



7N60K-MTQ

Power MOSFET

6.2A, 600V N-CHANNEL POWER MOSFET

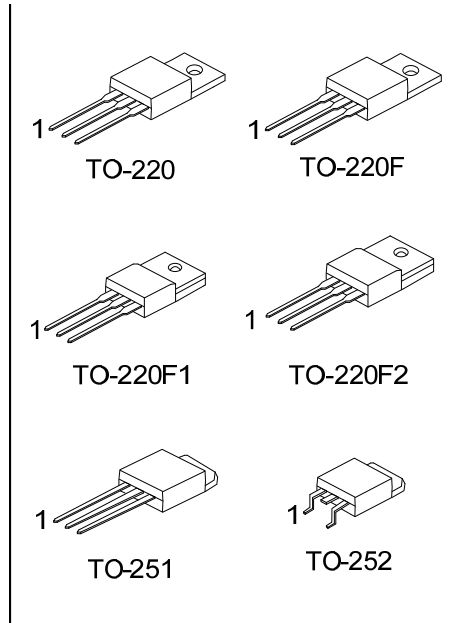
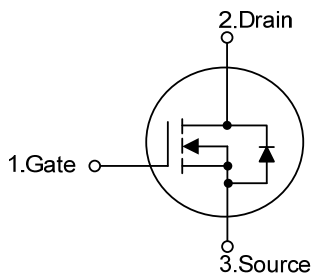
DESCRIPTION

The UTC **7N60K-MTQ** is a high voltage power MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in switching power supplies and adaptors.

FEATURES

- * $R_{DS(ON)} < 1.4\Omega @ V_{GS} = 10V, I_D = 3.5A$
- * Fast switching capability
- * Avalanche energy tested
- * Improved dv/dt capability, high ruggedness

SYMBOL



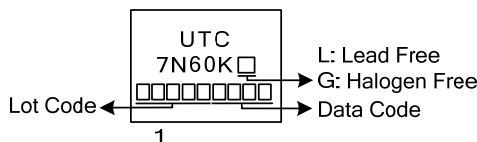
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
7N60KL-TA3-T	7N60KG-TA3-T	TO-220	G	D	S	Tube
7N60KL-TF1-T	7N60KG-TF1-T	TO-220F1	G	D	S	Tube
7N60KL-TF2-T	7N60KG-TF2-T	TO-220F2	G	D	S	Tube
7N60KL-TF3-T	7N60KG-TF3-T	TO-220F	G	D	S	Tube
7N60KL-TM3-T	7N60KG-TM3-T	TO-251	G	D	S	Tube
7N60KL-TN3-R	7N60KG-TN3-R	TO-252	G	D	S	Tape Reel

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

<p>7N60KG-TA3-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) T: Tube, R: Tape Reel</p> <p>(2) TA3: TO-220, TF1: TO-220F1, TF2: TO-220F2, TF3: TO-220F, TM3: TO-251, TN3: TO-252</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
---	--

MARKING



■ ABSOLUTE MAXIMUM RATINGS ($T_c = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	600	V
Gate-Source Voltage		V_{GSS}	± 30	V
Avalanche Current (Note 2)		I_{AR}	7	A
Continuous Drain Current		I_D	7	A
Pulsed Drain Current (Note 2)		I_{DM}	28	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	340	mJ
	Repetitive (Note 2)	E_{AR}	13	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	2.8	ns
Power Dissipation	TO-220	P_D	142	W
	TO-220F/TO-220F1		48	W
	TO-220F2			
	TO-251/TO-252		59	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
Operating Temperature		T_{OPR}	-55 ~ +150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-55 ~ +150	$^\circ\text{C}$

Notes: 1. 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.

2. Repetitive Rating : Pulse width limited by maximum junction temperature.

3. $L = 18.33\text{mH}$, $I_{AS} = 7\text{A}$, $V_{DD} = 90\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 7\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220/TO-220F	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-220F1/TO-220F2			
	TO-251/TO-252		110	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	0.88	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		2.6	$^\circ\text{C}/\text{W}$
	TO-220F2			
	TO-251/TO-252		2.1	$^\circ\text{C}/\text{W}$

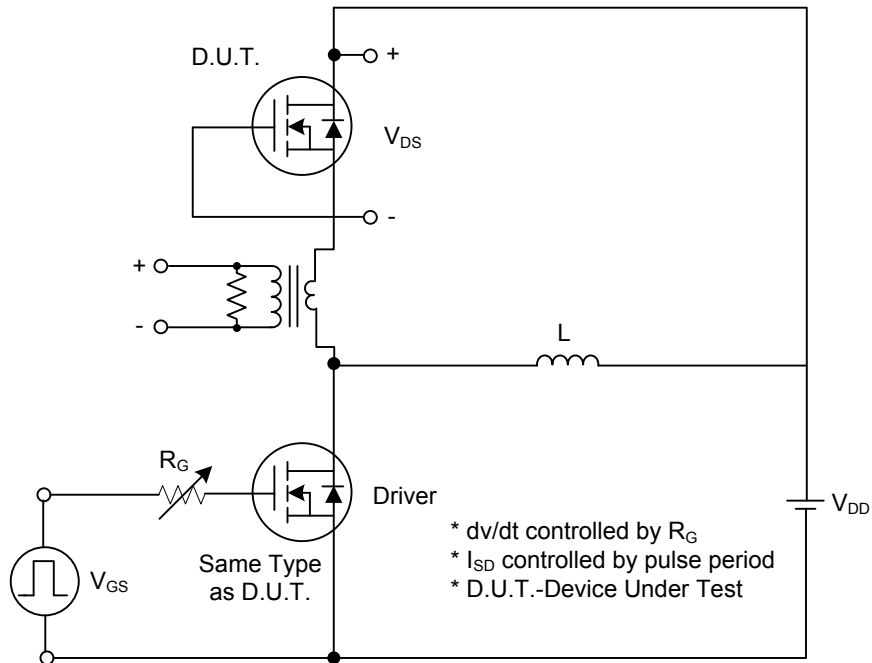
■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	600			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=600V, V_{GS}=0V$			10	μA
		$V_{DS}=480V, V_{GS}=0V, T_J=125^\circ C$			10	μA
Gate- Source Leakage Current	Forward	I_{GSS}				
	Reverse					
		$V_{GS}=30V, V_{DS}=0V$			100	nA
		$V_{GS}=-30V, V_{DS}=0V$			-100	nA
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu A$, Referenced to $25^\circ C$		0.53		$V/^\circ C$
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0		4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=3.5A$			1.4	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	$V_{DS}=25V, V_{GS}=0V, f=1.0\text{ MHz}$		740	1110	pF
Output Capacitance	C_{OSS}			140	210	pF
Reverse Transfer Capacitance	C_{RSS}			8	12	pF
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q_G	$V_{DS}=50V, I_D=1.3A, V_{GS}=10V$ $I_G=100\mu A$ (Note 1, 2)		68	82	nC
Gate-Source Charge	Q_{GS}			6		nC
Gate-Drain Charge	Q_{GD}			6.6		nC
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD}=30V, I_D=0.5A, R_G=25\Omega$ (Note 1, 2)		60	72	ns
Turn-On Rise Time	t_R			66	79	ns
Turn-Off Delay Time	$t_{D(OFF)}$			120	144	ns
Turn-Off Fall Time	t_F			64	77	ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				7	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				28	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=7A, V_{GS}=0V$			1.4	V
Body Diode Reverse Recovery Time	t_{rr}	$I_{SD}=7A, di_S/dt=100A/\mu s$		368		ns
Body Diode Reverse Recovery Charge	Q_{rr}			3.5		nC

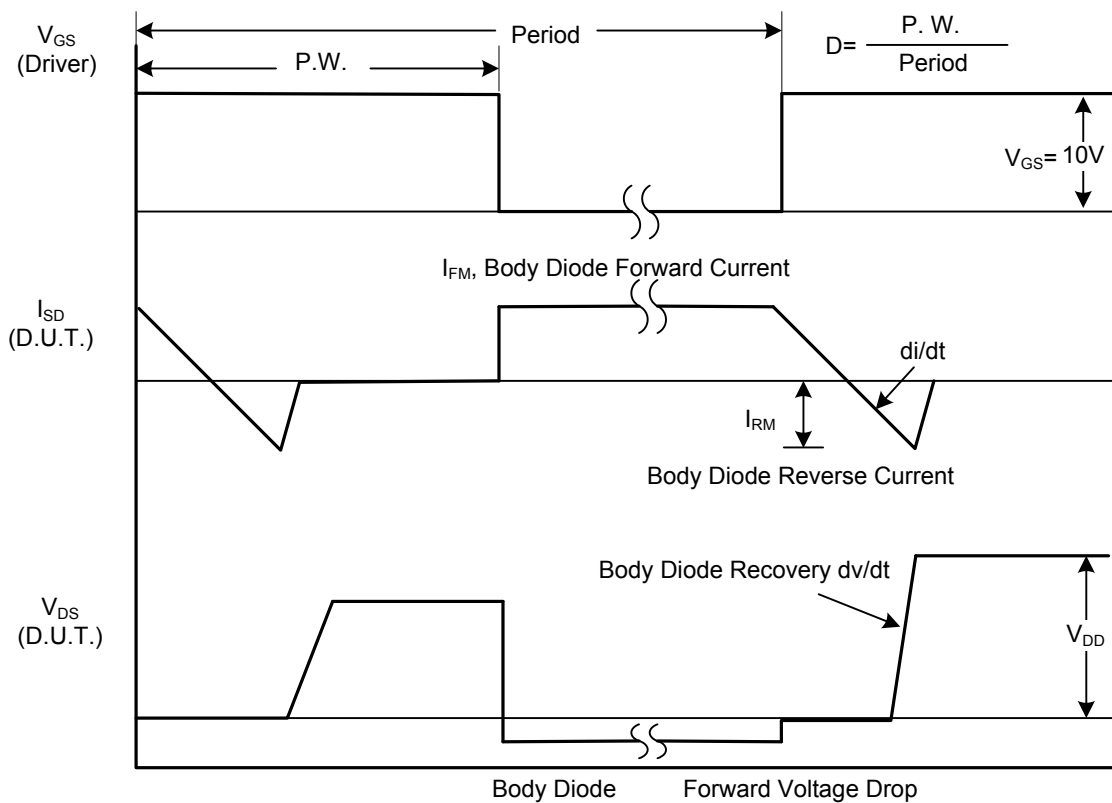
Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

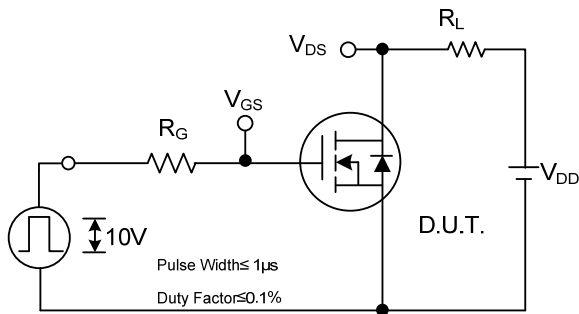


Peak Diode Recovery dv/dt Test Circuit

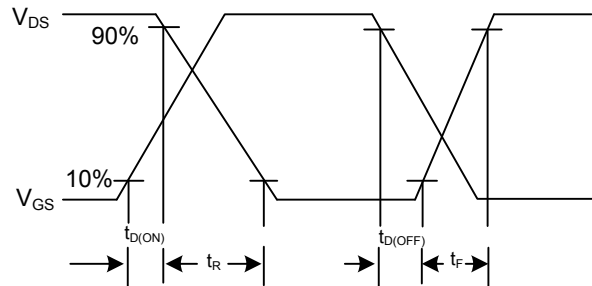


Peak Diode Recovery dv/dt Waveforms

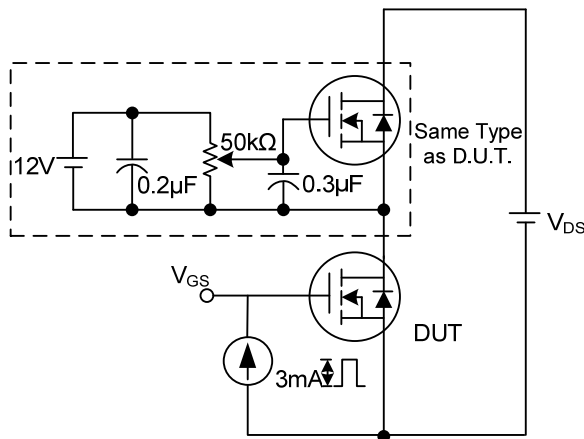
TEST CIRCUITS AND WAVEFORMS (Cont.)



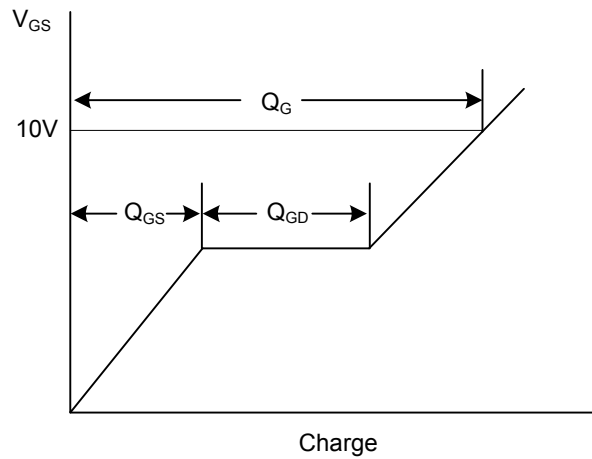
Switching Test Circuit



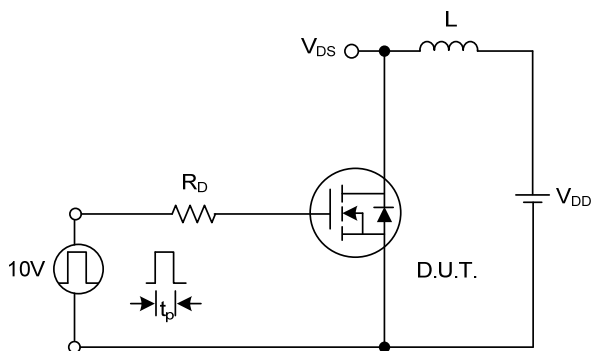
Switching Waveforms



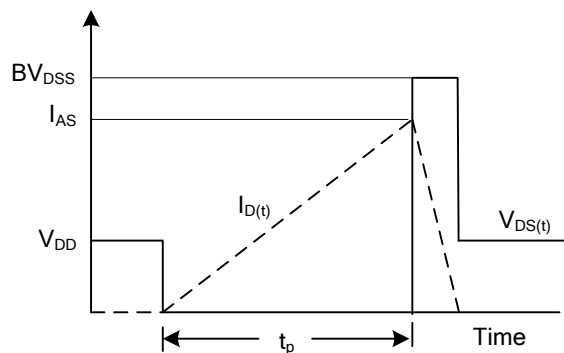
Gate Charge Test Circuit



Gate Charge Waveform

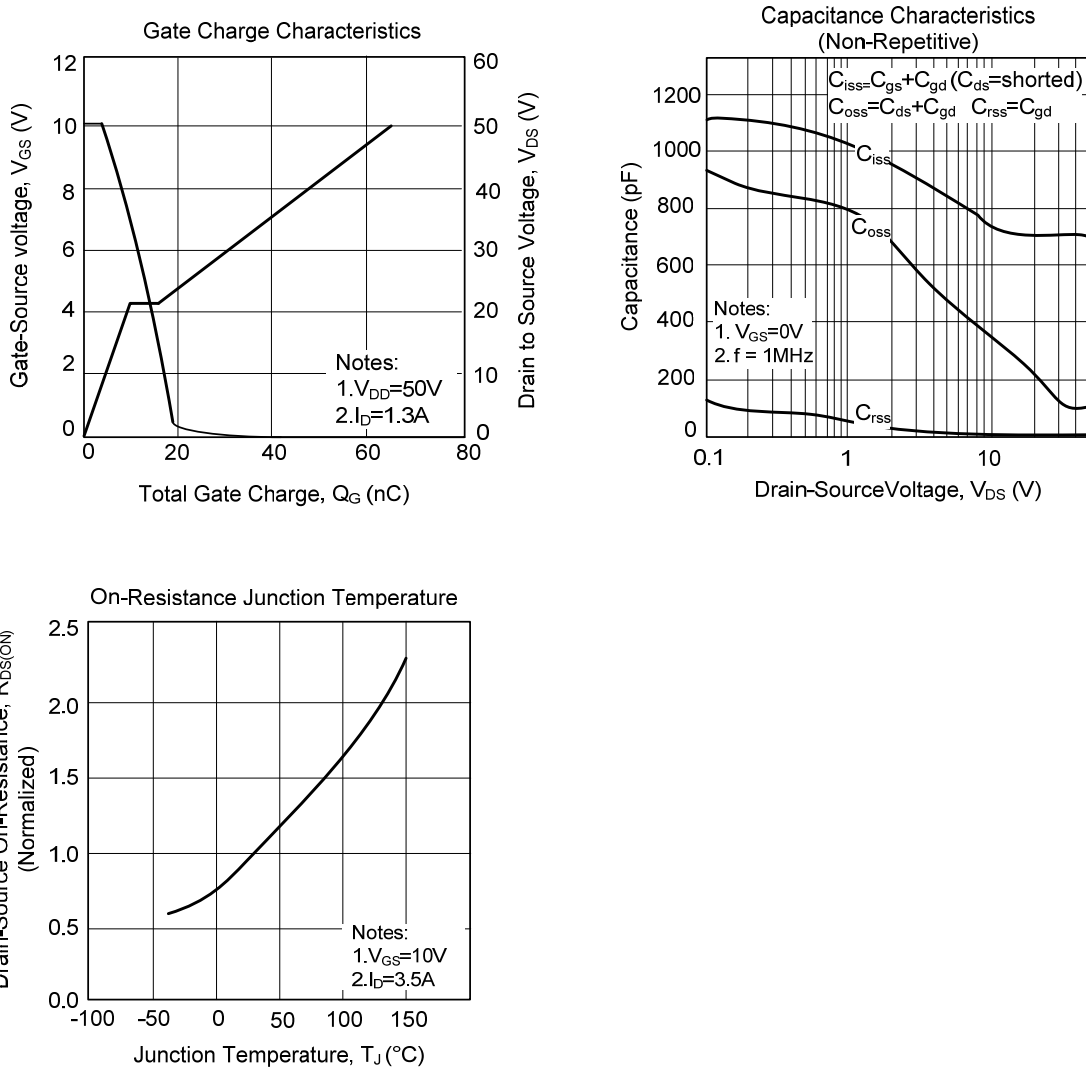


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.