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

Product Summary

RoHS

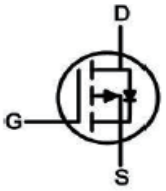
BVDSS	RDSON	ID
-20V	30mΩ	-4.1A

Description

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

SOT23 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter		Max.	Units
V_{DSS}	Drain-Source Voltage		20	V
V_{GSS}	Gate-Source Voltage		±12	V
I_D	Continuous Drain Current	T_C = 25℃	-4.1	A
		T_C = 100℃	-2.6	A
I_{DM}	Pulsed Drain Current note1		-16	A
P_D	Power Dissipation	T_C = 25℃	1	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		125	℃/W
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +175	℃

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristic						
$V_{(BR)DSS}$	Drain Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-20	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}= -20V V_{GS}= 0V	---	---	-1.0	μA
I_{GSS}	Gate to Body Leakage Current	V_{DS}=0V, V_{GS}= ±12V	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	-0.4	-0.7	-1.0	V
$R_{DS(on)}$	Static Drain-Source on-Resistance note2	V_{GS}=-4.5V, I_D=-4.1A	---	30	38	mΩ
		V_{GS}=-2.5V, I_D=-3A	---	38	53	
Dynamic Characteristics						
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	---	
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DS}=-10V,I_D=-3.3A,R_{GEN}=1Ω, 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	---	
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		---	---	-4.1	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≤300μs, Duty Cycle≤2%

Typical Performance Characteristics

Figure1: Output Characteristics

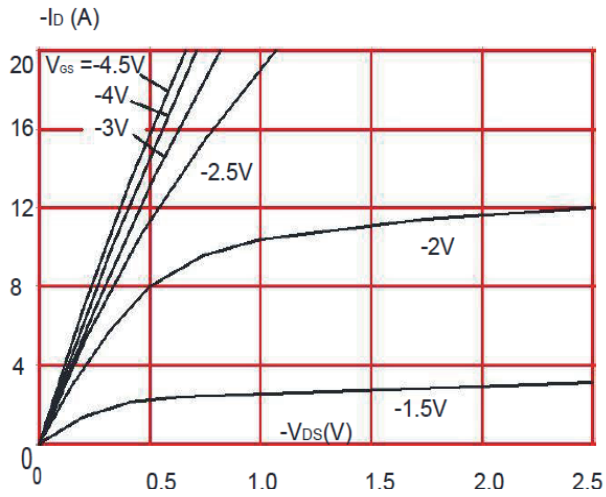


Figure 2: Typical Transfer Characteristics

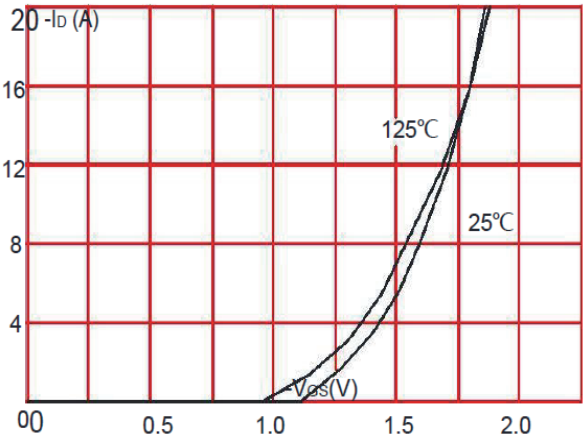


Figure 3:On-resistance vs. Drain Current

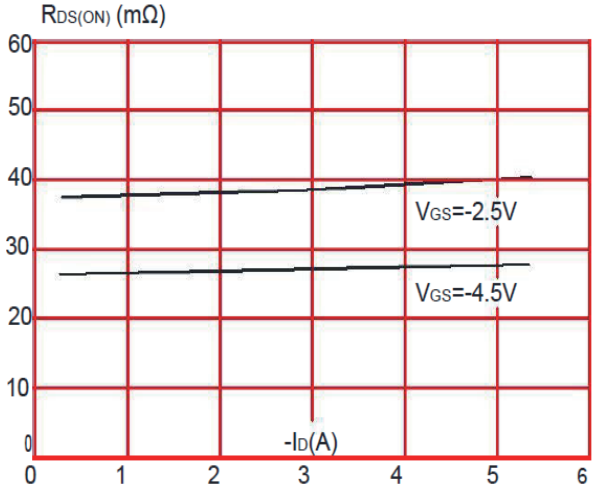


Figure 4: Body Diode Characteristics

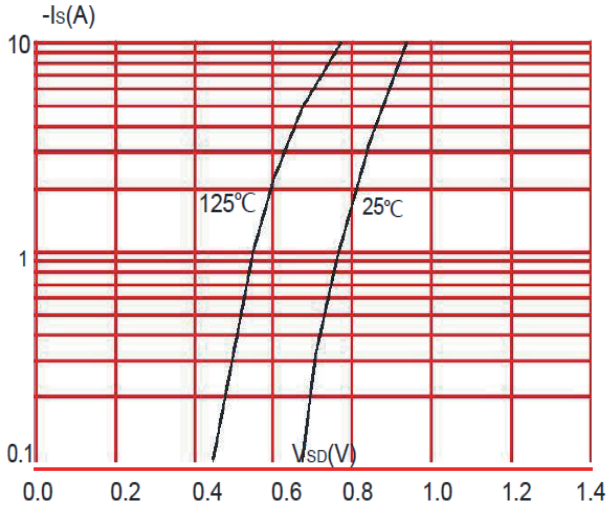


Figure 5: Gate Charge Characteristics

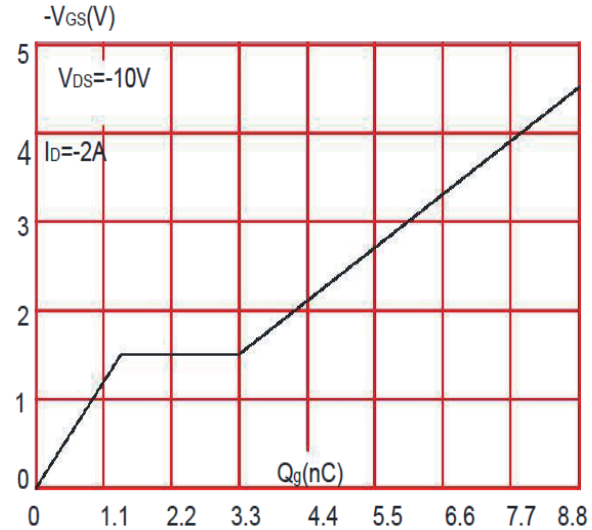
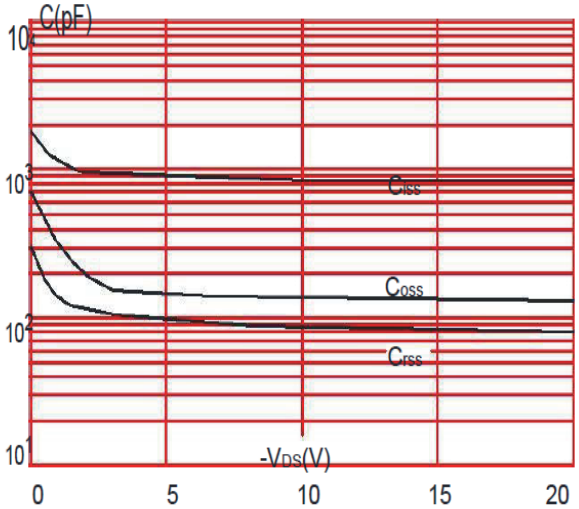


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown Voltage

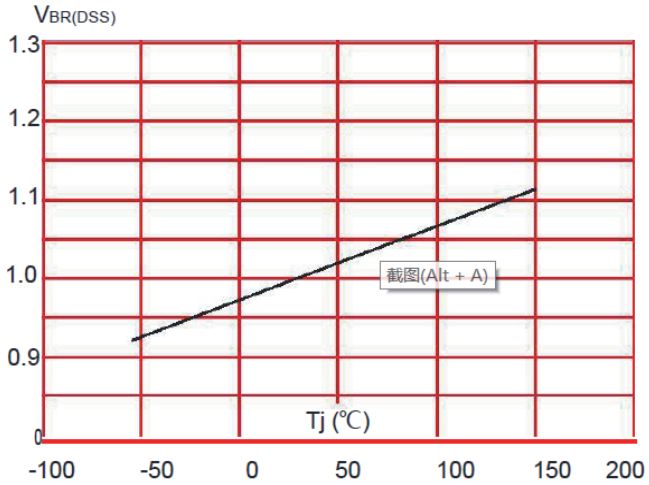


Figure 8: Normalized on Resistance vs. Ju

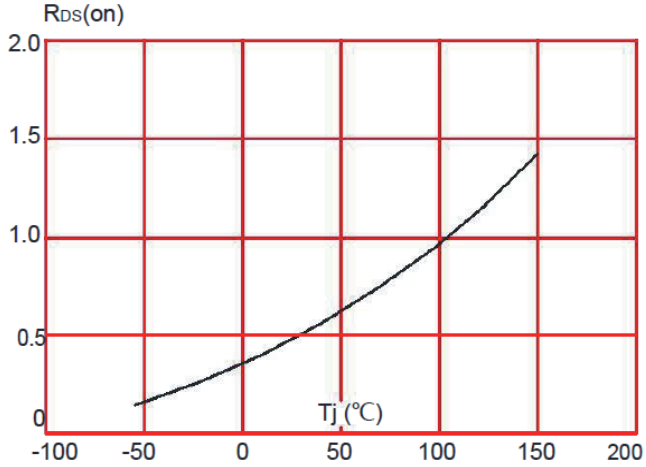
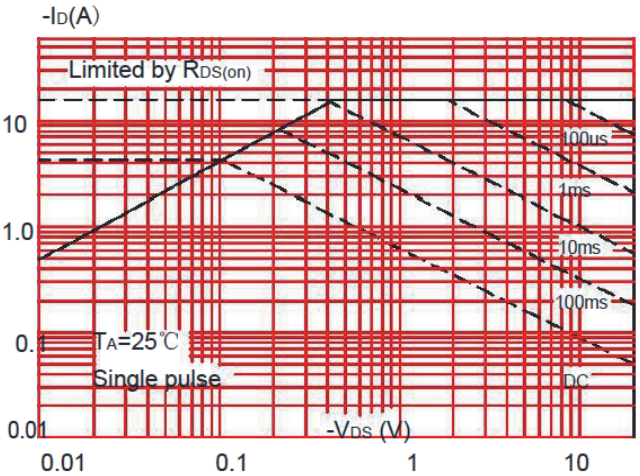


Figure 9: Maximum Safe Operating Area



FFigure 10: Maximum Continuous Drain C

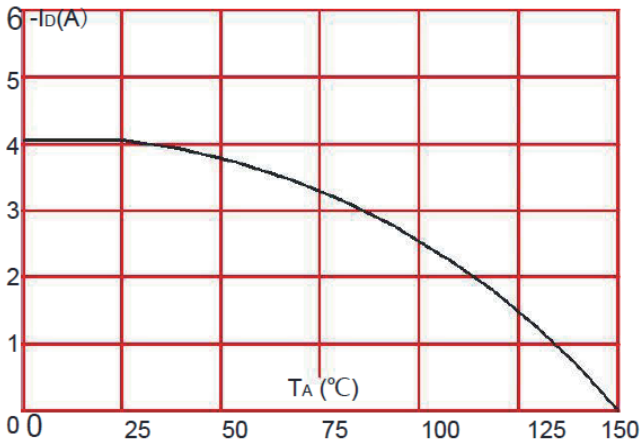
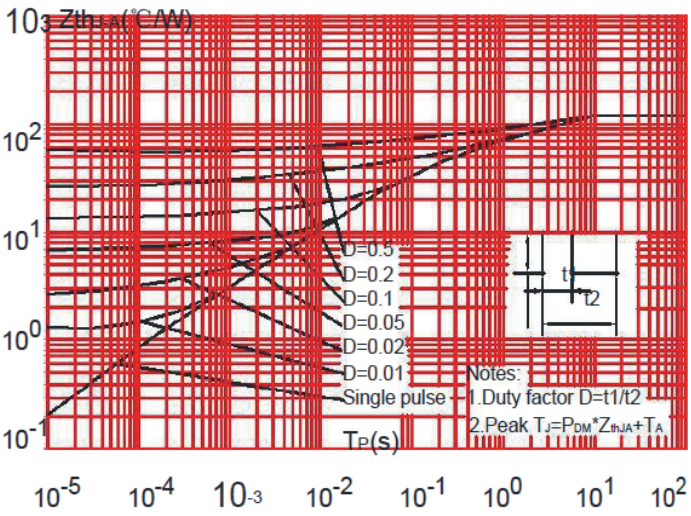
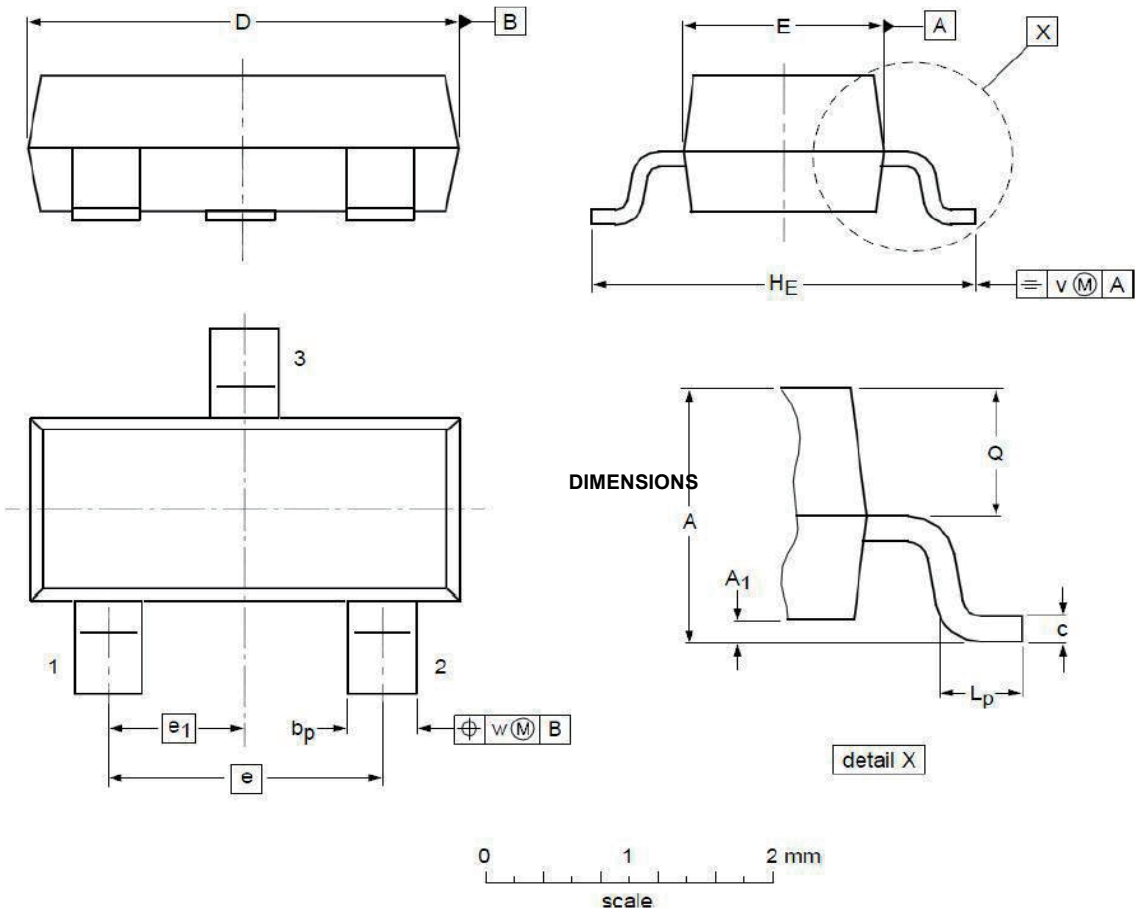


Figure.11: Maximum Effective Transient T



Package Mechanical Data-SOT-23



DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.9	1.01	1.15	A_1	0.01	0.05	0.1
b_p	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_1	--	0.95	--
H_E	2.25	2.4	2.55	L_p	0.3	0.42	0.5
Q	0.45	0.49	0.55	v	--	0.2	--
w	--	0.1	--				