

General Features

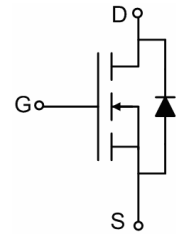
- $V_{DS} = 60V, I_D = 0.115A$
 $R_{DS(ON)} < 3.5\Omega @ V_{GS}=5V$
 $R_{DS(ON)} < 3\Omega @ V_{GS}=10V$
- Lead free product is acquired
- Surface mount package

Application

- Direct logic-level interface: TTL/CMOS
- Drivers: relays, solenoids, lamps, hammers, display, memories, transistors, etc.
- Battery operated systems
- Solid-state relays



SOT-23-3



Schematic Diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
VSM2N7002A-S2	VSM2N7002A	SOT-23-3	Ø180mm	8 mm	3000 units

Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous@ Current-Pulsed (Note 1)	I_D	0.115	A
	I_{DM}	0.8	A
Maximum Power Dissipation	P_D	0.2	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	625	°C/W
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Electrical Characteristics (TC=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60	68	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$	-	-	1	μA

Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1	1.7	2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =5V, I _D =0.05A	-	2.3	3.5	Ω
		V _{GS} =10V, I _D =0.5A	-	2.1	3	Ω
Forward Transconductance	g _{FS}	V _{DS} =10V, I _D =0.2A	0.08	-	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C _{ISS}	V _{DS} =30V, V _{GS} =0V, F=1.0MHz	-	20	50	PF
Output Capacitance	C _{OSS}		-	10	20	PF
Reverse Transfer Capacitance	C _{RSS}		-	3.6	5	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =30V, I _D =0.2A V _{GS} =10V, R _{GEN} =10Ω	-	10	-	nS
Turn-on Rise Time	t _r		-	50	-	nS
Turn-Off Delay Time	t _{d(off)}		-	17	-	nS
Turn-Off Fall Time	t _f		-	10	-	nS
Total Gate Charge	Q _g	V _{DS} =10V, I _D =0.115A, V _{GS} =4.5V	-	1.7	3	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =0.115A	-	-	1.2	V
Diode Forward Current (Note 2)	I _S		-	-	0.115	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Typical Electrical and Thermal Characteristics

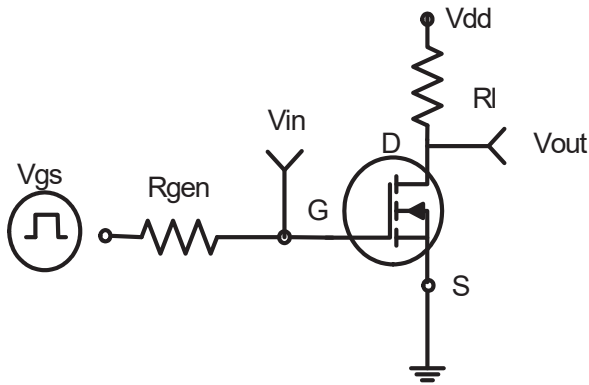


Figure 1: Switching Test Circuit

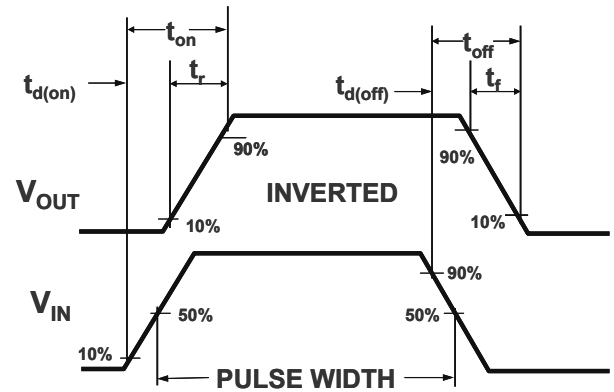


Figure 2: Switching Waveforms

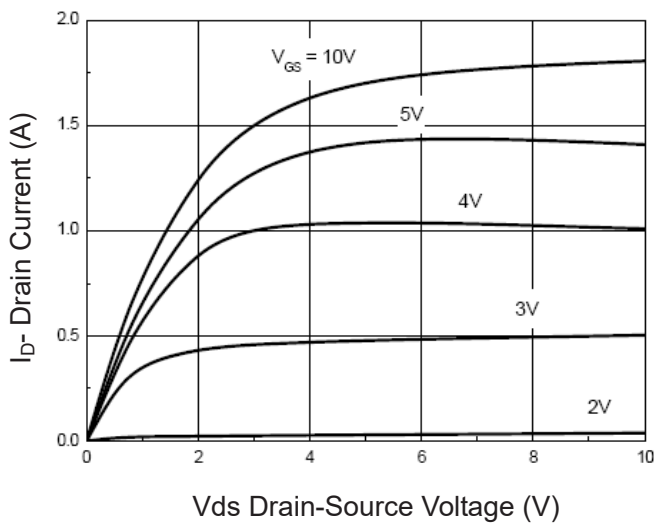


Figure 3 Output Characteristics

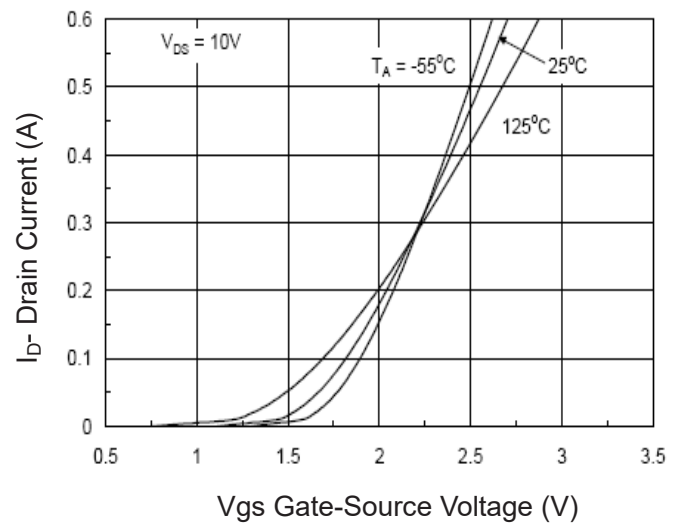


Figure 4 Transfer Characteristics

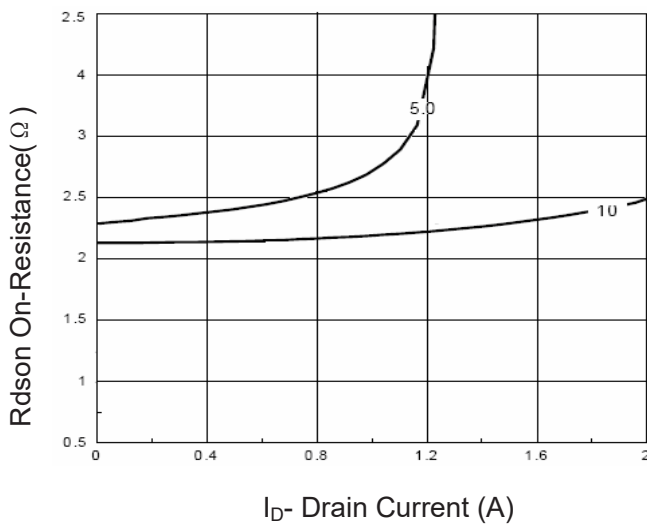


Figure 5 Drain-Source On-Resistance

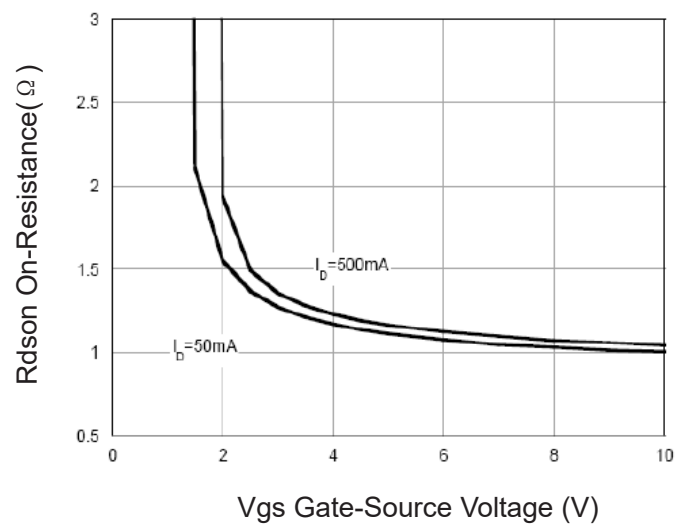
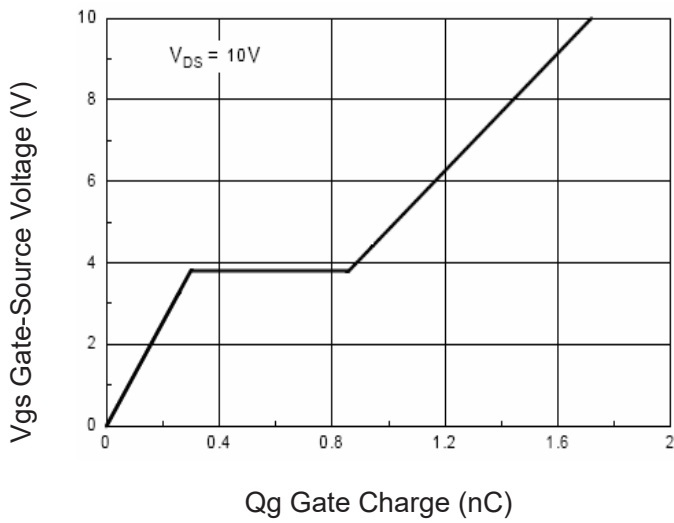
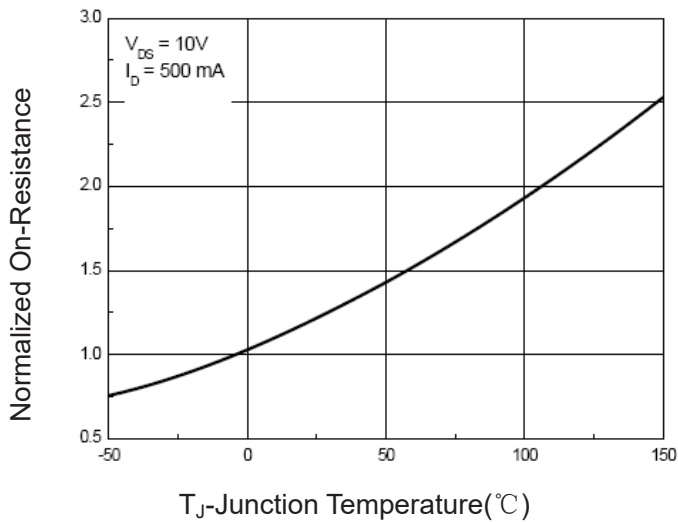
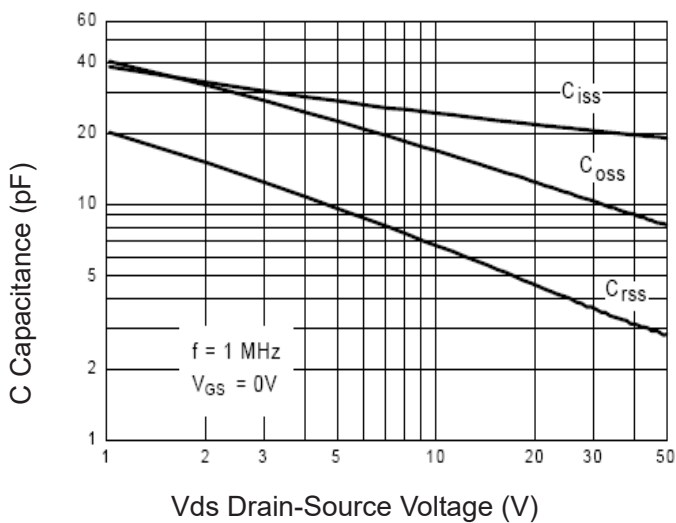
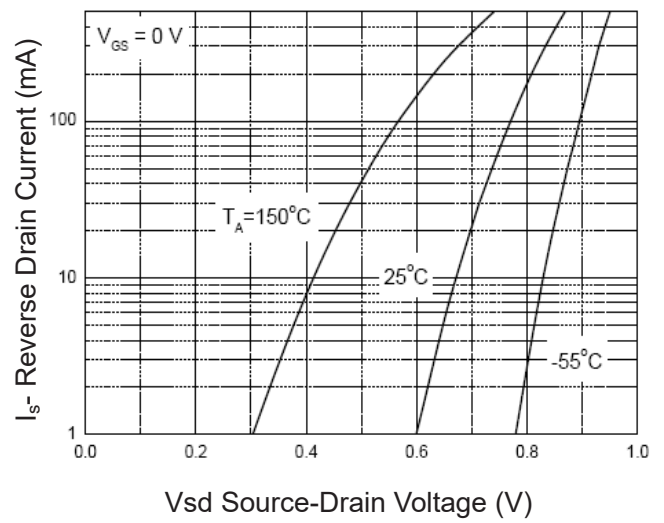
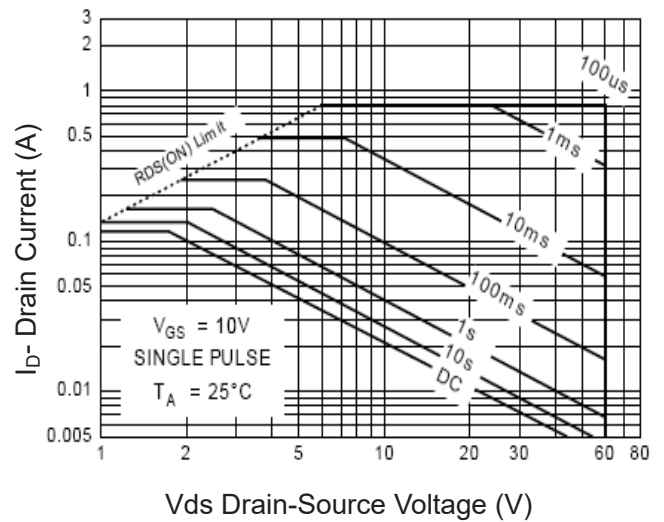


Figure 6 Rdson vs Vgs


Figure 7 Gate Charge

Figure 9 Drain-Source On-Resistance

Figure 11 Capacitance vs Vds

Figure 8 Source-Drain Diode Forward

Figure 10 Safe Operation Area

