



**UT9P20Z**

Preliminary

*Power MOSFET*

**9.0A, 200V P-CHANNEL  
POWER MOSFET**

■ DESCRIPTION

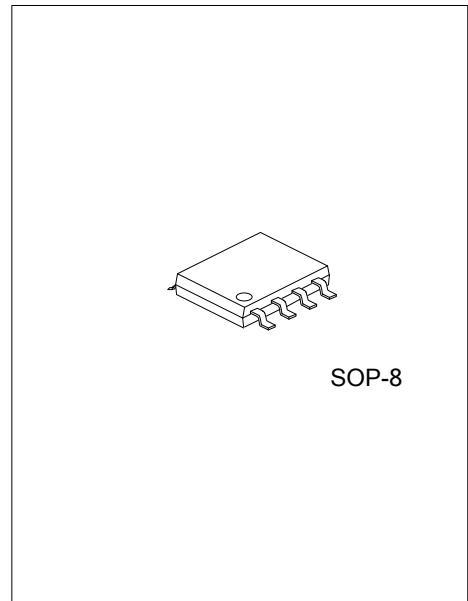
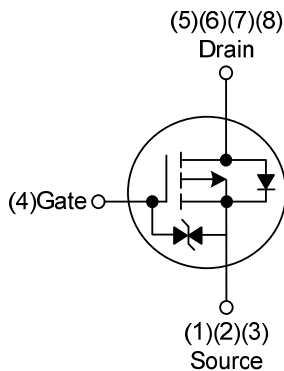
The **UT9P20Z** employs advanced MOSFET technology and features low gate charge while maintaining low on-resistance.

Optimized for switching applications, this device improves the overall efficiency of DC/DC converters and allows operation to higher switching frequencies.

■ FEATURES

- \*  $R_{DS(ON)} \leq 345 \text{ m}\Omega$  @  $V_{GS} = -10V, I_D = -4.5A$
- \* Low Capacitance
- \* Low Gate Charge
- \* With ESD protection

■ SYMBOL



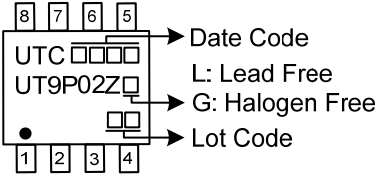
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
UT9P20ZL-S08-R	UT9P20ZG-S08-R	SOP-8	S	S	S	G	D	D	D	D	Tape Reel

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

<p>UT9P20ZG-S08-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) S08: SOP-8</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



■ ABSOLUTE MAXIMUM RATINGS (T<sub>C</sub>=25°C unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V <sub>DSS</sub>	-200	V
Gate-Source Voltage	V <sub>GSS</sub>	±20	V
Continuous Drain Current	DC	-9	A
	Pulse	-18	A
Power Dissipation	P <sub>D</sub>	5.5	W
Junction Temperature	T <sub>J</sub>	+150	°C
Storage Temperature	T <sub>STG</sub>	-55 ~ +150	°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 <sub>JA</sub>	90	°C/W
Junction to Case	θ <sub>JC</sub>	22.72	°C/W

Note: Device mounted on FR-4 substrate P<sub>c</sub> board, 2oz copper, with 1inch square copper plate.

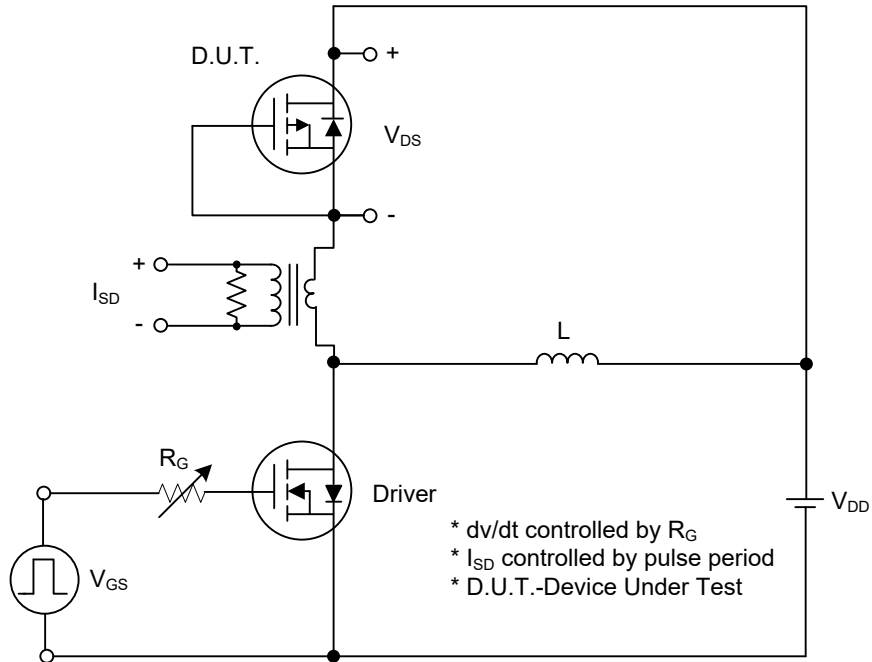
■ ELECTRICAL CHARACTERISTICS (T<sub>J</sub>=25°C unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA	-200			V
Drain-Source Leakage Current	I <sub>DSS</sub>	V <sub>DS</sub> =-200V, V <sub>GS</sub> =0V			-1	μA
Gate-Source Leakage Current	Forward	I <sub>GSS</sub>			10	μA
	Reverse					
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-2.0		-4.0	V
Static Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-4.5A			345	mΩ
<b>DYNAMIC PARAMETERS</b>						
Input Capacitance	C <sub>ISS</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =-10V, f=1.0MHz		2697		pF
Output Capacitance	C <sub>OSS</sub>			130		pF
Reverse Transfer Capacitance	C <sub>RSS</sub>			77		pF
<b>SWITCHING PARAMETERS</b>						
Total Gate Charge (Note 1)	Q <sub>G</sub>	V <sub>DS</sub> =-100V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-9.0A (Note 1, 2)		50		nC
Gate to Source Charge	Q <sub>GS</sub>			12		nC
Gate to Drain Charge	Q <sub>GD</sub>			20		nC
Turn-ON Delay Time	t <sub>D(ON)</sub>	V <sub>DD</sub> =-100V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-9.0A, R <sub>G</sub> =3Ω (Note 1, 2)		35		ns
Rise Time	t <sub>R</sub>			44		ns
Turn-OFF Delay Time	t <sub>D(OFF)</sub>			108		ns
Fall-Time	t <sub>F</sub>			92		ns
<b>SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS</b>						
Maximum Body-Diode Continuous Current	I <sub>S</sub>				-9	A
Diode Forward Voltage	V <sub>SD</sub>	I <sub>F</sub> =-9.0A, V <sub>GS</sub> =0V			-1.4	V
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>S</sub> =-9A, V <sub>GS</sub> =0V,		100		ns
Reverse Recovery Charge	Q <sub>rr</sub>	di <sub>F</sub> /dt=100A/μs (Note 1)		378		nC

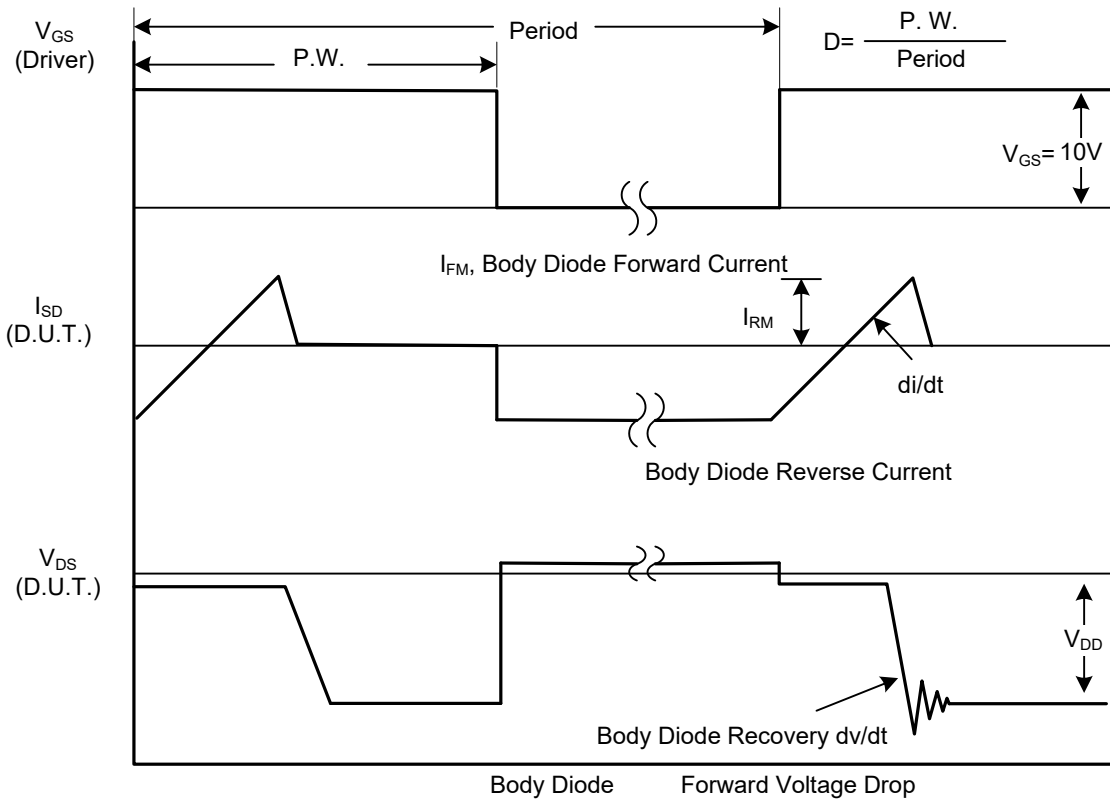
Notes: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

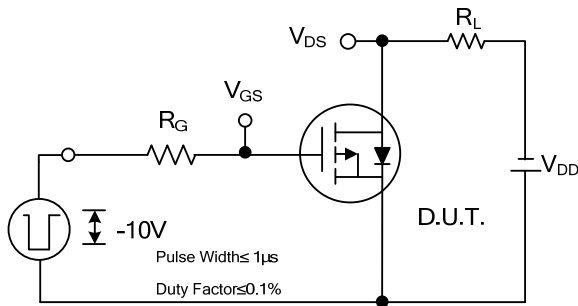


Peak Diode Recovery dv/dt Test Circuit

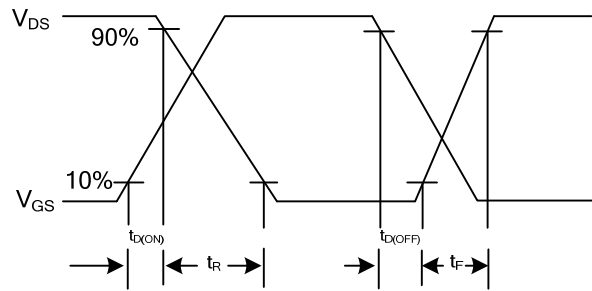


Peak Diode Recovery dv/dt Waveforms

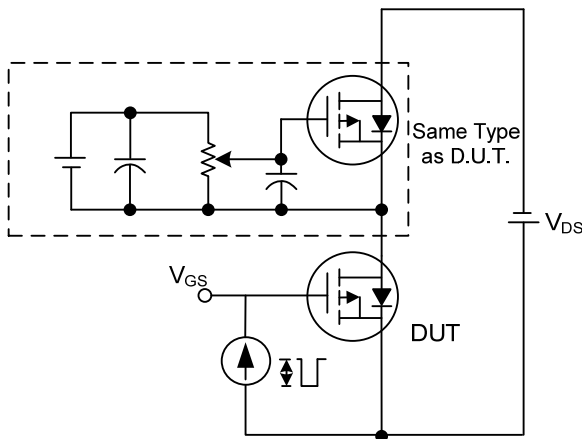
■ TEST CIRCUITS AND WAVEFORMS



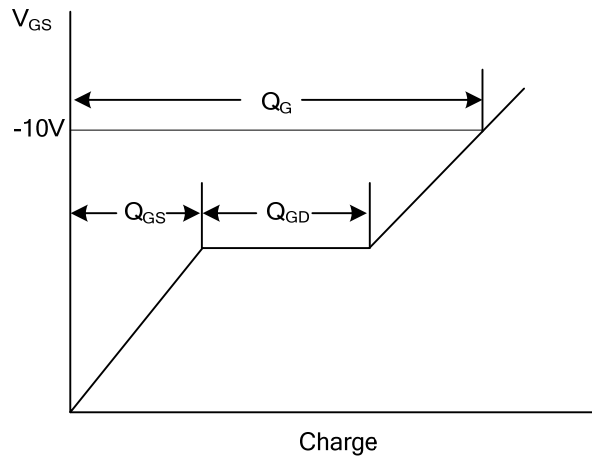
Switching Test Circuit



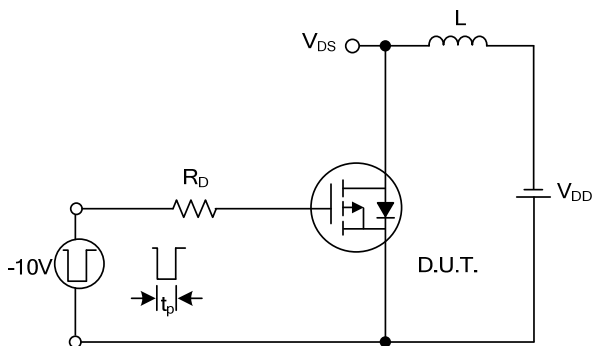
Switching Waveforms



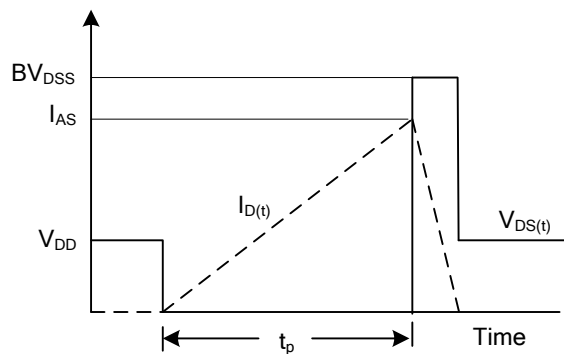
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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