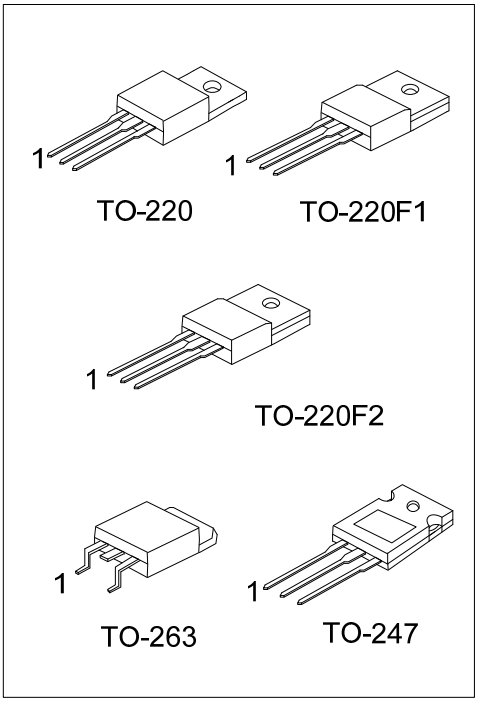
30A, 200V N-CHANNEL POWER MOSFET



■ DESCRIPTION

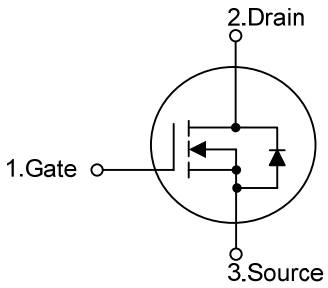
The UTC **30N20-HC** is a N-channel enhancement MOSFET using UTC's advanced technology to provide the customers with perfect $R_{DS(ON)}$, high switching speed, high current capacity and low gate charge.

The UTC **30N20-HC** is universally applied in low voltage such as automotive, high efficiency switching for AC/DC converters and DC motor control, etc.

■ FEATURES

* $R_{DS(ON)} \leq 60\ m\Omega$ @ V_{GS}=10V, I_D=15A
* High Switching Speed

■ SYMBOL



■ ORDERING INFORMATION

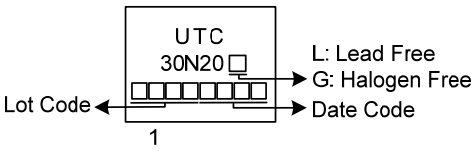
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
30N20L-TA3-T	30N20G-TA3-T	TO-220	G	D	S	Tube
30N20L-TF1-T	30N20G-TF1-T	TO-220F1	G	D	S	Tube
30N20L-TF2-T	30N20G-TF2-T	TO-220F2	G	D	S	Tube
30N20L-TQ2-T	30N20G-TQ2-T	TO-263	G	D	S	Tube
30N20L-TQ2-R	30N20G-TQ2-R	TO-263	G	D	S	Tape Reel
30N20L-T47-T	30N20G-T47-T	TO-247	G	D	S	Tube

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

30N20G-TA3-T
(1)Packing Type
(2)Package Type
(3)Green Package

(1) T: Tube, R: Tape Reel
(2) TA3: TO-220, TF1: TO-220F1, TF2: TO-220F2
TQ2: TO-263, T47: TO-247
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING



■ ABSOLUTE MAXIMUM RATINGS (unless otherwise specified)

PARAMETER			SYMBOL	RATINGS	UNIT
Drain-Source Voltage			V_{DSS}	200	V
Gate-Source Voltage			V_{GSS}	±30	V
Continuous Drain Current	Continuous	T_A=25°C	I_D	30	A
		T_A=100°C		18	A
	Pulsed		I_{DM}	60	A
Single Pulsed Avalanche Current			I_{AS}	86	A
Single Pulsed Avalanche Energy (Note 3)			E_{AS}	1411	mJ
Peak Diode Recovery dv/dt (Note 4)			dv/dt	4.7	V/ns
Power Dissipation	TO-220/TO-263		P_D	232	W
	TO-220F1/TO-220F2			55	W
	TO-247			250	W
Junction Temperature			T_J	+150	°C
Storage Temperature			T_{STG}	-55 ~ +150	°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 maximum junction temperature.
3. L=30mH, I_{AS}=9.7A, V_{DD}=50V, R_G=25Ω, Starting T_J = 25°C
4. I_{SD}≤30A, di/dt≤200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

■ THERMAL DATA

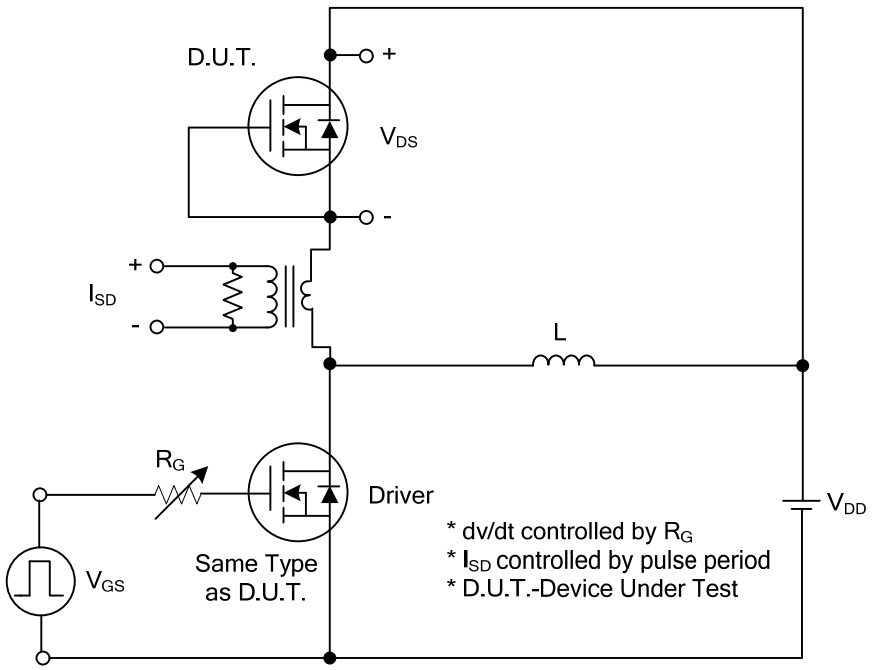
PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220/TO-220F1 TO-220F2/TO-263	θ_{JA}	62.5	°C/W
	TO-247		50	°C/W
Junction to Case	TO-220/TO-263	θ_{JC}	0.53	°C/W
	TO-220F1/TO-220F2		2.2	°C/W
	TO-247		0.5	°C/W

■ ELECTRICAL CHARACTERISTICS

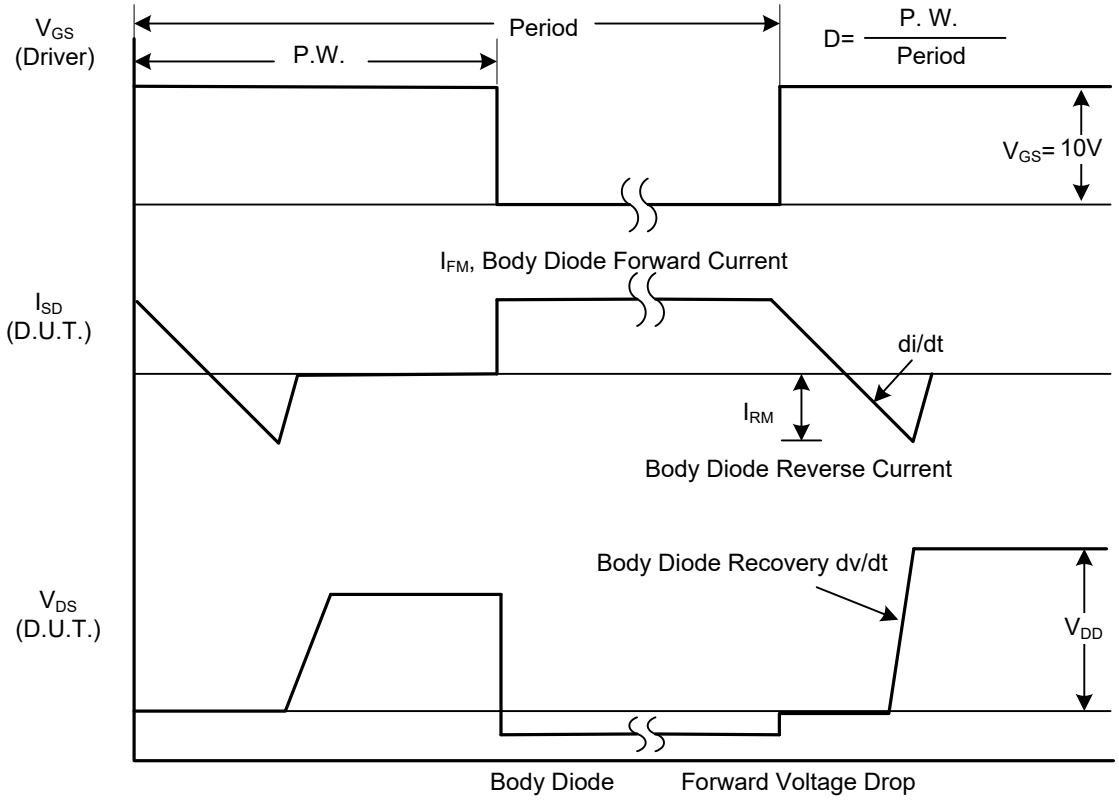
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	200			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=200V, V_{GS}=0V			10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+30V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-30V, V_{DS}=0V			-100	nA
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=15A			60	mΩ
DYNAMIC PARAMETERS							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		3340		pF
Output Capacitance		C_{OSS}			950		pF
Reverse Transfer Capacitance		C_{RSS}			240		pF
SWITCHING PARAMETERS							
Total Gate Charge		Q_G	V_{DS}=160V, V_{GS}=10V, I_D=30A I_G=1mA (Note 1, 2)		85		nC
Gate to Source Charge		Q_{GS}			22		nC
Gate to Drain Charge		Q_{GD}			28		nC
Turn-ON Delay Time		$t_{D(ON)}$	V_{DD}=100V, V_{GS}=10V, I_D=30A, R_G=25Ω (Note 1, 2)		40		ns
Rise Time		t_R			55		ns
Turn-OFF Delay Time		$t_{D(OFF)}$			210		ns
Fall-Time		t_F			58		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				30	A
Maximum Body-Diode Pulsed Current		I_{SM}				60	A
Drain-Source Diode Forward Voltage		V_{SD}	I_S=30A, V_{GS}=0V			1.4	V
Body Diode Reverse Recovery Time		t_{rr}	I_S=30A, V_{GS}=0V, dI_F/dt=100A/μs (Note 1)		210		ns
Reverse Recovery Charge		Q_{rr}			1.7		μC

Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

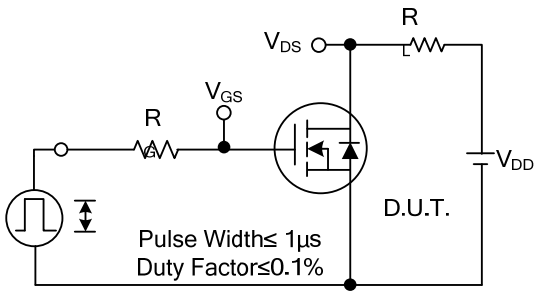


Peak Diode Recovery dv/dt Test Circuit

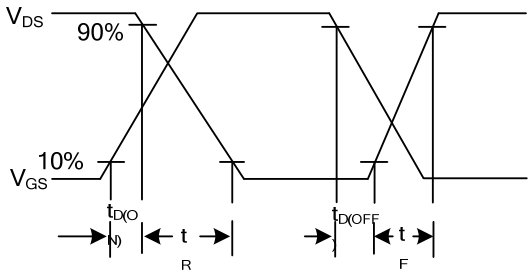


Peak Diode Recovery dv/dt Waveforms

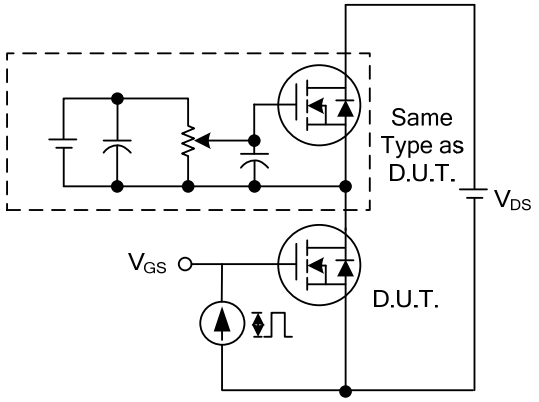
■ TEST CIRCUITS AND WAVEFORMS



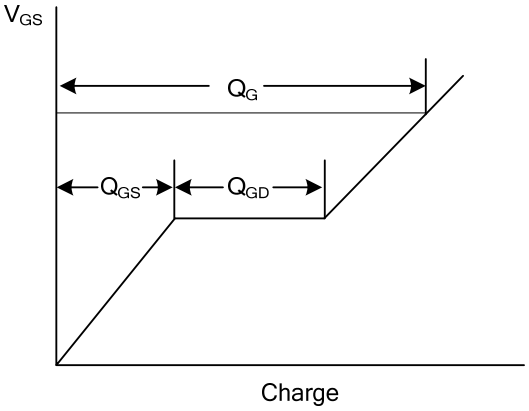
Switching Test Circuit



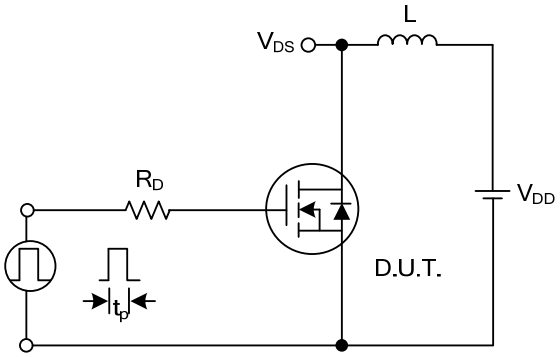
Switching Waveforms



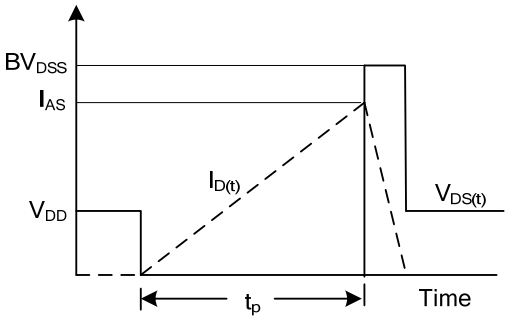
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms