



CST20P70F P-Ch 18V Fast Switching MOSFETs

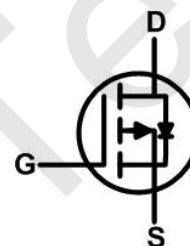
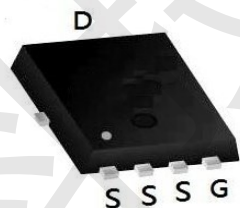
- ★ Super Low Gate Charge
- ★ Green Device Available
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

CST20P70F Product Summary



BVDSS	RDSON	ID
-18V	3.6mΩ	-70A

CST20P70F PDFN5060-8L Pin Configuration



CST20P70F Description

The CST20P70F 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 CST20P70F meet the RoHS and Green Product requirement with full function reliability approved.

CST20P70F Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-18	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-70	A
$I_D@T_C=70^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-53	A
I_{DM}	Pulsed Drain Current ²	-280	A
$P_D@T_C=25^\circ C$	Total Power Dissipation ³	62	W
$P_D@T_C=70^\circ C$	Total Power Dissipation ³	35	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$

CST20P70F Thermal Data

Symbol	Parameter	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	3	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹ (t ≤ 10s)		$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹		$^\circ C/W$



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CST20P70F 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	-15	18	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -15V, V _{GS} = 0V,	-	-	-1	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±12V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	-0.35	-0.65	-1.0	V
R _{DS(on)}	Static Drain-Source on-Resistance <small>note3</small>	V _{GS} =-4.5V, I _D =-15A	-	3.6	5.5	mΩ
		V _{GS} =-2.5V, I _D =-12A	-	4.5	92	
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =-10V, V _{GS} =0V, f = 1.0MHz	-	6600	-	pF
C _{oss}	Output Capacitance		-	460	-	pF
C _{rss}	Reverse Transfer Capacitance		-	659	-	pF
Q _g	Total Gate Charge	V _{DS} =-10V, I _D =-15A, V _{GS} =-4.5V	-	76	-	nC
Q _{gs}	Gate-Source Charge		-	10	-	nC
Q _{gd}	Gate-Drain("Miller") Charge		-	20	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} =-10V, I _D =-13A, R _{GEN} =2.7Ω, V _{GS} =-10V	-	14	-	ns
t _r	Turn-on Rise Time		-	130	-	ns
t _{d(off)}	Turn-off Delay Time		-	187	-	ns
t _f	Turn-off Fall Time		-	190	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	-70	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-280	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} = 0V, I _S =-30A	-	-	-1.2	V
trr	Reverse Recovery Time	T _J =25°C, I _{SD} =-15A,	-	23	-	ns
Qrr	Reverse Recovery Charge	V _{GS} =0V di/dt=-100A/μs	-	14	-	Nc

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

2. EAS condition: T_J=25°C, V_{DD}=-10V, V_G=-10V, R_G=5.9Ω, L=0.5mh, I_{AS}=-16A

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



CST20P70F Typical Performance Characteristics

Figure 1: Output Characteristics

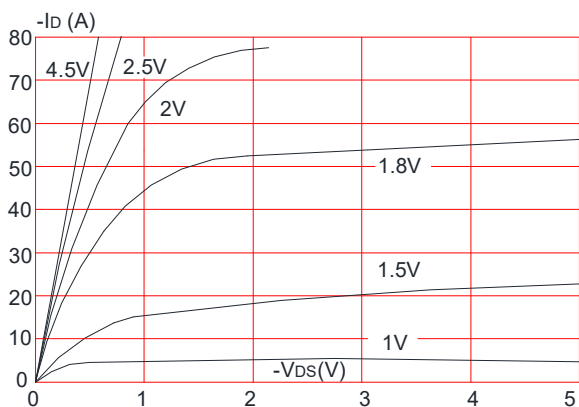


Figure 2: Typical Transfer Characteristics

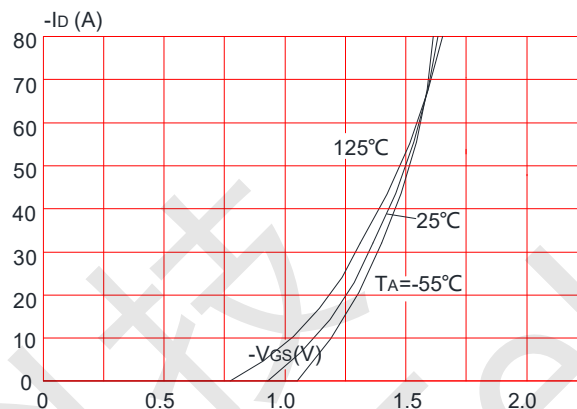


Figure 3: On-resistance vs. Drain Current

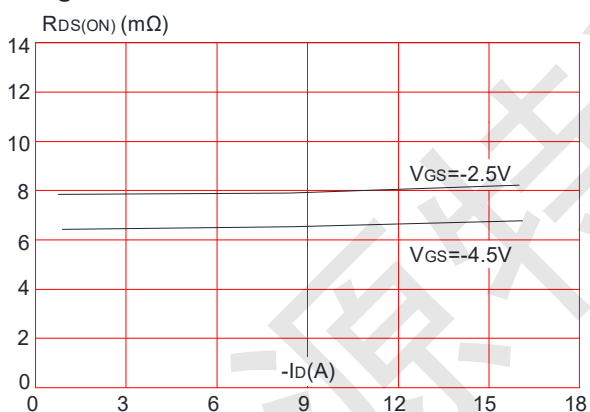


Figure 4: Body Diode Characteristics

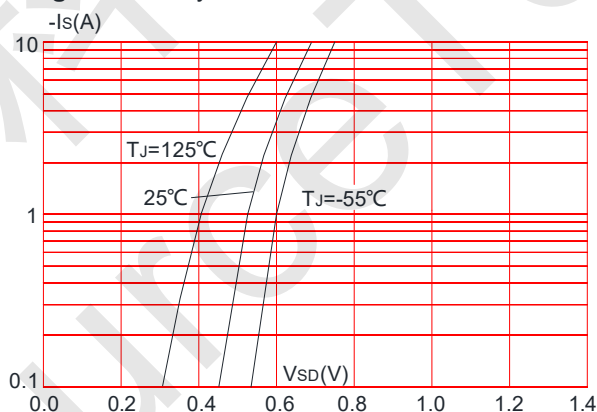


Figure 5: Gate Charge Characteristics

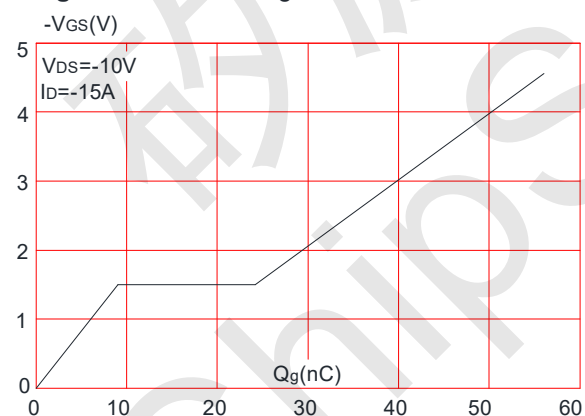
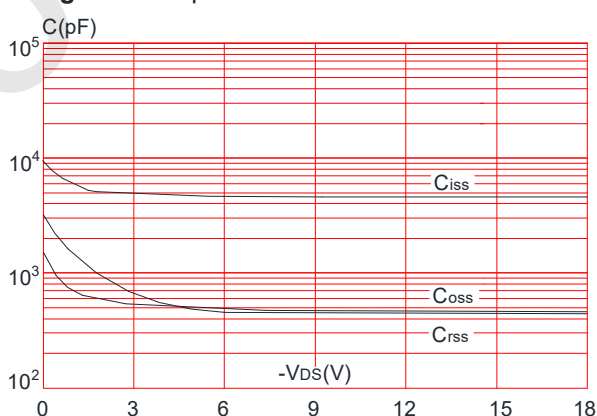


Figure 6: Capacitance Characteristics





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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

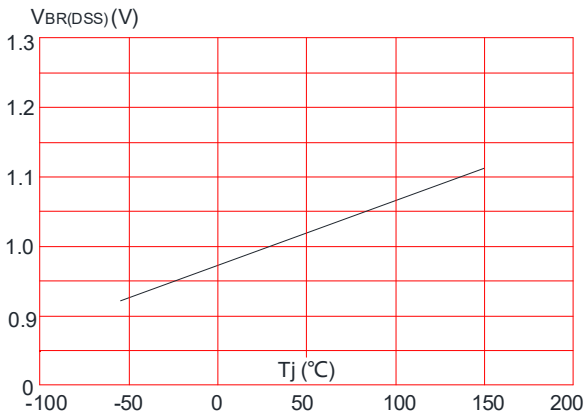


Figure 8: Normalized on Resistance vs. Junction Temperature

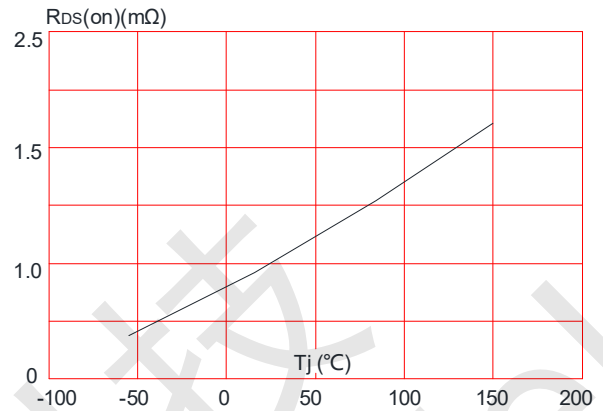


Figure 9: Maximum Safe Operating Area

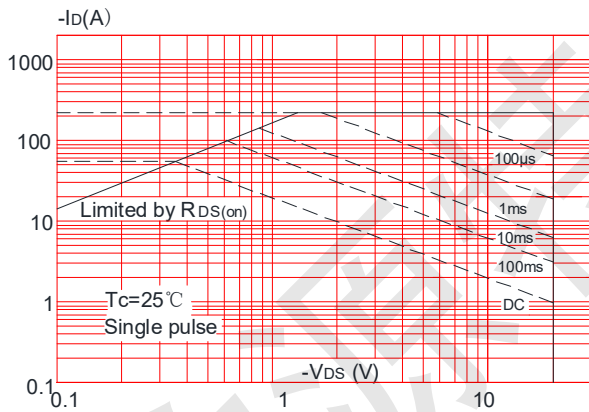


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

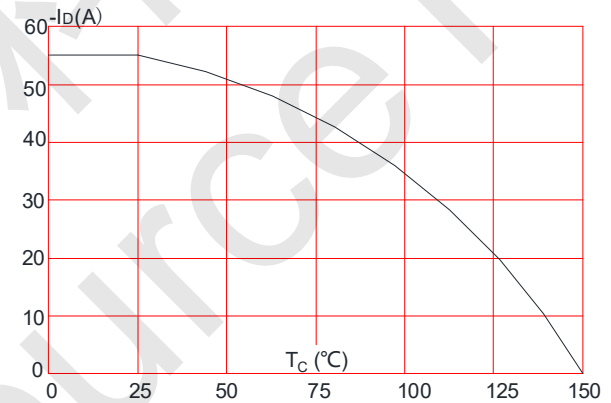
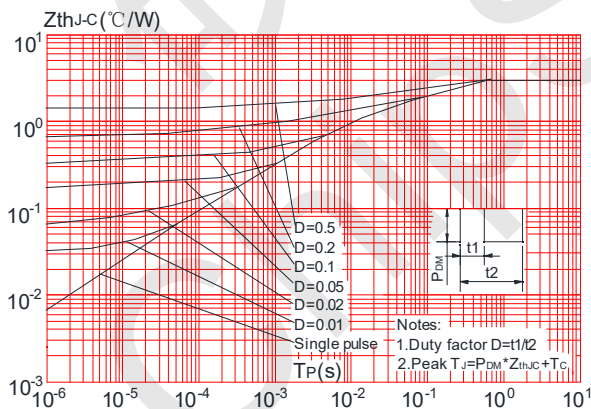
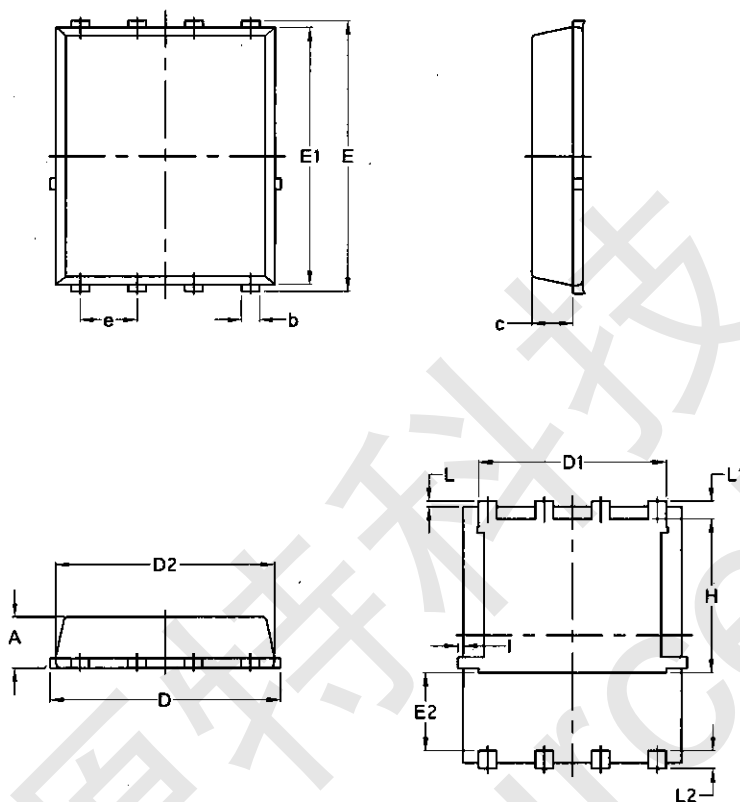


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case





CST20P70F Package Mechanical Data-PDFN5060-8L-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