



6N60Z

Power MOSFET

6.2A, 600V N-CHANNEL POWER MOSFET

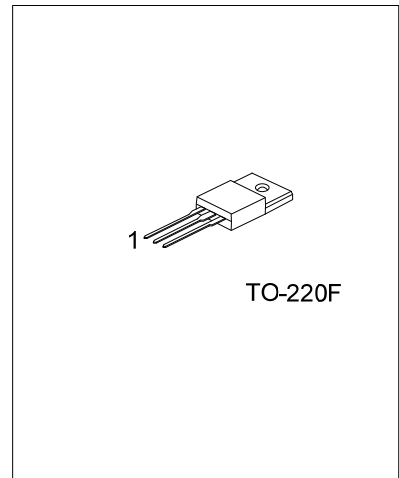
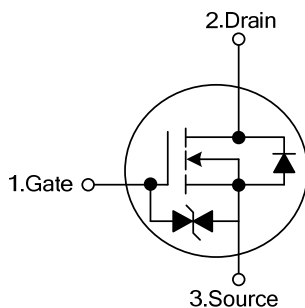
DESCRIPTION

The UTC **6N60Z** 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 high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in switching power supplies and adaptors.

FEATURES

- * $R_{DS(ON)} < 1.75\Omega$ @ $V_{GS} = 10V$, $I_D = 3.1A$
- * 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	
6N60ZL-TF3-T	6N60ZG-TF3-T	TO-220F	G	D	S	Tube

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

6N60ZL-TA3-T (1) Packing Type (2) Package Type (3) Lead Free		(1) T: Tube (2) TF3: TO-220F (3) L: Lead Free, G: Halogen Free
--	--	---

■ **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}	± 20	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}	252	mJ
	Repetitive (Note 2)	E_{AR}	13	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	ns
Power Dissipation		P_D	40	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. $L = 14\text{mH}$, $I_{AS} = 6\text{A}$, $V_{DD} = 90\text{V}$, $R_G = 25\ \Omega$, 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	RATING	UNIT
Junction to Ambient	θ_{JA}	62.5	$^{\circ}\text{C}/\text{W}$
Junction to Case	θ_{JC}	3.2	$^{\circ}\text{C}/\text{W}$

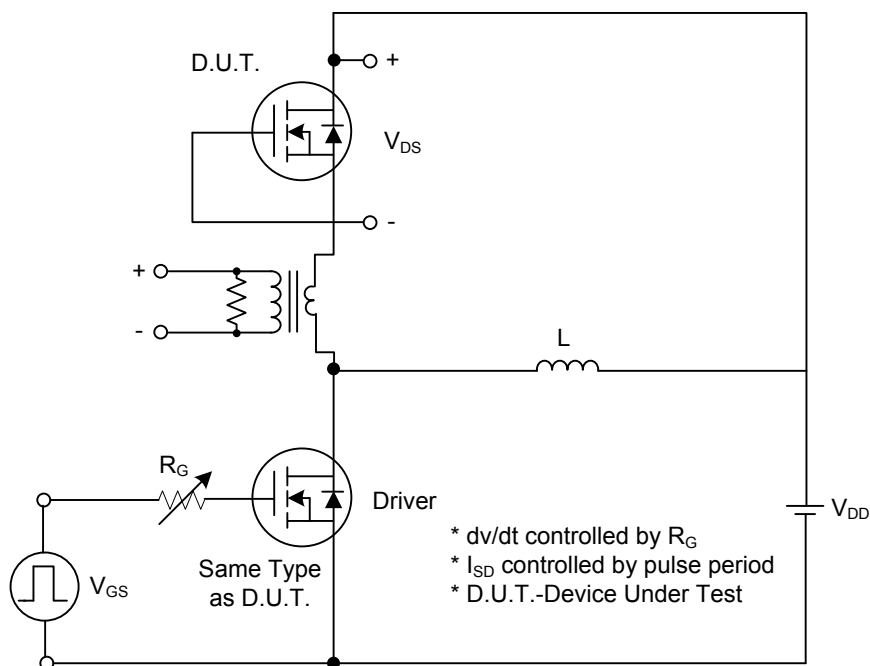
■ ELECTRICAL CHARACTERISTICS (T_J=25°C, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} = 0V, I _D = 250μA	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°C			100	μA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} = 20V, V _{DS} = 0V			10	μA
	Reverse		V _{GS} = -20V, V _{DS} = 0V			-10	μA
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 = 3.1A		1.4	1.75	Ω
DYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0 MHz		770	1000	pF
Output Capacitance		C _{OSS}			95	120	pF
Reverse Transfer Capacitance		C _{RSS}			10	13	pF
SWITCHING CHARACTERISTICS							
Turn-On Delay Time		t _{D(ON)}	V _{GS} =0~10V, V _{DD} =30V, I _D =0.5A, R _G =25Ω (Note 1, 2)		45	60	ns
Turn-On Rise Time		t _r			95	110	ns
Turn-Off Delay Time		t _{D(OFF)}			185	200	ns
Turn-Off Fall Time		t _f			110	125	ns
Total Gate Charge		Q _G	V _{GS} =10V, V _{DD} =50V, I _D =1.3A I _G =100μA (Note 1, 2)		32.8		nC
Gate-Source Charge		Q _{GS}			7.0		nC
Gate-Drain Charge		Q _{GD}			9.8		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS							
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} = 0 V, I _S = 6.2 A			1.4	V
Maximum Continuous Drain-Source Diode Forward Current		I _S				6.2	A
Maximum Pulsed Drain-Source Diode Forward Current		I _{SM}				24.8	A
Reverse Recovery Time		t _{rr}	V _{GS} = 0 V, I _S = 6.2 A,		290		ns
Reverse Recovery Charge		Q _{RR}	dI _F /dt = 100 A/μs (Note 1)		2.35		μC

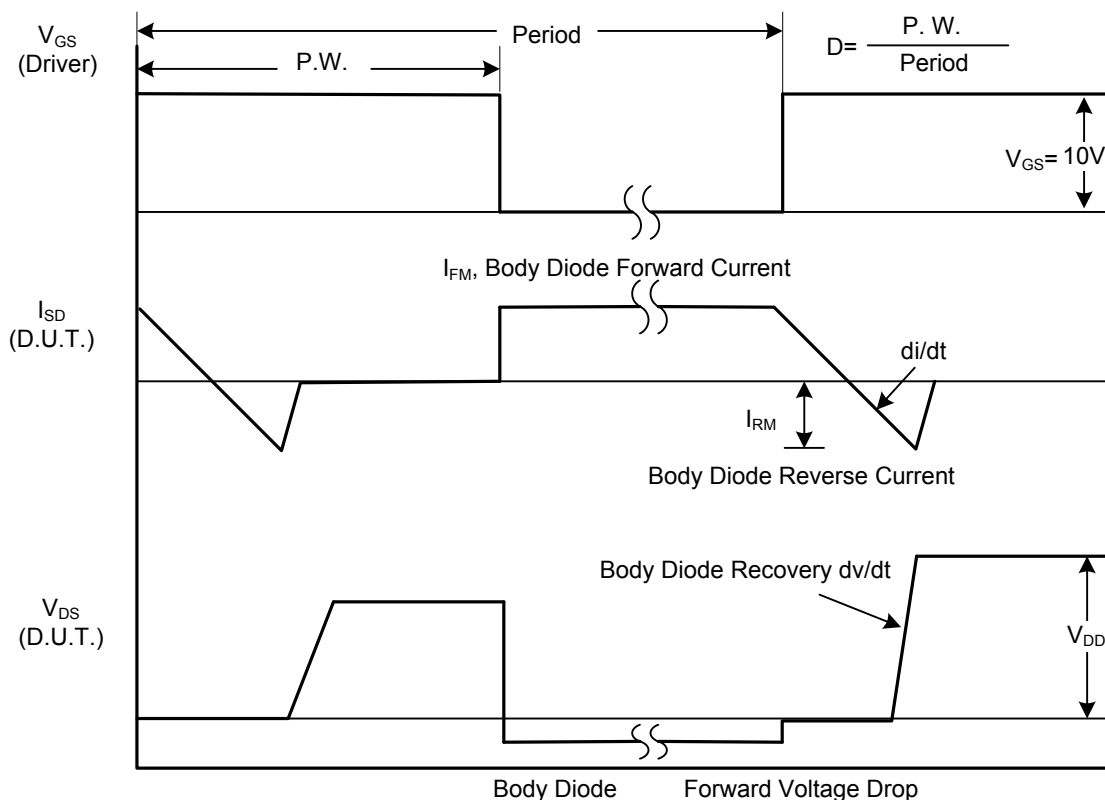
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%

2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

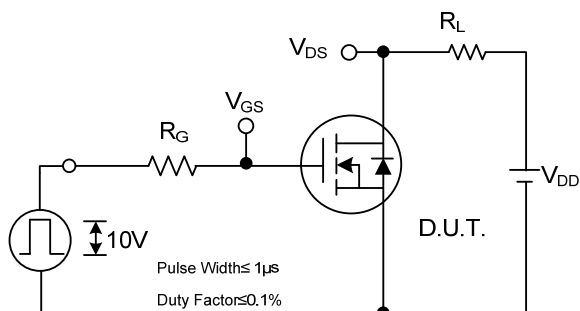


Peak Diode Recovery dv/dt Test Circuit

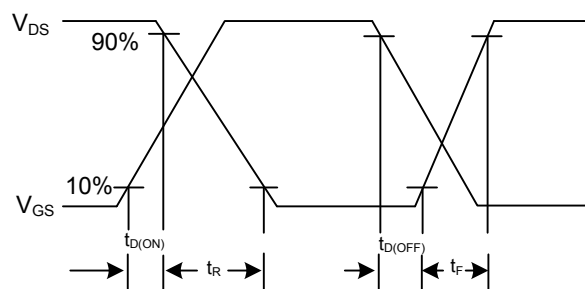


Peak Diode Recovery dv/dt Waveforms

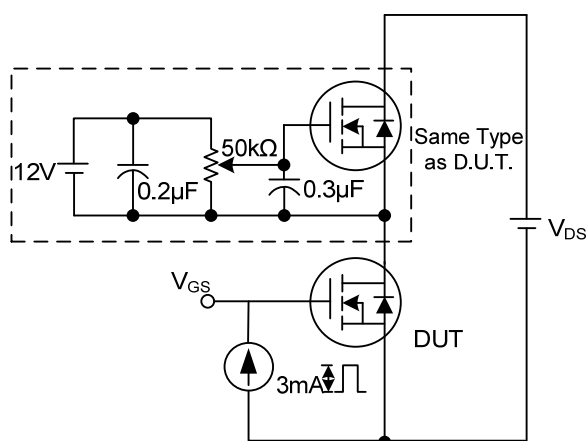
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



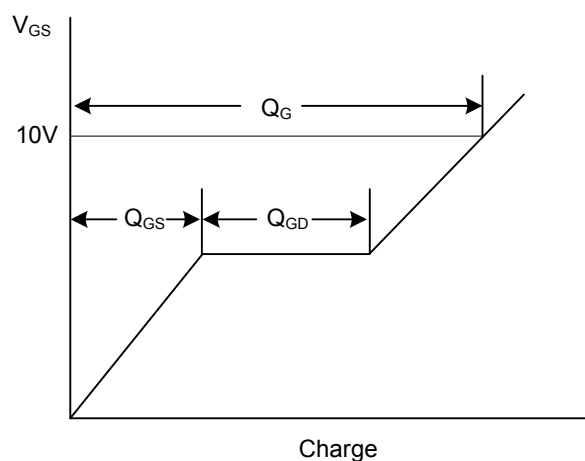
Switching Test Circuit



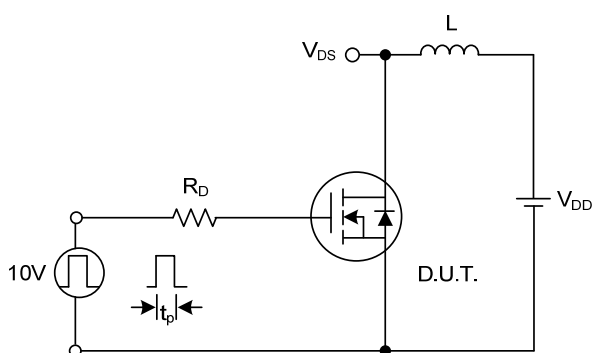
Switching Waveforms



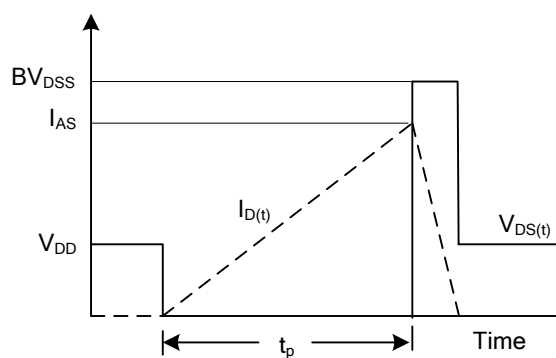
Gate Charge Test Circuit



Gate Charge Waveform

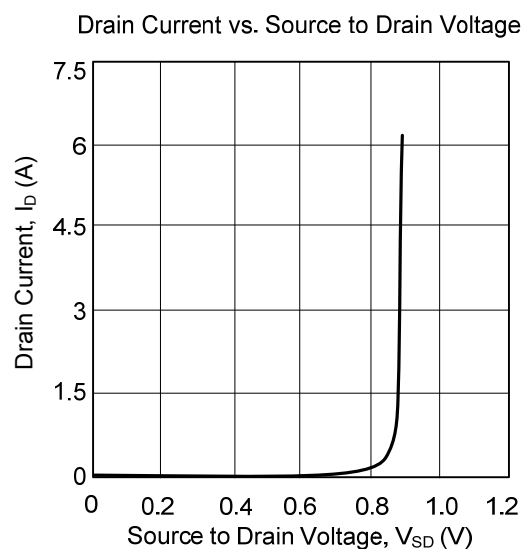
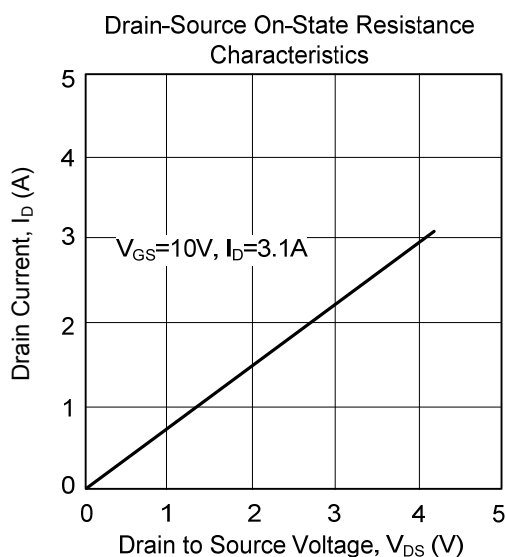
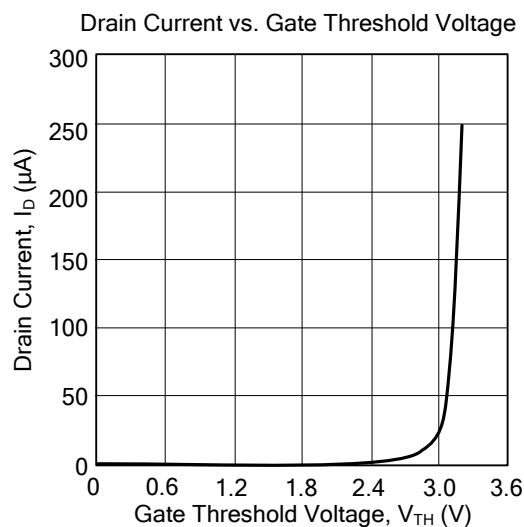
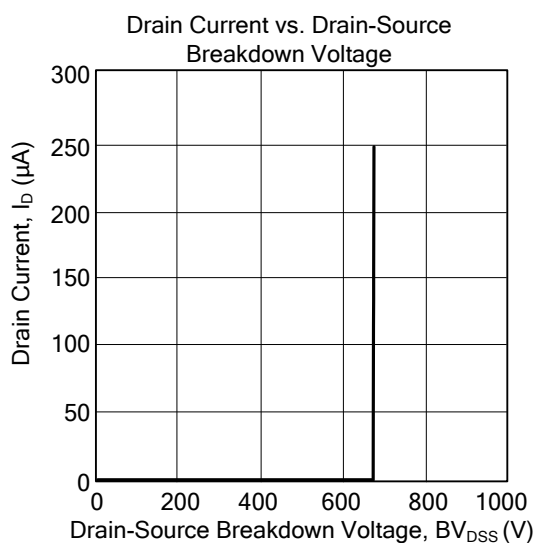


Unclamped Inductive Switching Test Circuit



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.