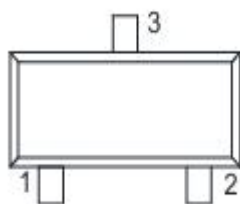
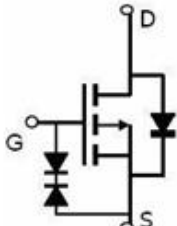


Features ➤ Super Low Gate Charge ➤ Green Device Available ➤ Excellent Cdv/dt effect decline ➤ Advanced high cell density Trench technology ➤ ESDRating:2500V HBM	Bvdss	Rdson	ID
	-20V	29mΩ	-5A
	Application ➤ Battery protection ➤ Load Switch ➤ Uninterruptible power supply		

RoHS

Package		
		
1. Marking and pin assignment	2. SOT23 top view	3. Schematic diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
3415E	3415E	SOT23	3000

Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Parameter	Symbol	Rating		Unit
		10s	SteadyState	
Drain-Source Voltage	V _{DS}	-20		V
Gate-Source Voltage	V _{GS}	± 10		V
Continuous Drain Current, V _{GS} @-4.5V (1)	I _D @T _A =25°C	-5	-4	A
Continuous Drain Current, V _{GS} @-4.5V (1)	I _D @T _A =70°C	-4	-3.7	A
Pulsed Drain Current(2)	I _{DM}	-18		A
Total Power Dissipation	P _D @T _A =25°C	1.32	1	W
Storage Temperature Range	T _{STG}	-55 to 150		°C
Operating Junction Temperature Range	T _J	-55 to 150		°C

Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-ambient(1)	R _{θJA}	125	°C/W
Thermal Resistance Junction-ambient(1) (t ≤ 10s)	R _{θJA}	95	°C/W
Thermal Resistance Junction-Case(1)	R _{θJC}	80	°C/W



Ordering Information

Ordering Number	Package	Pin Assignment			Packing
Halogen Free		G	S	D	
HL3415E	SOT23	1	2	3	Tape Reel

Electrical Characteristics ($T_j=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-20V, V_{GS}=0V$	-	-	-1.0	μA
Gate to Body Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 10V$	-	-	± 10	μA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.4	-0.7	-1.0	V
Static Drain to Source On-State Resistance(2)	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-4A$	-	29	40	$m\Omega$
		$V_{GS}=-2.5V, I_D=-3A$	-	40	56	
Input Capacitance	C_{iss}	$V_{DS}=-10V, V_{GS}=0V$ $f=1.0MHz$	-	289	-	pF
Output Capacitance	C_{oss}		-	98	-	pF
Reverse Transfer Capacitance	C_{rss}		-	22	-	pF
Turn-ON Delay Time	$t_{d(on)}$	$V_{DD}=-10V, R_{GEN}=1\Omega$ $R_L=1.2\Omega, V_{GEN}=-4.5V$	-	12	-	ns
Rise Time	t_r		-	35	-	ns
Turn-OFF Delay Time	$t_{d(off)}$		-	30	-	ns
Fall Time	t_f		-	10	-	ns
Total Gate Charge	Q_g	$V_{DS}=-10V, I_D=-4.1A$ $V_{GS}=-4.5V$	-	9	-	nC
	Q_{gs}		-	1	-	nC
	Q_{gd}		-	2.6	-	nC
Continuous Diode Forward Current	I_S		-	-	-4.1	A
Continuous Diode Pulse Current	I_{sm}		-	-	-16.4	A
Drain to Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=-4.1A$	-	-	-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 $\leq 0.5\%$

Typical Characteristics

Figure 1: Output Characteristics

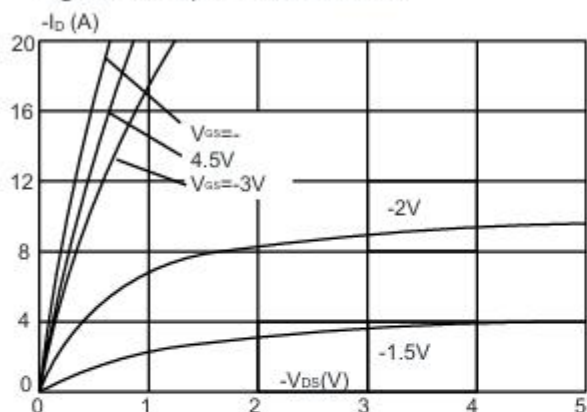


Figure 2: Typical Transfer Characteristics

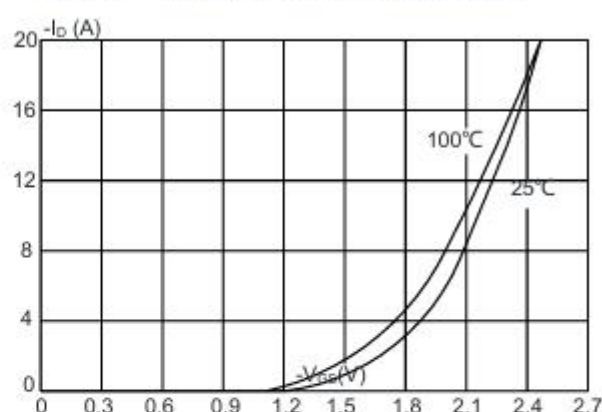


Figure 3: On-resistance vs. Drain Current

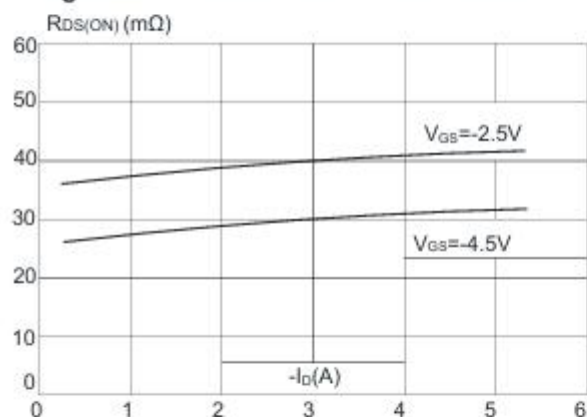


Figure 4: Body Diode Characteristics

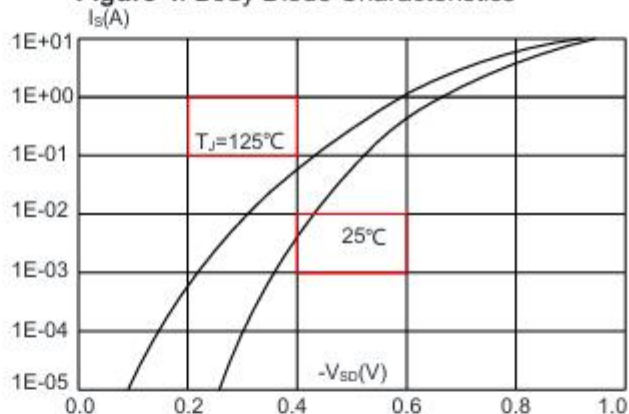


Figure 5: Gate Charge Characteristics

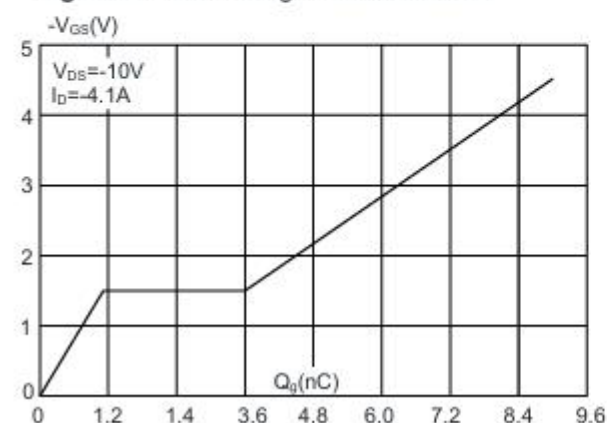
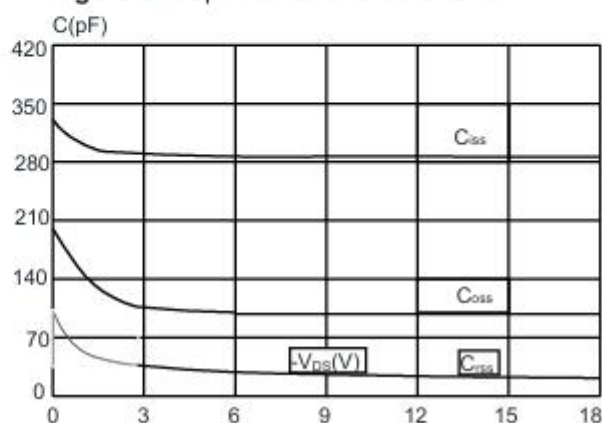


Figure 6: Capacitance Characteristics



Typical Characteristics

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

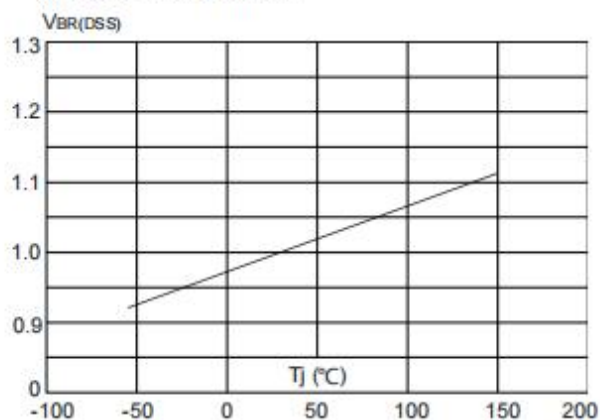


Figure 8: Normalized on Resistance vs. Junction Temperature

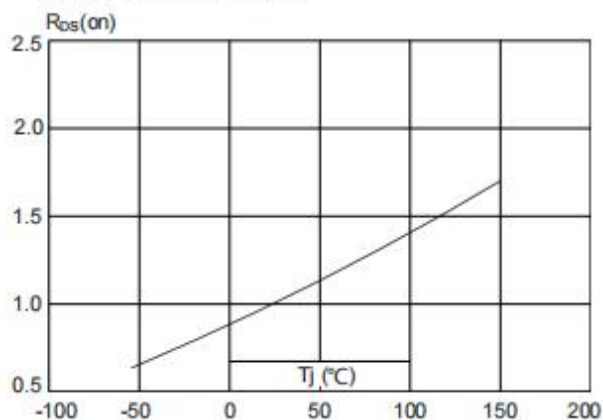


Figure 9: Maximum Safe Operating Area

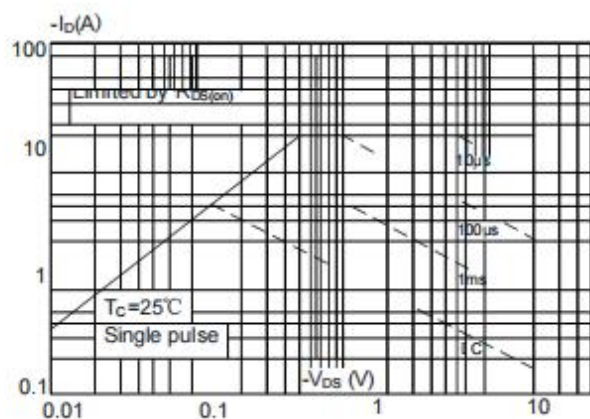


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

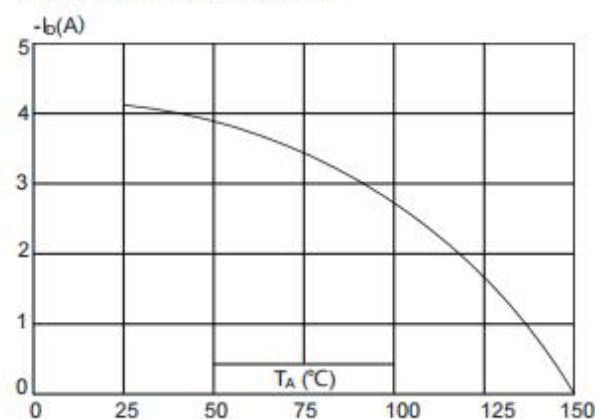
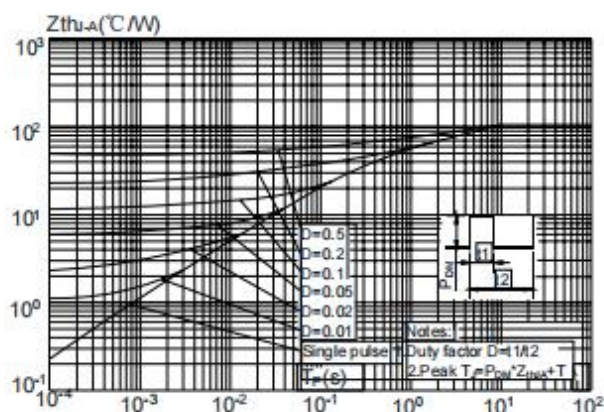
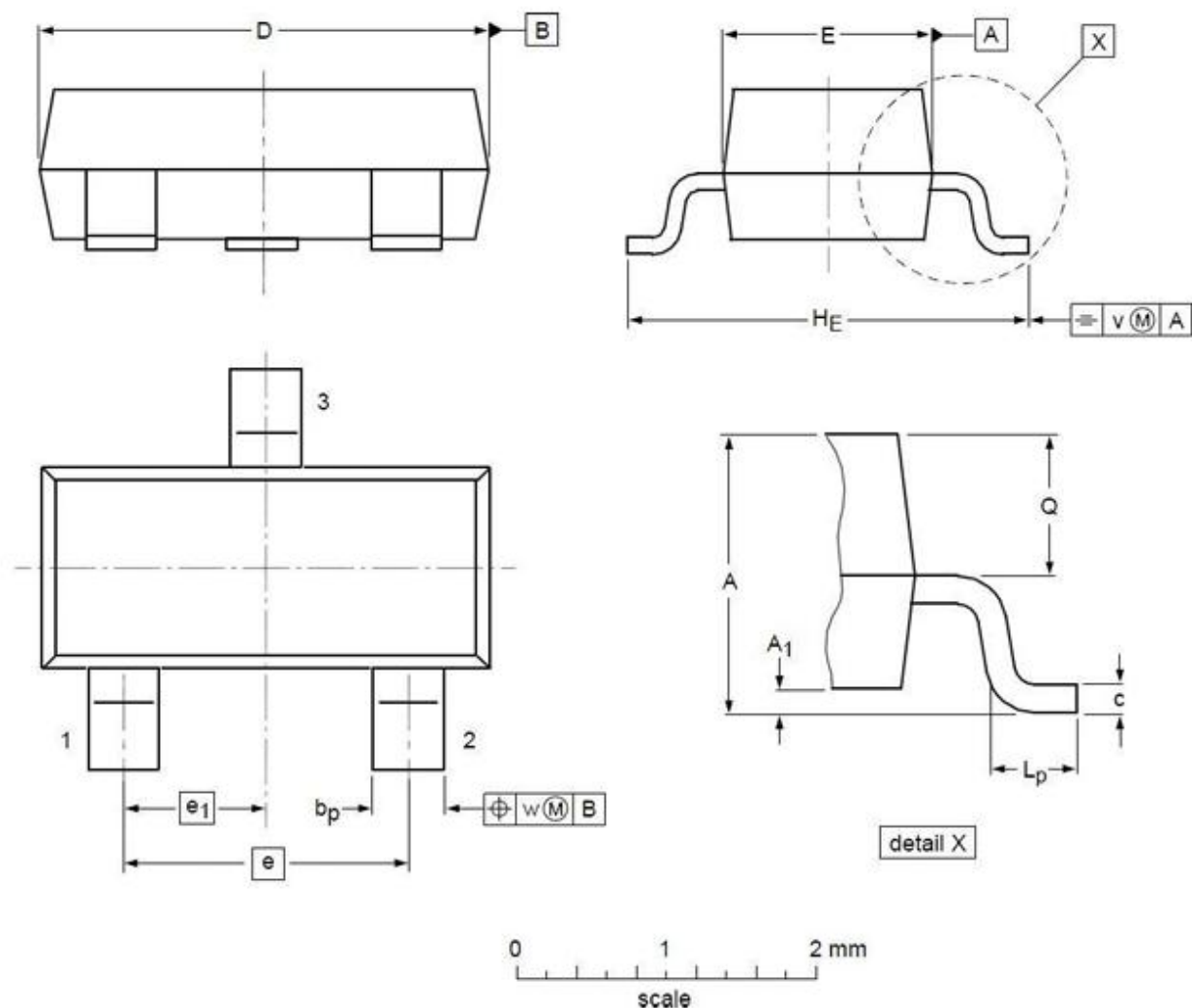


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Package Dimensions

➤ SOT23



DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.90	1.01	1.15	A ₁	0.01	0.05	0.10
b _p	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 ₁	--	0.95	--
H _E	2.25	2.40	2.55	L _p	0.30	0.42	0.50
Q	0.45	0.49	0.55	v	--	0.20	--
w	--	0.10	--				



Important Notice and Disclaimer

HL Microelectronics reserves the right to make changes to this document and its products and specifications at any time without notice.

Customers should obtain and confirm the latest product information and specifications before final design, purchase or use.

HL Microelectronics makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, not does HL Microelectronics assume any liability for application assistance or customer product design.

HL Microelectronics does not warrant or accept any liability with products which are purchased or used for any unintended or unauthorized application.

No license is granted by implication or otherwise under any intellectual property rights of HL Microelectronics.

HL Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of HL Microelectronics.