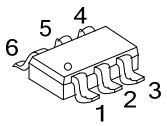
2N7002DW

Power MOSFET

300m Amps, 60 Volts DUAL N-CHANNEL POWER MOSFET



SOT-363

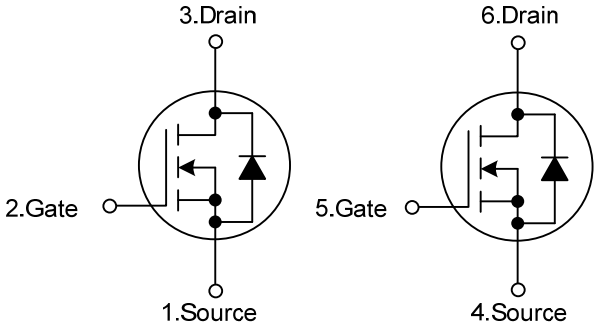
■ DESCRIPTION

The UTC **2N7002DW** has been designed to minimize on-state resistance to provide rugged, reliable, and fast switching performance. It can be used in most applications requiring up to 400mA DC and can deliver pulsed currents up to 2A. The product is particularly suited for low voltage, low current applications, such as small servo motor control, power MOSFET gate drivers and other switching applications

■ FEATURES

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

■ SYMBOL



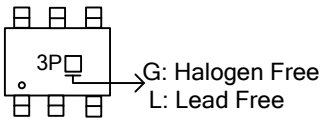
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment						Packing
Lead Free	Halogen Free		1	2	3	4	5	6	
2N7002DWL-AL6-R	2N7002DWG-AL6-R	SOT-363	S1	G1	D2	S2	G2	D1	Tape Reel

2N7002DWG-AL6-R

(1)Packing Type	(1) R: Tape Reel
(2)Package Type	(2) AL6: SOT-363
(3)Halogen Free	(3) G: Halogen Free, L: Lead Free

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C unless otherwise noted.)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	60	V
Drain-Gate Voltage (R_{GS} ≤1MΩ)		V_{DGR}	60	V
Gate Source Voltage	Continuous	V_{GSS}	±20	V
	Non Repetitive(tp<50μs)		±40	
Drain Current	Continuous	I_D	300	mA
	Pulsed		800	
Power Dissipation Derated Above 25°C		P_D	200 1.6	mW mW/°C
Junction Temperature		T_J	+ 150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°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 CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	625 (Note1)	°C/W

■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=10μA	60			V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=60V, V_{GS} =0V			1	μA
Gate-Source Leakage Current	I_{GSSF}	V_{GS} =20V, V_{DS}=0V			100	nA
	I_{GSSR}	V_{GS} =-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS (Note 2)						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_D=250μA	1	2.1	2.5	V
Drain-Source On-Voltage	$V_{DS\ (ON)}$	V_{GS} = 10V, I_D=500mA		0.6	3.75	V
		V_{GS} = 5.0V, I_D=50mA		0.09	1.5	
On-State Drain Current	$I_{D(ON)}$	V_{GS}=10V,V_{DS}≥2$V_{DS(ON)}$	500	2700		mA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	V_{GS}=10V, I_D=500mA,T_J=125°C			13.5	Ω
		V_{GS} =5.0V, I_D=50mA			7.5	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	V_{DS}=25V,V_{GS}=0V,f=1.0MHz		20	50	pF
Output Capacitance	C_{OSS}			11	25	pF
Reverse Transfer Capacitance	C_{RSS}			4	5	pF
Turn-On Time	t_{ON}	V_{DD}=30V, R_L=150Ω I_D=200mA, V_{GS} =10V R_{GEN} =25Ω			20	nS
Turn-Off Time	t_{OFF}	V_{DD}=30V, R_L=25Ω I_D=200mA, V_{GS}=10V R_{GEN} =25Ω			20	nS
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, Is=115mA (Note)		0.88	1.5	V
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				0.8	A
Maximum Continuous Drain-Source Diode Forward Current	Is				115	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 Test: Pulse Width≤300μs, Duty Cycle≤2.0%

■ TEST CIRCUIT AND WAVEFORM

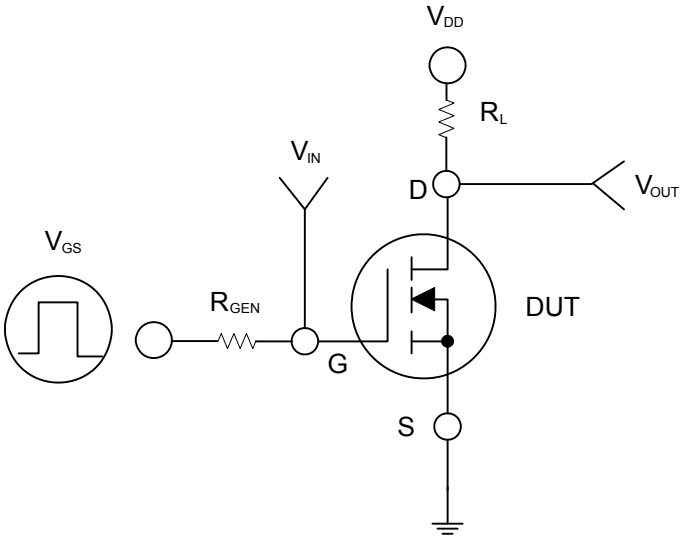


Figure 1

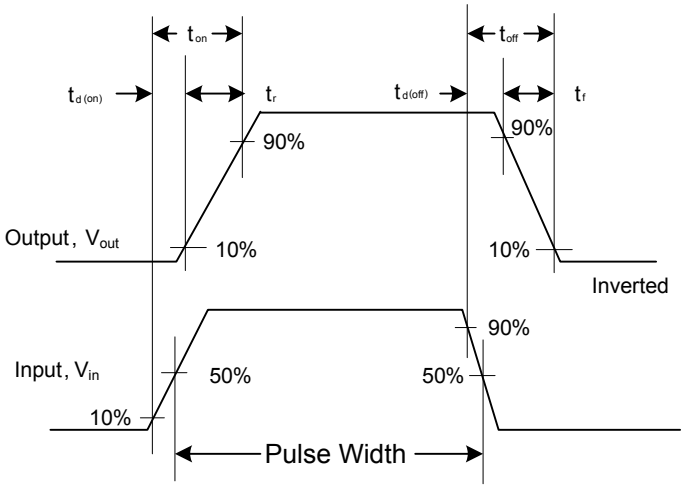
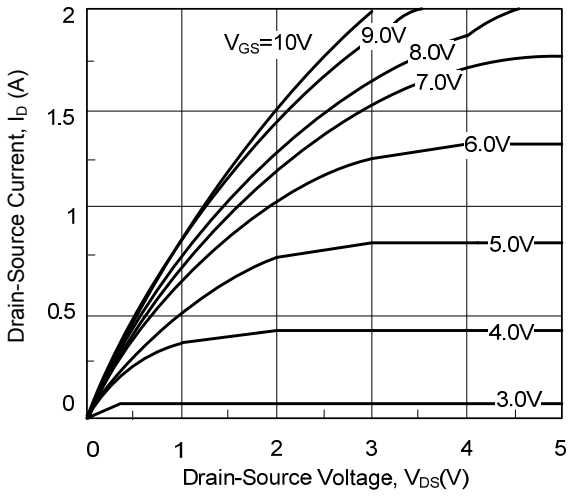


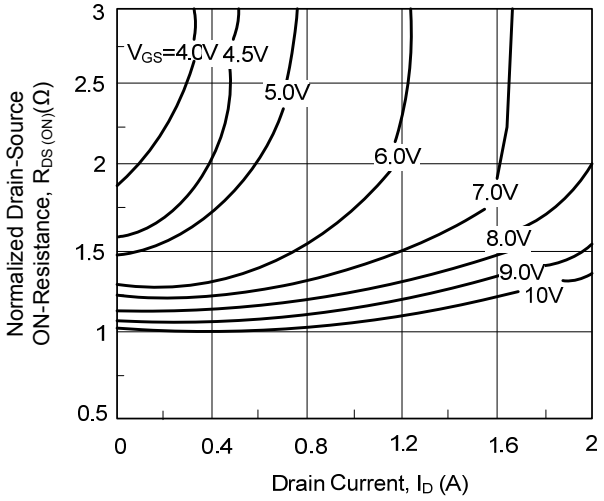
Figure 2. Switching Waveforms

■ TYPICAL CHARACTERISTICS

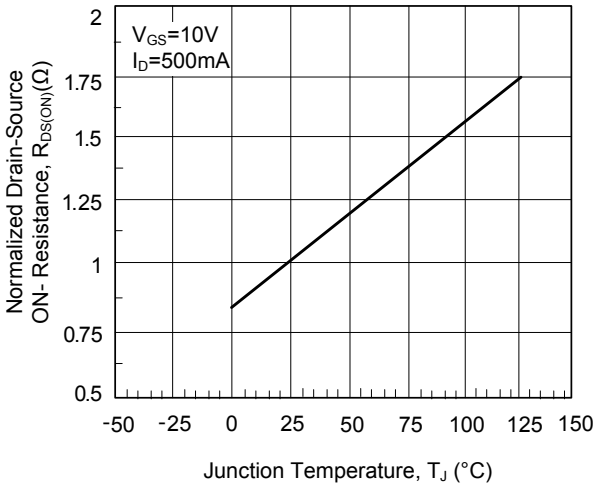
On-Resistance Characteristics



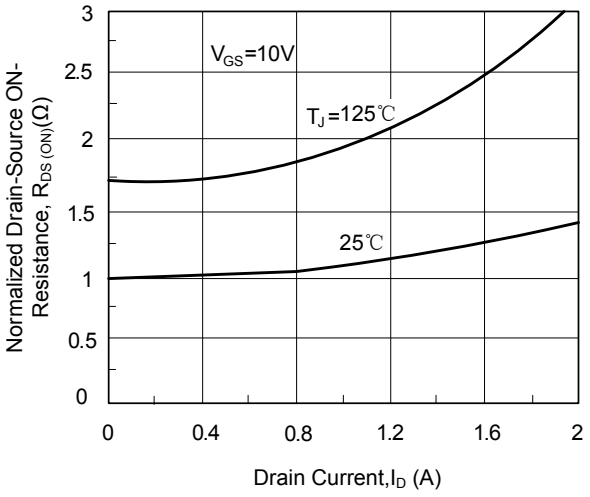
On-Resistance Varisation with Gate Voltage and Drain Current



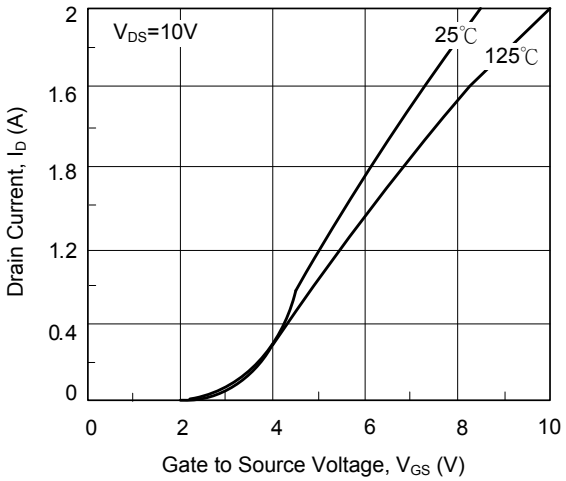
On-Resistance Varisation with Temperature



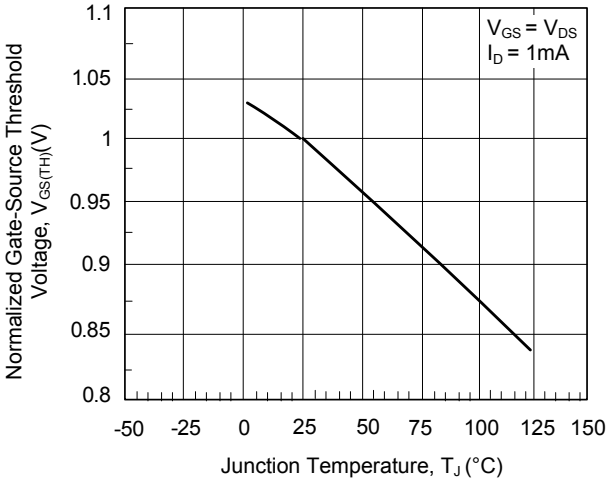
On-Resistance Varisation with Drain Current and Temperature



Transfer Characteristics

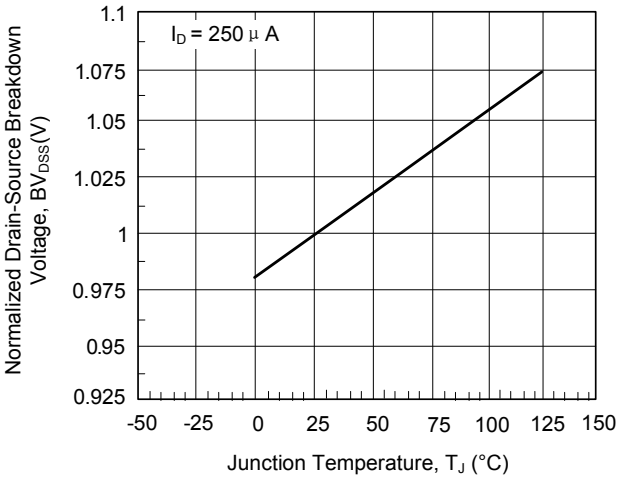


Gate Threshold Varisation with Temperature

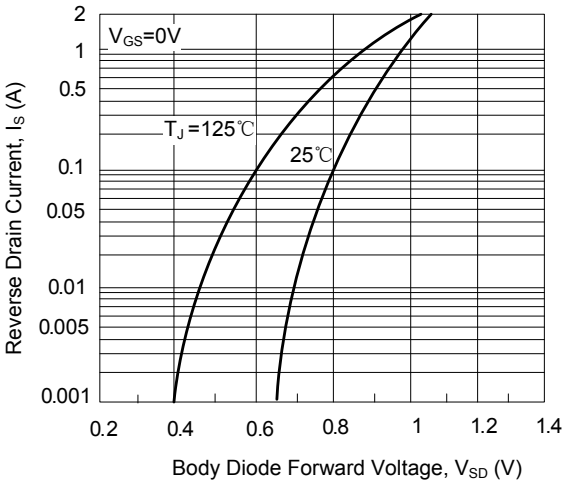


■ TYPICAL CHARACTERICS (Cont.)

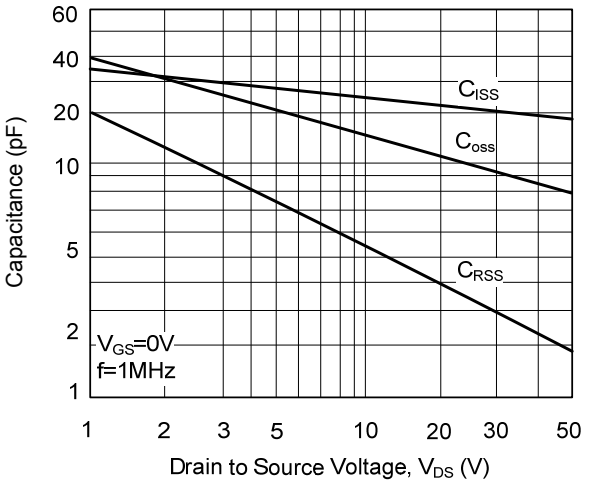
Breakdown Voltage Variation with Temperature



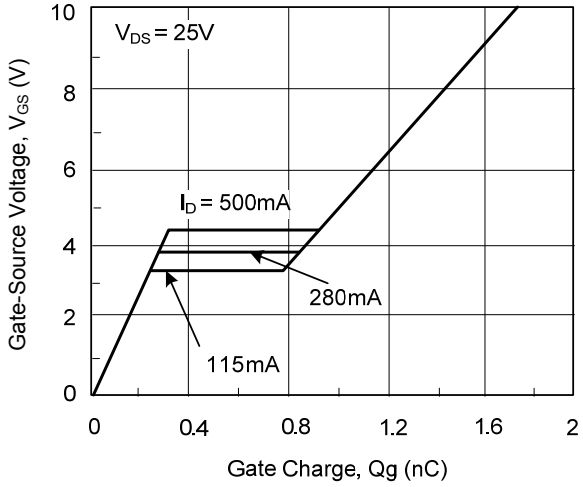
Body Diode Forward Voltage Variation with Temperature



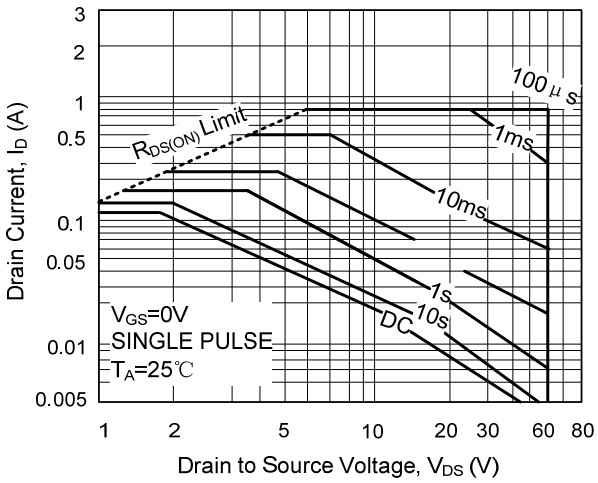
Capacitance Characteristics



Gate Charge Characteristics



Maximum Safe Operating Area



Transient Thermal Response Curve