

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

Product Summary



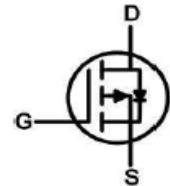
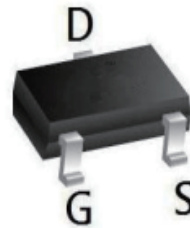
BVDSS	RDS(on)	ID
-20V	28mΩ	-5A

Description

The 3415A is the high cell density trenched p-ch MOSFETs, which provide excellent RDS(on) and gate charge for most of the synchronous buck converter applications.

The 3415A meet the RoHS and Green Product requirement with full function reliability approved.

SOT23 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V <sub>DS</sub>	Drain-Source Voltage	-20	V
V <sub>GS</sub>	Gate-Source Voltage	±12	V
I <sub>D</sub> @T <sub>A</sub> =25°C	Continuous Drain Current, V <sub>GS</sub> @ -4.5V <sup>1</sup>	-5	A
I <sub>D</sub> @T <sub>A</sub> =70°C	Continuous Drain Current, V <sub>GS</sub> @ -4.5V <sup>1</sup>	-3	A
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	-16	A
P <sub>D</sub> @T <sub>A</sub> =25°C	Total Power Dissipation <sup>3</sup>	1.31	W
P <sub>D</sub> @T <sub>A</sub> =70°C	Total Power Dissipation <sup>3</sup>	0.84	W
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Units
R <sub>θJA</sub>	Thermal Resistance Junction-Ambient <sup>1</sup>	---	125	°C/W
R <sub>θJA</sub>	Thermal Resistance Junction-Ambient <sup>1</sup> (t ≤ 10s)	---	---	°C/W

**Electrical Characteristics ( $T_J = 25^\circ\text{C}$  unless otherwise specified)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristic</b>						
$V_{(BR)DSS}$	Drain Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-20	---	---	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = -20V, V_{GS} = 0V$	---	---	-1.0	$\mu A$
$I_{GSS}$	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}= \pm 12V$	---	---	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	-0.4	-0.7	-1.0	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note2</small>	$V_{GS}=-4.5V, I_D=-4.1A$	---	28	35	m $\Omega$
		$V_{GS}=-2.5V, I_D=-3A$	---	38	53	
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=-10V, V_{GS}=0V, f=1.0MHz$	---	830	---	pF
$C_{oss}$	Output Capacitance		---	132	---	
$C_{rss}$	Reverse Transfer Capacitance		---	85	---	
$Q_g$	Total Gate Charge	$V_{DS}=-10V, I_D=-2A, V_{GS}=-4.5V$	---	8.8	---	nC
$Q_{gs}$	Gate-Source Charge		---	1.4	---	
$Q_{gd}$	Gate-Drain( "Miller" ) Charge		---	1.9	---	
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=-10V, I_D=-3.3A, R_{GEN}=1\Omega, V_{GS}=-4.5V$	---	10	---	ns
$t_r$	Turn-on Rise Time		---	32	---	
$t_{d(off)}$	Turn-off Delay Time		---	50	---	
$t_f$	Turn-off Fall Time		---	51	---	
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain to Source Diode Forward Current		---	---	-5.0	A
$I_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current		---	---	-16	A
$V_{SD}$	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=-4.1A$	---	---	-1.2	V

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature  
 2.Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$

Typical Performance Characteristics

Figure 1: Output Characteristics

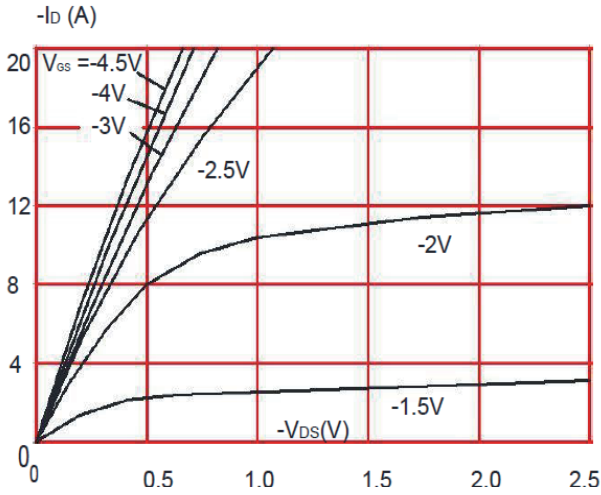


Figure 2: Typical Transfer Characteristics

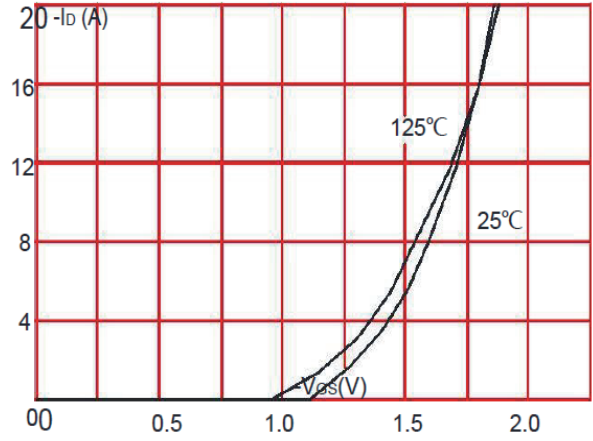


Figure 3: On-resistance vs. Drain Current

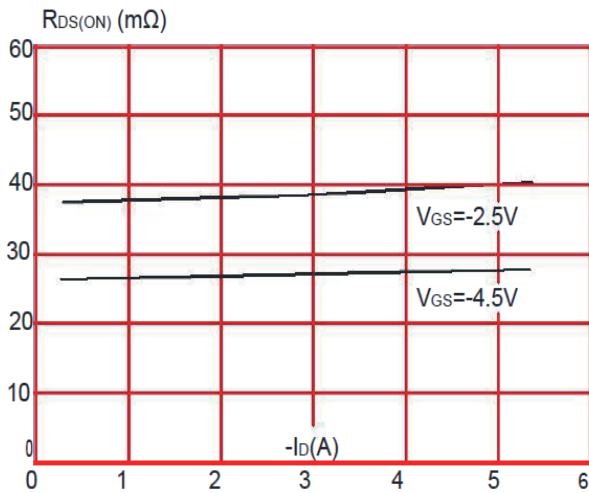


Figure 4: Body Diode Characteristics

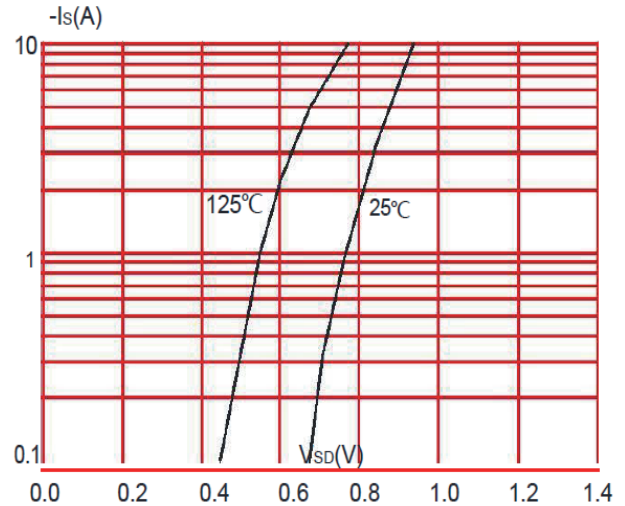


Figure 5: Gate Charge Characteristics

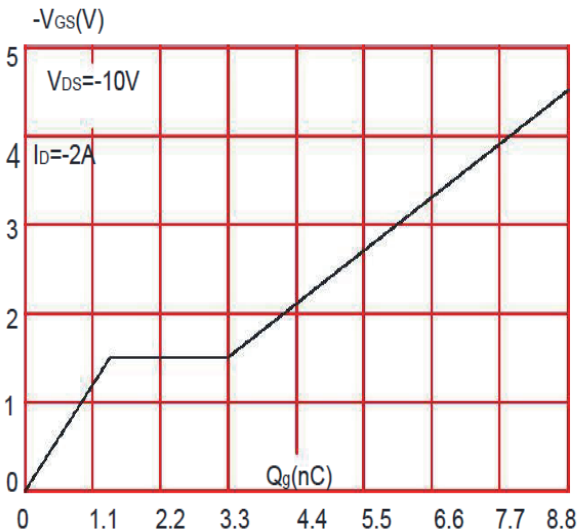
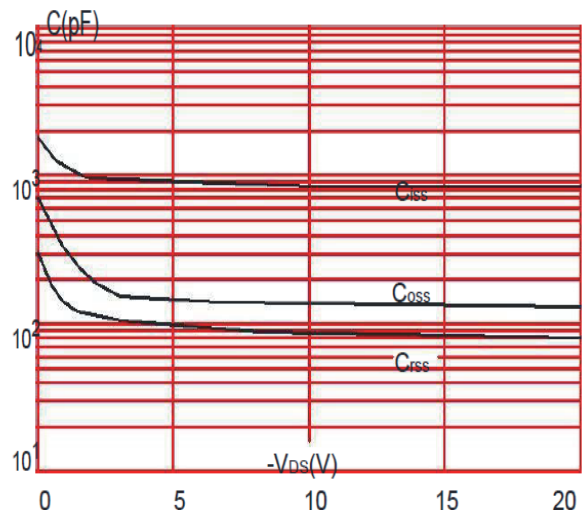


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown Voltage

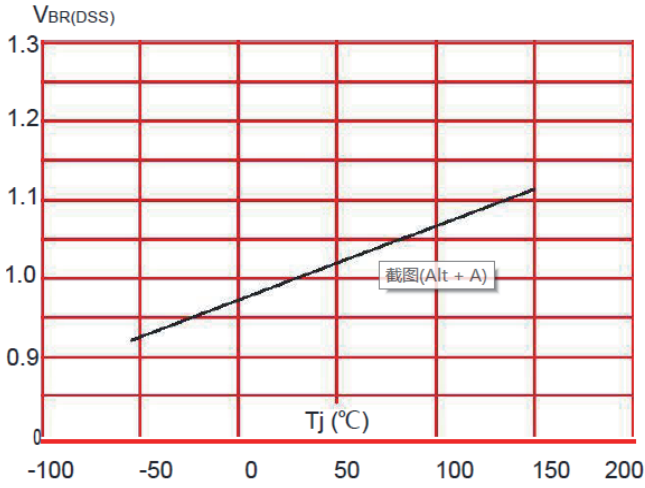


Figure 8: Normalized on Resistance vs. Junction Temperature

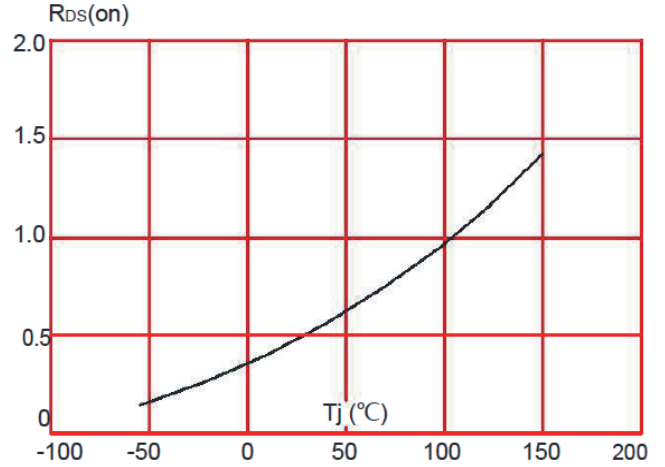


Figure 9: Maximum Safe Operating Area

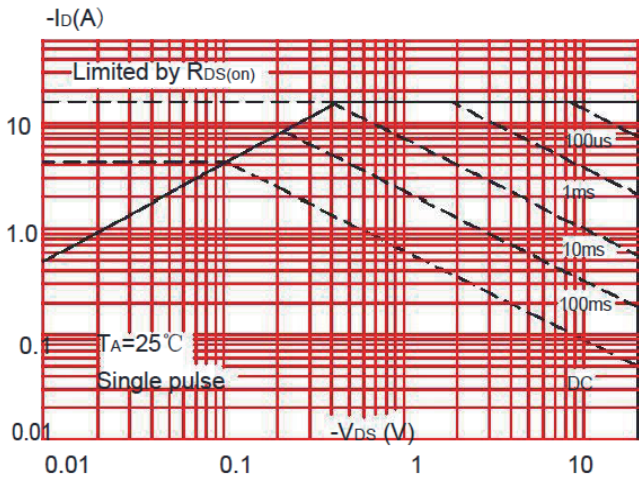


Figure 10: Maximum Continuous Drain Current vs. Temperature

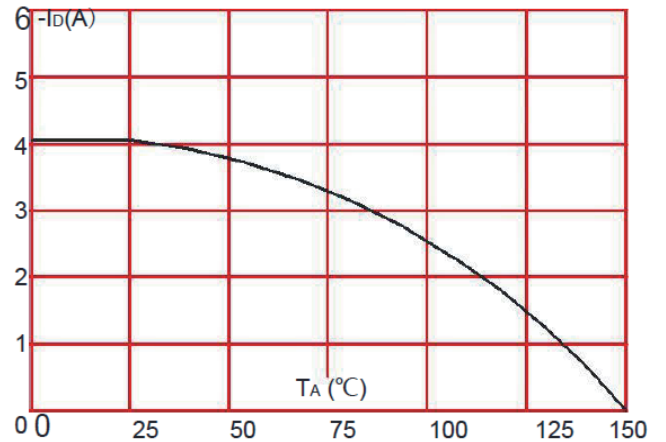
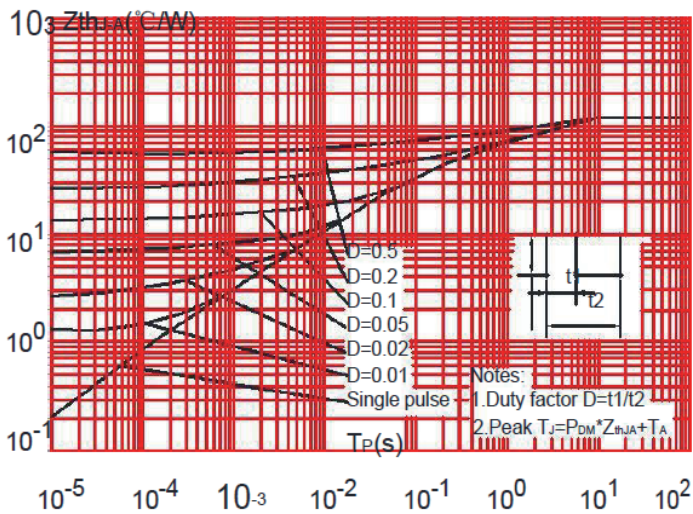
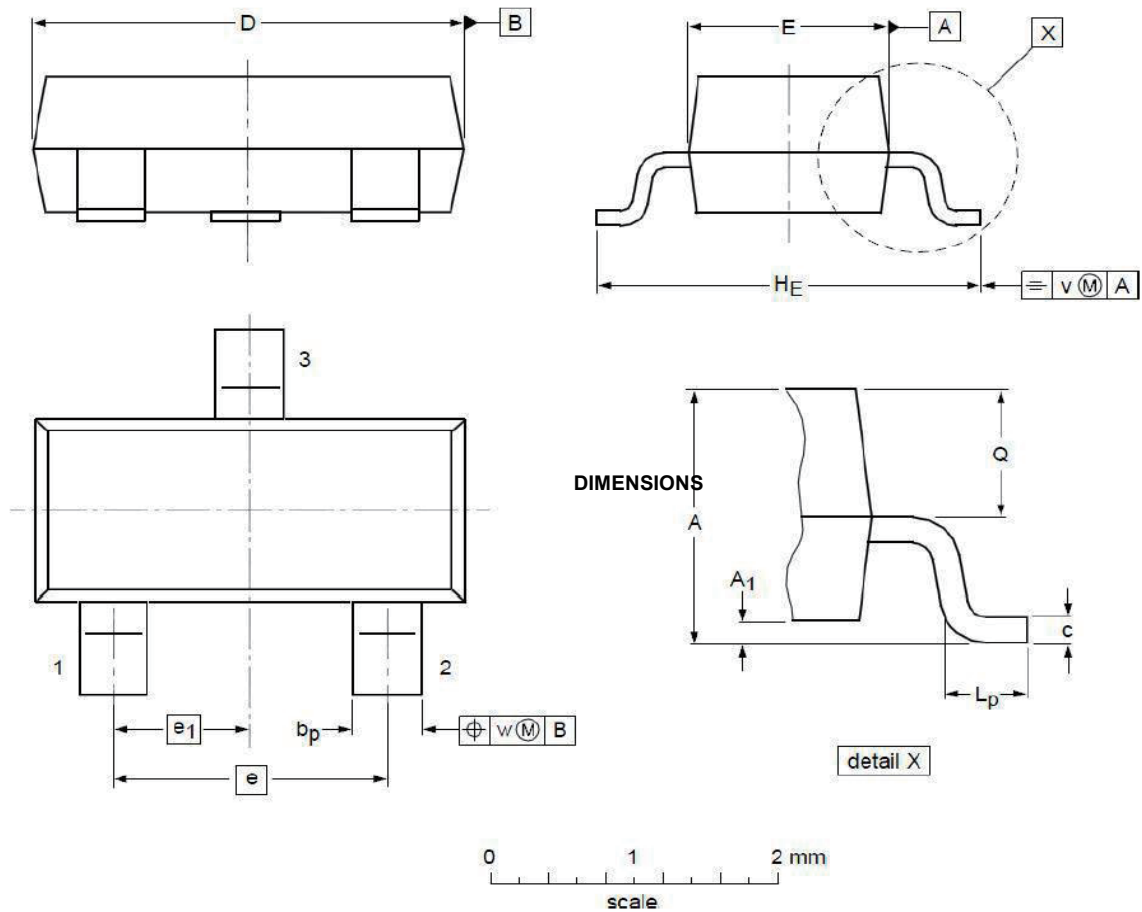


Figure.11: Maximum Effective Transient Thermal Impedance



Package Mechanical Data-SOT-23

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DIMENSIONS ( unit : mm )

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.9	1.01	1.15	A <sub>i</sub>	0.01	0.05	0.1
b <sub>p</sub>	0.3	0.42	0.5	c	0.08	0.13	0.15
D	2.8	2.92	3	E	1.2	1.33	1.4
e	--	1.9	--	e <sub>1</sub>	--	0.95	--
H <sub>E</sub>	2.25	2.4	2.55	L <sub>p</sub>	0.3	0.42	0.5
Q	0.45	0.49	0.55	v	--	0.2	--
w	--	0.1	--				

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