



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

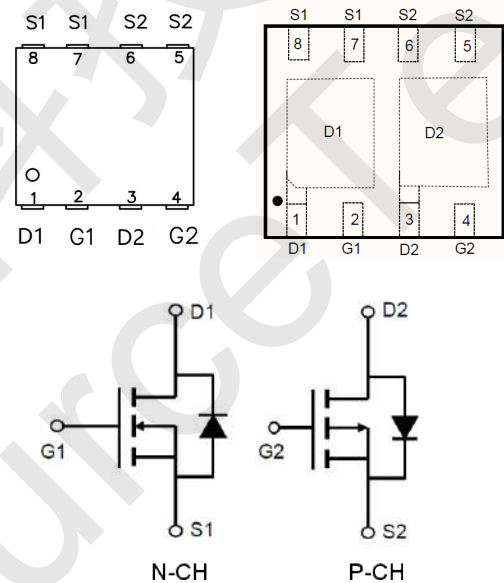
#### CST8G02M Product Summary

BVDSS	RDSON	ID
20V	12mΩ	8A
-20V	17mΩ	-8A

#### CST8G02M Description

The CST8G02M 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 CST8G02M meet the RoHS and Green Product requirement with full function reliability approved.

#### CST8G02M DFN2020-8L Pin Configuration



#### CST8G02M Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Limit		Unit
		N	P	
Drain-source voltage	$V_{DS}$	20	-20	V
Gate-source voltage	$V_{GS}$	±12	±12	V
Operating junction Temperature range	$T_j$	-55—150	-55—150	°C
Drain Current-Continuous (Silicon Limited)	$T_A=25^\circ\text{C}$	8	-8	A
	$T_A=75^\circ\text{C}$	6	-6	
Pulsed Drain Current (Package Limited)	$I_{DM}$	32	-28	A
Avalanche Current <sup>C</sup>	$I_{AS}, I_{AR}$	16	-27	A
Avalanche energy L=0.1mH <sup>C</sup>	$E_{AS}, E_{AR}$	20	36	mJ
Power Dissipation <sup>B</sup>	$T_A=25^\circ\text{C}$	15	20	W
	$T_A=75^\circ\text{C}$	4	8	
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55—150		°C



#### CST8G02M N-Channel Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>OFF Characteristics</b>						
Drain-source breakdown voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	20	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V	-	-	1	μA
Gate-body leakage	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V	-	-	±100	nA
<b>ON Characteristics</b>						
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.5	0.7	1.5	V
Drain-source on-state resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A	-	12	15	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =5A	-	16	23	
Forward transconductance	g <sub>fs</sub>	V <sub>DS</sub> =5V, I <sub>D</sub> =5A	-	15	-	S
<b>Dynamic Characteristics</b>						
Input capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V f=1.0MHz	-	740	-	pF
Output capacitance	C <sub>OSS</sub>		-	110	-	
Reverse transfer capacitance	C <sub>RSS</sub>		-	82	-	
Gate resistance	R <sub>g</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1.0MHz	-	1.1	-	Ω
<b>Switching Characteristics</b>						
Turn-on delay time	t <sub>D(ON)</sub>	V <sub>DS</sub> =15V V <sub>GS</sub> =10V R <sub>L</sub> =1.8Ω R <sub>GEN</sub> =3Ω	-	5	-	ns
Rise time	t <sub>r</sub>		-	3.5	-	
Turn-off delay time	t <sub>D(OFF)</sub>		-	9	-	
Fall time	t <sub>f</sub>		-	3.5	-	
Total gate charge	Q <sub>g</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =5A V <sub>GS</sub> =10V	-	15	-	nC
Gate-source charge	Q <sub>gs</sub>		-	2.5	-	
Gate-drain charge	Q <sub>gd</sub>		-	3	-	



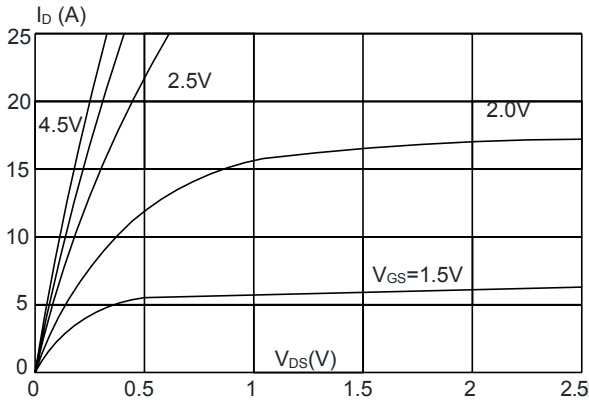
#### CST8G02M P-Channel Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>OFF Characteristics</b>						
Drain-source breakdown voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA	-20	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V	-	-	-1	μA
Gate-body leakage	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V	-	-	±100	nA
<b>ON Characteristics</b>						
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-0.5	-0.7	-1.5	V
Drain-source on-state resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5A	-	17	25	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-5A	-	24	30	
Forward transconductance	g <sub>fs</sub>	V <sub>DS</sub> =-5V, I <sub>D</sub> =-5A	-	18	-	S
<b>Dynamic Characteristics</b>						
Input capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V f=1.0MHz	-	1040	-	pF
Output capacitance	C <sub>OSS</sub>		-	180	-	
Reverse transfer capacitance	C <sub>RSS</sub>		-	125	-	
Gate resistance	R <sub>g</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1.0MHz	-	4	-	Ω
<b>Switching Characteristics</b>						
Turn-on delay time	t <sub>D(ON)</sub>	V <sub>DS</sub> =-15V V <sub>GS</sub> =-10V R <sub>L</sub> =2.3Ω R <sub>GEN</sub> =3Ω	-	10	-	ns
Rise time	t <sub>r</sub>		-	5.5	-	
Turn-off delay time	t <sub>D(OFF)</sub>		-	3.6	-	
Fall time	t <sub>f</sub>		-	4.6	-	
Total gate charge	Q <sub>g</sub>	V <sub>DS</sub> =-15V, I <sub>D</sub> =-5A V <sub>GS</sub> =-10V	-	19	-	nC
Gate-source charge	Q <sub>gs</sub>		-	3.6	-	
Gate-drain charge	Q <sub>gd</sub>		-	4.6	-	

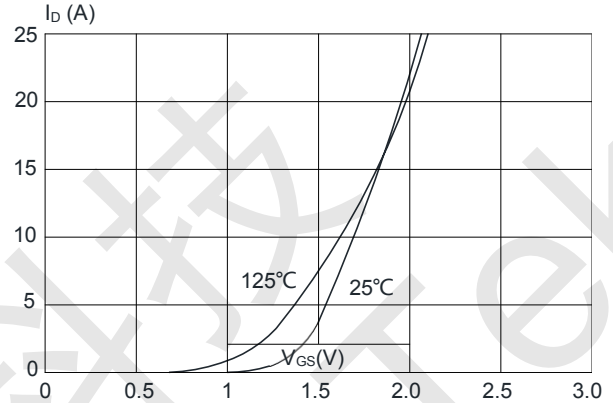


## CST8G02M N-Channel Typical Characteristics

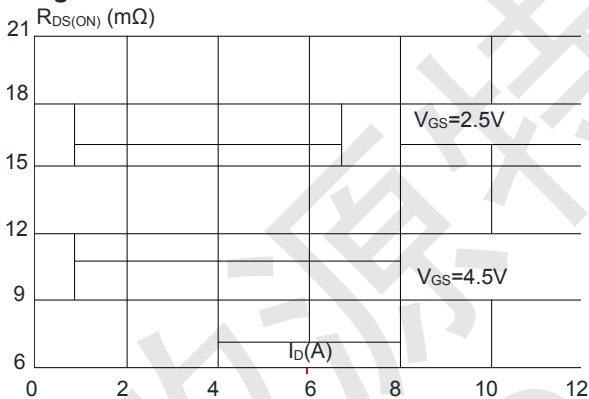
**Figure 1: Output Characteristics**



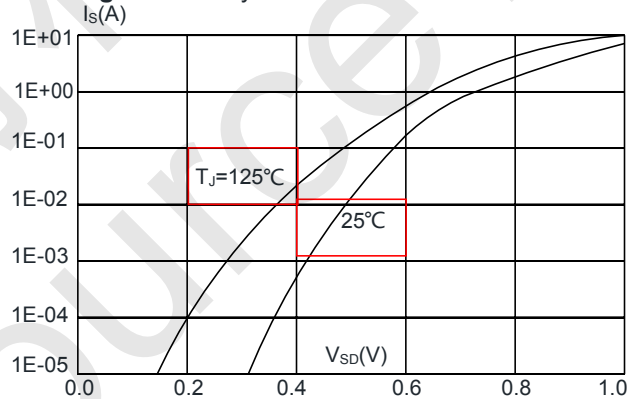
**Figure 2: Typical Transfer Characteristics**



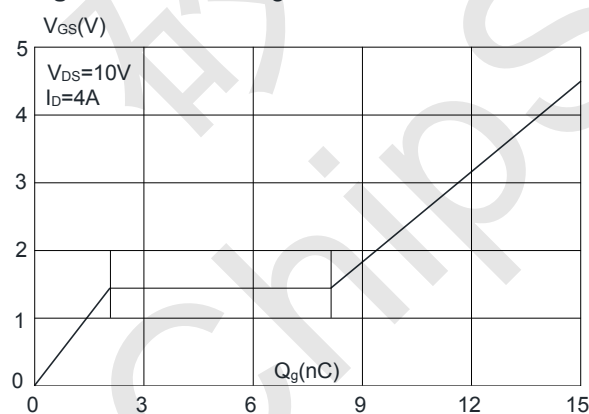
**Figure 3: On-resistance vs. Drain Current**



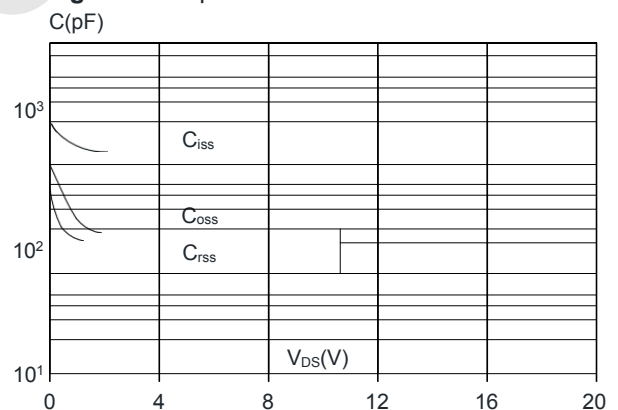
**Figure 4: Body Diode Characteristics**



**Figure 5: Gate Charge Characteristics**



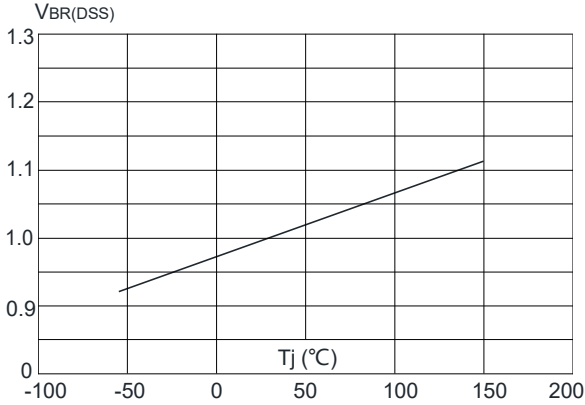
**Figure 6: Capacitance Characteristics**



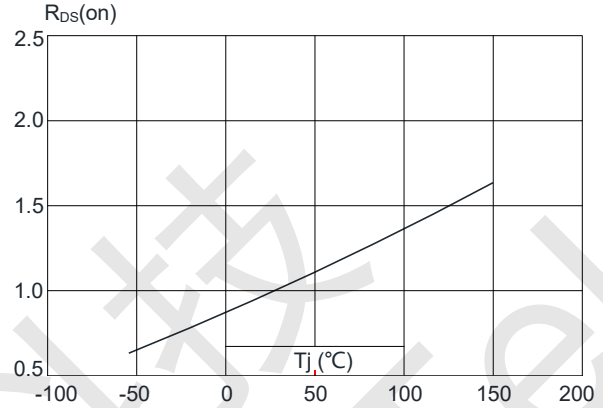


### CST8G02M N+P-Ch 20V Fast Switching MOSFETs

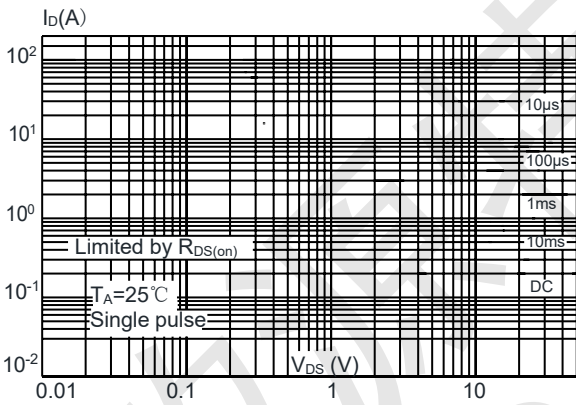
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



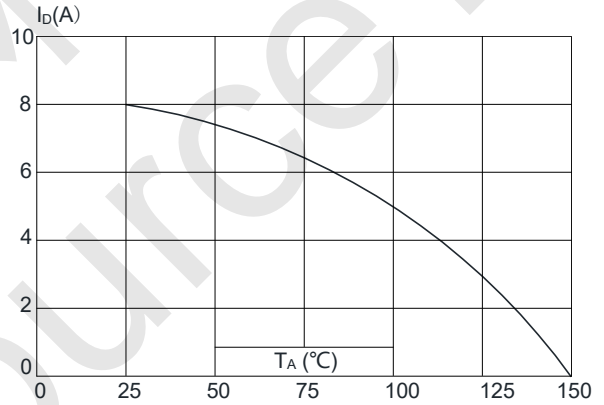
**Figure 8:** Normalized on Resistance vs. Junction Temperature



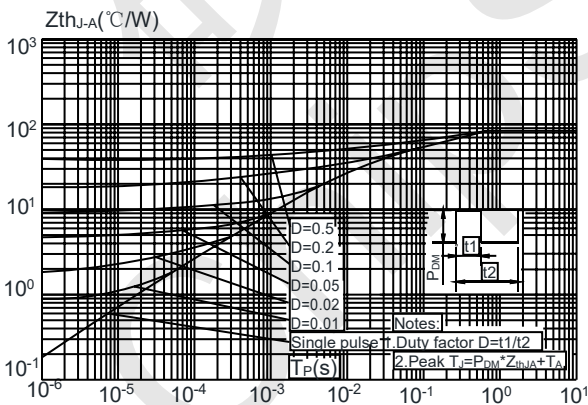
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature



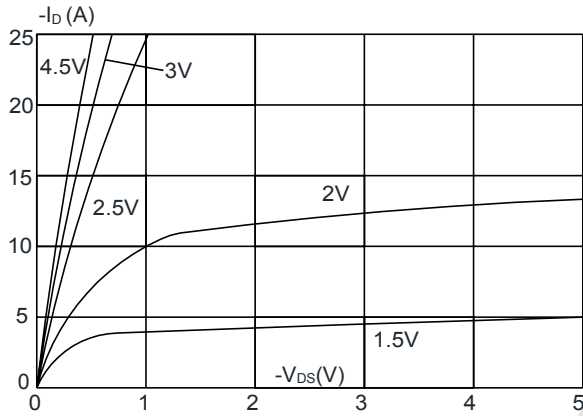
**Figure 11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



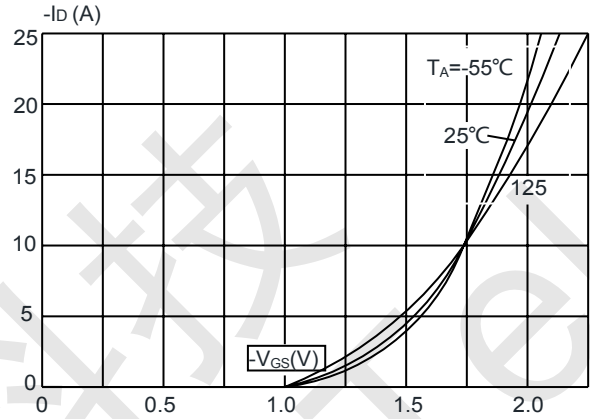


## CST8G02M P-Channel Typical Characteristics

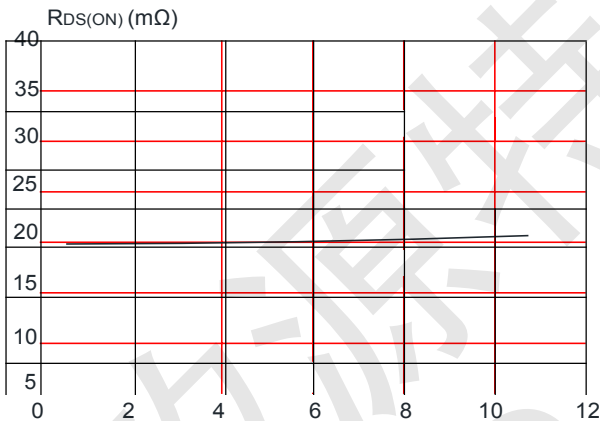
**Figure 1: Output Characteristics**



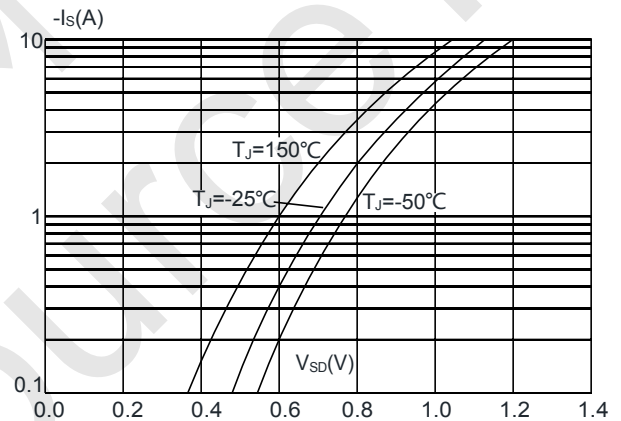
**Figure 2: Typical Transfer Characteristics**



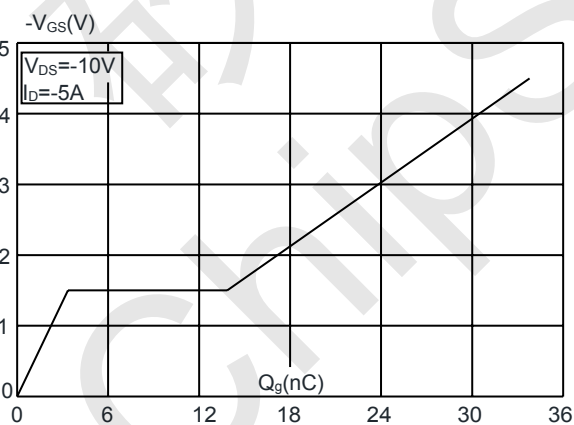
**Figure 3: On-resistance vs. Drain Current**



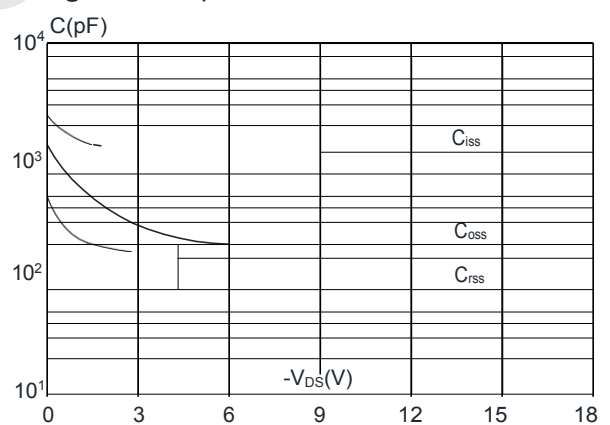
**Figure 4: Body Diode Characteristics**



**Figure 5: Gate Charge Characteristics**



**Figure 6: Capacitance Characteristics**

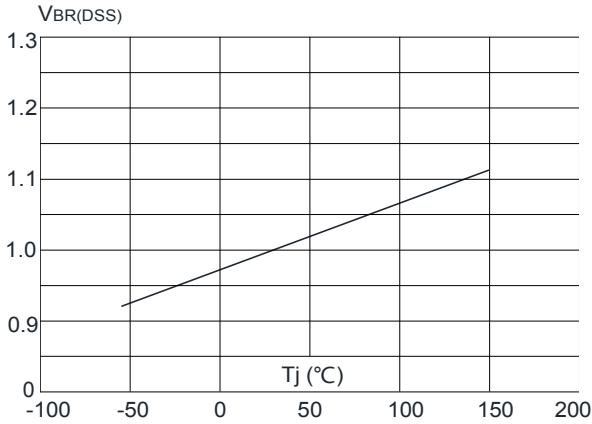




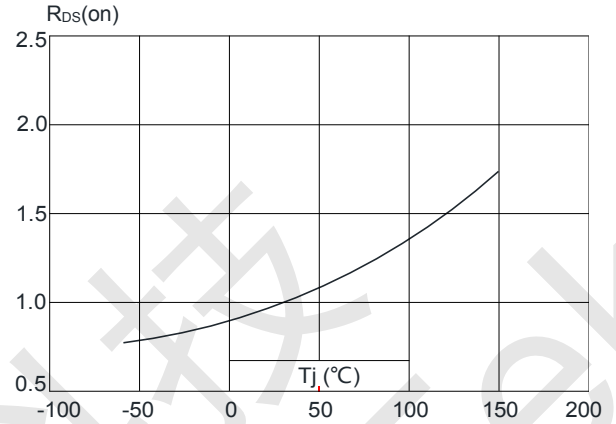


### CST8G02M N+P-Ch 20V Fast Switching MOSFETs

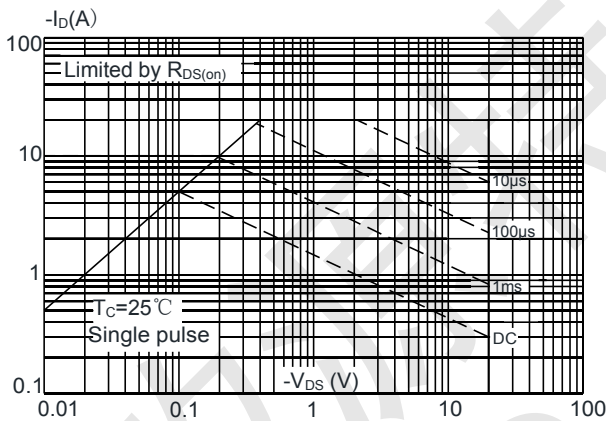
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



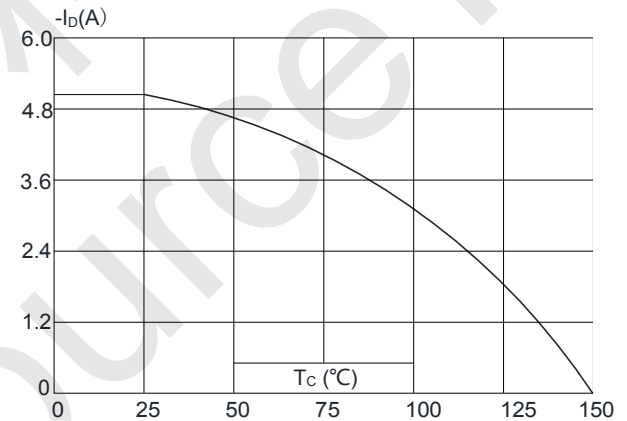
**Figure 8:** Normalized on Resistance vs. Junction Temperature



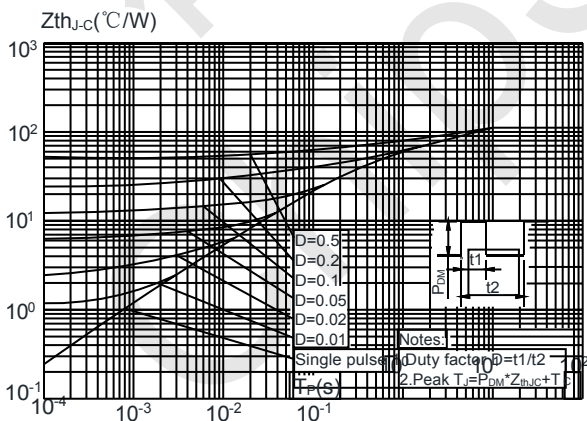
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature

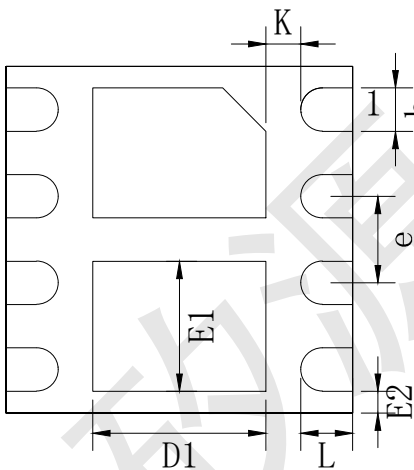
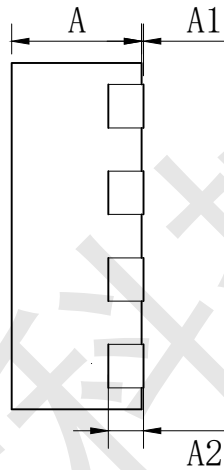
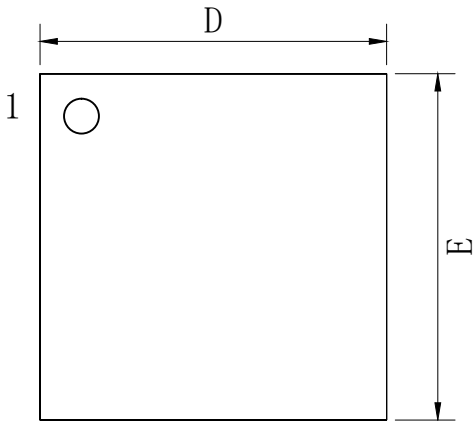


**Figure 11:** Maximum Effective Transient Thermal Impedance, Junction-to-Case





CST8G02M Package Mechanical Data-DFN2020-8L



SYMBOL	MILLMETER		
	MIN	NOM	MAX
A	—	—	0.80
A1	0.00	—	0.05
A2	0.203 TIY		
b	0.20	0.25	0.30
D	1.95	2.00	2.05
D1	0.95	1.00	1.05
E	1.95	2.00	2.05
E1	0.70	0.75	0.80
E2	0.125 TIY		
e	0.50 BSC		
K	0.20 BSC		
L	0.25	0.30	0.35