



**Product Summary**

- $V_{DS} = -20V, I_D = -4A$
- $R_{DS(ON)} < 36m\Omega @ V_{GS} = -4.5V$
- $R_{DS(ON)} < 49m\Omega @ V_{GS} = -2.5V$
- ESD Rating: 2500V HBM

**Application**

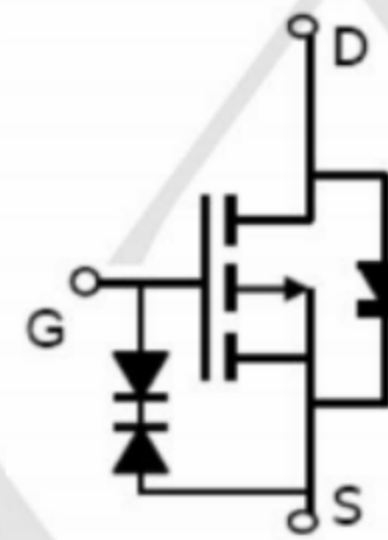
- Load/Power Switching
- Interfacing Switching
- Logic Level Shift

**Package and Pin Configuration**  
SOT-23



Marking: 3415

**Circuit diagram**



**Absolute Maximum Ratings ( $T_A = 25^\circ C$  unless otherwise noted)**

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 10$	V
Drain Current-Continuous	$I_D$	-4	A
Drain Current-Pulsed (Note 1)	$I_{DM}$	-30	A
Maximum Power Dissipation	$P_D$	1.4	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ C$

**Thermal Characteristic**

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	89.3	$^\circ C/W$
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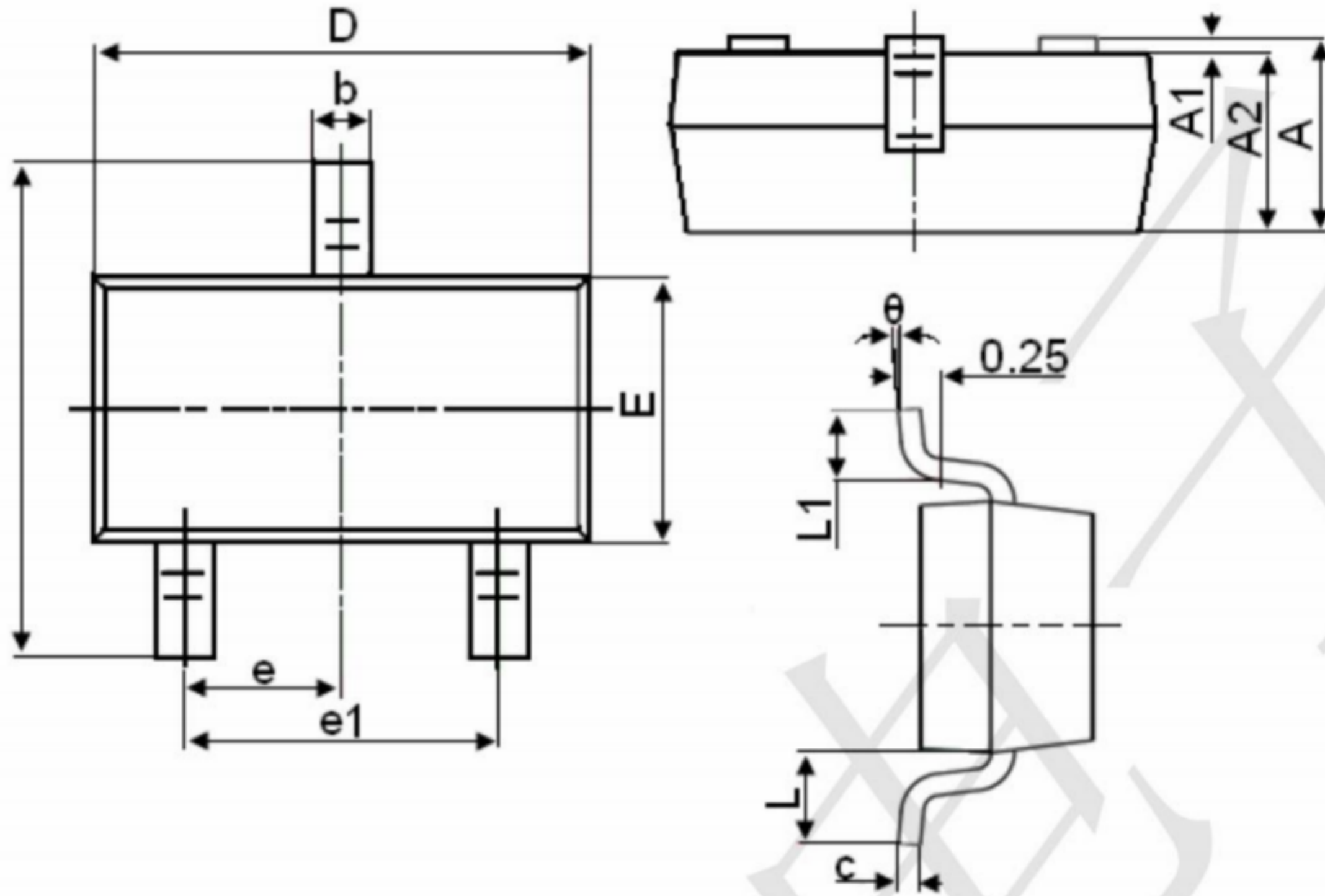


**Electrical Characteristics (  $T_A = 25^\circ\text{C}$  unless otherwise noted )**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20		-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-20V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V$	-	-	$\pm 10$	$\mu A$
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.35	-0.65	-0.9	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-4A$	-	29	36	$m\Omega$
		$V_{GS}=-2.5V, I_D=-4A$	-	37	49	$m\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=-5V, I_D=-4A$	8	-	-	S
<b>Dynamic Characteristics (Note4)</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-10V, V_{GS}=0V,$ $F=1.0MHz$	-	1181.1	-	PF
Output Capacitance	$C_{oss}$		-	121.3	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	114.8	-	PF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-10V, R_L=2.5\Omega$ $V_{GS}=-4.5V, R_{GEN}=3\Omega$	-	12		nS
Turn-on Rise Time	$t_r$		-	10		nS
Turn-Off Delay Time	$t_{d(off)}$		-	19		nS
Turn-Off Fall Time	$t_f$		-	25		nS
Total Gate Charge	$Q_g$	$V_{DS}=-10V, I_D=-4A,$ $V_{GS}=-4.5V$	-	10.2		nC
Gate-Source Charge	$Q_{gs}$		-	1.3	-	nC
Gate-Drain Charge	$Q_{gd}$		-	2.4	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=-4A$	-	-	-1.2	V
Diode Forward Current (Note 2)	$I_S$		-	-	-4	A



SOT-23 Package Information



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
$\theta$	0°	8°