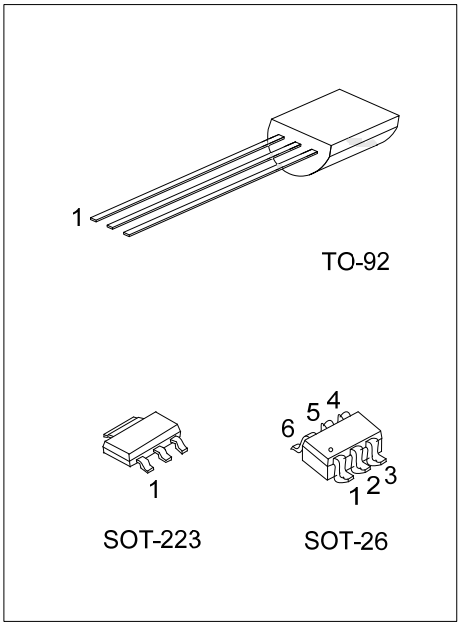
UT2N20

POWER MOSFET

2.0A, 200V N-CHANNEL POWER MOSFET



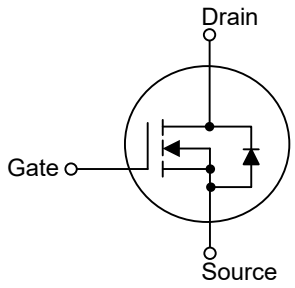
■ DESCRIPTION

The UTC **UT2N20** is a high voltage power MOSFET combines advanced trench MOSFET 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 in high speed switching applications of switching power supplies and adaptors.

■ FEATURES

* $R_{DS(ON)} \leq 625\ m\Omega$ @ V_{GS}=10V, I_D=1.0A
* Fast switching capability
* Avalanche energy tested
* Improved dv/dt capability, high ruggedness

■ SYMBOL



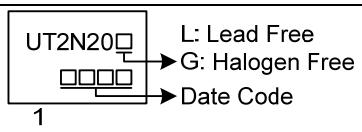
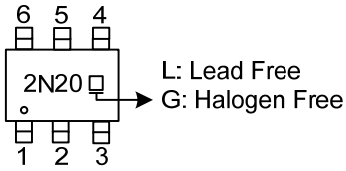
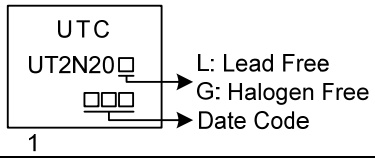
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment						Packing
Lead Free	Halogen Free		1	2	3	4	5	6	
UT2N20L-AA3-R	UT2N20G-AA3-R	SOT-223	G	D	S	-	-	-	Tape Reel
UT2N20L-AG6-R	UT2N20G-AG6-R	SOT-26	D	D	G	S	D	D	Tape Reel
UT2N20L-T92-B	UT2N20G-T92-B	TO-92	G	D	S	-	-	-	Tape Box
UT2N20L-T92-K	UT2N20G-T92-K	TO-92	G	D	S	-	-	-	Bulk
UT2N20L-T92-C-B	UT2N20G-T92-C-B	TO-92	S	G	D	-	-	-	Tape Box
UT2N20L-T92-C-K	UT2N20G-T92-C-K	TO-92	S	G	D	-	-	-	Bulk

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

UT2N20G-T92-C-B (1)Packing Type (2)Pin Assignment (3)Package Type (4)Green Package	(1) B: Tape Box, K: Bulk, R: Tape Reel (2) refer to Pin Assignment (for TO-92) (3) AA3: SOT-223, AG6: SOT-26, T92: TO-92 (4) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

PACKAGE	MARKING
SOT-223	
SOT-26	
TO-92	

■ ABSOLUTE MAXIMUM RATING (T_A=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	200	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	Continuous	I_D	2	A
	Pulsed	I_{DM}	4	A
Peak Diode Recovery dv/dt (Note 3)		dv/dt	3.7	V/ns
Power Dissipation	SOT-223	P_D	2.2	W
	SOT-26		1.5	W
	TO-92		2	W
Junction Temperature		T_J	+150	°C
Storage Temperature Range		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. I_{SD} ≤ 2.0A, di/dt ≤ 200A/μs, V_{DD}≤ BV_{DSS}, Starting T_J= 25°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	θ_{JA}	140	°C/W
	SOT-26		240	°C/W
	TO-92		160	°C/W
Junction to Case	SOT-223	θ_{Jc}	56.8	°C/W
	SOT-26		83	°C/W
	TO-92		62.5	°C/W

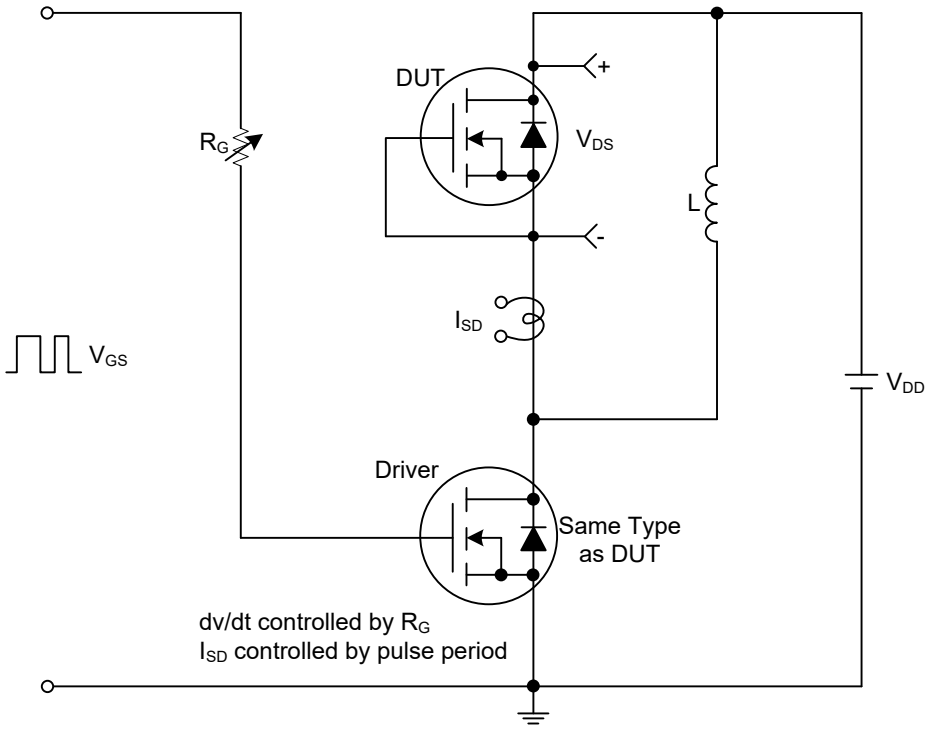
Note: Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

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

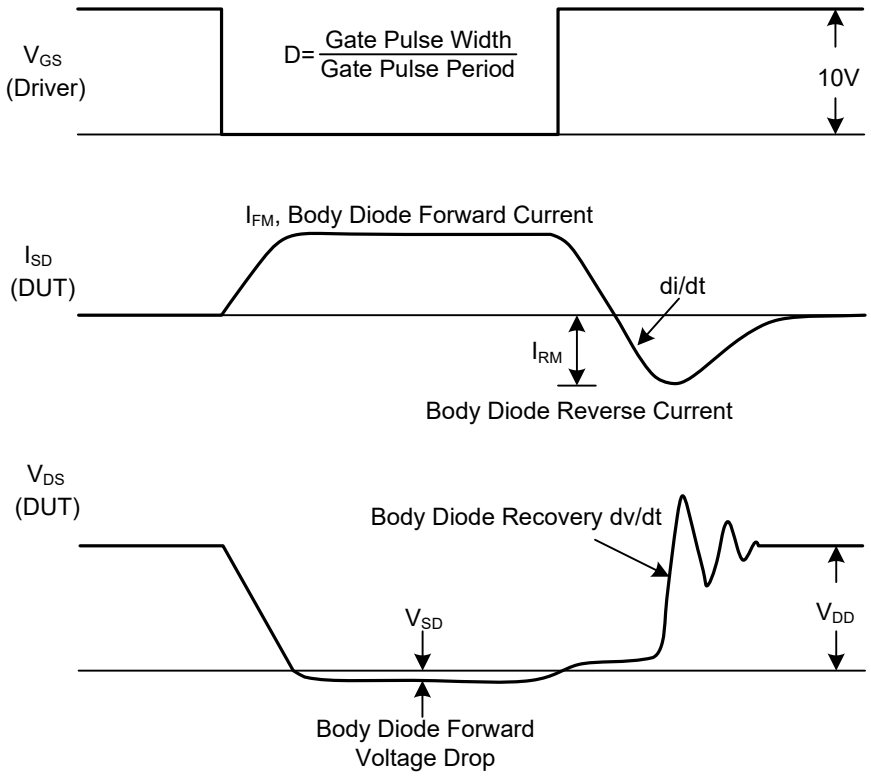
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV_{DSS}	I_D=250μA, V_{GS}=0V	200			V
Drain-Source Leakage Current		I_{DSS}	V_{DS}=200V, V_{GS}=0V			10	μA
Gate-Source Leakage Current	Forward	I_{GSS}	V_{GS}=+20V, V_{DS}=0V			+100	nA
	Reverse		V_{GS}=-20V, V_{DS}=0V			-100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	2.0		3.5	V
Static Drain-Source On-State Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=1.0A			625	mΩ
DYNAMIC CHARACTERISTICS							
Input Capacitance		C_{ISS}	V_{DS}=25V, V_{GS}=0V, f=1MHz		404.8		pF
Output Capacitance		C_{OSS}			32.1		pF
Reverse Transfer Capacitance		C_{RSS}			17.2		pF
SWITCHING PARAMETERS							
Total Gate Charge (Note 1)		Q_G	V_{DS}=160V, V_{GS}=10V, I_D=2.0A I_G=1mA (Note 1, 2)		16.1		nC
Gate to Source Charge		Q_{GS}			4.3		nC
Gate to Drain Charge		Q_{GD}			3.5		nC
Turn-on Delay Time (Note 1)		$t_{D(ON)}$	V_{DD}=100V, V_{GS}=10V, I_D =2.0A, R_G =25Ω (Note 1, 2)		17.6		ns
Rise Time		t_R			15.2		ns
Turn-off Delay Time		$t_{D(OFF)}$			41.6		ns
Fall-Time		t_F			22		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS							
Maximum Body-Diode Continuous Current		I_S				2	A
Maximum Body-Diode Pulsed Current		I_{SM}				4	A
Drain-Source Diode Forward Voltage (Note 1)		V_{SD}	I_S=2.0A, V_{GS}=0V			1.4	V
Reverse Recovery Time		t_{rr}	I_S=2.0A, V_{GS}=0V, d_{IF}/d_t=100A/μs		72		ns
Reverse Recovery Charge		Q_{rr}			0.1		μC

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

■ TEST CIRCUITS AND WAVEFORMS



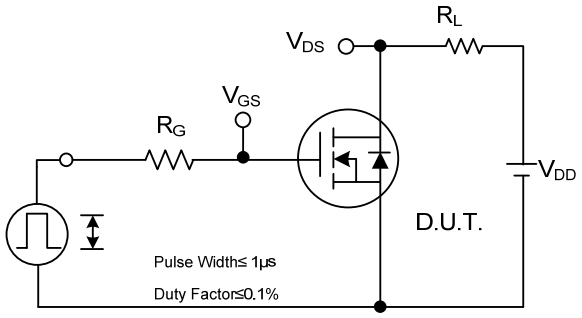
Peak Diode Recovery dv/dt Test Circuit



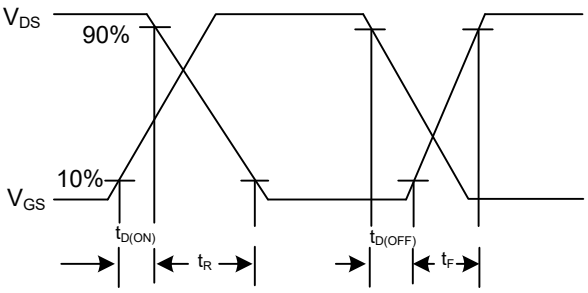
Peak Diode Recovery dv/dt Test Circuit and Waveforms

Peak Diode Recovery dv/dt Waveforms

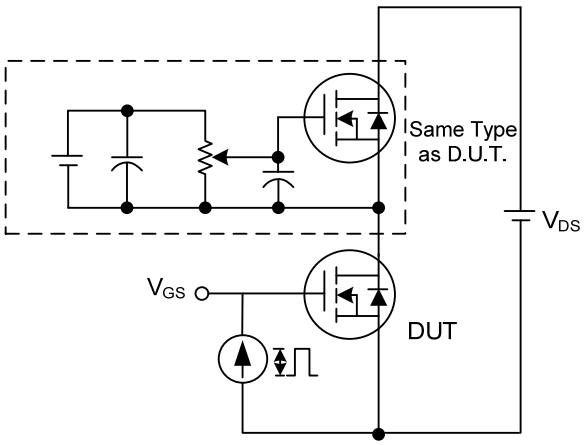
■ TEST CIRCUITS AND WAVEFORMS



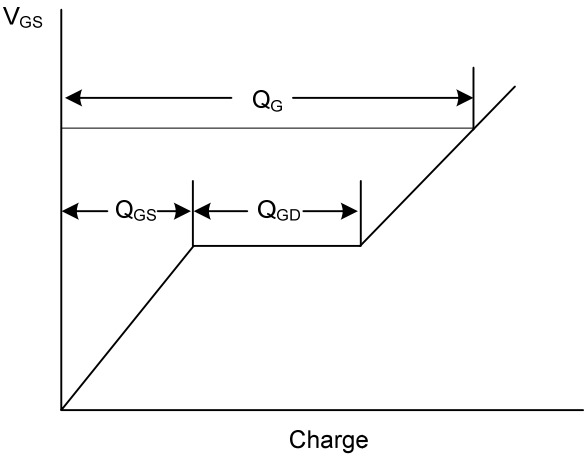
Switching Test Circuit



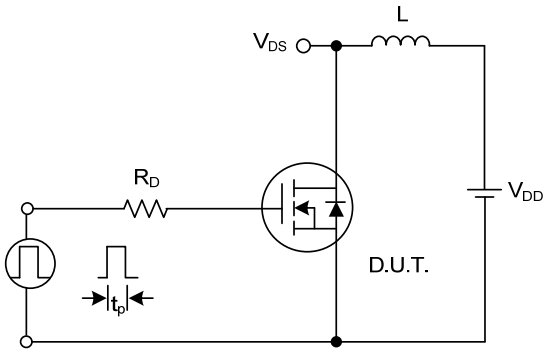
Switching Waveforms



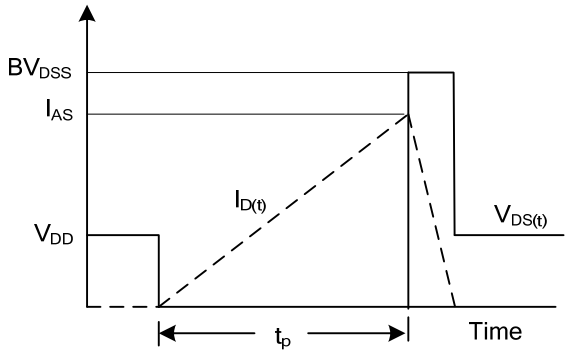
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms