



2N7002K

Power MOSFET

300mA, 60V N-CHANNEL ENHANCEMENT MODE MOSFET

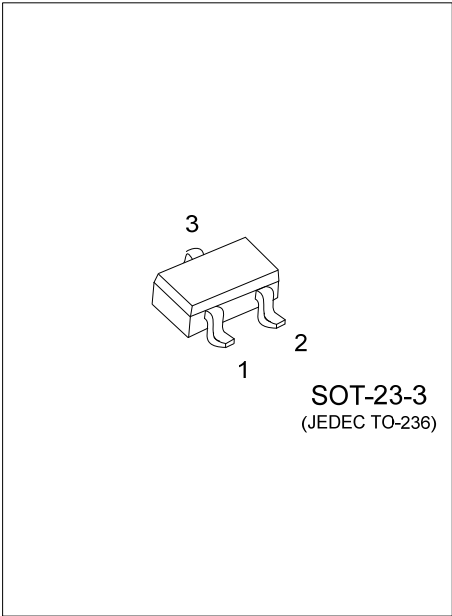
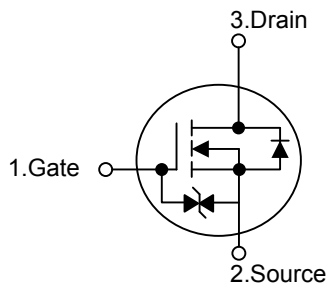
DESCRIPTION

The UTC **2N7002K** 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



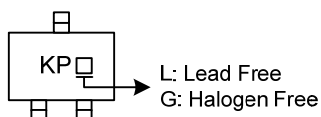
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
2N7002KL-AE2-R	2N7002KG-AE2-R	SOT-23-3	G	S	D	Tape Reel

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

<p>2N7002KG-AE2-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) AE2: SOT-23-3 (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}	± 20	V
Drain Current	Continuous	300	mA
	Pulse(Note 2)	800	
Power Dissipation	P_D	350	mW
Derating above $T_A=25^\circ\text{C}$		2.8	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.

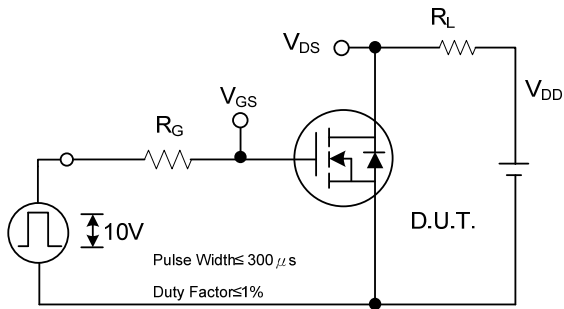
■ ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
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	μA
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 10	μA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=10V, I_D=1mA$	1.0	1.85	2.5	V
Static Drain-Source On-Resistance (Note)	$R_{DS(ON)}$	$V_{GS}=10V, I_D=300mA$			2	Ω
		$V_{GS}=4.5V, I_D=200mA$			4	Ω
DYNAMIC PARAMETERS						
Input Capacitance (Note 1)	C_{ISS}	$V_{DS}=25V, V_{GS}=0V, f=1.0MHz$		25		pF
Output Capacitance	C_{OSS}			11		pF
Reverse Transfer Capacitance	C_{RSS}			5		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q_G	$V_{DS}=48V, V_{GS}=10V, I_D=0.3A$ $I_G=1mA$ (Note 1, 2)		5.22		nC
Gate to Source Charge	Q_{GS}			1.8		nC
Gate to Drain Charge	Q_{GD}			0.8		nC
Turn-ON Delay Time	$t_{D(ON)}$	$I_D=0.2A, V_{DD}=30V, V_{GS}=10V,$ $R_L=150\Omega, R_G=10\Omega$		12		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			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}	$V_{GS}=0V, I^S=300mA$ (Note)		0.88	1.5	V

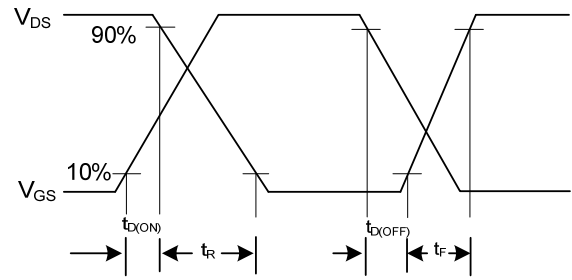
Notes: 1. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch. Minimum land pad size.

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

■ TEST CIRCUITS AND WAVEFORMS

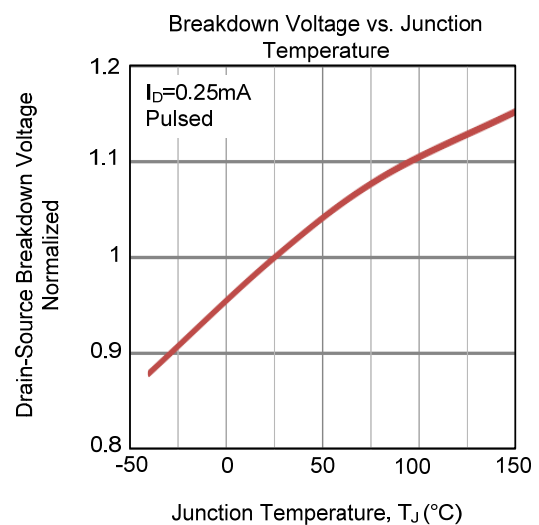
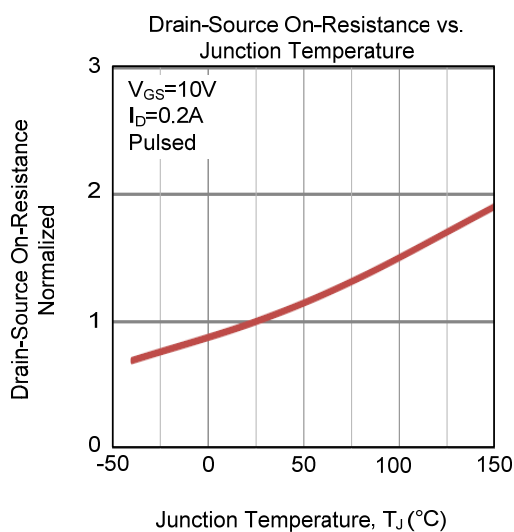
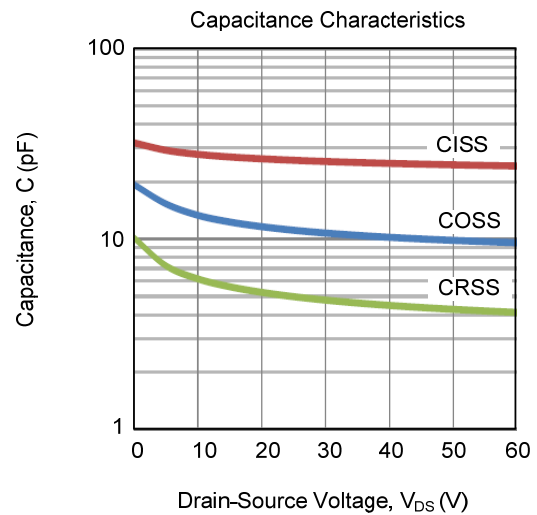
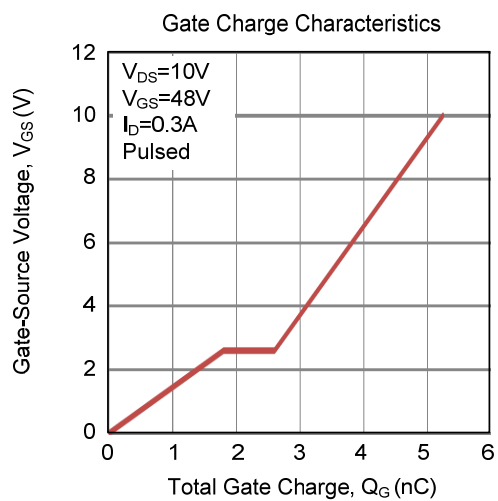
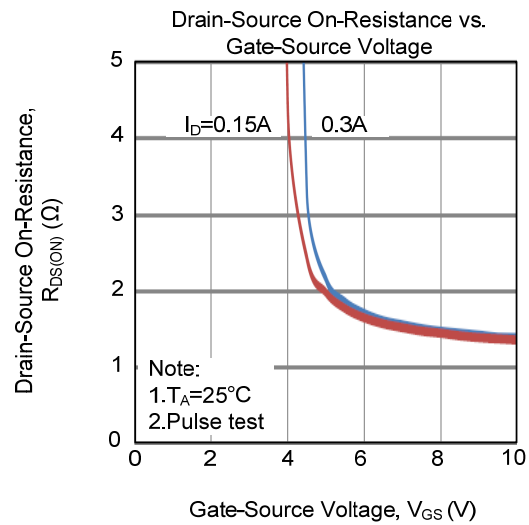
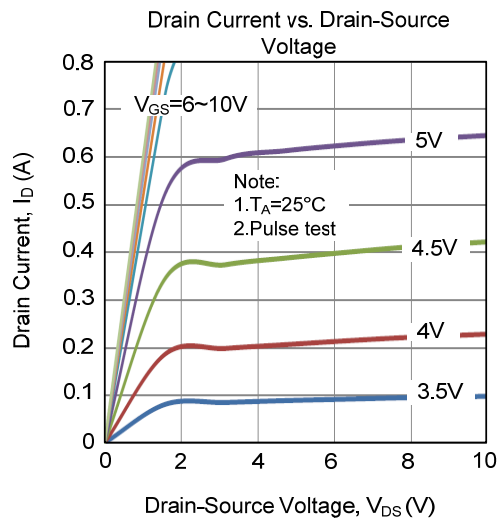


Switching Test Circuit

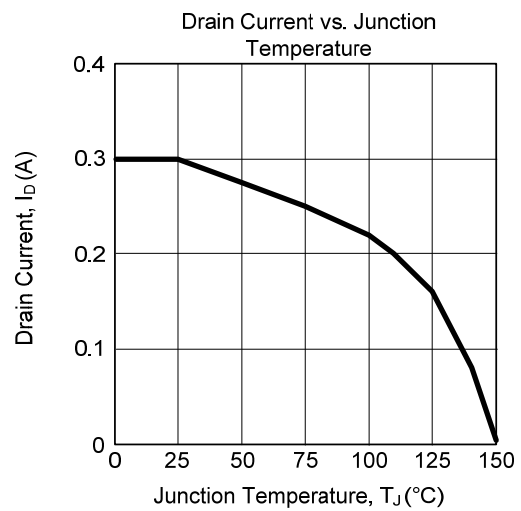
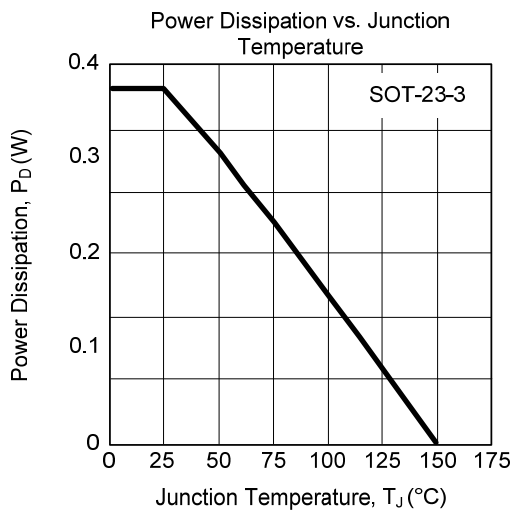
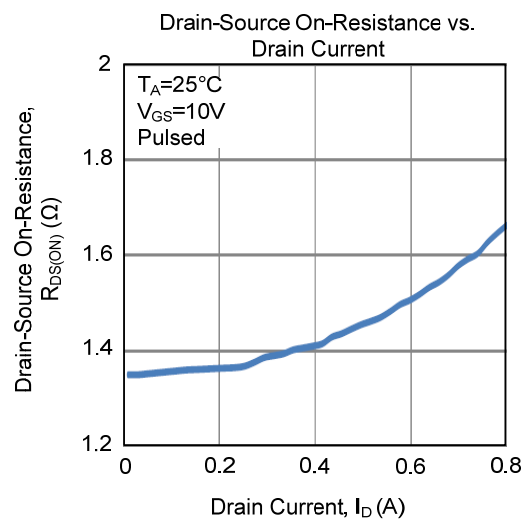
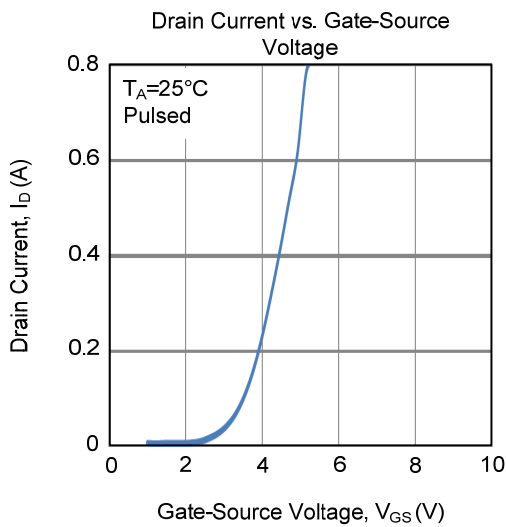
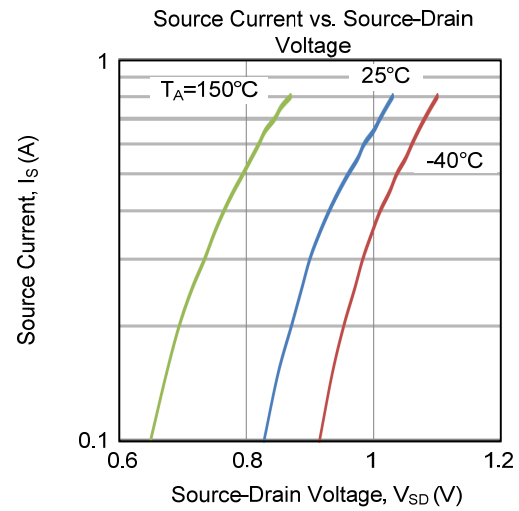
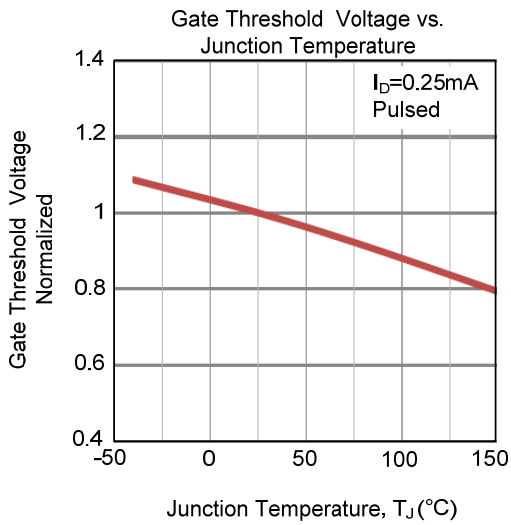


Switching Waveforms

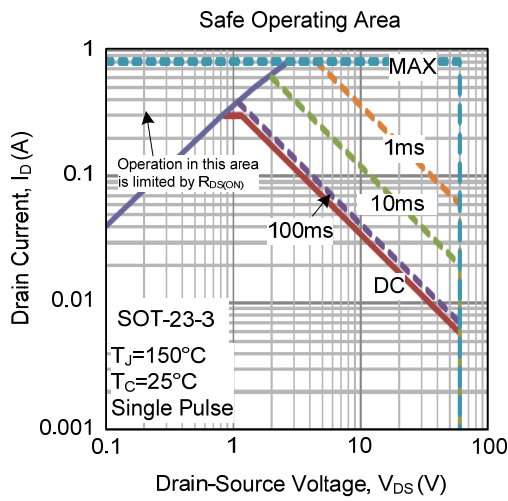
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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