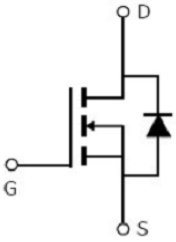
Main Product Characteristics:

V_{DSS}	800V
R_{DS}(on)	13Ω (typ.)
I_D	1A

SOT223

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	1	A
I_D @ TC = 100°C	Continuous Drain Current, V_{GS} @ 10V①	0.65	
I_{DM}	Pulsed Drain Current②	4	
P_D @TC = 25°C	Power Dissipation③	40	W
	Linear Derating Factor	0.32	W/°C
V_{DS}	Drain-Source Voltage	800	V
V_{GS}	Gate-to-Source Voltage	± 30	V
E_{AS}	Single Pulse Avalanche Energy @ L=100mH	50	mJ
I_{AS}	Avalanche Current @ L=100mH	1	A
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C

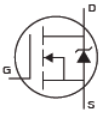
Thermal Resistance

Symbol	Characterizes	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case③	—	2.88	℃/W
$R_{\theta JA}$	Junction-to-ambient (t ≤ 10s) ④	—	62	℃/W
	Junction-to-Ambient (PCB mounted, steady-state) ④	—	40	℃/W

Electrical Characterizes @T_A=25℃ unless otherwise specified

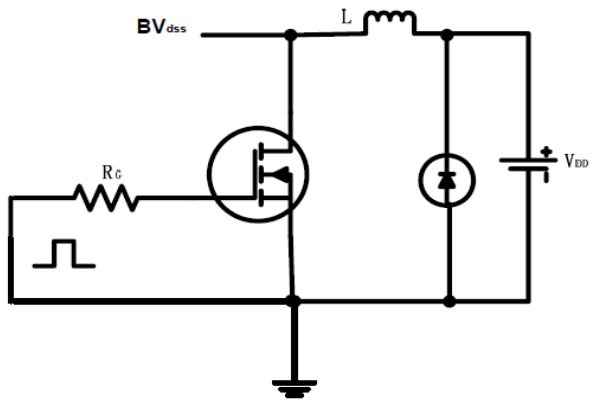
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	800	—	—	V	V_{GS} = 0V, ID = 250μA
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	13	16	Ω	V_{GS}=10V,I_D = 0.5A
		—	18	—		T_J = 125℃
$V_{GS(th)}$	Gate threshold voltage	2	—	4	V	V_{DS} = V_{GS}, I_D = 250μA
		—	2.0	—		T_J = 125℃
I_{DSS}	Drain-to-Source leakage current	—	—	1	μA	V_{DS} = 800V,V_{GS} = 0V
		—	—	50		T_J = 125℃
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	V_{GS} =30V
		—	—	-100		V_{GS} = -30V
Q_g	Total gate charge	—	8.9	—	nC	I_D = 1A,
Q_{gs}	Gate-to-Source charge	—	2.1	—		V_{DS}=640V,
Q_{gd}	Gate-to-Drain("Miller") charge	—	3.3	—		V_{GS} = 10V
$t_{d(on)}$	Turn-on delay time	—	8.1	—	ns	V_{GS}=10V, VDS=400V,
t_r	Rise time	—	29	—		R_L=44Ω,
$t_{d(off)}$	Turn-Off delay time	—	19	—		R_{GEN}=25Ω
t_f	Fall time	—	40	—		ID=1A
C_{iss}	Input capacitance	—	220	—	pF	V_{GS} = 0V
C_{oss}	Output capacitance	—	15	—		V_{DS} = 25V
C_{rss}	Reverse transfer capacitance	—	2	—		f = 1MHz

Source-Drain Ratings and Characteristics

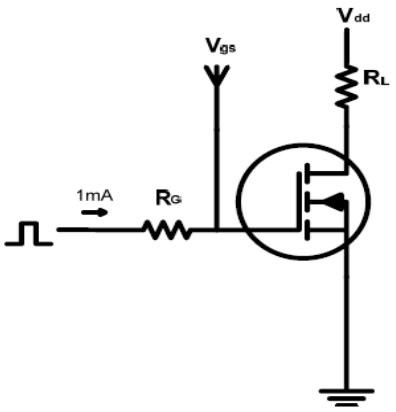
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	1	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode)	—	—	4	A	
V_{sd}	Diode Forward Voltage	—	1.2	1.5	V	I_S=1A, V_{GS}=0V
t_{rr}	Reverse Recovery Time	—	362	—	ns	T_J = 25°C, I_F =1A,
Q_{rr}	Reverse Recovery Charge	—	798	—	nC	di/dt = 100A/μs

Test circuits and Waveforms

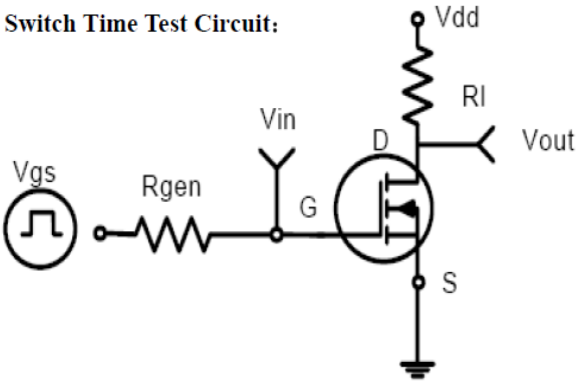
EAS test circuits:



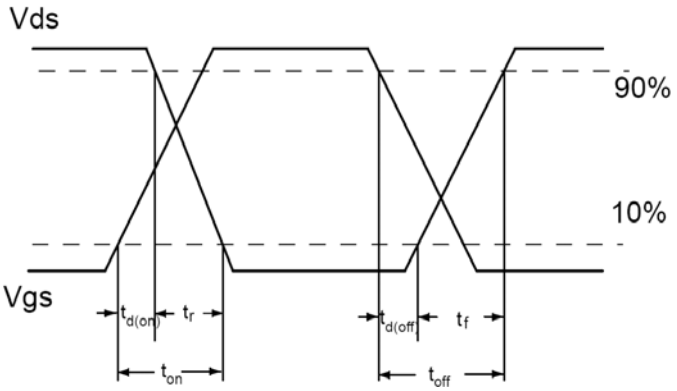
Gate charge test circuit:



Switch 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

Typical electrical and thermal characteristics

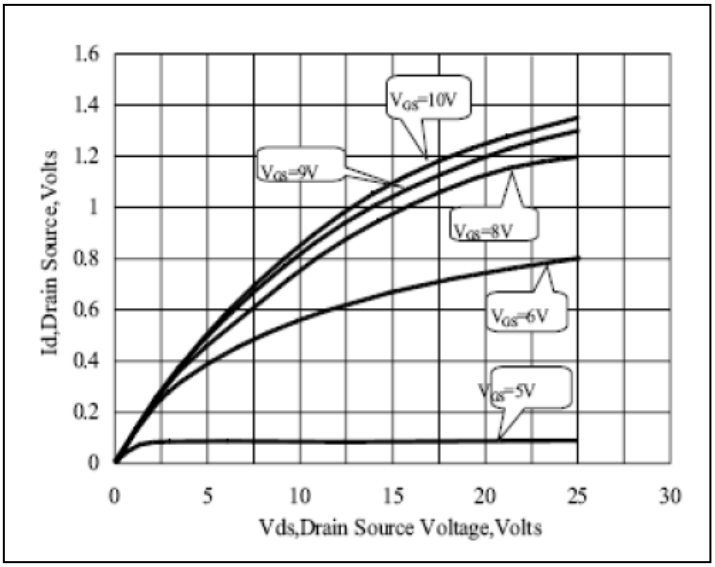


Figure 1: Typical Output Characteristics

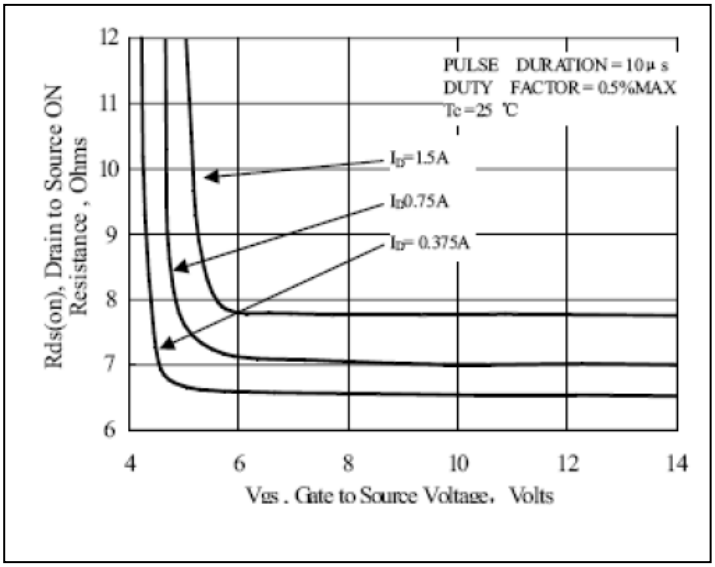


Figure 2. On-Resistance Vs. gate to source voltage

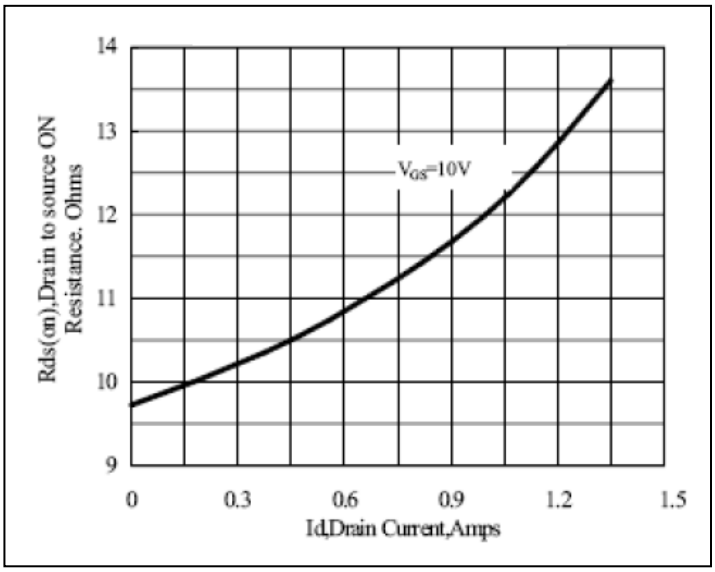


Figure 3. On-Resistance Vs. Drain to Source Current

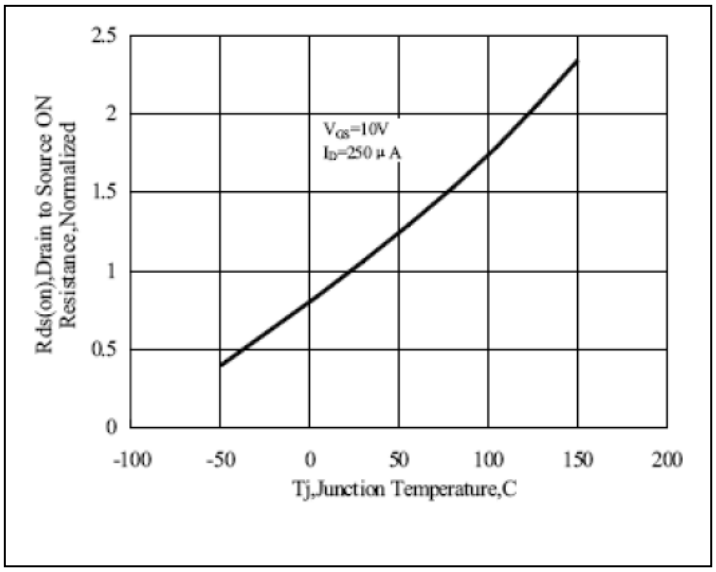
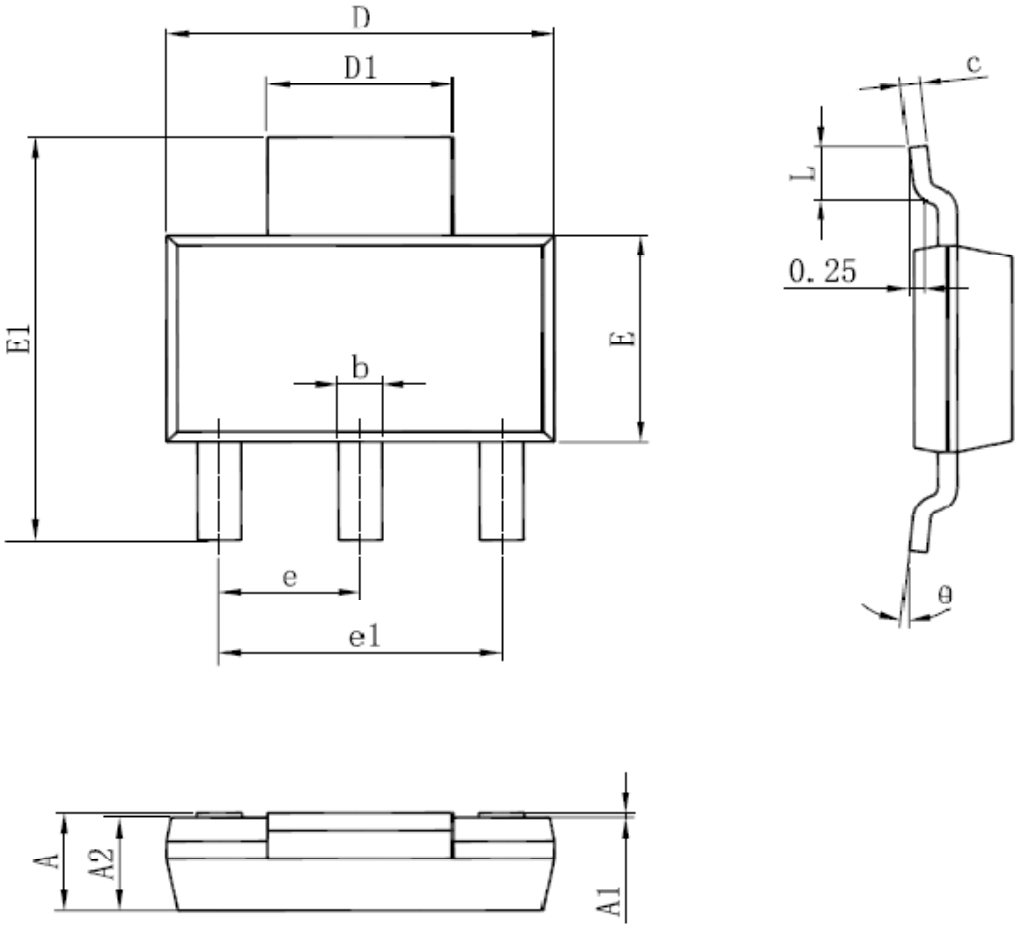


Figure 4: Normalized On-Resistance Vs. Case Temperature

Mechanical Data(SOT223)：



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.520	1.800	0.060	0.071
A1	0.000	0.100	0.000	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.820	0.026	0.032
c	0.250	0.350	0.010	0.014
D	6.200	6.400	0.244	0.252
D1	2.900	3.100	0.114	0.122
E	3.300	3.700	0.130	0.146
E1	6.830	7.070	0.269	0.278
e	2.300(BSC)		0.091(BSC)	
e1	4.500	4.700	0.177	0.185
L	0.900	1.150	0.035	0.045
θ	0°	10°	0°	10°

Ordering and Marking Information

Device Marking: 1N80G5

Package (Available)

SOT-223

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
SOT223	3000	10	30000	4	120000

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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