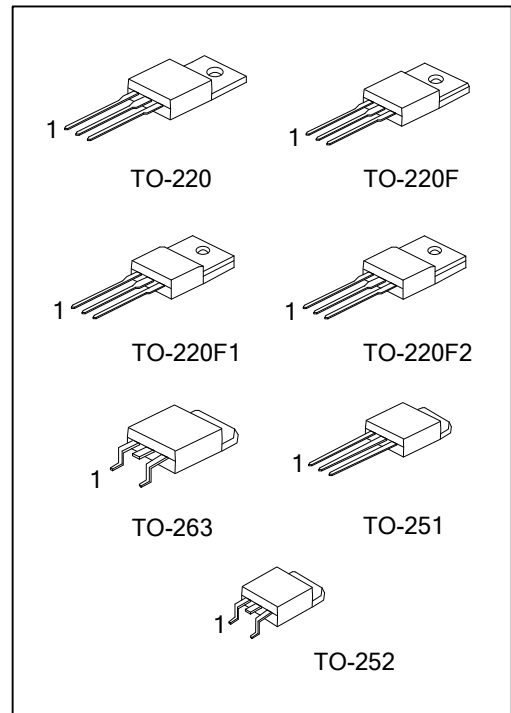
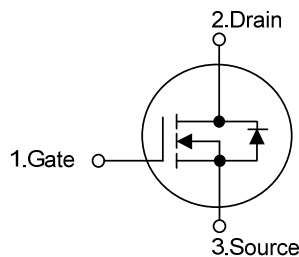


**6N60-P****Power MOSFET****6A, 600V N-CHANNEL POWER MOSFET****DESCRIPTION**

The UTC **6N60-P** 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

- * $R_{DS(ON)} < 1.75\Omega$ @ $V_{GS} = 10V$, $I_D = 3A$
- * Fast switching capability
- * Avalanche energy tested
- * Improved dv/dt capability, high ruggedness

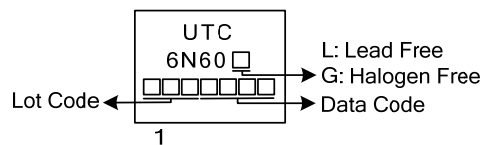
SYMBOL**ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
6N60L-TA3-T	6N60G-TA3-T	TO-220	G	D	S	Tube
6N60L-TF1-T	6N60G-TF1-T	TO-220F1	G	D	S	Tube
6N60L-TF2-T	6N60G-TF2-T	TO-220F2	G	D	S	Tube
6N60L-TF3-T	6N60G-TF3-T	TO-220F	G	D	S	Tube
6N60L-TM3-T	6N60G-TM3-T	TO-251	G	D	S	Tube
6N60L-TN3-R	6N60G-TN3-R	TO-252	G	D	S	Tape Reel
6N60L-TQ2-T	6N60G-TQ2-T	TO-263	G	D	S	Tube
6N60L-TQ2-R	6N60G-TQ2-R	TO-263	G	D	S	Tape Reel

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

		(1) T: Tube, R: Tape Reel (2) TA3: TO-220, TF3: TO-220F, TF1: TO-220F1, TF2: TO-220F2, TM3: TO-251, TN3: TO-252, TQ2: TO-263 (3) L: Lead Free, G: Halogen Free and Lead Free
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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	A
Continuous Drain Current		I_D	6	A
Pulsed Drain Current (Note 2)		I_{DM}	24	A
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	260	mJ
	Repetitive (Note 2)	E_{AR}	13	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	3.0	ns
Power Dissipation	TO-220/TO-263	P_D	125	W
	TO-220F/TO-220F1		40	W
	TO-220F2		42	W
	TO-251/TO-252		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. $L = 14\text{mH}$, $I_{AS} = 6\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\ \Omega$, Starting $T_J = 25^\circ\text{C}$

4. $I_{SD} \leq 6\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25^\circ\text{C}$

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220/TO-220F2 TO-220F/TO-220F1 TO-263	θ_{JA}	62.5	$^\circ\text{C}/\text{W}$
	TO-251/TO-252		110	
Junction to Case	TO-220/TO-263	θ_{JC}	1.0	$^\circ\text{C}/\text{W}$
	TO-220F/TO-220F1		3.2	
	TO-220F2		2.97	
	TO-251/TO-252		2.27	

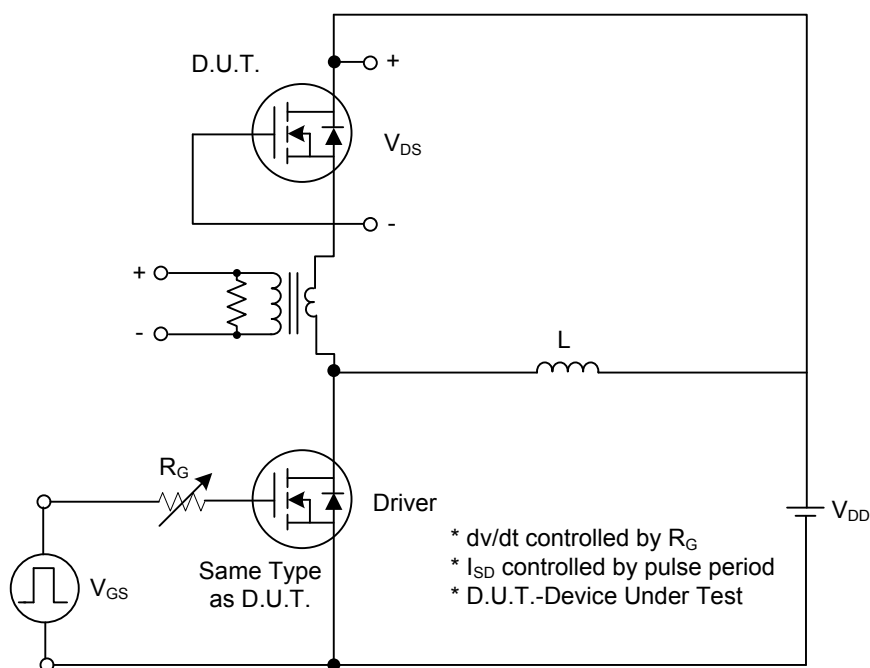
■ **ELECTRICAL CHARACTERISTICS** ($T_J = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} = 0V, I _D = 250μA	600			V
Drain-Source Leakage Current		I _{DSS}	V _{DS} = 600V, V _{GS} = 0V			10	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} = 30V, V _{DS} = 0V			100	nA
	Reverse		V _{GS} = -30V, V _{DS} = 0V			-100	nA
Breakdown Voltage Temperature Coefficient		ΔBV _{DSS} /ΔT _J	I _D =250μA, Referenced to 25°C		0.53		V/°C
ON CHARACTERISTICS							
Gate Threshold Voltage		V _{GS(TH)}	V _{DS} = V _{GS} , I _D = 250μA	2.0		4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} = 10V, I _D = 3A		1.2	1.75	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0 MHz		751		pF
Output Capacitance		C _{OSS}			89		pF
Reverse Transfer Capacitance		C _{RSS}			17		pF
SWITCHING CHARACTERISTICS							
Total Gate Charge		Q _G	V _{DS} =50V, I _D =1.3A, V _{GS} =10 V (Note 1, 2)		25		nC
Gate-Source Charge		Q _{GS}			4.9		nC
Gate-Drain Charge		Q _{GD}			9.4		nC
Turn-On Delay Time		t _{D(ON)}	V _{DD} =30V, I _D =0.5A, R _G =25Ω I _G = 100μA (Note 1, 2)		60		ns
Turn-On Rise Time		t _R			80		ns
Turn-Off Delay Time		t _{D(OFF)}			230		ns
Turn-Off Fall Time		t _F			90		ns
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} = 0 V, I _S = 6 A			1.4	V
Maximum Continuous Drain-Source Diode Forward Current		I _S				6	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				24	A
Reverse Recovery Time		t _{rr}	V _{GS} = 0 V, I _S = 6 A,		290		ns
Reverse Recovery Charge		Q _{RR}	di _F /dt = 100 A/μs (Note 1)		3.0		μC

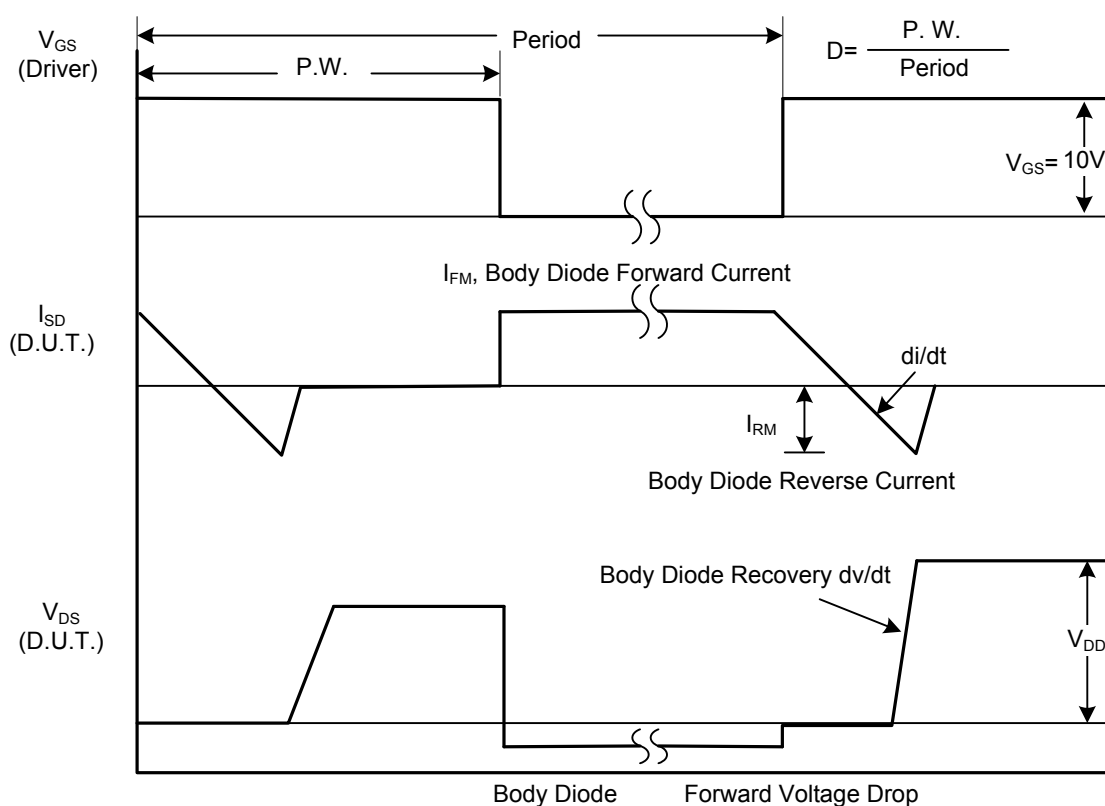
Notes: 1. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

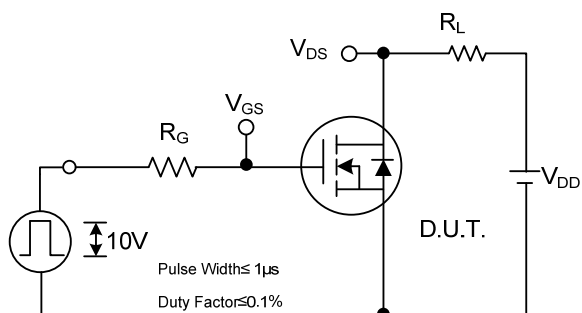


Peak Diode Recovery dv/dt Test Circuit

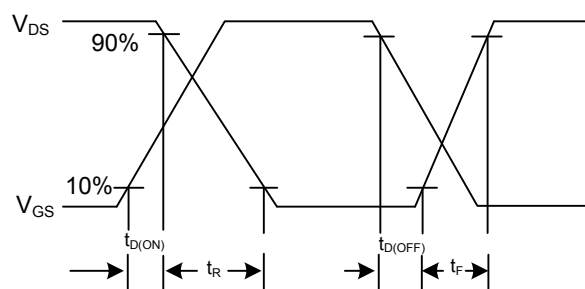


Peak Diode Recovery dv/dt Waveforms

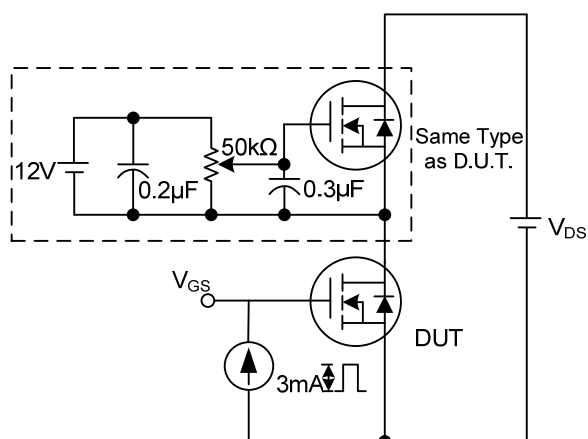
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



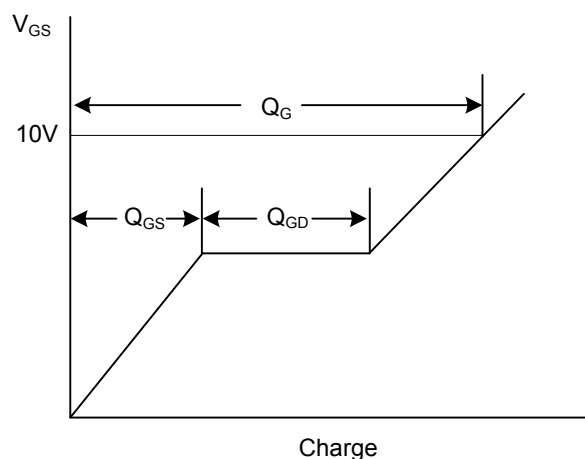
Switching Test Circuit



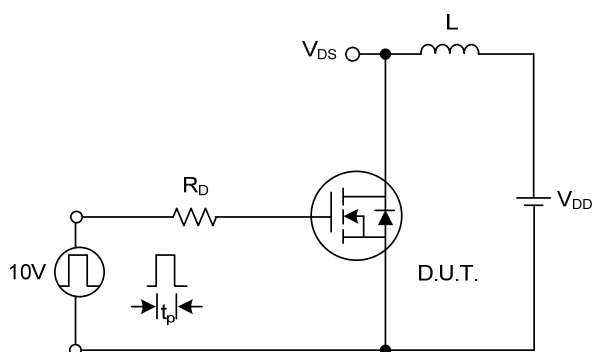
Switching Waveforms



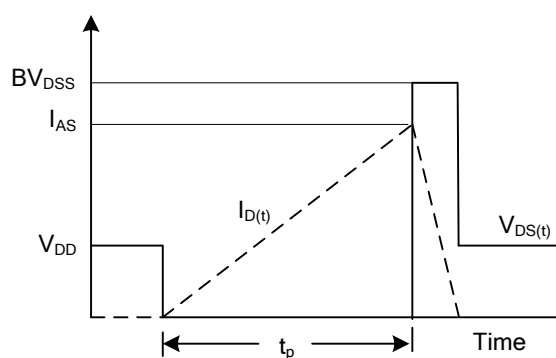
Gate Charge Test Circuit



Gate Charge Waveform

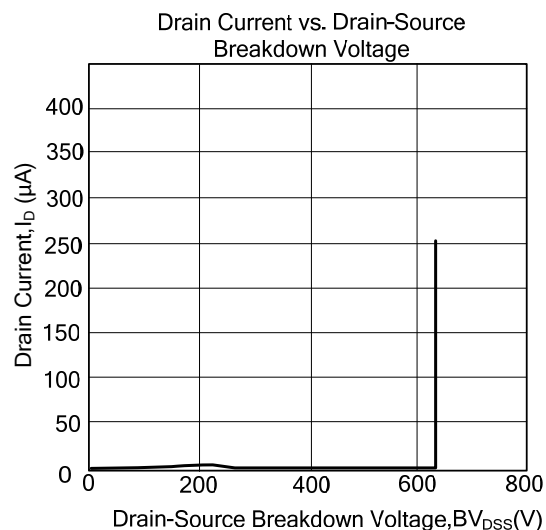
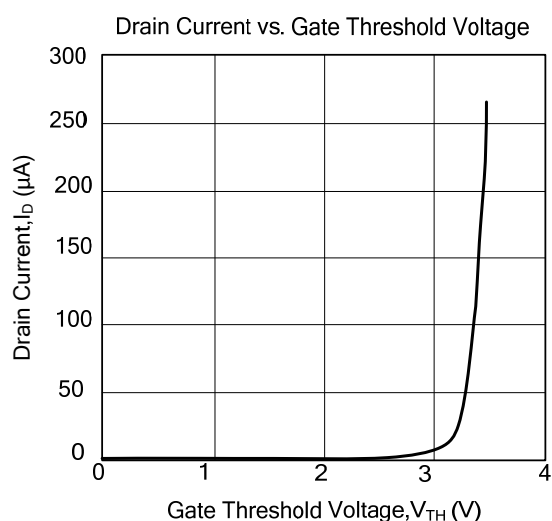
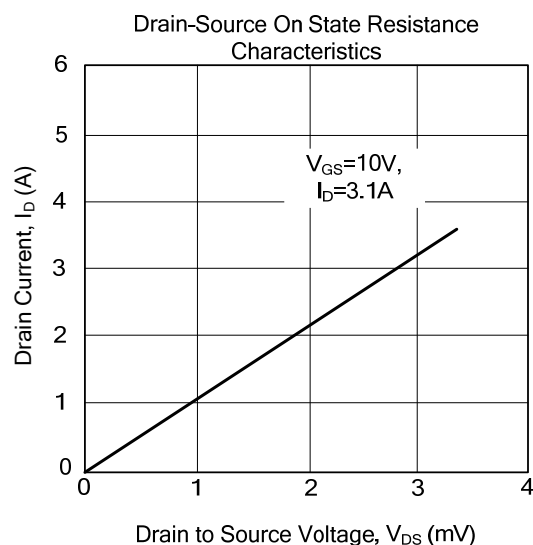
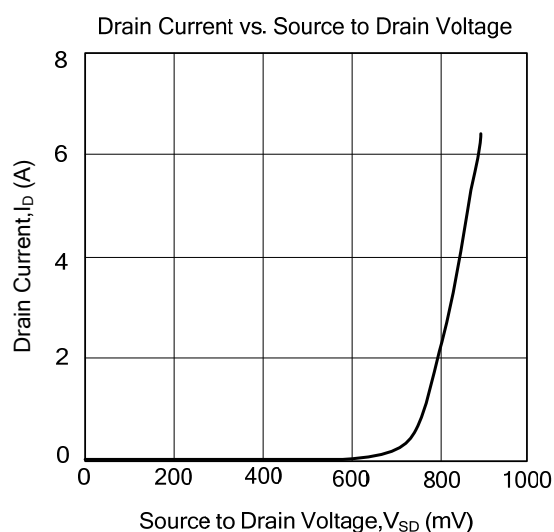


Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ TYPICAL CHARACTERISTICS



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