



### CST20P80G P-Ch 18V Fast Switching MOSFETs

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

#### CST20P80G Product Summary

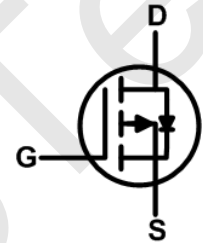
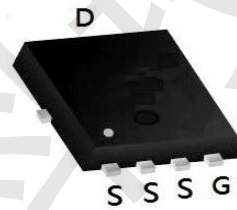


BVDSS	RDSON	ID
-18V	2.4mΩ	-85A

#### CST20P80G Description

The CST20P80G is the high cell density trenched P-ch MOSFETs, which provides excellent RDSON and efficiency for most of the small power switching and load switch applications. The CST20P80G meet the RoHS and Green Product requirement with full function reliability approved.

#### CST20P80G PDFN5060-8L Pin Configuration



#### CST20P80G Absolute Maximum Ratings $T_c=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	-18	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Drain Current – Continuous ( $T_c=25^\circ\text{C}$ )	-85	A
	Drain Current – Continuous ( $T_c=100^\circ\text{C}$ )	-54	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	-360	A
$P_D$	Power Dissipation ( $T_c=25^\circ\text{C}$ )	41.67	W
	Power Dissipation – Derate a bove $25^\circ\text{C}$	0.33	W/ $^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

#### CST20P80G Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	3	$^\circ\text{C/W}$



## CST20P80G Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)

### Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250uA	-18	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =-1mA	---	-0.008	---	V/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	-1	uA
		V <sub>DS</sub> =-16V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C	---	---	-30	uA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V	---	---	±500	nA

### On Characteristics

R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-20A	---	2.4	3.2	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-20A	---	3.3	4.5	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA	-0.4	-0.6	-1.0	V
ΔV <sub>GS</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	-3.44	---	mV/°C
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-10V, I <sub>S</sub> =-3A	---	30	---	S

### Dynamic and switching Characteristics

Q <sub>g</sub>	Total Gate Charge <sup>2, 3</sup>	V <sub>DS</sub> =-16V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5A	---	149		nC
Q <sub>gs</sub>	Gate-Source Charge <sup>2, 3</sup>		---	14.4		
Q <sub>gd</sub>	Gate-Drain Charge <sup>2, 3</sup>		---	42.8		
T <sub>d(on)</sub>	Turn-On Delay Time <sup>2, 3</sup>	V <sub>DD</sub> =-15V, V <sub>GS</sub> =-4.5V, R <sub>G</sub> =25Ω I <sub>D</sub> =-1A	---	21.2		nS
T <sub>r</sub>	Rise Time <sup>2, 3</sup>		---	20.6		
T <sub>d(off)</sub>	Turn-Off Delay Time <sup>2, 3</sup>		---	26		
T <sub>f</sub>	Fall Time <sup>2, 3</sup>		---	400		
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, F=1MHz	---	10698		pF
C <sub>oss</sub>	Output Capacitance		---	2347		
C <sub>rss</sub>	Reverse Transfer Capacitance		---	1267		
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	---	2.6	---	Ω

### Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	-85	A
I <sub>SM</sub>	Pulsed Source Current		---	---	-190	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =-1A, T <sub>J</sub> =25°C	---	---	-1	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
3. Essentially independent of operating temperature.



CST20P80G Typical Performance Characteristics

Figure 1: Output Characteristics

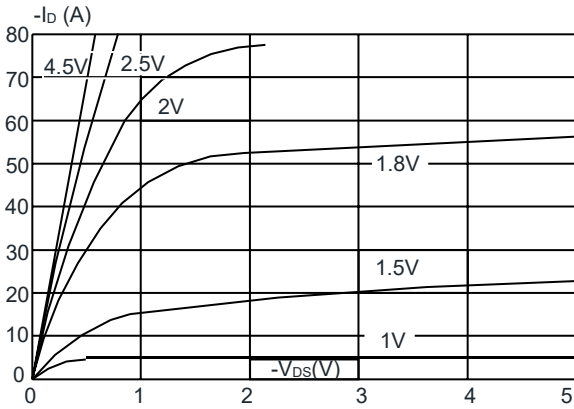


Figure 2: Typical Transfer Characteristics

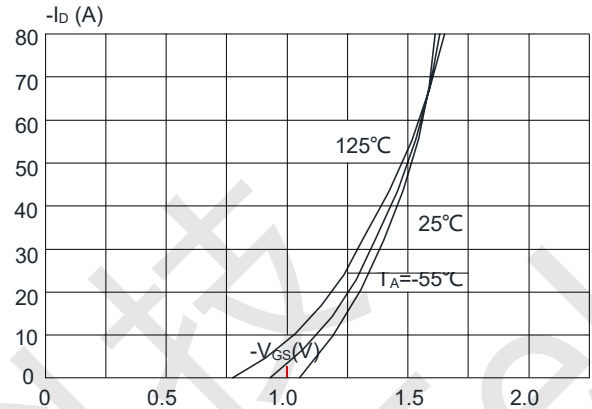


Figure 3: On-resistance vs. Drain Current

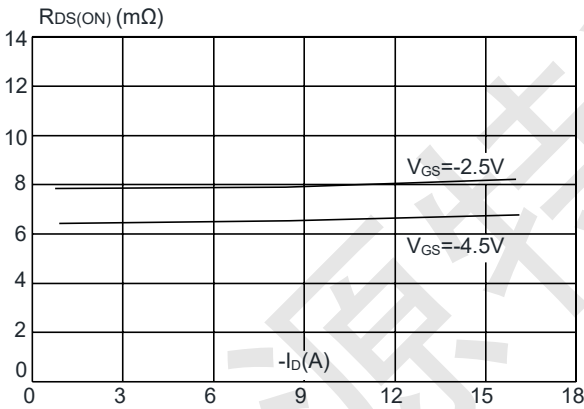


Figure 4: Body Diode Characteristics

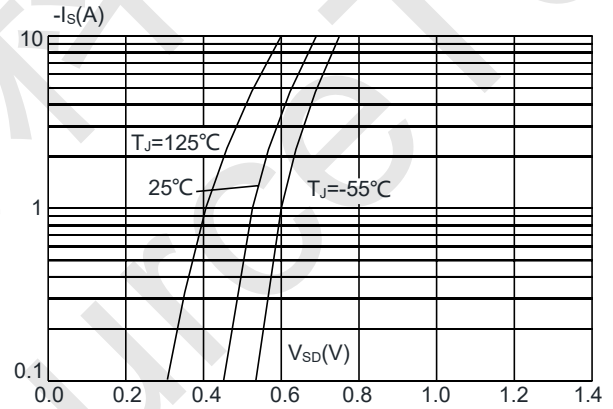


Figure 5: Gate Charge Characteristics

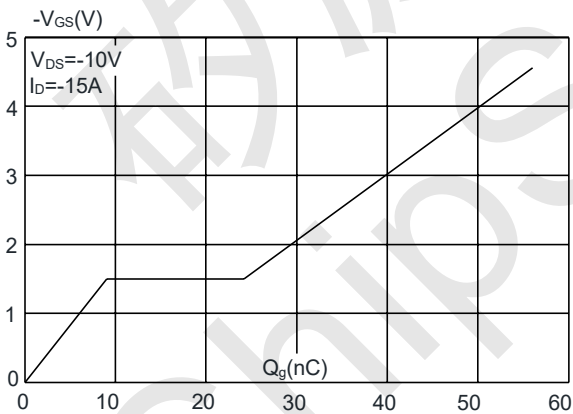
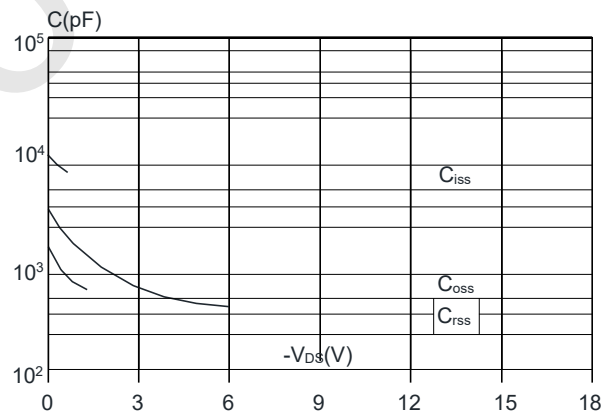


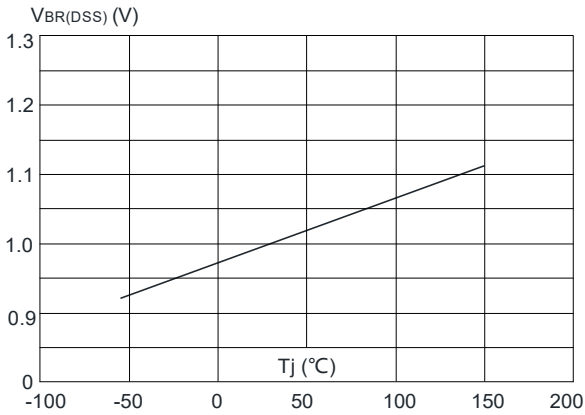
Figure 6: Capacitance Characteristics



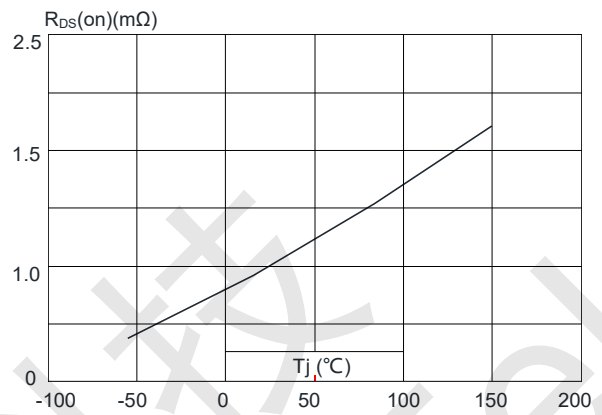


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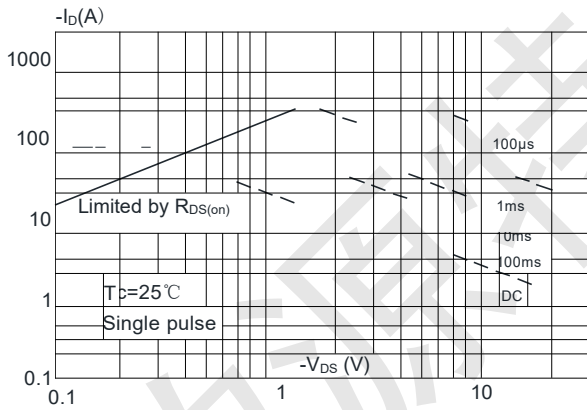
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



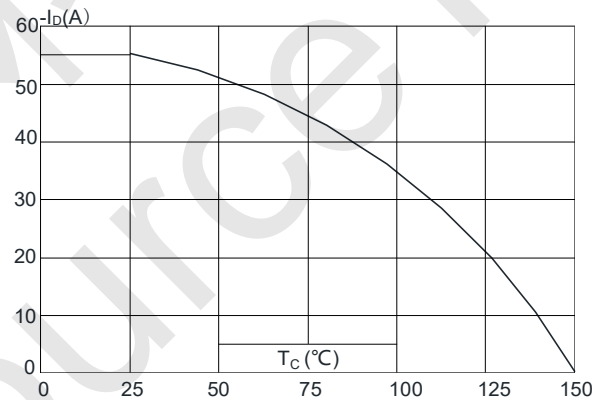
**Figure 8:** Normalized on Resistance vs. Junction Temperature



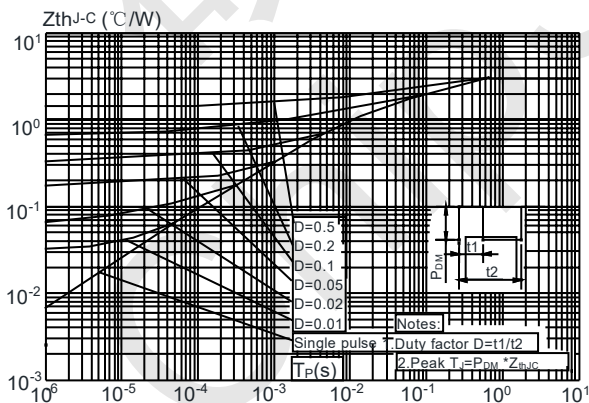
**Figure 9:** Maximum Safe Operating Area



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



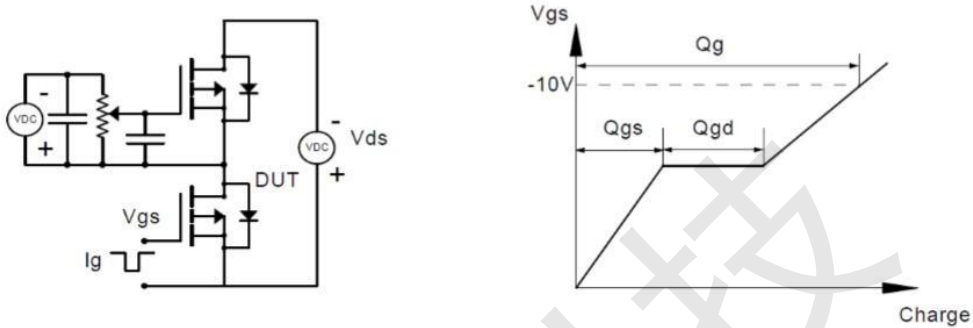
**Figure 11:** Maximum Effective Transient Thermal Impedance, Junction-to-Case



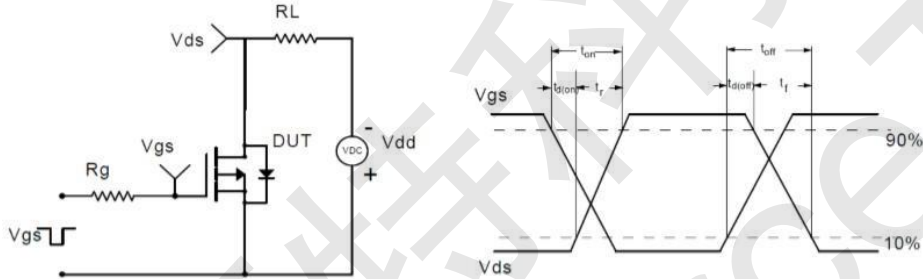


#### CST20P80G Test Circuit

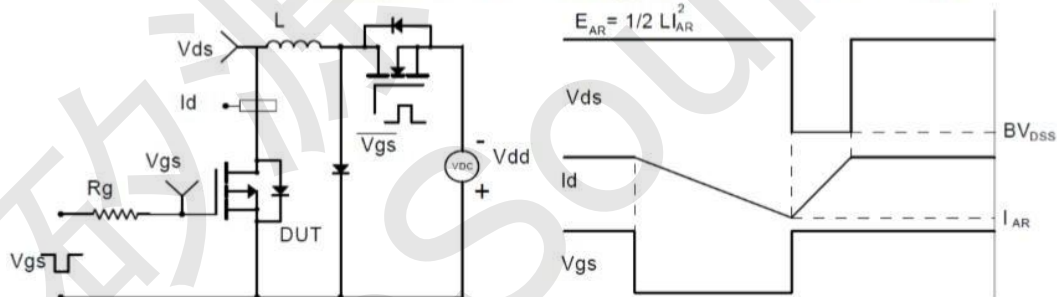
Gate Charge Test Circuit & Waveform



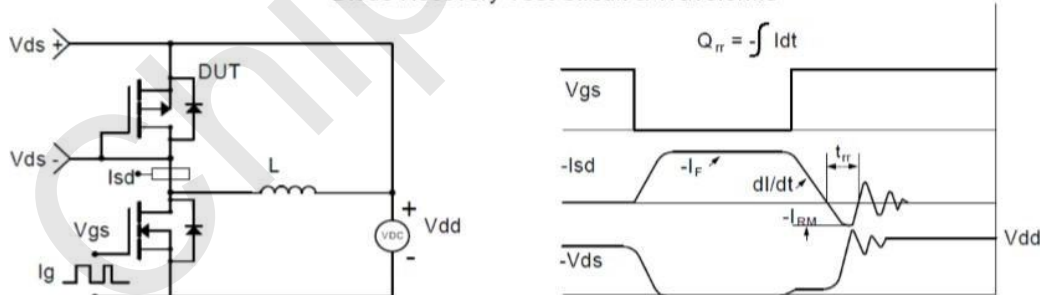
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

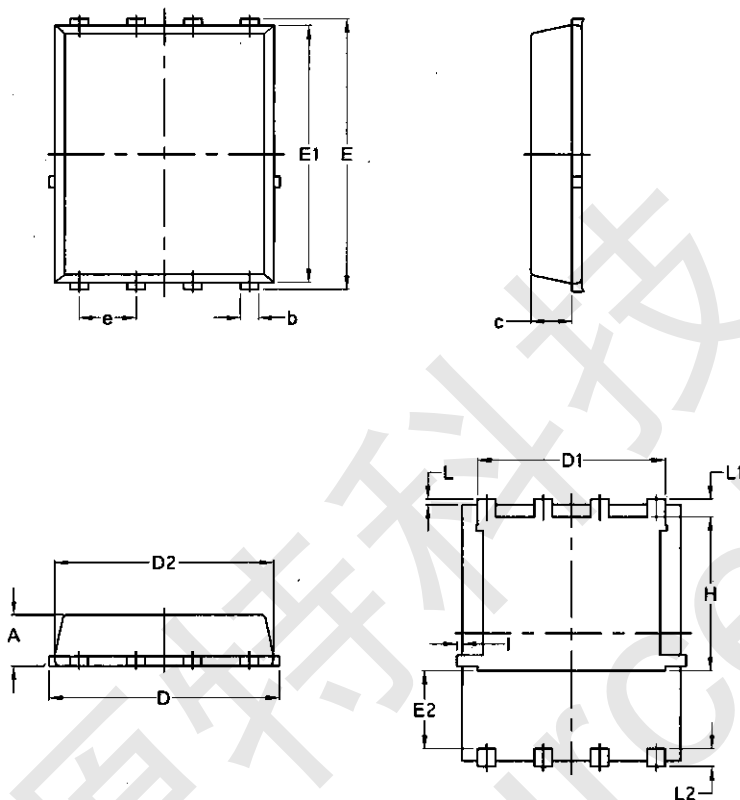


Diode Recovery Test Circuit & Waveforms





CST20P80G 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