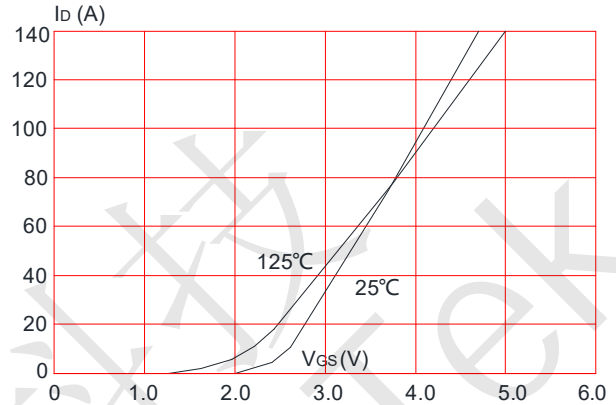


Figure 3: On-resistance vs. Drain Current

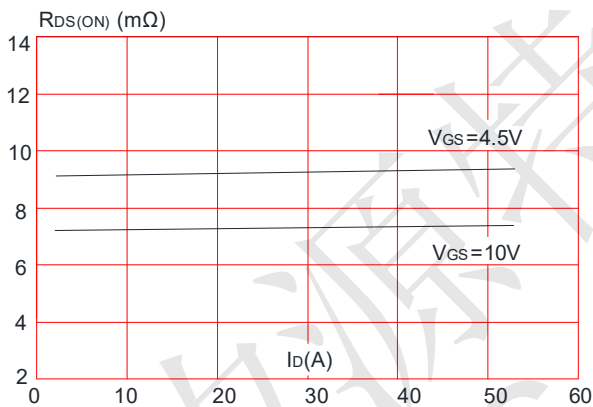


Figure 4: Body Diode Characteristics

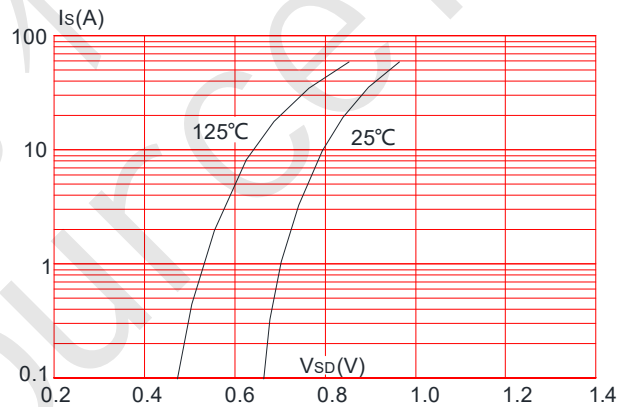


Figure 5: Gate Charge Characteristics

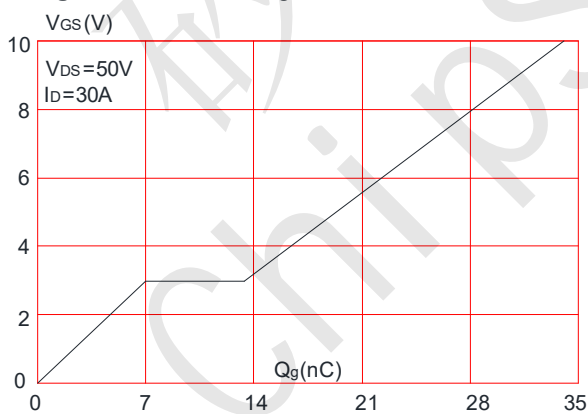
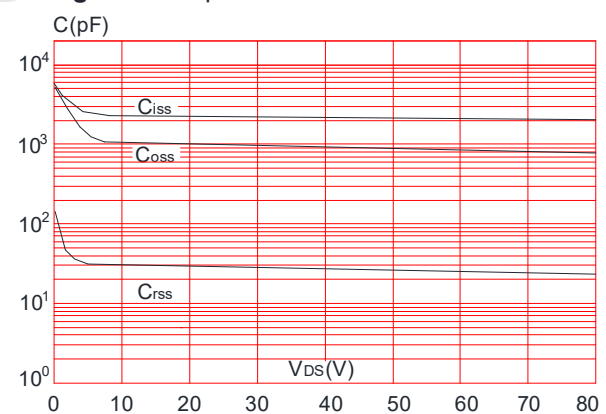


Figure 6: Capacitance Characteristics





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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

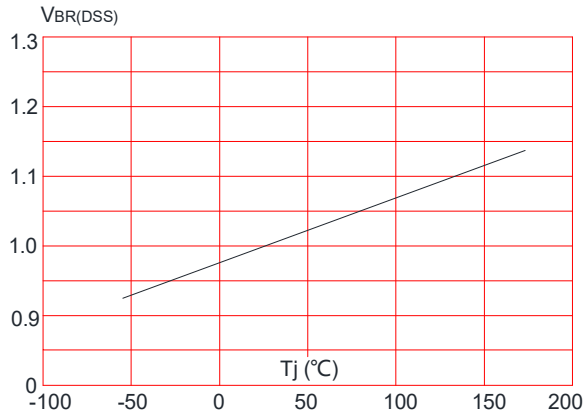


Figure 8: Normalized on Resistance vs. Junction Temperature

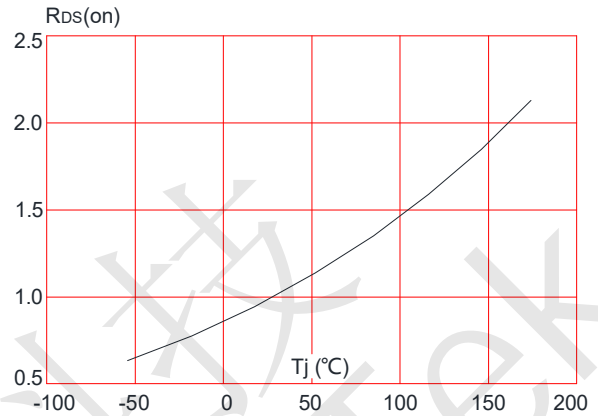


Figure 9: Maximum Safe Operating Area

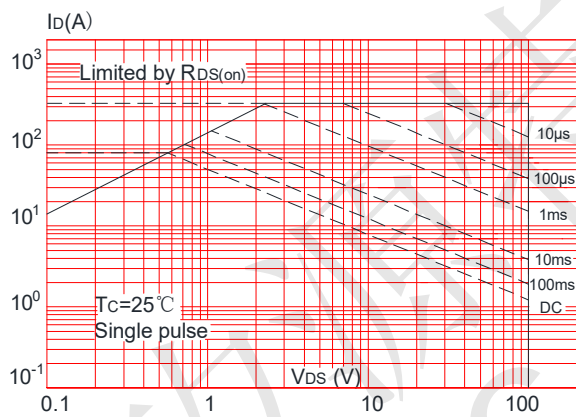


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

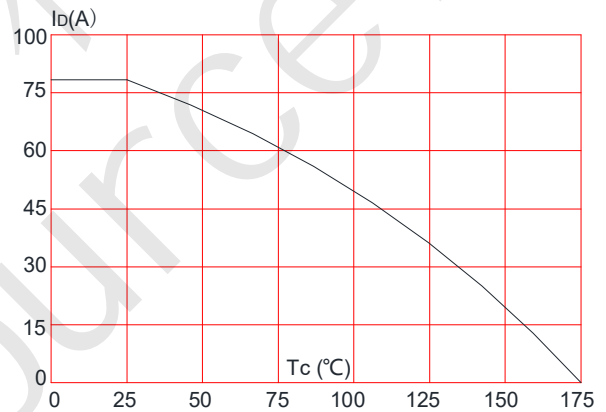
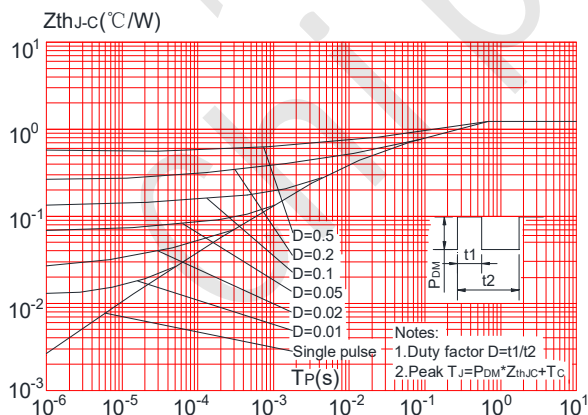


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case





CST75N10F Test Circuit

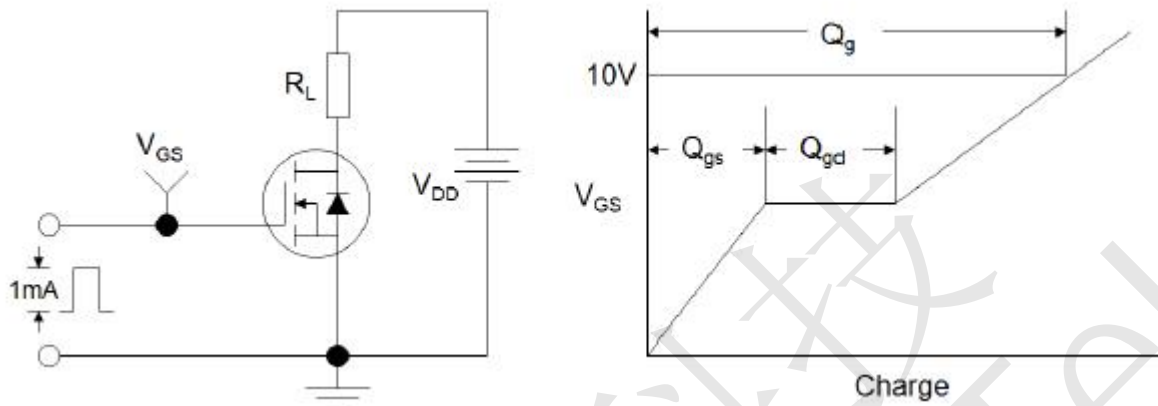


Figure1:Gate Charge Test Circuit & Waveform

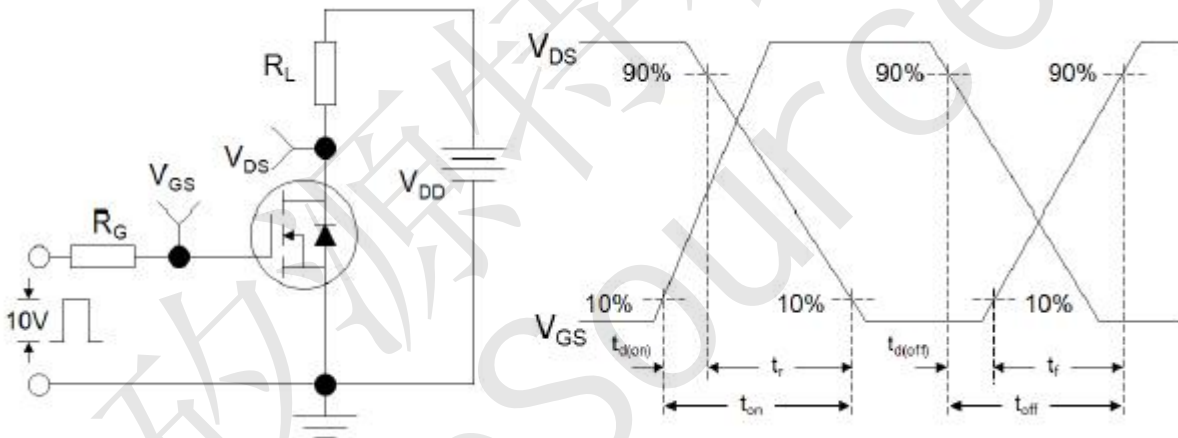


Figure 2: Resistive Switching Test Circuit & Waveforms

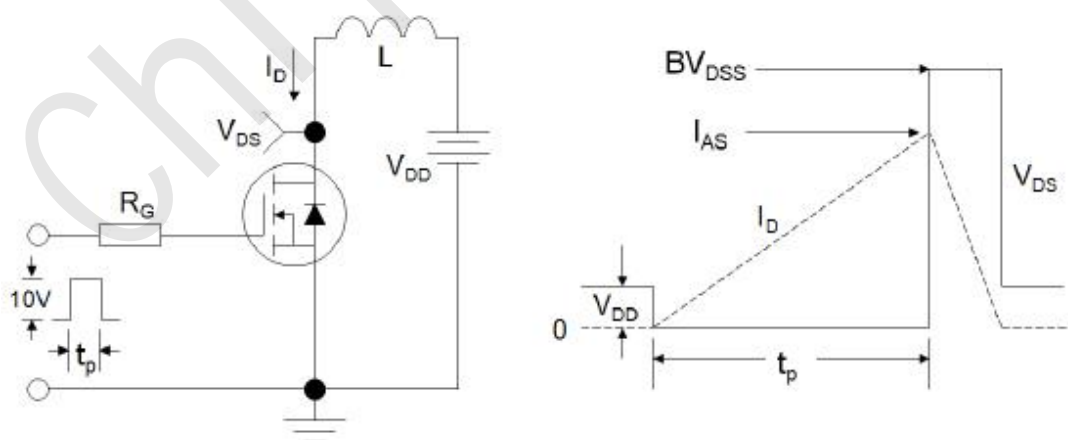
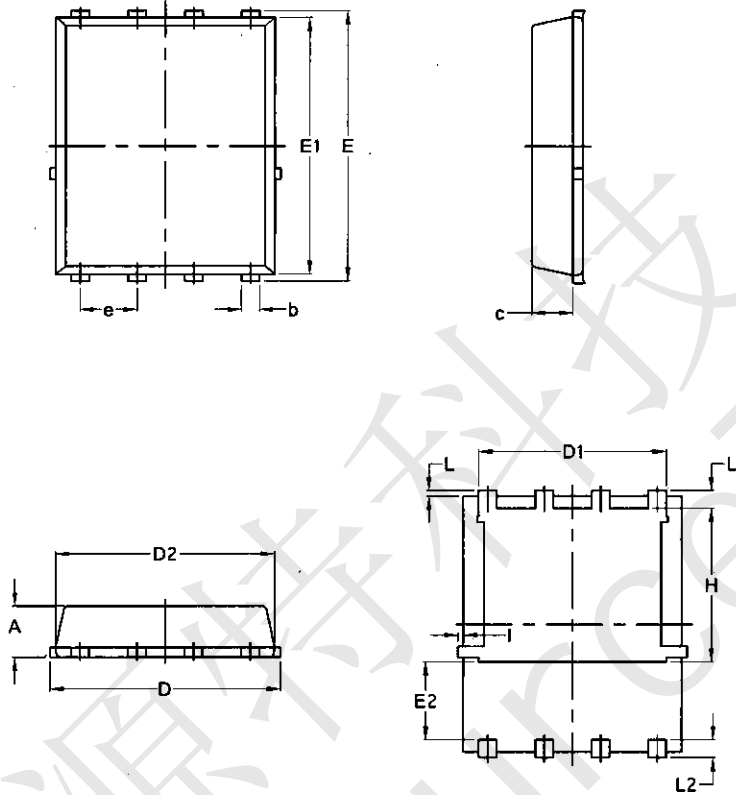


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms



CST75N10F Package Mechanical Data-DFN5*6-8L-Single



Symbol	Common			
	mm		Inch	
	Min	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070