



22N60

Power MOSFET

22A, 600V N-CHANNEL POWER MOSFET

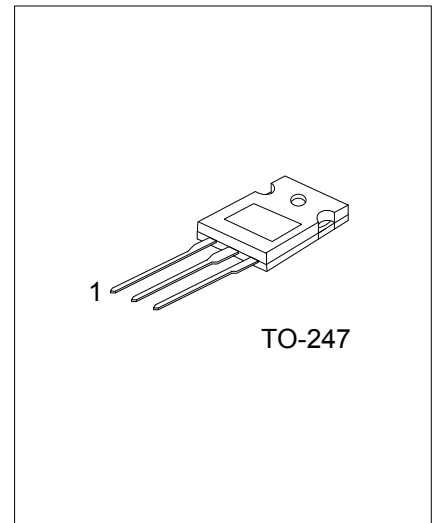
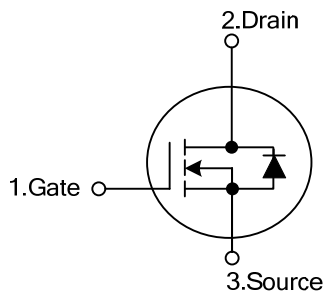
DESCRIPTION

As the SMPS MOSFET, the UTC **22N60** uses UTC's advanced technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with low gate voltages. This device is suitable for use as a load switch or in PWM applications.

FEATURES

- * $R_{DS(ON)} = 0.35\Omega$
- * Ultra Low Gate Charge (Typical 150 nC)
- * Low Reverse Transfer Capacitance (C_{RSS} = Typical 36 pF)
- * 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	
22N60L-T47-T	22N60G-T47-T	TO-247	G	D	S	Tube

<p>22N60L-T47-T</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Lead Free</p>		<p>(1) T: Tube</p> <p>(2) T47: TO-247</p> <p>(3) G: Halogen Free, L: Lead Free</p>
---	--	--

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

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	600	V
Gate-Source Voltage		V_{GS}	± 30	V
Avalanche Current		I_{AR}	22	A
Continuous Drain Current		I_D	22	A
Pulsed Drain Current (Note 1)		I_{DM}	88	A
Avalanche Energy	Single Pulsed	E_{AS}	380	mJ
	Repetitive	E_{AR}	37	mJ
Peak Diode Recovery dv/dt (Note 3)		dv/dt	18	V/ns
Power Dissipation		P_D	370	W
Junction Temperature		T_J	150	$^\circ\text{C}$
Operating Temperature		T_{OPR}	$-55 \sim +150$	$^\circ\text{C}$
Storage Temperature		T_{STG}	$-55 \sim +150$	$^\circ\text{C}$

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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	40	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	0.34	$^\circ\text{C}/\text{W}$

■ 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 =250μA	600			V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =600V, V _{GS} =0V			50	μA
Gate- Source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±30V			±100	nA
Breakdown Voltage Temperature Coefficient	ΔBV _{DSS} /ΔT _J	I _D =1mA,Referenced to 25°C		0.30		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-Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =13A (Note 4)		0.26	0.35	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, f=1.0MHz		3570		pF
Output Capacitance	C _{OSS}			350		pF
Reverse Transfer Capacitance	C _{RSS}			36		pF
SWITCHING PARAMETERS						
Turn-ON Delay Time	t _{D(ON)}	V _{DD} =300V, I _D =22A, R _G =6.2Ω V _{GS} =10V (Note 4)		26		ns
Turn-ON Rise Time	t _R			99		ns
Turn-OFF Delay Time	t _{D(OFF)}			48		ns
Turn-OFF Fall-Time	t _F			37		ns
Total Gate Charge	Q _G	V _{DS} =480V, V _{GS} =10V, I _D =22A (Note 4)			150	nC
Gate Source Charge	Q _{GS}				45	nC
Gate Drain Charge	Q _{GD}				76	nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =22A			1.5	V
Continuous Source Current (Body Diode)	I _S	(Note 1)			22	A
Pulsed Source Current (Body Diode)	I _{SM}				88	A
Reverse Recovery Time	t _{rr}	I _S =22A, di/dt=100A/μs		590	890	ns
Reverse Recovery Charge	Q _{RR}	(Note 4)		7.2	11	μC

Notes: 1. Repetitive rating; pulse width limited by max. junction temperature.

2. $T_J = 25^\circ\text{C}$, $L = 1.5mH$, $R_G=25\Omega$, $I_{AS} = 22A$

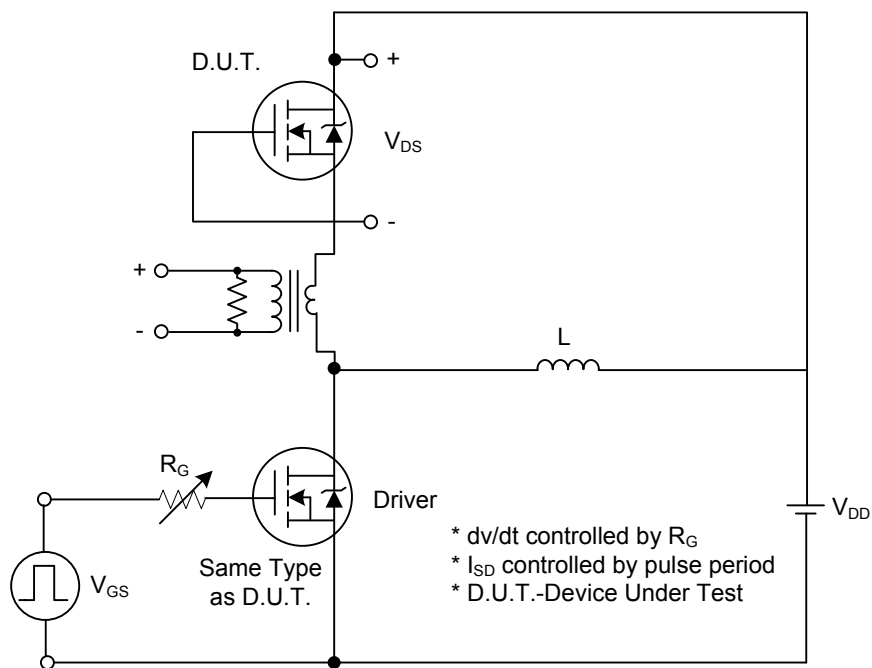
3. $I_{SD} \leq 22A$, $di/dt \leq 540A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 150^\circ\text{C}$.

4. Pulse Width ≤ 300 s, Duty Cycle $\leq 2\%$.

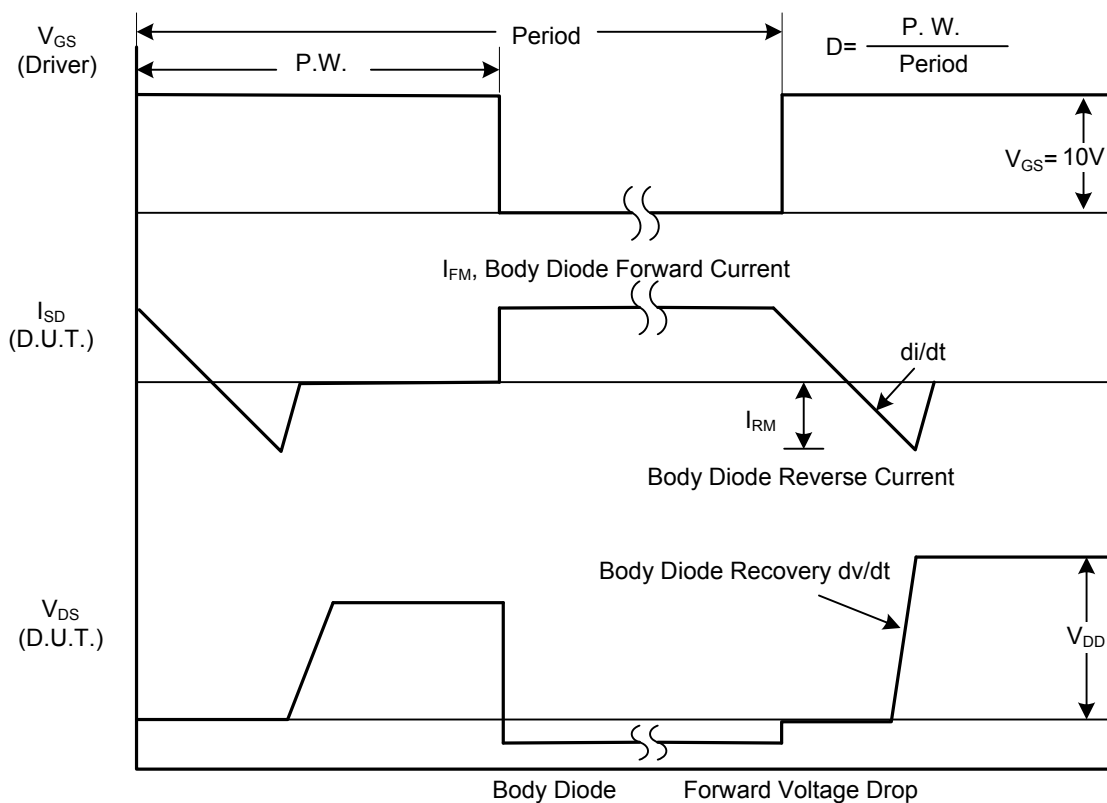
A graph showing the relationship between Gate Voltage (V_{GS}) and Charge. The y-axis is labeled V_{GS} and has a 10V mark. The x-axis is labeled Charge. The curve starts at the origin, rises linearly to a plateau at 10V, remains constant at 10V, and then rises linearly again. The first linear segment is labeled Q_{GS} , the constant segment is labeled Q_G , and the second linear segment is labeled Q_{GD} .

Gate Charge Waveform

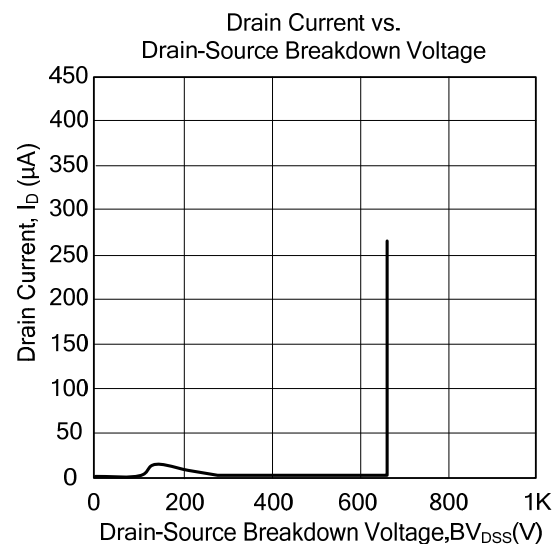
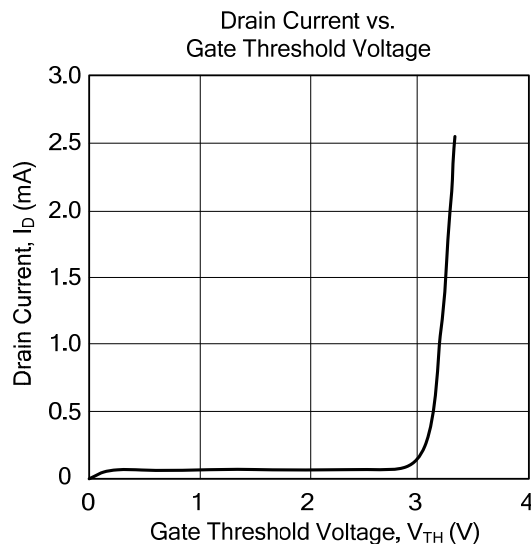
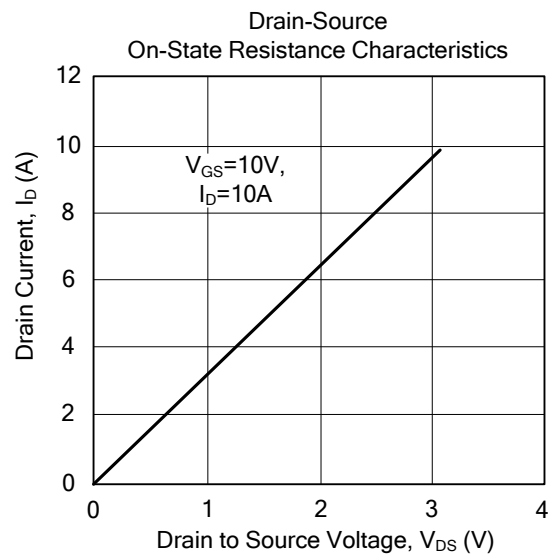
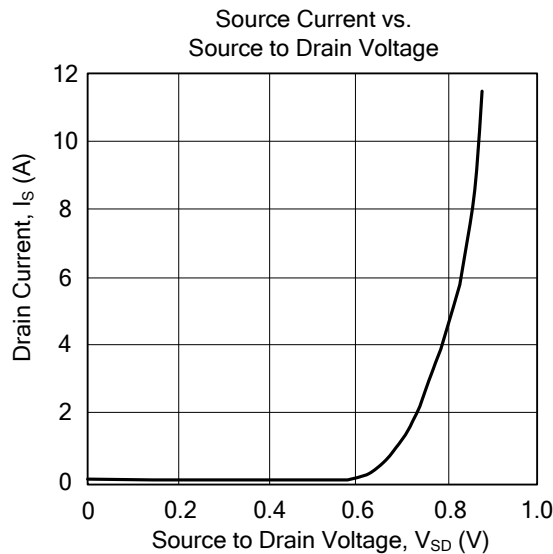
■ TEST CIRCUITS(Cont.)



Peak Diode Recovery dv/dt Test Circuit



■ 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.