



22N60

Power MOSFET

22A, 600V N-CHANNEL POWER MOSFET

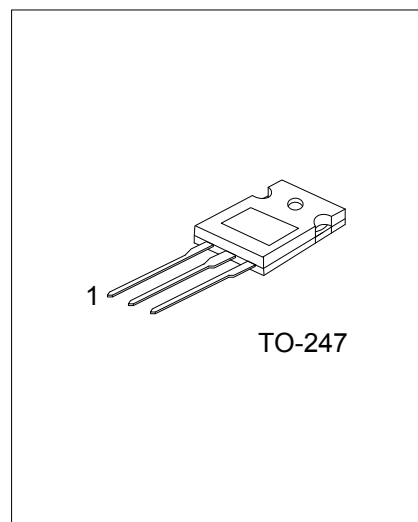
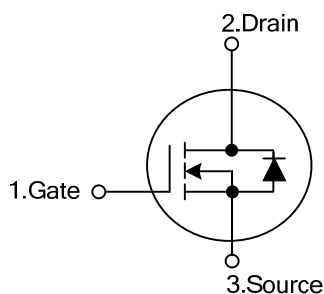
DESCRIPTION

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 ($C_{RSS} = \text{Typical } 36 \text{ pF}$)
- * 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> <ul style="list-style-type: none">(1)Packing Type(2)Package Type(3)Lead Free	<p>(1) T: Tube</p> <p>(2) T47: TO-247</p> <p>(3) G: Halogen Free, L: Lead Free</p>
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■ 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

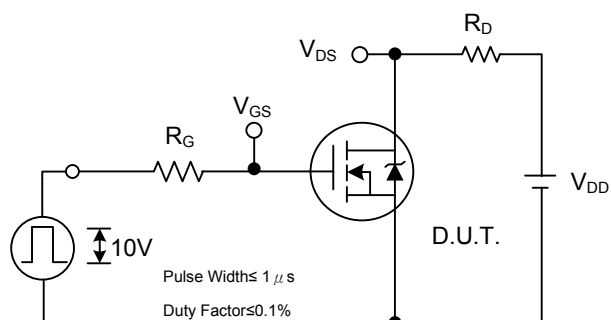
Notes: 1. Repetitive rating; pulse width limited by max. junction temperature.

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

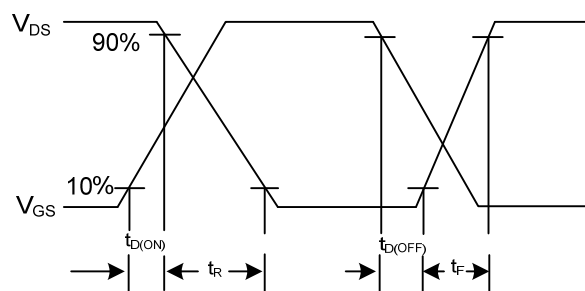
3. $I_{SD} \leq 22A$, $di/dt \leq 540A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 150^\circ\text{C}$.

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

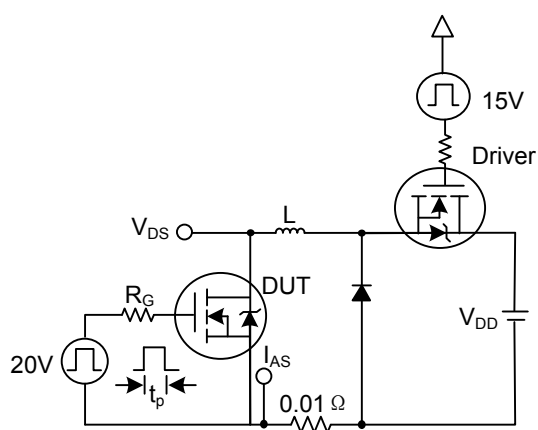
■ TEST CIRCUITS



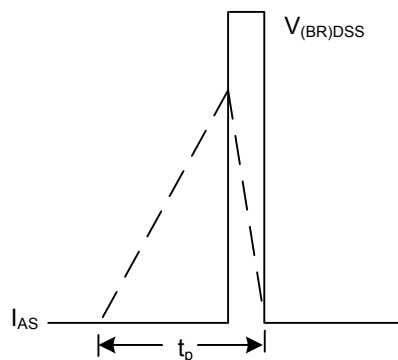
Switching Test Circuit



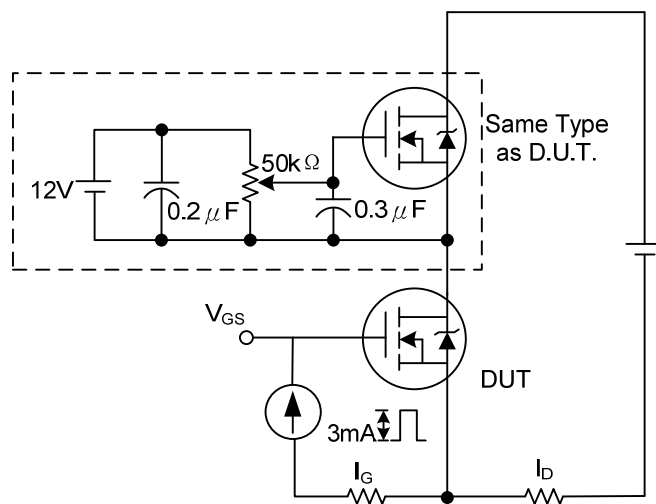
Switching Waveforms



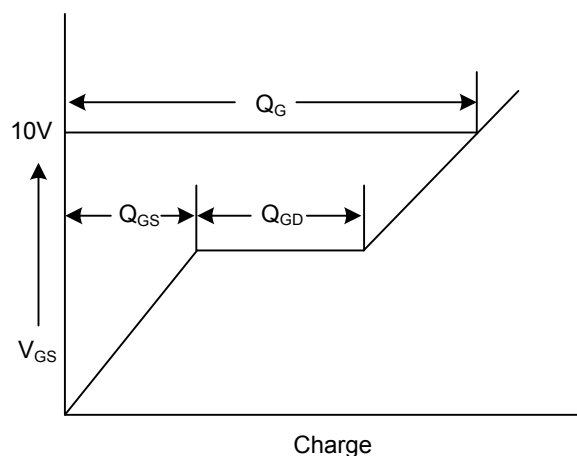
Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

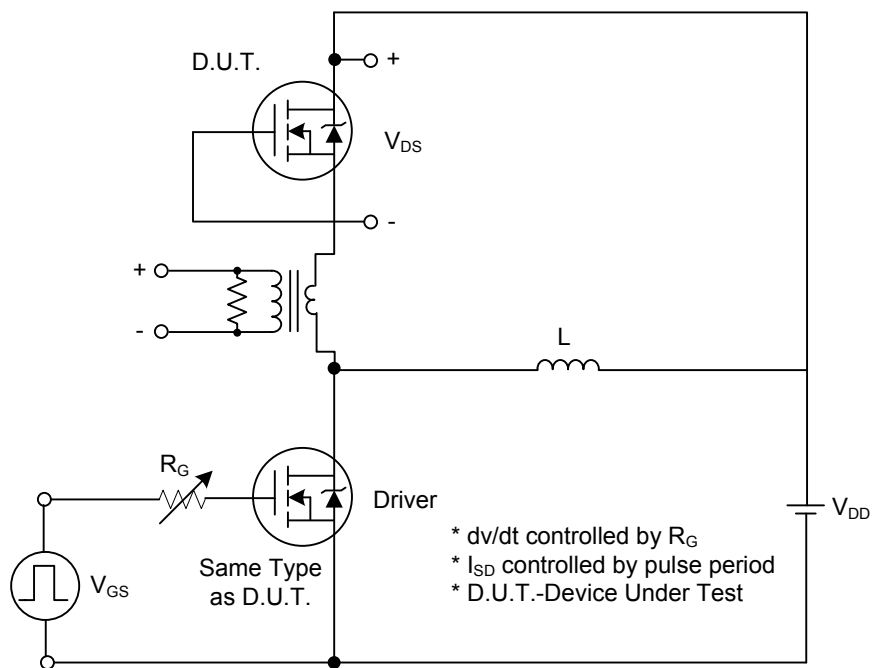


Gate Charge Test Circuit

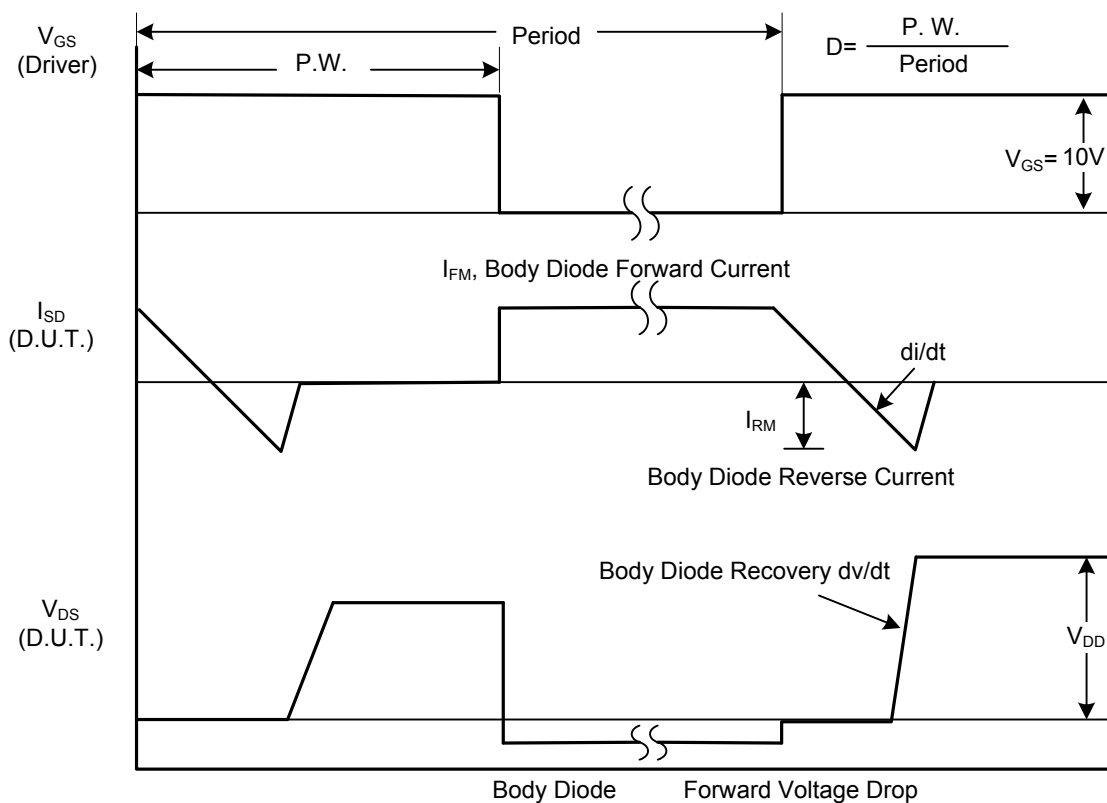


Gate Charge Waveform

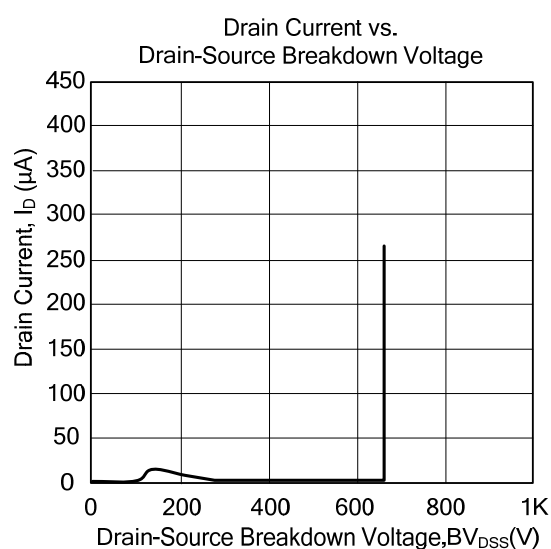
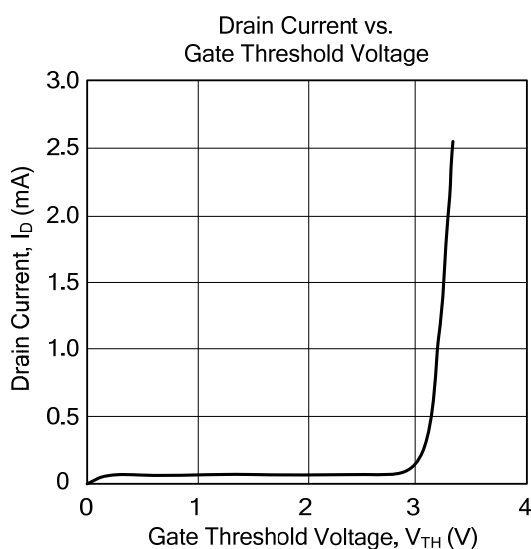
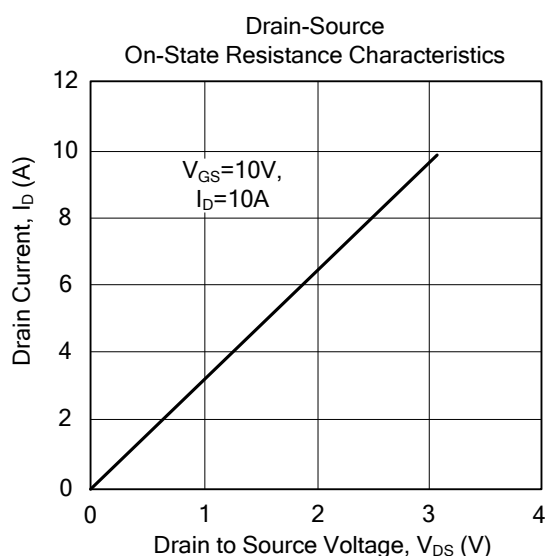
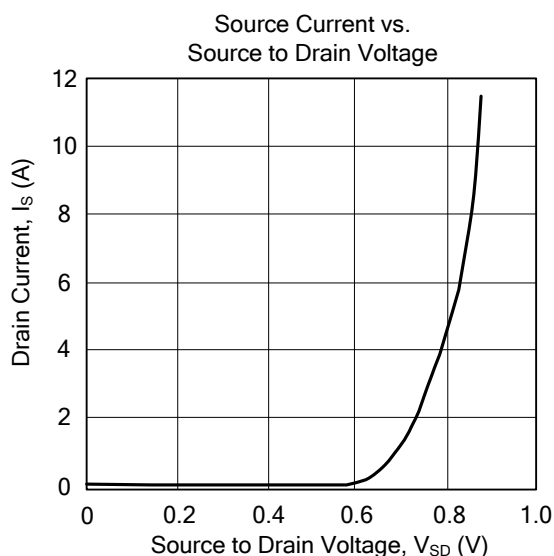
■ TEST CIRCUITS(Cont.)



Peak Diode Recovery dv/dt Test Circuit



■ TYPICAL CHARACTERISTICS



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