



## 2N7002ZT

Power MOSFET

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

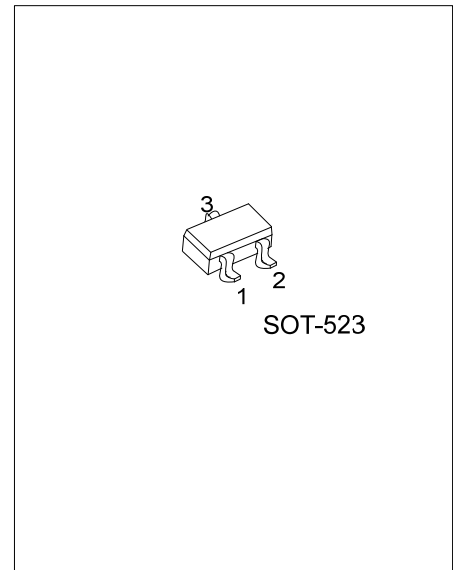
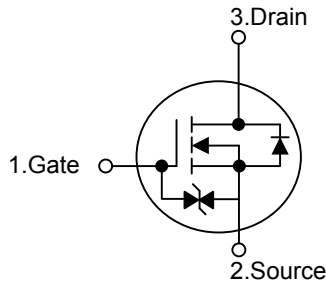
#### DESCRIPTION

The UTC **2N7002ZT** 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
- \* ESD Protected
- \* Fast Switching Capability
- \* Avalanche Energy Specified
- \* Improved dv/dt Capability, High Ruggedness

#### SYMBOL



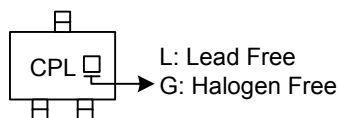
#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
2N7002ZTL-AN3-R	2N7002ZTG-AN3-R	SOT-523	G	S	D	Tape Reel

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

<p>2N7002ZTG-AN3-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) AN3: SOT-523 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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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	$^\circ\text{C}$

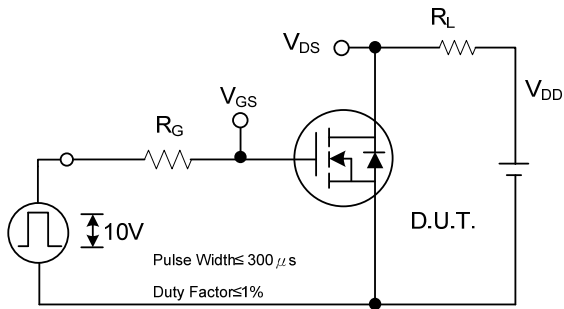
Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

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

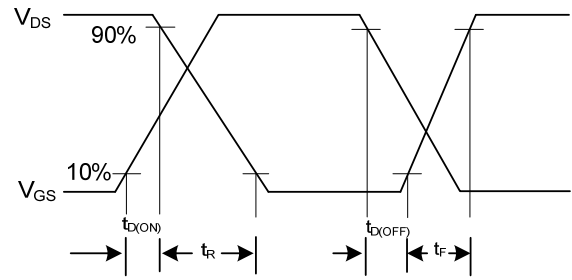
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0\text{V}, I_D=10\mu\text{A}$	60			V
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=60\text{V}, V_{GS}=0\text{V}$			1	$\mu\text{A}$
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0\text{V}, V_{GS}=\pm 20\text{V}$			$\pm 10$	$\mu\text{A}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1.0		2.5	V
Static Drain-Source On-Resistance (Note)	$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=300\text{mA}$			4.0	$\Omega$
		$V_{GS}=4.5\text{V}, I_D=50\text{mA}$			6.0	$\Omega$
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=25\text{V}, V_{GS}=0\text{V}, f=1.0\text{MHz}$		22	50	pF
Output Capacitance	$C_{OSS}$		9	25	pF	
Reverse Transfer Capacitance	$C_{RSS}$		4	5.0	pF	
<b>SWITCHING PARAMETERS</b>						
Turn-ON Delay Time	$t_{D(ON)}$	$I_D=0.2\text{A}, V_{DD}=30\text{V}, V_{GS}=10\text{V}, R_L=150\Omega, R_G=10\Omega$		1.3	20	ns
Turn-OFF Delay Time	$t_{D(OFF)}$		4.2	30	ns	
<b>DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS</b>						
Maximum Continuous Drain-Source Diode Forward Current	$I_S$				300	mA
Maximum Pulsed Drain-Source Diode Forward Current	$I_{SM}$				0.8	A
Drain-Source Diode Forward Voltage	$V_{SD}$	$V_{GS}=0\text{V}, I_S=300\text{mA}$ (Note)		0.88	1.5	V

Notes: 1. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch. Minimum land pad size.  
2. Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 1\%$

## ■ TEST CIRCUITS AND WAVEFORMS

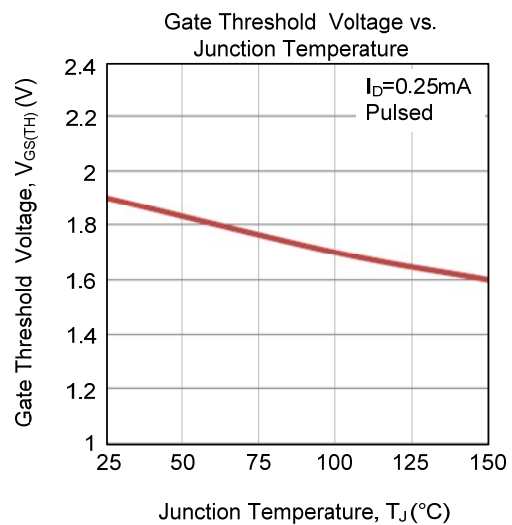
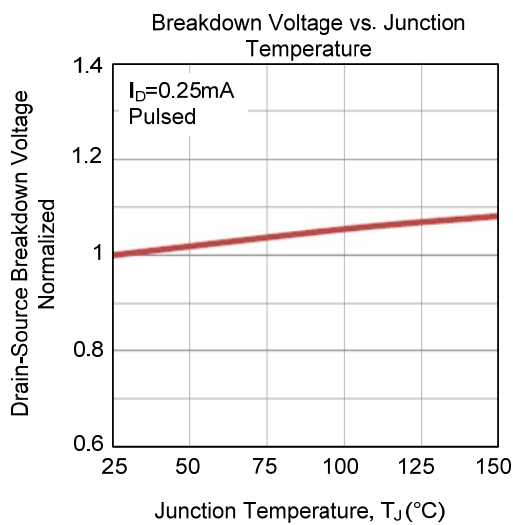
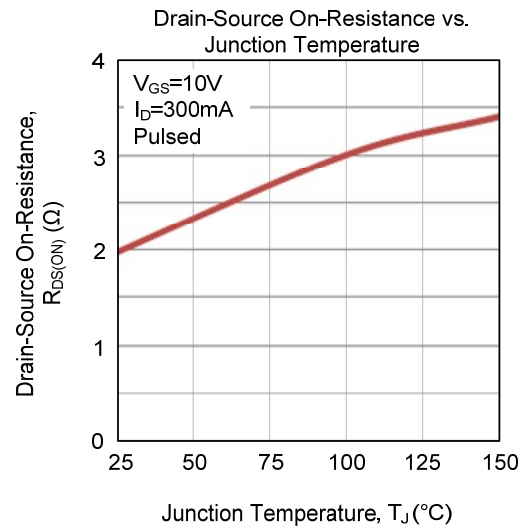
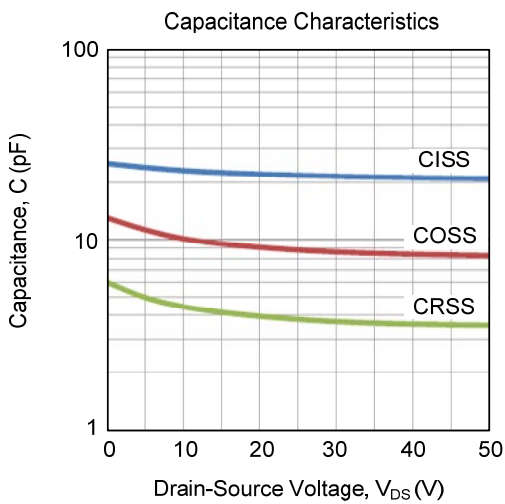
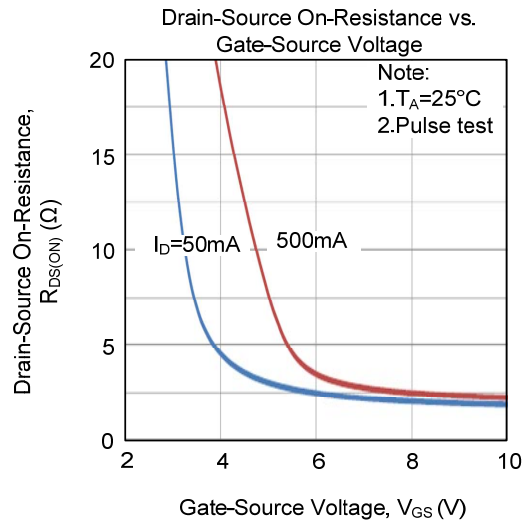
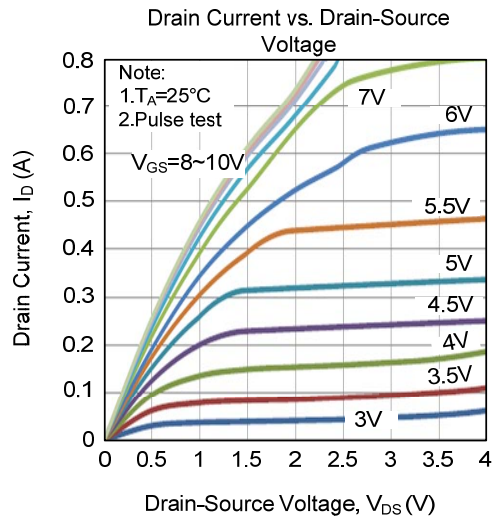


**Switching Test Circuit**

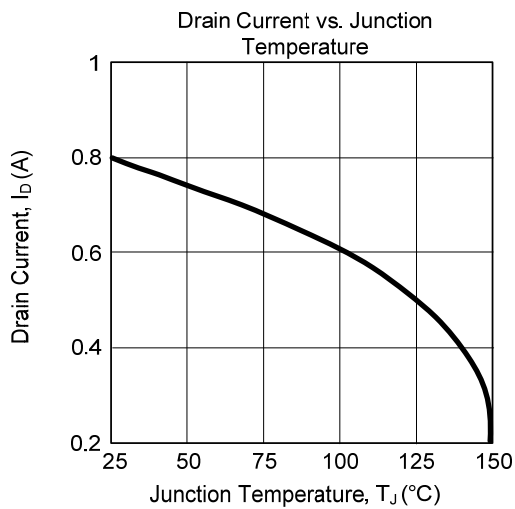
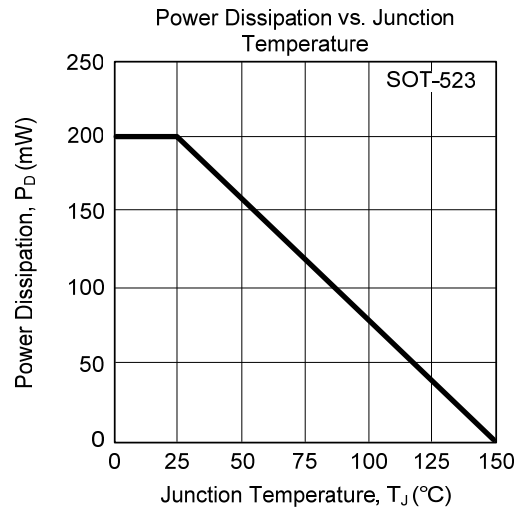
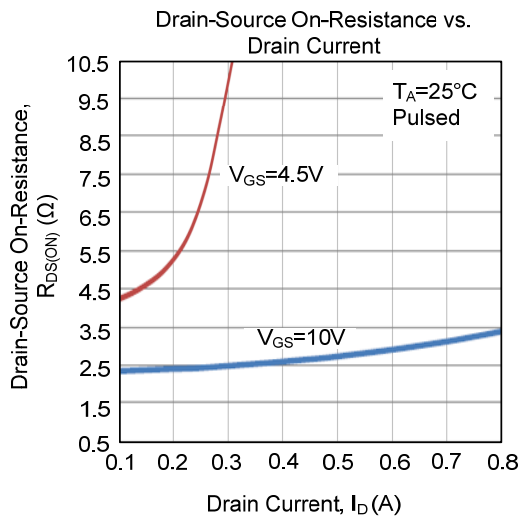
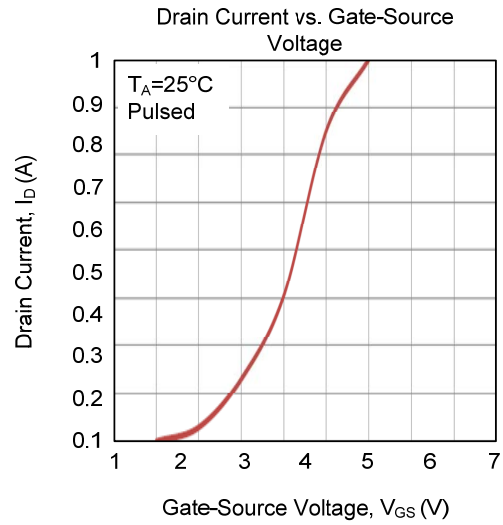
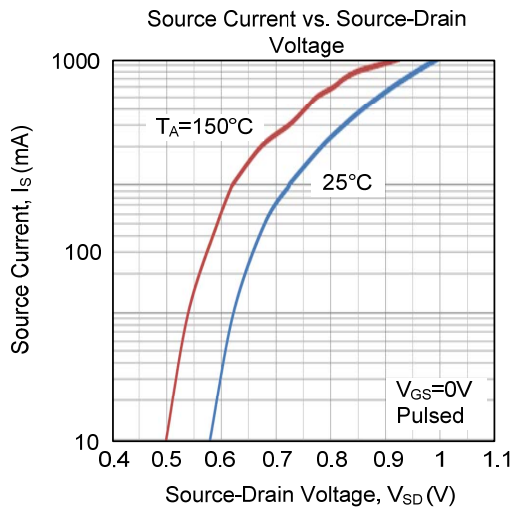


**Switching Waveforms**

## TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



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