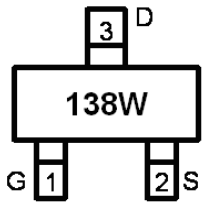
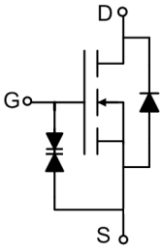
Main Product Characteristics:

V_{DSS}	50V
R_{DS}(on)	1.4Ω (typ.)
I_D	0.2A

SOT-323



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
- ESD Rating：1000V HBM
- 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	0.2	A
I_{DM}	Pulsed Drain Current②	0.8	
P_D @TC = 25°C	Power Dissipation③	0.2	W
V_{DS}	Drain-Source Voltage	50	V
V_{GS}	Gate-to-Source Voltage	± 20	V
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C

Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-ambient (t ≤ 10s) ④	—	625	℃/W

Electrical Characteristics @T_A=25℃ unless otherwise specified

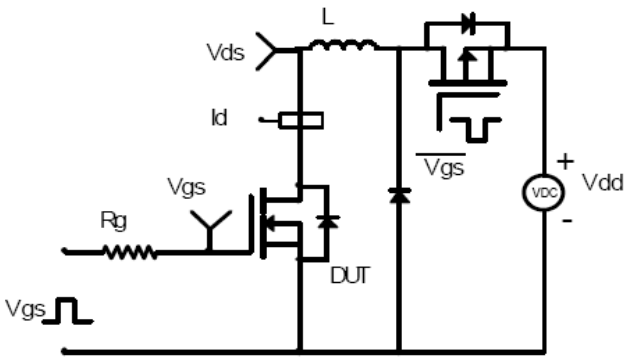
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	50	—	—	V	V_{GS} = 0V, ID = 250μA
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	1.4	3.5	Ω	V_{GS}=10V, I_D=0.22A
		—	1.57	6		V_{GS}=4.5V, I_D=0.22A
$V_{GS(th)}$	Gate threshold voltage	0.7	—	1.5	V	V_{DS} = V_{GS}, I_D = 250μA
I_{DSS}	Drain-to-Source leakage current	—	—	1	μA	V_{DS} = 50V,V_{GS} = 0V
I_{GSS}	Gate-to-Source forward leakage	—	—	±100	nA	V_{GS}=±5V,V_{DS}=0V
		—	—	±10	uA	V_{GS}=±20V,V_{DS}=0V
$t_{d(on)}$	Turn-on delay time	—	—	20	ns	V_{GS}=10V, VDS=30V, ID=0.2A,R_{GEN}=50Ω
$t_{d(off)}$	Turn-Off delay time	—	—	20		
C_{iss}	Input capacitance	—	30	—	pF	V_{GS} = 0V V_{DS} = 10V f = 1MHz
C_{oss}	Output capacitance	—	7.8	—		
C_{rss}	Reverse transfer capacitance	—	3.1	—		

Source-Drain Ratings and Characteristics

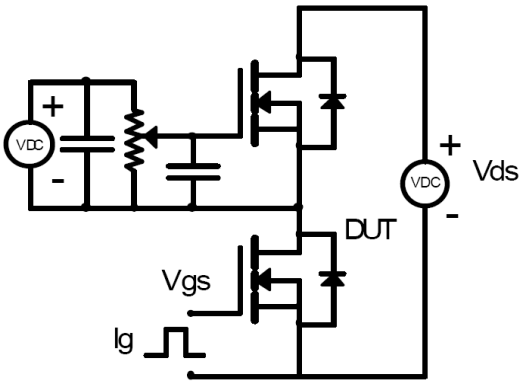
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	0.2	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode)	—	—	0.8	A	
V_{sd}	Diode Forward Voltage	—	—	1.4	V	I_S=0.22A, V_{GS}=0V

Test circuits and Waveforms

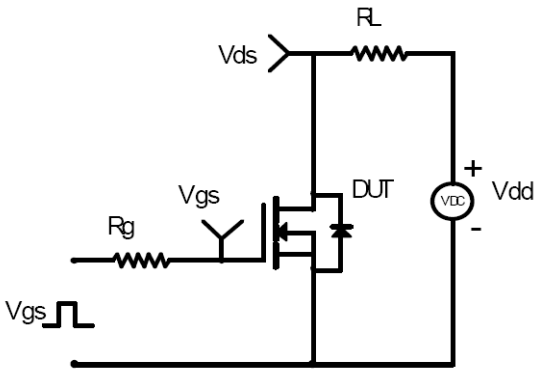
EAS Test Circuit



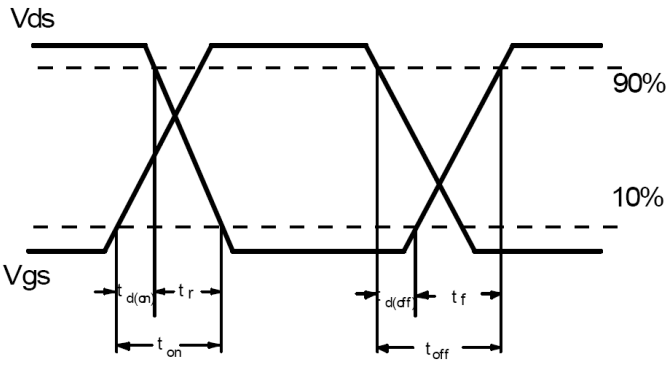
Gate charge test circuit



Switching Time Test Circuit



Switching Waveforms



Notes:

①Calculated continuous current based on maximum allowable junction temperature.

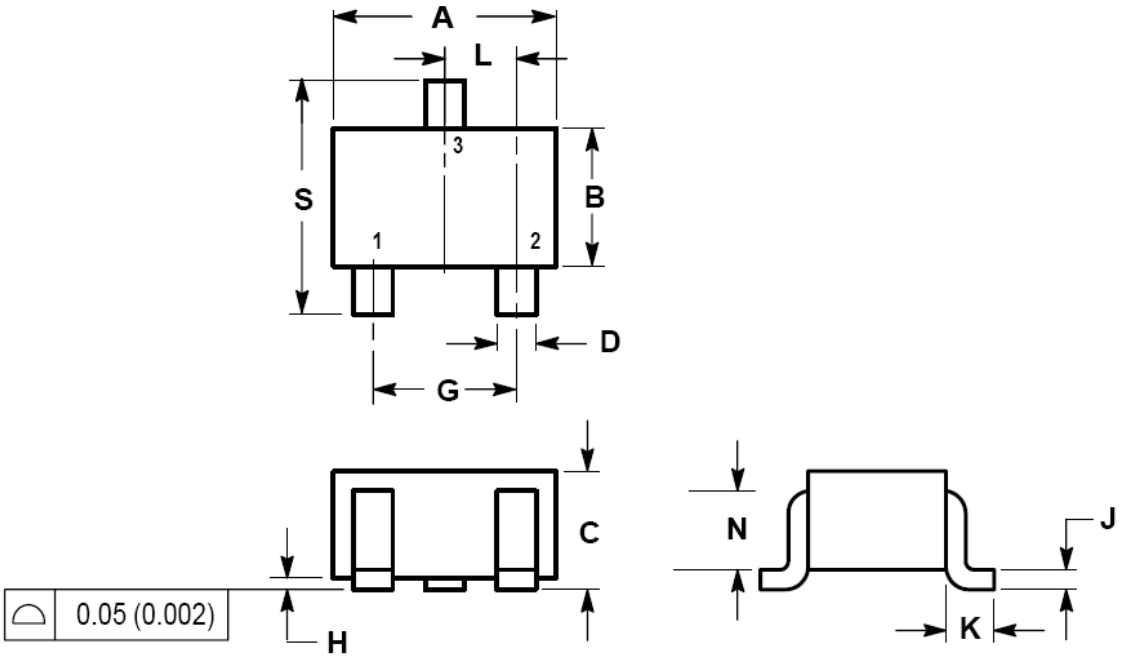
②Repetitive rating; pulse width limited by max. junction temperature.

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 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with TA =25°C

Mechanical Data：

SOT-323(SC-70) PACKAGE OUTLINE DIMENSION



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.071	0.087	1.80	2.20
B	0.045	0.053	1.15	1.35
C	0.032	0.040	0.80	1.00
D	0.012	0.016	0.30	0.40
G	0.047	0.055	1.20	1.40
H	0.000	0.004	0.00	0.10
J	0.004	0.010	0.10	0.25
K	0.017 REF		0.425 REF	
L	0.026 BSC		0.650 BSC	
N	0.028 REF		0.700 REF	
S	0.079	0.095	2.00	2.40

Ordering and Marking Information

Device Marking: 138W

Package (Available)

SOT-323

Operating Temperature Range

C : -55 to 150 ºC

Devices per Unit

Package Type	Units/ Tape	Tapes/Inner Box	Units/Inner Box	Inner Boxes/Carton Box	Units/ Carton Box
SOT-323	3000	10	30000	12	360000

Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	T_j=125℃ to 150℃ @ 80% of Max V_{DSS}/V_{CES}/VR	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	T_j=150℃ @ 100% of Max V_{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices

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