



CST120N03F 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

CST120N03F Product Summary

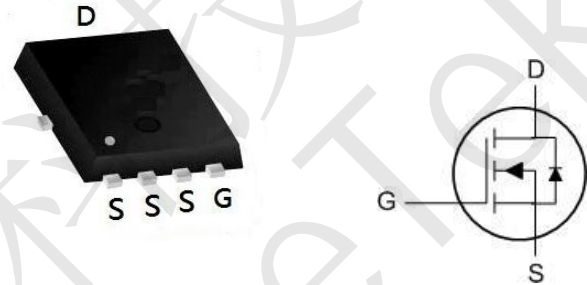


BVDSS	R _{DS(on)}	ID
30V	3.0mΩ	120 A

CST120N03F Description

The CST120N03F is the high cell density trenched N-ch MOSFETs, which provide excellent R_{DS(on)} and gate charge for most of the synchronous buck converter applications. The CST120N03F meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

CST120N03F PDFN5060-8L Pin Configuration



CST120N03F 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°C	Continuous Drain Current, V _{GS} @ 10V ¹	120		A
I _D @T _C =100°C	Continuous Drain Current, V _{GS} @ 10V ¹	75		A
I _{DM}	Pulsed Drain Current ²	384		A
EAS	Single Pulse Avalanche Energy ³	198		mJ
I _{AS}	Avalanche Current	53.8		A
P _D @T _C =25°C	Total Power Dissipation ⁴	62.5		W
P _D @T _A =25°C	Total Power Dissipation ⁴	6	2.42	W
T _{STG}	Storage Temperature Range	-55 to 175		°C
T _J	Operating Junction Temperature Range	-55 to 175		°C

CST120N03F Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction-Ambient ¹	---	62	°C/W
R _{θJA}	Thermal Resistance Junction-Ambient ¹ (t ≤ 10s)	---	25	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	---	2.4	°C/W



CST120N03F N-Ch 30V Fast Switching MOSFETs

CST120N03F Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=24V, V_{GS}=0V$	-	-	1	μA
		$T_J=85^\circ\text{C}$	-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	1.4	1.7	2.5	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
$R_{DS(ON)}^d$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=20A$	-	3	3.8	m Ω
		$T_J=125^\circ\text{C}$	-	4.4	-	
		$V_{GS}=4.5V, I_{DS}=15A$	-	4.0	5.5	
Gfs	Forward Transconductance	$V_{DS}=5V, I_{DS}=10A$	-	24.6	-	S
Diode Characteristics						
V_{SD}^d	Diode Forward Voltage	$I_{SD}=20A, V_{GS}=0V$	-	0.8	1.1	V
t_{rr}	Reverse Recovery Time	$I_{DS}=20A, di_{SD}/dt=100A/\mu s$	-	35.6	-	ns
t_a	Charge Time		-	19.3	-	
t_b	Discharge Time		-	16.3	-	
Q_{rr}	Reverse Recovery Charge		-	26	-	
Dynamic Characteristics [°]						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	-	1	2	Ω
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=15V,$ Frequency=1.0MHz	-	2485	2971	pF
C_{oss}	Output Capacitance		-	850	-	
C_{riss}	Reverse Transfer Capacitance		-	85	-	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=15V, R_L=15\Omega,$ $I_{DS}=1A, V_{GEN}=10V,$ $R_G=6\Omega$	-	12.4	23	ns
t_r	Turn-on Rise Time		-	9.5	18	
$t_{d(OFF)}$	Turn-off Delay Time		-	27.2	49	
t_f	Turn-off Fall Time		-	35.2	64	
Gate Charge Characteristics [°]						
Q_g	Total Gate Charge	$V_{DS}=15V, V_{GS}=10V,$ $I_{DS}=20A$	-	20.6	28.8	nC
Q_g	Total Gate Charge	$V_{DS}=15V, V_{GS}=4.5V,$ $I_{DS}=20A$	-	9.8	-	
Q_{gth}	Threshold Gate Charge		-	1.8	-	
Q_{gs}	Gate-Source Charge		-	3.8	-	
Q_{gd}	Gate-Drain Charge		-	3.7	-	

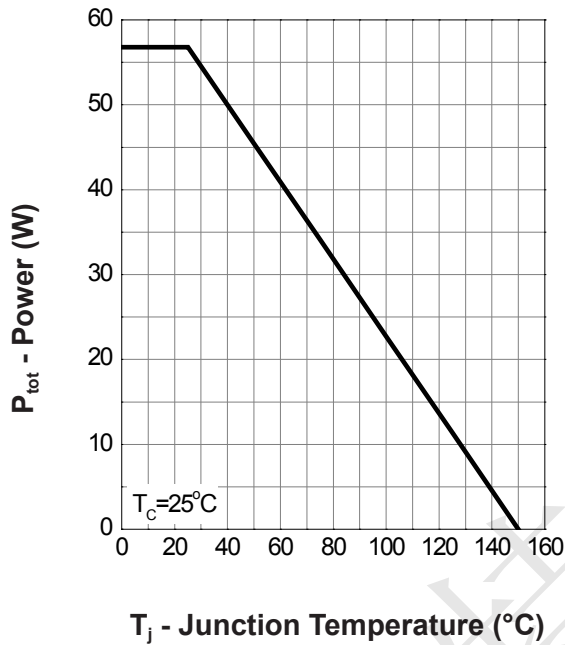
Note d : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

Note e : Guaranteed by design, not subject to production testing.

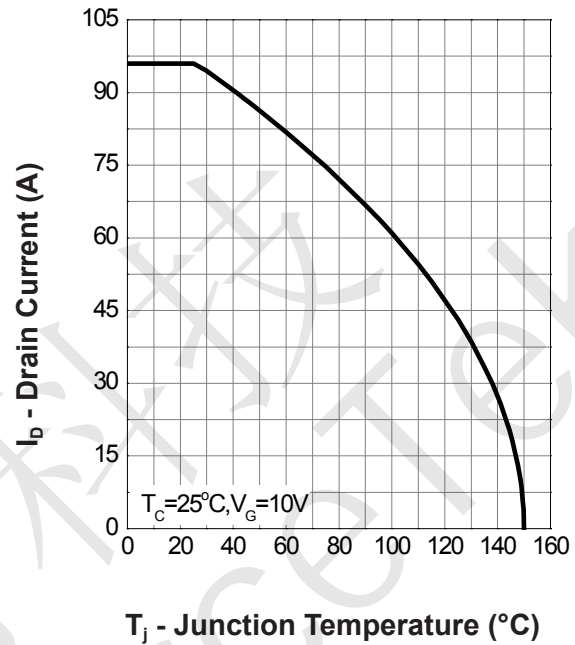


CST120N03F Typical Operating Characteristics

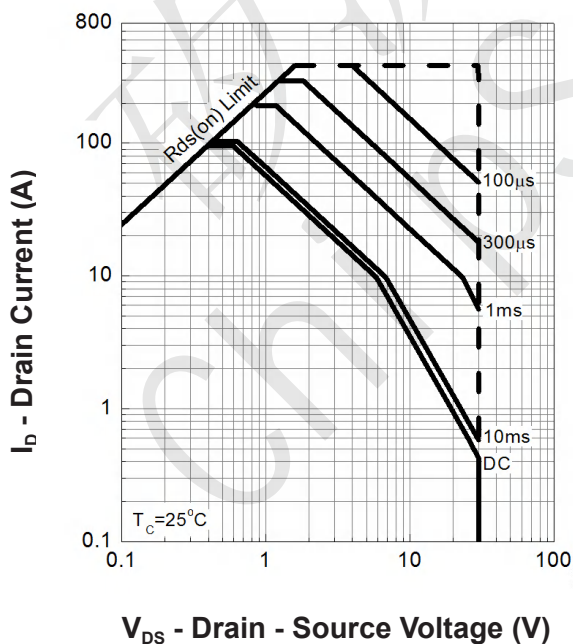
Power Dissipation



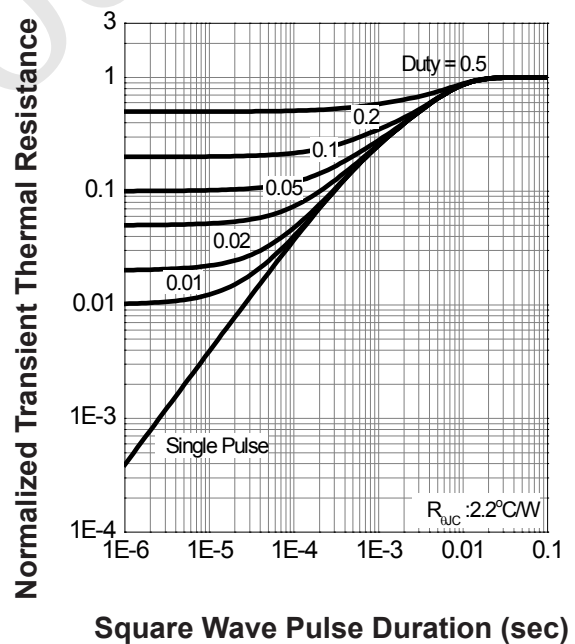
Drain Current



Safe Operation Area



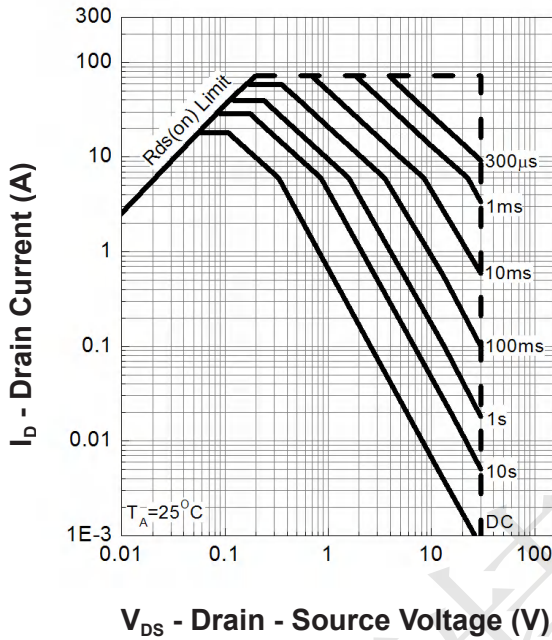
Thermal Transient Impedance



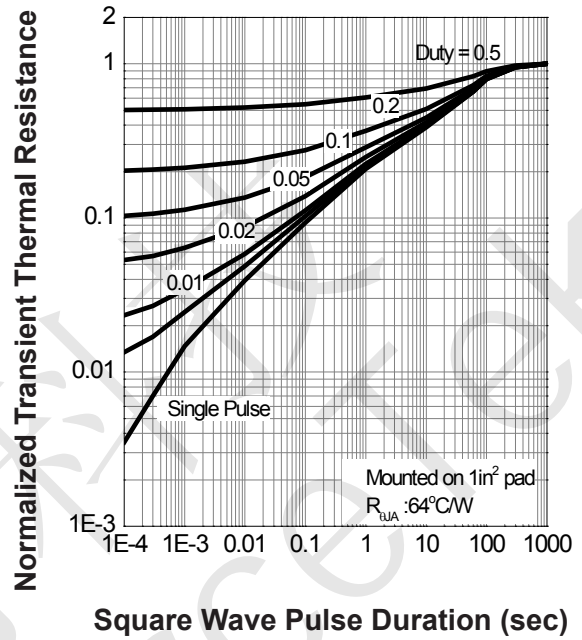


CST120N03F Typical Operating Characteristics(Cont.)

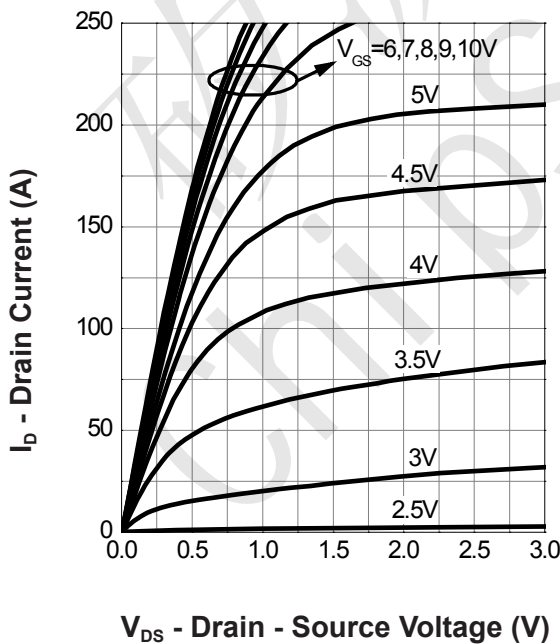
Safe Operation Area



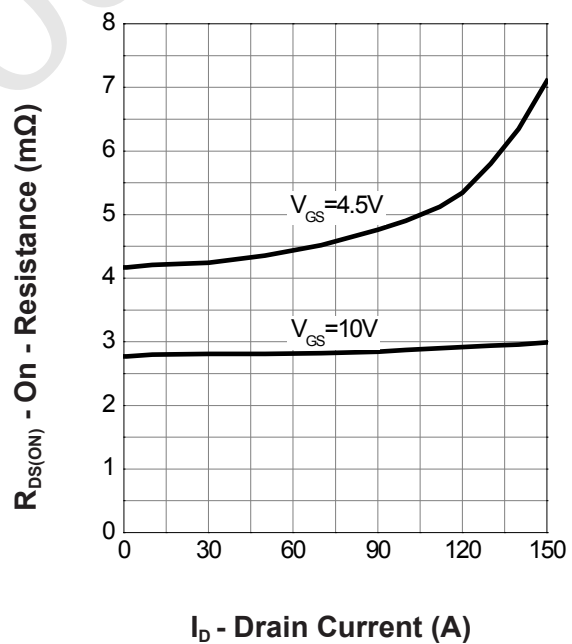
Thermal Transient Impedance



Output Characteristics



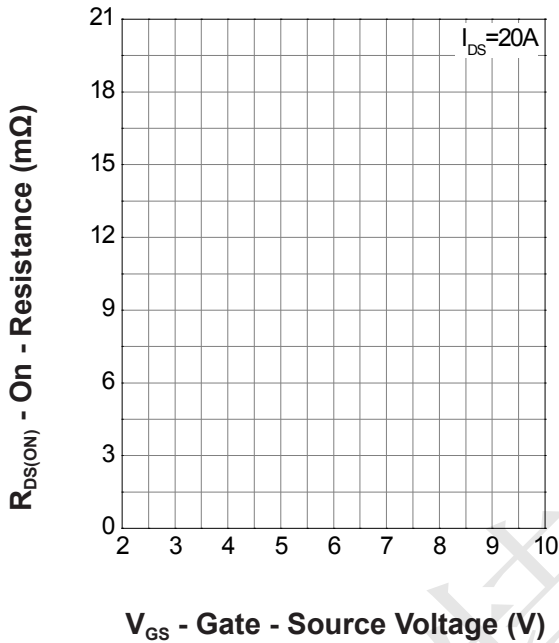
Drain-Source On Resistance



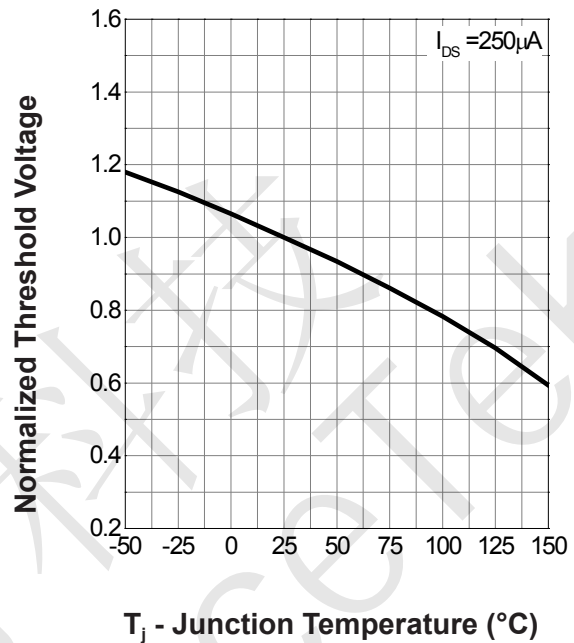


CST120N03F Typical Operating Characteristics(Cont.)

Gate-Source On Resistance



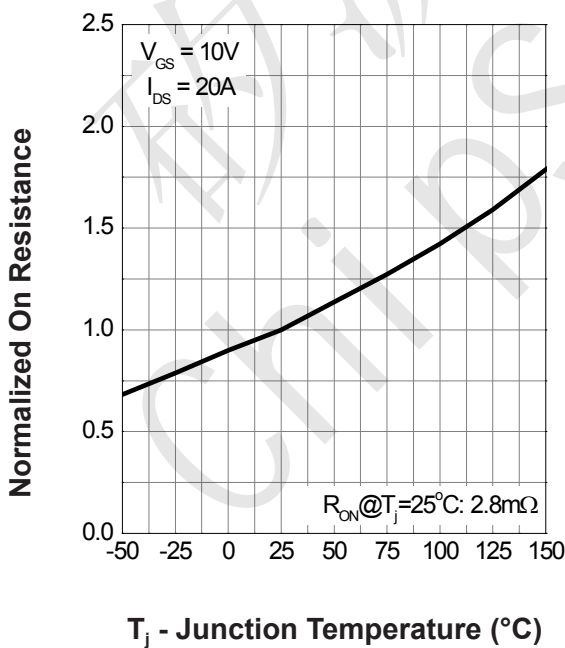
Gate Threshold Voltage



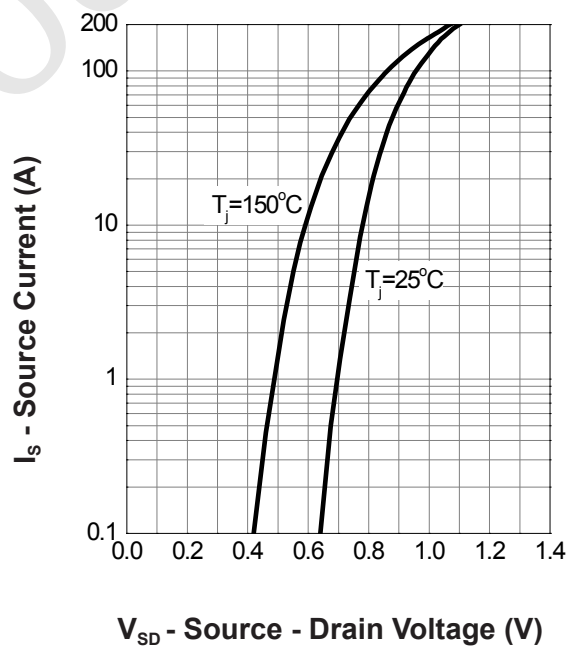
V_{GS} - Gate - Source Voltage (V)

T_j - Junction Temperature (°C)

Drain-Source On Resistance



Source-Drain Diode Forward



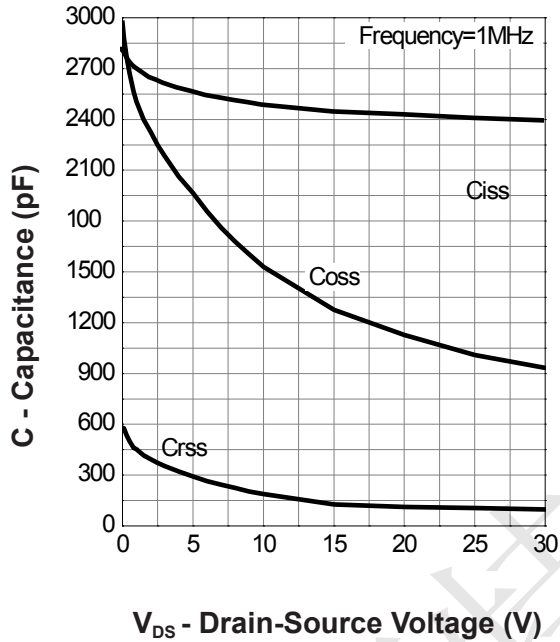
T_j - Junction Temperature (°C)

V_{SD} - Source - Drain Voltage (V)

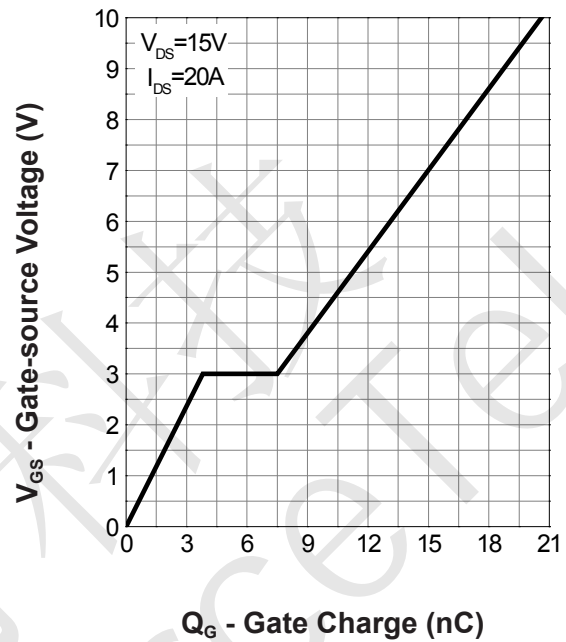


CST120N03F Typical Operating Characteristics(Cont.)

Capacitance

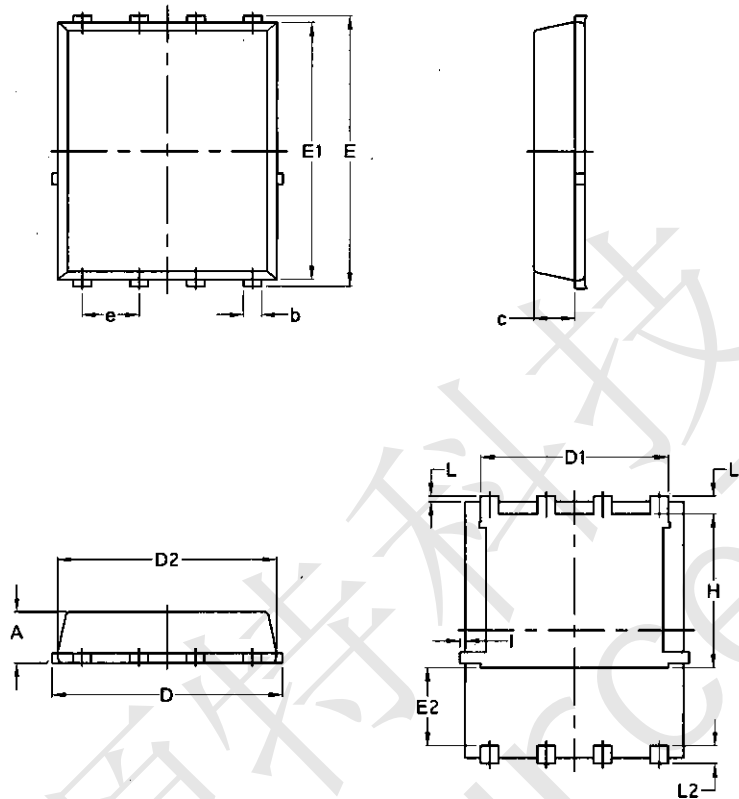


Gate Charge





CST120N03F 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