



NM2302B

3A, 20V N-CHANNEL MOSFET

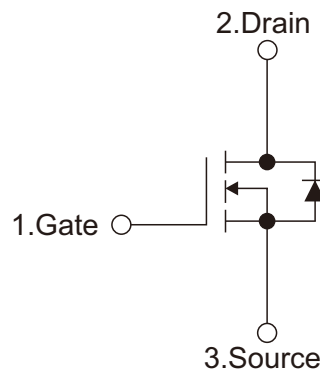
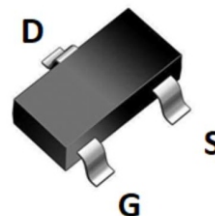
Features

- $R_{DS(ON)} \leq 55m\Omega$ @ $V_{GS}=4.5V$, $I_D=3.0A$
- $R_{DS(ON)} \leq 85m\Omega$ @ $V_{GS}=2.5V$, $I_D=2.0A$
- Fast switching capability
- Avalanche energy tested
- Improved dv/dt capability, high ruggedness

Application

- Load Switch
- PWM Application
- Power management

SOT-23



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

Parameter	Symbols	Ratings	Units	
Drain-Source Voltage	V_{DSS}	20	V	
Gate-Source Voltage	V_{GSS}	± 12	V	
Continuous Drain Current	I_D	$T_A=25^\circ C$	3	A
		$T_A=70^\circ C$	2.4	A
Pulsed Drain Current (Note 2)	I_{DM}	14	A	
Power Dissipation	P_D	0.7	W	
Operation Junction Temperature and Storage Temperature	T_j, T_{stg}	-55 ~ +150	°C	

Notes:

1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating: Pulse width limited by maximum junction temperature.



Electrical Characteristics (TA=25°C, unless otherwise specified)

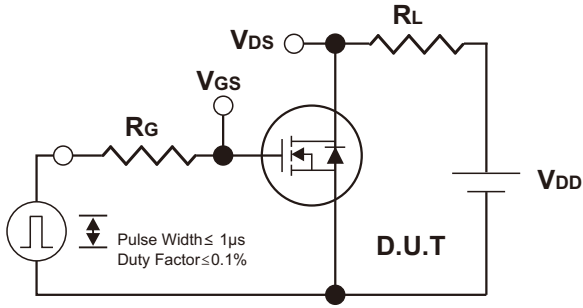
Parameter	Symbols	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	B_{VDSS}	$V_{GS}=0V, I_D=250\mu A$	20	22		V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=20V, V_{GS}=0V$			1	μA
Gate- Source Leakage Current	Forward	I_{GSS}			100	nA
	Reverse				-100	
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.5	0.7	1.1	V
Static Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=3A$		36	55	$m\Omega$
		$V_{GS}=2.5V, I_D=2A$		47	85	$m\Omega$
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=10V,$		220		pF
Output Capacitance	C_{oss}	$V_{GS}=0V,$		34		pF
Reverse Transfer Capacitance	C_{rss}	$f=1.0MHz$		26		pF
Switching Characteristics						
Total Gate Charge (Note 1)	Q_G	$V_{DS}=10V, V_{GS}=4.5V,$ $I_D=3A$		3.61		nC
Gate-Source Charge	Q_{GS}			0.88		nC
Gate-Drain Charge	Q_{GD}			0.77		nC
Turn-On Delay Time	$t_{D(on)}$	$V_{DS}=10V, V_{GS}=4.5V,$ $R_L=1.5\Omega, R_{GEN}=3\Omega$		6.8		ns
Turn-On Rise Time	t_R			57		ns
Turn-Off Delay Time	$t_{D(off)}$			14		ns
Turn-Off Fall Time	t_F			53		ns
Drain-Source Diode Characteristics and Maximum Ratings						
Maximum Body-Diode Continuous Current	I_S				3	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	$I_S=3A, V_{GS}=0V$			1.2	V

Notes:

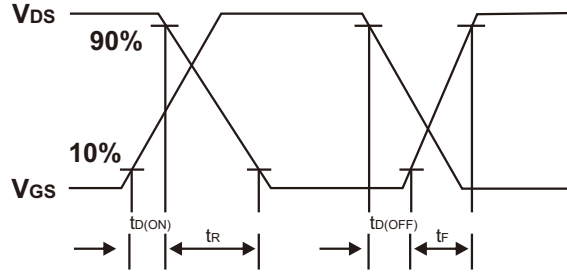
1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.
2. Essentially independent of operating temperature.



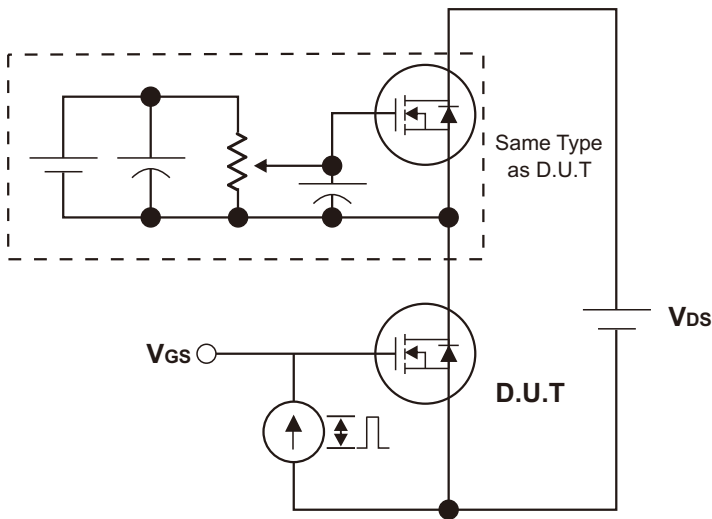
Test Circuits and waveforms



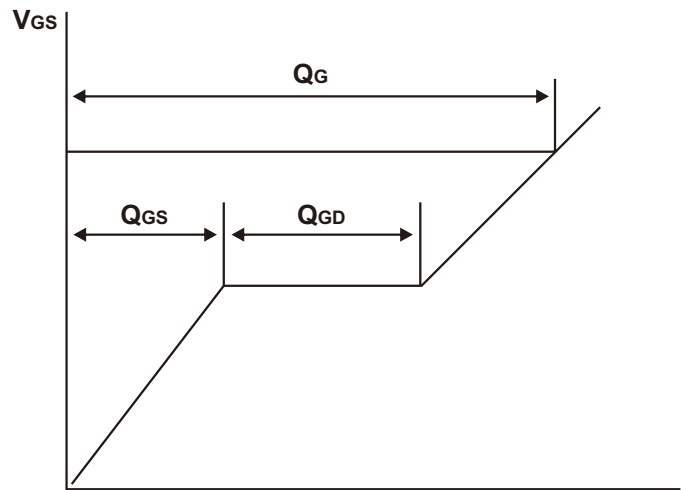
Switching Test Circuit



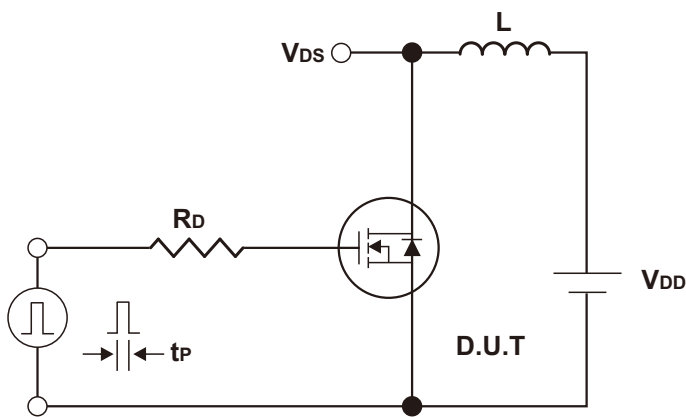
Switching Waveforms



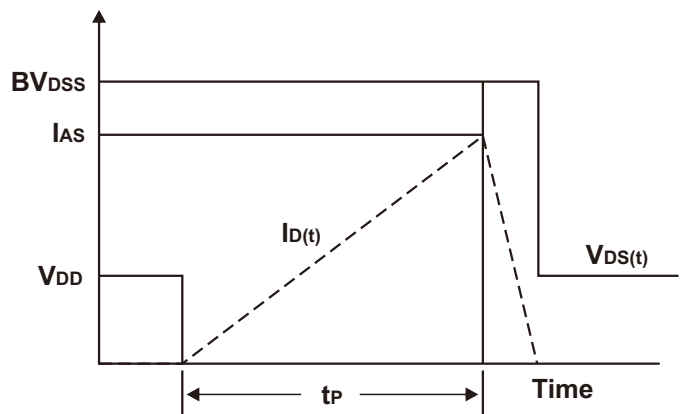
Gate Charge Test Circuit



Charge
Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms



Typical Characteristics

Fig.1 Drain Current vs. Drain-Source Voltage

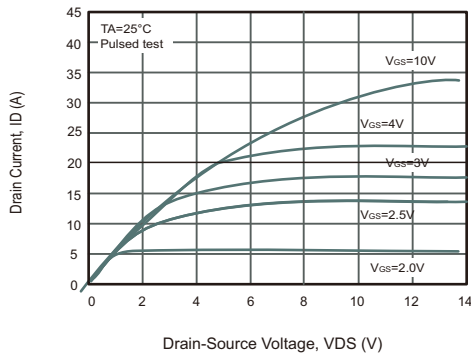


Fig.2 Transfer Characteristics

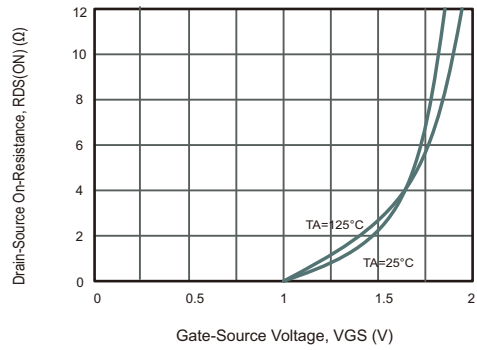


Fig.3 Gate Charge Characteristics

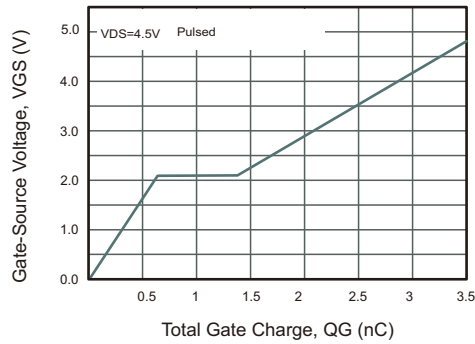


Fig.4 Capacitance Characteristics

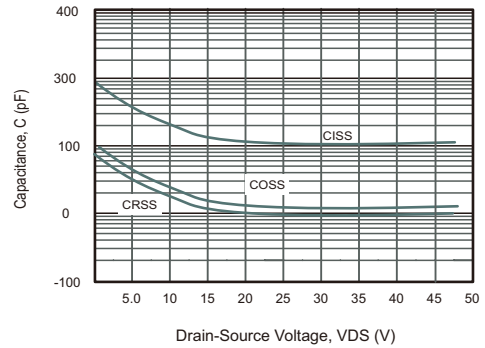


Fig.5 Drain-Source On-Resistance vs. Junction Temperature

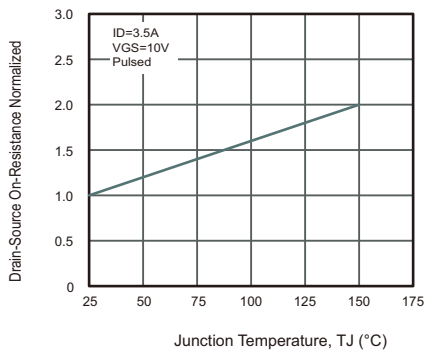
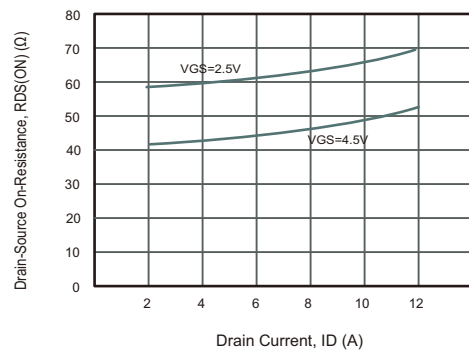
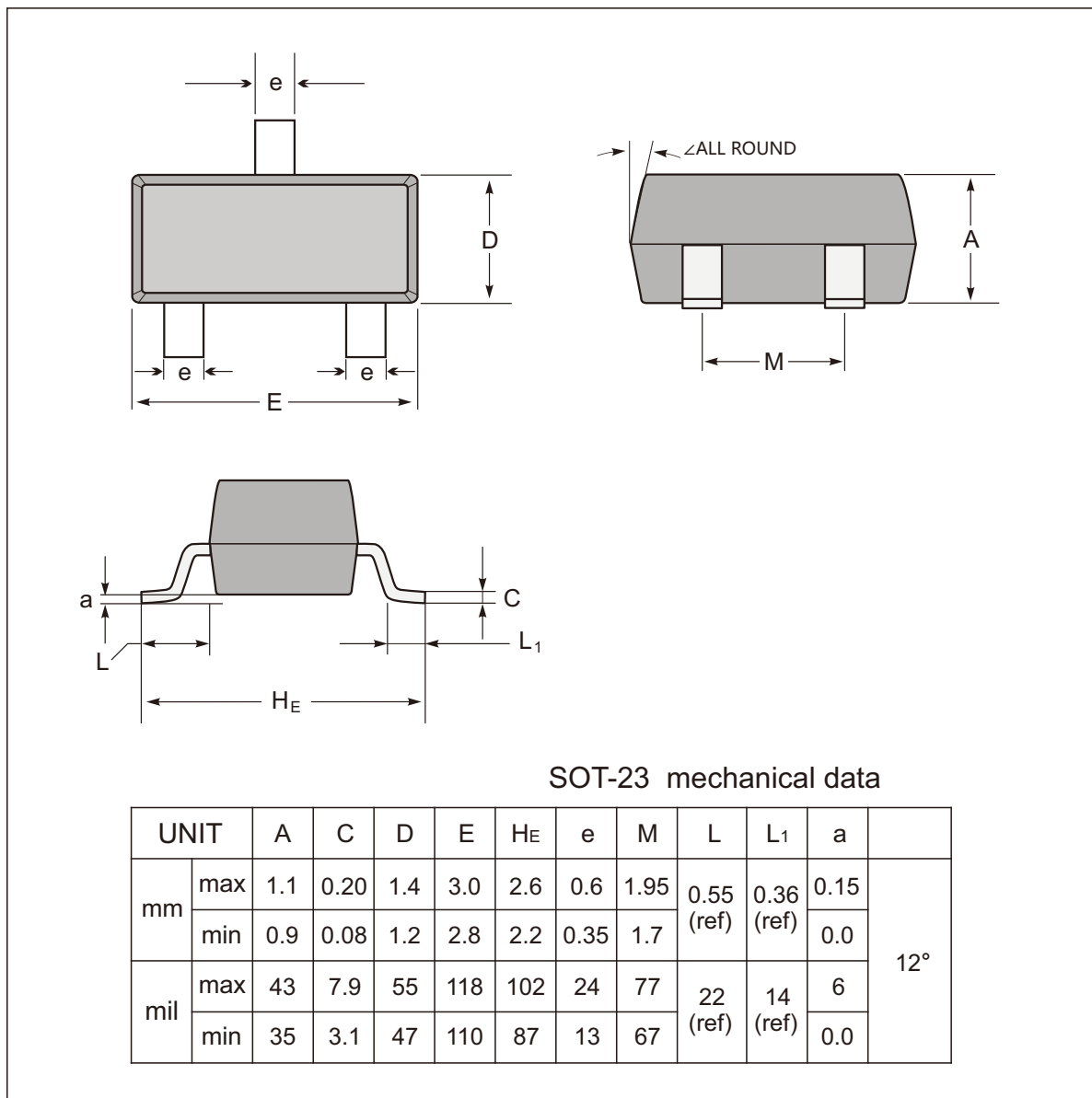


Fig.10 Drain-Source On-Resistance vs. Drain Current

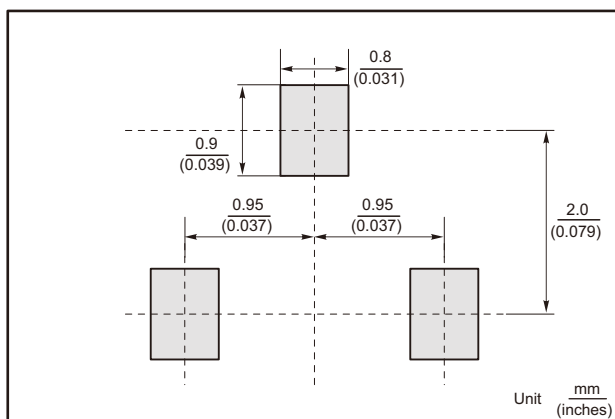




SOT-23 Package Outline Dimensions



The recommended mounting pad size



Marking

Type number	Marking code
NM2302B	2302B



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