



UFR9120

Preliminary

Power MOSFET

P CHANNEL POWER MOSFET

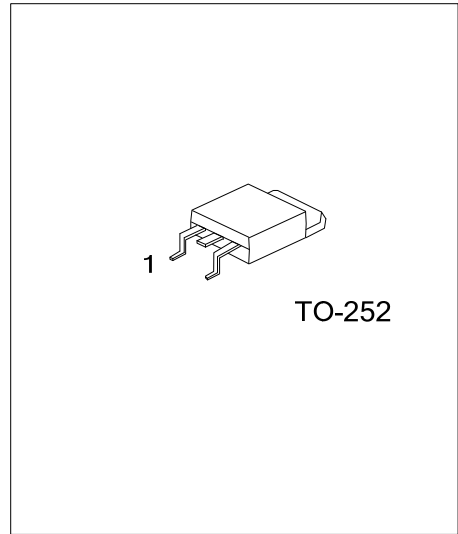
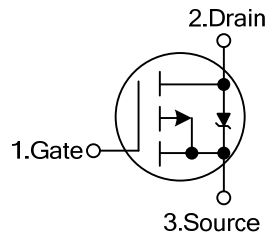
DESCRIPTION

The UTC **UFR9120** is a P-channel power MOSFET using UTC's advanced processing technology to provide customers a minimum on-state resistance and high switching speed

FEATURES

- * Fully Avalanche Rated
- * High Switching Speed
- * extremely Low On-Resistance
- * Surface Mount

SYMBOL



ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UFR9120L-TN3-R	UFR9120G-TN3-R	TO-252	G	D	S	Tape Reel
UFR9120L-TN3-T	UFR9120G-TN3-T	TO-252	G	D	S	Tube

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

<p>UFR9120L-TN3-R</p>	<p>(1) R: Tape Reel, T: Tube</p> <p>(2) TN3: TO-252</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_{DSS}	-100	V	
Gate-Source Voltage		V_{GSS}	± 20	V	
Drain Current, $V_{GS}@-10\text{V}$	Continuous	I_D	$T_C=25^\circ\text{C}$	-6.6	A
			$T_C=100^\circ\text{C}$	-4.2	A
	Pulsed (Note 2)		I_{DM}	-26	A
Avalanche Current (Note 2)		I_{AR}	-6.6	A	
Avalanche Energy	Single Pulsed (Note 3)	E_{AS}	100	mJ	
	Repetitive (Note 2)	E_{AR}	4.0	mJ	
Peak Diode Recovery dv/dt (Note 4)		dv/dt	-5.0	V/ns	
Power Dissipation $T_C=25^\circ\text{C}$		P_D	40	W	
Linear Derating Factor			0.32	W/ $^\circ\text{C}$	
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. Repetitive Rating; pulse width limited by max. junction temperature.(See Fig.11)
3. Starting $T_J=25^\circ\text{C}$, $L=13\text{mH}$ $R_G=25\Omega$, $I_{AS}=-3.9\text{A}$ (See Fig.12)
4. $I_{SD} \leq -4.0\text{A}$, $di/dt \leq 300\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 25^\circ\text{C}$

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	110	$^\circ\text{C}/\text{W}$
Junction to Case	θ_{JC}	3.1	$^\circ\text{C}/\text{W}$

Note: 1. For recommended footprint and soldering techniques refer to application note

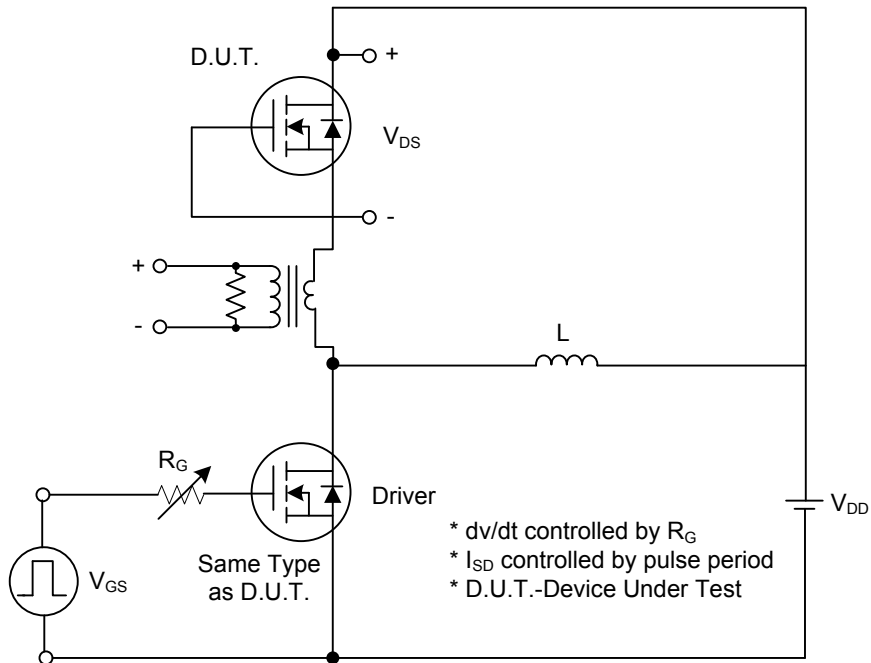
■ ELECTRICAL CHARACTERISTICS ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	-100			V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , $I_D=-1\text{mA}$		-0.11		$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=-100\text{V}$, $V_{GS}=0\text{V}$			-25	μA
		$V_{DS}=-80\text{V}$, $V_{GS}=0\text{V}$, $T_J=150^\circ\text{C}$			-250	
Gate- Source Leakage Current	Forward	I_{GSS}				
	Reverse					
		$V_{GS}=+20\text{V}$			+100	nA
		$V_{GS}=-20\text{V}$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$	-2.0		-4.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10\text{V}$, $I_D=-3.9\text{A}$			0.48	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0\text{V}$, $V_{DS}=-25\text{V}$, $f=1.0\text{MHz}$		350		pF
Output Capacitance	C_{OSS}			110		pF
Reverse Transfer Capacitance	C_{RSS}			70		pF
SWITCHING PARAMETERS						
Total Gate Charge	Q_G	$V_{GS}=-10\text{V}$, $V_{DS}=-80\text{V}$, $I_D=-4.0\text{A}$ (Note 1, 2)			27	nC
Gate to Source Charge	Q_{GS}				5.0	nC
Gate to Drain Charge	Q_{GD}				15	nC
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=-50\text{V}$, $I_D=-4.0\text{A}$, $R_G=12\Omega$, $R_D=12\Omega$ (Note 1, 2)		14		ns
Rise Time	t_R			47		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			28		ns
Fall-Time	t_F			31		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S	MOSFET symbol showing the integral reverse p-n junction diode			-6.6	A
Maximum Body-Diode Pulsed Current (Note 1)	I_{SM}				-26	A
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=-3.9\text{A}$, $V_{GS}=0\text{V}$, $T_J=25^\circ\text{C}$			-2.0	V
Body Diode Reverse Recovery Time	t_{RR}	$I_F=-4.0\text{A}$, $V_{GS}=0\text{V}$, $di/dt=100\text{A}/\mu\text{s}$,		100	150	ns
Body Diode Reverse Recovery Charge	Q_{RR}	$T_J=25^\circ\text{C}$ (Note 1)		420	630	nC

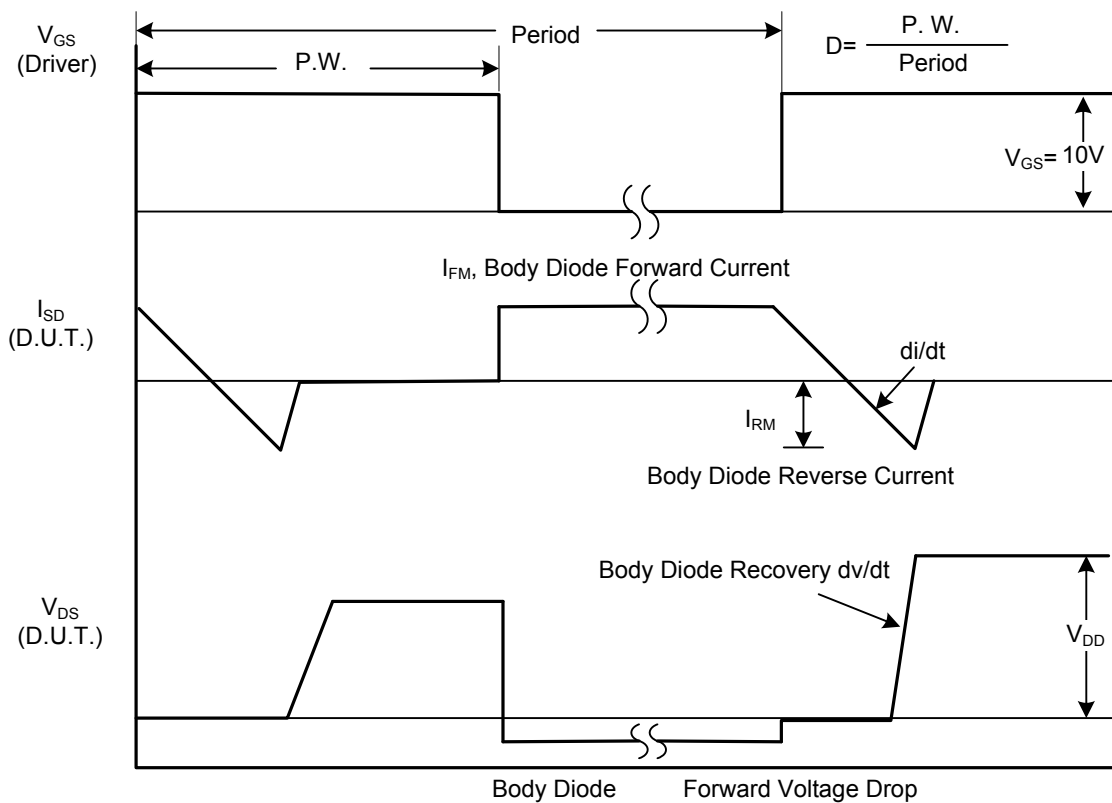
Notes: 1. Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

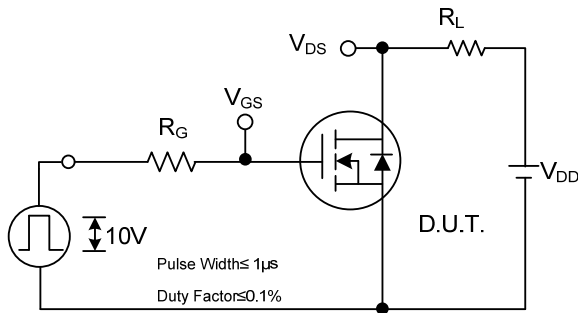


Peak Diode Recovery dv/dt Test Circuit

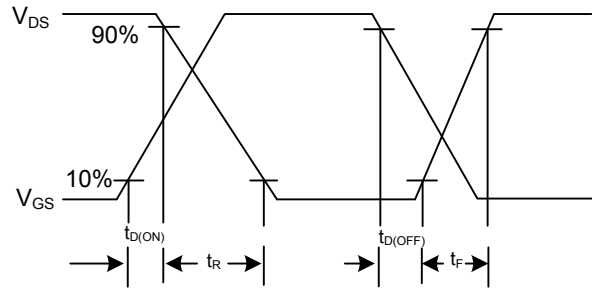


Peak Diode Recovery dv/dt Waveforms

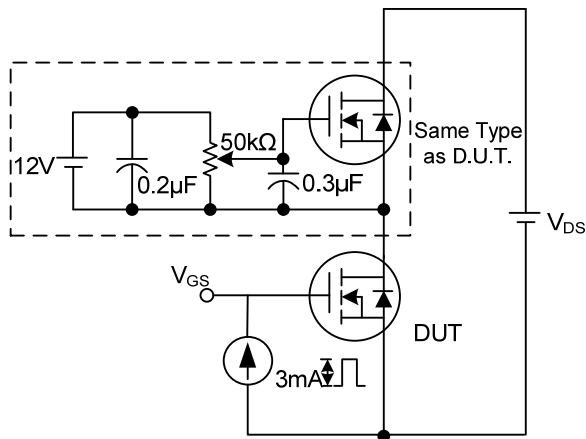
■ TEST CIRCUITS AND WAVEFORMS(Cont.)



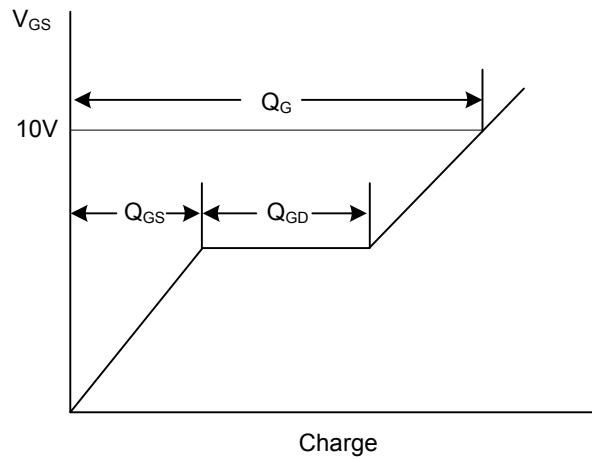
Switching Test Circuit



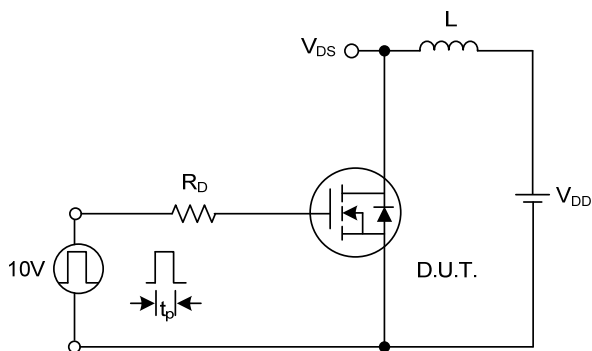
Switching Waveforms



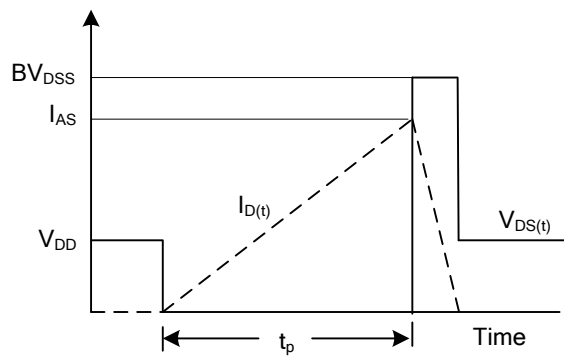
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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