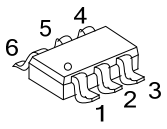
2N7002DW-Q

Preliminary | ***Power MOSFET***

300mA, 60V DUAL N-CHANNEL POWER MOSFET



SOT-363

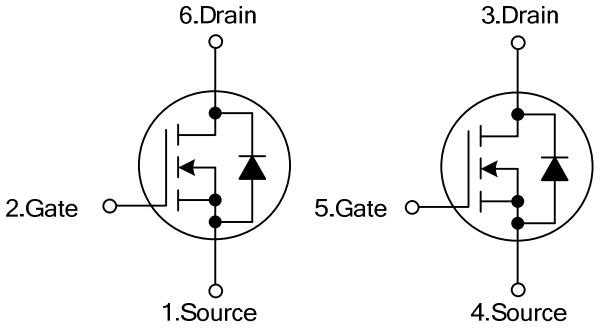
■ DESCRIPTION

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

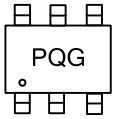
Ordering Number	Package	Pin Assignment						Packing
		1	2	3	4	5	6	
2N7002DWG-Q-AL6-R	SOT-363	S1	G1	D2	S2	G2	D1	Tape Reel

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

2N7002DWG-Q-AL6-R

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

■ MARKING



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■ ABSOLUTE MAXIMUM RATINGS (T_A=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(t_P<50μs)		±40	
Drain Current	Continuous	I_D	300	mA
	Pulsed		800	
Power Dissipation		P_D	200	mW
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 DATA

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	1.0		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	Ω
		V_{GS}=10V, I_D=500mA			2.5	Ω
DYNAMIC CHARACTERISTICS						
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=150Ω, I_D=200mA, V_{GS}=10V, R_G=25Ω			20	nS
Turn-Off Time	$t_{D(OFF)}$	V_{DD}=30V, R_L=25Ω, I_D=200mA, V_{GS}=10V, R_G=25Ω			20	nS
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
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 ≤ 300μs, Duty Cycle ≤ 2.0%.

■ TEST CIRCUIT AND WAVEFORM

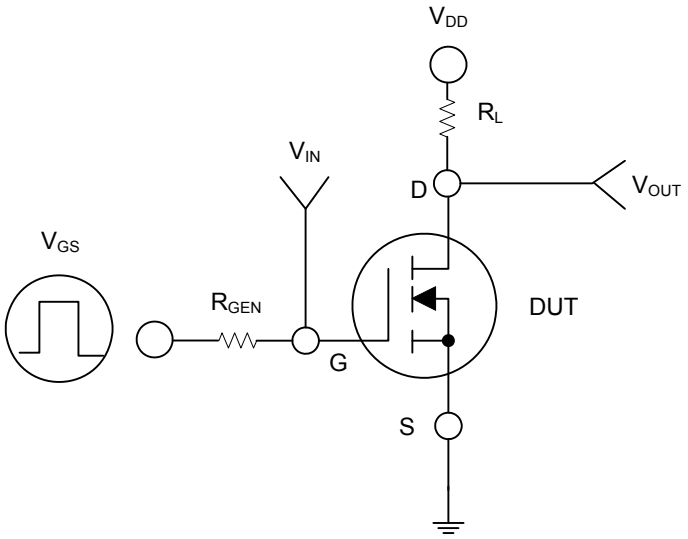


Fig. 1

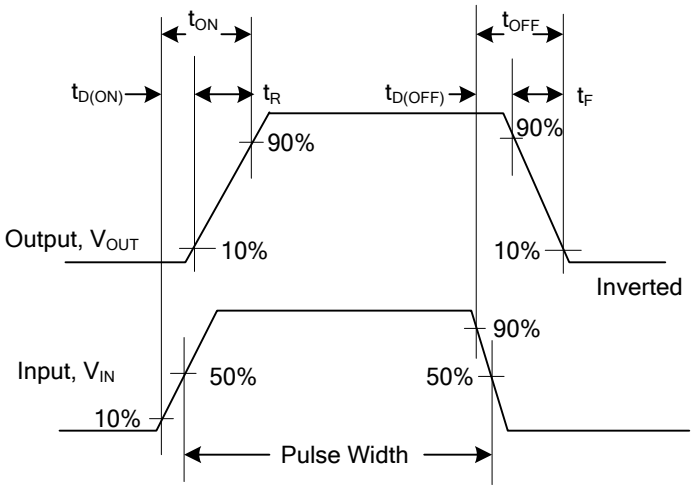
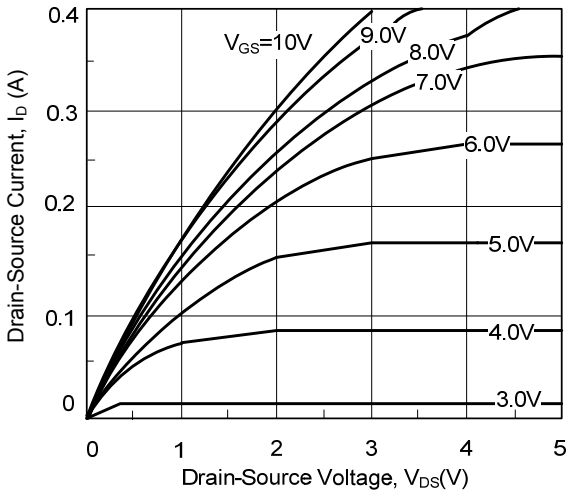


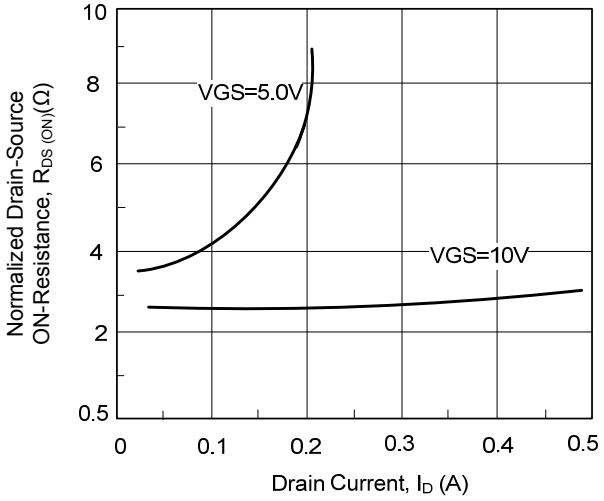
Fig. 2 Switching Waveforms

■ TYPICAL CHARACTERISTICS

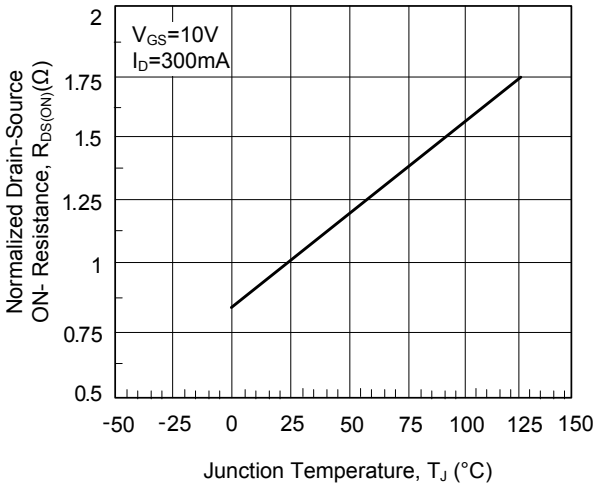
On-Resistance Characteristics



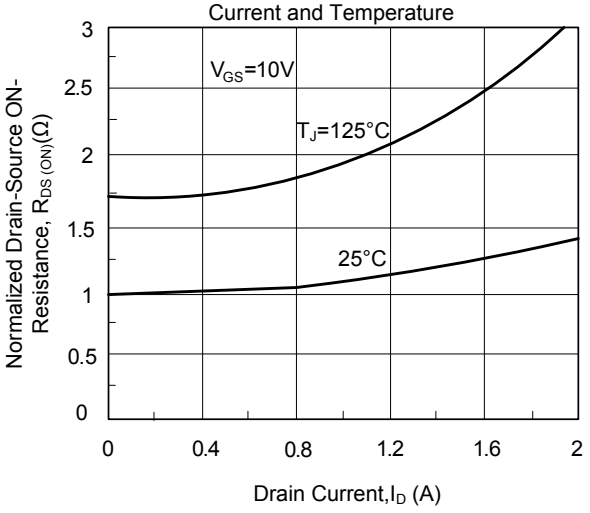
On-Resistance Varisation with Gate Voltage and Drain Current



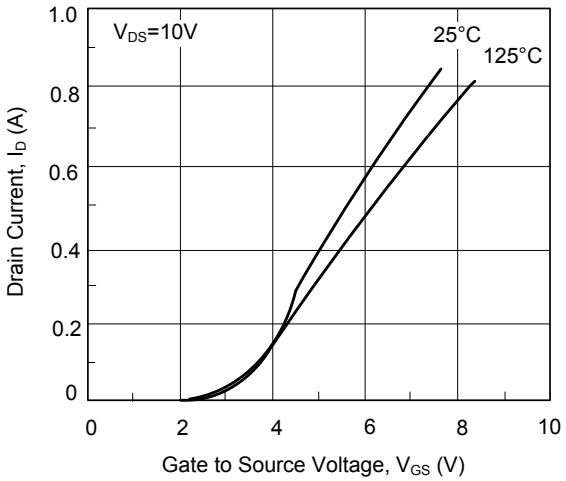
On-Resistance Varisation with Temperature



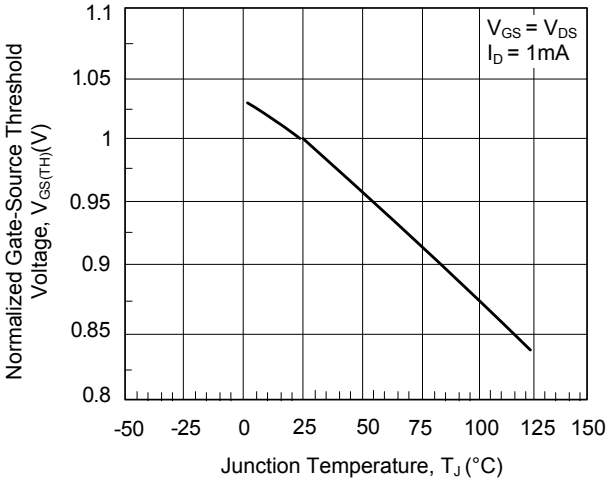
On-Resistance Varisation with Drain Current and Temperature



Transfer Characteristics

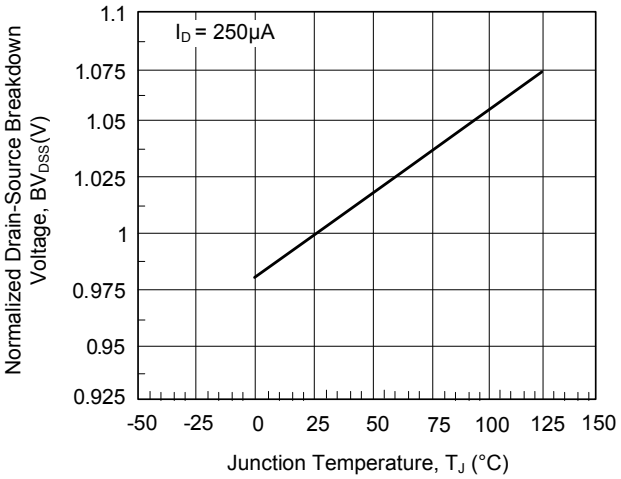


Gate Threshold Varisation with Temperature

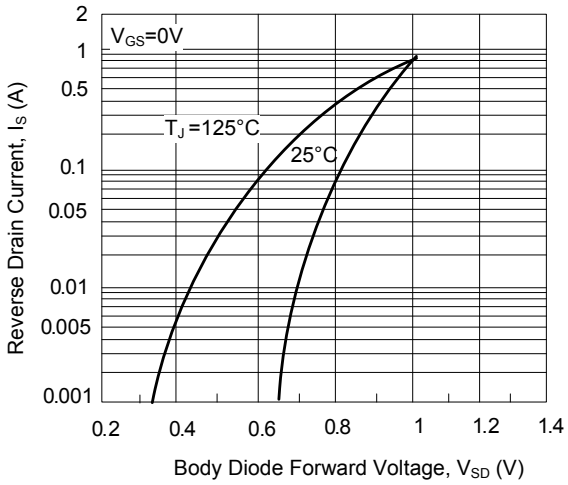


■ TYPICAL CHARACTERICS (Cont.)

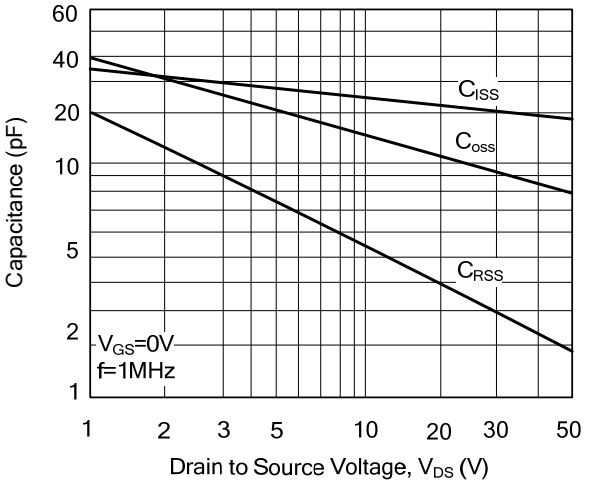
Breakdown Voltage Variation with Temperature



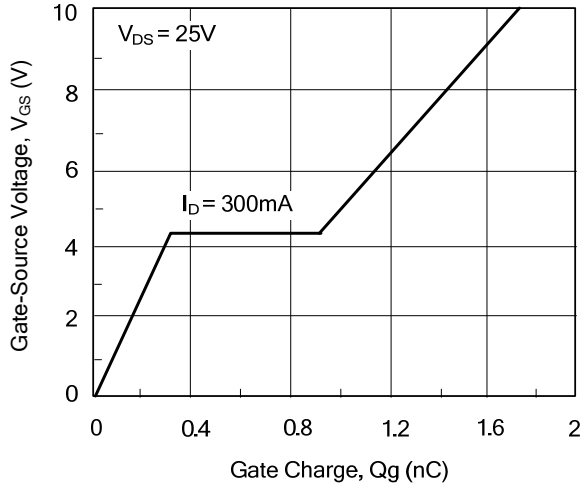
Body Diode Forward Voltage Variation with Temperature



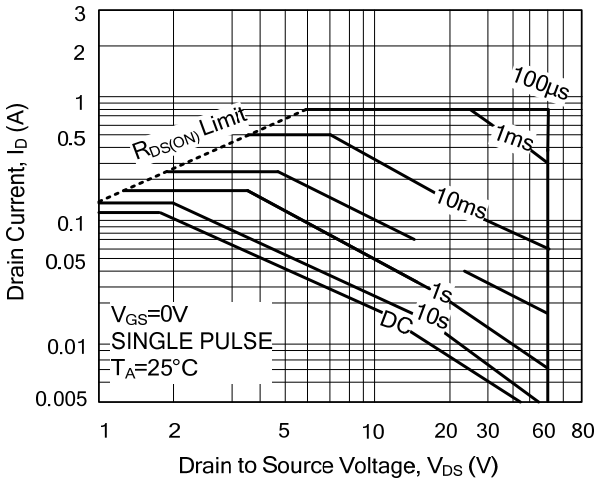
Capacitance Characteristics



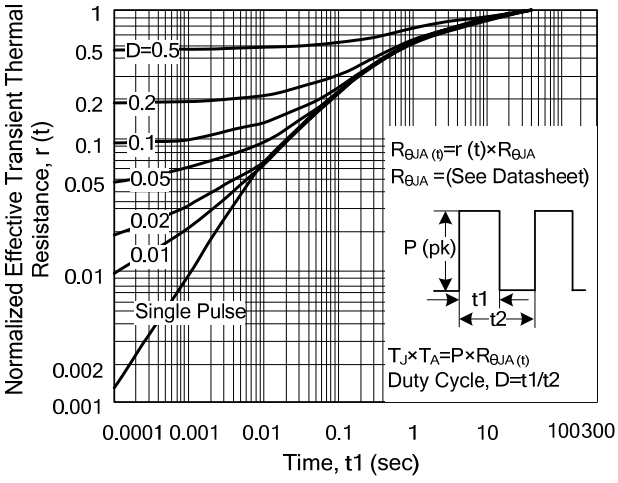
Gate Charge Characteristics



Maximum Safe Operating Area



Transient Thermal Response Curve



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