



### N and P Channel Enhancement Mode Power MOSFET

#### CST83G30F Description

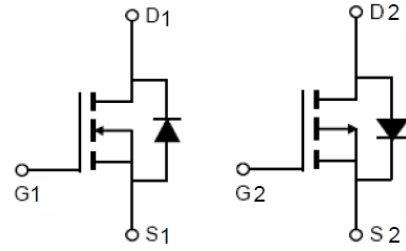
The CST83G30F uses advanced trench technology to provide excellent  $R_{DS(ON)}$  and low gate charge. It can be used in a wide variety of applications.

#### CST83G30F General Features

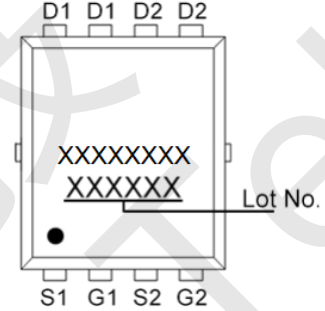
- **N-Channel**
  - $V_{DS} = 30V, I_D = 30A$
  - $R_{DS(ON)} < 10.5m\Omega @ V_{GS}=10V$
  - $R_{DS(ON)} < 18m\Omega @ V_{GS}=4.5V$
- **P-Channel**
  - $V_{DS} = -30V, I_D = -30A$
  - $R_{DS(ON)} < 22m\Omega @ V_{GS}=-10V$
  - $R_{DS(ON)} < 30m\Omega @ V_{GS}=-4.5V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

#### CST83G30F Application

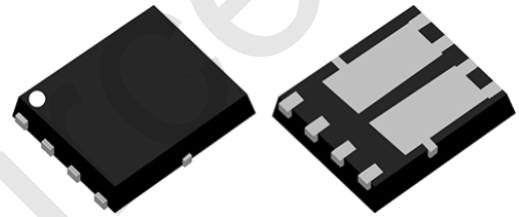
- DC motor
- PWM applications



Schematic diagram



Marking and pin assignment



DFN5x6-8L

#### CST83G30F Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	$V_{DS}$	30	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	$\pm 20$	V
Drain Current-Continuous	$I_D$	30	-30	A
Drain Current-Continuous (TC=100°C)	$I_D$	21	-21	A
Pulsed Drain Current (Note 1)	$I_{DM}$	90	-90	A
Maximum Power Dissipation	$P_D$	30	30	W
Avalanche Energy (L=0.5mH)	$E_{AS}$	24	36	mJ
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150		°C

#### CST83G30F Thermal Characteristic

Parameter	Symbol	N-Channel	P-Channel	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	4.16	4.16	°C/W



### CST83G30F N-Channel Electrical Characteristics (TC=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=30V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics</b> (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.7	2.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=10A$	-	8.5	10.5	m $\Omega$
		$V_{GS}=4.5V, I_D=5A$	-	12	18	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=10V, I_D=8A$	10	-	-	S
<b>Dynamic Characteristics</b> (Note 4)						
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$	-	840	-	pF
Output Capacitance	$C_{oss}$		-	120	-	pF
Reverse Transfer Capacitance (Note 4)	$C_{rss}$		-	85	-	pF
<b>Switching Characteristics</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=15V, I_D=2A, R_L=1\Omega,$ $V_{GS}=10V, R_G=3\Omega$	-	4.2	-	nS
Turn-on Rise Time	$t_r$		-	8.2	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	31	-	nS
Turn-Off Fall Time	$t_f$		-	4	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=15V, I_D=10A, V_{GS}=10V$	-	14	-	nC
Gate-Source Charge	$Q_{gs}$		-	2.4	-	nC
Gate-Drain Charge	$Q_{gd}$		-	3	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=1A$	-	-	1.2	V
Diode Forward Current (Note 2)	$I_S$		-	-	16	A

#### Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to product.



CST83G30F Typical Electrical and Thermal Characteristics

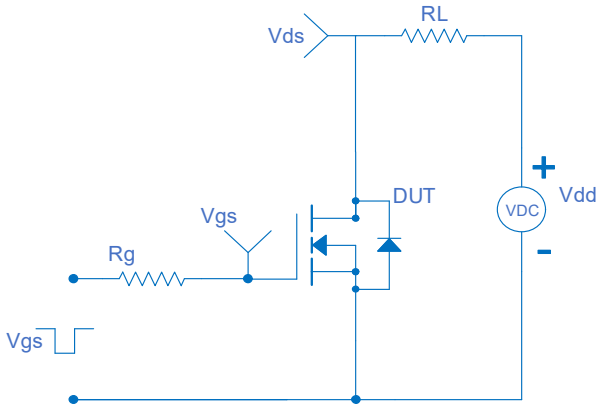


Figure 1 Switching Test Circuit

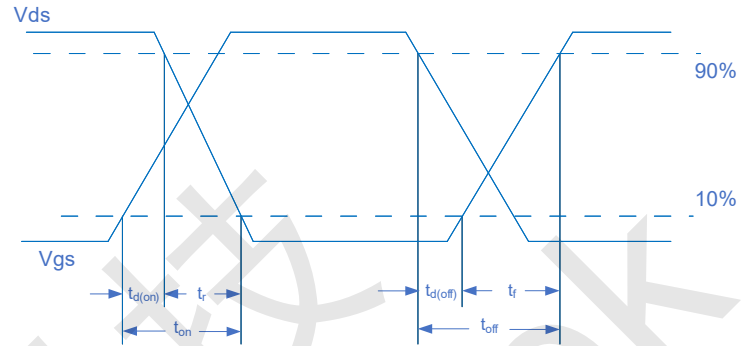


Figure 2 Switching Waveform

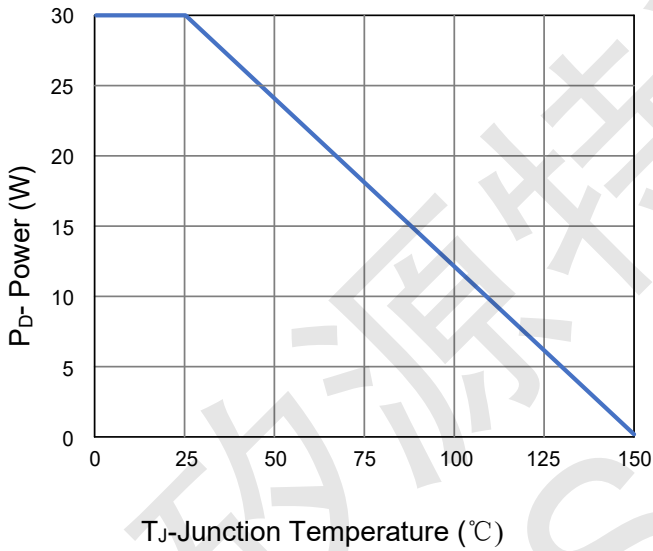


Figure 3 Power De-rating

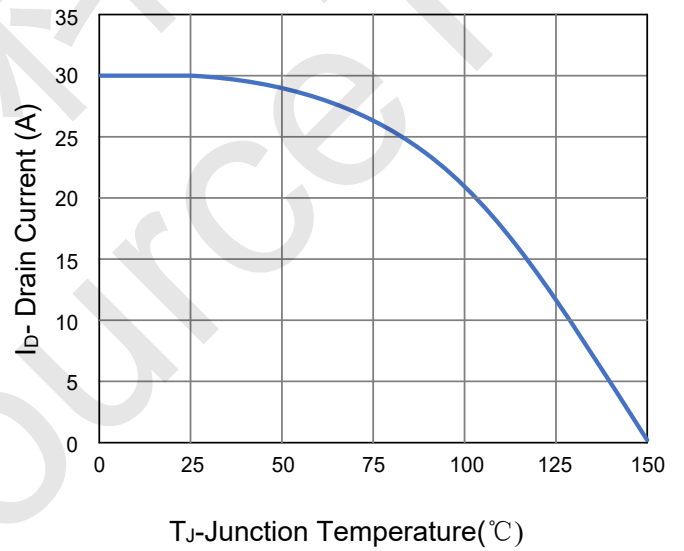


Figure 4 Drain Current

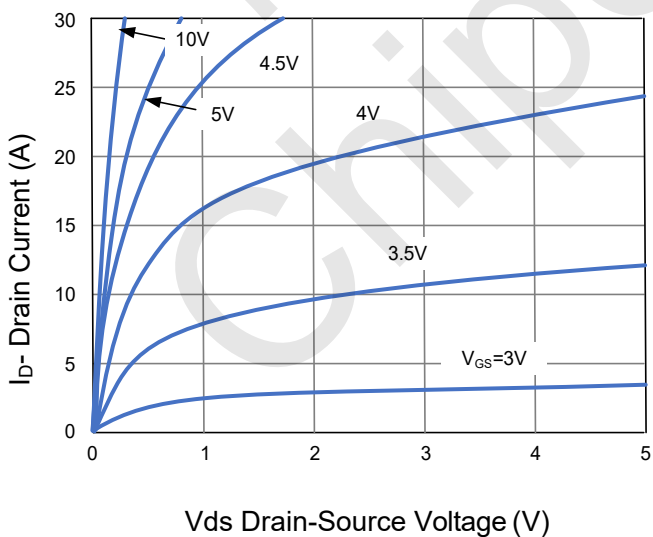


Figure 5 Output Characteristics

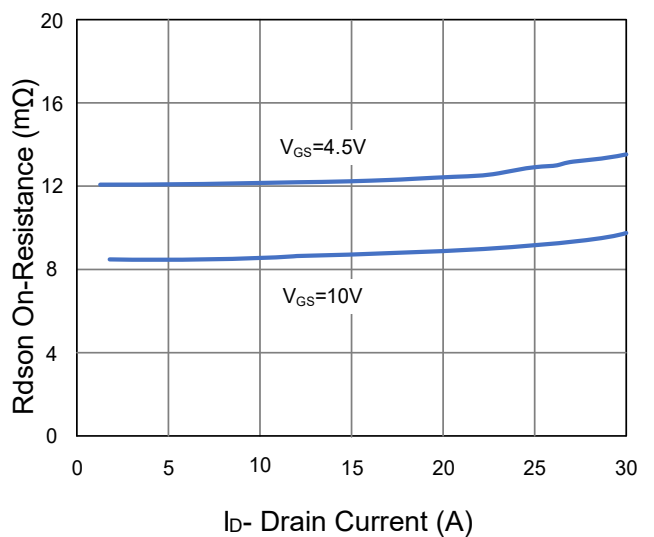


Figure 6 Rdson vs Drain Current

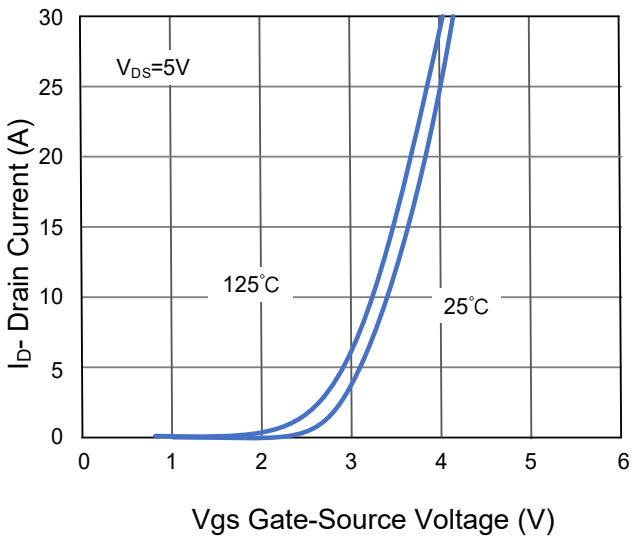


Figure 7 Transfer Characteristics

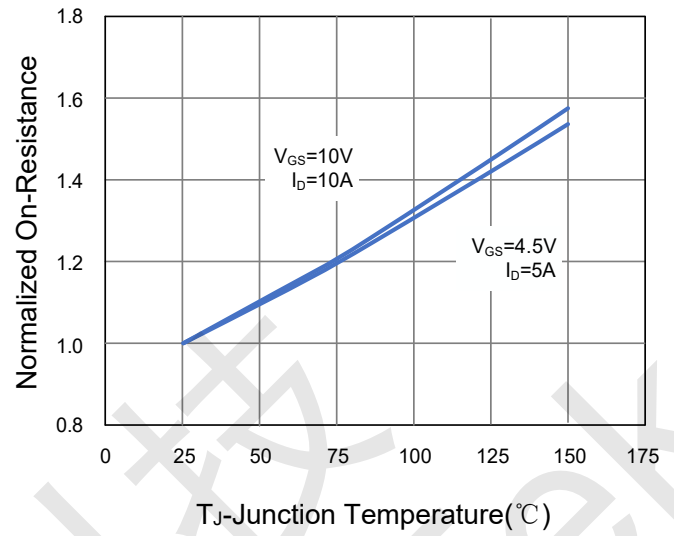


Figure 8 Rdson vs Junction Temperature

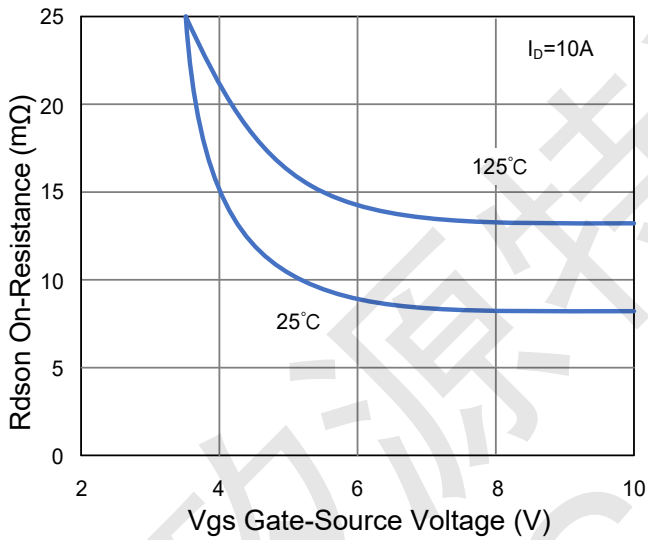


Figure 9 Rdson vs Vgs

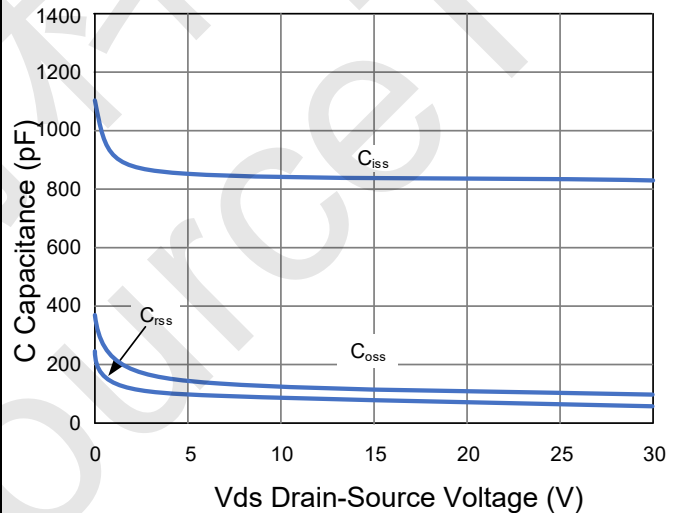


Figure 10 Capacitance vs Vds

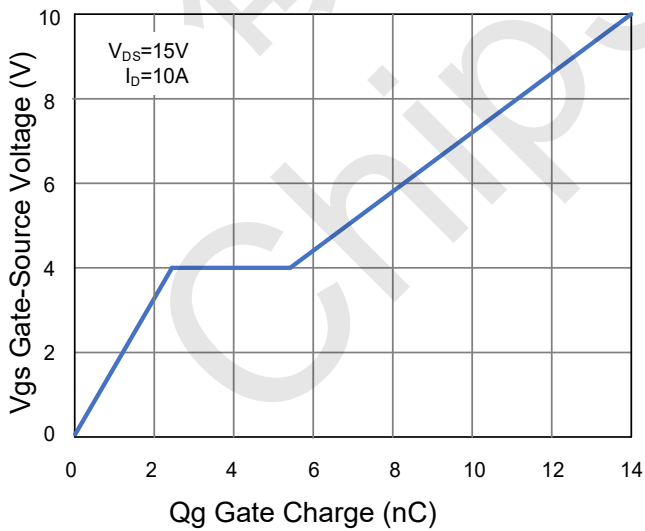


Figure 11 Gate Charge

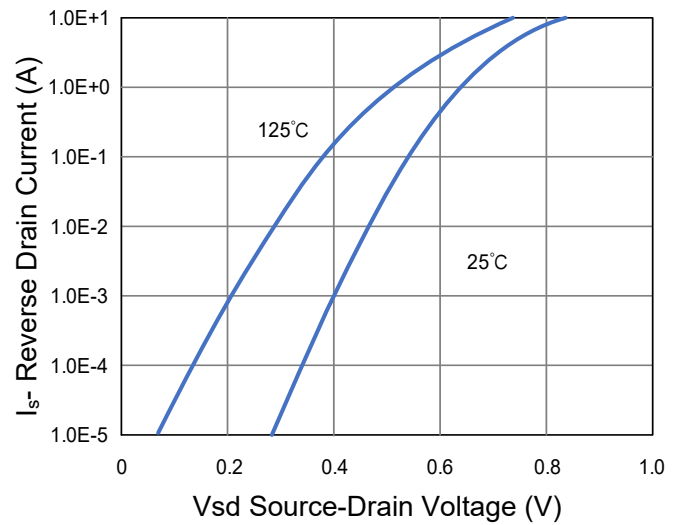


Figure 12 Source- Drain Diode Forward

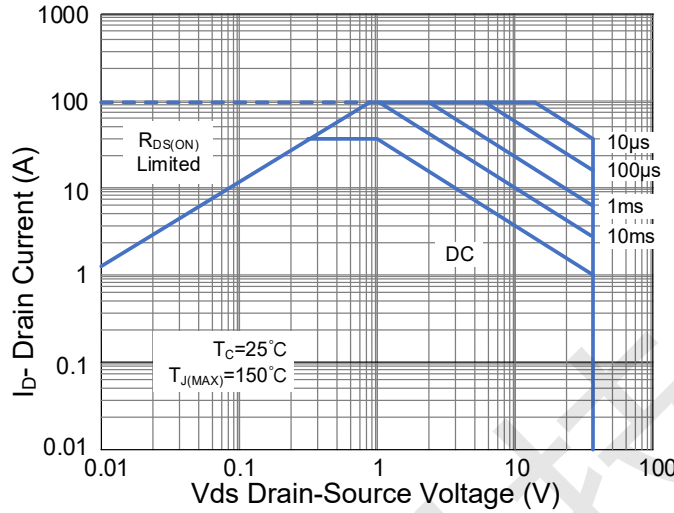


Figure 13 Safe Operation Area

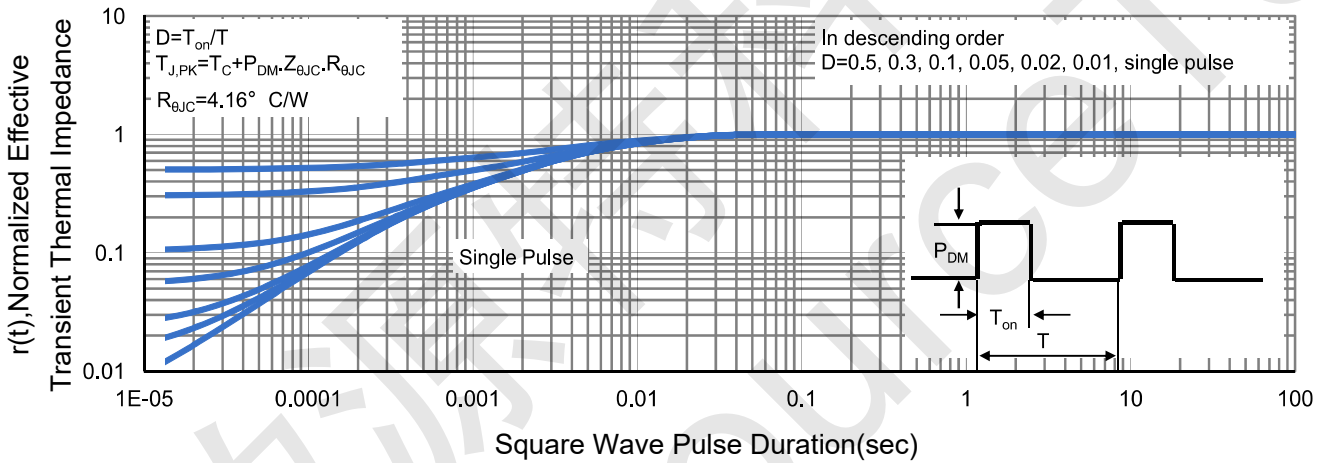


Figure 14 Normalized Maximum Transient Thermal Impedance



### CST83G30F P-Channel Electrical Characteristics (TC=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-30V, V_{GS}=0V$	-	-	-1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics</b> (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	-1.6	-2.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-10A$	-	16	22	m $\Omega$
		$V_{GS}=-4.5V, I_D=-5A$	-	22	30	m $\Omega$
<b>Dynamic Characteristics</b> (Note 4)						
Input Capacitance	$C_{iss}$	$V_{DS}=-15V, V_{GS}=0V,$ $F=1.0MHz$	-	1470	-	pF
Output Capacitance	$C_{oss}$		-	181	-	pF
Reverse Transfer Capacitance (Note 4)	$C_{rss}$		-	167	-	pF
<b>Switching Characteristics</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, R_L=1\Omega,$ $V_{GS}=-10V, R_G=3\Omega$	-	10	-	nS
Turn-on Rise Time	$t_r$		-	5.5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	26	-	nS
Turn-Off Fall Time	$t_f$		-	9	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=-15V, I_D=-10A,$ $V_{GS}=-10V$	-	18	-	nC
Gate-Source Charge	$Q_{gs}$		-	3.6	-	nC
Gate-Drain Charge	$Q_{gd}$		-	5	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=-1A$	-	-	-1.2	V
Diode Forward Current (Note 2)	$I_S$		-	-	-16	A

#### Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to product.





### CST83G30F Typical Electrical and Thermal Characteristics

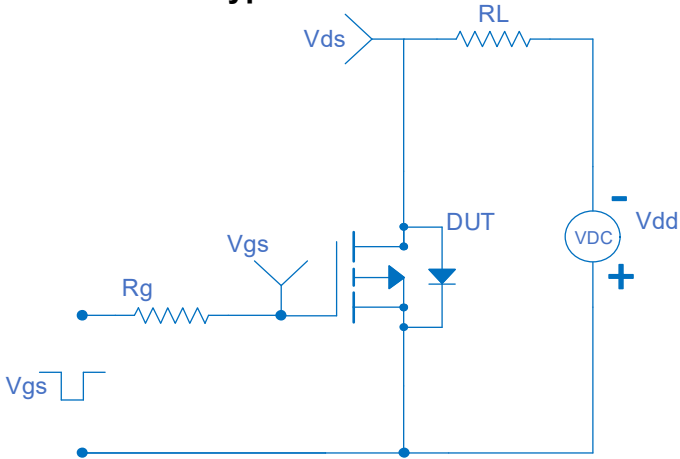


Figure 1 Switching Test Circuit

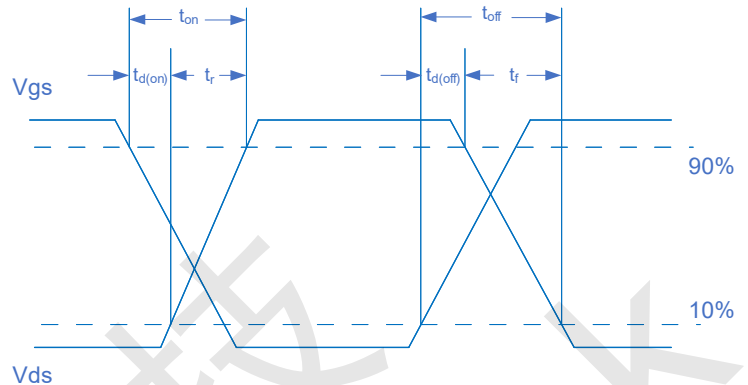


Figure 2 Switching Waveform

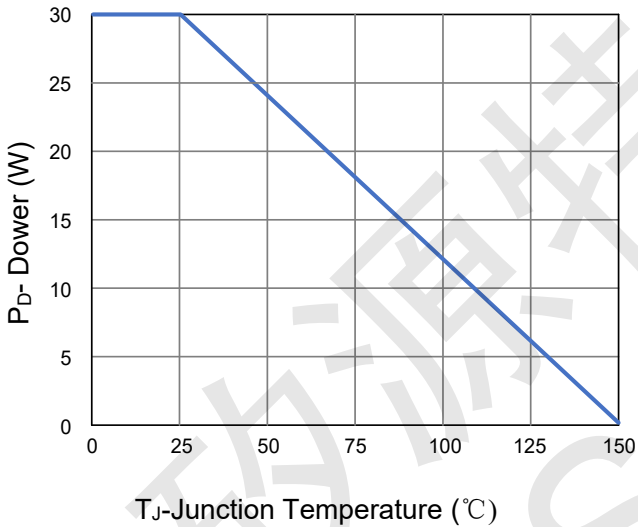


Figure 3 Power De-rating

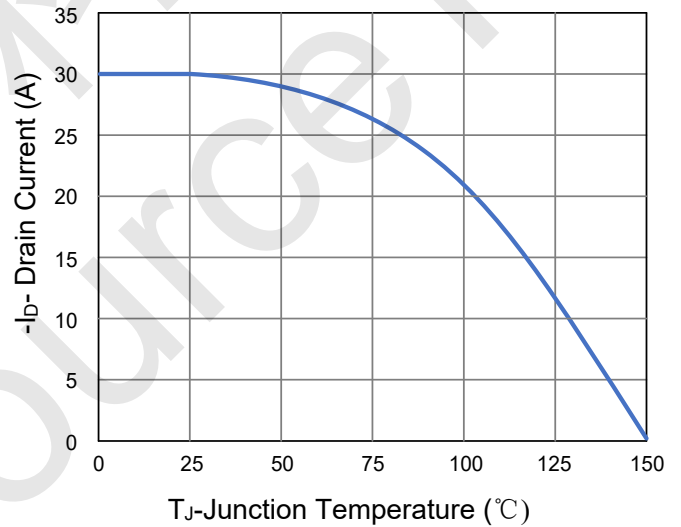


Figure 4 Drain Current

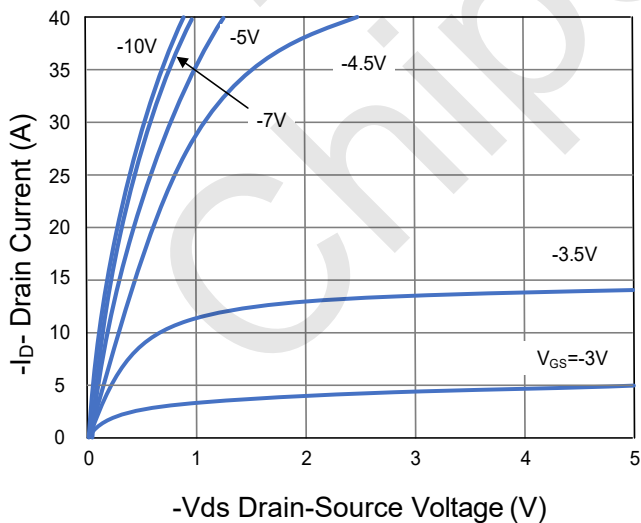


Figure 5 Output Characteristics

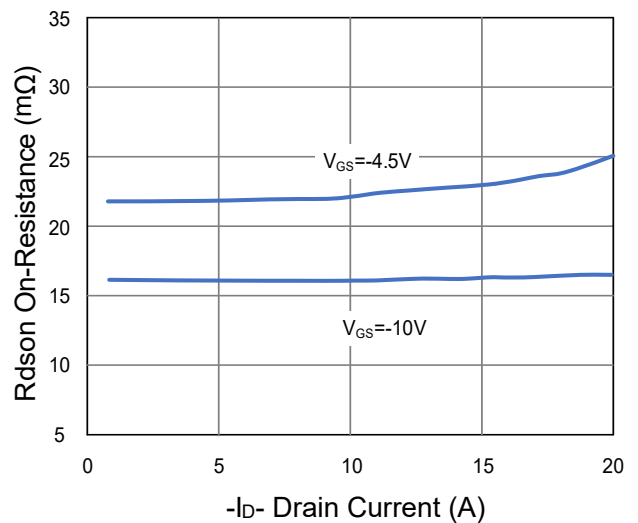


Figure 6 Rdson vs Drain Current

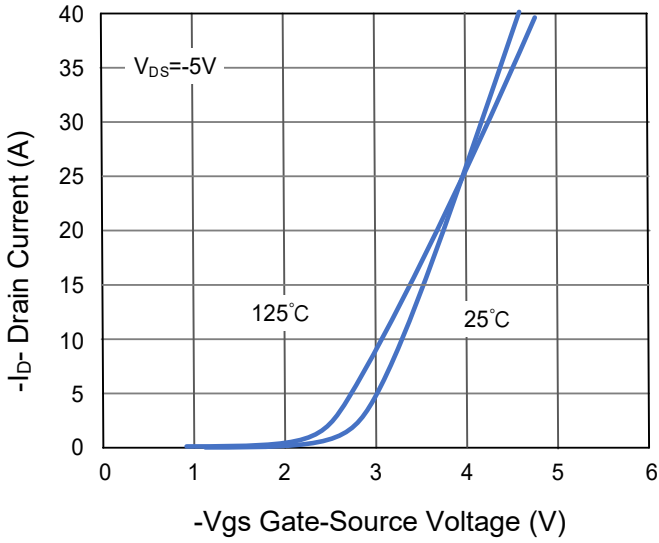


Figure 7 Transfer Characteristics

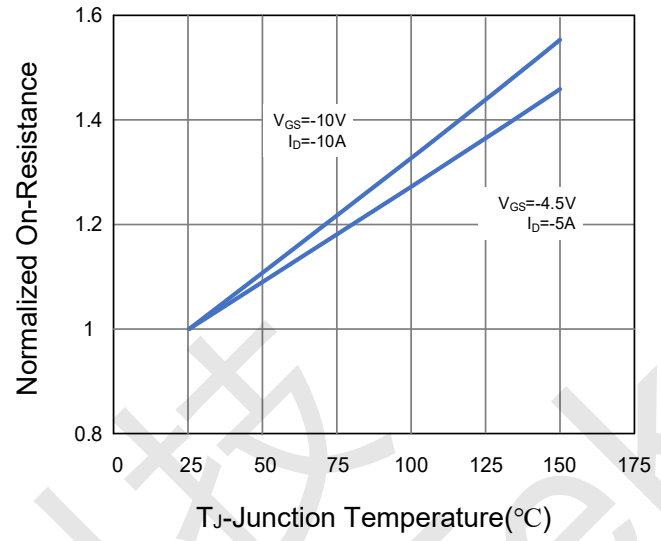


Figure 8 Rdson vs Junction Temperature

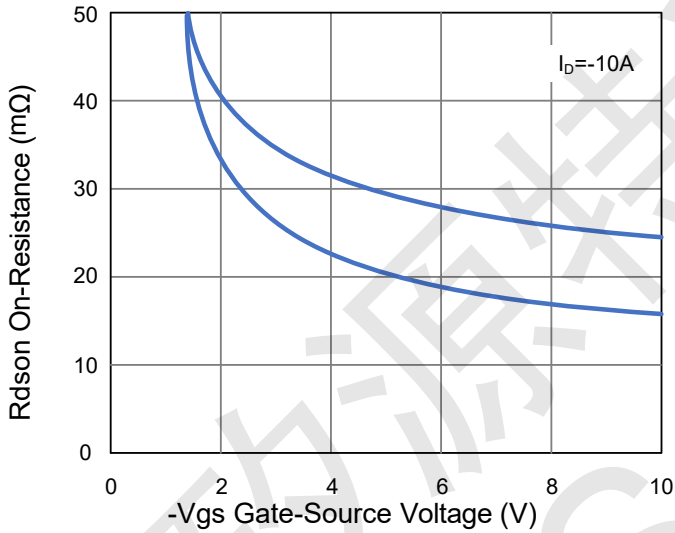


Figure 9 Rdson vs Vgs

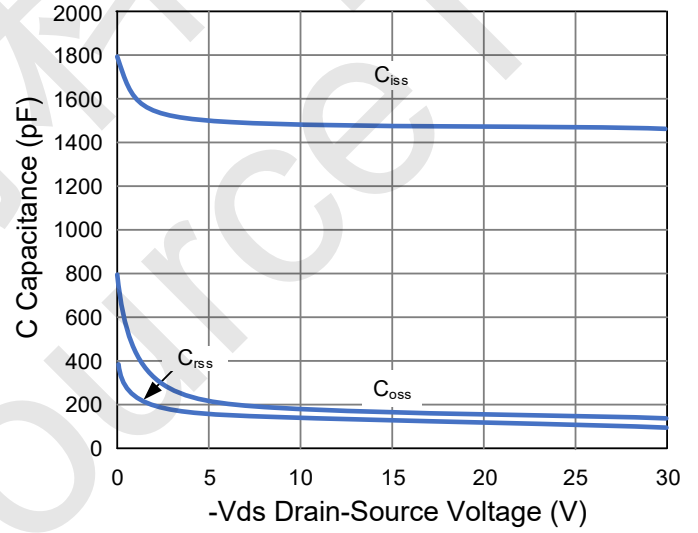


Figure 10 Capacitance vs Vds

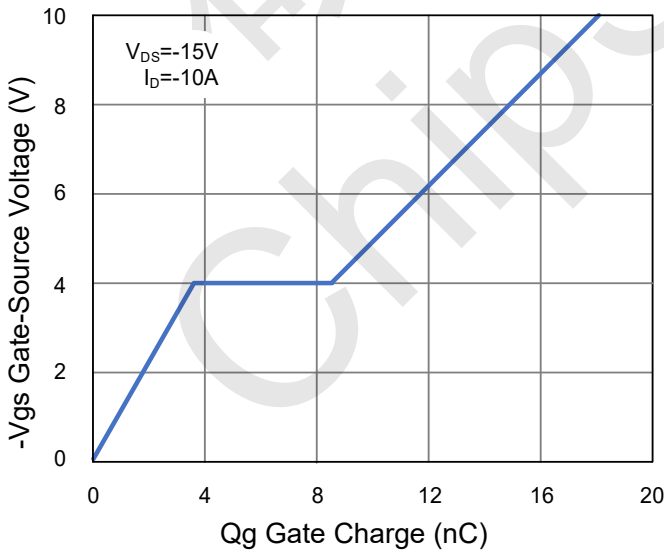


Figure 11 Gate Charge

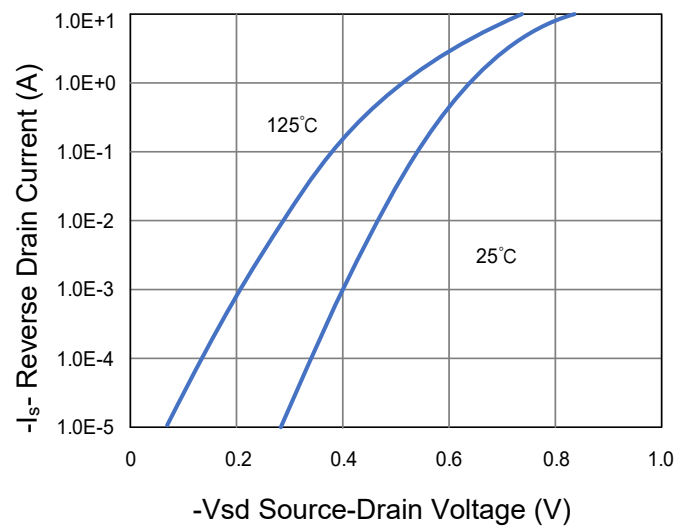


Figure 12 Source- Drain Diode Forward



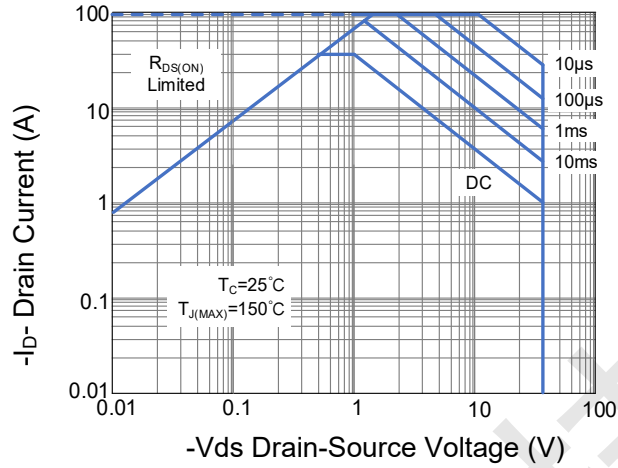


Figure 13 Safe Operation Area

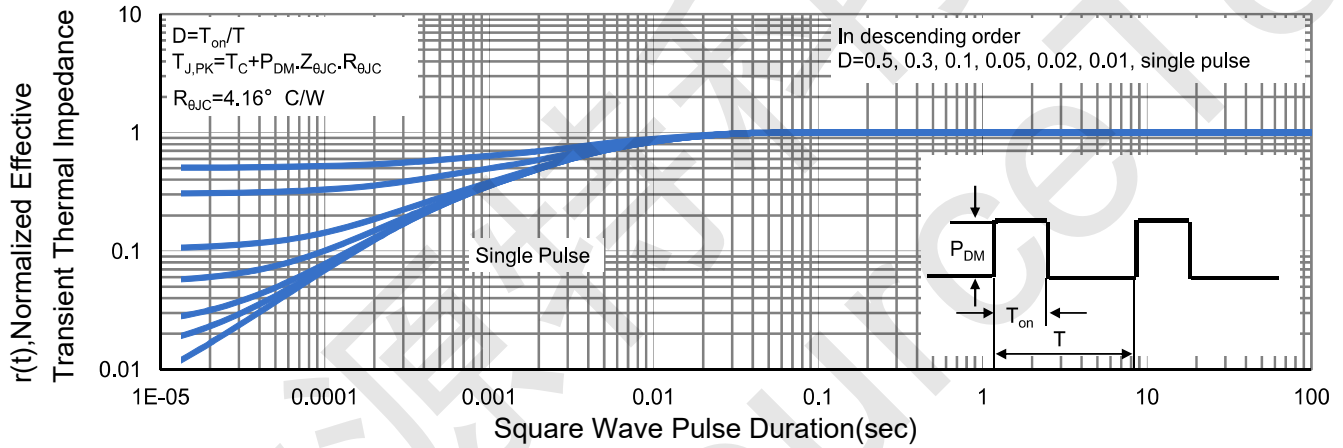
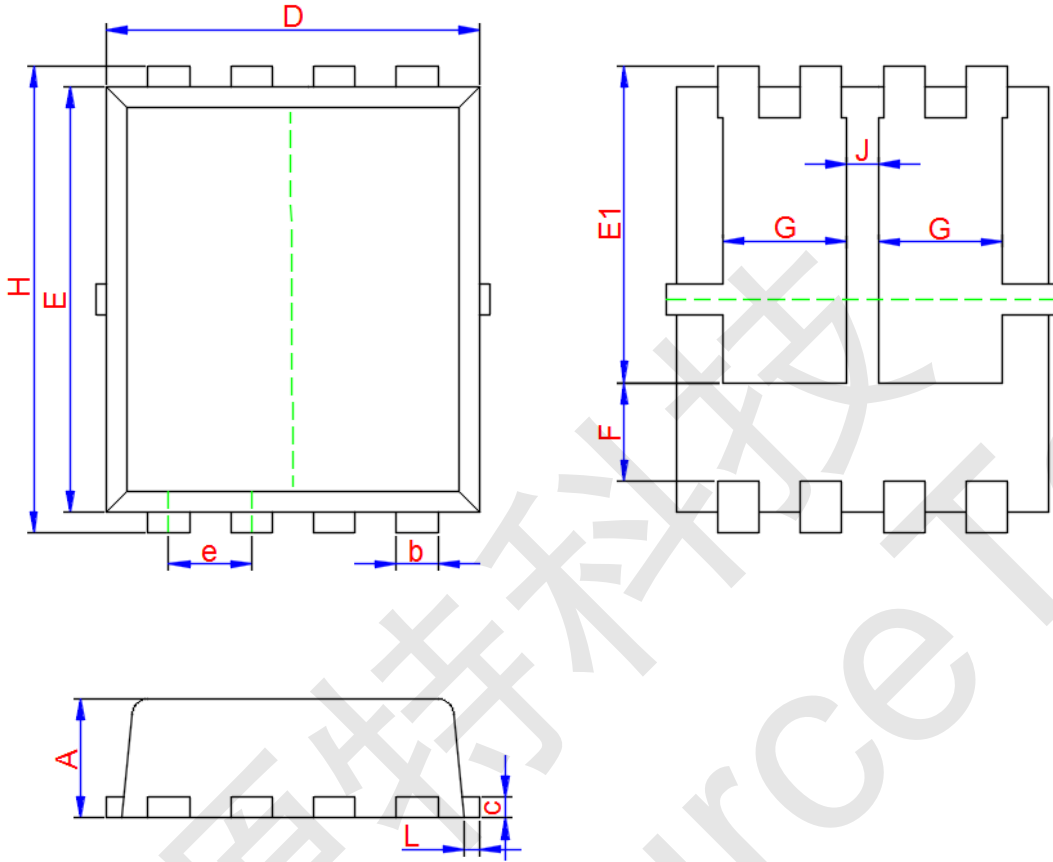


Figure 14 Normalized Maximum Transient Thermal Impedance



CST83G30F DFN5x6-8L Package Information



Symbol	Dimensions In Millimeters		
	Min.	Typ.	Max.
A	0.850	0.950	1.050
b	0.300 TYP.		
c	0.254 TYP.		
D	5.100	5.200	5.300
e	1.270 TYP.		
E	5.450	5.550	5.650
E1	3.900	4.100	4.300
F	1.090	1.290	1.490
G	1.500	1.700	1.900
H	5.850	6.050	6.250
J	0.400	0.600	0.800
L	0.150 MAX.		