



### 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	RDSON	ID
30V	3.0mΩ	120 A

#### CST120N03F Description

The CST120N03F 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 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	$\pm 20$		V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	120		A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	75		A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	384		A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	198		mJ
$I_{AS}$	Avalanche Current	53.8		A
$P_D@T_C=25^\circ C$	Total Power Dissipation <sup>4</sup>	62.5		W
$P_D@T_A=25^\circ C$	Total Power Dissipation <sup>4</sup>	6	2.42	W
$T_{STG}$	Storage Temperature Range	-55 to 175		$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 175		$^\circ C$

#### CST120N03F Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup>	---	62	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup> ( $t \leq 10s$ )	---	25	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	2.4	$^\circ C/W$



### CST120N03F N-Ch 30V Fast Switching MOSFETs

#### CST120N03F Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>DS</sub> =250μA	30	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =24V, V <sub>GS</sub> =0V T <sub>J</sub> =85°C	-	-	1 30	μA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250μA	1.4	1.7	2.5	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
R <sub>DS(ON)</sub> <sup>d</sup>	Drain-Source On-state Resistance	V <sub>GS</sub> =10V, I <sub>DS</sub> =20A T <sub>J</sub> =125°C	-	3 4.4	3.8	mΩ
Gfs	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>DS</sub> =10A	-	24.6	-	S
<b>Diode Characteristics</b>						
V <sub>SD</sub> <sup>d</sup>	Diode Forward Voltage	I <sub>SD</sub> =20A, V <sub>GS</sub> =0V	-	0.8	1.1	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>DS</sub> =20A, di <sub>SD</sub> /dt=100A/μs	-	35.6	-	ns
t <sub>a</sub>	Charge Time		-	19.3	-	
t <sub>b</sub>	Discharge Time		-	16.3	-	
Q <sub>rr</sub>	Reverse Recovery Charge		-	26	-	
<b>Dynamic Characteristics</b> <sup>e</sup>						
R <sub>G</sub>	Gate Resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	-	1	2	Ω
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, Frequency=1.0MHz	-	2485	2971	pF
C <sub>oss</sub>	Output Capacitance		-	850	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	85	-	
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DD</sub> =15V, R <sub>L</sub> =15Ω, I <sub>DS</sub> =1A, V <sub>GEN</sub> =10V, R <sub>G</sub> =6Ω	-	12.4	23	ns
t <sub>r</sub>	Turn-on Rise Time		-	9.5	18	
t <sub>d(OFF)</sub>	Turn-off Delay Time		-	27.2	49	
t <sub>f</sub>	Turn-off Fall Time		-	35.2	64	
<b>Gate Charge Characteristics</b> <sup>e</sup>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, V <sub>GS</sub> =10V, I <sub>DS</sub> =20A	-	20.6	28.8	nC
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, V <sub>GS</sub> =4.5V, I <sub>DS</sub> =20A	-	9.8	-	
Q <sub>gth</sub>	Threshold Gate Charge		-	1.8	-	
Q <sub>gs</sub>	Gate-Source Charge		-	3.8	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	3.7	-	

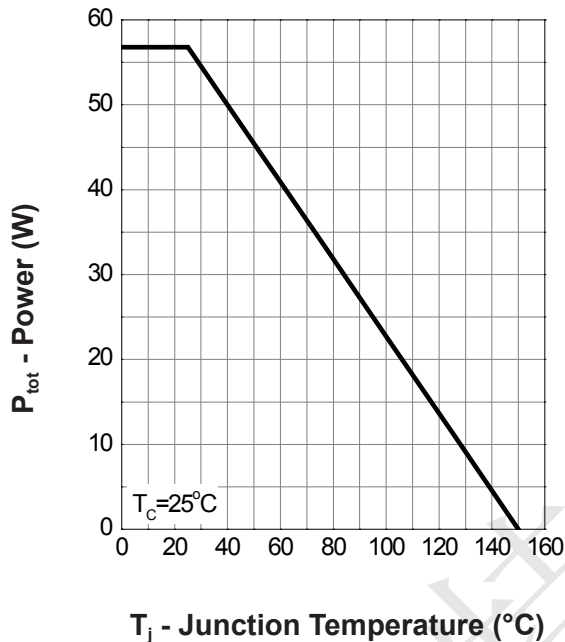
Note d : Pulse test ; pulse width≤300μs, duty cycle≤2%.

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

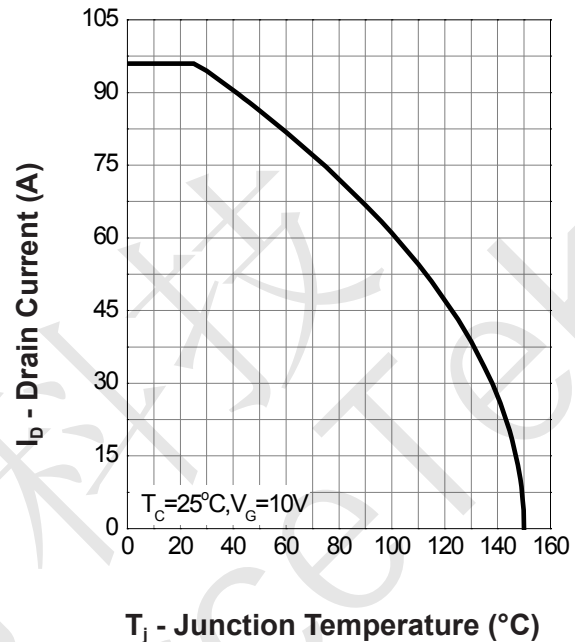


### CST120N03F Typical Operating Characteristics

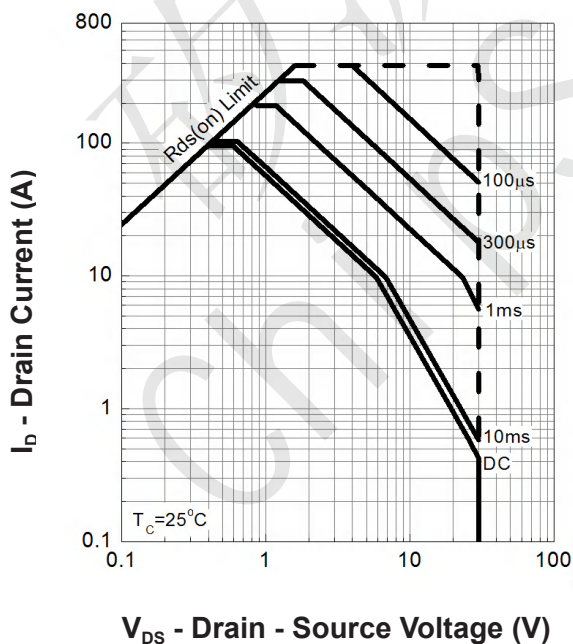
Power Dissipation



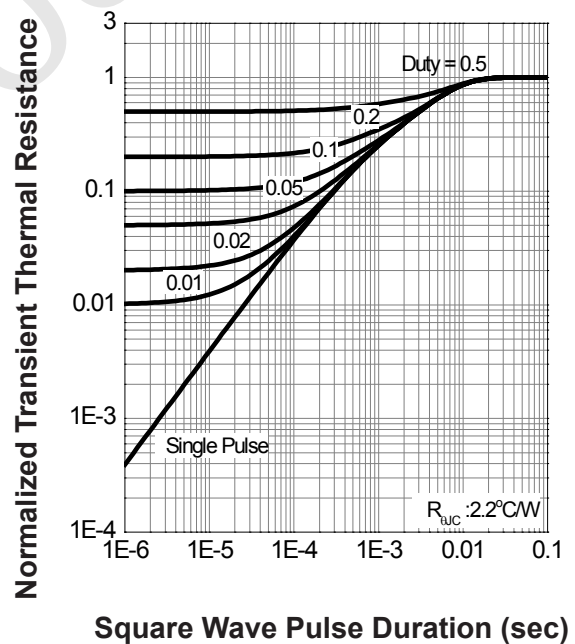
Drain Current



Safe Operation Area



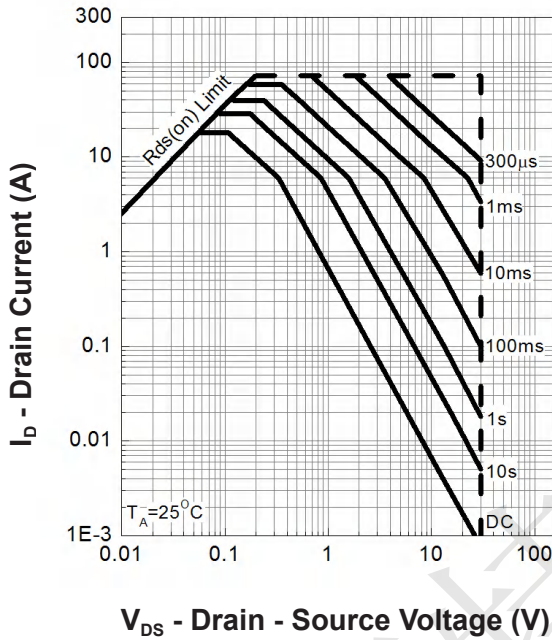
Thermal Transient Impedance



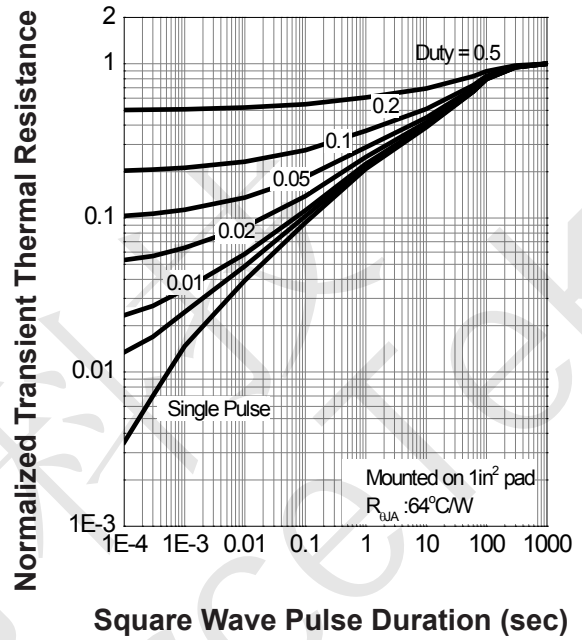


CST120N03F Typical Operating Characteristics(Cont.)

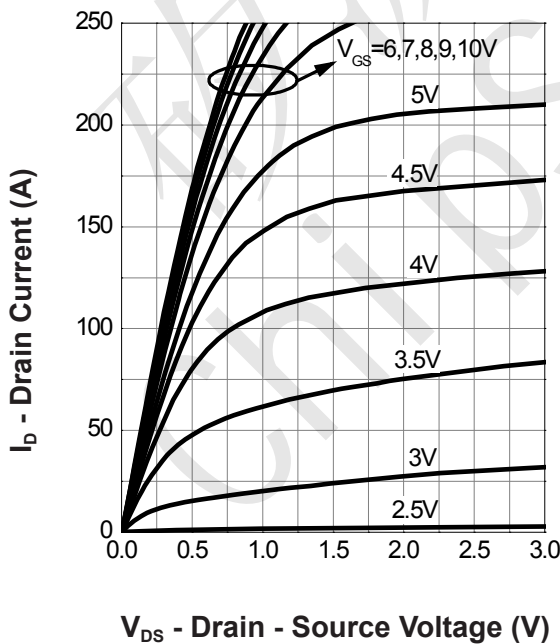
Safe Operation Area



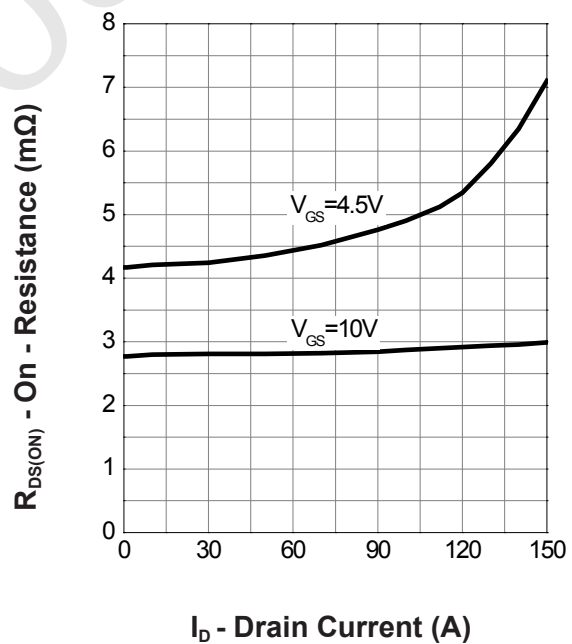
Thermal Transient Impedance



Output Characteristics



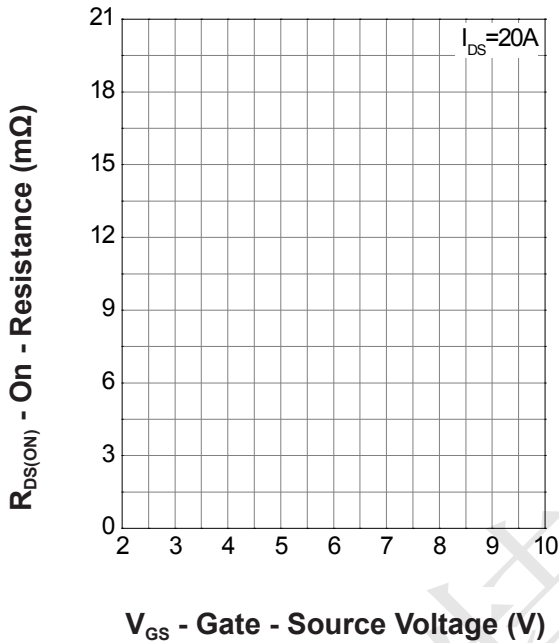
Drain-Source On Resistance



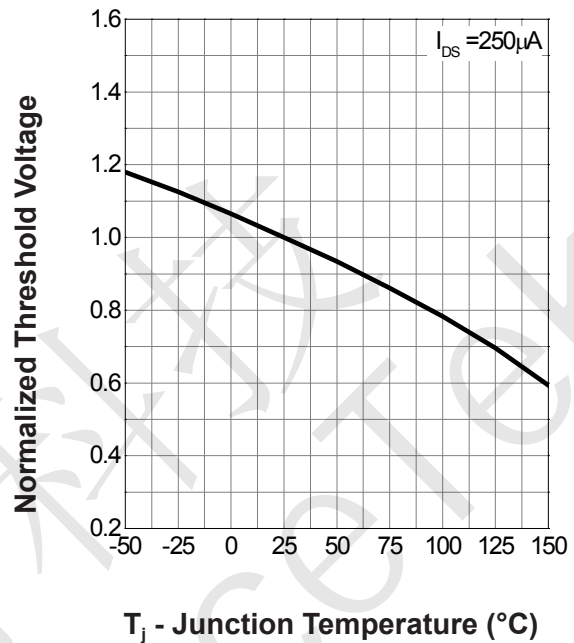


CST120N03F Typical Operating Characteristics(Cont.)

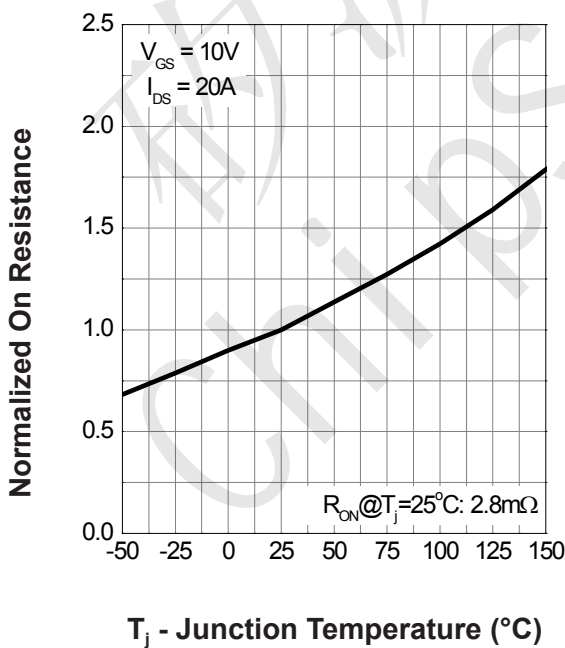
Gate-Source On Resistance



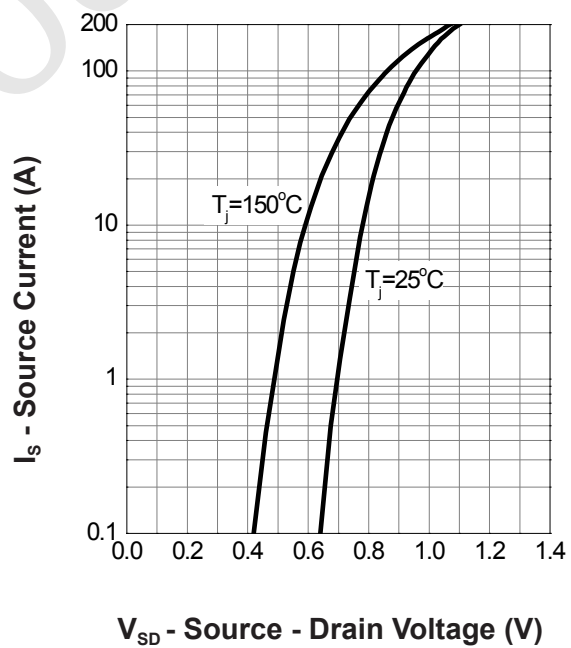
Gate Threshold Voltage



Drain-Source On Resistance



Source-Drain Diode Forward

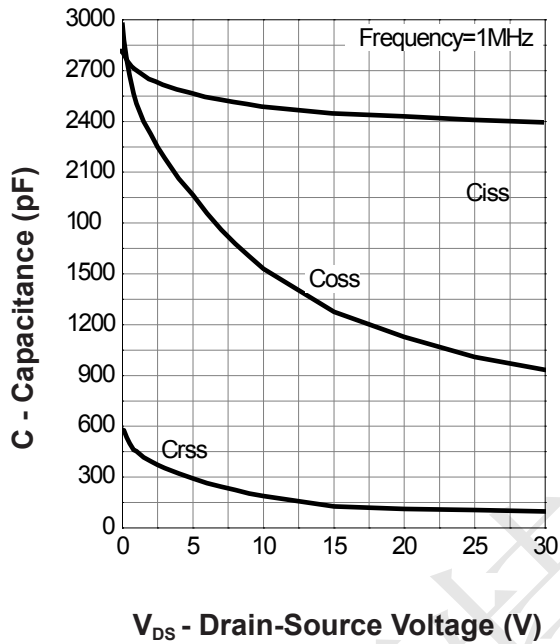




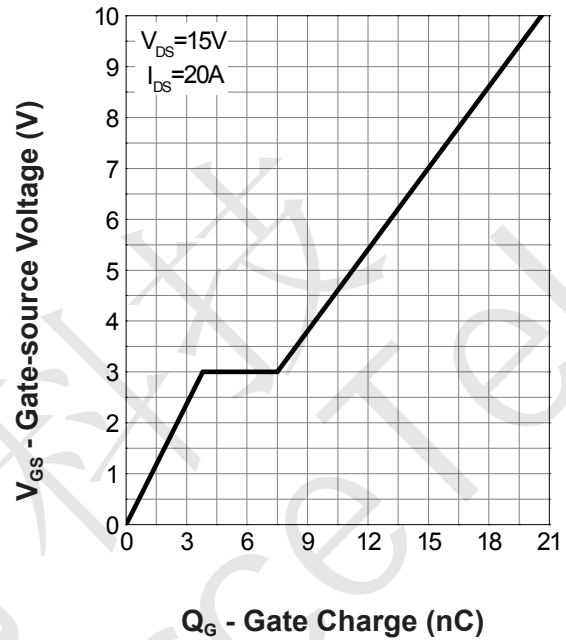


CST120N03F Typical Operating Characteristics(Cont.)

Capacitance

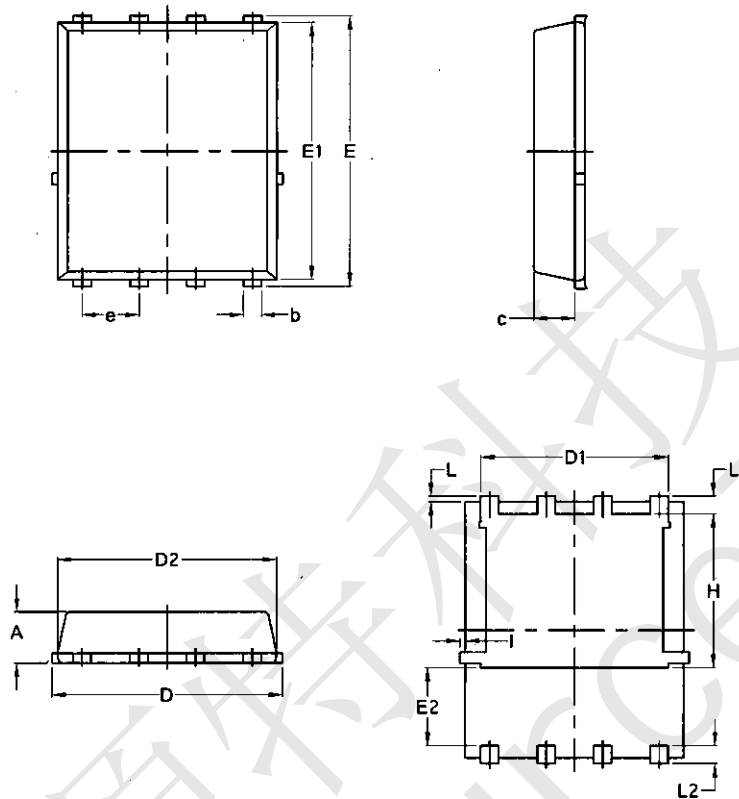


Gate Charge





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