



### CST5P04L P-Ch 40V Fast Switching MOSFETs

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

#### CST5P04L Product Summary

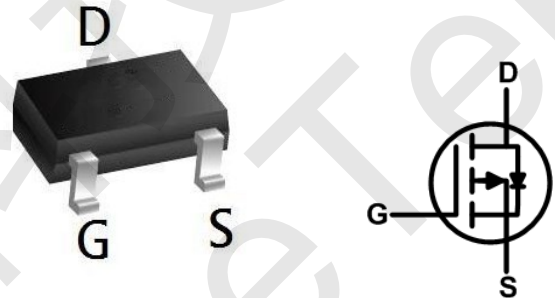


BVDSS	RDS(on)	ID
-40V	45mΩ	-5 A

#### CST5P04L Description

The CST5P04L is the high cell density trenched P-ch MOSFETs, which provides excellent RDS(on) and efficiency for most of the small power switching and load switch applications. The CST5P04L meet the RoHS and Green Product requirement with full function reliability approved.

#### CST5P04L SOT 23 -3L Pin Configurations



#### CST5P04L Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	-40	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub> @T <sub>A</sub> =25°C	Continuous Drain Current	-5	A
I <sub>D</sub> @T <sub>A</sub> =70°C	Continuous Drain Current	-3.6	A
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	-22	A
P <sub>D</sub> @T <sub>A</sub> =25°C	Total Power Dissipation <sup>3</sup>	2.0	W
P <sub>D</sub> @T <sub>A</sub> =70°C	Total Power Dissipation <sup>3</sup>	1.5	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

#### CST5P04L Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction-Ambient <sup>1</sup>	---	65	°C/W
R <sub>θJA</sub>	Thermal Resistance Junction-Ambient <sup>1</sup> (t ≤ 10s)	---	48	°C/W



#### CST5P04L 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	-40	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = -40V, 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> = ±20V	-	-	±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	-1.0	-1.6	-2.5	V
R <sub>DS(on)</sub>	Static Drain-Source on-Resistance Note2	V <sub>GS</sub> = -10V, I <sub>D</sub> = -5A	-	45	54	mΩ
		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -4A	-	60	85	
<b>Dynamic Characteristics</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = -20V, V <sub>GS</sub> =0V, f=1.0MHz	-	869	-	pF
C <sub>oss</sub>	Output Capacitance		-	94	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	69	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> = -20V, I <sub>D</sub> = -4A, V <sub>GS</sub> = -10V	-	17.3	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	3.2	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	4.3	-	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> = -20V, I <sub>D</sub> = -4A, V <sub>GS</sub> = -10V, R <sub>GEN</sub> =3Ω	-	10.3	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	4.3	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	39	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	46.5	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	-5.0	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-22	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> = -5.5A	-	-0.8	-1.2	V
t <sub>rr</sub>	Reverse Recovery Time	V <sub>GS</sub> =0V, I <sub>S</sub> = -5.5A, di/dt=100A/μs	-	17	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge		-	11.5	-	nC

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

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



## CST5P04L Typical Performance Characteristics

Figure 1: Output Characteristics

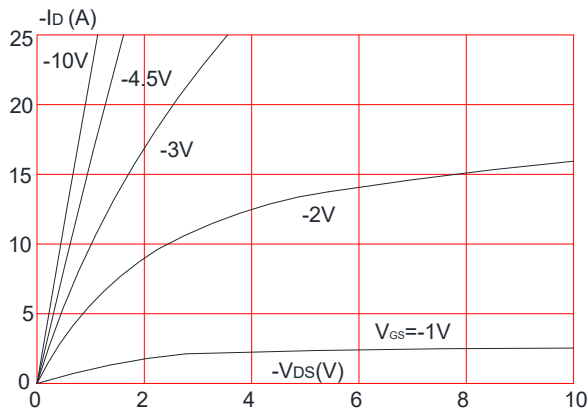


Figure 2: Typical Transfer Characteristics

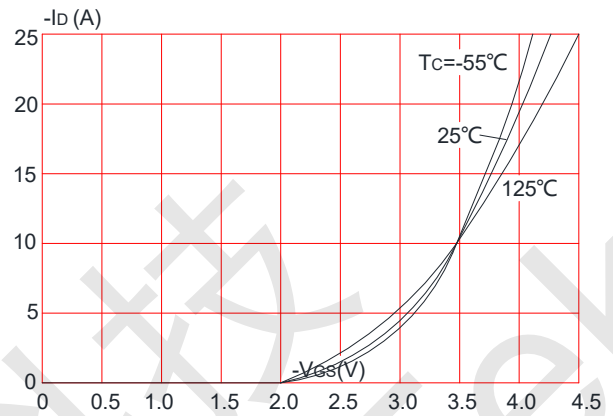


Figure 3: On-resistance vs. Drain Current

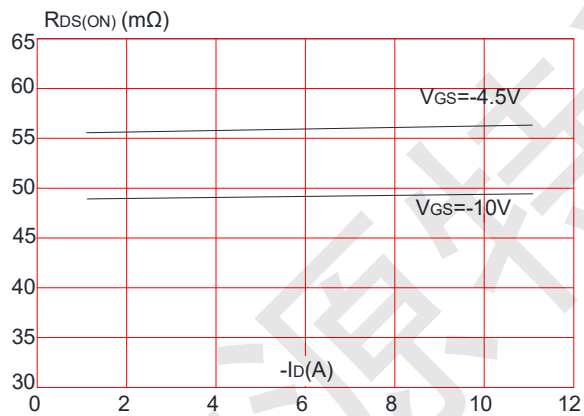


Figure 4: Body Diode Characteristics

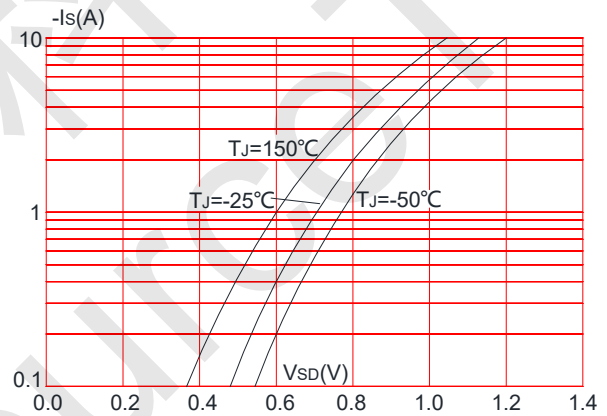


Figure 5: Gate Charge Characteristics

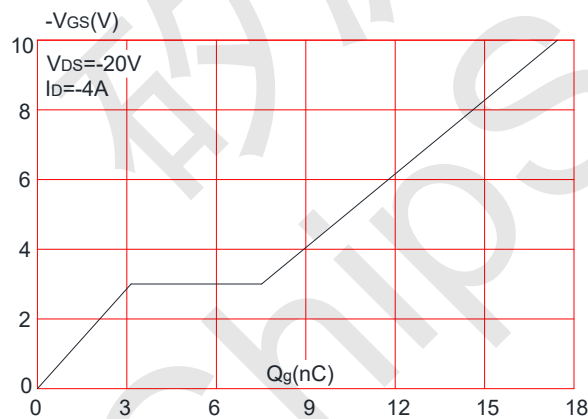
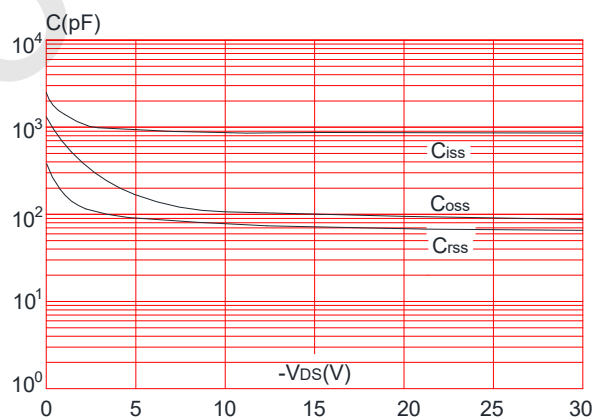


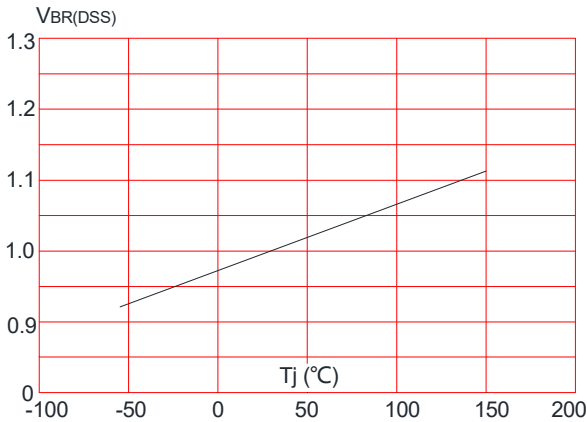
Figure 6: Capacitance Characteristics



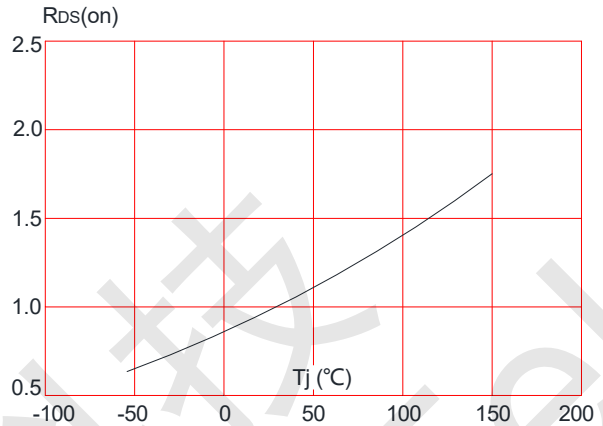


### CST5P04L P-Ch 40V Fast Switching MOSFETs

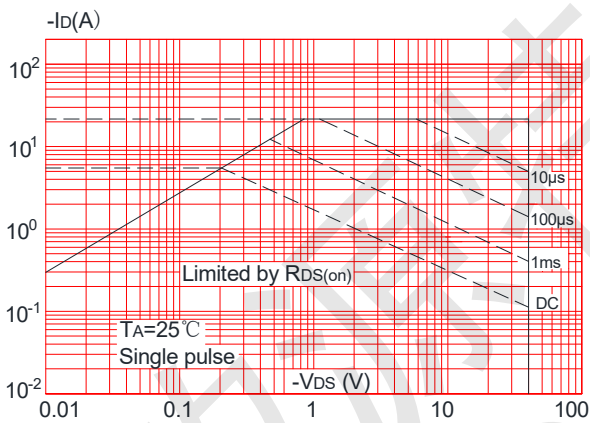
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



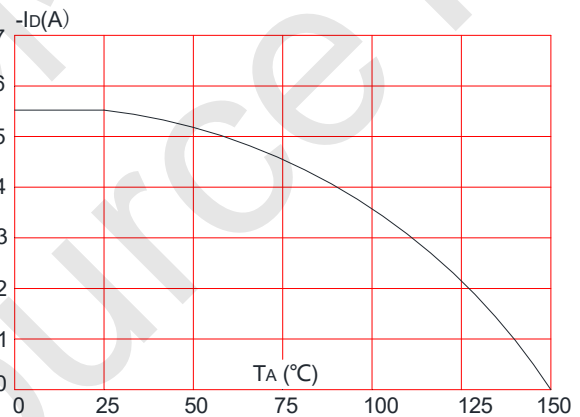
**Figure 8:** Normalized on Resistance vs. Junction Temperature



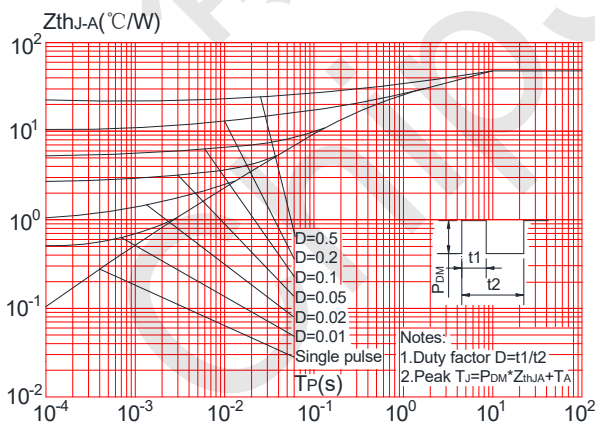
**Figure 9:** Maximum Safe Operating Area



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

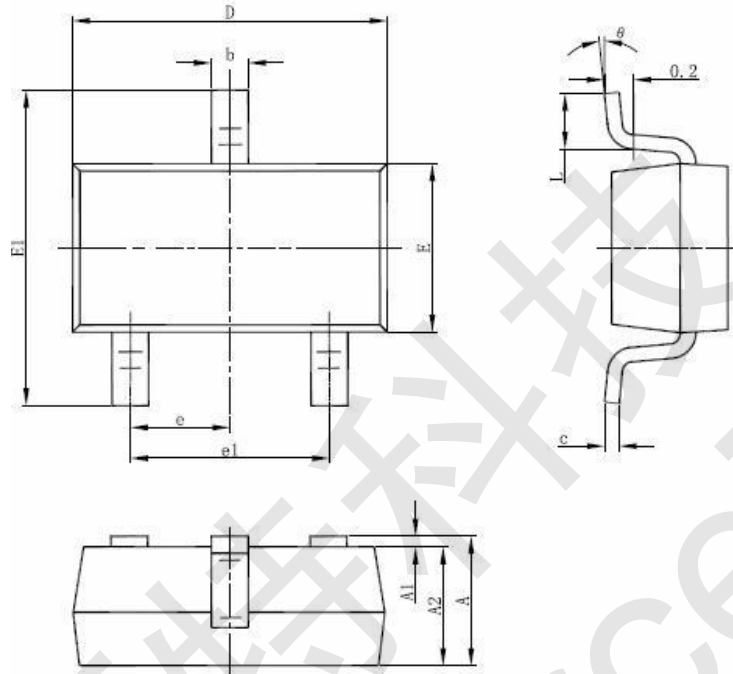


**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient





CST5P04L Package Mechanical Data-SOT-23-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
theta	0°	8°	0°	8°