



**2N7002DW-Q**

Preliminary

*Power MOSFET*

**300mA, 60V DUAL  
N-CHANNEL POWER MOSFET**

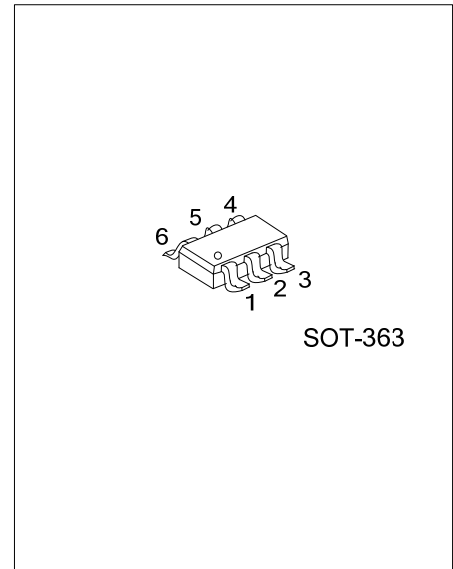
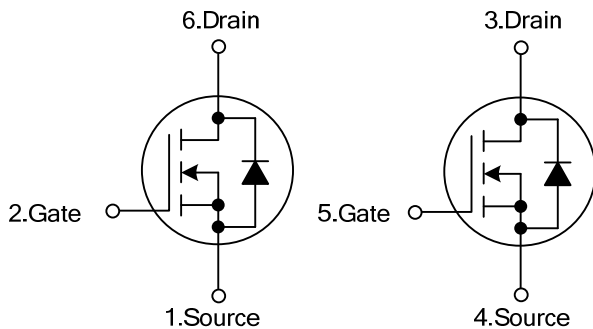
■ DESCRIPTION

The UTC **2N7002DW-Q** uses advanced technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

■ FEATURES

- \* High Density Cell Design for Low  $R_{DS(ON)}$ .
- \* Voltage Controlled Small Signal Switch
- \* Rugged and Reliable
- \* High Saturation Current Capability

■ SYMBOL



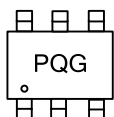
■ ORDERING INFORMATION

Ordering Number	Package	Pin Assignment						Packing
		1	2	3	4	5	6	
2N7002DWG-Q-AL6-R	SOT-363	S1	G1	D2	S2	G2	D1	Tape Reel

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

<p>2N7002DWG-Q-AL6-R</p> <p>├── (1)Packing Type</p> <p>├── (2)Package Type</p> <p>└── (3)Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) AL6: SOT-363</p> <p>(3) G: Halogen Free and Lead Free</p>
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■ MARKING



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

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	$V_{DSS}$	60	V
Drain-Gate Voltage ( $R_{GS} \leq 1M\Omega$ )	$V_{DGR}$	60	V
Gate Source Voltage	$V_{GSS}$	±20	V
		±40	
Drain Current	$I_D$	300	mA
		800	
Power Dissipation	$P_D$	200	mW
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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	625 (Note1)	$^\circ\text{C/W}$

■ 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	$\mu A$
Gate-Source Leakage Current	$I_{GSSF}$	$V_{GS}=20V, V_{DS}=0V$			100	nA
		$V_{GS}=-20V, V_{DS}=0V$			-100	nA
<b>ON CHARACTERISTICS (Note 2)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0		2.5	V
Drain-Source On-Voltage	$V_{DS(ON)}$	$V_{GS}=10V, I_D=500mA$			3.75	V
		$V_{GS}=5.0V, I_D=50mA$			1.5	
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=5.0V, I_D=50mA$			4.0	$\Omega$
		$V_{GS}=10V, I_D=500mA$			2.5	$\Omega$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=25V, V_{GS}=0V, f=1.0MHz$		20		pF
Output Capacitance	$C_{OSS}$			11		pF
Reverse Transfer Capacitance	$C_{RSS}$			4		pF
Turn-On Time	$t_{D(ON)}$	$V_{DD}=30V, R_L=150\Omega, I_D=200mA, V_{GS}=10V, R_G=25\Omega$			20	nS
Turn-Off Time	$t_{D(OFF)}$	$V_{DD}=30V, R_L=25\Omega, I_D=200mA, V_{GS}=10V, R_G=25\Omega$			20	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	$V_{SD}$	$I_S=300mA, V_{GS}=0V$ (Note )			1.5	V

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

2. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2.0\%$ .

■ TEST CIRCUIT AND WAVEFORM

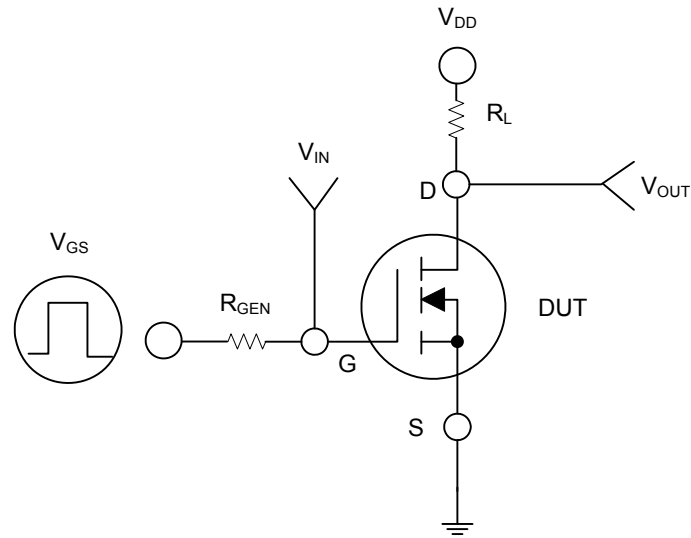


Fig. 1

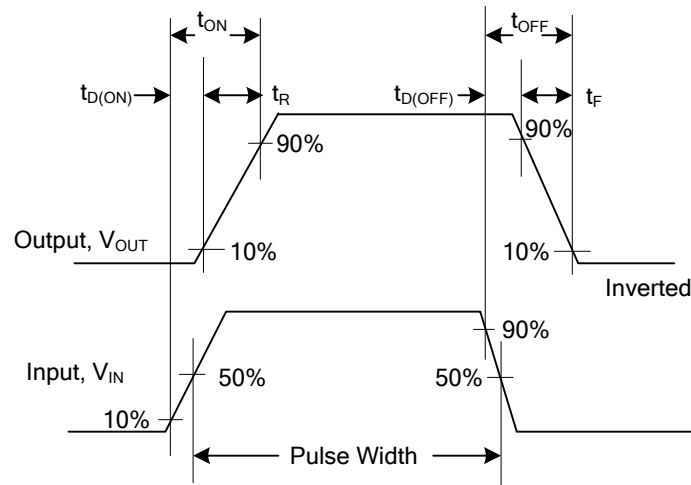
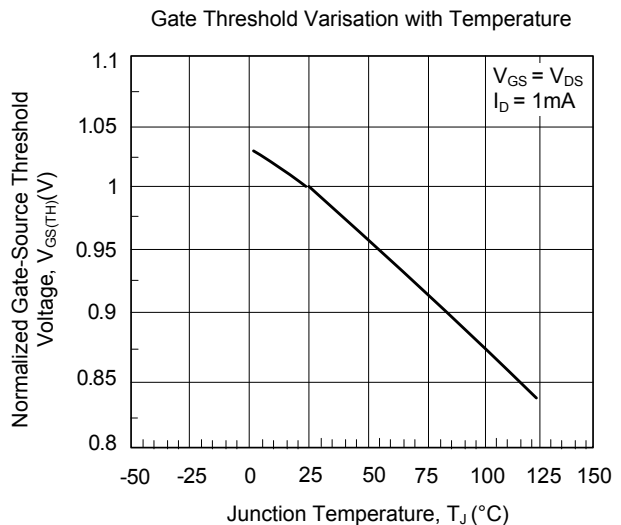
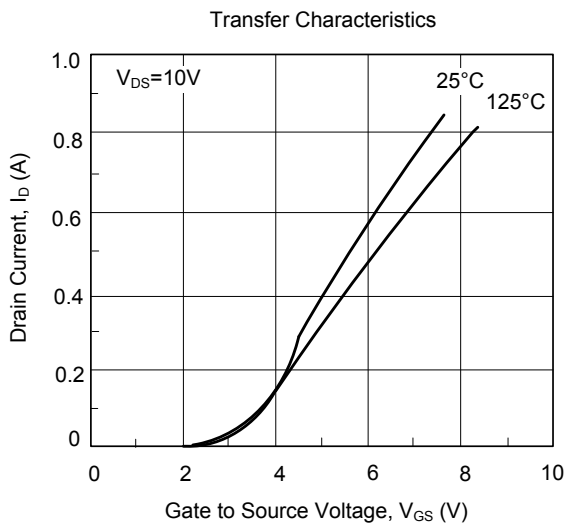
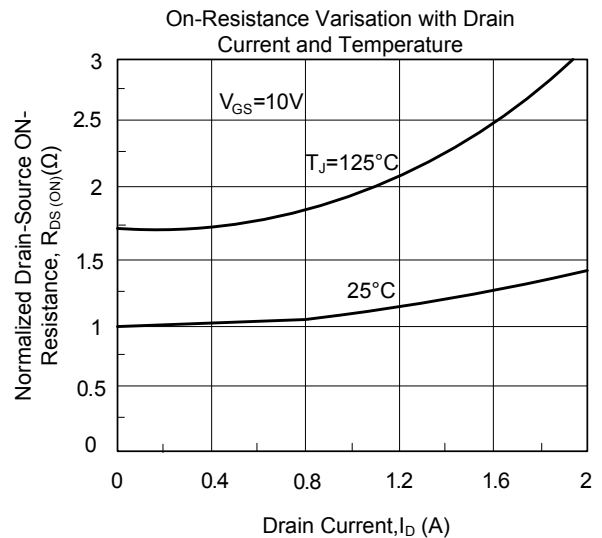
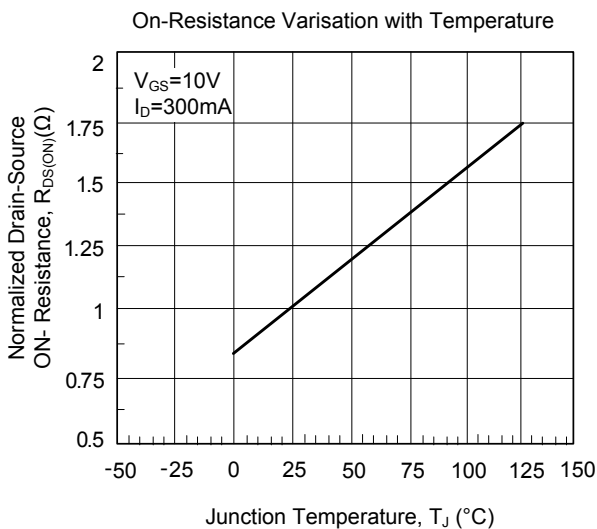
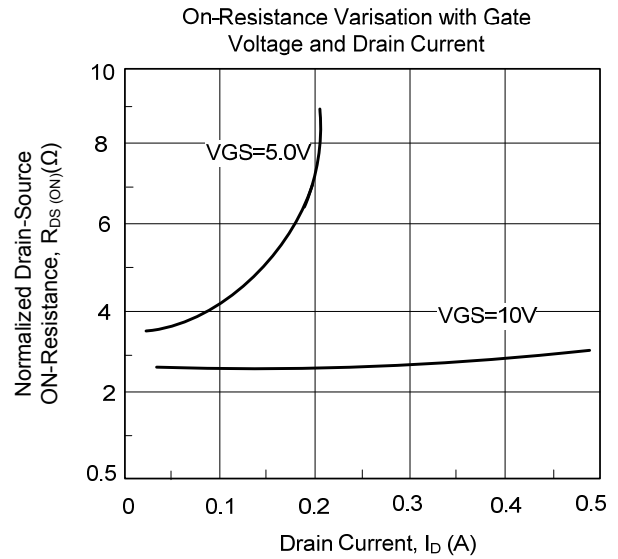
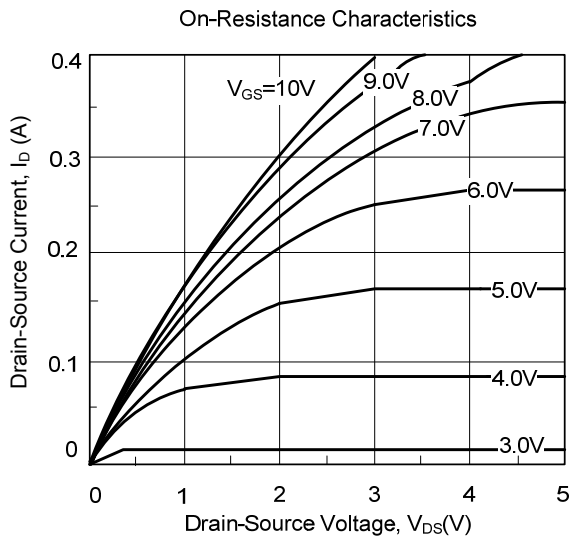


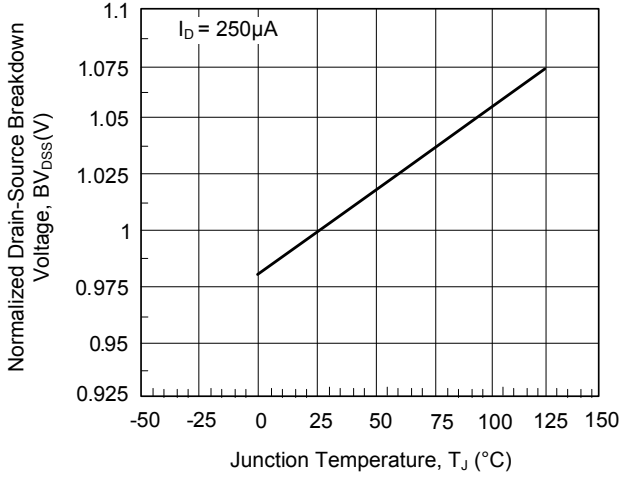
Fig. 2 Switching Waveforms

■ TYPICAL CHARACTERISTICS

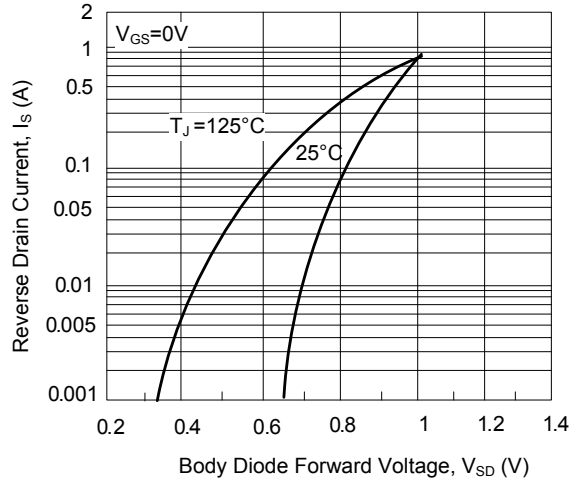


■ TYPICAL CHARACTERISTICS (Cont.)

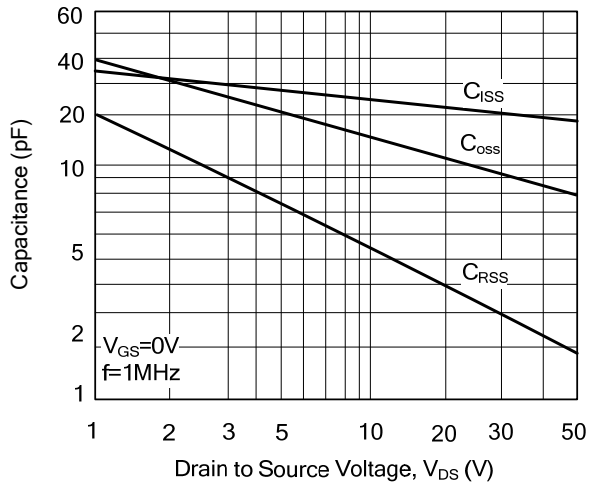
Breakdown Voltage Variation with Temperature



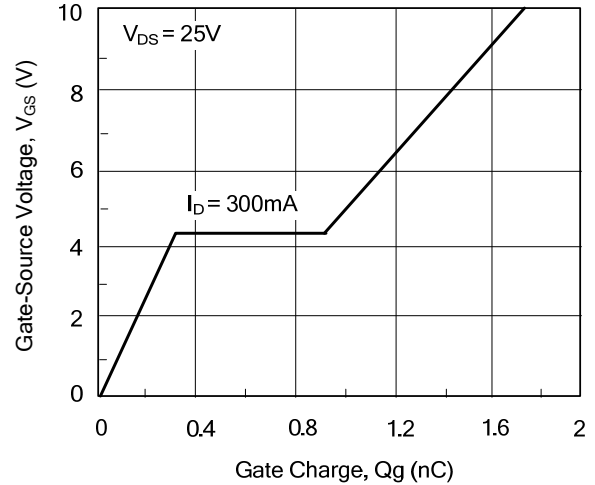
Body Diode Forward Voltage Variation with Temperature



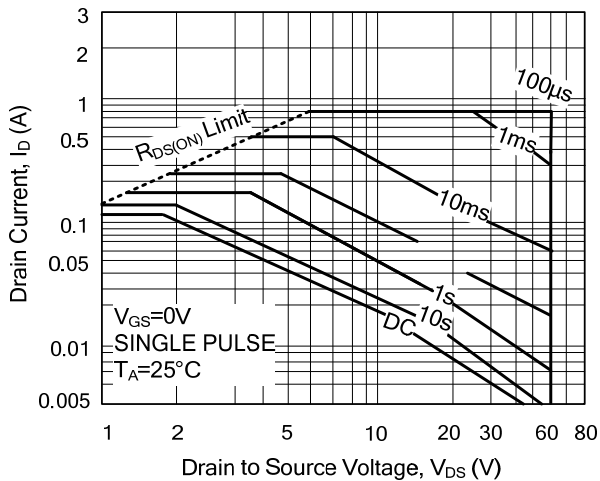
Capacitance Characteristics



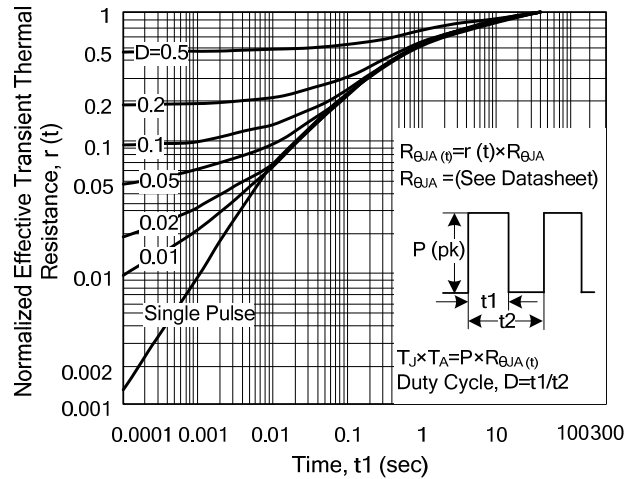
Gate Charge Characteristics



Maximum Safe Operating Area



Transient Thermal Response Curve



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