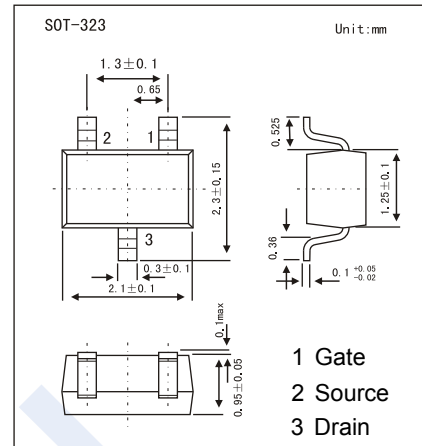


N-Channel MOSFET

2N7002W

■ Features

- $V_{DS}(V) = 60V$
- $I_D = 0.34 A$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 1.6 \Omega$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 2.5 \Omega$ ($V_{GS} = 4.5V$)
- ESD Protected



■ Absolute Maximum Ratings $T_a = 25^\circ C$

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (Steady State)	$T_a = 25^\circ C$	I_D	310	mA
	$T_a = 85^\circ C$		220	
Continuous Drain Current ($t < 5 s$)	$T_a = 25^\circ C$		340	
	$T_a = 85^\circ C$		240	
Pulsed Drain Current ($t_p = 10 \mu s$)		I_{DM}	1.4	A
Gate-Source ESD Rating		ESD	900	V
Power Dissipation	Steady State	P_D	280	mW
	$t < 5 s$		330	
Thermal Resistance.Junction- to-Ambient	Steady State	R_{thJA}	450	$^\circ C/W$
Thermal Resistance.Junction- to-Case	$t \leq 5 s$	R_{thJC}	375	
Lead Temperature for Soldering Purposes		T_L	260	$^\circ C$
Junction Temperature		T_J	150	
Storage Temperature Range		T_{stg}	-55 to 150	

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■ Electrical Characteristics Ta = 25°C

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V _{DSS}	I _D =250 μA, V _{GS} =0V	60			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V, T _J =25°C			1	μA
		V _{DS} =60V, V _{GS} =0V, T _J =125°C			500	
		V _{DS} =50V, V _{GS} =0V, T _J =25°C			0.1	
Gate-Body Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±10	μA
		V _{DS} =0V, V _{GS} =±10V			±450	
		V _{DS} =0V, V _{GS} =±5V			±150	
Gate Threshold Voltage (Note.1)	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250 μA	1		2.5	V
Static Drain-Source On-Resistance (Note.1)	R _{DS(on)}	V _{GS} =10V, I _D =500mA		1.19	1.6	Ω
		V _{GS} =4.5V, I _D =200mA		1.33	2.5	
On State Drain Current	I _{D(on)}	V _{GS} =4.5V, V _{DS} =5V	30			A
Forward Transconductance (Note.1)	g _{FS}	V _{DS} =5V, I _D =200mA		80		mS
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =20V, f=1MHz		24.5		pF
Output Capacitance	C _{oss}			4.2		
Reverse Transfer Capacitance	C _{rss}			2.2		
Total Gate Charge	Q _g	V _{GS} =4.5V, V _{DS} =10V, I _D =200mA		0.7		nC
Threshold Gate Charge	Q _{gT}			0.1		
Gate Source Charge	Q _{gs}			0.3		
Gate Drain Charge	Q _{gd}			0.1		
Turn-On DelayTime	t _{d(on)}	V _{GS} =10V, V _{DS} =25V, I _D =500mA, R _G =25 Ω (Note.2)		12.2		ns
Turn-On Rise Time	t _r			9		
Turn-Off DelayTime	t _{d(off)}			55.8		
Turn-Off Fall Time	t _f			29		
Maximum Body-Diode Continuous Current	I _S				0.25	A
Diode Forward Voltage	V _{SD}	I _S =0.2 A, V _{GS} =0V, T _J = 25°C		0.8	1.2	V
		I _S =0.2 A, V _{GS} =0V, T _J = 85°C		0.7		

Note.1:Pulse Test: pulse width ≤ 300us, duty cycle ≤ 2%

Note.2:Switching characteristics are independent of operating junction temperatures

■ Marking

Marking	71
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■ Typical Characteristics

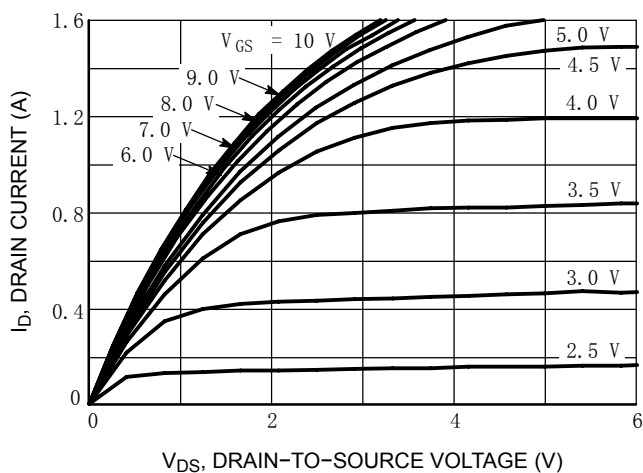


Figure 1. On -Region Characteristics

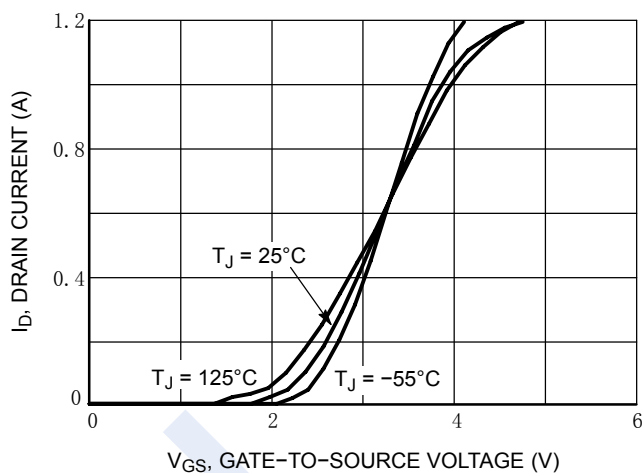


Figure 2. Transfer Characteristics

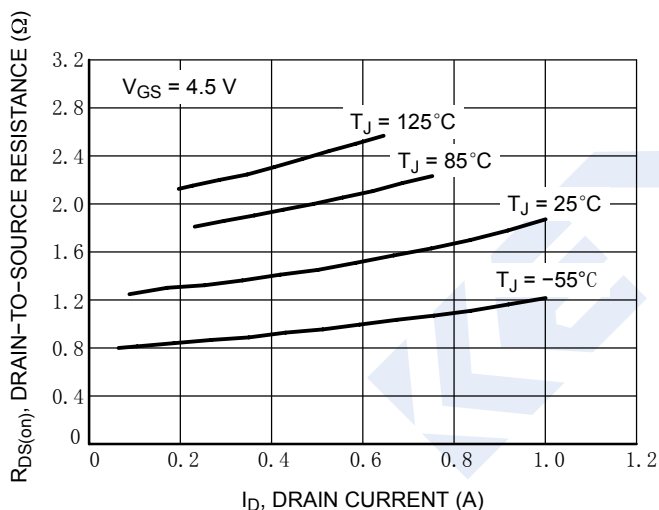


Figure 3. On -Resistance vs. Drain Current and Temperature

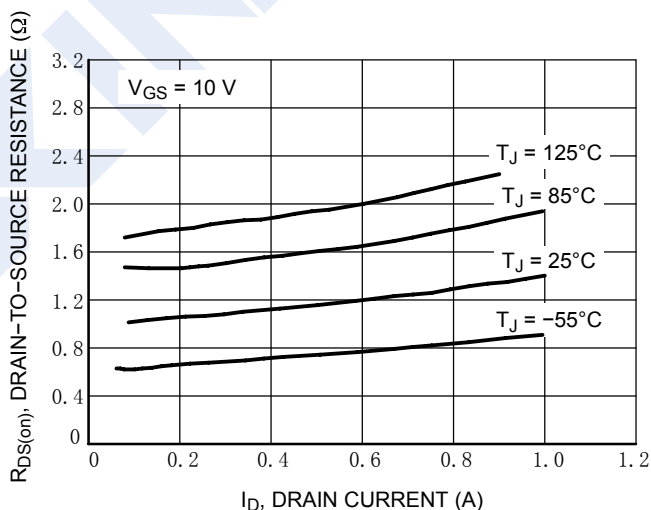


Figure 4. On -Resistance vs. Drain Current and Temperature

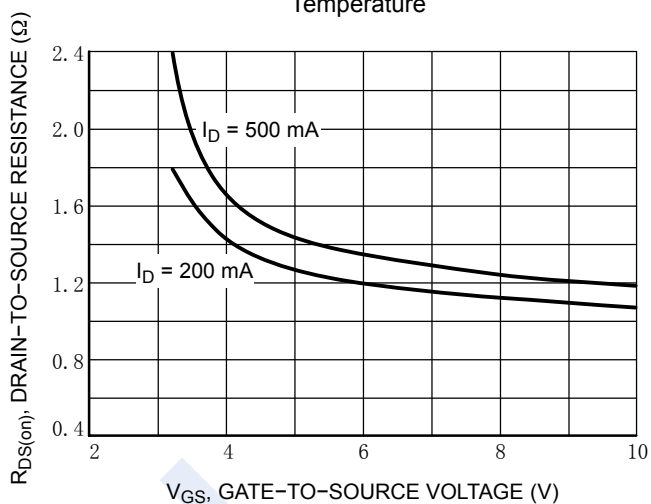


Figure 5. On -Resistance vs. Gate -to-Source Voltage

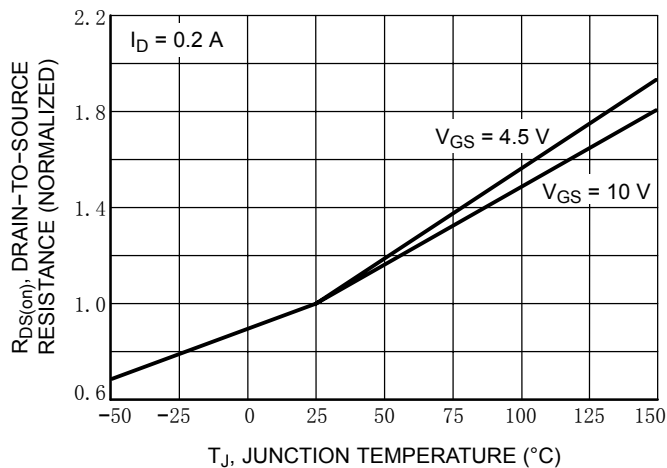


Figure 6. On -Resistance Variation with Temperature

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■ Typical Characteristics

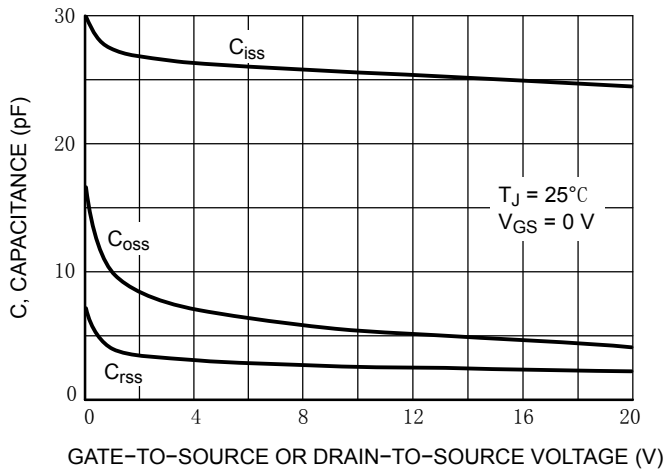


Figure 7. Capacitance Variation

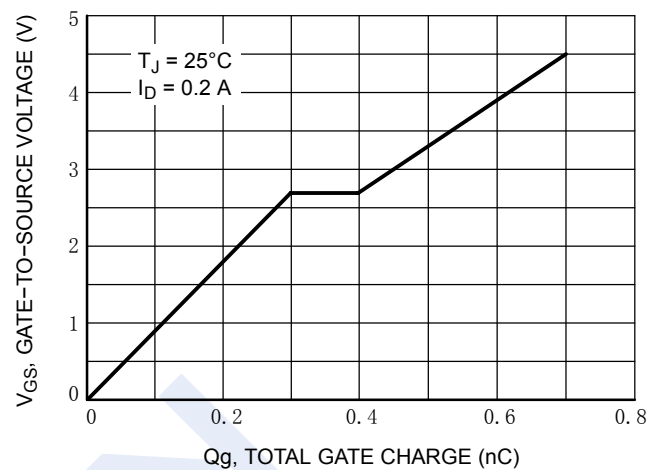


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

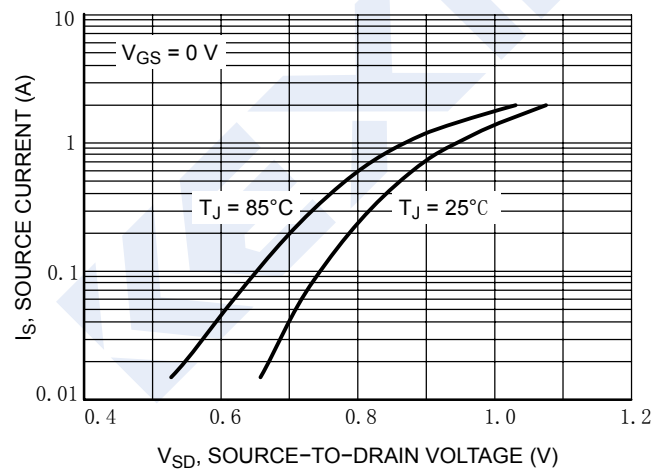


Figure 9. Diode Forward Voltage vs. Current