



#### CST4606C Features

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

#### CST4606C Applications

- Power management in half bridge and inverters
- DC-DC Converter
- Load Switch

#### CST4606C General Description

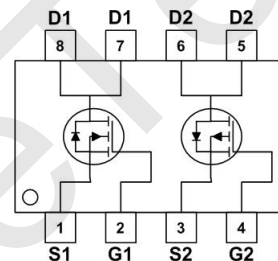
The CST4606C is the highest performance trench N-ch and P-ch MOSFETs with extreme high cell density , which provide excellent RDSON and gate charge for most of the synchronous buck converter applications .

The CST4606C meet the RoHS and Green Product requirement , 100% EAS guaranteed with full function reliability approved.

#### CST4606C Product Summary

BVDSS	RDSON	ID
20V	45mΩ	3A
-20V	80mΩ	- 3A

#### CST4606C SOP-8 Pin Configuration



#### CST4606C Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		N-Channel	P-Channel	
$V_{DS}$	Drain-Source Voltage	20	-20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	$\pm 12$	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	3.0	-3	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	2.0	-2	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	12	-10	A
$P_D@T_C=25^\circ C$	Total Power Dissipation <sup>4</sup>	2.5	2.08	W
$T_{STG}$	Storage Temperature Range	-55 to 150	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	-55 to 150	$^\circ C$

#### CST4606C Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup>	---	105	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	50	$^\circ C/W$



#### CST4606C Electrical Characteristics (T<sub>J</sub>=25 °C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	20	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V,	-	-	1.0	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±12V	-	-	±100	nA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.4	0.7	1.0	V
R <sub>DS(on)</sub>	Static Drain-Source on-Resistance note2	V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A	-	4	55	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =2A	-	62	85	
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1.0MHz	-	184	-	pF
C <sub>oss</sub>	Output Capacitance		-	38	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	28	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =10V, I <sub>D</sub> =3A, V <sub>GS</sub> =4.5V	-	2.7	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	0.4	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	0.5	-	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =10V, I <sub>D</sub> =3A, R <sub>GEN</sub> =3Ω, V <sub>GS</sub> =4.5V	-	8	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	27	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	26	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	33	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	3	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	12	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =3A	-	-	1.2	V

Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 0.5%



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Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> = -250μA	-20	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V,	-	-	-1	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±12V	-	-	±100	nA
<b>On Characteristics</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA	-0.4	-0.7	-1.0	V
R <sub>DS(on)</sub>	Static Drain-Source on-Resistance <small>note2</small>	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -2.5A	-	80	104	mΩ
		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -1.5A	-	110	154	
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = -10V, V <sub>GS</sub> = 0V, f = 1.0MHz	-	248	-	pF
C <sub>oss</sub>	Output Capacitance		-	42	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	31	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> = -10V, I <sub>D</sub> = -2.5A, V <sub>GS</sub> = -4.5V	-	2.9	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	0.45	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	0.75	-	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> = -10V, R <sub>L</sub> =5Ω, R <sub>GEN</sub> =3Ω, V <sub>GS</sub> =-4.5V,	-	9.8	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	4.9	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	20.5	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	7	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	-3.0	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-10	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> = 0V, I <sub>S</sub> = -2.5A	-	-	-1.2	V

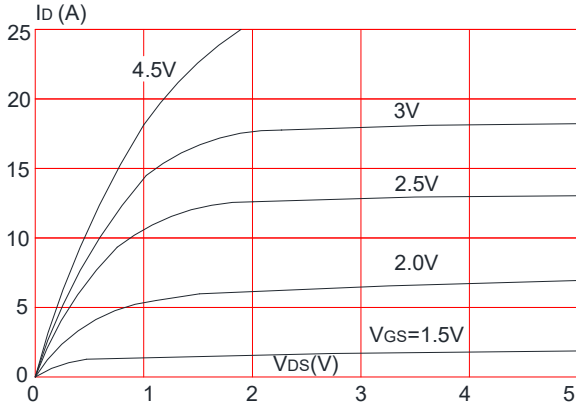
Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

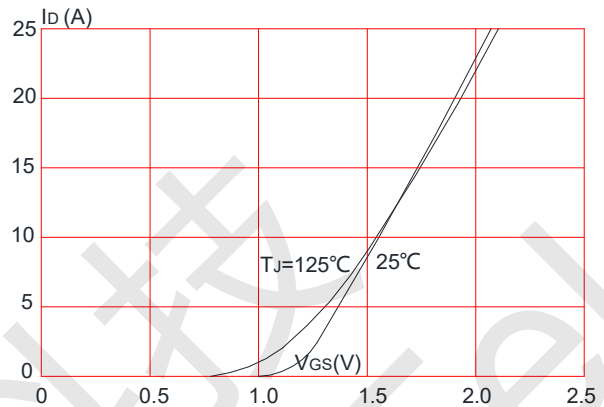


#### CST4606C N-Channel Typical Characteristics

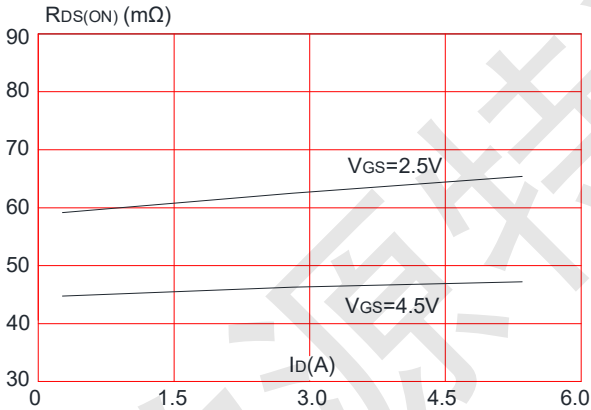
**Figure 1:** Output Characteristics



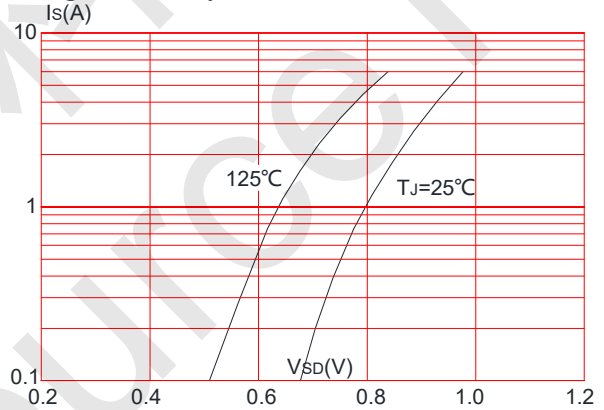
**Figure 2:** Typical Transfer Characteristics



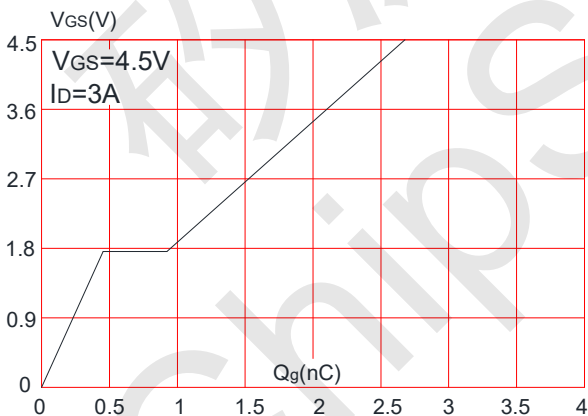
**Figure 3:** On-resistance vs. Drain Current



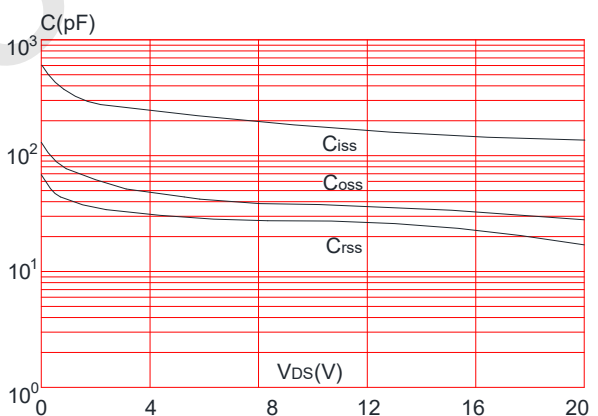
**Figure 4:** Body Diode Characteristics



**Figure 5:** Gate Charge Characteristics



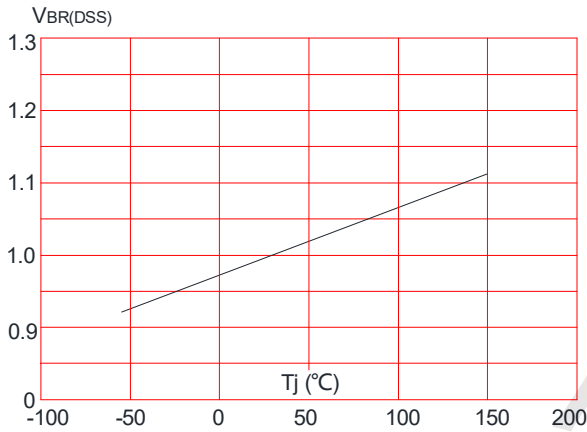
**Figure 6:** Capacitance Characteristics



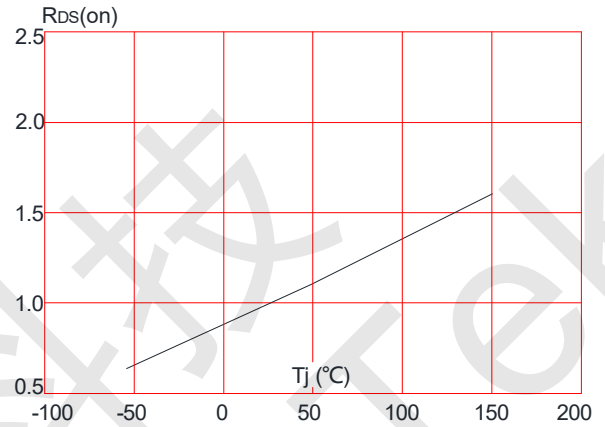


#### CST4606C N-Channel Typical Characteristics

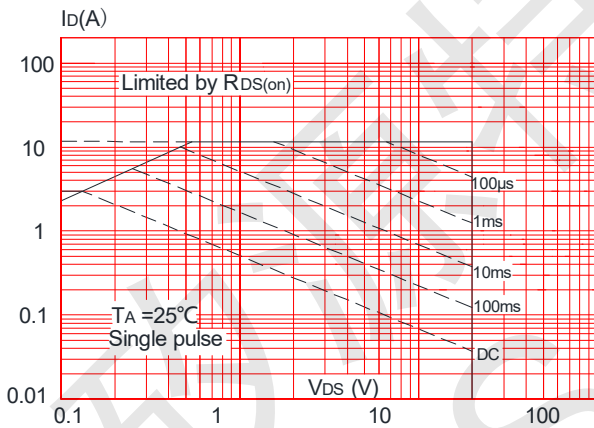
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



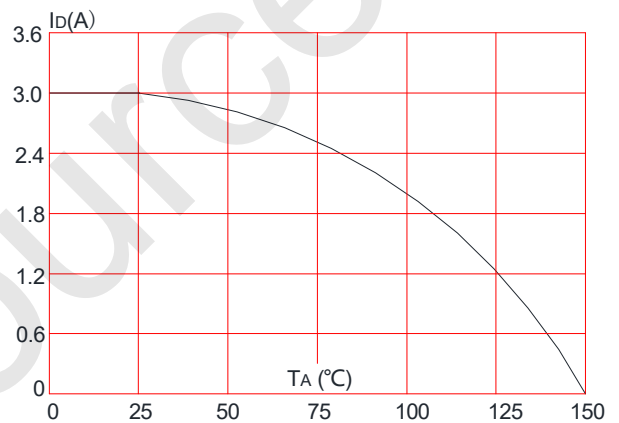
**Figure 8:** Normalized on Resistance vs. Junction Temperature



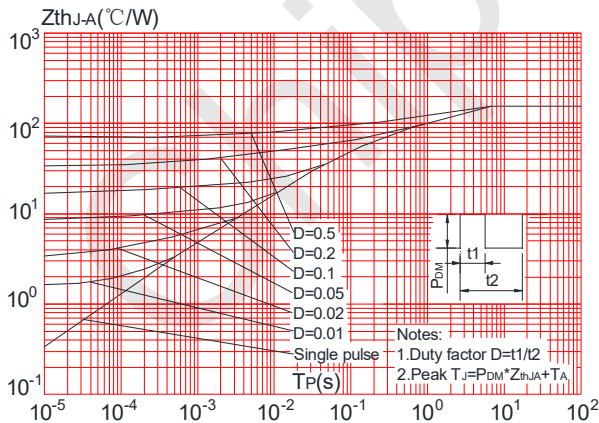
**Figure 9:** Maximum Safe Operating Area



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



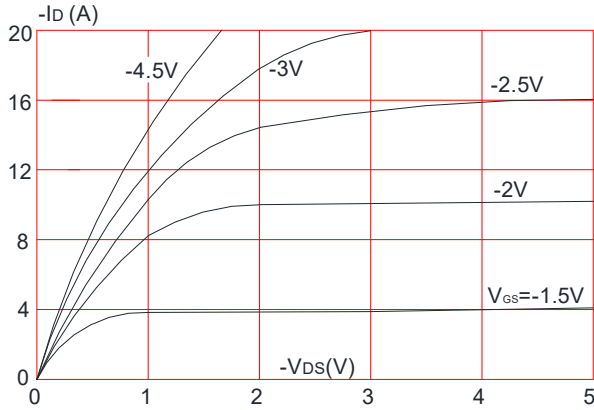
**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



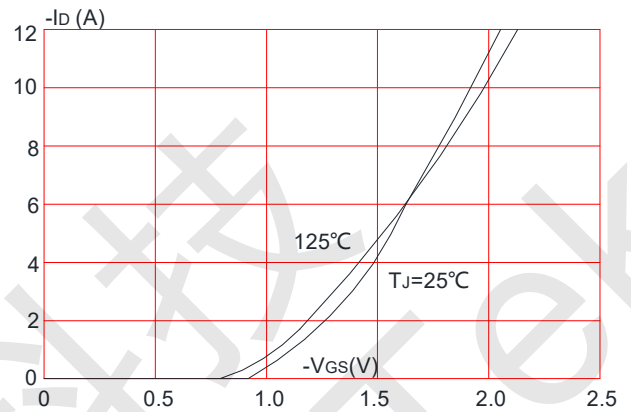


#### CST4606C P-Channel Typical Characteristics

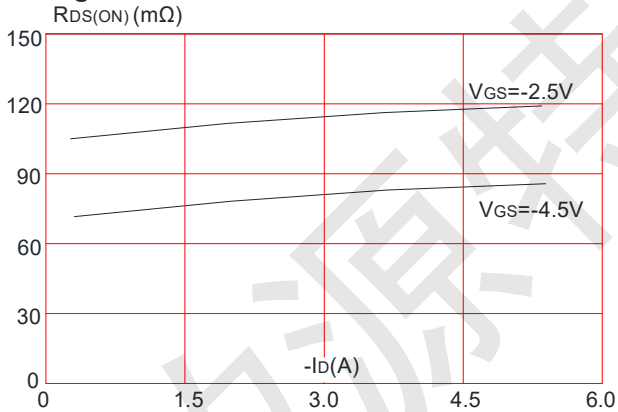
**Figure 1:** Output Characteristics



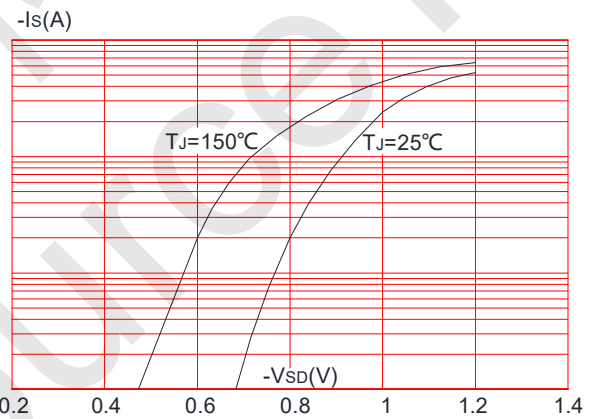
**Figure 2:** Typical Transfer Characteristics



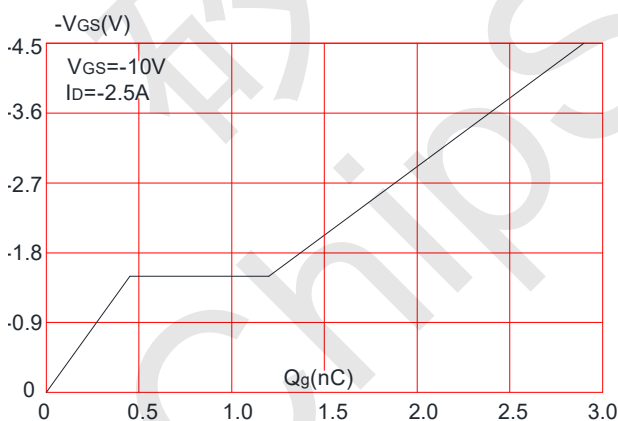
**Figure 3:** On-resistance vs. Drain Current



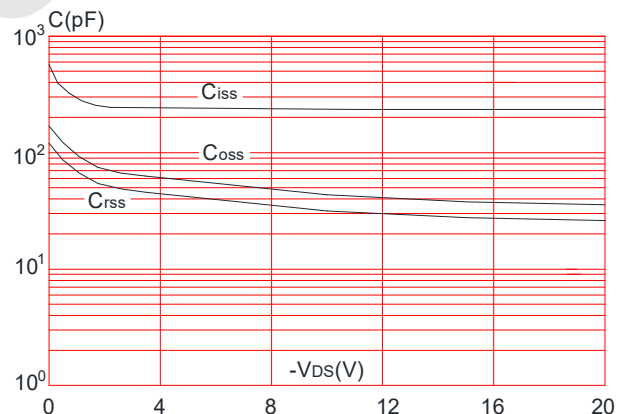
**Figure 4:** Body Diode Characteristics



**Figure 5:** Gate Charge Characteristics



**Figure 6:** Capacitance Characteristics

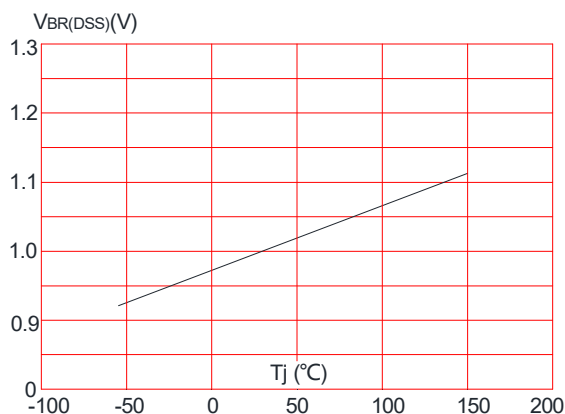




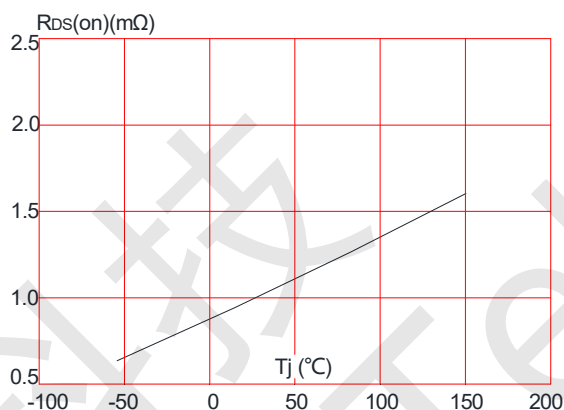


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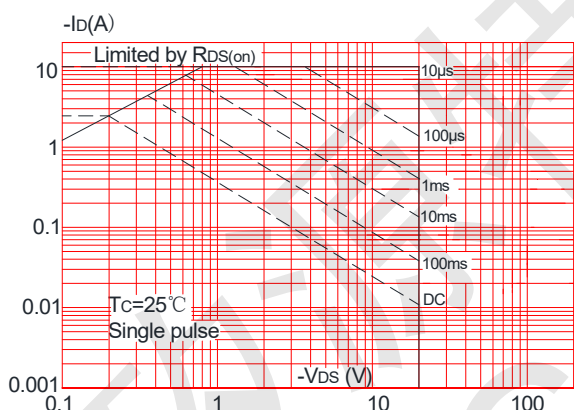
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



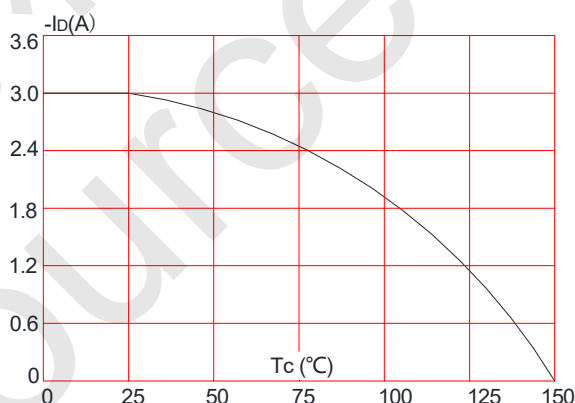
**Figure 8:** Normalized on Resistance vs. Junction Temperature



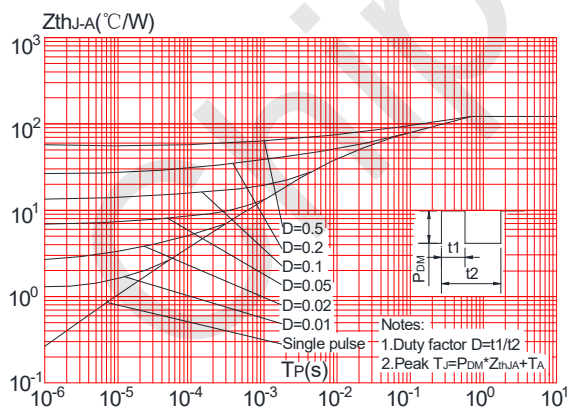
**Figure 9:** Maximum Safe Operating Area



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

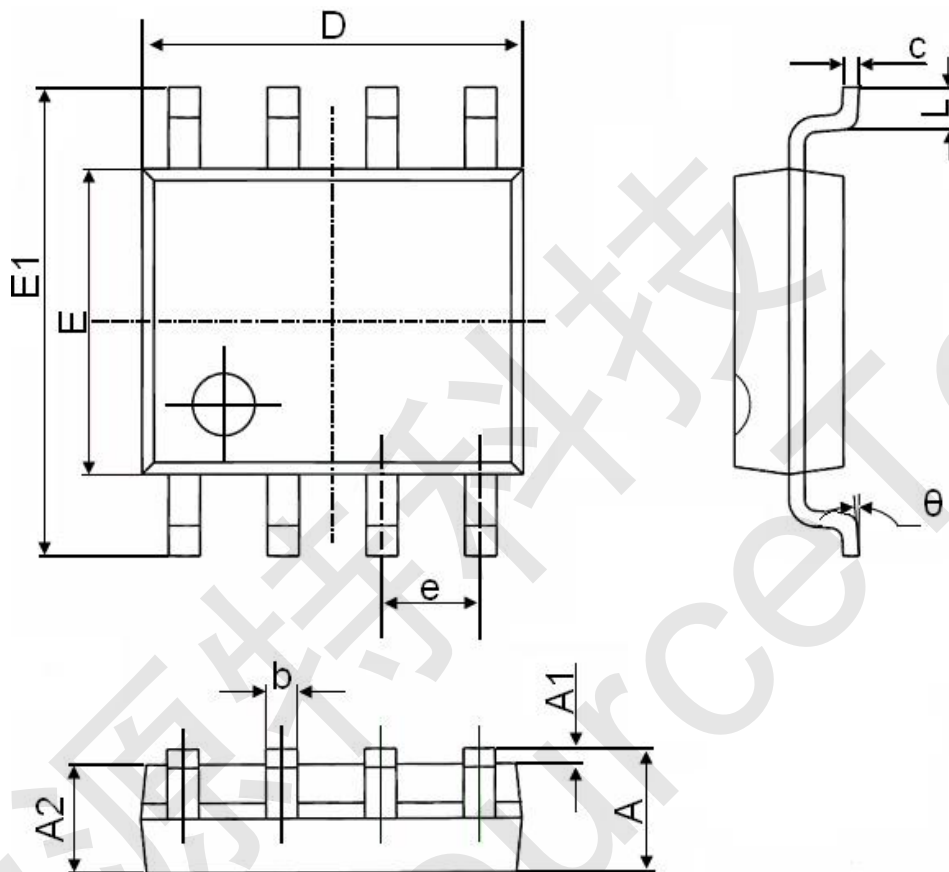


**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient





CST4606C SOP-8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
theta	0°	8°	0°	8°