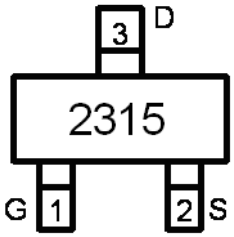
STEIFPOWER TECHNOLOGY

SP2315

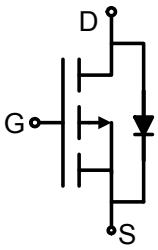
Main Product Characteristics:

V_{DSS}	-20V
R_{DS}(on)	95mΩ (typ.)
I_D	-3A

SOT-23



Marking and pin Assignment



Schematic diagram

Features and Benefits:

- Advanced MOSFET process technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150℃ operating temperature

Description:

It utilizes the latest processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in power switching application and a wide variety of other applications.

Absolute max Rating:

Symbol	Parameter	Max.	Units
I_D @ TC = 25°C	Continuous Drain Current, V_{GS} @ 10V①	-3	A
I_D @ TC = 70°C	Continuous Drain Current, V_{GS} @ 10V①	-2.4	
I_{DM}	Pulsed Drain Current②	-15	
P_D @TC = 25°C	Power Dissipation③	1.4	W
	Linear Derating Factor	0.011	W/°C
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-to-Source Voltage	± 12	V
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C

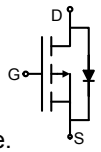
Thermal Resistance

Symbol	Characterizes	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-ambient (t ≤ 10s) ④	80	100	℃/W

Electrical Characterizes @T_A=25℃ unless otherwise specified

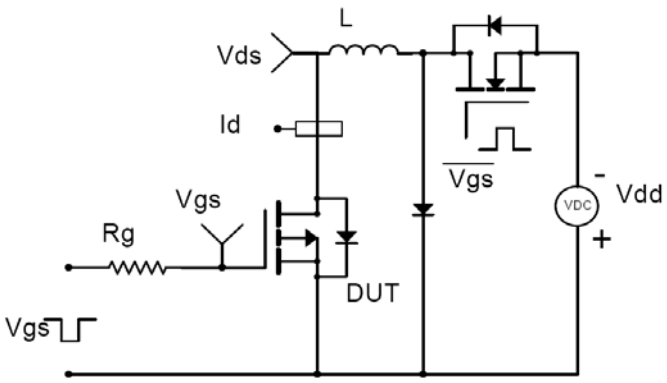
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	-20	—	—	V	V_{GS} = 0V, ID = -250μA
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	95	130	mΩ	V_{GS}=-4.5V,I_D = -2.8A
		—	128	160		V_{GS}=-2.5V,I_D = -2A
$V_{GS(th)}$	Gate threshold voltage	-0.5	—	-1.0	V	V_{DS} = V_{GS}, I_D = -250μA
I_{DSS}	Drain-to-Source leakage current	—	—	-1	μA	V_{DS} = -20V,V_{GS} = 0V
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	V_{GS} =12V
		—	—	-100		V_{GS} = -12V
Q_g	Total gate charge	—	8.5	—	nC	I_D = -3A,
Q_{gs}	Gate-to-Source charge	—	1.2	—		V_{DS}= -10V,
Q_{gd}	Gate-to-Drain("Miller") charge	—	2.1	—		V_{GS} = -4.5V
$t_{d(on)}$	Turn-on delay time	—	7.2	—	ns	V_{GS}=-4.5V, VDS=-10V, I_D=-3A ,R_{GEN}=3Ω
t_r	Rise time	—	36	—		
$t_{d(off)}$	Turn-Off delay time	—	53	—		
t_f	Fall time	—	56	—		
C_{iss}	Input capacitance	—	560	—	pF	V_{GS} = 0V
C_{oss}	Output capacitance	—	80	—		V_{DS} = -10V
C_{rss}	Reverse transfer capacitance	—	70	—		f = 1MHz

Source-Drain Ratings and Characteristics

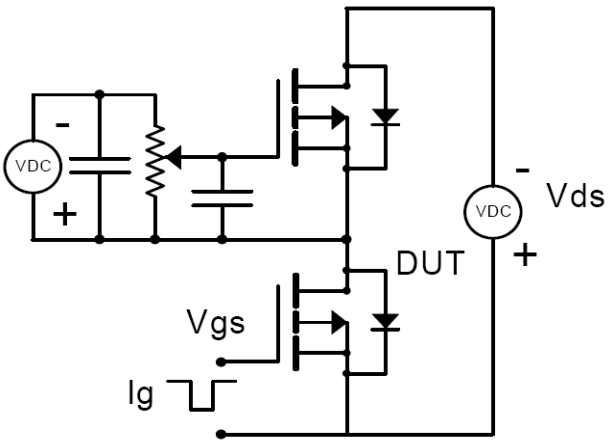
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-3	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode)	—	—	-15	A	
V_{SD}	Diode Forward Voltage	—	—	-1.2	V	I_S=-1A, V_{GS}=0V
t_{rr}	Reverse Recovery Time	—	37	—	ns	T_J = 25°C, I_F =-4A, di/dt = 100A/μs
Q_{rr}	Reverse Recovery Charge	—	27	—	nC	

Test circuits and Waveforms

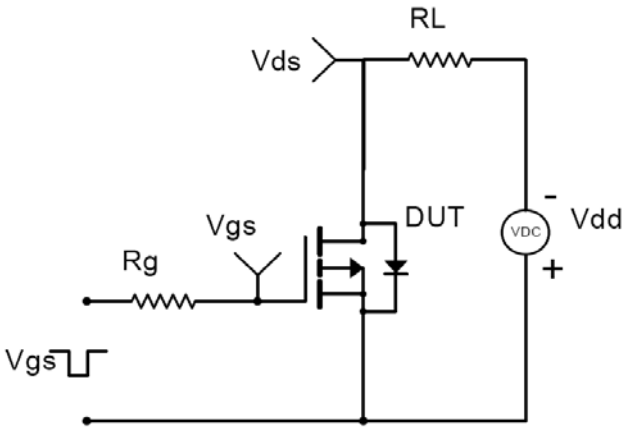
EAS test circuit:



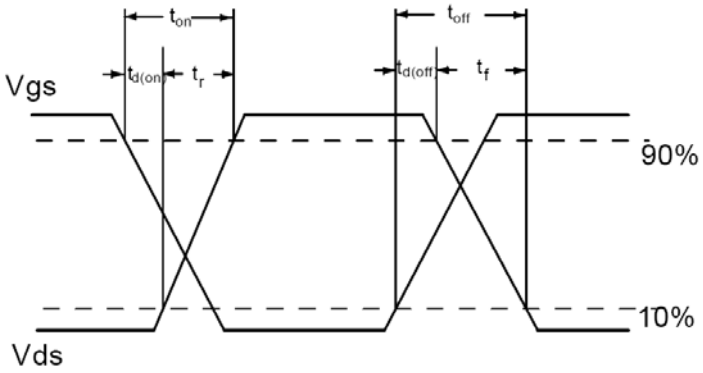
Gate charge test circuit:



Switching time test circuit:



Switch Waveforms:



Notes:

①The maximum current rating is limited by bond-wires.

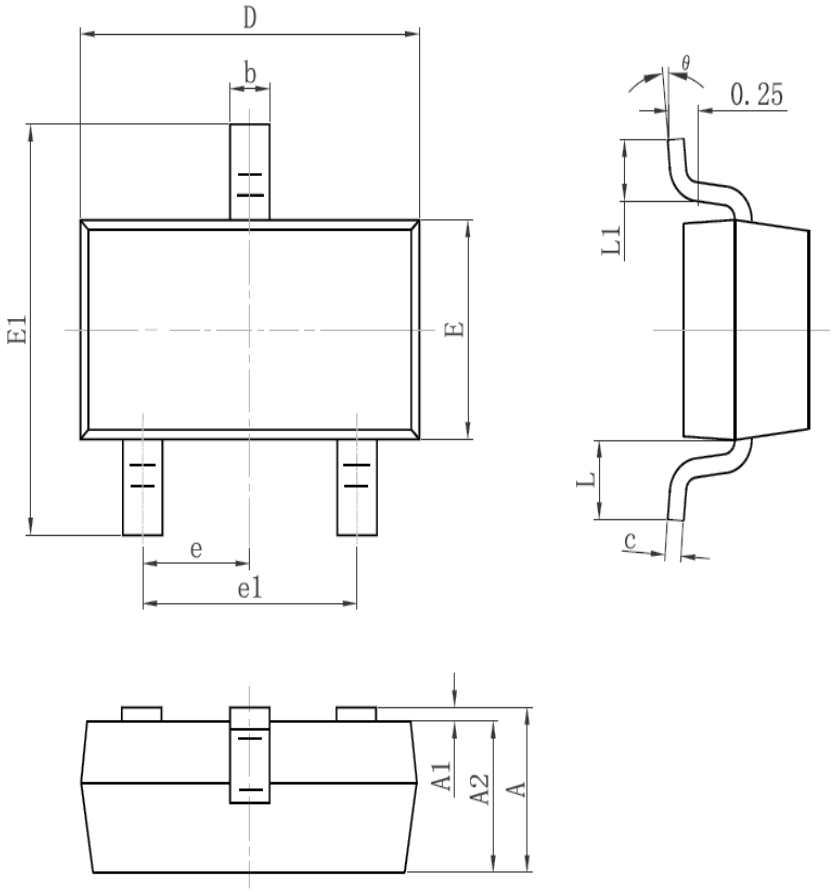
②Repetitive rating; pulse width limited by max. junction temperature.

③The power dissipation PD is based on max. junction temperature, using junction-to-case thermal resistance.

④The value of $R_{\theta JA}$ is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with TA =25°C

Mechanical Data：

SOT-23 PACKAGE OUTLINE DIMENSION



Symbol	Dimension In Millimeters		Dimension In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.95TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.55REF		0.022REF	
L1	0.300	0.500	0.012	0.020
θ	0^0	8^0	0^0	8^0

Ordering and Marking Information

Device Marking: 2315

Package (Available)

SOT-23

Operating Temperature Range

C : -55 to 150 ºC

Devices per Unit

Package Type	Units/ Tube	Tubes/Inner Box	Units/Inner Box	Inner Boxes/Carton Box	Units/Carton Box
SOT-23	3000	10	30000	4	120000

Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	Tj=150℃ @ 80% of Max V_{DSS}/V_{CES}/V_R	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	Tj=150℃@ 100% of Max V_{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices

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