



CSTS150P06G P-Ch 60V Fast Switching MOSFETs

CSTS150P06G Features

- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$

CSTS150P06G Product Summary

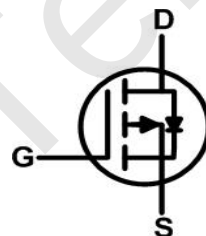
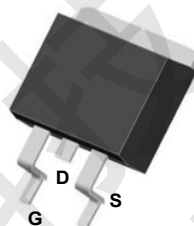


BVDSS	RDSON	ID
-60V	3.4 mΩ	-150A

CSTS150P06G Applications

- DC-DC Converters
- Power management functions
- Synchronous-rectification applications

CSTS150P06G TO263 Pin Configuration



CSTS150P06G Absolute Maximum Ratings ($T_C = 25^\circ\text{C}$ unless otherwise specified):

Symbol	Parameter		Value	Units
V _{DSS}	Drain-to-Source Voltage		-60	V
I _D	Continuous Drain Current	T _C = 25 °C	-150	A
	Continuous Drain Current	T _C = 100 °C	-91.7	A
I _{DM} ^{a1}	Pulsed Drain Current		-580	A
V _{GS}	Gate-to-Source Voltage		±20	V
E _{AS} ^{a2}	Single pulse avalanche energy		2058	mJ
P _D	Power Dissipation		183	W
T _J , T _{STG}	Operating Junction and Storage Temperature Range		150, −55 to 150	°C
T _L	Maximum Temperature for Soldering		260	°C

CSTS150P06G Thermal Characteristics:

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.68	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	60	$^\circ\text{C/W}$



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CSTS150P06G Electrical Characteristics (T_J= 25°C unless otherwise specified):

Static Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
V _{DSS}	Drain to Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	-60	--	--	V
I _{DSS}	Drain to Source Leakage Current	V _{DS} = -60V, V _{GS} = 0V	--	--	1	μA
I _{GSS(F)}	Gate to Source Forward Leakage	V _{GS} =-20V	--	--	100	nA
I _{GSS(R)}	Gate to Source Reverse Leakage	V _{GS} =+20V	--	--	-100	nA
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-2	-2.4	-2.8	V
R _{DS(ON)}	Drain-to-Source On-Resistance	V _{GS} =-10V, I _D =-20A	--	3.4	4.1	mΩ

Dynamic Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
C _{iss}	Input Capacitance	V _{GS} =0V V _{DS} =-30V f=1.0MHz	--	9123	--	pF
C _{oss}	Output Capacitance		--	1583	--	
C _{rss}	Reverse Transfer Capacitance		--	85.6	--	

Resistive Switching Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
t _{d(ON)}	Turn-on Delay Time	I _D =-10A, V _{DS} = -30V V _{GS} = -10V R _G = 3Ω	--	70	--	ns
t _r	Rise Time		--	45	--	
t _{d(OFF)}	Turn-Off Delay Time		--	165	--	
t _f	Fall Time		--	50	--	
Q _g	Total Gate Charge	V _{GS} =-10V V _{DS} =-30V I _D =-10A	--	135	--	nC
Q _{gs}	Gate Source Charge		--	28	--	
Q _{gd}	Gate Drain Charge		--	22.4	--	

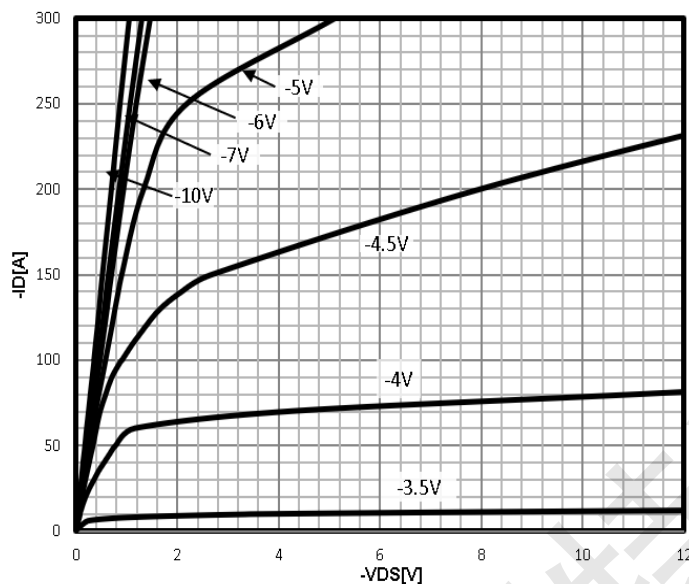
Source-Drain Diode Characteristics						
Symbol	Parameter	Test Conditions	Value			Units
			Min.	Typ.	Max.	
I _S	Diode Forward Current	T _C =25 °C	--	--	-150	A
V _{SD}	Diode Forward Voltage	I _S =-20A, V _{GS} =0V	--	--	-1.2	V
t _{rr}	Reverse Recovery time	I _S =-10A, V _{DD} =-30V dI/dt=100A/μs	--	45	--	ns
Q _{rr}	Reverse Recovery Charge		--	100	--	nC



CSTS150P06G Characteristics Curve:

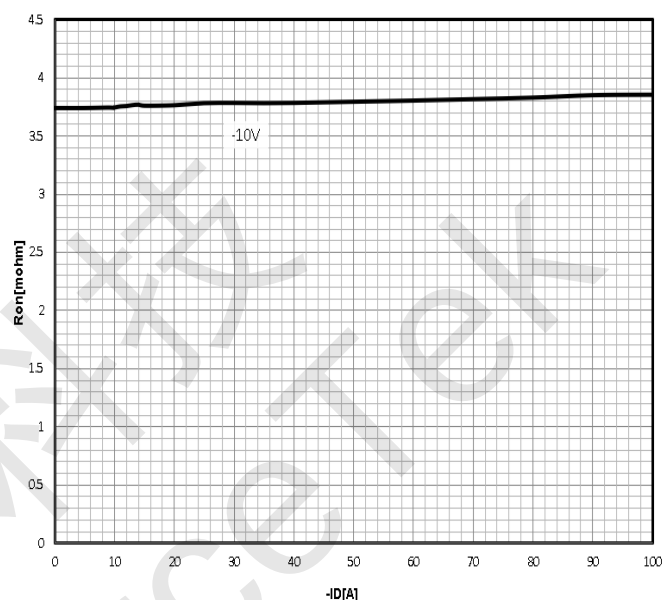
Typ. output characteristics

$$I_D = f(V_{DS})$$



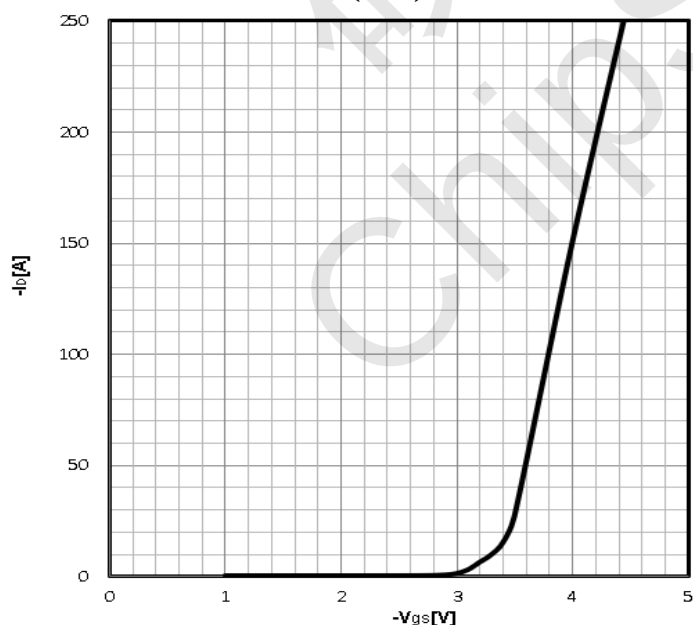
Typ. drain-source on resistance

$$R_{DS(on)} = f(I_D)$$



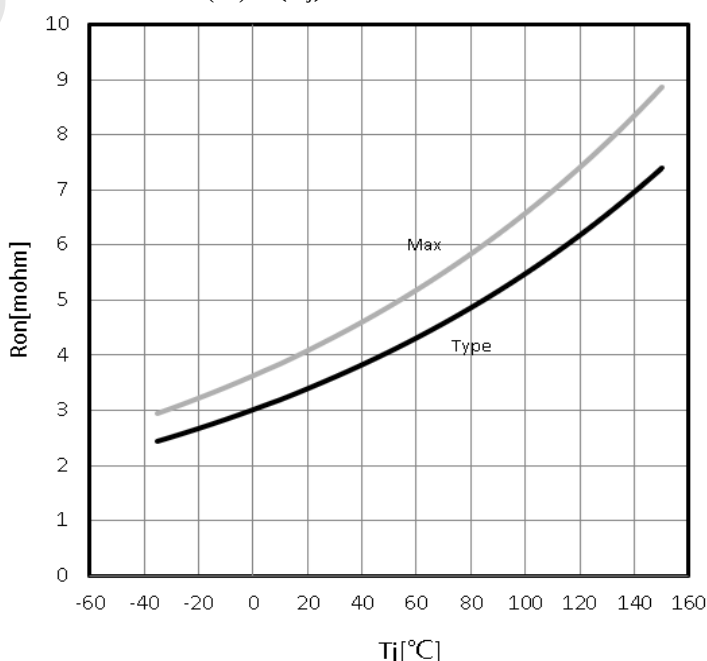
Typ. transfer characteristics

$$I_D = f(V_{GS})$$



Drain-source on-state resistance

$$R_{DS(on)} = f(T_j); I_D = -20A; V_{GS} = -10V$$

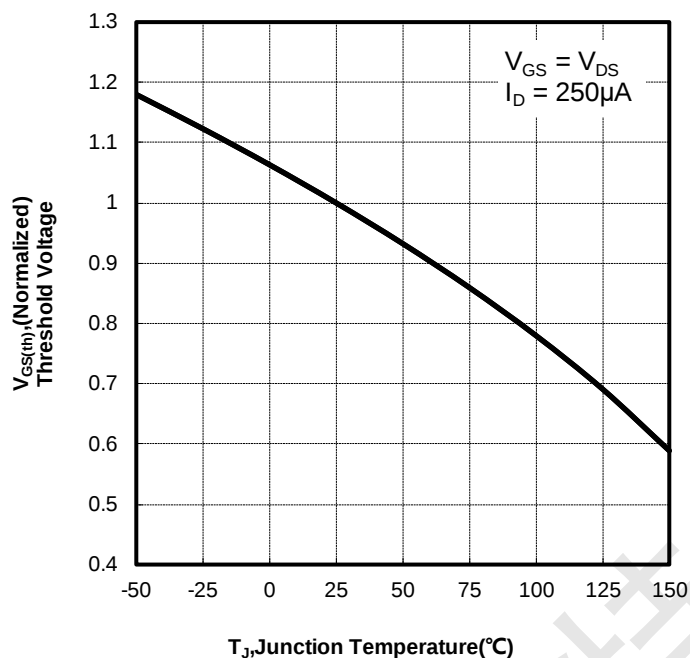




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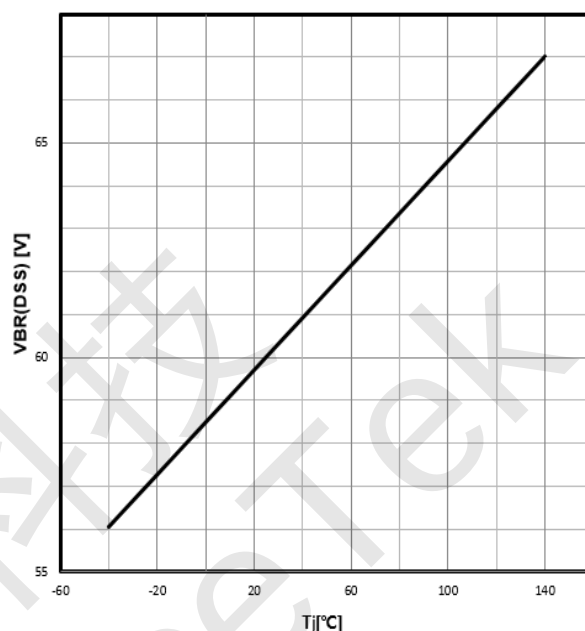
Gate Threshold Voltage

$-V_{TH}=f(T_j); I_D=-250\mu A$



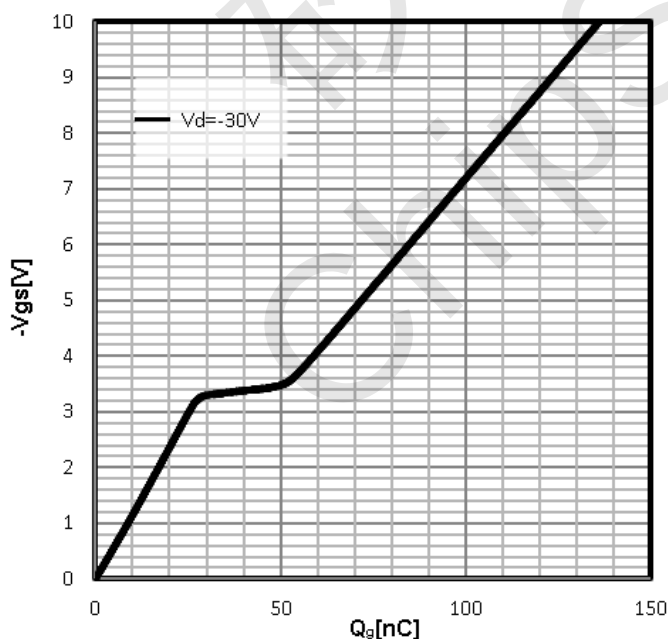
Drain-source breakdown voltage

$V_{BR(DSS)}=f(T_j); I_D=-250\mu A$



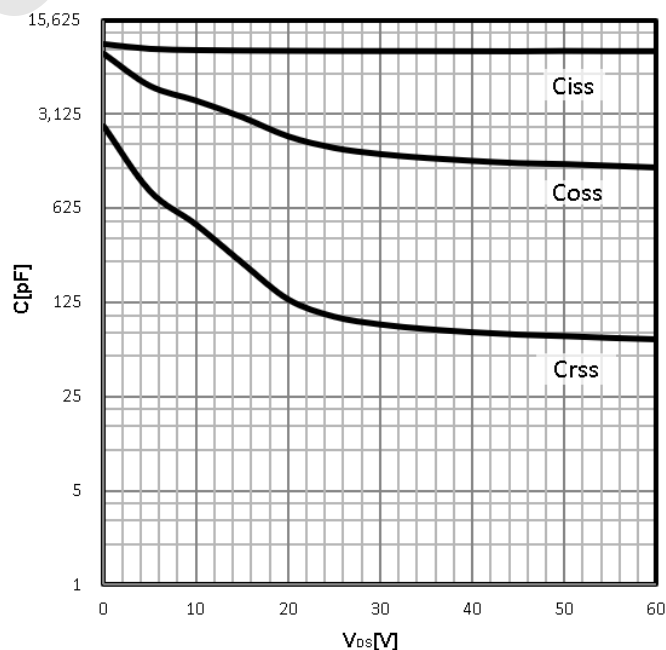
Typ. gate charge

$V_{GS}=f(Q_{gate}); I_D=-10A$



Typ. capacitances

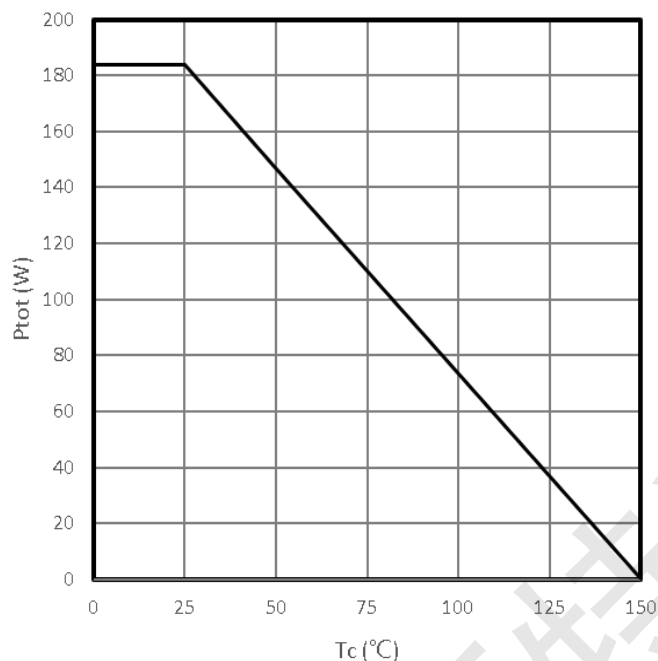
$C=f(V_{DS}); V_{GS}=0V; f=1MHz$



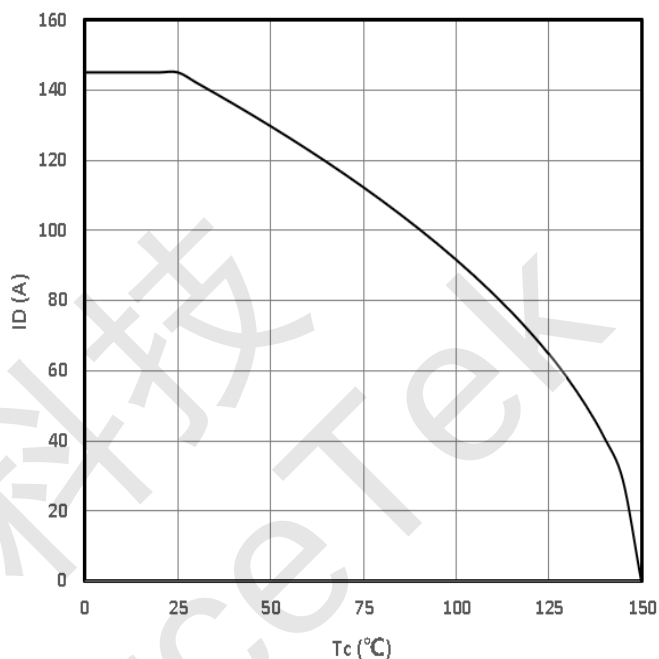


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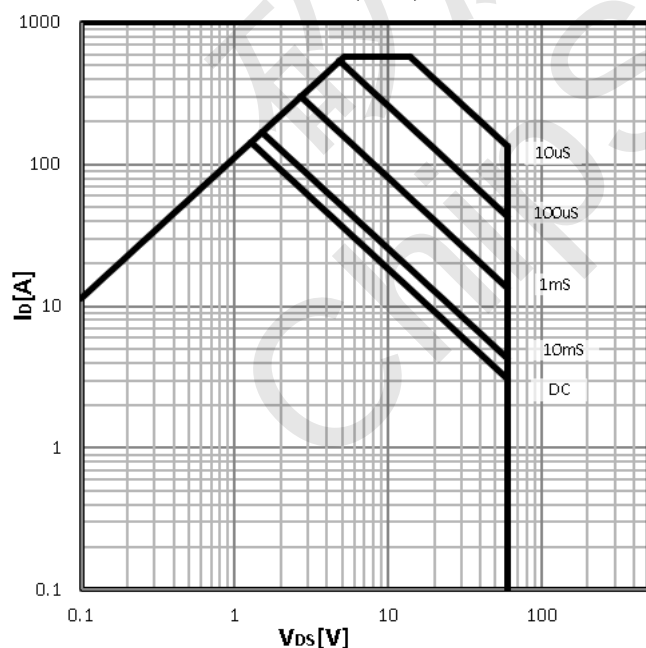
Power Dissipation
 $P_{tot}=f(T_C)$



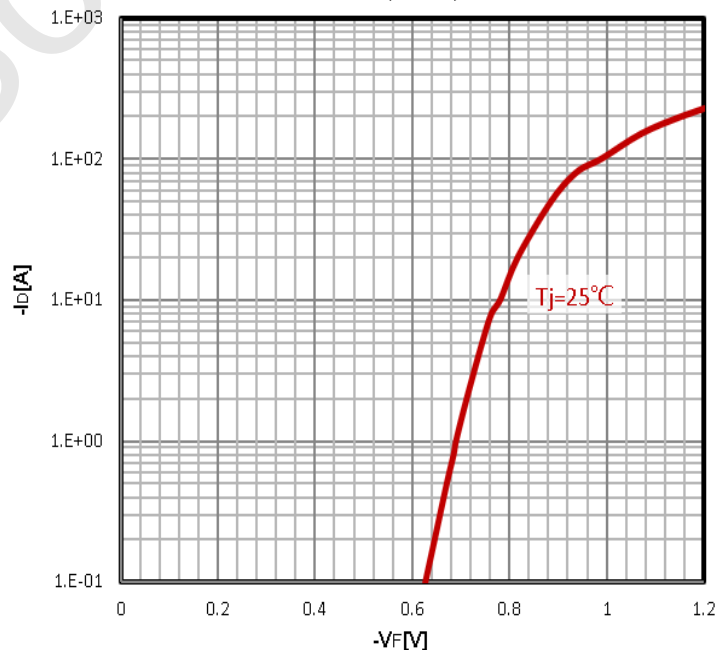
Maximum Drain Current
 $-I_D=f(T_C)$



Safe operating area
 $I_D=f(V_{DS})$



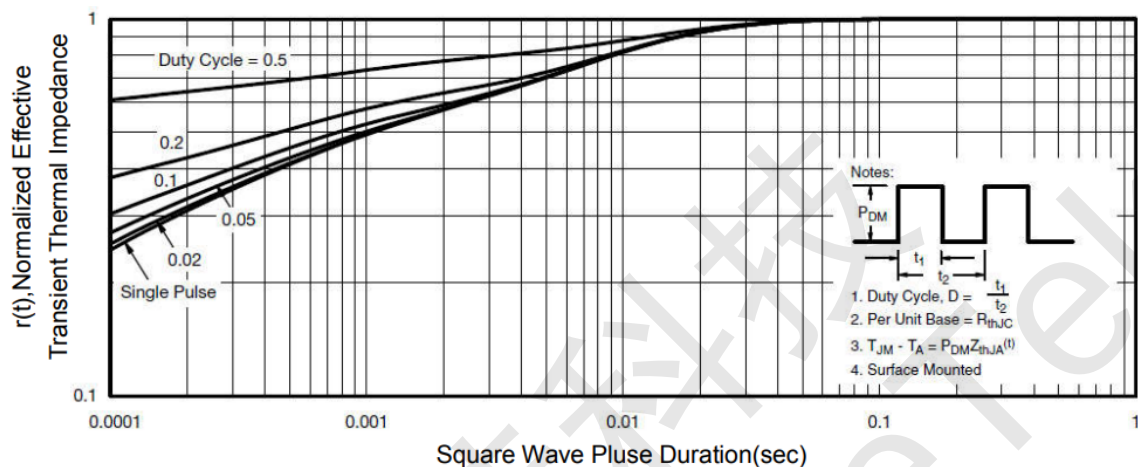
Body Diode Forward Voltage Variation
 $-I_F=f(-V_{DS})$





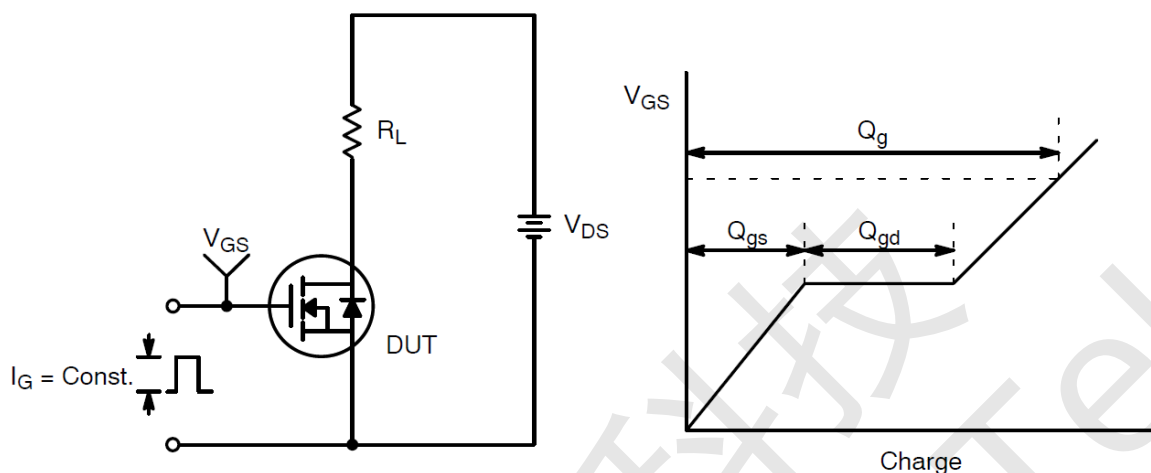
Max. transient thermal impedance

$$Z_{thJC}=f(t_p)$$

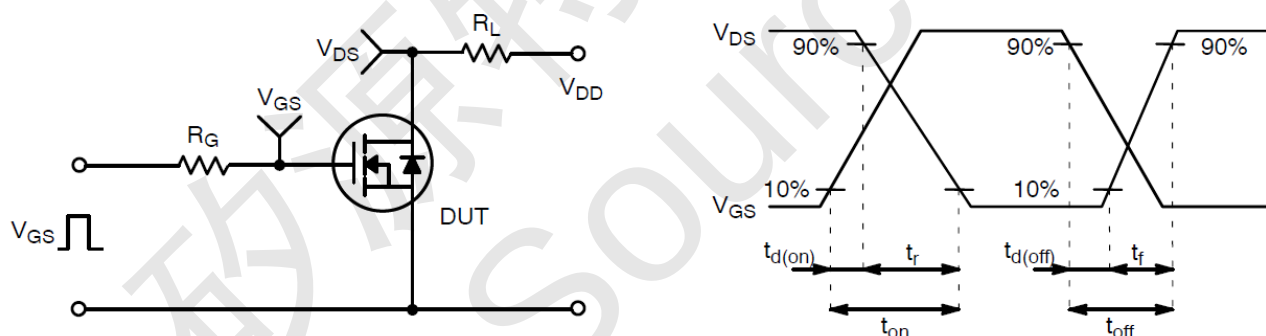




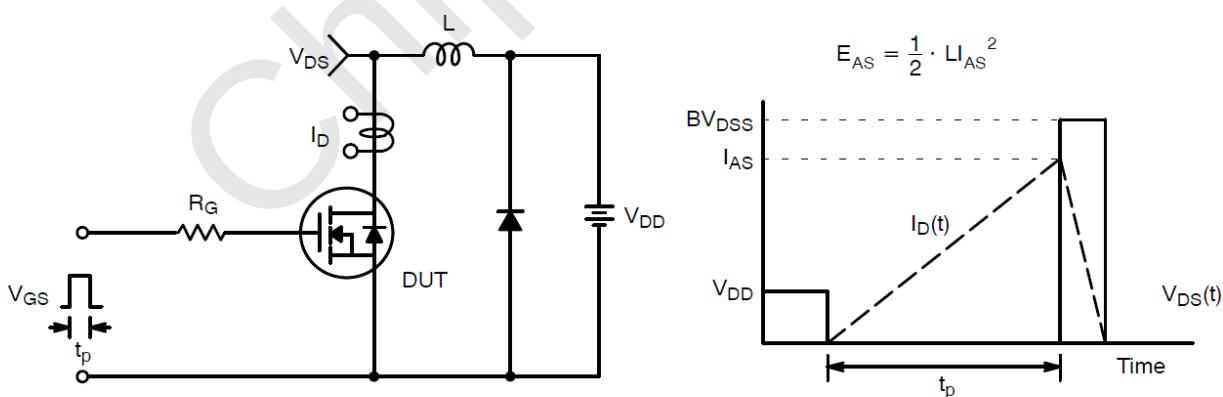
CSTS150P06G Test Circuit and Waveform:



Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

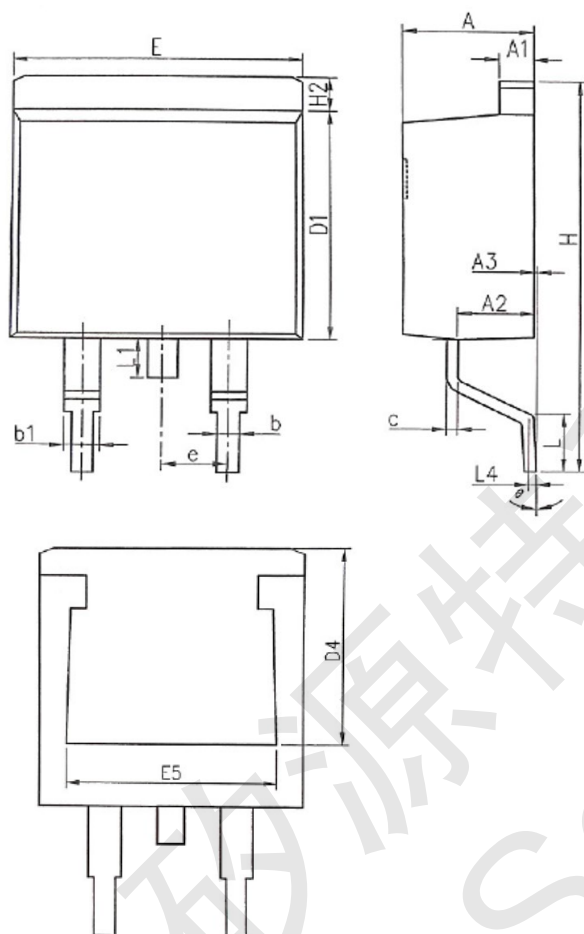


Unclamped Inductive Switching Test Circuit & Waveforms



CSTS150P06G Mechanical Dimensions for TO-263

COMMON DIMENSIONS



SYMBOL	MM	
	MIN	MAX
A	4.37	4.89
A1	1.17	1.42
A2	2.20	2.90
A3	0.00	0.25
b	0.70	0.96
b1	1.17	1.47
c	0.28	0.60
D1	8.45	9.30
D4	6.60	-
E	9.80	10.40
E5	7.06	-
e	2.54BSC	
H	14.70	15.70
H2	1.07	1.47
L	2.00	2.80
L1	-	1.75
L4	0.254BSC	
θ	0°	9°