



6N60K-MT

Power MOSFET

6.2A, 600V N-CHANNEL POWER MOSFET

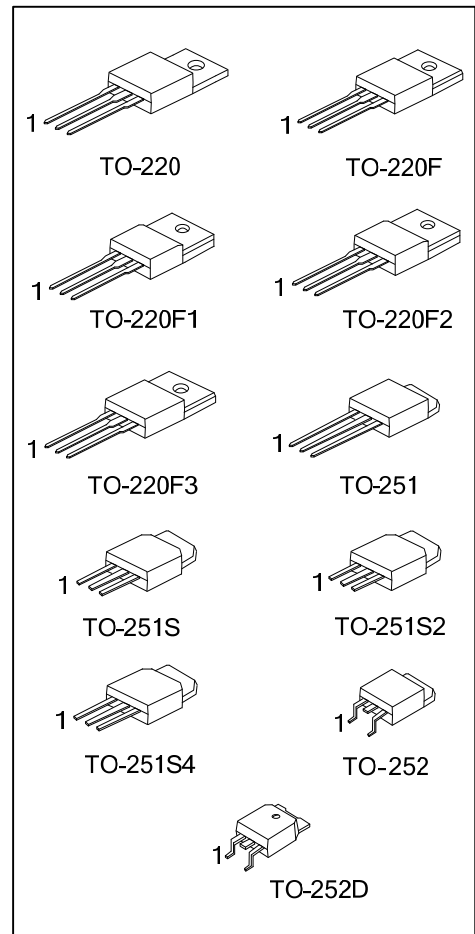
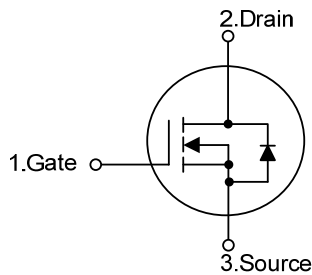
DESCRIPTION

The UTC **6N60K-MT** 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

- * $R_{DS(ON)} < 1.4\Omega$ @ $V_{GS} = 10V, I_D = 3.1A$
- * Fast switching capability
- * Avalanche energy tested
- * Improved dv/dt capability, high ruggedness

SYMBOL



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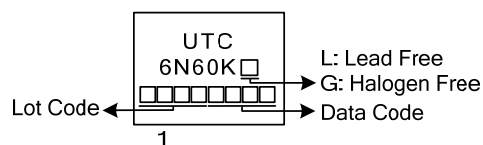
ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
6N60KL-TA3-T	6N60KG-TA3-T	TO-220	G	D	S	Tube
6N60KL-TF3-T	6N60KG-TF3-T	TO-220F	G	D	S	Tube
6N60KL-TF1-T	6N60KG-TF1-T	TO-220F1	G	D	S	Tube
6N60KL-TF2-T	6N60KG-TF2-T	TO-220F2	G	D	S	Tube
6N60KL-TF3-T	6N60KG-TF3-T	TO-220F3	G	D	S	Tube
6N60KL-TM3-T	6N60KG-TM3-T	TO-251	G	D	S	Tube
6N60KL-TMS-T	6N60KG-TMS-T	TO-251S	G	D	S	Tube
6N60KL-TMS2-T	6N60KG-TMS2-T	TO-251S2	G	D	S	Tube
6N60KL-TMS4-T	6N60KG-TMS4-T	TO-251S4	G	D	S	Tube
6N60KL-TN3-R	6N60KG-TN3-R	TO-252	G	D	S	Tape Reel
6N60KL-TND-R	6N60KG-TND-R	TO-252D	G	D	S	Tape Reel

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

<p>6N60KL-TA3-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1, TF2: TO-220F2, TF3: TO-220F3, TM3: TO-251 TMS: TO-251S, TMS2: TO-251S2, TMS4: TO-251S4, TN3: TO-252, TND: TO-252D (3) L: Lead Free, G: Halogen Free and Lead Free</p>
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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}	6.2	A
Continuous Drain Current		I_D	6.2	A
Pulsed Drain Current (Note 2)		I_{DM}	24.8	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	330	mJ
	Repetitive (Note 2)	E_{AR}	13	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.0	V/ns
Power Dissipation	TO-220	P_D	125	W
	TO-220F/TO-220F1		40	W
	TO-220F3			
	TO-220F2		42	W
	TO-251/TO-251S TO-251S2/TO-251S4 TO-252/TO-252D		55	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 T_J

3. $L = 18.33\text{mH}$, $I_{AS} = 6\text{A}$, $V_{DD} = 90\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 6.2\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ THERMAL DATA

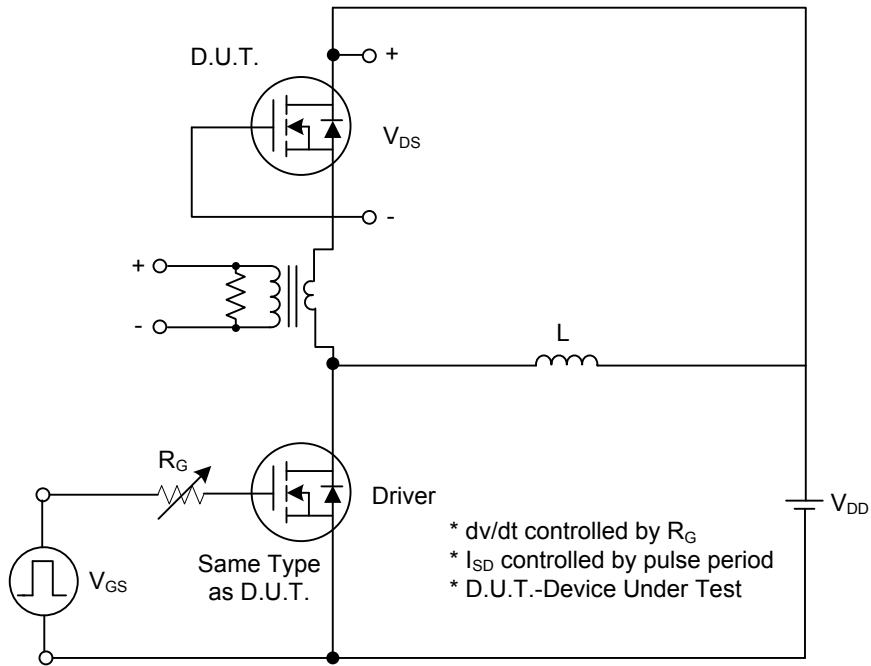
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-220/TO-220F TO-220F1/TO-220F2 TO-220F3	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-251/TO-251S TO-251S2/TO-251S4 TO-252/TO-252D		110	$^\circ\text{C}/\text{W}$
Junction to Case	TO-220	θ_{JC}	1.0	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		3.2	$^\circ\text{C}/\text{W}$
	TO-220F3			
	TO-220F2		2.97	$^\circ\text{C}/\text{W}$
	TO-251/TO-251S TO-251S2/TO-251S4 TO-252/TO-252D		2.27	$^\circ\text{C}/\text{W}$

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

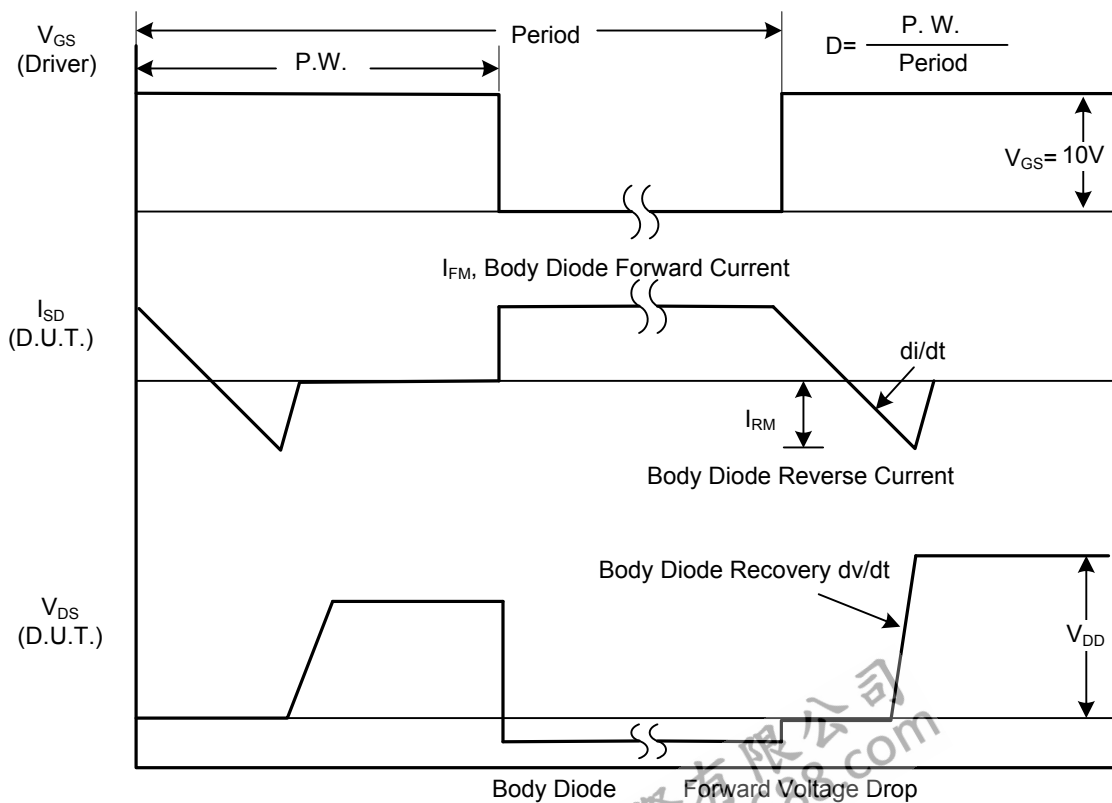
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	600			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=600V, V_{GS}=0V$			10	μA
		$V_{DS}=480V, V_{GS}=0V, T_J=125^\circ\text{C}$			10	μA
Gate- Source Leakage Current	Forward	I_{GSS}			100	nA
	Reverse					
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=250\mu A$, Referenced to 25°C		0.53		$V/^\circ\text{C}$
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	$R_{DS(ON)}$	$V_{GS}=10V, I_D=3.1A$			1.4	Ω
DYNAMIC CHARACTERISTICS						
Input Capacitance	C_{ISS}	$V_{DS}=25V, V_{GS}=0V, f=1.0\text{ MHz}$		540		pF
Output Capacitance	C_{OSS}			97		pF
Reverse Transfer Capacitance	C_{RSS}			11		pF
SWITCHING CHARACTERISTICS						
Total Gate Charge	Q_G	$V_{DS}=50V, I_D=1.3A, V_{GS}=10V$ (Note 1, 2)		23		nC
Gate-Source Charge	Q_{GS}			6.7		nC
Gate-Drain Charge	Q_{GD}			5.7		nC
Turn-On Delay Time	$t_{D(ON)}$	$V_{DD}=30V, I_D=0.5A, R_G=25\Omega$ (Note 1, 2)		60		ns
Turn-On Rise Time	t_R			66		ns
Turn-Off Delay Time	$t_{D(OFF)}$			120		ns
Turn-Off Fall Time	t_F			64		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				6.2	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				24.8	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=6.2A, V_{GS}=0V$			1.4	V
Body Diode Reverse Recovery Time	t_{RR}	$I_S=6.2A, V_{GS}=0V,$		400		ns
Body Diode Reverse Recovery Charge	Q_{RR}	$di_F/dt=100A/\mu s$ (Note 1)		2.8		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

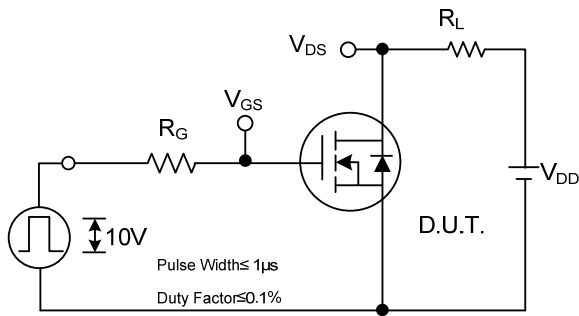


Peak Diode Recovery dv/dt Test Circuit

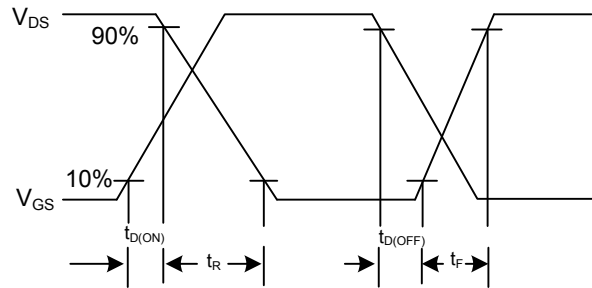


Peak Diode Recovery dv/dt Waveforms

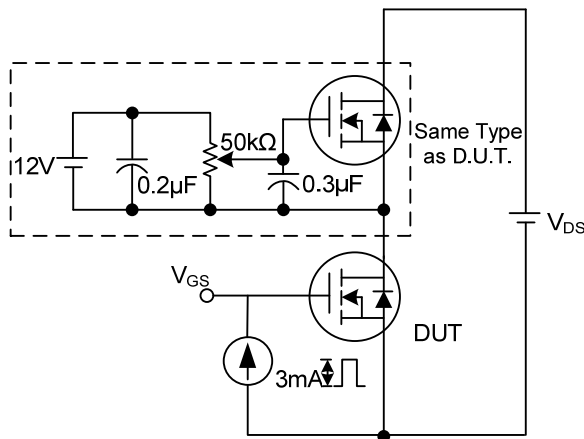
TEST CIRCUITS AND WAVEFORMS (Cont.)



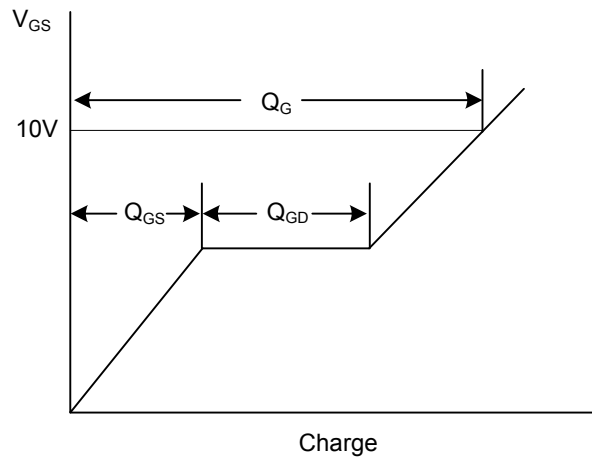
Switching Test Circuit



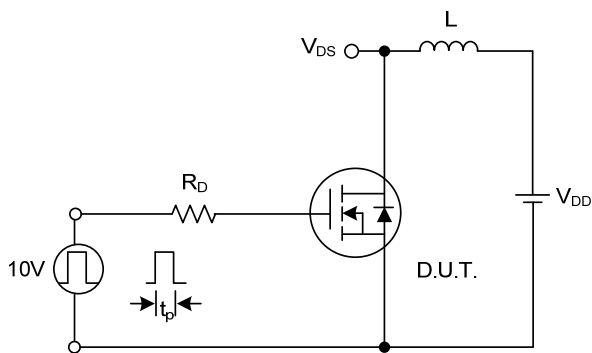
Switching Waveforms



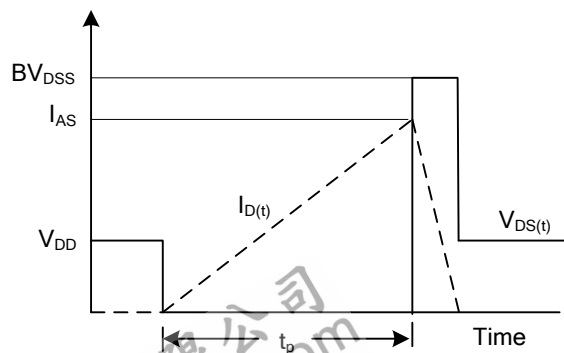
Gate Charge Test Circuit



Gate Charge Waveform

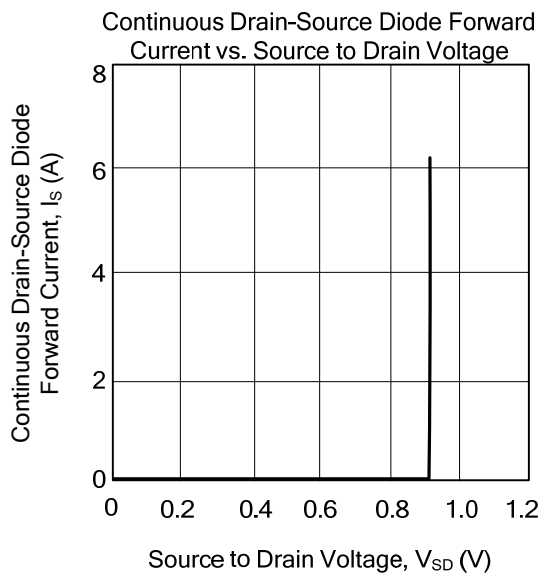
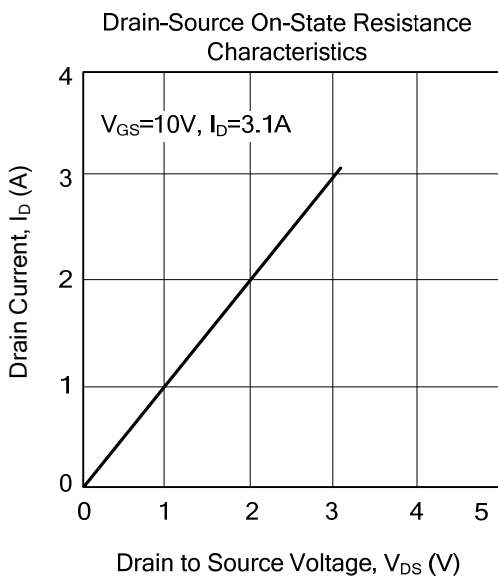
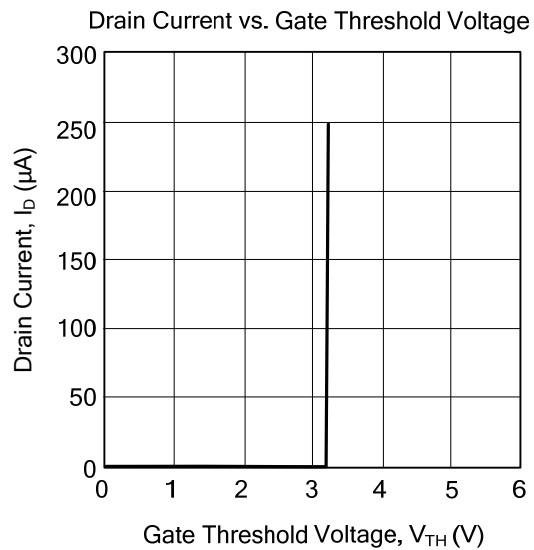
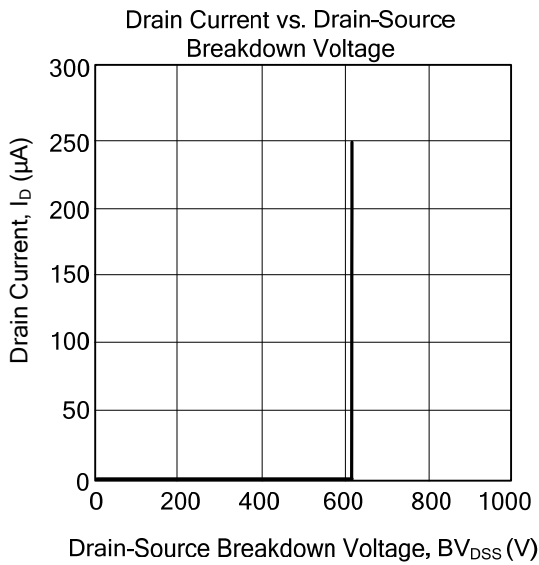


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS



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