



## 2N7002ZW

Power MOSFET

### 300mA, 60V N-CHANNEL ENHANCEMENT MODE MOSFET

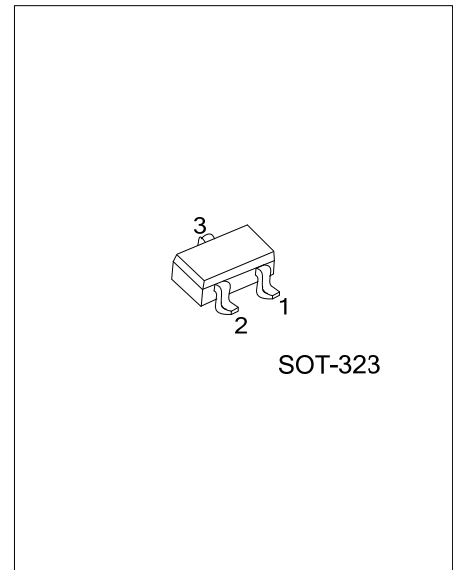
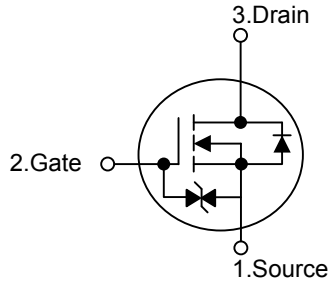
#### DESCRIPTION

The UTC **2N7002ZW** uses advanced technology to provide excellent  $R_{DS(ON)}$ , low gate charge and low gate voltages during operation. This device is suitable for use as a load switch or in PWM applications.

#### FEATURES

- \* Low Reverse Transfer Capacitance ( $C_{RSS}$  = typical 3.0 pF)
- \* ESD Protected
- \* Fast Switching Capability
- \* Avalanche Energy Specified
- \* Improved dv/dt Capability, High Ruggedness

#### SYMBOL



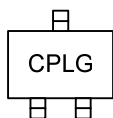
#### ORDERING INFORMATION

Ordering Number	Package	Pin Assignment			Packing
		1	2	3	
2N7002ZWG-AL3-R	SOT-323	S	G	D	Tape Reel

Note: Pin Assignment: G: Gate D: Drain S: Source

<p>2N7002ZWG-AL3-R</p> <ul style="list-style-type: none"> <li>(1) Packing Type</li> <li>(2) Package Type</li> <li>(3) Green Package</li> </ul>	<ul style="list-style-type: none"> <li>(1) R: Tape Reel</li> <li>(2) AL3: SOT-323</li> <li>(3) G: Halogen Free and Lead Free</li> </ul>
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#### MARKING



■ ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ , unless otherwise specified.)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DSS}$	60	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Drain Current	Continuous	300	mA
	Pulse(Note 2)	800	
Power Dissipation	$P_D$	200	mW
Derating above $T_A=25^\circ\text{C}$		1.6	mW/ $^\circ\text{C}$
Junction Temperature	$T_J$	+150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

Note: 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.

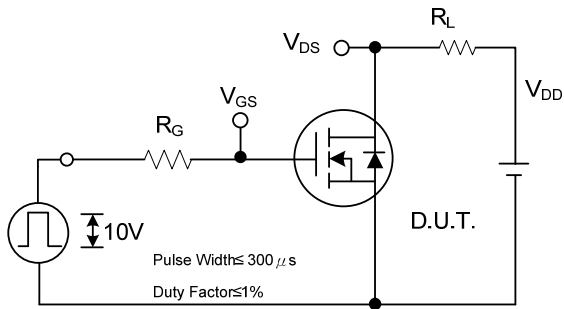
■ ELECTRICAL CHARACTERISTICS ( $T_A=25^\circ\text{C}$ , unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=10\mu A$	60			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V$			1.0	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 10$	$\mu A$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.85	2.5	V
Static Drain-Source On-Resistance (Note)	$R_{DS(ON)}$	$V_{GS}=10V, I_D=500mA$			2	$\Omega$
		$V_{GS}=4.5V, I_D=200mA$			4	
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=25V, V_{GS}=0V, f=1.0MHz$		25	50	pF
Output Capacitance	$C_{OSS}$		10	25	pF	
Reverse Transfer Capacitance	$C_{RSS}$		3.0	5.0	pF	
<b>SWITCHING PARAMETERS</b>						
Turn-ON Delay Time	$t_{D(ON)}$	$I_D=0.2A, V_{DD}=30V, V_{GS}=10V,$		12	20	ns
Turn-OFF Delay Time	$t_{D(OFF)}$	$R_L=150\Omega, R_G=10\Omega$		20	30	ns
<b>DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS</b>						
Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=200mA$ (Note )		0.88	1.3	V
Maximum Pulsed Drain-Source Diode Forward Current	$I_{SM}$				0.8	A
Maximum Continuous Drain-Source Diode Forward Current	$I_S$				300	mA

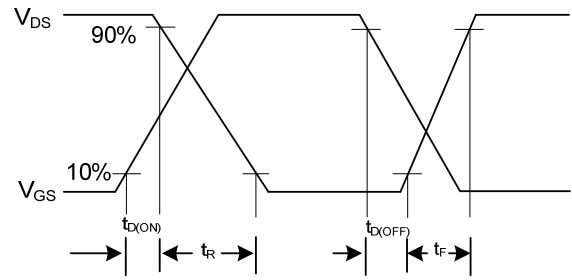
Note: 1. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch. Minimum land pad size.

2. Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 1\%$

## ■ TEST CIRCUITS AND WAVEFORMS

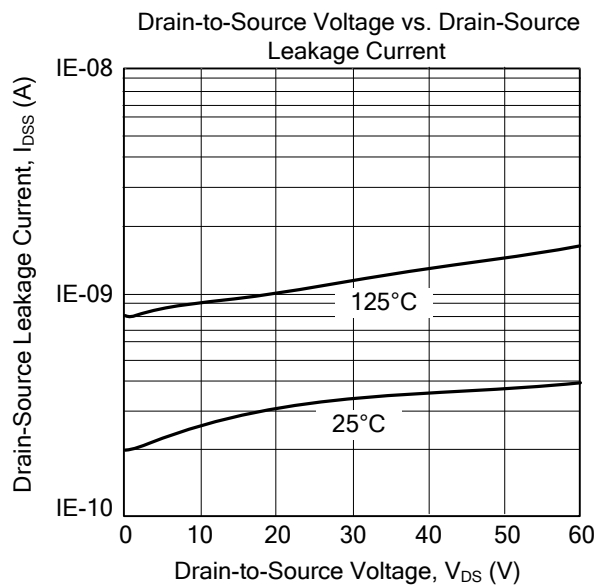
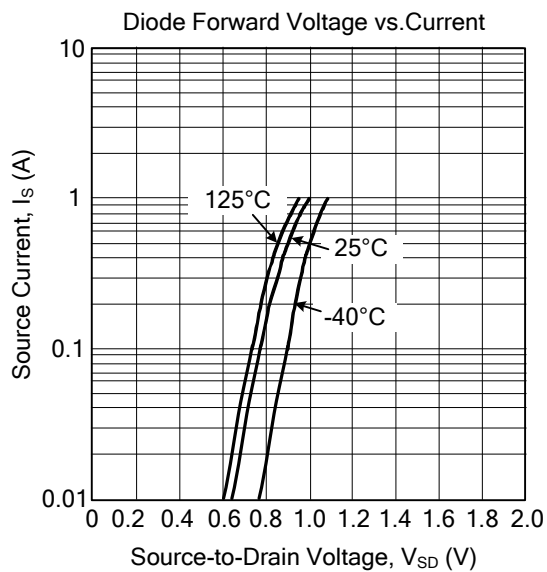
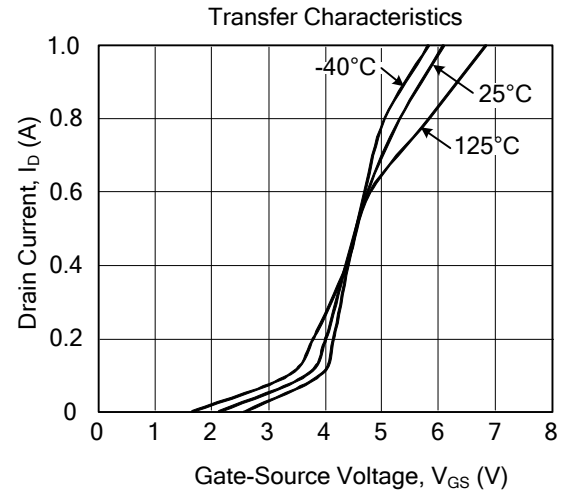
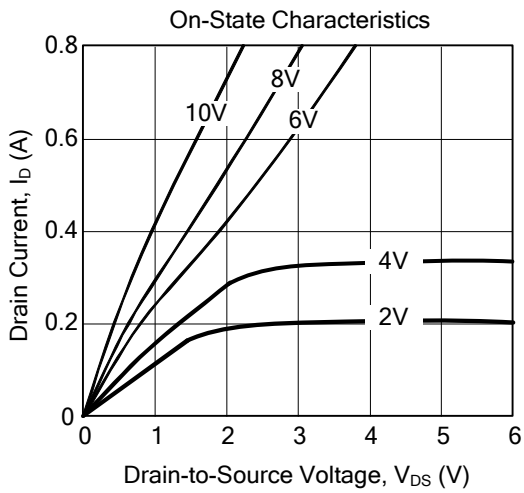
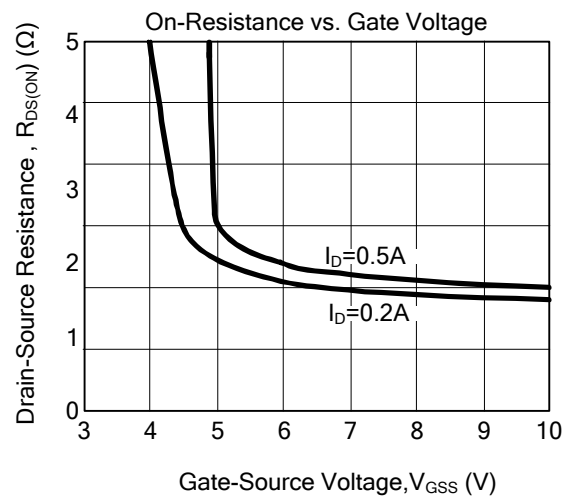
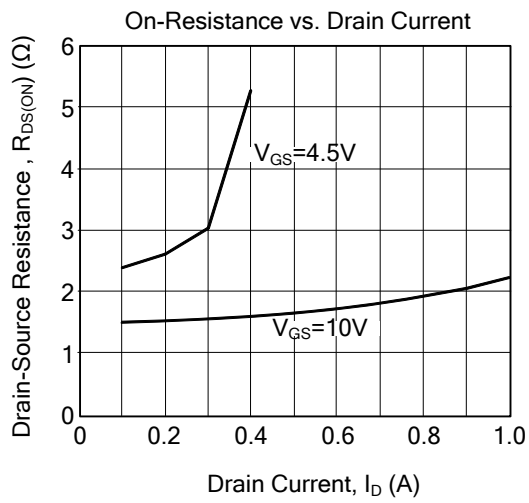


**Switching Test Circuit**

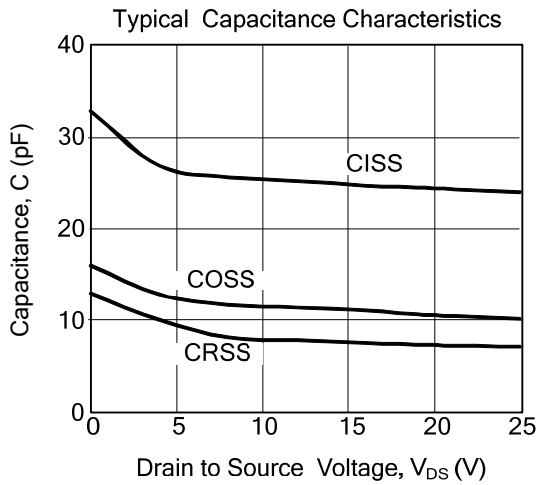


**Switching Waveforms**

## ■ TYPICAL CHARACTERISTICS



## ■ TYPICAL CHARACTERISTICS (Cont.)



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