



### CST3415E P-Ch 20V Fast Switching MOSFETs

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

#### CST3415E Product Summary



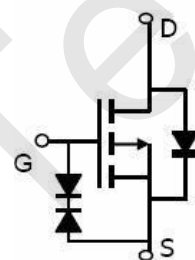
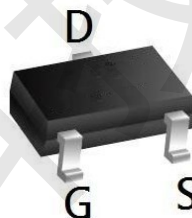
BVDSS	RDSON	ID
-20V	29mΩ	-5.0A

#### CST3415E Description

The CST3415E is the high cell density trenched P-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The CST3415E meet the RoHS and Green Product requirement with full function reliability approved. ESD Rating: 2500V HBM

#### CST3415E SOT23 Pin Configuration



#### CST3415E Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		10s	Steady State	
$V_{DS}$	Drain-Source Voltage	-20		V
$V_{GS}$	Gate-Source Voltage	$\pm 10$		V
$I_D@T_A=25^{\circ}C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-5.	-4.	A
$I_D@T_A=70^{\circ}C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-4.	-3.7	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	-18		A
$P_D@T_A=25^{\circ}C$	Total Power Dissipation <sup>3</sup>	1.32	1	W
$T_{STG}$	Storage Temperature Range	-55 to 150		$^{\circ}C$
$T_J$	Operating Junction Temperature Range	-55 to 150		$^{\circ}C$

#### CST3415E Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup>	---	125	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup> (t $\leq 10s$ )	---	95	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	80	$^{\circ}C/W$



### CST3415E P-Ch 20V Fast Switching MOSFETs

#### CST3415E Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
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> = ±10V	-	-	±10	uA
On Characteristics						
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> = -4A	-	29	40	mΩ
		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -3A	-	40	56	
Dynamic Characteristics <span>www.power-mos.com</span>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = -10V, V <sub>GS</sub> = 0V, f = 1.0MHz	-	289	-	pF
C <sub>oss</sub>	Output Capacitance		-	98	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	22	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> = -10V, I <sub>D</sub> = -4.1A, V <sub>GS</sub> = -4.5V	-	9	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	1	-	nC
Q <sub>gd</sub>	Gate-Drain(“Miller”) Charge		-	2.6	-	nC
Switching Characteristics						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> = -10V, R <sub>G</sub> = 1Ω, V <sub>GEN</sub> =-4.5V, R <sub>L</sub> =1.2Ω	-	12	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	35	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	30	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	10	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	-4.1	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-16.4	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> = 0V, I <sub>S</sub> = -4.1A	-	-	-1.2	V

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

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



## CST3415E Typical Performance Characteristics

Figure1: Output Characteristics

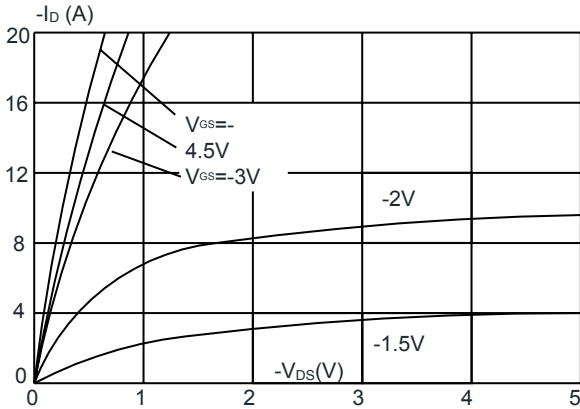


Figure 2: Typical Transfer Characteristics

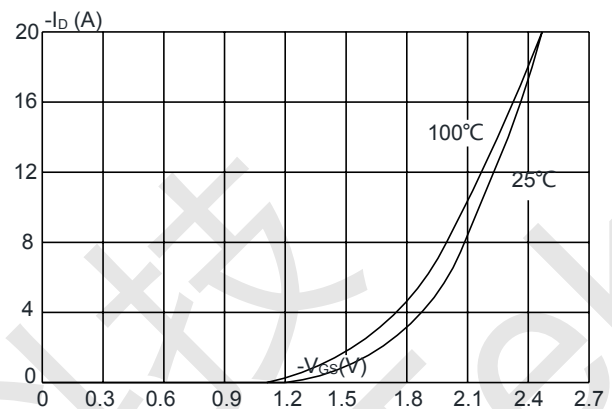


Figure 3: On-resistance vs. Drain Current

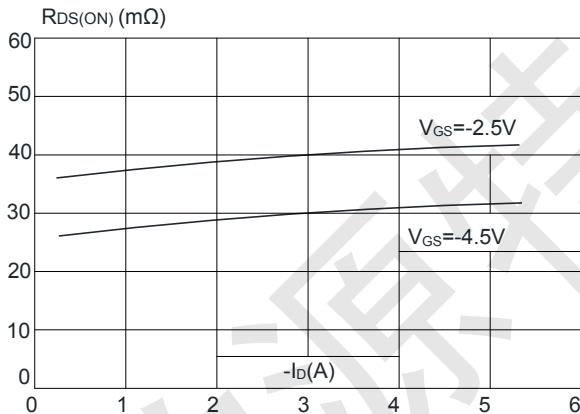


Figure 4: Body Diode Characteristics

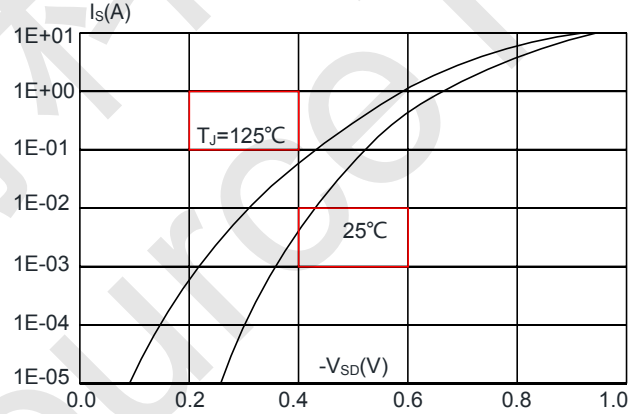


Figure 5: Gate Charge Characteristics

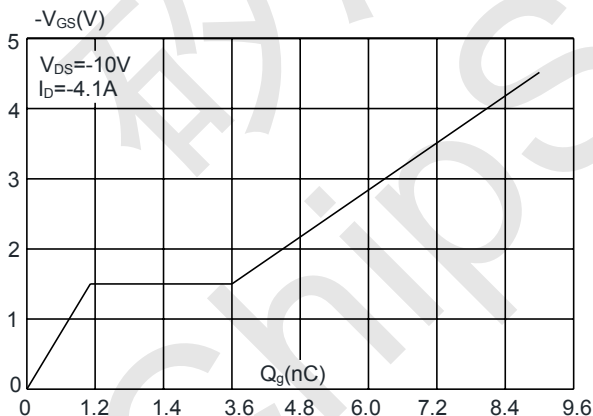
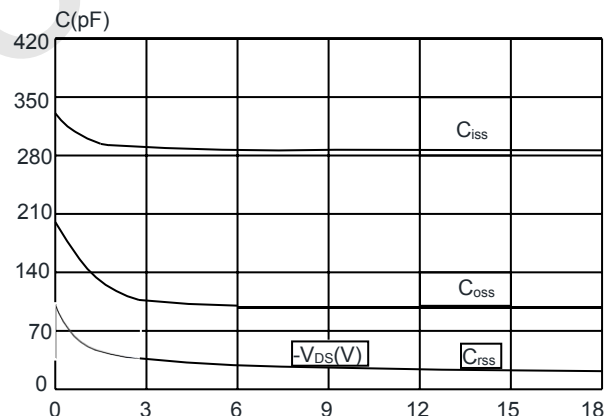


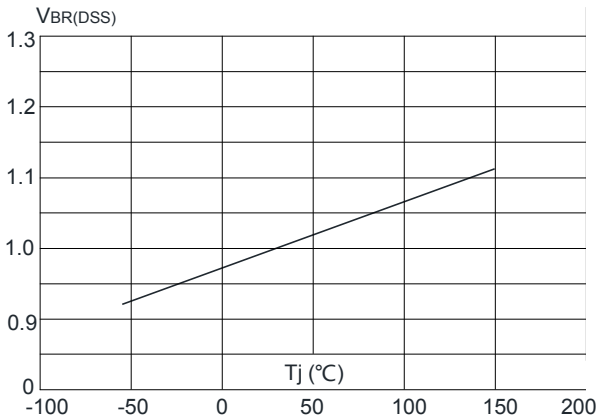
Figure 6: Capacitance Characteristics



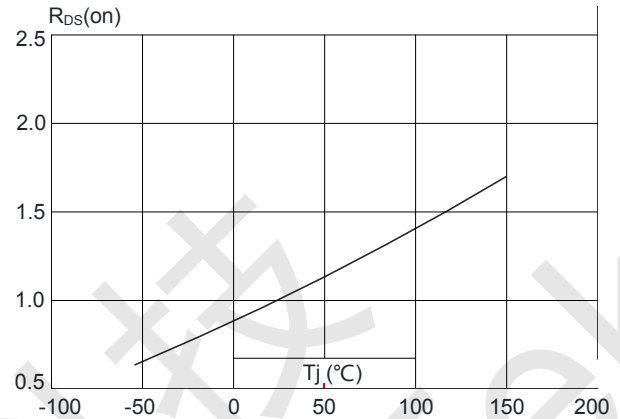


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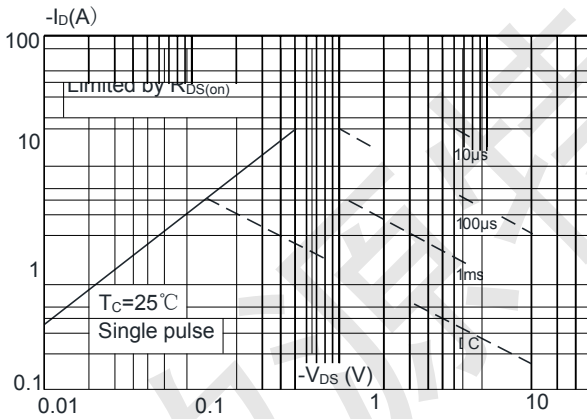
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



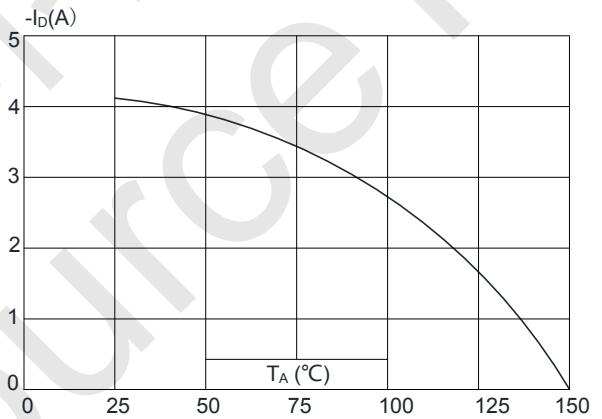
**Figure 8:** Normalized on Resistance vs. Junction Temperature



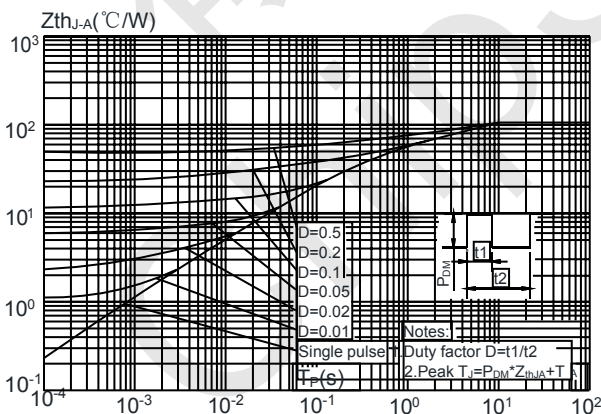
**Figure 9:** Maximum Safe Operating Area



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

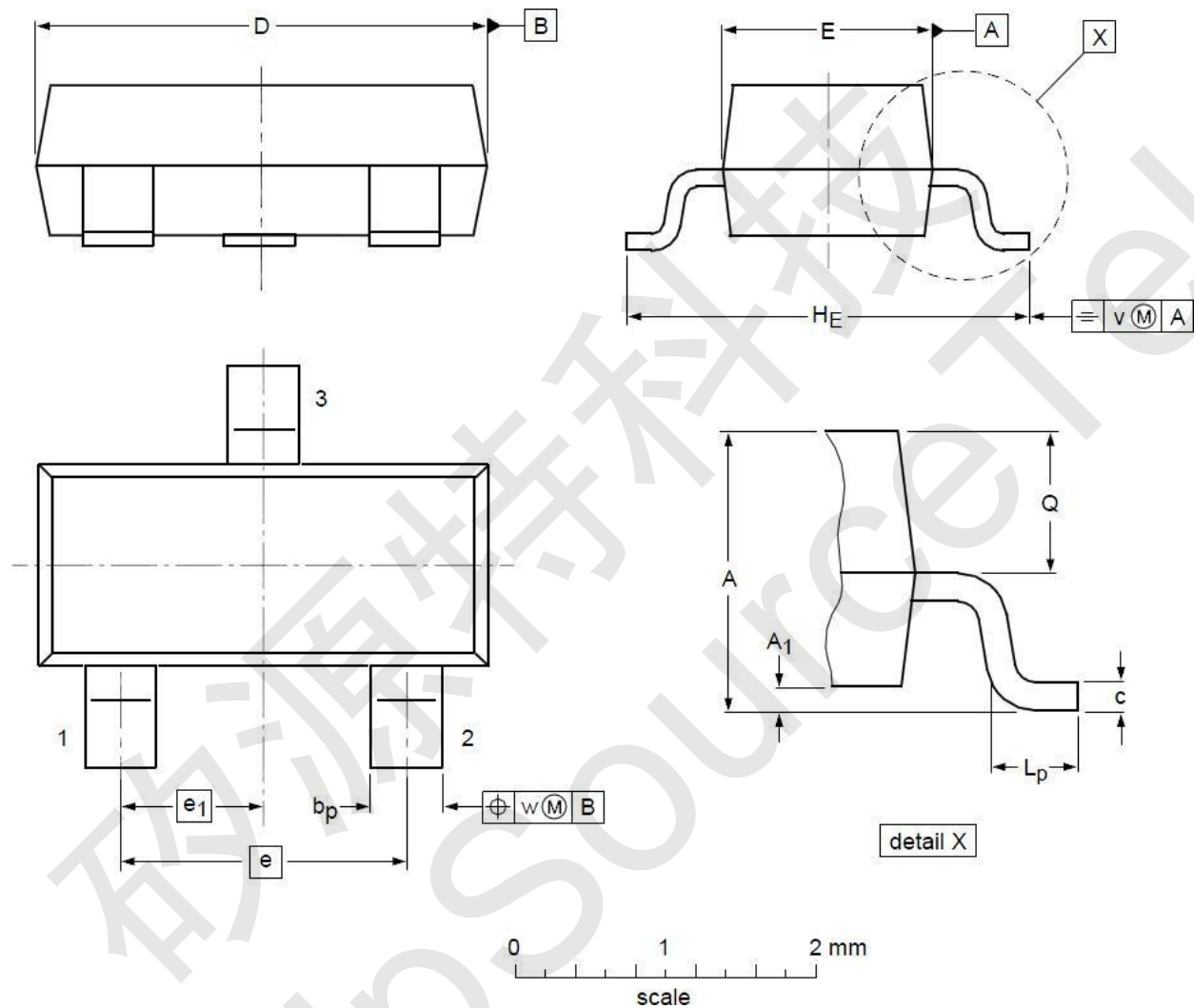


**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient





CST3415E SOT23 Mechanical Data



DIMENSIONS ( unit : mm )

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.90	1.01	1.15	A <sub>1</sub>	0.01	0.05	0.10
b <sub>p</sub>	0.30	0.42	0.50	c	0.08	0.13	0.15
D	2.80	2.92	3.00	E	1.20	1.33	1.40
e	--	1.90	--	e <sub>1</sub>	--	0.95	--
H <sub>E</sub>	2.25	2.40	2.55	L <sub>p</sub>	0.30	0.42	0.50
Q	0.45	0.49	0.55	v	--	0.20	--
w	--	0.10	--				