

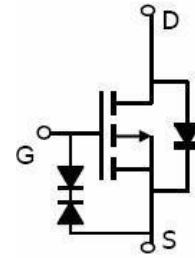


- ★ Super Low Gate Charge
- ★ Green Device Available
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

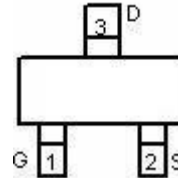
### Description

The WL3415E is the high cell density trenched P-ch MOSFETs, which provide excellent R<sub>DS(on)</sub> and gate charge for most of the synchronous buck converter applications.

The WL3415E meet the RoHS and Green Product requirement with full function reliability approved. ESD Rating: 2500V HBM



### SOT23 Pin Configurations



Marking and pin Assignment



SOT 23 top view

### Product Summary

BVDSS	R <sub>DS(on)</sub>	ID
-20V	29mΩ	-5.0A

### Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		10s	Steady State	
V <sub>DS</sub>	Drain-Source Voltage	-20		V
V <sub>GS</sub>	Gate-Source Voltage	±10		V
I <sub>D@T<sub>A</sub>=25°C</sub>	Continuous Drain Current, V <sub>GS</sub> @ -4.5V <sup>1</sup>	-5.	-4.	A
I <sub>D@T<sub>A</sub>=70°C</sub>	Continuous Drain Current, V <sub>GS</sub> @ -4.5V <sup>1</sup>	-4.	-3.7	A
I <sub>DM</sub>	Pulsed Drain Current <sup>2</sup>	-18		A
P <sub>D@T<sub>A</sub>=25°C</sub>	Total Power Dissipation <sup>3</sup>	1.32	1	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.	Unit
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)	---	95	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction-Case <sup>1</sup>	---	80	°C/W



### 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	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±10V	-	-	±10	uA
<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> =-4A	-	29	40	mΩ
		V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-3A	-	40	56	
<b>Dynamic Characteristics</b>						
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
<b>Switching Characteristics</b>						
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
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
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 Cycle≤2%



### Typical Performance Characteristics

Figure 1: Output Characteristics

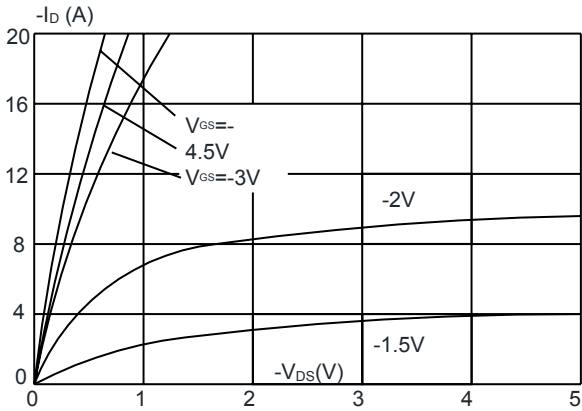


Figure 2: Typical Transfer Characteristics

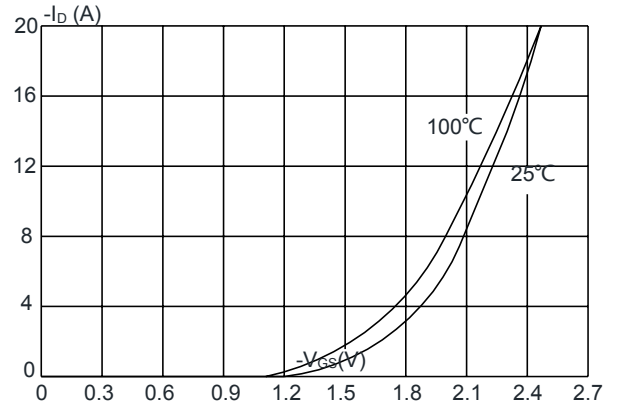


Figure 3: On-resistance vs. Drain Current

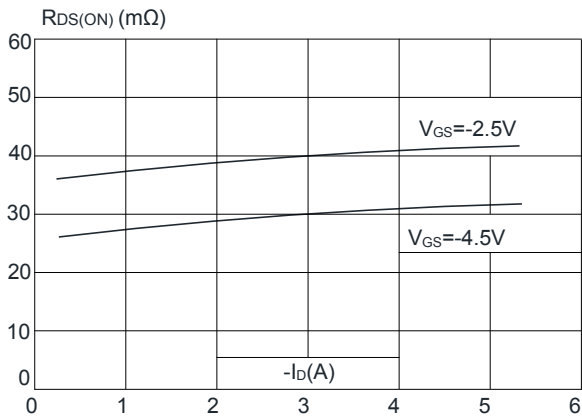


Figure 4: Body Diode Characteristics

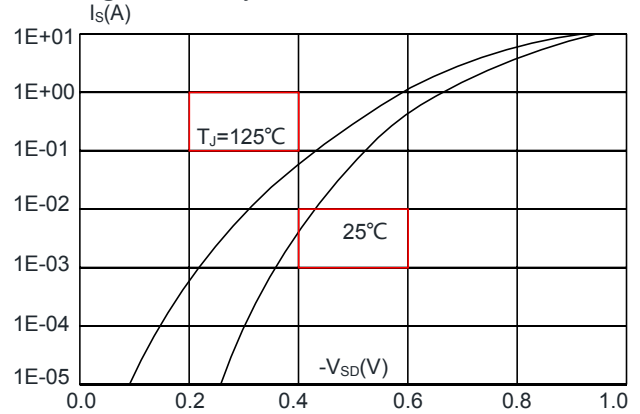


Figure 5: Gate Charge Characteristics

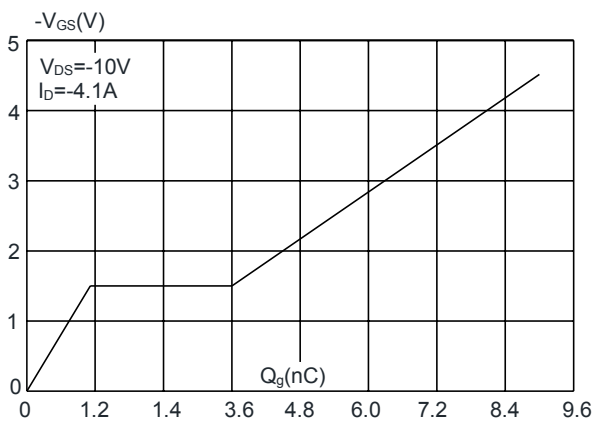
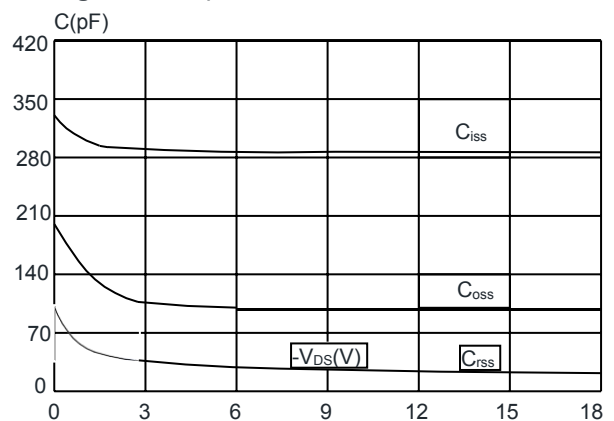
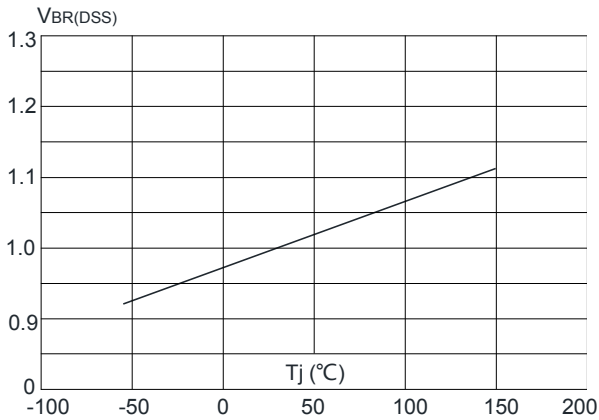


Figure 6: Capacitance Characteristics

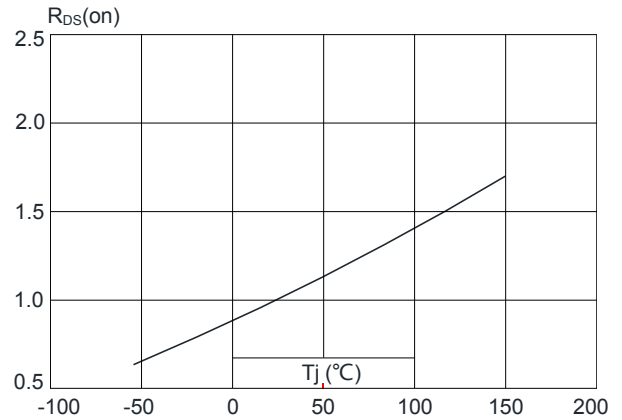




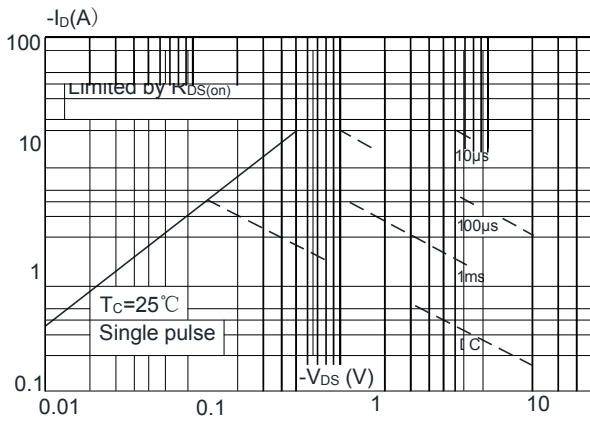
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



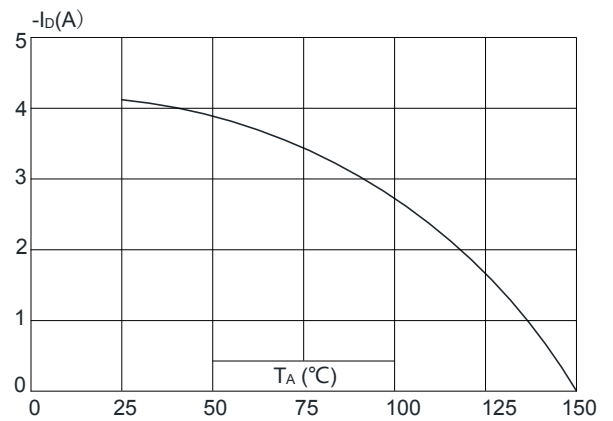
**Figure 8:** Normalized on Resistance vs. Junction Temperature



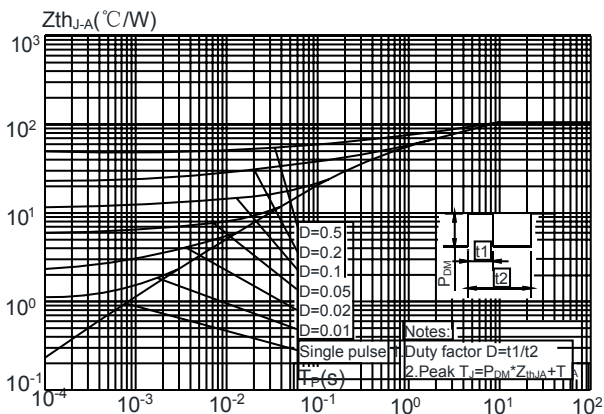
**Figure 9:** Maximum Safe Operating Area



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

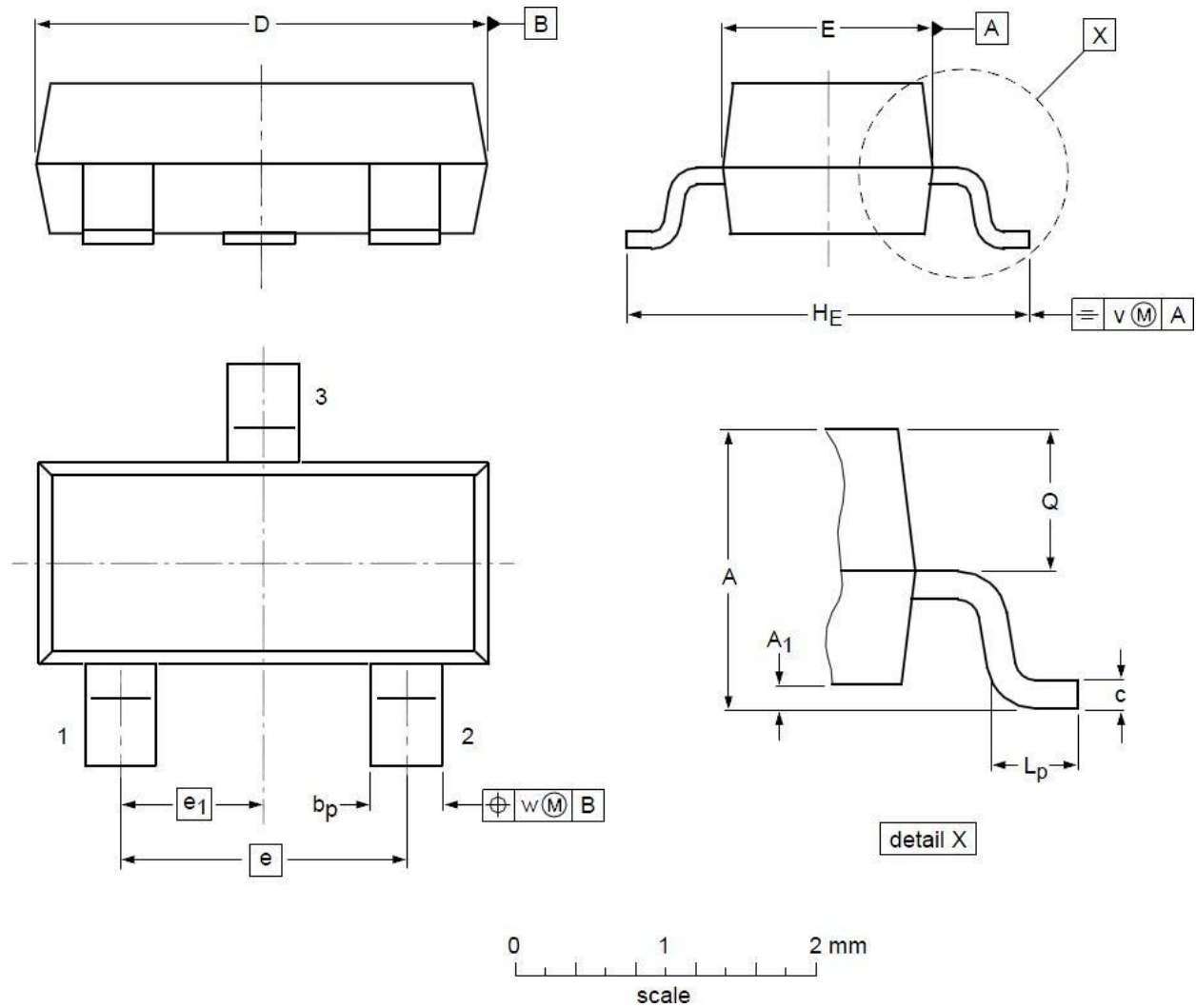


**Figure 11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient





### 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	--				