



7P20

Preliminary

Power MOSFET

200V P-CHANNEL MOSFET

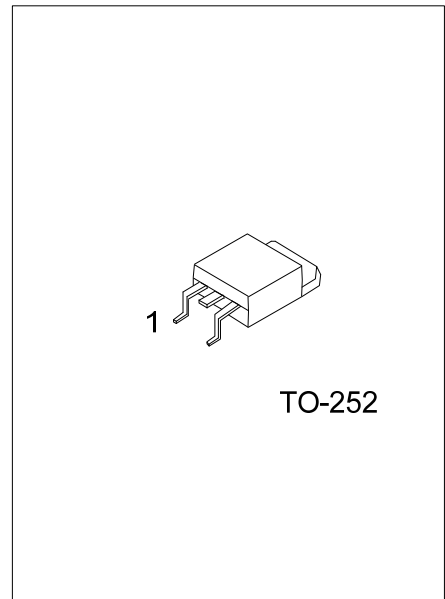
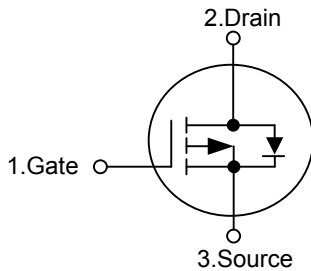
■ DESCRIPTION

The **7P20** uses advanced proprietary, planar stripe, DMOS 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. They are also well suited for high efficiency switching DC/DC converters.

■ FEATURES

- * $R_{DS(ON)} \cong 0.69\Omega @ V_{GS} = -10 V$
- * Ultra low gate charge (typical 19 nC)
- * Low reverse transfer capacitance ($C_{RSS} =$ typical 25 pF)
- * Fast switching capability
- * Avalanche energy specified
- * Improved dv/dt capability, high ruggedness

■ SYMBOL



Lead-free: 7P20L
Halogen-free: 7P20G

■ ORDERING INFORMATION

Ordering Number			Package	Pin Assignment			Packing
Normal	Lead Free	Halogen Free		1	2	3	
7P20-TN3-R	7P20L-TN3-R	7P20G-TN3-R	TO-252	G	D	S	Tape Reel

<p>7P20L-TN3-R</p> <p>├── (1)Packing Type</p> <p>├── (2)Package Type</p> <p>└── (3)Lead Plating</p>	<p>(1) R: Tape Reel</p> <p>(2) TN3: TO-252</p> <p>(3) G: Halogen Free, L: Lead Free, Blank: Pb/Sn</p>
---	---

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

PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V_{DSS}	-200	V
Gate-Source Voltage	V_{GSS}	± 30	V
Continuous Drain Current	I_D	-5.7	A
Pulsed Drain Current (Note 2)	I_{DM}	-22.8	A
Avalanche Current (Note 2)	I_{AR}	-5.7	A
Single Pulsed Avalanche Energy (Note 3)	E_{AS}	570	mJ
Repetitive Avalanche Energy (Note 2)	E_{AR}	5.5	mJ
Peak Diode Recovery dv/dt (Note 4)	dv/dt	-5.5	V/ns
Power Dissipation	$T_a = 25^\circ\text{C}$	2.5	W
	$T_C = 25^\circ\text{C}$	55	
Junction Temperature	T_J	+150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 ~ +150	$^\circ\text{C}$

Note: 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. Pulse width limited by $T_{J(MAX)}$

3. $L=26.3\text{mH}$, $I_{AS}=-5.7\text{A}$, $V_{DD}=-50\text{V}$, $R_G=25\Omega$

4. $I_{SD} \leq -7.3\text{A}$, $di/dt \leq 300\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$

■ THERMAL DATA

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Junction-to-Ambient	θ_{JA}			110	$^\circ\text{C}/\text{W}$
Junction-to-Case	θ_{JC}			2.27	$^\circ\text{C}/\text{W}$

■ ELECTRICAL CHARACTERISTICS ($T_C=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0\text{V}$, $I_D=-250\mu\text{A}$	-200			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	$I_D=-250\mu\text{A}$, Referenced to 25°C		-0.1		$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=-200\text{V}$, $V_{GS}=0\text{V}$			-1	μA
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0\text{V}$, $V_{GS}=\pm 30\text{V}$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$	-3.0		-5.0	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=-10\text{V}$, $I_D=-2.85\text{A}$		0.54	0.69	Ω
Forward Transconductance	g_{FS}	$V_{DS}=-40\text{V}$, $I_D=-2.85\text{A}$ (Note 1)		3.7		S
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{DS}=-25\text{V}$, $V_{GS}=0\text{V}$, $f=1.0\text{MHz}$		590	770	pF
Output Capacitance	C_{OSS}			140	180	pF
Reverse Transfer Capacitance	C_{RSS}			25	35	pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{DS}=-160\text{V}$, $V_{GS}=-10\text{V}$, $I_D=-7.3\text{A}$ (Note 1, 2)		19	25	nC
Gate Source Charge	Q_{GS}			4.6		nC
Gate Drain Charge	Q_{GD}			9.5		nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=-100\text{V}$, $I_D=-7.3\text{A}$, $R_G=25\Omega$ (Note 1, 2)		15	40	ns
Turn-ON Rise Time	t_R			110	230	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			30	70	ns
Turn-OFF Fall-Time	t_F			42	90	ns

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Diode Forward Voltage	V_{SD}	$I_S = -5.7A, V_{GS} = 0V$			-5.0	V
Maximum Body-Diode Continuous Current	I_S				-5.7	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				-22.8	A
Body Diode Reverse Recovery Time	t_{RR}	$V_{GS} = 0V, I_S = -7.30 A$		180		ns
Body Diode Reverse Recovery Charge	Q_{RR}	$dI_F/dt = 100A/s$ (Note 1)		1.07		μC

Note: 1. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$

2. Essentially independent of operating temperature

■ TEST CIRCUITS AND WAVEFORMS

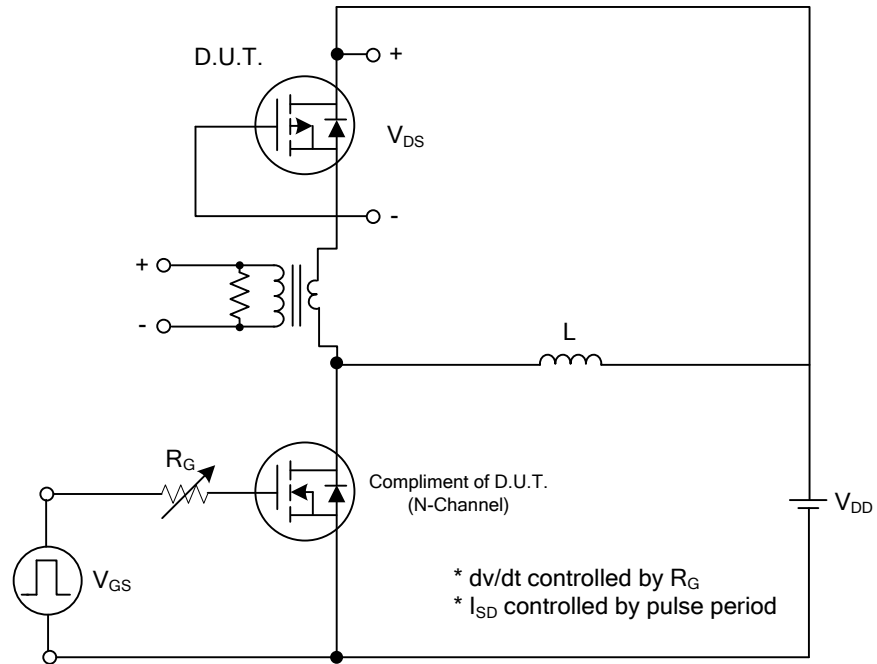


Fig. 1A Peak Diode Recovery dv/dt Test Circuit

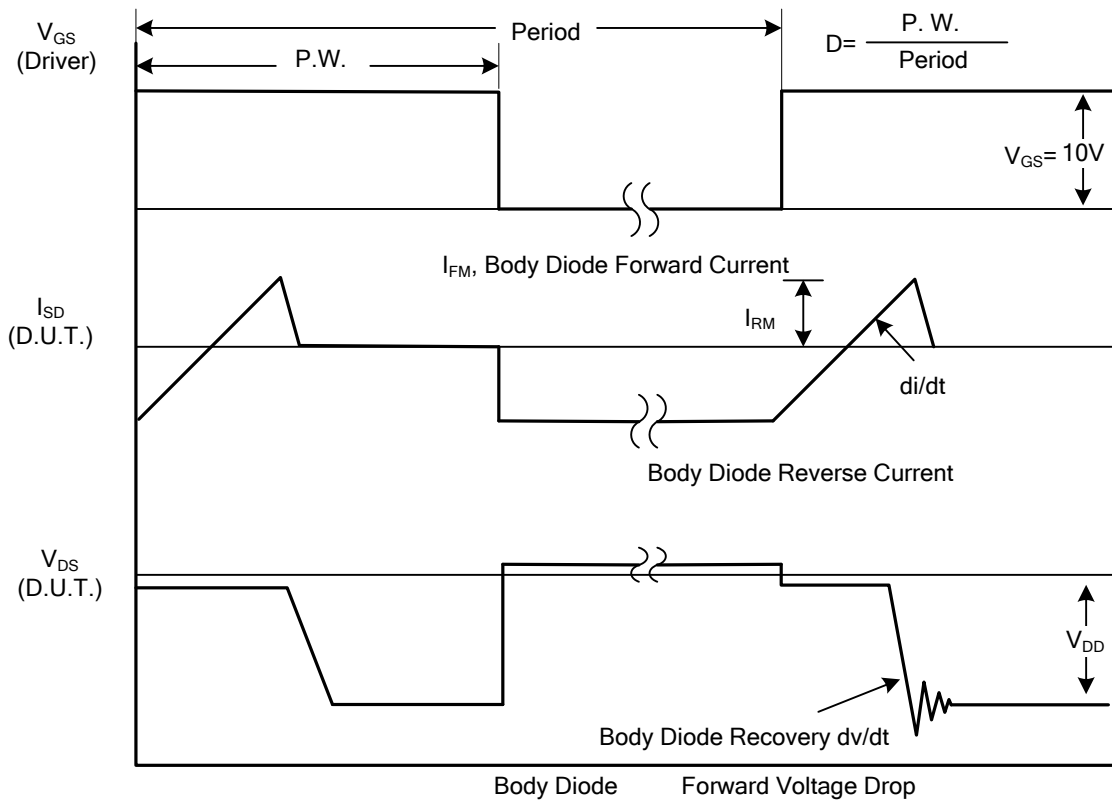


Fig. 1B Peak Diode Recovery dv/dt Waveforms

■ TEST CIRCUITS AND WAVEFORMS (Cont.)

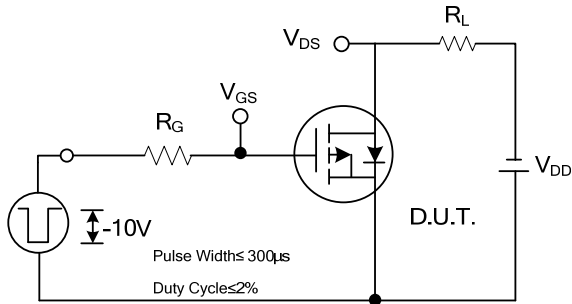


Fig. 2A Switching Test Circuit

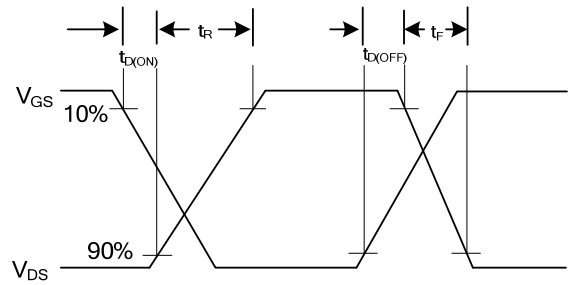


Fig. 2B Switching Waveforms

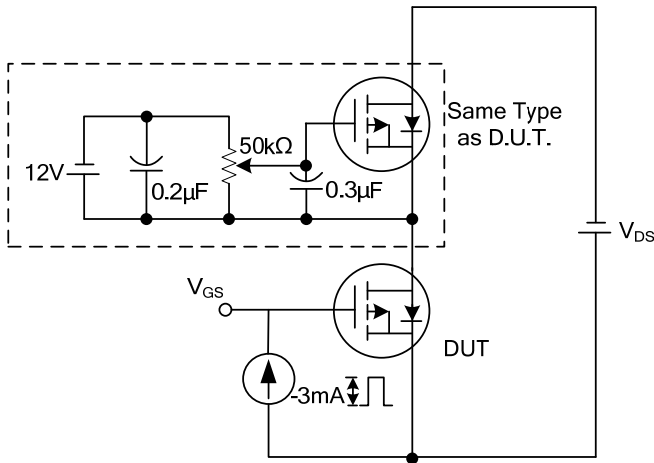


Fig. 3A Gate Charge Test Circuit

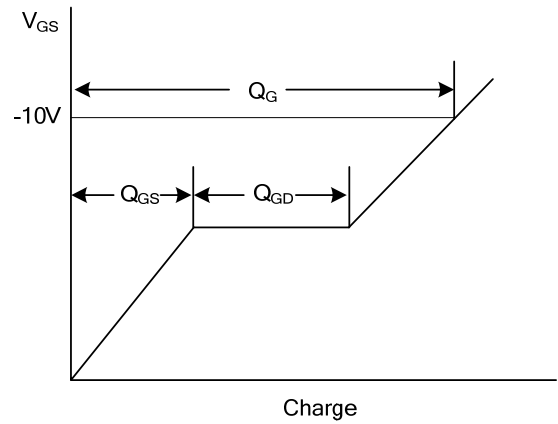


Fig. 3B Gate Charge Waveform

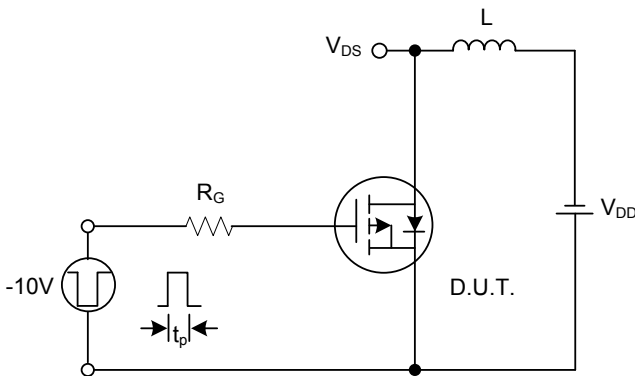


Fig. 4A Unclamped Inductive Switching Test Circuit

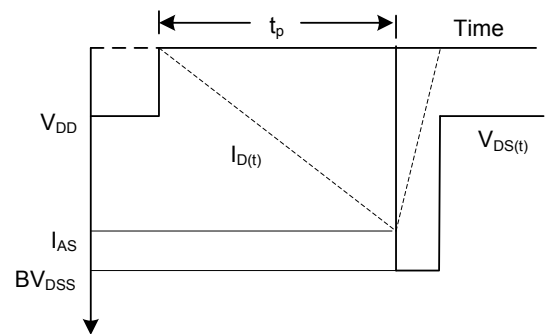


Fig. 4B Unclamped Inductive Switching Waveforms

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.